



## Analog and Interface Product Selector Guide

*Thermal Management • Motor Driver • Interface Peripherals  
Power Management • Linear and Mixed Signal • Safety and Security*



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**Note:** New products to this edition are reflected in bold.

# Are You Looking for Complete Analog and Interface Design Solutions?

Microchip's integrated analog technology, peripherals and features are engineered to meet today's demanding design requirements. Our broad spectrum of analog products addresses thermal management, power management, battery management, mixed-signal, linear, interface and safety solutions. Combined with Microchip's Intelligent Analog microcontrollers, our extensive analog portfolio can be used in thousands of high-performance design applications in the automotive, communications (wireless), consumer, computing and industrial control markets.

Our broad portfolio of stand-alone analog and interface devices offers highly integrated solutions that combine various analog functions in space-saving packages and support a variety of bus interfaces. Many of these devices support functionality that enhances the analog features currently available on PIC® microcontrollers.

## Want a Business Partner, Not Just a Vendor?

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Microchip Technology provides low-risk product development, lower total system cost and faster time to market to more than 80,000 of these successful companies worldwide. Headquartered in Chandler, Arizona, Microchip offers outstanding technical support along with dependable delivery and quality.

Founded in 1989, Microchip's business model is based on a series of guiding values that aim to establish successful customer partnerships by exceeding expectations for products, services and attitude. Continuous improvement, technology innovation and the pursuit of the highest quality possible drive Microchip's company culture.

The result is a worldwide organization dedicated to delivering whole product solutions which include high-performance silicon devices, easy-to-use development tools, outstanding technical support and sophisticated technical documentation.

## Are Quality and Delivery a Concern?

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## Microchip Technology's Stand-Alone Analog and Interface Portfolio

| Thermal Management                                                                                                       | Power Management                                                                                                                                                                                                                                                                                                                                                                                           | Linear                                                                                                                                                                                                | Mixed-Signal                                                                                                                                                                                                                   | Interface                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Temperature Sensors</li> <li>Fan Speed Controllers/Fan Fault Detectors</li> </ul> | <ul style="list-style-type: none"> <li>Voltage Regulators</li> <li>Charge Pump DC/DC Converters</li> <li>Power MOSFET Drivers</li> <li>Digitally Enhanced and PWM Controllers</li> <li>System Supervisors</li> <li>Voltage Detectors</li> <li>Voltage References</li> <li>Li-Ion/Li-Polymer Battery Chargers</li> <li>MOSFETs</li> <li>High-Voltage Drivers</li> <li>USB Port Power Controllers</li> </ul> | <ul style="list-style-type: none"> <li>Op Amps</li> <li>Instrumentation Amps</li> <li>Programmable Gain Amplifiers</li> <li>Comparators</li> </ul>                                                    | <ul style="list-style-type: none"> <li>A/D Converter Families</li> <li>Digital Potentiometers</li> <li>D/A Converters</li> <li>V/F and F/V Converters</li> <li>Energy Measurement ICs</li> <li>Current/DC Power ICs</li> </ul> | <ul style="list-style-type: none"> <li>CAN Transceivers/Controllers</li> <li>LIN Transceivers</li> <li>Wireless Products</li> <li>Serial Peripherals</li> <li>Ethernet ICs</li> <li>USB ICs</li> <li>Real-Time Clock/Calendars</li> </ul> |
| Motor Drive                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                            | Safety and Security                                                                                                                                                                                   |                                                                                                                                                                                                                                |                                                                                                                                                                                                                                           |
| <ul style="list-style-type: none"> <li>Stepper and DC</li> <li>3Φ Brushless DC Motor Driver</li> </ul>                   |                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>Photoelectric Smoke Detectors</li> <li>Ionization Smoke Detectors</li> <li>Ionization Smoke Detector Front Ends</li> <li>Piezoelectric Horn Drivers</li> </ul> |                                                                                                                                                                                                                                |                                                                                                                                                                                                                                           |

Direct control over manufacturing resources allows shortened design and production cycles. By owning the wafer fabrication facilities and the majority of the test and assembly operations, and by employing proprietary statistical process control techniques, Microchip has been able to achieve and maintain high production yields.

## Need Additional Support and Resources?

Microchip is committed to supporting its customers by helping design engineers develop products faster and more efficiently. You can access three main service areas at [www.microchip.com](http://www.microchip.com). The Support area provides a fast way to get questions answered. The Sample area offers evaluation samples of any Microchip device. microchipDIRECT provides 24-hour pricing, ordering, inventory and credit for convenient purchasing of all Microchip devices and development tools. This site also features online programming capabilities. Finally, the Training area offers opportunities to expand your knowledge with Microchip's online web seminars and hands-on courses at our worldwide Technical Training Centers. Our seminars and training classes are designed to fit your schedule and offer an overview of many product, development tool and application topics. Visit [www.microchip.com/training](http://www.microchip.com/training) for class content and schedules.

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## THERMAL MANAGEMENT

### THERMAL MANAGEMENT PRODUCTS: Temperature Sensors

| Part #                                    | Typical Accuracy (°C) | Maximum Accuracy @ 25°C (°C) | Maximum Temperature Range (°C) | Vcc Range (V) | Maximum Supply Current (µA) | Features                                                                                                                                                           | Packages                                       |
|-------------------------------------------|-----------------------|------------------------------|--------------------------------|---------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| <b>Logic Output Temperature Sensors</b>   |                       |                              |                                |               |                             |                                                                                                                                                                    |                                                |
| TC6501                                    | ±0.5                  | ±3                           | –55 to +125                    | +2.7 to +5.5  | 40                          | Cross to MAX6501, open-drain                                                                                                                                       | 5-pin SOT-23A                                  |
| TC6502                                    | ±0.5                  | ±3                           | –55 to +125                    | +2.7 to +5.5  | 40                          | Cross to MAX6502, push-pull                                                                                                                                        | 5-pin SOT-23A                                  |
| TC6503                                    | ±0.5                  | ±3                           | –55 to +125                    | +2.7 to +5.5  | 40                          | Cross to MAX6503, open-drain                                                                                                                                       | 5-pin SOT-23A                                  |
| TC6504                                    | ±0.5                  | ±3                           | –55 to +125                    | +2.7 to +5.5  | 40                          | Cross to MAX6504, push-pull                                                                                                                                        | 5-pin SOT-23A                                  |
| TC620                                     | ±1                    | ±3                           | –40 to +125                    | +4.5 to +18   | 400                         | Two resistor-programmable trip points                                                                                                                              | 8-pin PDIP, 8-pin SOIC                         |
| TC621                                     | Note 1                | Note 1                       | –40 to +85                     | +4.5 to +18   | 400                         | Requires external thermistor, resistor-programmable trip points                                                                                                    | 8-pin PDIP, 8-pin SOIC                         |
| TC622                                     | ±1                    | ±5                           | –40 to +125                    | +4.5 to +18   | 600                         | Dual output, T0-220 for heat sink mounting, resistor-programmable trip points                                                                                      | 8-pin PDIP, 8-pin SOIC, 5-pin T0-220           |
| TC623                                     | ±1                    | ±3                           | –40 to +125                    | +2.7 to +4.5  | 250                         | Two resistor-programmable trip points                                                                                                                              | 8-pin PDIP, 8-pin SOIC                         |
| TC624                                     | ±1                    | ±5                           | –40 to +125                    | +2.7 to +4.5  | 300                         | Dual output, resistor-programmable trip points                                                                                                                     | 8-pin PDIP, 8-pin SOIC                         |
| MCP9501                                   | ±1                    | ±4                           | –40 to +125                    | +2.7 to +5.5  | 40                          | Active-High, Push-Pull Output, Rising Temperature Switch                                                                                                           | 5-pin SOT-23                                   |
| MCP9502                                   | ±1                    | ±4                           | –40 to +125                    | +2.7 to +5.5  | 40                          | Active-Low, Open Drain Output, Rising Temperature Switch                                                                                                           | 5-pin SOT-23                                   |
| MCP9503                                   | ±1                    | ±4                           | –40 to +125                    | +2.7 to +5.5  | 40                          | Active-High, Push-Pull Output, Falling Temperature Switch                                                                                                          | 5-pin SOT-23                                   |
| MCP9504                                   | ±1                    | ±4                           | –40 to +125                    | +2.7 to +5.5  | 40                          | Active-Low, Open Drain Output, Falling Temperature Switch                                                                                                          | 5-pin SOT-23                                   |
| MCP9509                                   | ±0.5                  | NS                           | –40 to +125                    | +2.7 to +5.5  | 50                          | Resistor-programmable temperature switch                                                                                                                           | 5-pin SOT-23                                   |
| MCP9510                                   | ±0.5                  | NS                           | –40 to +125                    | +2.7 to +5.5  | 80                          | Resistor-programmable temperature switch                                                                                                                           | 6-pin SOT-23                                   |
| <b>Voltage Output Temperature Sensors</b> |                       |                              |                                |               |                             |                                                                                                                                                                    |                                                |
| MCP9700                                   | ±1                    | ±4                           | –40 to +125                    | +2.3 to +5.5  | 12                          | Linear Active Thermistor® IC, Temperature slope: 10 mV/°C                                                                                                          | 3-pin T0-92, 5-pin SC-70, 3-pin SOT-23         |
| MCP9701                                   | ±1                    | ±4                           | –40 to +125                    | +3.1 to +5.5  | 12                          | Linear Active Thermistor IC, Temperature slope: 19.53 mV/°C, cross to MAX6612                                                                                      | 3-pin T0-92, 5-pin SC-70, 3-pin SOT-23         |
| MCP9700A                                  | ±1                    | ±2                           | –40 to +125                    | +2.3 to +5.5  | 12                          | Linear Active Thermistor IC, Temperature slope: 10 mV/°C                                                                                                           | 3-pin T0-92, 5-pin SC-70, 3-pin SOT-23         |
| MCP9701A                                  | ±1                    | ±2                           | –40 to +125                    | +3.1 to +5.5  | 12                          | Linear Active Thermistor IC, Temperature slope: 19.53 mV/°C, cross to MAX6612                                                                                      | 3-pin T0-92, 5-pin SC-70, 3-pin SOT-23         |
| TC1046                                    | ±0.5                  | ±2                           | –40 to +125                    | +2.7 to +4.4  | 60                          | High precision temperature-to-voltage converter, 6.25 mV/°C                                                                                                        | 3-pin SOT-23B                                  |
| TC1047                                    | ±0.5                  | ±2                           | –40 to +125                    | +2.7 to +4.4  | 60                          | High precision temperature-to-voltage converter, 10 mV/°C                                                                                                          | 3-pin SOT-23B                                  |
| TC1047A                                   | ±0.5                  | ±2                           | –40 to +125                    | +2.5 to +5.5  | 60                          | High precision temperature-to-voltage converter, 10 mV/°C                                                                                                          | 3-pin SOT-23B                                  |
| <b>Serial Output Temperature Sensors</b>  |                       |                              |                                |               |                             |                                                                                                                                                                    |                                                |
| MCP9800                                   | ±0.5                  | ±1                           | –55 to +125                    | +2.7 to +5.5  | 400                         | SMbus/I <sup>2</sup> C™ compatible interface, 0.0625°C to 0.5°C adj. resolution, Power-saving one-shot temperature measurement                                     | 5-pin SOT-23                                   |
| MCP9801                                   | ±0.5                  | ±1                           | –55 to +125                    | +2.7 to +5.5  | 400                         | SMbus/I <sup>2</sup> C compatible interface, 0.0625°C to 0.5°C adj. resolution, Power-saving one-shot temperature measurement, multi-drop capability               | 8-pin MSOP, 8-pin SOIC                         |
| MCP9802                                   | ±0.5                  | ±1                           | –55 to +125                    | +2.7 to +5.5  | 400                         | SMbus/I <sup>2</sup> C compatible interface with time out, 0.0625°C to 0.5°C adj. resolution, Power-saving one-shot temperature measurement                        | 5-pin SOT-23                                   |
| MCP9803                                   | ±0.5                  | ±1                           | –55 to +125                    | +2.7 to +5.5  | 400                         | SMbus/I <sup>2</sup> C compatible interface with time out, 0.0625°C to 0.5°C adj. resolution, Power-saving one-shot temperature measurement, Multi-drop capability | 8-pin MSOP, 8-pin SOIC                         |
| MCP9804                                   | ±0.25                 | ±1                           | –40 to +125                    | +2.7 to +5.5  | 400                         | User programmable temperature limits with alert output, 1°C temp. accuracy from –40°C to +125°C                                                                    | 8-pin MSOP, 8-pin 2 × 3 DFN                    |
| MCP9805                                   | ±0.5                  | ±1 <sup>(2)</sup>            | –20 to +125                    | +3.0 to +3.6  | 400                         | JEDEC-compatible register set, SMbus/I <sup>2</sup> C compatible interface, Programmable, Shut-down modes and EVENT output                                         | 8-pin TSSOP, 8-pin 2 × 3 DFN                   |
| MCP9808                                   | ±0.25                 | ±0.5                         | –40 to +125                    | +2.7 to +5.5  | 400                         | 0.5°C temperature accuracy from –10°C to +100°C                                                                                                                    | 8-pin 2 × 3 DFN, 8-pin MSOP                    |
| MCP9843                                   | ±0.5                  | ±1 <sup>(2)</sup>            | –20 to +125                    | +3.0 to +3.6  | 500                         | Compliant to JEDEC TS2002 specification                                                                                                                            | 8-pin TSSOP, 8-pin 2 × 3 DFN, 8-pin 2 × 3 TDFN |
| MCP98242                                  | ±0.5                  | ±1 <sup>(2)</sup>            | –20 to +125                    | +3.0 to +3.6  | 400                         | Same temperature sensor as MCP9805 plus integrated DDR2 Serial Presence Detect EEPROM                                                                              | 8-pin TSSOP, 8-pin 2 × 3 DFN                   |
| MCP98243                                  | ±1                    | ±3                           | –40 to +125                    | +3.0 to +3.6  | 500                         | Serial output temperature sensor with integrated EEPROM                                                                                                            | 8-pin TSSOP, 8-pin 2 × 3 DFN, 8-pin 2 × 3 TDFN |
| MCP98244                                  | ±0.5                  | ±3                           | –40 to +125                    | +1.7 to +3.6  | 500                         | Serial output temperature sensor with integrated EEPROM (TES2004)                                                                                                  | 8-pin TSSOP, 8-pin 2 × 3 DFN, 8-pin 2 × 3 TDFN |
| MCP9844                                   | ±0.5                  | ±3                           | –40 to +125                    | +1.7 to +1.9  | 500                         | Serial output temperature sensor with integrated EEPROM (TES2004)                                                                                                  | 8-pin TSSOP, 8-pin 2 × 3 DFN, 8-pin 2 × 3 TDFN |
| TC77                                      | ±0.5                  | ±1                           | –55 to +125                    | +2.7 to +5.5  | 400                         | SPI-compatible interface, 0.0625°C temperature resolution                                                                                                          | 5-pin SOT-23A, 8-pin SOIC                      |
| TC72                                      | ±0.5                  | ±1                           | –55 to +125                    | +2.65 to +5.5 | 400                         | SPI-compatible interface, Power-saving one-shot temperature measurement, 0.25°C temperature resolution                                                             | 8-pin MSOP, 8-pin 3 × 3 DFN                    |

**Note 1:** These devices use an external temperature sensor. Accuracy of the total solution is a function of the accuracy of the external sensor.

**2:** Maximum accuracy measured at 85°C.

## Serial Output Temperature Sensors (Continued)

| Part #  | Typical Accuracy (°C) | Maximum Accuracy @ 25°C (°C) | Maximum Temperature Range (°C) | Vcc Range (V) | Maximum Supply Current (µA) | Features                                                                                                                                                               | Packages                    |
|---------|-----------------------|------------------------------|--------------------------------|---------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| TC74    | ±0.5                  | ±2                           | –40 to +125                    | +2.7 to +5.5  | 350                         | SMBus/I <sup>2</sup> C™-compatible interface, 1°C temperature resolution                                                                                               | 5-pin SOT-23A, 5-pin TO-220 |
| TCN75A  | ±0.5                  | ±2                           | –40 to +125                    | +2.7 to +5.5  | 500                         | SMBus/I <sup>2</sup> C-compatible interface, power-saving one-shot temperature measurement, multi-drop capability, 0.0625°C to 0.5°C adjustable temperature resolution | 8-pin MSOP, 8-pin SOIC      |
| TCN75   | ±0.5                  | ±2                           | –55 to +125                    | +2.7 to +5.5  | 1,000 <sup>(3)</sup>        | SMBus/I <sup>2</sup> C-compatible interface, multi-drop capability, interrupt output, 0.5°C temperature resolution                                                     | 8-pin MSOP, 8-pin SOIC      |
| EMC1001 | ±0.5                  | ±1.5                         | –25 to +125                    | 3.0–3.6       | 50                          | 1.5°C SMBus/I <sup>2</sup> C ambient with two alerts                                                                                                                   | 6-pin SOT                   |

## Serial Output Temperature Sensors with Remote Diode Monitors

| Part #         | # of Remote Temp. Sensors | Typical Accuracy (°C) | Maximum Accuracy @ 25°C (°C) | Maximum Temperature Range (°C) | Ambient Temp. Sensor | Alert/ THERM | Hardware Shutdown | Vcc Range (V)  | Typical Supply Current (µA) | Description and Additional Features                                                                                                                             | Packages                |
|----------------|---------------------------|-----------------------|------------------------------|--------------------------------|----------------------|--------------|-------------------|----------------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| <b>MCP9902</b> | <b>1</b>                  | <b>±0.25</b>          | <b>±1.0</b>                  | <b>–40 to +125</b>             | <b>1</b>             | <b>1</b>     | –                 | <b>3.0–3.6</b> | <b>200</b>                  | <b>Dual Channel Low-Temperature SMBus/I<sup>2</sup>C™ Temperature Sensor with Resistance Error Correction, Beta Compensation</b>                                | <b>8-pin WDFN</b>       |
| EMC1033        | 2                         | ±1.0                  | ±3                           | –40 to +125                    | 1                    | 2            | –                 | 3.0–3.6        | 50                          | Triple SMBus/I <sup>2</sup> C Sensor with Resistance Error Correction                                                                                           | 8-pin MSOP              |
| EMC1043        | 2                         | ±0.5                  | ±1.0                         | –40 to +125                    | 1                    | –            | –                 | 3.0–3.6        | 105                         | Triple SMBus/I <sup>2</sup> C Sensor with Resistance Error Correction, Beta Compensation and Hotter of Two Zones                                                | 8-pin MSOP              |
| EMC1046        | 5                         | ±0.25                 | ±1.0                         | –40 to +125                    | 1                    | –            | –                 | 3.0–3.6        | 395                         | Sextuple SMBus/I <sup>2</sup> C Sensor with Resistance Error Correction, Beta Compensation and Hottest of Thermal Zones                                         | 10-pin MSOP             |
| EMC1047        | 6                         | ±0.25                 | ±1.0                         | –40 to +125                    | 1                    | –            | –                 | 3.0–3.6        | 395                         | Septuple SMBus/I <sup>2</sup> C Sensor with Resistance Error Correction, Beta Compensation and Hottest of Thermal Zones                                         | 10-pin MSOP             |
| EMC1053        | 2                         | ±0.5                  | ±1.0                         | –40 to +125                    | 1                    | –            | –                 | 3.0–3.6        | 105                         | Triple SMBus/I <sup>2</sup> C Sensor with Resistance Error Correction and Hotter of Two Zones                                                                   | 8-pin MSOP              |
| EMC1063        | 2                         | ±0.5                  | ±1.0                         | –40 to +125                    | 1                    | –            | –                 | 3.0–3.6        | 105                         | Triple SMBus/I <sup>2</sup> C Sensor with Hotter of Two Zones                                                                                                   | 8-pin MSOP              |
| EMC1072        | 1                         | ±0.25                 | ±1.0                         | –40 to +125                    | 1                    | 2            | –                 | 3.0–3.6        | 430                         | Dual SMBus/I <sup>2</sup> C Sensor with Selectable Address                                                                                                      | 8-pin MSOP              |
| EMC1073        | 2                         | ±0.25                 | ±1.0                         | –40 to +125                    | 1                    | 2            | –                 | 3.0–3.6        | 430                         | Triple SMBus/I <sup>2</sup> C Sensor with Selectable Address                                                                                                    | 10-pin MSOP             |
| EMC1074        | 3                         | ±0.25                 | ±1.0                         | –40 to +125                    | 1                    | 2            | –                 | 3.0–3.6        | 430                         | Quad SMBus/I <sup>2</sup> C Sensor with Selectable Address                                                                                                      | 10-pin MSOP             |
| EMC1182        | 1                         | ±0.25                 | ±1.0                         | –40 to +125                    | 1                    | 2            | -                 | 3.0–3.6        | 200                         | Dual Channel 1.8V SMBus/I <sup>2</sup> C Temperature Sensor with Resistance Error Correction, Beta Compensation                                                 | 8-pin TDFN, 8-pin DFN   |
| EMC1183        | 2                         | ±0.25                 | ±1.0                         | –40 to +125                    | 1                    | 2            | -                 | 3.0–3.6        | 200                         | Triple Channel 1.8V SMBus/I <sup>2</sup> C Temperature Sensor with Resistance Error Correction, Beta Compensation                                               | 10-pin DFN              |
| EMC1184        | 3                         | ±0.25                 | ±1.0                         | –40 to +125                    | 1                    | 2            | -                 | 3.0–3.6        | 200                         | Quad Channel 1.8V SMBus/I <sup>2</sup> C Temperature Sensor with Resistance Error Correction, Beta Compensation                                                 | 10-pin DFN              |
| EMC1186        | 1                         | ±0.25                 | ±1.0                         | –40 to +125                    | 1                    | 1            | 1                 | 3.0–3.6        | 200                         | Dual Channel 1.8V SMBus/I <sup>2</sup> C Sensor with Resistance Error Correction, Beta Compensation and Resistor-Settable Hardware Thermal Shutdown             | 8-pin TDFN              |
| EMC1187        | 2                         | ±0.25                 | ±1.0                         | –40 to +125                    | 1                    | 1            | 1                 | 3.0–3.6        | 200                         | Triple Channel 1.8V SMBus/I <sup>2</sup> C Sensor with Resistance Error Correction, Beta Compensation and Resistor-Settable Hardware Thermal Shutdown           | 10-pin DFN              |
| EMC1188        | 3                         | ±0.25                 | ±1.0                         | –40 to +125                    | 1                    | 1            | 1                 | 3.0–3.6        | 200                         | Quad Channel 1.8V SMBus/I <sup>2</sup> C Sensor with Resistance Error Correction, Beta Compensation and Resistor-Settable Hardware Thermal Shutdown             | 10-pin DFN              |
| EMC1412        | 1                         | ±0.25                 | ±1.0                         | –40 to +125                    | 1                    | 2            | –                 | 3.0–3.6        | 430                         | Dual SMBus/I <sup>2</sup> C Sensor with Resistance Error Correction, Beta Compensation and Selectable Address                                                   | 8-pin TDFN, 8-pin MSOP  |
| EMC1413        | 2                         | ±0.25                 | ±1.0                         | –40 to +125                    | 1                    | 2            | –                 | 3.0–3.6        | 430                         | Triple SMBus/I <sup>2</sup> C Sensor with Resistance Error Correction, Beta Compensation and Selectable Address                                                 | 10-pin DFN, 10-pin MSOP |
| EMC1414        | 3                         | ±0.25                 | ±1.0                         | –40 to +125                    | 1                    | 2            | –                 | 3.0–3.6        | 430                         | Quad SMBus/I <sup>2</sup> C Sensor with Resistance Error Correction, Beta Compensation and Selectable Address                                                   | 10-pin MSOP, 10-pin DFN |
| EMC1422        | 1                         | ±0.25                 | ±1.0                         | –40 to +125                    | 1                    | 1            | 1                 | 3.0–3.6        | 430                         | Dual SMBus/I <sup>2</sup> C Sensor with Resistance Error Correction, Beta Compensation and Resistor-Settable Hardware Thermal Shutdown                          | 8-pin MSOP              |
| EMC1423        | 2                         | ±0.25                 | ±1.0                         | –40 to +125                    | 1                    | 1            | 1                 | 3.0–3.6        | 430                         | Triple SMBus/I <sup>2</sup> C Sensor with Resistance Error Correction, Beta Compensation and Resistor-Settable Hardware Thermal Shutdown                        | 10-pin MSOP             |
| EMC1424        | 3                         | ±0.25                 | ±1.0                         | –40 to +125                    | 1                    | 1            | 1                 | 3.0–3.6        | 430                         | Quad SMBus/I <sup>2</sup> C Sensor with Resistance Error Correction, Beta Compensation and Resistor-Settable Hardware Thermal Shutdown                          | 10-pin MSOP             |
| EMC1428        | 7                         | ±0.25                 | ±1.0                         | –40 to +125                    | 1                    | 1            | 1                 | 3.0–3.6        | 450                         | Octal SMBus/I <sup>2</sup> C Sensor Resistance Error Correction, Beta Compensation and Resistor-Settable Hardware Thermal Shutdown and Hottest of Thermal Zones | 16-pin QFN              |

**Note 1:** These devices use an external temperature sensor. Accuracy of the total solution is a function of the accuracy of the external sensor.

**2:** Maximum accuracy measured at 85°C.

**3:** TCN75 idle current is 250 mA. This device also has a Software Shutdown mode that reduces supply current to < 1 mA.

## THERMAL MANAGEMENT PRODUCTS: Open-Loop Fan Controllers and Fan Fault Detectors

| Part #    | Description                                | # of Temp. Monitors | Typical Accuracy (°C) | Maximum Accuracy @ 25°C (°C) | Maximum Temperature Range (°C) | Vcc Range (V) | Maximum Supply Current (μA) | Features                                                                                             | Packages                           |
|-----------|--------------------------------------------|---------------------|-----------------------|------------------------------|--------------------------------|---------------|-----------------------------|------------------------------------------------------------------------------------------------------|------------------------------------|
| EMC2101   | Single SMBus I <sup>2</sup> C™ Fan Manager | 2                   | ±0.5                  | ±1                           | −40 to +125                    | +3.0 to +3.6  | 1,000                       | Fan Controller with high-frequency PWM driver, programmable fan speed table and alert                | 8-pin MSOP, 8-pin SOIC             |
| EMC2300   | Triple SMBus I <sup>2</sup> C Fan Manager  | 3                   | ±0.25                 | ±3                           | −0 to +70                      | +3.0 to +3.6  | 3,000                       | Fan Controller with high-frequency PWM driver, programmable fan speed table, voltage monitors, alert | 16-pin SSOP                        |
| EMC6D103S | Triple SMBus I <sup>2</sup> C Fan Manager  | 3                   | ±0.25                 | ±3                           | −0 to +70                      | +3.0 to +3.6  | 3,000                       | Fan Controller with high-frequency PWM driver, programmable fan speed table, voltage monitors, alert | 24-pin SSOP1                       |
| TC642     | Fan Manager                                | 1                   | Note 1                | Note 1                       | −40 to +85                     | +3.0 to +5.5  | 1,000                       | FanSense™ Fan Monitor, Minimum fan speed control                                                     | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP |
| TC642B    | Fan Manager                                | 1                   | Note 1                | Note 1                       | −40 to +85                     | +3.0 to +5.5  | 400                         | FanSense Fan Monitor, Minimum fan speed control, Fan auto-restart                                    | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP |
| TC646     | Fan Manager                                | 1                   | Note 1                | Note 1                       | −40 to +85                     | +3.0 to +5.5  | 1,000                       | FanSense Fan Monitor, Auto-shutdown                                                                  | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP |
| TC646B    | Fan Manager                                | 1                   | Note 1                | Note 1                       | −40 to +85                     | +3.0 to +5.5  | 400                         | FanSense Fan Monitor, Auto-shutdown, Fan auto-restart                                                | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP |
| TC647     | Fan Manager                                | 1                   | Note 1                | Note 1                       | −40 to +85                     | +3.0 to +5.5  | 1,000                       | FanSense Fan Monitor, Minimum fan speed control                                                      | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP |
| TC647B    | Fan Manager                                | 1                   | Note 1                | Note 1                       | −40 to +85                     | +3.0 to +5.5  | 400                         | FanSense Fan Monitor, Minimum fan speed control, Fan auto-restart                                    | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP |
| TC648     | Fan Manager                                | 1                   | Note 1                | Note 1                       | −40 to +85                     | +3.0 to +5.5  | 1,000                       | Overtemperature alert, Auto-shutdown                                                                 | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP |
| TC648B    | Fan Manager                                | 1                   | Note 1                | Note 1                       | −40 to +85                     | +3.0 to +5.5  | 400                         | Overtemperature alert, Auto-shutdown, Fan auto-restart                                               | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP |
| TC649     | Fan Manager                                | 1                   | Note 1                | Note 1                       | −40 to +85                     | +3.0 to +5.5  | 1,000                       | FanSense Fan Monitor, Auto-shutdown                                                                  | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP |
| TC649B    | Fan Manager                                | 1                   | Note 1                | Note 1                       | −40 to +85                     | +3.0 to +5.5  | 400                         | FanSense Fan Monitor, Auto-shutdown, Fan auto-restart                                                | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP |
| TC650     | Fan Manager                                | 1                   | ±1                    | ±3                           | −40 to +125                    | +2.8 to +5.5  | 90                          | Overtemperature alert                                                                                | 8-pin MSOP                         |
| TC651     | Fan Manager                                | 1                   | ±1                    | ±3                           | −40 to +125                    | +2.8 to +5.5  | 90                          | Overtemperature alert, Auto-shutdown                                                                 | 8-pin MSOP                         |
| TC652     | Fan Manager                                | 1                   | ±1                    | ±3                           | −40 to +125                    | +2.8 to +5.5  | 90                          | FanSense Fan Monitor, Overtemperature alert                                                          | 8-pin MSOP                         |
| TC653     | Fan Manager                                | 1                   | ±1                    | ±3                           | −40 to +125                    | +2.8 to +5.5  | 90                          | FanSense Fan Monitor, Overtemperature alert, Auto-shutdown                                           | 8-pin MSOP                         |
| TC654     | Dual SMBus Fan Manager                     | 1                   | Note 1                | Note 1                       | −40 to +85                     | +3.0 to +5.5  | 320                         | FanSense Fan Monitor, RPM data                                                                       | 10-pin MSOP                        |
| TC655     | Dual SMBus Fan Manager                     | 1                   | Note 1                | Note 1                       | −40 to +85                     | +3.0 to +5.5  | 320                         | FanSense Fan Monitor, RPM data, Overtemperature alert                                                | 10-pin MSOP                        |
| TC664     | Single SMBus Fan Manager                   | 1                   | Note 1                | Note 1                       | −40 to +85                     | +3.0 to +5.5  | 320                         | FanSense Fan Monitor, RPM data                                                                       | 10-pin MSOP                        |
| TC665     | Single SMBus Fan Manager                   | 1                   | Note 1                | Note 1                       | −40 to +85                     | +3.0 to +5.5  | 320                         | FanSense Fan Monitor, RPM data, Overtemperature alert                                                | 10-pin MSOP                        |
| TC670     | Predictive Fan Fault Detector              | 1                   | N/A                   | N/A                          | −40 to +85                     | +3.0 to +5.5  | 150                         | FanSense Fan Monitor, Programmable threshold                                                         | 6-pin SOT-23                       |

**Note 1:** These devices use an external temperature sensor. Accuracy of the total solution is a function of the accuracy of the external sensor.

THERMAL MANAGEMENT PRODUCTS: Closed-Loop Fan Controllers with SMBus/I<sup>2</sup>C™ Interface

| Part #    | # of Fan Drivers | PWM/Linear Control | # of Remote Temp. Monitors | Ambient Temp. Sensor | Typical Accuracy (°C) | Maximum Accuracy @ 25°C (°C) | Maximum Temperature Range (°C) | Vcc Range (V) | SMBus Alert | System Shutdown | Voltage Monitors | Description                                                                 | Packages   |
|-----------|------------------|--------------------|----------------------------|----------------------|-----------------------|------------------------------|--------------------------------|---------------|-------------|-----------------|------------------|-----------------------------------------------------------------------------|------------|
| EMC2112   | 1                | Linear             | 3                          | 1                    | ±0.25                 | ±1.0                         | 0 to +85                       | +3.3 and +5   | Yes         | Yes             | No               | RPM-Based Fan Controller with Hardware Thermal Shutdown                     | 20-pin QFN |
| EMC2103-1 | 1                | PWM                | 1                          | 1                    | ±0.5                  | ±1.0                         | −40 to +125                    | +3.0 to +3.6  | Yes         | Yes             | No               | RPM-Based Fan Controller with Hardware Thermal Shutdown                     | 12-pin QFN |
| EMC2103-2 | 1                | PWM                | 3                          | 1                    | ±0.5                  | ±1.0                         | −40 to +125                    | +3.0 to +3.6  | Yes         | Yes             | No               | RPM-Based Fan Controller with Hardware Thermal Shutdown                     | 16-pin QFN |
| EMC2103-4 | 1                | PWM                | 3                          | 1                    | ±0.5                  | ±1.0                         | −40 to +125                    | +3.0 to +3.6  | Yes         | Yes             | No               | RPM-Based Fan Controller with Hardware Thermal Shutdown and EEPROM loadable | 16-pin QFN |
| EMC2104   | 2                | PWM                | 4                          | 1                    | ±0.25                 | ±1.0                         | −40 to +85                     | +3.0 to +3.6  | Yes         | Yes             | Yes              | Dual RPM-Based PWM Fan Controller with Hardware Thermal Shutdown            | 20-pin QFN |
| EMC2105   | 1                | Linear             | 4                          | 1                    | ±0.25                 | ±1.0                         | −40 to +85                     | +3.3 and +5.0 | Yes         | Yes             | Yes              | RPM-Based High Side Fan Controller with Hardware Thermal Shutdown           | 20-pin QFN |

**THERMAL MANAGEMENT PRODUCTS: Closed Loop Fan Controllers with SMBus/I<sup>2</sup>C™ Interface (Continued)**

| Part #  | # of Fan Drivers | PWM/Linear Control | # of Remote Temp. Monitors | Ambient Temp. Sensor | Typical Accuracy (°C) | Maximum Accuracy @ 25°C (°C) | Maximum Temperature Range (°C) | Vcc Range (V) | SMBus Alert | System Shutdown | Voltage Monitors | Description                                                                                   | Packages    |
|---------|------------------|--------------------|----------------------------|----------------------|-----------------------|------------------------------|--------------------------------|---------------|-------------|-----------------|------------------|-----------------------------------------------------------------------------------------------|-------------|
| EMC2106 | 2                | PWM and Linear     | 4                          | 1                    | ±0.25                 | ±1.0                         | −40 to +85                     | +3.3 and +5.0 | Yes         | Yes             | Yes              | RPM-Based High Side Fan Controller with Hardware Thermal Shutdown                             | 28-pin QFN  |
| EMC2113 | 1                | PWM                | 3                          | 1                    | ±0.5                  | ±1.0                         | −40 to +125                    | +3.0 to +3.6  | Yes         | Yes             | No               | Single RPM-Based Fan Controller with Multiple Temperature Zones and Hardware Thermal Shutdown | 16-pin QFN  |
| EMC2301 | 1                | PWM                | N/A                        | N/A                  | N/A                   | N/A                          | −40 to +125                    | +3.0 to +3.6  | Yes         | No              | N/A              | Single RPM-Based PWM Fan Speed Controller                                                     | 8-pin MSOP  |
| EMC2302 | 2                | PWM                | N/A                        | N/A                  | N/A                   | N/A                          | −40 to +125                    | +3.0 to +3.6  | Yes         | No              | N/A              | Dual RPM-Based PWM Fan Speed Controller                                                       | 10-pin MSOP |
| EMC2303 | 3                | PWM                | N/A                        | N/A                  | N/A                   | N/A                          | −40 to +125                    | +3.0 to +3.6  | Yes         | No              | N/A              | Triple RPM-Based PWM Fan Speed Controller                                                     | 12-pin QFN  |
| EMC2305 | 5                | PWM                | N/A                        | N/A                  | N/A                   | N/A                          | −40 to +125                    | +3.0 to +3.6  | Yes         | No              | N/A              | Penta RPM-Based PWM Fan Speed Controller                                                      | 16-pin QFN  |

**MOTOR DRIVERS**

**MOTOR DRIVER PRODUCTS: Stepper Motors, DC Motors and 3-Phase BLDC Motors**

| Part #    | Motor Type                                 | Input Voltage Range (V) | Internal/External FETs | Output Current (mA) | Control Scheme                                         | Motor Speed Output  | Protections                                                                                                     | Temperature Operating Range (°C) | Features                                                                                                                                                                | Packages                            |
|-----------|--------------------------------------------|-------------------------|------------------------|---------------------|--------------------------------------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| MCP8024   | 3-Phase Brushless Motors                   | 6.0 to 28.0             | External               | 500                 | Direct PWM                                             | N/A                 | UVLO, OVLO, 48V Load Dump, Thermal Shutdown, Overcurrent Output                                                 | −40 to +150                      | Three Op Amps, Adj. Buck Regulator, 5V LDO, 12V LDO, Thermal Warning, Dead Time, Blanking Time, Level Translator, Motor Enable                                          | 40-pin 5 × 5 QFN, 48-pin 7 × 7 TQFP |
| MCP8025   | 3-Phase Brushless Motor                    | 6.0 to 19.0             | External               | 500                 | Direct PWM                                             | No                  | Overcurrent, Overvoltage, Undervoltage, Overtemperature, 48V Load Dump Protection, Short Circuit, Shoot Through | −40 to +150                      | Sleep Mode, LIN Transceiver, AZ Output, Adj. Buck Regulator, LOD, Op Amp, Overcurrent Comparator, Fault Output, Thermal Warning, Selectable Dead Time and Blanking Time | 40-pin 5 × 5 QFN, 48-pin 7 × 7 TQFP |
| MCP8026   | 3-Phase Brushless Motor                    | 6.0 to 28.0             | External               | 500                 | Direct PWM                                             | No                  | Overcurrent, Overvoltage, Undervoltage, Overtemperature, 48V Load Dump Protection, Short Circuit, Shoot Through | −40 to +150                      | Sleep Mode, LIN Transceiver, AZ Output, Adj. Buck Regulator, LOD, Op Amp, Overcurrent Comparator, Fault Output, Thermal Warning, Selectable Dead Time and Blanking Time | 40-pin 5 × 5 QFN, 48-pin 7 × 7 TQFP |
| MCP8063   | 3-Phase Brushless Motor                    | 2.0 to 14.0             | Internal               | 750                 | Sensorless Sinusoidal                                  | Frequency Generator | Overtemperature, Motor Lock-up, Overcurrent, Overvoltage                                                        | −40 to +125                      | 3-Phase BLDC 180° Sinusoidal Sensorless Fan Motor Driver, Overcurrent limitation, Output Switching Frequency at 23 kHz                                                  | Thermally Enhanced 8-pin 4 × 4 DFN  |
| MTS62C19A | One Bipolar Stepper Motor or Two DC Motors | 10.0 to 40.0            | Internal               | 750                 | Direct PWM Input, Current Limit Control, Microstepping | No                  | Overtemperature, Under Voltage                                                                                  | −40 to +105                      | Dual Full-Bridge Motor Driver for Stepper Motors, Pin compatible with Allegro 6219                                                                                      | 24-pin SOIC                         |
| MTS2916A  | One Bipolar Stepper Motor or Two DC Motors | 10.0 to 40.0            | Internal               | 750                 | Direct PWM Input, Current Limit Control, Microstepping | No                  | Overtemperature, Under Voltage                                                                                  | −40 to +105                      | Dual Full-Bridge Motor Driver for Stepper Motors, Pin compatible with Allegro 2916                                                                                      | 24-pin SOIC                         |
| MTD6501C  | 3-Phase Brushless Motor                    | 2.0 to 14.0             | Internal               | 800                 | Sensorless Sinusoidal                                  | Frequency Generator | Overtemperature, Motor Lock-up, Overcurrent, Overvoltage                                                        | −30 to +95                       | 3-Phase BLDC 180° Sinusoidal Sensorless Fan Motor Driver, Overcurrent limitation, Output Switching Frequency at 20 kHz                                                  | Thermally Enhanced 8-pin SOP        |
| MTD6501D  | 3-Phase Brushless Motor                    | 2.0 to 14.0             | Internal               | 500                 | Sensorless Sinusoidal                                  | Frequency Generator | Overtemperature, Motor Lock-up, Overcurrent, Overvoltage                                                        | −30 to +95                       | 3-Phase BLDC 180° Sinusoidal Sensorless Fan Motor Driver, Boost Mode, Overcurrent limitation, Output Switching Frequency at 20 kHz                                      | 10-pin MSOP                         |
| MTD6501G  | 3-Phase Brushless Motor                    | 2.0 to 14.0             | Internal               | 800                 | Sensorless Sinusoidal                                  | Frequency Generator | Overtemperature, Motor Lock-up, Overcurrent, Overvoltage                                                        | −30 to +95                       | 3-Phase BLDC 180° Sinusoidal Sensorless Fan Motor Driver, Overcurrent limitation, Output Switching Frequency at 23 kHz                                                  | Thermally Enhanced 8-pin SOP        |
| MTD6502B  | 3-Phase Brushless Motor                    | 2.0 to 5.5              | Internal               | 750                 | Sensorless Sinusoidal                                  | Frequency Generator | Overtemperature, Motor Lock-up, Overcurrent, Overvoltage                                                        | −40 to +125                      | 3-Phase BLDC Sinusoidal Sensorless Fan Motor Driver, Direction control, Overcurrent limitation, Output Switching Frequency at 30 kHz                                    | 10-pin 3 × 3 TDFN                   |
| MTD6505   | 3-Phase Brushless Motor                    | 2.0 to 5.5              | Internal               | 750                 | Sensorless Sinusoidal                                  | Frequency Generator | Overcurrent, Overvoltage, Overtemperature, Motor Lock-up                                                        | −40 to +125                      | 180° Sinusoidal Sensorless Drive, Direction Control, Programmable BEMF Coefficient Range, Output Switching Frequency at 30 kHz                                          | 10-pin 3 × 3 UDFN                   |

**POWER MANAGEMENT**

**POWER MANAGEMENT: Voltage References**

| Part #  | Vcc Range (V) | Output Voltage (V) | Max. Load Current (mA) | Initial Accuracy (max.%) | Temperature Coefficient (ppm/°C) | Maximum Supply Current (µA @ 25°C) | Packages                   |
|---------|---------------|--------------------|------------------------|--------------------------|----------------------------------|------------------------------------|----------------------------|
| MCP1525 | 2.7 to 5.5    | 2.5                | ±2                     | ±1                       | 50                               | 100                                | 3-pin TO-92, 3-pin SOT-23B |
| MCP1541 | 4.3 to 5.5    | 4.096              | ±2                     | ±1                       | 50                               | 100                                | 3-pin TO-92, 3-pin SOT-23B |

## POWER MANAGEMENT: Linear Regulators

| Part #                        | Output Current (mA) | Max. Input Voltage (V) | Output Voltage Range (V) | Typical Quiescent Current (μA) | Typical Dropout Voltage (at max I <sub>out</sub> , mV) | PSRR (typical dB) | Typical Output Voltage Accuracy (%) | Features                                                               | Packages                                                    |
|-------------------------------|---------------------|------------------------|--------------------------|--------------------------------|--------------------------------------------------------|-------------------|-------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------|
| Low-Dropout Linear Regulators |                     |                        |                          |                                |                                                        |                   |                                     |                                                                        |                                                             |
| TC1072                        | 50                  | 6.0                    | 1.8 to 5.0               | 50                             | 85                                                     | 64                | 0.5                                 | Low noise, fast transient response, shutdown, error output             | 6-pin SOT-23                                                |
| TC1014                        | 50                  | 6.0                    | 1.8 to 5.0               | 50                             | 85                                                     | 64                | 0.5                                 | Reference bypass                                                       | 5-pin SOT-23                                                |
| TC1054                        | 50                  | 6.5                    | 1.8 to 5.0               | 50                             | 85                                                     | 64                | 0.5                                 | Error output                                                           | 5-pin SOT-23                                                |
| TC1070                        | 50                  | 6.0                    | 1.2 to 5.5               | 50                             | 85                                                     | 64                | 0.5                                 | Adjustable output                                                      | 5-pin SOT-23                                                |
| TC2014                        | 50                  | 6.0                    | 1.8 to 5.0               | 55                             | 45                                                     | 55                | 0.4                                 | Low noise, fast transient response, shutdown, bypass pin               | 5-pin SOT-23A                                               |
| TC2054                        | 50                  | 6.0                    | 1.8 to 5.0               | 55                             | 45                                                     | 50                | 0.4                                 | Low noise, fast transient response, shutdown, error output             | 5-pin SOT-23A                                               |
| TC1223                        | 50                  | 6.0                    | 2.5 to 5.0               | 50                             | 85                                                     | 64                | 0.5                                 | Shutdown                                                               | 5-pin SOT-23A                                               |
| MCP1790                       | 70                  | 30.0                   | 3.0, 3.3, 5.0            | 70                             | 700                                                    | 90                | 0.2                                 | Load dump protected, fast transient response                           | 3-pin SOT-223                                               |
| MCP1791                       | 70                  | 30.0                   | 3.0, 3.3, 5.0            | 70                             | 700                                                    | 90                | 0.2                                 | Load dump protected, fast transient response, shutdown, powergood      | 5-pin SOT-223                                               |
| TC1016                        | 80                  | 6.0                    | 1.8 to 4.0               | 53                             | 150                                                    | 58                | 0.5                                 | Fast transient response                                                | 5-pin SOT-23, 5 pin-SC-70                                   |
| TC1073                        | 100                 | 6.0                    | 1.8 to 5.0               | 50                             | 180                                                    | 64                | 0.5                                 | Low noise, fast transient response, shutdown, error output             | 6-pin SOT-23                                                |
| TC1015                        | 100                 | 6.0                    | 1.8 to 5.0               | 50                             | 180                                                    | 64                | 0.5                                 | Reference bypass                                                       | 5-pin SOT-23                                                |
| TC1055                        | 100                 | 6.5                    | 1.8 to 5.0               | 50                             | 180                                                    | 64                | 0.5                                 | Error output                                                           | 5-pin SOT-23                                                |
| TC1071                        | 100                 | 6.0                    | 1.2 to 5.5               | 50                             | 180                                                    | 64                | 0.5                                 | Adjustable output                                                      | 5-pin SOT-23                                                |
| TC2015                        | 100                 | 6.0                    | 1.8 to 5.0               | 55                             | 90                                                     | 55                | 0.4                                 | Low noise, fast transient response, shutdown, bypass pin               | 5-pin SOT-23A                                               |
| TC2055                        | 100                 | 6.0                    | 1.8 to 5.0               | 55                             | 90                                                     | 50                | 0.4                                 | Low noise, fast transient response, shutdown, error output             | 5-pin SOT-23A                                               |
| TC1224                        | 100                 | 6.0                    | 2.5 to 5.0               | 50                             | 180                                                    | 64                | 0.5                                 | Shutdown                                                               | 5-pin SOT-23A                                               |
| TC1188                        | 120                 | 6.0                    | 1.8 to 3.15              | 50                             | 120                                                    | 80                | –                                   | Shutdown                                                               | 5-pin SOT-23A                                               |
| TC1189                        | 120                 | 6.0                    | 1.8 to 3.15              | 50                             | 120                                                    | 80                | –                                   | Shutdown, output capacitor discharge                                   | 5-pin SOT-23A                                               |
| TC1186                        | 150                 | 6.5                    | 1.8 to 5.0               | 50                             | 270                                                    | 64                | 0.5                                 | Error output                                                           | 5-pin SOT-23                                                |
| TC1017                        | 150                 | 6.0                    | 1.8 to 4.0               | 53                             | 285                                                    | 58                | 0.5                                 | Shutdown                                                               | 5-pin SOT-23 and 5-pin SC-70                                |
| TC1185                        | 150                 | 6.0                    | 1.8 to 5.0               | 50                             | 270                                                    | 64                | 0.5                                 | Reference bypass                                                       | 5-pin SOT-23                                                |
| TC1187                        | 150                 | 6.0                    | 1.2 to 5.5               | 50                             | 270                                                    | 64                | 0.5                                 | Adjustable output                                                      | 5-pin SOT-23                                                |
| MCP1754                       | 150                 | 16.0                   | 1.8 to 5.5               | 56                             | 300                                                    | 72                | 0.2                                 | Powergood, shutdown                                                    | 5-pin SOT-23, 5-pin SOT-223, 8-pin 2 × 3 DFN                |
| MCP1754S                      | 150                 | 16.0                   | 1.8 to 5.5               | 56                             | 300                                                    | 72                | 0.2                                 | –                                                                      | 3-pin SOT-23, 3-pin SOT89, 3-pin SOT-223, 8-pin 2 × 3 DFN   |
| MCP1804                       | 150                 | 28.0                   | 1.8 to 18                | 50                             | 260 at 20 mA                                           | 50                | 2                                   | Shutdown version                                                       | 5-pin SOT-23, 5 pin SOT-89, 3-pin SOT-89, 3-pin SOT-223     |
| TC2185                        | 150                 | 6.0                    | 1.8 to 5.0               | 55                             | 140                                                    | 55                | 0.4                                 | Low noise, fast transient response, shutdown, bypass pin               | 5-pin SOT-23A                                               |
| TC2186                        | 150                 | 6.0                    | 1.8 to 5.0               | 55                             | 140                                                    | 50                | 0.4                                 | Low noise, fast transient response, shutdown, error output             | 5-pin SOT-23A                                               |
| MCP1710                       | 200                 | 5.5                    | 1.2 to 4.2               | 0.02                           | 450                                                    | 22                | –                                   | Extremely low I <sub>q</sub> , small outline package, shutdown         | 8-pin 2 × 2 VDFN                                            |
| MCP1700                       | 250                 | 6.0                    | 1.2 to 5.0               | 1.6                            | 178                                                    | 44                | 0.4                                 | Very low I <sub>q</sub> , small outline package options                | 3-pin SOT-23, 3-pin SOT-89, 3-pin TO-92, 6-pin 2 × 2 DFN    |
| MCP1702                       | 250                 | 13.2                   | 1.2 to 5.5               | 2.0                            | 625                                                    | 44                | 0.4                                 | Very low I <sub>q</sub>                                                | 3-pin SOT-23A, 3-pin SOT-89, 3-pin TO-92                    |
| MCP1703A                      | 250                 | 16.0                   | 1.2 to 5.5               | 2.0                            | 625                                                    | 35                | 0.4                                 | Very low I <sub>q</sub> , low ground pin current in dropout            | 3-pin SOT-23A, 3-pin SOT-89, 3-pin SOT-223, 8-pin 2 × 3 DFN |
| MCP1755                       | 300                 | 16.0                   | 1.8 to 5.5               | 68                             | 300                                                    | 80                | 0.85                                | Powergood, shutdown                                                    | 5-pin SOT-23, 5-pin SOT-223, 8-pin 2 × 3 DFN                |
| MCP1755S                      | 300                 | 16.0                   | 1.8 to 5.5               | 68                             | 300                                                    | 80                | 0.85                                | –                                                                      | 3-pin SOT-223, 8-pin 2 × 3 DFN                              |
| MCP1824                       | 300                 | 6.0                    | 0.8 to 5.0               | 120                            | 200                                                    | 55                | 0.4                                 | Fast transient response, shutdown, powergood                           | 5-pin SOT-23, 5-pin SOT-223                                 |
| MCP1824S                      | 300                 | 6.0                    | 0.8 to 5.0               | 120                            | 200                                                    | 55                | 0.4                                 | Fast transient response                                                | 3-pin SOT-223                                               |
| TC1107                        | 300                 | 6.0                    | 2.5 to 5.0               | 50                             | 240                                                    | 60                | 0.5                                 | Low noise, fast transient response, shutdown, bypass pin               | 8-pin SOIC, 8-pin MSOP                                      |
| TC1108                        | 300                 | 6.0                    | 2.5 to 5.0               | 50                             | 240                                                    | 60                | 0.5                                 | Low noise, fast transient response                                     | 3-pin SOT-223                                               |
| TC1173                        | 300                 | 6.0                    | 2.5 to 5.0               | 50                             | 240                                                    | 60                | 0.5                                 | Low noise, fast transient response, shutdown, bypass pin, error output | 8-pin SOIC, 8-pin MSOP                                      |
| TC1174                        | 300                 | 6.0                    | –                        | 50                             | 270                                                    | 60                | –                                   | Adjustable output                                                      | 8-pin SOIC, 8-pin MSOP                                      |

## POWER MANAGEMENT: Linear Regulators (Continued)

| Part #                                            | Output Current (mA) | Max. Input Voltage (V) | Output Voltage Range (V) | Typical Quiescent Current ( $\mu$ A) | Typical Dropout Voltage (at max $I_{OUT}$ , mV) | PSRR (typical dB) | Typical Output Voltage Accuracy (%) | Features                                                                                 | Packages                             |
|---------------------------------------------------|---------------------|------------------------|--------------------------|--------------------------------------|-------------------------------------------------|-------------------|-------------------------------------|------------------------------------------------------------------------------------------|--------------------------------------|
| Low-Dropout Linear Regulators (Continued)         |                     |                        |                          |                                      |                                                 |                   |                                     |                                                                                          |                                      |
| TC1269                                            | 300                 | 6.0                    | 2.5 to 5.0               | 50                                   | 240                                             | 50                | 0.5                                 | Low noise, fast transient response, shutdown, bypass pin                                 | 8-pin MSOP                           |
| TC1262                                            | 500                 | 6.0                    | 1.8 to 5.0               | 80                                   | 350                                             | 64                | 0.5                                 | Low noise, fast transient response                                                       | 3-pin SOT-223                        |
| MCP1725                                           | 500                 | 6.0                    | 0.8 to 5.0               | 120                                  | 210                                             | 60                | 0.5/0.4/0.5                         | Fast transient response, shutdown, adjustable delay powergood, adjustable output version | 8-pin SOIC-8, 8-pin 2 $\times$ 3 DFN |
| MCP1825                                           | 500                 | 6.0                    | 0.8 to 5.0               | 120                                  | 210                                             | 60                | 0.5                                 | Fast transient response, shutdown, powergood                                             | 5-pin SOT-223                        |
| MCP1825S                                          | 500                 | 6.0                    | 0.8 to 5.0               | 120                                  | 210                                             | 60                | 0.5                                 | Fast transient response                                                                  | 3-pin SOT-223                        |
| TC1263                                            | 500                 | 6.0                    | 2.5 to 5.0               | 80                                   | 350                                             | 64                | 0.5                                 | Low noise, fast transient response, shutdown, bypass pin                                 | 8-pin SOIC                           |
| TC1264                                            | 800                 | 6.0                    | 1.8 to 5.0               | 80                                   | 450                                             | 64                | 0.5                                 | Low noise, fast transient response                                                       | 3-pin SOT-223                        |
| TC1265                                            | 800                 | 6.0                    | 1.8 to 3.3               | 80                                   | 450                                             | 64                | 0.5                                 | Low noise, fast transient response, shutdown, bypass pin                                 | 8-pin SOIC                           |
| TC2117                                            | 800                 | 6.0                    | 1.8 to 3.3               | 80                                   | 1200                                            | 55                | 0.5                                 | Low noise, fast transient response                                                       | 3-pin SOT-223                        |
| MCP1726                                           | 1000                | 6.0                    | 0.8 to 5.0               | 140                                  | 220                                             | 54                | 0.5/0.4/0.5                         | Fast transient response, shutdown, adjustable delay powergood, adjustable output version | 8-pin SOIC-8, 8-pin 3 $\times$ 3 DFN |
| MCP1826                                           | 1000                | 6.0                    | 0.8 to 5.0               | 120                                  | 250                                             | 60                | 0.5                                 | Fast transient response, shutdown, powergood                                             | 5-pin SOT-223                        |
| MCP1826S                                          | 1000                | 6.0                    | 0.8 to 5.0               | 120                                  | 250                                             | 60                | 0.5                                 | Fast transient response                                                                  | 3-pin SOT-223                        |
| MCP1727                                           | 1500                | 6.0                    | 0.8 to 5.0               | 120                                  | 330                                             | 60                | 0.5/0.4/0.5                         | Fast transient response, shutdown, adjustable delay powergood, adjustable output version | 8-pin SOIC-8, 8-pin 3 $\times$ 3 DFN |
| MCP1827                                           | 1500                | 6.0                    | 0.8 to 5.0               | 120                                  | 330                                             | 60                | 0.5                                 | Fast transient response, shutdown, powergood                                             | 5-pin DPAK, 5-pin TO-220             |
| MCP1827S                                          | 1500                | 6.0                    | 0.8 to 5.0               | 120                                  | 330                                             | 60                | 0.5                                 | Fast transient response                                                                  | 3-pin DPAK, 3-pin TO-220             |
| Negative Voltage Linear Regulators                |                     |                        |                          |                                      |                                                 |                   |                                     |                                                                                          |                                      |
| TC59                                              | 100                 | -10                    | -3.0 to -5.0             | 3                                    | 380                                             | 50                | 2                                   | Negative LDO                                                                             | 3-pin SOT23A                         |
| Combination and Multiple Output Linear Regulators |                     |                        |                          |                                      |                                                 |                   |                                     |                                                                                          |                                      |
| TC1300                                            | 300                 | 6.0                    | 2.5 to 3.0               | 80                                   | 210                                             | 60                | 0.5                                 | Shutdown, bypass, undervoltage detection and reset signal generation                     | 8-pin MSOP                           |
| TC1301A                                           | 300/150             | 6.0                    | 1.5 to 3.3               | 103                                  | 104/150                                         | 58                | 0.5                                 | Dual output LDO, reset, bypass pin and shutdown pin for second output                    | 8-pin MSOP, 8-pin 3 $\times$ 3 DFN   |
| TC1301B                                           | 300/150             | 6.0                    | 1.5 to 3.3               | 114                                  | 104/150                                         | 58                | 0.5                                 | Dual output LDO, reset, bypass pin and shutdown pins for both outputs                    | 8-pin MSOP, 8-pin 3 $\times$ 3 DFN   |
| TC1302A                                           | 300/150             | 6.0                    | 1.5 to 3.3               | 103                                  | 104/150                                         | 58                | 0.5                                 | Dual output LDO, bypass pin and shutdown pin for second output                           | 8-pin MSOP, 8-pin 3 $\times$ 3 DFN   |
| TC1302B                                           | 300/150             | 6.0                    | 1.5 to 3.3               | 114                                  | 104/150                                         | 58                | 0.5                                 | Dual output LDO, bypass pin and shutdown pins for both outputs                           | 8-pin MSOP, 8-pin 3 $\times$ 3 DFN   |
| TC1307                                            | 150                 | 6.0                    | 1.8 to 3.0               | 220                                  | 100                                             | 60                | 0.5                                 | Four-channel LDO, independent shutdown pins, selectable output voltages                  | 16-pin QSOP                          |

## POWER MANAGEMENT: Switching Regulators

| Part #            | Description                                                               | Input Voltage Range (V) | Output Voltage (V) | Operating Temperature Range ( $^{\circ}$ C) | Control Scheme          | Switching Frequency (kHz) | Typical Active Current ( $\mu$ A) | Output Current (mA) | Features                                                                                                                                                            | Packages                                                 |
|-------------------|---------------------------------------------------------------------------|-------------------------|--------------------|---------------------------------------------|-------------------------|---------------------------|-----------------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| MCP1601           | Synchronous Buck Regulator                                                | 2.7 to 5.5              | 0.9V to $V_{IN}$   | -40 to +85                                  | PFM/PWM/LDO             | 750                       | 825 (PWM)<br>125 (PFM)            | 500                 | UVLO, auto-switching, LDO                                                                                                                                           | 8-pin MSOP                                               |
| MCP1602           | Synchronous Buck Regulator                                                | 2.7 to 5.5              | 0.8 to 4.5         | -40 to +85                                  | PFM/PWM                 | 2000                      | 35                                | 500                 | PFM, PWM auto-switching, UVLO, soft start, power good indicator                                                                                                     | 10-pin MSOP,<br>10-pin 3 $\times$ 3 DFN                  |
| MCP1603           | Synchronous Buck Regulator                                                | 2.7 to 5.5              | 0.8 to 4.0         | -40 to +85                                  | PFM/PWM                 | 2000                      | 45                                | 500                 | Overtemperature and overcurrent protection                                                                                                                          | 5-pin TSOT-23,<br>8-pin 2 $\times$ 3 DFN                 |
| MCP1612           | Synchronous Buck Regulator                                                | 2.7 to 5.5              | 0.8 to 5.5         | -40 to +85                                  | Constant frequency, PWM | 1400                      | 5000                              | 1000                | Overall efficiency > 94%, Soft start, overtemperature and overcurrent protection                                                                                    | 8-pin MSOP,<br>8-pin 3 $\times$ 3 DFN                    |
| MCP1623/4         | Synchronous Boost Regulator                                               | 0.65 to 6.0             | 2.0 to 5.5         | -40 to +85                                  | PWM or PWM/PFM          | 500                       | 19                                | 175                 | Integrated synchronous boost regulator, 0.65V start-up voltage, soft start, true load disconnect                                                                    | 6-pin SOT-23,<br>8-pin 2 $\times$ 3 DFN                  |
| MCP16311          | 30V Input, 1A, Synchronous Buck Switching Regulator                       | 4.4 to 30.0             | 2.0 to 24.0        | -40 to +125                                 | PFM/PFM                 | 500                       | 44                                | 1000                | PFM/PWM operation, enable function                                                                                                                                  | 8-pin MSOP,<br>8-pin 2 $\times$ 3 TDFN                   |
| MCP16312          | 30V Input, 1A, Synchronous Buck Switching Regulator                       | 4.4 to 30.0             | 2.0 to 24.0        | -40 to +125                                 | PWM                     | 500                       | 3800                              | 1000                | PWM operation, enable function                                                                                                                                      | 8-pin MSOP,<br>8-pin 2 $\times$ 3 TDFN                   |
| <b>MCP1642B/D</b> | <b>1.8A Input Switch Current, Low <math>V_{IN}</math> Boost Regulator</b> | <b>0.65 to 6.0</b>      | <b>1.8 to 5.5</b>  | <b>-40 to +85</b>                           | <b>PWM</b>              | <b>1000</b>               | <b>400</b>                        | <b>&gt;800</b>      | <b>Integrated synchronous boost regulator, 0.65V start-up voltage, soft start, enable, power good output, true load disconnect or input-to-output bypass option</b> | <b>8-pin MSOP,<br/>8-pin 2 <math>\times</math> 3 DFN</b> |
| MCP16251          | Low Quiescent Current Synchronous Boost Regulator                         | 0.82 to 5.5             | 1.8 to 5.5         | -40 to +85                                  | PFM/PWM                 | 500                       | 4                                 | 250                 | True load disconnect shutdown                                                                                                                                       | 6-pin SOT-23,<br>8-pin 2 $\times$ 3 DFN                  |
| MCP16252          | Low Quiescent Current Synchronous Boost Regulator                         | 0.82 to 5.5             | 1.8 to 5.5         | -40 to +85                                  | PFM/PWM                 | 500                       | 4                                 | 250                 | Input to output bypass shutdown                                                                                                                                     | 6-pin SOT-23,<br>8-pin 2 $\times$ 3 DFN                  |

**POWER MANAGEMENT: Switching Regulators (Continued)**

| Part #         | Description                                                                         | Input Voltage Range (V) | Output Voltage (V)     | Operating Temperature Range (°C) | Control Scheme                 | Switching Frequency (kHz) | Typical Active Current (µA) | Output Current (mA) | Features                                                                                                                          | Packages                             |
|----------------|-------------------------------------------------------------------------------------|-------------------------|------------------------|----------------------------------|--------------------------------|---------------------------|-----------------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| MCP1640/B/C/D  | Synchronous Boost Regulator                                                         | 0.65 to 6               | 2.0 to 5.5             | −40 to +85                       | PWM or PWM/PFM                 | 500                       | 19                          | 350                 | Integrated synchronous boost regulator, 0.65V start-up voltage, Soft start, True load disconnect or input-to-output bypass option | 6-pin SOT-23, 8-pin 2 × 3 DFN        |
| MCP1643        | Synchronous Boost LED Driver                                                        | 0.5                     | 0.6 to 5.0             | −40 to +85                       | PWM                            | 1000                      | –                           | 550                 | True Load Disconnect, Shutdown                                                                                                    | 8-pin 2 × 3 DFN, 8-pin MSOP          |
| MCP1650        | Step-up DC/DC Controller                                                            | 2.7 to 5.5              | 2.5 to ext. tx limited | −40 to +125                      | Constant frequency             | 750                       | 120                         | 560/440             | Two duty cycles for min. and max. loads, Shutdown control, UVLO, Soft start                                                       | 8-pin MSOP                           |
| MCP1651        | Step-up DC/DC Controller                                                            | 2.7 to 5.5              | 2.5 to ext. tx limited | −40 to +125                      | Constant frequency, 2 fixed DC | 750                       | 120                         | 560/440             | Two duty cycles for min. and max. loads, Shutdown control, low battery detect, UVLO, Soft start                                   | 8-pin MSOP                           |
| MCP1652        | Step-up DC/DC Controller                                                            | 2.7 to 5.5              | 2.5 to ext. tx limited | −40 to +125                      | Constant frequency, 2 fixed DC | 750                       | 120                         | 560/440             | Two duty cycles for min. and max. loads, Shutdown control, Power good indicator, UVLO, Soft start                                 | 8-pin MSOP                           |
| MCP1653        | Step-up DC/DC Controller                                                            | 2.7 to 5.5              | 2.5 to ext. tx limited | −40 to +125                      | Constant frequency, 2 fixed DC | 750                       | 120                         | 560/440             | Two duty cycles for min. and max. loads, Shutdown control, Low battery detect, Power good indicator, UVLO, Soft start             | 10-pin MSOP                          |
| <b>MCP1661</b> | <b>32 Vout, 1.3A Input Switch Current Non-Synchronous Boost Switching Regulator</b> | <b>2.4 to 5.5</b>       | <b>5.5 to 32</b>       | <b>−40 to +85</b>                | <b>PWM</b>                     | <b>500</b>                | <b>250</b>                  | <b>&gt;200</b>      | <b>Non-synchronous boost regulator, Soft start, Enable</b>                                                                        | <b>6-pin SOT23, 8-pin 3 × 3 TDFN</b> |
| <b>MCP1662</b> | <b>32 Vout, 1.3A Input Switch Current Non-Synchronous LED Boost Regulator</b>       | <b>2.4 to 5.5</b>       | <b>5.5 to 32</b>       | <b>−40 to +85</b>                | <b>PWM</b>                     | <b>500</b>                | <b>–</b>                    | <b>&gt;200</b>      | <b>Non-synchronous boost regulator, Soft start, Enable, 300 mV feedback for LED driving</b>                                       | <b>6-pin SOT23, 8-pin 3 × 3 TDFN</b> |
| MCP16301       | 30V Input Buck Regulator                                                            | 4.0 to 30               | 2.0 to 15              | −40 to +85                       | PWM                            | 500                       | 2000                        | 600                 | Integrated N-channel, UVLO, Soft start, Overtemperature protection                                                                | SOT23-6                              |
| MCP16321       | Synchronous Buck Regulator                                                          | 6 to 24                 | 0.9 to 5               | −40 to +125                      | PWM/PFM                        | 1000                      | 2300                        | 1000                | Integrated switches, Internal compensation, Peak current mode control, Soft-start, UVLO, Power good pin                           | 16-pin 3 × 3 QFN                     |
| MCP16322       | Synchronous Buck Regulator                                                          | 6 to 24                 | 0.9 to 5               | −40 to +125                      | PWM/PFM                        | 1000                      | 2300                        | 2000                | Integrated switches, Internal compensation, Peak current mode control, Soft-start, UVLO, Power good pin                           | 16-pin 3 × 3 QFN                     |
| MCP16323       | Synchronous Buck Regulator                                                          | 6 to 18                 | 0.9 to 5               | −40 to +125                      | PWM/PFM                        | 1000                      | 2300                        | 3000                | Integrated switches, Internal compensation, Peak current mode control, Soft-start, UVLO, Power good pin                           | 16-pin 3 × 3 QFN                     |
| TC105          | Step-down DC/DC Controller                                                          | 2.2 to 10               | 3.0, 3.3, 5.0          | −40 to +85                       | PFM/PWM                        | 300                       | 57                          | 1,000               | Low power shutdown mode                                                                                                           | 5-pin SOT-23A                        |
| TC115          | Step-up DC/DC Regulator                                                             | 0.9 to 10               | 3.0, 3.3, 5.0          | −40 to +85                       | PFM/PWM                        | 100                       | 80                          | 140                 | Feedback voltage sensing, Low power shutdown mode                                                                                 | 5-pin SOT-89                         |
| TC110          | Step-up DC/DC Controller                                                            | 2.0 to 10               | 3.0, 3.3, 5.0          | −40 to +85                       | PFM/PWM                        | 100/300                   | 50/120                      | 300                 | Soft start, Low power shutdown mode                                                                                               | 5-pin SOT-23A                        |

**POWER MANAGEMENT: Switching Regulators Combination Products**

| Part # | Description                                     | Input Voltage Range (V) | Output Voltage (V)                | Operating Temperature Range (°C) | Control Scheme | Switching Frequency (kHz) | Typical Active Current (µA) | Output Current (mA)       | Features                                  | Packages                      |
|--------|-------------------------------------------------|-------------------------|-----------------------------------|----------------------------------|----------------|---------------------------|-----------------------------|---------------------------|-------------------------------------------|-------------------------------|
| TC1303 | Synchronous Buck Regulator, LDO with Power good | 2.7 to 5.5              | DC/DC: 0.8 to 4.5 LDO: 1.5 to 3.3 | −40 to +85                       | PFM/PWM        | 2000                      | 65/600                      | DC/DC: 500 mA LDO: 300 mA | PFM/PWM auto-switching, Power good output | 10-pin MSOP, 10-pin 3 × 3 DFN |
| TC1304 | Synchronous Buck Regulator, LDO                 | 2.7 to 5.5              | DC/DC: 0.8 to 4.5 LDO: 1.5 to 3.3 | −40 to +85                       | PFM/PWM        | 2000                      | 65/600                      | DC/DC: 500 mA LDO: 300 mA | PFM/PWM auto-switching, Power sequencing  | 10-pin MSOP, 10-pin 3 × 3 DFN |
| TC1313 | Synchronous Buck Regulator, LDO                 | 2.7 to 5.5              | DC/DC: 0.8 to 4.5 LDO: 1.5 to 3.3 | −40 to +85                       | PFM/PWM        | 2000                      | 65/600                      | DC/DC: 500 mA LDO: 300 mA | PFM/PWM auto-switching                    | 10-pin MSOP, 10-pin 3 × 3 DFN |

**POWER MANAGEMENT: PWM Controllers**

| Part #     | Description                                                                                  | Input Voltage Range (V) | Operating Temp. Range (°C) | Switching Frequency (kHz) | Typical Active Current (mA) | Features                                                                                                                                                                                         | Packages                                    |
|------------|----------------------------------------------------------------------------------------------|-------------------------|----------------------------|---------------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| MCP1630    | Current mode, high-speed PWM to use with PIC® MCUs                                           | 3.0 to 5.5              | −40 to +125                | 1000                      | 2.8                         | UVLO, Short circuit and Overtemperature protection, Integrated MOSFET driver                                                                                                                     | 8-pin MSOP, 8-pin 2 × 3 DFN                 |
| MCP1630V   | Voltage mode, high-speed PWM to use with PIC MCUs                                            | 3.0 to 5.5              | −40 to +125                | 1000                      | 2.8                         | UVLO, Short circuit and Overtemperature protection, Integrated MOSFET driver                                                                                                                     | 8-pin MSOP, 8-pin 2 × 3 DFN                 |
| MCP1631    | Current mode, high-speed PWM to use with PIC MCUs                                            | 3.0 to 5.5              | −40 to +125                | 2000                      | 3.7                         | UVLO, Integrated error, Current and voltage sense amplifiers, Overvoltage comparator and MOSFET driver                                                                                           | 20-pin SSOP, 20-pin TSSOP, 20-pin 4 × 4 QFN |
| MCP1631HV  | Current mode, high-speed PWM to use with PIC MCUs                                            | 3.5 to 16               | −40 to +125                | 2000                      | 3.7                         | Integrated 16V LDO, UVLO, Integrated error, Current and voltage sense amplifiers, Overvoltage comparator and MOSFET driver                                                                       | 20-pin SSOP, 20-pin TSSOP                   |
| MCP1631V   | Voltage mode, high-speed PWM to use with PIC MCUs                                            | 3.0 to 5.5              | −40 to +125                | 2000                      | 3.7                         | UVLO, Integrated error, Current and voltage sense amplifiers, Overvoltage comparator and MOSFET driver                                                                                           | 20-pin SSOP, 20-pin TSSOP, 20-pin 4 × 4 QFN |
| MCP1631VHV | Voltage mode, high-speed PWM to use with PIC MCUs                                            | 3.5 to 16               | −40 to +125                | 2000                      | 3.7                         | Integrated 16V LDO, UVLO, Integrated error, Current and voltage sense amplifiers, Overvoltage comparator and MOSFET driver                                                                       | 20-pin SSOP, 20-pin TSSOP                   |
| MCP1632    | Standalone, Current or Voltage mode high-speed PWM controller with Integrated MOSTFET Driver | 3.0 to 5.5              | −40 to +125                | 300/600                   | 5                           | Adjustable V <sub>REF</sub> and Soft Start, Internal slope compensation, UVLO, Short circuit and overtemperature protection, Integrated low-side MOSFET driver                                   | 8-pin MSOP, 8-pin 2 × 3 DFN                 |
| MCP19035   | Synchronous Buck PWM Controller with Integrated MOSFET Driver Family                         | 4.5 to 30               | −40 to +125                | 300/600                   | 6                           | Multiple dead-time options for low-FOM MOSFET compatibility, Integrated current sense capability for short circuit protection, Integrated synchronous MOSFET driver and linear voltage regulator | 10-pin 3 × 3 DFN                            |

| POWER MANAGEMENT: PWM Controllers (Continued) |                                              |                         |                            |                           |                             |                                                                                                                                        |                         |
|-----------------------------------------------|----------------------------------------------|-------------------------|----------------------------|---------------------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| Part #                                        | Description                                  | Input Voltage Range (V) | Operating Temp. Range (°C) | Switching Frequency (kHz) | Typical Active Current (mA) | Features                                                                                                                               | Packages                |
| HV9110                                        | High-Voltage Single Switch Current-Mode PWM  | 10 to 120               | –55 to +125                | 3000                      | 0.55                        | UVLO, Internal Start-Up Circuit, 50% Max. Duty Cycle                                                                                   | 14-pin SOIC             |
| HV9112                                        | High-Voltage Single Switch Current-Mode PWM  | 9 to 80                 | –55 to +125                | 3000                      | 0.55                        | UVLO, Internal Start-Up Circuit, 50% Max. Duty Cycle                                                                                   | 14-pin SOIC             |
| HV9113                                        | High-Voltage Single Switch Current-Mode PWM  | 10 to 120               | –55 to +125                | 3000                      | 0.55                        | UVLO, Internal Start-Up Circuit, 50% Max. Duty Cycle                                                                                   | 14-pin SOIC             |
| HV9120                                        | 450V Single Switch Current-Mode PWM          | 10 to 450               | –55 to +125                | 3000                      | 0.55                        | UVLO, Internal Start-Up Circuit, 50% Max. Duty Cycle                                                                                   | 14-pin SOIC, 16-pin DIP |
| HV9123                                        | 450V Single Switch Current-Mode PWM          | 10 to 450               | –55 to +125                | 3000                      | 0.55                        | UVLO, Internal Start-Up Circuit, 50% Max. Duty Cycle                                                                                   | 14-pin SOIC, 16-pin DIP |
| HV9150                                        | High-Voltage Output Hysteretic Step-up DC/DC | 2.7 to 12               | –25 to +85                 | 400                       | 2.5                         | Built-In Charge Pump and LDO, Programmable Switching Frequency from 40 kHz to 400 kHz, Four Programmable Duty Cycles from 50% to 87.5% | 16-pin QFN              |

| POWER MANAGEMENT: Hybrid PWM Controllers – Digitally-Enhanced Power Analog |                         |                                                   |                            |                            |                |                              |             |                                                                                                                                                                                                                                                                                                     |                  |
|----------------------------------------------------------------------------|-------------------------|---------------------------------------------------|----------------------------|----------------------------|----------------|------------------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Part #                                                                     | Input Voltage Range (V) | Output Voltage (V)                                | Operating Temp. Range (°C) | Topologies Supported       | Integrated MCU | Program Memory Size (kWords) | RAM (bytes) | Features                                                                                                                                                                                                                                                                                            | Packages         |
| MCP19110                                                                   | 4.5 to 32               | 0.5 to 90% * V <sub>IN</sub>                      | –40 to +125                | Buck                       | ✓              | 4                            | 256         | Synchronous Buck Analog Controller with integrated MCU, LDO and Synchronous MOSFET Drivers. User-Configurable/Programmable including MOSFET Dead Time, Switching Frequency, Analog Loop Compensation and Protection Thresholds                                                                      | 24-pin 4 × 4 QFN |
| MCP19111                                                                   | 4.5 to 32               | 0.5 to 90% * V <sub>IN</sub>                      | –40 to +125                | Buck                       | ✓              | 4                            | 256         | Synchronous Buck Analog Controller with integrated MCU, LDO and Synchronous MOSFET Drivers. User-Configurable/Programmable including MOSFET Dead Time, Switching Frequency, Analog Loop Compensation and Protection Thresholds                                                                      | 28-pin 5 × 5 QFN |
| MCP19114                                                                   | 4.5 to 42               | 0.5 to V <sub>IN</sub> *n (dependent on topology) | –40 to +125                | Boost, Flyback, SEPIC, Ćuk | ✓              | 4                            | 256         | High-Speed Analog-based PWM Controller with integrated MCU, LDO and Synchronous MOSFET Drivers. User-Configurable/Programmable including MOSFET Dead Time, Switching Frequency, Analog Loop Compensation and Protection Thresholds. An I <sup>2</sup> C communication interface is also integrated. | 24-pin 4 × 4 QFN |
| MCP19115                                                                   | 4.25 to 42              | 0.5 to V <sub>IN</sub> *n (dependent on topology) | –40 to +125                | Boost, Flyback, SEPIC, Ćuk | ✓              | 4                            | 256         | High-Speed Analog-based PWM Controller with integrated MCU, LDO and Synchronous MOSFET Drivers. User-Configurable/Programmable including MOSFET Dead Time, Switching Frequency, Analog Loop Compensation and Protection Thresholds. An I <sup>2</sup> C communication interface is also integrated. | 28-pin 5 × 5 QFN |
| MCP19118                                                                   | 4.5 to 40               | 0.5 to 90% * V <sub>IN</sub>                      | –40 to +125                | Buck                       | ✓              | 4                            | 256         | 40V DC operation, 48V transient capability, Synchronous Buck Analog Controller with integrated MCU, LDO and Synchronous MOSFET Drivers. User-Configurable/Programmable including MOSFET Dead Time, Switching Frequency, Analog Loop Compensation and Protection Thresholds                          | 24-pin 4 × 4 QFN |
| MCP19119                                                                   | 4.5 to 40               | 0.5 to 90% * V <sub>IN</sub>                      | –40 to +125                | Buck                       | ✓              | 4                            | 256         | 40V DC operation, 48V transient capability, Synchronous Buck Analog Controller with integrated MCU, LDO and Synchronous MOSFET Drivers. User-Configurable/Programmable including MOSFET Dead Time, Switching Frequency, Analog Loop Compensation and Protection Thresholds                          | 28-pin 5 × 5 QFN |

| POWER MANAGEMENT: Charge Pump DC-to-DC Converters |                       |                         |                                        |                             |                           |                                                            |                                                        |                                 |                                                                   |                                  |
|---------------------------------------------------|-----------------------|-------------------------|----------------------------------------|-----------------------------|---------------------------|------------------------------------------------------------|--------------------------------------------------------|---------------------------------|-------------------------------------------------------------------|----------------------------------|
| Part #                                            | Configuration         | Input Voltage Range (V) | Output Voltage (V)                     | Typical Output Current (mA) | Switching Frequency (kHz) | Supply Current (I <sub>s</sub> , floating output μA, 25°C) | Output Resistance (Ω, at typical output current, 25°C) | Power Conversion Efficiency (%) | Features                                                          | Packages                         |
| Inverting or Doubling Charge Pumps                |                       |                         |                                        |                             |                           |                                                            |                                                        |                                 |                                                                   |                                  |
| TC682                                             | Inverted doubling     | 2.4 to 5.5              | –2*V <sub>IN</sub>                     | 10                          | 12                        | 185                                                        | 140                                                    | 92% at 2.5 mA                   | –                                                                 | 8-pin SOIC and 8-pin PDIP        |
| TC1240A                                           | Doubling              | 2.5 to 5                | 2*V <sub>IN</sub>                      | 20                          | 80                        | 550                                                        | 12                                                     | 94% at 5 mA                     | Shutdown                                                          | 6-pin SOT-23                     |
| TC7660S                                           | Inverting or doubling | 1.5 to 12               | –V <sub>IN</sub> or 2* V <sub>IN</sub> | 20                          | 10 or 45                  | 80                                                         | 60                                                     | 98% at 1 mA                     | Boost pin increases switching frequency                           | 8-pin SOIC and 8-pin PDIP        |
| TC7660H                                           | Inverting or doubling | 1.5 to 10               | –V <sub>IN</sub> or 2* V <sub>IN</sub> | 20                          | 120                       | 1000                                                       | 55                                                     | 85% at 10 mA                    | High-voltage oscillator                                           | 8-pin SOIC and 8-pin PDIP        |
| TC7662B                                           | Inverting or doubling | 1.5 to 15               | –V <sub>IN</sub> or 2* V <sub>IN</sub> | 20                          | 10 or 35                  | 80                                                         | 65                                                     | 96% at 1 mA                     | Boost pin increases switching frequency                           | 8-pin SOIC and 8-pin PDIP        |
| TC7662A                                           | Inverting or doubling | 3 to 18                 | –V <sub>IN</sub> or 2* V <sub>IN</sub> | 40                          | 12                        | 190                                                        | 50                                                     | 97% at 7.5 mA                   | No low-voltage terminal required                                  | 8-pin PDIP                       |
| TC962                                             | Inverting or doubling | 3 to 18                 | –V <sub>IN</sub> or 2* V <sub>IN</sub> | 80                          | 12 or 24                  | 190                                                        | 35                                                     | 97% at 7.5 mA                   | Boost pin increases switching frequency                           | 16-pin SOIC, 8-pin PDIP          |
| Regulated Charge Pumps                            |                       |                         |                                        |                             |                           |                                                            |                                                        |                                 |                                                                   |                                  |
| MCP1256                                           | Regulated             | 1.8 to 3.6              | 3.3                                    | 100                         | 650                       | 2300                                                       | N/A                                                    | 85% at 50 mA                    | Soft start, shutdown, power good signal and sleep mode            | 10-pin MSOP and 10-pin 3 × 3 DFN |
| MCP1257                                           | Regulated             | 1.8 to 3.6              | 3.3                                    | 100                         | 650                       | 2300                                                       | N/A                                                    | 85% at 50 mA                    | Soft start, shutdown, low battery warning signal, and sleep mode  | 10-pin MSOP and 10-pin 3 × 3 DFN |
| MCP1258                                           | Regulated             | 1.8 to 3.6              | 3.3                                    | 100                         | 650                       | 2300                                                       | N/A                                                    | 85% at 50 mA                    | Soft start, shutdown, power good signal and bypass mode           | 10-pin MSOP and 10-pin 3 × 3 DFN |
| MCP1259                                           | Regulated             | 1.8 to 3.6              | 3.3                                    | 100                         | 650                       | 2300                                                       | N/A                                                    | 85% at 50 mA                    | Soft start, shutdown, low battery warning signal, and bypass mode | 10-pin MSOP and 10-pin 3 × 3 DFN |
| MCP1252                                           | Regulated             | 2.0 to 5.5              | 3.3, 5.0, or adjustable                | 150                         | 650                       | 60                                                         | N/A                                                    | 81% at 10 mA                    | Shutdown, power good, regulated output, adjustable version        | 8-pin MSOP                       |
| MCP1253                                           | Regulated             | 2.0 to 5.5              | 3.3, 5.0, or adjustable                | 150                         | 1000                      | 60                                                         | N/A                                                    | 81% at 10 mA                    | Shutdown, power good, regulated output, adjustable version        | 8-pin MSOP                       |

## POWER MANAGEMENT: CPU/System Supervisors

| Part #   | V <sub>CC</sub> Range (V) | Operating Temp. Range (°C) | Nominal Reset Voltage (V)                 | Reset Type      | Output                        | Typical Reset Pulse Width (ms) | Typical Supply Current (μA) | Additional Features                                                                                   | Packages                                | Bond Options |
|----------|---------------------------|----------------------------|-------------------------------------------|-----------------|-------------------------------|--------------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------|-----------------------------------------|--------------|
| MCP102   | 1.0 to 5.5                | −40 to +125                | 4.63, 4.38, 3.08, 2.93, 2.63, 2.32, 1.9   | Active-Low      | CMOS Push-Pull                | 120                            | 1                           |                                                                                                       | 3-pin SOT-23B, 3-pin SC-70, 3-pin TO-92 | N/A          |
| MCP103   | 1.0 to 5.5                | −40 to +125                | 4.63, 4.38, 3.08, 2.93, 2.63, 2.32, 1.9   | Active-Low      | CMOS Push-Pull                | 120                            | 1                           | Max809 Pinout                                                                                         | 3-pin SOT-23B, 3-pin SC-70, 3-pin TO-92 | N/A          |
| MCP121   | 1.0 to 5.5                | −40 to +125                | 4.63, 4.38, 3.08, 2.93, 2.63, 2.32, 1.9   | Active-Low      | Open-Drain                    | 120                            | 1                           |                                                                                                       | 3-pin SOT-23B, 3-pin SC-70, 3-pin TO-92 | N/A          |
| MCP131   | 1.0 to 5.5                | −40 to +125                | 4.63, 4.38, 3.08, 2.93, 2.63, 2.32, 1.9   | Active-Low      | Open-Drain                    | 120                            | 1                           | 100 kΩ Internal Pull-up Resistor                                                                      | 3-pin SOT-23B, 3-pin SC-70, 3-pin TO-92 | N/A          |
| MCP1316  | 1.0 to 5.5                | −40 to +125                | 4.6, 2.9 <sup>(1)</sup>                   | Active-Low      | CMOS Push-Pull                | 200                            | 5                           | Watchdog Input (WDI), Timeout = 1.6 sec., Manual Reset                                                | 5-pin SOT-23                            | N/A          |
| MCP1317  | 1.0 to 5.5                | −40 to +125                | 4.6, 2.9 <sup>(1)</sup>                   | Active-High     | CMOS Push-Pull                | 200                            | 5                           | Watchdog Input (WDI), Timeout = 1.6 sec., Manual Reset                                                | 5-pin SOT-23                            | N/A          |
| MCP1318  | 1.0 to 5.5                | −40 to +125                | 4.6, 2.9 <sup>(1)</sup>                   | Active-Low/High | CMOS Push-Pull                | 200                            | 5                           | Watchdog Input (WDI), Timeout = 1.6 sec.                                                              | 5-pin SOT-23                            | N/A          |
| MCP1319  | 1.0 to 5.5                | −40 to +125                | 4.6, 2.9 <sup>(1)</sup>                   | Active-Low/High | CMOS Push-Pull                | 200                            | 1                           | Manual Reset                                                                                          | 5-pin SOT-23                            | N/A          |
| MCP1320  | 1.0 to 5.5                | −40 to +125                | 4.6, 2.9 <sup>(1)</sup>                   | Active-Low      | Open-Drain                    | 200                            | 5                           | Watchdog Input (WDI), Timeout = 1.6 sec., Manual Reset                                                | 5-pin SOT-23                            | N/A          |
| MCP1321  | 1.0 to 5.5                | −40 to +125                | 4.6, 2.9 <sup>(1)</sup>                   | Active-Low      | Open-Drain/<br>CMOS Push-Pull | 200                            | 5                           | Watchdog Input (WDI), Timeout = 1.6 sec., Manual Reset (Active-Low Open-Drain, Active-High Push-Pull) | 5-pin SOT-23                            | N/A          |
| TC1270A  | 1.0 to 5.5                | −40 to +125                | 4.63, 4.38, 3.08, 2.93, 2.63              | Active-Low      | CMOS Push-Pull                | 280                            | 7                           | Manual Reset                                                                                          | 4-pin SOT-143, 5-pin SOT-23             | N/A          |
| TC1271A  | 1.0 to 5.5                | −40 to +125                | 4.63, 4.38, 3.08, 2.93, 2.63              | Active-High     | CMOS Push-Pull                | 280                            | 7                           | Manual Reset                                                                                          | 4-pin SOT-143, 5-pin SOT-23             | N/A          |
| TC1270AN | 1.0 to 5.5                | −40 to +125                | 4.63, 4.38, 3.08, 2.93, 2.63              | Active-Low      | Open-Drain                    | 0                              | 7                           | Manual Reset                                                                                          | 4-pin SOT-143, 5-pin SOT-23             | N/A          |
| TCM809   | 1.2 to 5.5                | −40 to +85                 | 4.63, 4.38, 4.00, 3.08, 2.93, 2.63, 2.32  | Active-Low      | CMOS Push-Pull                | 240                            | 12                          |                                                                                                       | 3-pin SOT-23B, 3-pin SC-70              | N/A          |
| TCM810   | 1.2 to 5.5                | −40 to +85                 | 4.63, 4.38, 4.00, 3.08, 2.93, 2.63, 2.32  | Active-High     | CMOS Push-Pull                | 240                            | 12                          |                                                                                                       | 3-pin SOT-23B, 3-pin SC-70              | N/A          |
| MCP100   | 1.0 to 5.5                | −40 to +85                 | 4.72, 4.62, 4.47, 4.37, 3.075, 2.92, 2.62 | Active-Low      | CMOS Push-Pull                | 350                            | 45                          |                                                                                                       | 3-pin TO-92, 3-pin SOT-23B              | D, H         |
| MCP809   | 1.0 to 5.5                | −40 to +85                 | 4.72, 4.62, 4.47, 4.37, 3.075, 2.92, 2.62 | Active-Low      | CMOS Push-Pull                | 350                            | 45                          |                                                                                                       | 3-pin SOT-23B                           | N/A          |
| MCP101   | 1.0 to 5.5                | −40 to +85                 | 4.72, 4.62, 4.47, 4.37, 3.075, 2.92, 2.62 | Active-High     | CMOS Push-Pull                | 350                            | 45                          |                                                                                                       | 3-pin TO-92, 3-pin SOT-23B              | D, H         |
| MCP810   | 1.0 to 5.5                | −40 to +85                 | 4.72, 4.62, 4.47, 4.37, 3.075, 2.92, 2.62 | Active-High     | CMOS Push-Pull                | 350                            | 45                          |                                                                                                       | 3-pin SOT-23B                           | N/A          |
| MCP120   | 1.0 to 5.5                | −40 to +85                 | 4.72, 4.62, 4.47, 4.37, 3.075, 2.92, 2.62 | Active-Low      | Open-Drain                    | 350                            | 45                          |                                                                                                       | 3-pin TO-92, 3-pin SOT-23, 8-pin SOIC   | D, G, H      |
| MCP130   | 1.0 to 5.5                | −40 to +85                 | 4.72, 4.62, 4.47, 4.37, 3.075, 2.92, 2.62 | Active-Low      | Open-Drain<br>w/5 kΩ Pull-up  | 350                            | 45                          |                                                                                                       | 3-pin TO-92, 3-pin SOT-23, 8-pin SOIC   | D, F, H      |
| TC1232   | 4.5 to 5.5                | −40 to +85                 | 4.62, 4.37                                | Active-Low/High | Open-Drain                    | 610                            | 50                          | Watchdog Timer                                                                                        | 8-pin PDIP, 8-pin SOIC, 16-pin SOIC     | N/A          |
| TC32M    | 4.5 to 5.5                | −40 to +85                 | 4.5                                       | Active-Low      | Open-Drain                    | 700                            | 50                          | Watchdog Timer                                                                                        | 3-pin TO-92, 3-pin SOT-223              | N/A          |

**Note 1:** Other reset voltage options available: 2.0V to 4.7V in 100 mV increments. Contact local Microchip sales office.

## POWER MANAGEMENT: Voltage Detectors

| Part # | V <sub>CC</sub> Range (V) | Operating Temp. Range (°C) | Nominal Reset Voltage (V)                | Reset Type | Output         | Minimum Reset Pulse Width (ms) | Typical Supply Current (μA) | Features     | Packages                                              |
|--------|---------------------------|----------------------------|------------------------------------------|------------|----------------|--------------------------------|-----------------------------|--------------|-------------------------------------------------------|
| MCP111 | 1.0 to 5.5                | −40 to +125                | 4.63, 4.38, 3.08, 2.93, 2.63, 2.32, 1.90 | Active-Low | Open-Drain     | –                              | 1                           |              | 3-pin SOT-23B, 3-pin TO-92, 3-pin SC-70, 3-pin SOT-89 |
| MCP112 | 1.0 to 5.5                | −40 to +125                | 4.63, 4.38, 3.08, 2.93, 2.63, 2.32, 1.90 | Active-Low | CMOS Push-Pull | –                              | 1                           |              | 3-pin SOT-23B, 3-pin TO-92, 3-pin SC-70, 3-pin SOT-89 |
| TC52   | 1.5 to 10                 | −40 to +85                 | 4.5/2.7, 3.0/2.7                         | Active-Low | Open-Drain     | –                              | 2                           | Dual channel | 5-pin SOT-23A                                         |

| POWER MANAGEMENT: Power MOSFET Drivers |                        |                      |                                         |                            |                                               |                                              |                                     |                           |                                    |                                                       |
|----------------------------------------|------------------------|----------------------|-----------------------------------------|----------------------------|-----------------------------------------------|----------------------------------------------|-------------------------------------|---------------------------|------------------------------------|-------------------------------------------------------|
| Part #                                 | Drivers                | Configuration        | Peak Output Current<br>(source/sink, A) | Maximum Supply Voltage (V) | Output Resistance<br>(source/sink, $\Omega$ ) | Propagation Delay<br>( $T_{d1}/T_{d2}$ , ns) | Rise/Fall Time<br>( $T_r/T_f$ , ns) | Capacitive Load Drive     | Features                           | Packages                                              |
| Low-Side Power MOSFET Drivers          |                        |                      |                                         |                            |                                               |                                              |                                     |                           |                                    |                                                       |
| MCP1401                                | Low-Side Single        | Inverting            | 0.5/0.5                                 | 18                         | 12/10                                         | 35/35                                        | 19/15                               | 470 pF in 19 ns           | Small footprint                    | 5-pin SOT-23                                          |
| <b>MCP14A0051</b>                      | <b>Low-Side Single</b> | <b>Inverting</b>     | <b>0.5/0.5</b>                          | <b>18</b>                  | <b>6.5/4.5</b>                                | <b>40/31</b>                                 | <b>51/39</b>                        | <b>1000 pF in 40 ns</b>   | <b>Enable pin, small footprint</b> | <b>6-pin SOT-23, 6-pin 2 × 2 DFN</b>                  |
| <b>MCP14A0052</b>                      | <b>Low-Side Single</b> | <b>Non-inverting</b> | <b>0.5/0.5</b>                          | <b>18</b>                  | <b>6.5/4.5</b>                                | <b>40/31</b>                                 | <b>51/39</b>                        | <b>1000 pF in 40 ns</b>   | <b>Enable pin, small footprint</b> | <b>6-pin SOT-23, 6-pin 2 × 2 DFN</b>                  |
| MCP1402                                | Low-Side Single        | Non-inverting        | 0.5/0.5                                 | 18                         | 12/10                                         | 35/35                                        | 19/15                               | 470 pF in 19 ns           | Small footprint                    | 5-pin SOT-23                                          |
| TC1410                                 | Low-Side Single        | Inverting            | 0.5/0.5                                 | 16                         | 16/16                                         | 30/30                                        | 25/25                               | 500 pF in 25 ns           |                                    | 8-pin SOIC, 8-pin MSOP, 8-pin PDIP                    |
| TC1410N                                | Low-Side Single        | Non-inverting        | 0.5/0.5                                 | 16                         | 16/16                                         | 30/30                                        | 25/25                               | 500 pF in 25 ns           |                                    | 8-pin SOIC, 8-pin MSOP, 8-pin PDIP                    |
| TC1411                                 | Low-Side Single        | Inverting            | 1.0/1.0                                 | 16                         | 8/8                                           | 30/30                                        | 25/25                               | 1000 pF in 25 ns          |                                    | 8-pin SOIC, 8-pin MSOP, 8-pin PDIP                    |
| TC1411N                                | Low-Side Single        | Non-inverting        | 1.0/1.0                                 | 16                         | 8/8                                           | 30/30                                        | 25/25                               | 1000 pF in 25 ns          |                                    | 8-pin SOIC, 8-pin MSOP, 8-pin PDIP                    |
| TC1426                                 | Low-Side Dual          | Inverting            | 1.2/1.2                                 | 16                         | 12/8                                          | 75/75                                        | 25/35                               | 1000 pF in 38 ns          |                                    | 8-pin SOIC, 8-pin PDIP                                |
| TC1427                                 | Low-Side Dual          | Non-inverting        | 1.2/1.2                                 | 16                         | 12/8                                          | 75/75                                        | 25/35                               | 1000 pF in 38 ns          |                                    | 8-pin SOIC, 8-pin PDIP                                |
| TC1428                                 | Low-Side Dual          | Complimentary        | 1.2/1.2                                 | 16                         | 12/8                                          | 75/75                                        | 25/35                               | 1000 pF in 38 ns          |                                    | 8-pin SOIC, 8-pin PDIP                                |
| TC4467                                 | Low-Side Quad          | Inverting            | 1.2/1.2                                 | 18                         | 10/10                                         | 40/40                                        | 15/15                               | 470 pF in 15 ns           |                                    | 16-pin SOIC, 14-pin PDIP                              |
| TC4468                                 | Low-Side Quad          | Non-inverting        | 1.2/1.2                                 | 18                         | 10/10                                         | 40/40                                        | 15/15                               | 470 pF in 15 ns           |                                    | 16-pin SOIC, 14-pin PDIP                              |
| TC4469                                 | Low-Side Quad          | Complimentary        | 1.2/1.2                                 | 18                         | 10/10                                         | 40/40                                        | 15/15                               | 470 pF in 15 ns           |                                    | 16-pin SOIC, 14-pin PDIP                              |
| <b>MCP14A0151</b>                      | <b>Low-Side Single</b> | <b>Inverting</b>     | <b>1.5/1.5</b>                          | <b>18</b>                  | <b>17/10</b>                                  | <b>41/32</b>                                 | <b>18.5/17</b>                      | <b>1000 pF in 11.5 ns</b> | <b>Enable pin, small footprint</b> | <b>6-pin SOT-23, 6-pin 2 × 2 DFN</b>                  |
| <b>MCP14A0152</b>                      | <b>Low-Side Single</b> | <b>Non-inverting</b> | <b>1.5/1.5</b>                          | <b>18</b>                  | <b>17/10</b>                                  | <b>41/32</b>                                 | <b>18.5/17</b>                      | <b>1000 pF in 11.5 ns</b> | <b>Enable pin, small footprint</b> | <b>6-pin SOT-23, 6-pin 2 × 2 DFN</b>                  |
| MCP1415                                | Low-Side Single        | Inverting            | 1.5/1.5                                 | 18                         | 6/4                                           | 41/48                                        | 20/20                               | 470 pF in 13 ns           | Small footprint                    | 5-pin SOT-23                                          |
| MCP1416                                | Low-Side Single        | Non-inverting        | 1.5/1.5                                 | 18                         | 6/4                                           | 41/48                                        | 20/20                               | 470 pF in 13 ns           | Small footprint                    | 5-pin SOT-23                                          |
| TC4426A                                | Low-Side Dual          | Inverting            | 1.5/1.5                                 | 18                         | 7/7                                           | 30/30                                        | 25/25                               | 1000 pF in 25 ns          |                                    | 8-pin SOIC, 8-pin MSOP, 8-pin PDIP, 8-pin 6 × 5 DFN-S |
| TC4427A                                | Low-Side Dual          | Non-inverting        | 1.5/1.5                                 | 18                         | 7/7                                           | 30/30                                        | 25/25                               | 1000 pF in 25 ns          |                                    | 8-pin SOIC, 8-pin MSOP, 8-pin PDIP, 8-pin 6 × 5 DFN-S |
| TC4428A                                | Low-Side Dual          | Complimentary        | 1.5/1.5                                 | 18                         | 7/7                                           | 30/30                                        | 25/25                               | 1000 pF in 25 ns          |                                    | 8-pin SOIC, 8-pin MSOP, 8-pin PDIP, 8-pin 6 × 5 DFN-S |
| TC4404                                 | Low-Side Single        | Inverting            | 1.5/1.5                                 | 18                         | 7/7                                           | 40/60                                        | 40/40                               | 1000 pF in 30 ns          |                                    | 8-pin SOIC, 8-pin PDIP                                |
| TC4405                                 | Low-Side Single        | Non-inverting        | 1.5/1.5                                 | 18                         | 7/7                                           | 40/60                                        | 40/40                               | 1000 pF in 30 ns          |                                    | 8-pin SOIC, 8-pin PDIP                                |
| TC4626                                 | Low-Side Single        | Inverting            | 1.5/1.5                                 | 6                          | 10/8                                          | 35/45                                        | 33/27                               | 1000 pF in 40 ns          | Boosted drive voltage              | 16-pin SOIC, 8-pin PDIP                               |
| TC4627                                 | Low-Side Single        | Non-inverting        | 1.5/1.5                                 | 6                          | 10/8                                          | 35/45                                        | 33/27                               | 1000 pF in 40 ns          | Boosted drive voltage              | 16-pin SOIC, 8-pin PDIP                               |
| MCP14E6                                | Low-Side Dual          | Inverting            | 2.0/2.0                                 | 18                         | 5/5                                           | 45/45                                        | 12/15                               | 1000 pF in 15 ns          | Enable pin                         | 8-pin SOIC, 8-pin PDIP, 8-pin 6 × 5 DFN               |
| MCP14E7                                | Low-Side Dual          | Non-inverting        | 2.0/2.0                                 | 18                         | 5/5                                           | 45/45                                        | 12/15                               | 1000 pF in 15 ns          | Enable pin                         | 8-pin SOIC, 8-pin PDIP, 8-pin 6 × 5 DFN               |
| MCP14E8                                | Low-Side Dual          | Complimentary        | 2.0/2.0                                 | 18                         | 5/5                                           | 45/45                                        | 12/15                               | 1000 pF in 15 ns          | Enable pin                         | 8-pin SOIC, 8-pin PDIP, 8-pin 6 × 5 DFN               |
| TC1412                                 | Low-Side Single        | Inverting            | 2.0/2.0                                 | 16                         | 4/4                                           | 35/35                                        | 18/18                               | 1000 pF in 18 ns          |                                    | 8-pin SOIC, 8-pin MSOP, 8-pin PDIP                    |
| TC1412N                                | Low-Side Single        | Non-inverting        | 2.0/2.0                                 | 16                         | 4/4                                           | 35/35                                        | 18/18                               | 1000 pF in 18 ns          |                                    | 8-pin SOIC, 8-pin MSOP, 8-pin PDIP                    |
| TC4423A                                | Low-Side Dual          | Inverting            | 3.0/3.0                                 | 18                         | 2.2/2.8                                       | 40/41                                        | 12/12                               | 1800 pF in 12 ns          |                                    | 8-pin SOIC, 16-pin SOIC, 8-pin PDIP, 8-pin 6 × 5 DFN  |
| TC4424A                                | Low-Side Dual          | Non-inverting        | 3.0/3.0                                 | 18                         | 2.2/2.8                                       | 40/41                                        | 12/12                               | 1800 pF in 12 ns          |                                    | 8-pin SOIC, 16-pin SOIC, 8-pin PDIP, 8-pin 6 × 5 DFN  |
| TC4425A                                | Low-Side Dual          | Complimentary        | 3.0/3.0                                 | 18                         | 2.2/2.8                                       | 40/41                                        | 12/12                               | 1800 pF in 12 ns          |                                    | 8-pin SOIC, 16-pin SOIC, 8-pin PDIP, 8-pin 6 × 5 DFN  |
| MCP14E9                                | Low-Side Dual          | Inverting            | 3.0/3.0                                 | 18                         | 4/4                                           | 45/45                                        | 14/17                               | 1800 pF in 17 ns          | Enable pin                         | 8-pin SOIC, 8-pin PDIP, 8-pin 6 × 5 DFN               |
| MCP14E10                               | Low-Side Dual          | Non-inverting        | 3.0/3.0                                 | 18                         | 4/4                                           | 45/45                                        | 14/17                               | 1800 pF in 17 ns          | Enable pin                         | 8-pin SOIC, 8-pin PDIP, 8-pin 6 × 5 DFN               |
| MCP14E11                               | Low-Side Dual          | Complimentary        | 3.0/3.0                                 | 18                         | 4/4                                           | 45/45                                        | 14/17                               | 1800 pF in 17 ns          | Enable pin                         | 8-pin SOIC, 8-pin PDIP, 8-pin 6 × 5 DFN               |
| TC1413                                 | Low-Side Single        | Inverting            | 3.0/3.0                                 | 16                         | 2.7/2.7                                       | 35/35                                        | 20/20                               | 1800 pF in 20 ns          |                                    | 8-pin SOIC, 8-pin MSOP, 8-pin PDIP                    |
| TC1413N                                | Low-Side Single        | Non-inverting        | 3.0/3.0                                 | 16                         | 2.7/2.7                                       | 35/35                                        | 20/20                               | 1800 pF in 20 ns          |                                    | 8-pin SOIC, 8-pin MSOP, 8-pin PDIP                    |
| MCP14E3                                | Low-Side Dual          | Inverting            | 4.0/4.0                                 | 18                         | 2.5/2.5                                       | 46/50                                        | 15/18                               | 2200 pF in 15 ns          | Enable pin                         | 8-pin SOIC, 8-pin PDIP, 8-pin 6 × 5 DFN               |
| MCP14E4                                | Low-Side Dual          | Non-inverting        | 4.0/4.0                                 | 18                         | 2.5/2.5                                       | 46/50                                        | 15/18                               | 2200 pF in 15 ns          | Enable pin                         | 8-pin SOIC, 8-pin PDIP, 8-pin 6 × 5 DFN               |
| MCP14E5                                | Low-Side Dual          | Complimentary        | 4.0/4.0                                 | 18                         | 2.5/2.5                                       | 46/50                                        | 15/18                               | 2200 pF in 15 ns          | Enable pin                         | 8-pin SOIC, 8-pin PDIP, 8-pin 6 × 5 DFN               |
| MCP1403                                | Low-Side Dual          | Inverting            | 4.5/4.5                                 | 18                         | 2.2/2.8                                       | 40/40                                        | 15/18                               | 2200 pF in 15 ns          |                                    | 8-pin SOIC, 16-pin SOIC, 8-pin PDIP, 8-pin 6 × 5 DFN  |
| MCP1404                                | Low-Side Dual          | Non-inverting        | 4.5/4.5                                 | 18                         | 2.2/2.8                                       | 40/40                                        | 15/18                               | 2200 pF in 15 ns          |                                    | 8-pin SOIC, 16-pin SOIC, 8-pin PDIP, 8-pin 6 × 5 DFN  |

**POWER MANAGEMENT: Power MOSFET Drivers (Continued)**

| Part #                                           | Drivers              | Configuration               | Peak Output Current<br>(source/sink, A) | Maximum Supply Voltage (V) | Output Resistance<br>(source/sink, $\Omega$ ) | Propagation Delay<br>( $T_{d1}/T_{d2}$ , ns) | Rise/Fall Time ( $T_r/T_f$ , ns) | Capacitive Load Drive | Features                              | Packages                                             |
|--------------------------------------------------|----------------------|-----------------------------|-----------------------------------------|----------------------------|-----------------------------------------------|----------------------------------------------|----------------------------------|-----------------------|---------------------------------------|------------------------------------------------------|
| <b>Low-Side Power MOSFET Drivers (Continued)</b> |                      |                             |                                         |                            |                                               |                                              |                                  |                       |                                       |                                                      |
| MCP1405                                          | Low-Side Dual        | Complimentary               | 4.5/4.5                                 | 18                         | 2.2/2.8                                       | 40/40                                        | 15/18                            | 2200 pF in 15 ns      |                                       | 8-pin SOIC, 16-pin SOIC, 8-pin PDIP, 8-pin 6 × 5 DFN |
| MCP1406                                          | Low-Side Single      | Inverting                   | 6.0/6.0                                 | 18                         | 2.1/1.5                                       | 40/40                                        | 20/20                            | 2500 pF in 20 ns      |                                       | 8-pin SOIC, 8-pin PDIP, 8-pin 6 × 5 DFN              |
| MCP1407                                          | Low-Side Single      | Non-inverting               | 6.0/6.0                                 | 18                         | 2.1/1.5                                       | 40/40                                        | 20/20                            | 2500 pF in 20 ns      |                                       | 8-pin SOIC, 8-pin PDIP, 8-pin 6 × 5 DFN              |
| TC4421A                                          | Low-Side Single      | Inverting                   | 9.0/9.0                                 | 18                         | 1.25/0.8                                      | 38/42                                        | 28/26                            | 4700 pF in 15 ns      |                                       | 8-pin SOIC, 8-pin PDIP, 8-pin 6 × 5 DFN              |
| TC4422A                                          | Low-Side Single      | Non-inverting               | 9.0 / 9.0                               | 18                         | 1.25 / 0.8                                    | 38 / 42                                      | 28 / 26                          | 4700 pF in 15 ns      |                                       | 8-pin SOIC, 8-pin PDIP, 8-pin 6 × 5 DFN              |
| TC4451                                           | Low-Side Single      | Inverting                   | 12.0/12.0                               | 18                         | 1.0/0.9                                       | 44/44                                        | 30/32                            | 10,000 pF in 21 ns    |                                       | 8-pin SOIC, 8-pin PDIP, 8-pin 6 × 5 DFN              |
| TC4452                                           | Low Side Single      | Non-inverting               | 12.0/12.0                               | 18                         | 1.0/0.9                                       | 44/44                                        | 30/32                            | 10,000 pF in 21 ns    |                                       | 8-pin SOIC, 8-pin PDIP, 8-pin 6 × 5 DFN              |
| <b>High-Side and Synchronous Drivers</b>         |                      |                             |                                         |                            |                                               |                                              |                                  |                       |                                       |                                                      |
| TC4431                                           | High-Side Single     | Inverting                   | 3.0/1.5                                 | 30                         | 7/7                                           | 62/78                                        | 25/33                            | 1000 pF in 15 ns      | 30V, high-side driver                 | 8-pin SOIC, 8-pin PDIP                               |
| TC4432                                           | High-Side Single     | Non-inverting               | 3.0/1.5                                 | 30                         | 7/7                                           | 62/78                                        | 25/33                            | 1000 pF in 15 ns      | 30V, high-side driver                 | 8-pin SOIC, 8-pin PDIP                               |
| TC4403                                           | Floating Load Driver | Non-inverting               | 1.5/1.5                                 | 18                         | 2.8/3.5                                       | 33/38                                        | 23/25                            | 1800 pF in 25 ns      | Floating load driver                  | 8-pin PDIP                                           |
| MCP14628                                         | Sync. Buck Dual      | Synchronous Buck (high/low) | 2.0/2/0<br>(3.5 low side)               | 5.5<br>(36V boot pin)      | 1/1<br>(0.5 on low side)                      | 15–22                                        | 10/10                            | 3300 pF in 10 ns      | Continuous or discontinuous operation | 8-pin SOIC, 8-pin 3 × 3 DFN                          |
| MCP14700                                         | Sync. Buck Dual      | Synchronous Buck (high/low) | 2.0/2/0<br>(3.5 low side)               | 5.5<br>(36V boot pin)      | 1/1<br>(0.5 on low side)                      | 15–22                                        | 10/10                            | 3300 pF in 10 ns      | Allows external dead time control     | 8-pin SOIC, 8-pin 3 × 3 DFN                          |

**POWER MANAGEMENT: Power MOSFETs**

| Part #   | Vds (V) | Configuration | Polarity | Rds (on) @ 4.5V<br>(m $\Omega$ , Max.) | Rds (on) @ 10V<br>(m $\Omega$ , Max.) | Qg @ 4.5V<br>(nC, Max.) | Id (A, Max. @<br>25°C, Tcase) | Vgs (th)<br>(V, Min.) | Qgd (nC, Typ.) | Rg ( $\Omega$ , Typ.) | Packages                                  |
|----------|---------|---------------|----------|----------------------------------------|---------------------------------------|-------------------------|-------------------------------|-----------------------|----------------|-----------------------|-------------------------------------------|
| MCP87018 | 25      | Single        | N        | 2.2                                    | 1.9                                   | 37                      | 100                           | 1                     | 13             | 1.5                   | 8-pin 5 × 6 PDFN                          |
| MCP87022 | 25      | Single        | N        | 2.6                                    | 2.3                                   | 29                      | 100                           | 1                     | 9              | 1.3                   | 8-pin 5 × 6 PDFN                          |
| MCP87030 | 25      | Single        | N        | 4                                      | 3.5                                   | 22                      | 100                           | 1                     | 6.7            | 1.2                   | 8-pin 5 × 6 PDFN                          |
| MCP87050 | 25      | Single        | N        | 6                                      | 5                                     | 15                      | 100                           | 1                     | 4.7            | 1.1                   | 8-pin 5 × 6 PDFN                          |
| MCP87055 | 25      | Single        | N        | 7                                      | 6                                     | 14                      | 60                            | 1                     | 4.5            | 2.1                   | 8-pin 3.3 × 3.3 PDFN                      |
| MCP87090 | 25      | Single        | N        | 12                                     | 10.5                                  | 10                      | 64                            | 1.1                   | 2.8            | 1.8                   | 8-pin 5 × 6 PDFN,<br>8-pin 3.3 × 3.3 PDFN |
| MCP87130 | 25      | Single        | N        | 16.5                                   | 13.5                                  | 8                       | 54                            | 1.1                   | 2.6            | 1.7                   | 8-pin 5 × 6 PDFN,<br>8-pin 3.3 × 3.3 PDFN |

**POWER MANAGEMENT: Battery Chargers**

| Part #   | Mode   | Cell Type         | # of Cells | Vcc Range (V) | Cell Voltage (V)    | Maximum Charging Current (mA) | Max. Voltage Regulation (%) | Int/Ext FET | Features                                                                      | Packages         |
|----------|--------|-------------------|------------|---------------|---------------------|-------------------------------|-----------------------------|-------------|-------------------------------------------------------------------------------|------------------|
| MCP73113 | Linear | Li-Ion/Li-Polymer | 1          | 4 to 16       | 4.1, 4.2, 4.35, 4.4 | 1100                          | ±0.5                        | Int         | 6.5V Overvoltage Protection                                                   | 10-pin 3 × 3 DFN |
| MCP73114 | Linear | Li-Ion/Li-Polymer | 1          | 4 to 16       | 4.1, 4.2, 4.35, 4.4 | 1100                          | ±0.5                        | Int         | 5.8V Overvoltage Protection                                                   | 10-pin 3 × 3 DFN |
| MCP73123 | Linear | LiFePO4           | 1          | 4 to 16       | 3.6                 | 1100                          | ±0.5                        | Int         | 6.5V Overvoltage Protection, LiFePO4 charging                                 | 10-pin 3 × 3 DFN |
| MCP73213 | Linear | Li-Ion/Li-Polymer | 2          | 4 to 16       | 8.2, 8.4, 8.7, 8.8  | 1100                          | ±0.6                        | Int         | 13V Overvoltage Protection                                                    | 10-pin 3 × 3 DFN |
| MCP73223 | Linear | LiFePO4           | 2          | 4 to 16       | 7.2                 | 1100                          | ±0.6                        | Int         | 13V Overvoltage Protection, LiFePO4 charging                                  | 10-pin 3 × 3 DFN |
| MCP73826 | Linear | Li-Ion/Li-Polymer | 1          | 4.5 to 5.5    | 4.1, 4.2            | N/A                           | ±1.0                        | Ext         | Small size, charge current set by external FET                                | 6-pin SOT-23     |
| MCP73827 | Linear | Li-Ion/Li-Polymer | 1          | 4.5 to 5.5    | 4.1, 4.2            | N/A                           | ±1.0                        | Ext         | Mode indicator, Charge current monitor, Charge current set by external FET    | 8-pin MSOP       |
| MCP73828 | Linear | Li-Ion/Li-Polymer | 1          | 4.5 to 5.5    | 4.1, 4.2            | N/A                           | ±1.0                        | Ext         | Temperature monitor, Charge current set by external FET                       | 8-pin MSOP       |
| MCP73841 | Linear | Li-Ion/Li-Polymer | 1          | 4.5 to 12     | 4.1, 4.2            | N/A                           | ±0.5                        | Ext         | Safety charge timers, Temperature monitor, Charge current set by external FET | 10-pin MSOP      |
| MCP73841 | Linear | Li-Ion/Li-Polymer | 1          | 4.5 to 12     | 4.1, 4.2            | N/A                           | ±0.5                        | Ext         | Safety charge timers, Temperature monitor, Charge current set by external FET | 10-pin MSOP      |
| MCP73842 | Linear | Li-Ion/Li-Polymer | 2          | 8.7 to 12     | 8.2, 8.4            | N/A                           | ±0.5                        | Ext         | Safety charge timers, Temperature monitor, Charge current set by external FET | 10-pin MSOP      |
| MCP73843 | Linear | Li-Ion/Li-Polymer | 1          | 4.5 to 12     | 4.1, 4.2            | N/A                           | ±0.5                        | Ext         | Safety charge timers, Charge current set by external FET                      | 8-pin MSOP       |
| MCP73844 | Linear | Li-Ion/Li-Polymer | 2          | 8.7 to 12     | 8.2, 8.4            | N/A                           | ±0.5                        | Ext         | Safety charge timers, Charge current set by external FET                      | 8-pin MSOP       |
| MCP73811 | Linear | Li-Ion/Li-Polymer | 1          | 3.7 to 6.0    | 4.2                 | 500                           | ±1.0                        | Int         | Selectable charge current (100 mA, 500 mA), Charge enable input               | 5-pin SOT-23     |

**POWER MANAGEMENT: Battery Chargers (Continued)**

| Part #     | Mode   | Cell Type         | # of Cells | V <sub>CC</sub> Range (V) | Cell Voltage (V)    | Maximum Charging Current (mA)   | Max. Voltage Regulation (%) | Int/Ext FET | Features                                                                                                                       | Packages                      |
|------------|--------|-------------------|------------|---------------------------|---------------------|---------------------------------|-----------------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| MCP73812   | Linear | Li-Ion/Li Polymer | 1          | 3.7 to 6.0                | 4.2                 | 500                             | ±1.0                        | Int         | Programmable charge current (100 mA, 500 mA), Charge enable input                                                              | 5-pin SOT-23                  |
| MCP73830/L | Linear | Li-Ion/Li-Polymer | 1          | 3.75 to 6.0               | 4.2                 | 1000/200                        | ±0.75                       | Int         | Soft-start, Charge enable pin                                                                                                  | 6-pin 2 × 2 TDFN              |
| MCP73831   | Linear | Li-Ion/Li-Polymer | 1          | 3.7 to 6.0                | 4.2, 4.35, 4.4, 4.5 | 500                             | ±0.75                       | Int         | UVLO, Thermal regulation, Programmable charge current, Tri-state STAT pin                                                      | 5-pin SOT-23, 8-pin 2 × 3 DFN |
| MCP73832   | Linear | Li-Ion/Li-Polymer | 1          | 3.7 to 6.0                | 4.2, 4.35, 4.4, 4.5 | 500                             | ±0.75                       | Int         | UVLO, Thermal regulation, Programmable charge current, Open-drain STAT pin                                                     | 5-pin SOT-23, 8-pin 2 × 3 DFN |
| MCP73853   | Linear | Li-Ion/Li-Polymer | 1          | 4.5 to 5.5                | 4.1, 4.2            | 500                             | ±0.5                        | Int         | USB control, Safety charge timers, Temperature monitor, Thermal regulation                                                     | 16-pin 4 × 4 QFN              |
| MCP73855   | Linear | Li-Ion/Li-Polymer | 1          | 4.5 to 5.5                | 4.1, 4.2            | 500                             | ±0.5                        | Int         | USB control, Safety charge timers, Thermal regulation                                                                          | 10-pin 3 × 3 DFN              |
| MCP73833   | Linear | Li-Ion/Li-Polymer | 1          | 3.7 to 6.0                | 4.2, 4.35, 4.4, 4.5 | 1000                            | ±0.75                       | Int         | UVLO, Thermal regulation, Thermistor input, LDO Test mode, Multiple V <sub>REG</sub> outputs, Safety timer, Power good output  | 10-pin 3 × 3 DFN, 10-pin MSOP |
| MCP73834   | Linear | Li-Ion/Li-Polymer | 1          | 3.7 to 6.0                | 4.2, 4.35, 4.4, 4.5 | 1000                            | ±0.75                       | Int         | UVLO, Thermal regulation, Thermistor input, LDO Test mode, Multiple V <sub>REG</sub> outputs, Safety timer, Timer enable input | 10-pin 3 × 3 DFN, 10-pin MSOP |
| MCP73837   | Linear | Li-Ion/Li-Polymer | 1          | 3.7 to 6.0                | 4.2, 4.35, 4.4, 4.5 | 1000                            | ±0.75                       | Int         | Dual input (USB, DC input from adapter) auto-switching, UVLO, Thermal regulation, Thermistor input, Power good output          | 10-pin 3 × 3 DFN, 10-pin MSOP |
| MCP73838   | Linear | Li-Ion/Li Polymer | 1          | 3.7 to 6.0                | 4.2, 4.35, 4.4, 4.5 | 1000                            | ±0.75                       | Int         | Dual input (USB, DC input from adapter) auto-switching, UVLO, Thermal regulation, Timer enable input                           | 10-pin 3 × 3 DFN, 10-pin MSOP |
| MCP73871   | Linear | Li-Ion/Li-Polymer | 1          | 3.75 to 6.0               | 4.1, 4.2, 4.35, 4.4 | 1500 (A/C Adapter)<br>500 (USB) | ±0.5                        | Int         | Simultaneous charging of load and battery, Load-dependent charging, Multiple programmable charge currents                      | 20-pin 4 × 4 QFN, 20-pin SSOP |

**POWER MANAGEMENT: Hot Swap Controllers**

| Part #   | Number of Outputs | V <sub>POS</sub> to V <sub>NEG</sub> Differential Voltage (V) | Junction Temperature Range (°C) | OVLO       | UVLO       | Power Good | Int/Ext FET | Applications                        | Packages    |
|----------|-------------------|---------------------------------------------------------------|---------------------------------|------------|------------|------------|-------------|-------------------------------------|-------------|
| MCP18480 | 1                 | −0.3 to +15.0                                                 | −40 to +85                      | Adjustable | Adjustable | Adjustable | Ext         | −48V Telecom/Datacom, Bus/Backplane | 20-pin SSOP |

**POWER MANAGEMENT: Electroluminescent Backlight Drivers**

| Part #                     | Input Voltage Low (V) | Input Voltage High (V) | Nominal Output Voltage (V) | Switch Resistance (Max Ω) | Output Regulation | Lamp Size Per Device (Max in <sup>2</sup> ) | Packages        |
|----------------------------|-----------------------|------------------------|----------------------------|---------------------------|-------------------|---------------------------------------------|-----------------|
| <b>Single Lamp Drivers</b> |                       |                        |                            |                           |                   |                                             |                 |
| HV816 <sup>(3)</sup>       | 2.7                   | 5.5                    | ±180                       | -                         | Yes               | 42                                          | QFN-16          |
| HV823                      | 2.0                   | 9.5                    | ±90                        | 6.0                       | Yes               | 23                                          | SOIC-8          |
| HV825                      | 1.0                   | 1.6                    | ±56                        | 15                        | No                | 3.0                                         | SOIC-8, MSOP-8  |
| HV830                      | 2.0                   | 9.5                    | ±100                       | 4.0                       | Yes               | 25                                          | SOIC-8          |
| HV833                      | 1.8                   | 6.5                    | ±90                        | 4.0                       | Yes               | 12                                          | MSOP-8          |
| HV857L                     | 1.8                   | 5.0                    | ±95                        | 6.0                       | Yes               | 5.0                                         | DFN-8, MSOP-8   |
| HV857                      | 1.8                   | 5.0                    | ±95                        | 6.0                       | Yes               | 5.0                                         | DFN-8, MSOP-8   |
| HV859                      | 1.8                   | 5.0                    | ±105                       | 6.0                       | Yes               | 5.0                                         | DFN-8, MSOP-8   |
| HV860                      | 2.5                   | 4.5                    | ±110                       | 6.0                       | Yes               | 5.0                                         | QFN-12          |
| <b>Dual Lamp Drivers</b>   |                       |                        |                            |                           |                   |                                             |                 |
| HV839 <sup>(4)</sup>       | 2.0                   | 5.8                    | ±90                        | 6.0                       | Yes               | 3.5                                         | DFN-10, MSOP-10 |
| HV841 <sup>(4)</sup>       | 2.0                   | 5.8                    | ±100                       | 6.0                       | Yes               | 3.5                                         | DFN-10, MSOP-10 |
| HV843 <sup>(4)</sup>       | 2.0                   | 5.8                    | ±90                        | 10.0                      | Yes               | 3.5                                         | DFN-10          |
| HV845                      | 2.0                   | 5.8                    | ±90                        | 10.0                      | Yes               | 3.5                                         | QFN-12          |
| HV861                      | 2.5                   | 4.5                    | ±90                        | 7.0                       | Yes               | 5.0                                         | QFN-16          |

**Note 1:** For new cell phone designs use HV801.

**Note 2:** Up to 3.0 in<sup>2</sup> in any combination.

**Note 3:** The boost converter switching FET is external to the device, so its resistance will vary depending upon the application circuit.

**POWER MANAGEMENT: Electroluminescent Backlight Drivers (Continued)**

| Part #                                  | Input Voltage Low (V) | Input Voltage High (V) | Nominal Output Voltage (V) | Switch Resistance (Max $\Omega$ ) | Output Regulation | Lamp Size Per Device (Max in <sup>2</sup> ) | Packages                                |
|-----------------------------------------|-----------------------|------------------------|----------------------------|-----------------------------------|-------------------|---------------------------------------------|-----------------------------------------|
| <b>Tri-Lamp Drivers</b>                 |                       |                        |                            |                                   |                   |                                             |                                         |
| HV856 <sup>(2)</sup>                    | 1.8                   | 6.5                    | $\pm 105$                  | 6.0                               | Yes               | 3.0                                         | DFN-10                                  |
| HV858 <sup>(2)</sup>                    | 1.8                   | 6.5                    | $\pm 95$                   | 6.0                               | Yes               | 3.0                                         | DFN-10, MSOP-10                         |
| <b>16-Segment Drivers</b>               |                       |                        |                            |                                   |                   |                                             |                                         |
| HV509                                   | 2.0                   | 5.5                    | $\pm 200$                  | N/A                               | N/A               | 6.5                                         | QFN-32                                  |
| HV528                                   | 1.7                   | 5.5                    | $\pm 200$                  | N/A                               | N/A               | 6.5                                         | QFN-32                                  |
| HV881 <sup>(3)</sup>                    | 1.8                   | 5.5                    | $\pm 170$                  | N/A                               | Yes               | 4.6                                         | QFN-32                                  |
| <b>Single Inductorless Lamp Drivers</b> |                       |                        |                            |                                   |                   |                                             |                                         |
| HV850                                   | 3.0                   | 4.2                    | $\pm 70$                   | –                                 | Yes               | 1.5                                         | MSOP-8                                  |
| HV852                                   | 2.4                   | 5.0                    | $\pm 80$                   | –                                 | Yes               | 1.5                                         | MSOP-8, DFN-10                          |
| HV853                                   | 3.2                   | 5.0                    | $\pm 80$                   | –                                 | Yes               | 1.5                                         | MSOP-8, DFN-10                          |
| <b>Offline Driver</b>                   |                       |                        |                            |                                   |                   |                                             |                                         |
| HV809                                   | 50                    | 200                    | $\pm 200$                  | –                                 | N/A               | 100                                         | SOIC-8, SOIC-8 with heat slug, T0-220-7 |

**Note 1:** For new cell phone designs use HV801.

**Note 2:** Up to 3.0 in<sup>2</sup> in any combination.

**Note 3:** The boost converter switching FET is external to the device, so its resistance will vary depending upon the application circuit.

**POWER MANAGEMENT: High-Voltage Driver/Interface ICs**

| Part #                                           | Output Channels | Direction | Logic Configuration                                                             | Output Operating Voltage (V) | Output Current Per Channel (mA) | Packages                   |
|--------------------------------------------------|-----------------|-----------|---------------------------------------------------------------------------------|------------------------------|---------------------------------|----------------------------|
| <b>Sink-Only Outputs: Open Drain N-Channel</b>   |                 |           |                                                                                 |                              |                                 |                            |
| HV5122                                           | 32              | CCW       | Serial to parallel converter with output enable and strobe                      | 225                          | 100                             | 44-Lead PQFP, 44-Lead PLCC |
| HV5222                                           | 32              | CW        | Serial to parallel converter with output enable and strobe                      | 225                          | 100                             | 44-Lead PQFP, 44-Lead PLCC |
| HV5522                                           | 32              | CCW       | Serial to parallel converter with latches, polarity, and blanking               | 220                          | 100                             | 44-Lead PQFP, 44-Lead PLCC |
| HV5523                                           | 32              | CCW       | Serial to parallel converter with latches, polarity, and blanking               | 220                          | 100                             | 44-Lead QFN                |
| HV5530                                           | 32              | CCW       | Serial to parallel converter with latches, polarity, and blanking               | 300                          | 100                             | 44-Lead PQFP, 44-Lead PLCC |
| HV5622                                           | 32              | CW        | Serial to parallel converter with latches, polarity, and blanking               | 220                          | 100                             | 44-Lead PQFP, 44-Lead PLCC |
| HV5623                                           | 32              | CW        | Serial to parallel converter with latches, polarity, and blanking               | 220                          | 100                             | 44-Lead QFN                |
| HV5630                                           | 32              | CW        | Serial to parallel converter with latches, polarity, and blanking               | 300                          | 100                             | 44-Lead PLCC               |
| <b>Source-Only Outputs: Open Drain P-Channel</b> |                 |           |                                                                                 |                              |                                 |                            |
| HV4522                                           | 32              | CCW       | Serial to parallel converter with latches, polarity, and blanking               | –220                         | –60                             | 44-Lead PLCC               |
| HV4622                                           | 32              | CW        | Serial to parallel converter with latches, polarity, and blanking               | –220                         | –60                             | 44-Lead PLCC               |
| HV57009                                          | 64              | B         | Current controlled driver with latches and blanking, two 32-bit shift registers | –85                          | Controllable to –2              | 80-Lead PQFP               |

**POWER MANAGEMENT: High-Voltage Driver/Interface ICs (Continued)**

| Part #                                | Output Channels | Direction | Logic Configuration                                                                             | Output Operating Voltage (V) | Output Current Per Channel (mA) | Output Structure       | Clock Rate (Max MHz) | Bits | Outputs On | Packages                 |
|---------------------------------------|-----------------|-----------|-------------------------------------------------------------------------------------------------|------------------------------|---------------------------------|------------------------|----------------------|------|------------|--------------------------|
| <b>Source-Sink Outputs: Push-Pull</b> |                 |           |                                                                                                 |                              |                                 |                        |                      |      |            |                          |
| HV3418                                | 64              | Both      | Serial to parallel converter with latches, polarity, and blanking                               | +180                         | $\pm 5.0$                       | Push-Pull              | 6                    | 1    | All        | 80-Lead PQFP             |
| HV507                                 | 64              | Both      | Serial to parallel converter with latches, polarity, and blanking                               | +300                         | $\pm 1.0$                       | Push-Pull              | 8                    | 1    | All        | 80-Lead PQFP             |
| HV508                                 | 2               | –         | H-Bridge output with two output voltage level selections and polarity                           | +45                          | +225<br>–270                    | Push-Pull,<br>H-Bridge | –                    | –    | –          | 8-Lead SOIC              |
| HV513                                 | 8               | CW        | Serial to parallel converter with latches, polarity, and blanking HI-Z and short circuit detect | +250                         | $\pm 20$                        | Push-Pull              | 8                    | 1    | All        | 24-Lead SOW, 32-Lead QFN |

| POWER MANAGEMENT: High-Voltage Driver/Interface ICs (Continued) |                 |           |                                                                                                 |                              |                                 |                  |                      |      |            |                                        |
|-----------------------------------------------------------------|-----------------|-----------|-------------------------------------------------------------------------------------------------|------------------------------|---------------------------------|------------------|----------------------|------|------------|----------------------------------------|
| Part #                                                          | Output Channels | Direction | Logic Configuration                                                                             | Output Operating Voltage (V) | Output Current Per Channel (mA) | Output Structure | Clock Rate (Max MHz) | Bits | Outputs On | Packages                               |
| Source-Sink Outputs: Push-Pull (Continued)                      |                 |           |                                                                                                 |                              |                                 |                  |                      |      |            |                                        |
| HV514                                                           | 8               | CW        | Serial to parallel converter with data latches, channel polarity select and blanking            | +250                         | ±20                             | Push-Pull        | 8                    | 1    | All        | 24-Lead SOW                            |
| HV518                                                           | 32              | CW        | Serial to parallel converter with latches, enable and strobe                                    | +80                          | +1.0<br>–25                     | Push-Pull        | 6                    | 1    | All        | 40-Lead DIP, 44-Lead PLCC              |
| HV5308B                                                         | 32              | CW        | Serial to parallel converter with latches and output enable                                     | +80                          | ±20                             | Push-Pull        | 8                    | 1    | All        | 44-Lead PQFP, 44-Lead PLCC             |
| HV5408B                                                         | 32              | CCW       | Serial to parallel converter with latches and output enable                                     | +80                          | ±20                             | Push-Pull        | 8                    | 1    | All        | 44-Lead PQFP, 44-Lead PLCC             |
| HV574                                                           | 80              | Both      | Serial to parallel converter with latches, polarity and blanking                                | +80                          | +15<br>–30                      | Push-Pull        | 25                   | 4    | All        | 100-Lead PQFP                          |
| HV57708                                                         | 64              | Both      | EL driver with latches, polarity, and blanking with four 16-bit shift registers                 | +80                          | +12<br>–15                      | Push-Pull        | 6                    | 4    | All        | 80-Lead PQFP                           |
| HV57908                                                         | 64              | Both      | EL or plasma driver w/latches, blanking, polarity and single shift register                     | +80                          | +12<br>–15                      | Push-Pull        | 8                    | 1    | All        | 80-Lead PQFP                           |
| HV5812                                                          | 20              | CW        | Serial to parallel converter with latches, blanking and strobe                                  | +80                          | +1.0<br>–25                     | Push-Pull        | 5                    | 1    | All        | 28-Lead DIP, 28-Lead PLCC, 28-Lead SOW |
| HV583                                                           | 128             | Both      | Serial to parallel converter with latches, enable and blanking                                  | +80                          | ±20                             | Push-Pull        | 40                   | 1    | All        | Die only                               |
| HV632                                                           | 32              | Both      | Serial to parallel converter with latches, polarity and blanking                                | +80                          | ±4.0                            | Gray Shade PWM   | 10                   | 8    | All        | 64-Lead PQFP                           |
| HV633                                                           | 32              | Both      | Amplitude-modulated gray-shade column driver with 128 output levels                             | +80                          | ±7.0                            | Gray Shade Level | 12                   | 7    | All        | 64-Lead PQFP                           |
| HV66                                                            | 32              | CW        | Serial to parallel converter with latches, polarity, and blanking HI-Z and short circuit detect | +60                          | ±5.0                            | Push-Pull        | 5                    | 1    | All        | 44-Lead PQFP, 44-Lead PLCC             |
| HV6810                                                          | 10              | Both      | Serial to parallel converter with data latches, channel polarity select and blanking            | +80                          | +25                             | Push-Pull        | 5                    | 1    | All        | 20-Lead PLCC, 20-Lead SOW              |
| HV7022C                                                         | 34              | Both      | Serial to parallel converter with latches, enable and strobe                                    | +230                         | ±70 (min)                       | Push-Pull        | 4                    | 1    | One        | 44-Lead PLCC                           |
| HV7224                                                          | 40              | CW        | Serial to parallel converter with latches and output enable                                     | +240                         | ±70 (min)                       | Push-Pull        | 3                    | 1    | One        | 64-Lead PQFP                           |
| HV7620                                                          | 32              | Both      | Serial to parallel converter with latches and output enable                                     | +200                         | ±50 (min)                       | Push-Pull        | 10                   | 4    | All        | 64-Lead PQFP                           |
| HV9308                                                          | 32              | CW        | EL or plasma panel driver with latches and output enable                                        | +80                          | +5.0<br>–20                     | Push-Pull        | 8                    | 1    | All        | 44-Lead PLCC                           |
| HV9408                                                          | 32              | CCW       | EL or plasma panel driver with latches and output enable                                        | +80                          | +5.0<br>–20                     | Push-Pull        | 8                    | 1    | All        | 44-Lead PLCC                           |
| HV9708                                                          | 32              | CW        | EL or plasma panel driver with latches, polarity and blanking                                   | +80                          | +5.0<br>–20                     | Push-Pull        | 8                    | 1    | All        | 44-Lead PLCC                           |
| HV9808                                                          | 32              | CCW       | EL or plasma panel driver with latches, polarity and blanking                                   | +80                          | +5.0<br>–20                     | Push-Pull        | 8                    | 1    | All        | 44-Lead PLCC                           |

| POWER MANAGEMENT: LED Drivers               |              |                  |                           |                     |                |                                        |
|---------------------------------------------|--------------|------------------|---------------------------|---------------------|----------------|----------------------------------------|
| Part #                                      | Application  | Topology         | Input Voltage (V)         | Ouput Current       | Dimming        | Packages                               |
| Automotive (AEC-Q100 Certified) LED Drivers |              |                  |                           |                     |                |                                        |
| AT9917                                      | Auto         | Boost, Sepic     | 5.3–40                    | External FET        | PWM/Linear     | TSSOP-24                               |
| AT9919                                      | Auto         | Buck             | 4.5–40                    | External FET        | PWM            | DFN-8                                  |
| AT9932                                      | Auto         | Boost-Buck (Ćuk) | 5.3–40                    | External FET        | PWM/Linear     | TSSOP-24                               |
| AT9933                                      | Auto         | Boost-Buck (Ćuk) | 9.0–75                    | External FET        | PWM            | SOIC-8                                 |
| General Purpose LED Drivers                 |              |                  |                           |                     |                |                                        |
| HV9801A                                     | AC/DC        | Buck             | 15–450                    | External FET        | 4-Level Switch | SOIC-8, SOIC-16                        |
| <b>HV9805</b>                               | <b>AC/DC</b> | <b>Two-stage</b> | <b>110 ±15%, 220 ±15%</b> | <b>External FET</b> | <b>No</b>      | <b>MSOP-10</b>                         |
| HV9861A                                     | AC/DC, DC/DC | Buck             | 12–450                    | External FET        | PWM/Linear     | SOIC-8, SOIC-16                        |
| HV9910B                                     | AC/DC, DC/DC | Buck             | 8.0–450                   | External FET        | PWM/Linear     | SOIC-8, SOIC-16                        |
| HV9910C                                     | AC/DC, DC/DC | Buck             | 15–450                    | External FET        | PWM/Linear     | SOIC-8, SOIC-16, SOIC-8 with Heat Slug |
| HV9918                                      | DC/DC        | Buck             | 4.5–40                    | Integrated FET      | PWM            | DFN-8                                  |

**POWER MANAGEMENT: LED Drivers (Continued)**

| Part #                                         | Application  | Topology                 | Input Voltage (V) | Ouput Current  | Dimming    | Packages              |
|------------------------------------------------|--------------|--------------------------|-------------------|----------------|------------|-----------------------|
| <b>General Purpose LED Drivers (Continued)</b> |              |                          |                   |                |            |                       |
| HV9919B                                        | DC/DC        | Buck                     | 4.5–40            | External FET   | PWM        | DFN-8                 |
| HV9921                                         | AC/DC        | Buck                     | 20–400            | 20 mA          | No         | T0-92-3, SOT-89-3     |
| HV9922                                         | AC/DC        | Buck                     | 20–400            | 50 mA          | No         | T0-92-3, SOT-89-3     |
| HV9923                                         | AC/DC        | Buck                     | 20–400            | 30 mA          | No         | T0-92-3, SOT-89-3     |
| HV9925                                         | AC/DC        | Buck                     | 20–400            | 20–50 mA       | PWM        | SOIC-8 with Heat Slug |
| HV9930                                         | DC/DC        | Hysteric                 | 8.0–200           | External FET   | PWM        | SOIC-8                |
| HV9931                                         | AC/DC        | Single-switch PFC        | 8.0–450           | External FET   | PWM        | SOIC-8                |
| HV9961                                         | AC/DC, DC/DC | Buck                     | 8.0–450           | External FET   | PWM/Linear | SOIC-8, SOIC-16       |
| HV9967B                                        | DC/DC        | Buck                     | 8.0–60            | Integrated FET | PWM/Linear | DFN-8, MSOP-8         |
| <b>Backlight LED Drivers</b>                   |              |                          |                   |                |            |                       |
| HV9803                                         | DC/DC        | Buck                     | 7.0–13.2          | External FET   | PWM/Linear | SOIC-8                |
| HV9803B                                        | DC/DC        | Buck                     | 7.0–16.0          | External FET   | PWM/Linear | SOIC-8                |
| HV9861A                                        | DC/DC        | Buck                     | 15–450            | External FET   | PWM/Linear | SOIC-8, SOIC-16       |
| HV9911                                         | DC/DC        | Boost, Sepic, Buck-Boost | 9.0–250           | External FET   | PWM        | SOIC-16               |
| HV9912                                         | DC/DC        | Boost, Sepic, Buck-Boost | 9.0–100           | External FET   | PWM        | SOIC-16               |
| HV9961                                         | DC/DC        | Buck                     | 8.0–450           | External FET   | PWM/Linear | SOIC-8, SOIC-16       |
| HV9963                                         | DC/DC        | Boost, Sepic, Buck-Boost | 8.0–40            | External FET   | PWM/Linear | SOIC-16               |
| HV9967B                                        | DC/DC        | Buck                     | 8.0–60            | Integrated FET | PWM/Linear | DFN-8, MSOP-8         |
| HV9980                                         | DC/DC        | Buck                     | 100–160           | 70 mA          | PWM/Linear | SOW-24                |
| HV9982                                         | DC/DC        | Boost, SEPIC             | 10–40             | External FET   | PWM/Linear | QFN-40                |
| HV9989                                         | DC/DC        | Boost, SEPIC             | 10–40             | External FET   | PWM/Linear | QFN-40                |

**POWER MANAGEMENT: LED Drivers (Continued)**

| Part #                   | V <sub>IN</sub> (V) | V <sub>OUT</sub> (V) | Ouput Current (mA) | Dimming      | Parallelable | Packages                    | Features                         |
|--------------------------|---------------------|----------------------|--------------------|--------------|--------------|-----------------------------|----------------------------------|
| <b>Linear Regulators</b> |                     |                      |                    |              |              |                             |                                  |
| CL2                      | 5.0–90              | 5.0–90               | 20                 | External FET | Yes          | T0-252-3, T0-92-3, SOT-89-3 | –                                |
| CL25                     | 5.0–90              | 5.0–90               | 25                 | External FET | Yes          | T0-92-3, SOT-89-3           | –                                |
| CL220                    | 5.0–220             | 5.0–220              | 20                 | External FET | Yes          | T0-252-3, T0-220-3          | –                                |
| CL320                    | 6.5–90              | 4.0–90               | 20                 | PWM          | Yes          | SOIC-8 with Heat Slug       | OTP, separate ENABLE pin         |
| CL325                    | 6.5–90              | 4.0–90               | 25                 | PWM          | Yes          | SOIC-8 with Heat Slug       | OTP, separate ENABLE pin         |
| CL330                    | 6.5–90              | 4.0–90               | 30                 | PWM          | Yes          | SOIC-8 with Heat Slug       | OTP, separate ENABLE pin         |
| CL520                    | 4.75–90             | 1.0–90               | 20                 | –            | Yes          | T0-252-3, T0-92-3           | –                                |
| CL525                    | 4.75–90             | 1.0–90               | 25                 | –            | Yes          | T0-252-3, T0-92-3           | –                                |
| CL6                      | 6.5–90              | 4.0–90               | 100                | No           | Yes          | T0-252-3, T0-220-3          | Reverse polarity protection, OTP |
| CL7                      | 6.5–90              | 4.0–90               | 100                | PWM          | Yes          | SOIC-8 with Heat Slug       | Reverse polarity protection, OTP |

| POWER MANAGEMENT: LED Drivers (Continued) |                       |                      |                          |                 |              |          |          |
|-------------------------------------------|-----------------------|----------------------|--------------------------|-----------------|--------------|----------|----------|
| Part #                                    | V <sub>IN</sub> (VAC) | V <sub>OUT</sub> (V) | Output Current (Peak mA) | Dimming         | Parallelable | Packages | Features |
| Sequential Linear LED Drivers             |                       |                      |                          |                 |              |          |          |
| CL8800                                    | 90–275                | 70–350               | 115                      | External Dimmer | Yes          | QFN-33   | 6-Stage  |
| CL8801                                    | 90–275                | 70–350               | 200                      | External Dimmer | Yes          | QFN-33   | 4-Stage  |

| POWER MANAGEMENT: MOSFETs |                              |                                |                                 |                                 |                                         |          |                       |
|---------------------------|------------------------------|--------------------------------|---------------------------------|---------------------------------|-----------------------------------------|----------|-----------------------|
| Part #                    | BV <sub>DSS</sub><br>min (V) | R <sub>DS(ON)</sub><br>max (Ω) | V <sub>GS(OFF)</sub><br>min (V) | V <sub>GS(OFF)</sub><br>max (V) | I <sub>DSS</sub> @ V <sub>GS</sub> = 0V |          | Packages              |
|                           |                              |                                |                                 |                                 | min (mA)                                | max (mA) |                       |
| Depletion Mode MOSFETs    |                              |                                |                                 |                                 |                                         |          |                       |
| DN1509                    | 90                           | 6.0                            | −1.8                            | −3.5                            | 300                                     | –        | SOT-23, SOT-89        |
| DN2450                    | 500                          | 10                             | −1.5                            | −3.5                            | 700                                     | –        | T0-252, SOT-89        |
| DN2470                    | 700                          | 42                             | −1.5                            | −3.5                            | 500 (typ)                               | –        | T0-252                |
| DN2530                    | 300                          | 12                             | −1.0                            | −3.5                            | 200                                     | –        | T0-92, SOT-89         |
| DN2535                    | 350                          | 25                             | −1.5                            | −3.5                            | 150                                     | –        | T0-92, T0-220         |
| DN2540                    | 400                          | 25                             | −1.5                            | −3.5                            | 150                                     | –        | T0-92, T0-220, SOT-89 |
| DN2625                    | 250                          | 3.5                            | −1.5                            | −2.1                            | 3300                                    | –        | T0-252, SOIC-8        |
| DN3135                    | 350                          | 35                             | −1.5                            | −3.5                            | 180                                     | –        | SOT-23, SOT-89        |
| DN3145                    | 450                          | 60                             | −1.5                            | −3.5                            | 120                                     | –        | SOT-89                |
| DN3525                    | 250                          | 6.0                            | −1.5                            | −3.5                            | 300                                     | –        | SOT-89                |
| DN3535                    | 350                          | 10                             | −1.5                            | −3.5                            | 200                                     | –        | SOT-89                |
| DN3545                    | 450                          | 20                             | −1.5                            | −3.5                            | 200                                     | –        | T0-92, SOT-89         |
| DN3765                    | 650                          | 8.0                            | −1.5                            | −3.5                            | 200                                     | –        | T0-252                |
| LND01                     | 9.0                          | 1.4                            | −0.8                            | −3.0                            | 300                                     | –        | SOT-23                |
| LND150                    | 500                          | 1000                           | −1.0                            | −3.0                            | 1.0                                     | 3.0      | SOT-23, T0-92, SOT-89 |

| POWER MANAGEMENT: MOSFETs (Continued) |                              |                                |                               |                              |                                |               |
|---------------------------------------|------------------------------|--------------------------------|-------------------------------|------------------------------|--------------------------------|---------------|
| Part #                                | BV <sub>DSS</sub><br>min (V) | R <sub>DS(ON)</sub><br>max (Ω) | I <sub>D(ON)</sub><br>min (A) | C <sub>ISS</sub><br>max (pF) | V <sub>GS(TH)</sub><br>max (V) | Packages      |
| N-Channel Enhancement Mode MOSFETs    |                              |                                |                               |                              |                                |               |
| 2N6660                                | 60                           | 3.0                            | 1.5                           | 50                           | 2.0                            | T0-39         |
| 2N6661                                | 90                           | 4.0                            | 1.5                           | 50                           | 2.0                            | T0-39         |
| 2N7000                                | 60                           | 5.0                            | 0.075                         | 60                           | 3.0                            | T0-92         |
| 2N7002                                | 60                           | 7.5                            | 0.5                           | 50                           | 2.5                            | SOT-23        |
| 2N7008                                | 60                           | 7.5                            | 0.5                           | 50                           | 2.5                            | T0-92         |
| LN100                                 | 1200                         | 3000                           | 0.003                         | 50                           | 1.6                            | LFGA-6        |
| TN0104                                | 40                           | 1.8, 2.0                       | 2.0                           | 70                           | 1.6                            | T0-92, SOT-89 |
| TN0106                                | 60                           | 3.0                            | 2.0                           | 60                           | 2.0                            | T0-92         |
| TN0110                                | 100                          | 3.0                            | 2.0                           | 60                           | 2.0                            | T0-92         |
| TN0604                                | 40                           | 0.75                           | 4.0                           | 190                          | 1.6                            | T0-92, SOW-20 |
| TN0606                                | 60                           | 1.5                            | 3.0                           | 150                          | 2.0                            | T0-92         |
| TN0610                                | 100                          | 1.5                            | 3.0                           | 150                          | 2.0                            | T0-92         |
| TN0620                                | 200                          | 6.0                            | 1.0                           | 150                          | 1.6                            | T0-92         |
| TN0702                                | 20                           | 1.3                            | 0.5                           | 200                          | 1.0                            | T0-92         |
| TN2106                                | 60                           | 2.5                            | 0.6                           | 50                           | 2.0                            | SOT-23, T0-92 |
| TN2124                                | 240                          | 15                             | 0.14                          | 50                           | 2.0                            | SOT-23        |

## POWER MANAGEMENT: MOSFETs (Continued)

| Part #                                         | BV <sub>DSS</sub><br>min (V) | R <sub>DS(on)</sub><br>max (Ω) | I <sub>D(on)</sub><br>min (A) | C <sub>iss</sub><br>max (pF) | V <sub>GS(th)</sub><br>max (V) | Packages                    |
|------------------------------------------------|------------------------------|--------------------------------|-------------------------------|------------------------------|--------------------------------|-----------------------------|
| N-Channel Enhancement Mode MOSFETs (Continued) |                              |                                |                               |                              |                                |                             |
| TN2130                                         | 300                          | 25                             | 0.25                          | 50                           | 2.4                            | SOT-23                      |
| TN2425                                         | 250                          | 3.5                            | 1.5                           | 200                          | 2.0                            | SOT-89                      |
| TN2435                                         | 350                          | 6.0                            | 1.0                           | 200                          | 0.8 (min)                      | SOT-89                      |
| TN2501                                         | 18                           | 2.5                            | 0.25                          | 110                          | 1.0                            | SOT-89                      |
| TN2504                                         | 40                           | 1.0                            | 4.0                           | 125                          | 1.6                            | SOT-89                      |
| TN2510                                         | 100                          | 1.5                            | 3.0                           | 125                          | 2.0                            | SOT-89                      |
| TN2524                                         | 240                          | 6.0                            | 1.0                           | 125                          | 2.0                            | SOT-89                      |
| TN2529                                         | 290                          | 6.0                            | 1.0                           | 125                          | 2.0                            | QFN-14                      |
| TN2535                                         | 350                          | 10                             | 1.0                           | 125                          | 2.0                            | SOT-89                      |
| TN2540                                         | 400                          | 12                             | 1.0                           | 125                          | 2.0                            | T0-92, SOT-89               |
| TN2640                                         | 400                          | 5.0                            | 2.0                           | 225                          | 2.0                            | T0-252 D-PAK, SOIC-8, T0-92 |
| TN5325                                         | 250                          | 7.0                            | 1.2                           | 110                          | 2.0                            | SOT-23, T0-92, SOT-89       |
| TN5335                                         | 350                          | 15                             | 0.75                          | 110                          | 2.0                            | SOT-23, SOT-89              |
| VN0104                                         | 40                           | 3.0                            | 2.0                           | 65                           | 2.4                            | T0-92                       |
| VN0106                                         | 60                           | 3.0                            | 2.0                           | 65                           | 2.4                            | T0-92                       |
| VN0109                                         | 90                           | 3.0                            | 2.0                           | 65                           | 2.4                            | T0-92                       |
| VN0300                                         | 30                           | 1.2                            | 1.0                           | 190                          | 2.5                            | T0-92                       |
| VN0550                                         | 500                          | 60                             | 0.15                          | 55                           | 4.0                            | T0-92                       |
| VN0606                                         | 60                           | 3.0                            | 1.5                           | 50                           | 2.0                            | T0-92                       |
| VN0808                                         | 80                           | 4.0                            | 1.5                           | 50                           | 2.0                            | T0-92                       |
| VN10K                                          | 60                           | 5.0                            | 0.75                          | 60                           | 2.5                            | T0-92                       |
| VN1206                                         | 120                          | 6.0                            | 1.0                           | 125                          | 2.0                            | T0-92                       |
| VN2106                                         | 60                           | 4.0                            | 0.6                           | 50                           | 2.4                            | T0-92                       |
| VN2110                                         | 100                          | 4.0                            | 0.6                           | 50                           | 2.4                            | SOT-23                      |
| VN2210                                         | 100                          | 0.35                           | 8.0                           | 500                          | 2.4                            | T0-39, T0-92                |
| VN2222LL                                       | 60                           | 7.5                            | 0.75                          | 60                           | 2.5                            | T0-92                       |
| VN2224                                         | 240                          | 1.25                           | 5.0                           | 350                          | 3.0                            | T0-92                       |
| VN2406                                         | 240                          | 6.0                            | 1.0                           | 125                          | 2.0                            | T0-92                       |
| VN2410                                         | 240                          | 10                             | 1.0                           | 125                          | 2.0                            | T0-92                       |
| VN2450                                         | 500                          | 13                             | 0.5                           | 150                          | 4.0                            | T0-92, SOT-89               |
| VN2460                                         | 600                          | 20                             | 0.25                          | 150                          | 4.0                            | T0-92, SOT-89               |
| VN3205                                         | 50                           | 0.3                            | 3.0                           | 300                          | 2.4                            | T0-92, SOT-89, DIP-14       |
| VN3515                                         | 350                          | 15                             | 0.15                          | 110                          | 1.8                            | T0-92                       |
| VN4012                                         | 400                          | 12                             | 0.15                          | 110                          | 1.8                            | T0-92                       |

POWER MANAGEMENT: MOSFETs (Continued)

| Part #                             | BV <sub>DSS</sub><br>(V) | R <sub>DS(on)</sub><br>max (Ω) | I <sub>D(on)</sub><br>min (A) | C <sub>iss</sub><br>max (pF) | V <sub>GS(TH)</sub><br>max (V) | Packages       |
|------------------------------------|--------------------------|--------------------------------|-------------------------------|------------------------------|--------------------------------|----------------|
| P-Channel Enhancement Mode MOSFETs |                          |                                |                               |                              |                                |                |
| LP0701                             | −16.5                    | 1.5                            | −1.25                         | 250                          | −1.0                           | T0-92          |
| LP1030D                            | −300                     | 180 (typ.)                     | −0.05                         | 10.8 (typ.)                  | −2.4                           | SOT-23         |
| TP0604                             | −40                      | 2.0                            | −2.0                          | 150                          | −2.4                           | T0-92          |
| TP0606                             | −60                      | 3.5                            | −1.5                          | 150                          | −2.4                           | T0-92          |
| TP0610T                            | −60                      | 10                             | −0.05                         | 60                           | −2.4                           | SOT-23         |
| TP0620                             | −200                     | 12                             | −0.75                         | 150                          | −2.4                           | T0-92          |
| TP2104                             | −40                      | 6.0                            | −0.6                          | 60                           | −2.0                           | SOT-23, T0-92  |
| TP2424                             | −240                     | 8.0                            | −0.8                          | 200                          | −2.4                           | SOT-89         |
| TP2435                             | −350                     | 15                             | −0.8                          | 200                          | −2.4                           | SOT-89         |
| TP2502                             | −20                      | 2.0                            | −2.0                          | 125                          | −2.4                           | SOT-89         |
| TP2510                             | −100                     | 3.5                            | −1.5                          | 125                          | −2.4                           | SOT-89         |
| TP2520                             | −200                     | 12                             | −0.75                         | 125                          | −2.0                           | SOT-89         |
| TP2522                             | −220                     | 12                             | −0.75                         | 125                          | −2.4                           | SOT-89         |
| TP2535                             | −350                     | 25                             | −0.4                          | 125                          | −2.4                           | T0-92          |
| TP2540                             | −400                     | 25                             | −0.4                          | 125                          | −2.4                           | T0-92, SOT-89  |
| TP2635                             | −350                     | 15                             | −0.7                          | 300                          | −2.0                           | T0-92          |
| TP2640                             | −400                     | 15                             | −0.7                          | 300                          | −2.0                           | T0-92, SOIC-8  |
| TP5322                             | −220                     | 12                             | −0.7                          | 110                          | −2.4                           | SOT-23, SOT-89 |
| TP5335                             | −350                     | 30                             | −0.4                          | 110                          | −2.4                           | SOT-23         |
| VP0104                             | −40                      | 8.0                            | −0.5                          | 60                           | −3.5                           | T0-92          |
| VP0106                             | −60                      | 8.0                            | −0.5                          | 60                           | −3.5                           | T0-92          |
| VP0109                             | −90                      | 8.0                            | −0.5                          | 60                           | −3.5                           | T0-92          |
| VP0550                             | −500                     | 125                            | −0.1                          | 70                           | −4.5                           | T0-92          |
| VP0808                             | −80                      | 5.0                            | −1.1                          | 150                          | −4.5                           | T0-92          |
| VP2106                             | −60                      | 12                             | −0.5                          | 60                           | −3.5                           | T0-92          |
| VP2110                             | −100                     | 12                             | −0.5                          | 60                           | −3.5                           | SOT-23         |
| VP2206                             | −60                      | 0.9                            | −4.0                          | 450                          | −3.5                           | T0-92, T0-39   |
| VP2450                             | −500                     | 30                             | −0.2                          | 190                          | −3.5                           | T0-92, SOT-89  |
| VP3203                             | −30                      | 0.6                            | −4.0                          | 300                          | −3.5                           | T0-92, SOT-89  |

POWER MANAGEMENT: MOSFETs (Continued)

| Part #                                    | Channels | BV <sub>DSS</sub><br>min (V) | R <sub>DS(on)</sub><br>max (Ω) | C <sub>iss</sub><br>typical (pF) | V <sub>GS(TH)</sub><br>max (V) | Packages |
|-------------------------------------------|----------|------------------------------|--------------------------------|----------------------------------|--------------------------------|----------|
| Enhancement Mode MOSFET Arrays: N-Channel |          |                              |                                |                                  |                                |          |
| TD9944                                    | 2        | 240                          | 6.0                            | 65                               | 2.0                            | SOIC-8   |

POWER MANAGEMENT: MOSFETs (Continued)

| Part #                                    | Channels | BV <sub>DSS</sub><br>min (V) | R <sub>DS(on)</sub><br>max (Ω) | Packages |
|-------------------------------------------|----------|------------------------------|--------------------------------|----------|
| Enhancement Mode MOSFET Arrays: P-Channel |          |                              |                                |          |
| TP0604                                    | 4        | −40                          | 2.0                            | SOIC-20  |

**POWER MANAGEMENT: MOSFETs (Continued)**

| Part #                                                             | BV <sub>DSS</sub> /BV <sub>DGS</sub><br>N-Channel (V) | BV <sub>DSS</sub> /BV <sub>DGS</sub><br>P-Channel (V) | R <sub>DS(ON)</sub> N-Channel<br>max (Ω) | R <sub>DS(ON)</sub> P-Channel<br>max (Ω) | V <sub>GS(TH)</sub><br>max (V) | Packages      |
|--------------------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|------------------------------------------|------------------------------------------|--------------------------------|---------------|
| <b>Enhancement Mode MOSFET Arrays: Complementary MOSFET Arrays</b> |                                                       |                                                       |                                          |                                          |                                |               |
| TC1550 <sup>(1)</sup>                                              | 500                                                   | –500                                                  | 60                                       | 125                                      | 4.0                            | SOIC-8        |
| TC2320 <sup>(1)</sup>                                              | 200                                                   | –200                                                  | 7.0                                      | 12                                       | 2.0                            | SOIC-8        |
| TC6215 <sup>(1)</sup>                                              | 150                                                   | –150                                                  | 4.0                                      | 7.0                                      | 2.0                            | SOIC-8        |
| TC6320 <sup>(1)</sup>                                              | 200                                                   | –200                                                  | 7.0                                      | 8.0                                      | 2.0                            | QFN-8, SOIC-8 |
| TC7320 <sup>(2)</sup>                                              | 200                                                   | –200                                                  | 20                                       | 20                                       | 0.4 (typ)                      | LQFP-32       |

**Note 1:** N & P-channel pair**Note 2:** Six N & P-channel pairs**POWER MANAGEMENT: MOSFETs (Continued)**

| Part #                                           | BV <sub>(CONTINUOUS)</sub><br>(V) | IC <sub>(CONTINUOUS)</sub><br>(A) | IC <sub>(PULSED)</sub><br>(A) | Packages |
|--------------------------------------------------|-----------------------------------|-----------------------------------|-------------------------------|----------|
| <b>Insulated Gate Bipolar Transistors (IGBT)</b> |                                   |                                   |                               |          |
| GN2470                                           | 700                               | 1.0                               | 3.5                           | T0-252   |

**POWER MANAGEMENT: Inductorless Off-Line/Linear Regulator ICs**

| Part #                                     | V <sub>IN</sub><br>(VAC) | Adjustable V <sub>OUT</sub><br>(V) | Fixed V <sub>OUT</sub><br>(V) | I <sub>OUT</sub><br>max (mA) | Load Regulation<br>(%/mA) | Packages                   |
|--------------------------------------------|--------------------------|------------------------------------|-------------------------------|------------------------------|---------------------------|----------------------------|
| <b>Inductorless Off-Line Regulator ICs</b> |                          |                                    |                               |                              |                           |                            |
| SR086                                      | 80–285                   | 9.0–50                             | 3.3                           | 100                          | 0.025                     | 8-Lead SOIC with Heat Slug |
| SR087                                      | 80–285                   | 9.0–50                             | 5.0                           | 100                          | 0.017                     | 8-Lead SOIC with Heat Slug |
| SR10                                       | 80–285                   | 6.0–28                             | 6.0, 12, 24                   | 60                           | –                         | 8-Lead SOIC                |

**POWER MANAGEMENT: Inductorless Off-Line/Linear Regulator ICs (Continued)**

| Part #                      | +V <sub>IN</sub><br>min (V) | +V <sub>IN</sub><br>max (V) | Output Voltage<br>(V) | Max Output Current<br>(mA) | Typical Line Regulation<br>(%/V) | Typical Load Regulation<br>(%/mA) | Packages                                                |
|-----------------------------|-----------------------------|-----------------------------|-----------------------|----------------------------|----------------------------------|-----------------------------------|---------------------------------------------------------|
| <b>Linear Regulator ICs</b> |                             |                             |                       |                            |                                  |                                   |                                                         |
| LR8                         | 12                          | 450                         | 1.2–440               | 10                         | 0.003                            | 0.15                              | 3-Lead T0-252, 3-Lead T0-92, 3-Lead SOT-89              |
| LR12                        | 12                          | 100                         | 1.2–88                | 50                         | 0.003                            | 0.06                              | 3-Lead T0-252, 8-Lead SOIC, 3-Lead T0-92                |
| LR645                       | 15                          | 450                         | 10                    | 3.0                        | 0.0001                           | 0.5                               | 8-Lead SOIC, 3-Lead T0-92, 3-Lead T0-220, 3-Lead SOT-89 |
| LR745                       | 25                          | 450                         | 20                    | 2.0                        | 0.0001                           | 0.5                               | 3Lead T0-92 , 3Lead SOT-89                              |

**LINEAR****LINEAR: Op Amps**

| Part #  | # Per<br>Package | GBWP   | I <sub>Q</sub> Typical<br>(μA) | V <sub>OS</sub> Max<br>(mV) | Typical Input<br>Bias Current<br>(pA) | Input Voltage<br>Noise Density<br>(nV/rtHz) | Operating<br>Voltage (V) | Temperature<br>Range (°C) | Features                               | Packages                                                        |
|---------|------------------|--------|--------------------------------|-----------------------------|---------------------------------------|---------------------------------------------|--------------------------|---------------------------|----------------------------------------|-----------------------------------------------------------------|
| MCP6441 | 1                | 9 kHz  | 0.45                           | 4.5                         | 1                                     | 190 <sup>(1)</sup>                          | 1.8 to 6.0               | –40 to +125               | Rail-to-Rail Input/Output              | 5-pin SOT-23 <sup>(S)</sup> , 5-pin SC-70 <sup>(S)</sup>        |
| MCP6442 | 2                | 9 kHz  | 0.45                           | 4.5                         | 1                                     | 190 <sup>(1)</sup>                          | 1.8 to 6.0               | –40 to +125               | Rail-to-Rail Input/Output              | 8-pin SOIC, 8-pin MSOP, 8-pin 2 × 3 TDFN                        |
| MCP6444 | 4                | 9 kHz  | 0.45                           | 4.5                         | 1                                     | 190 <sup>(1)</sup>                          | 1.8 to 6.0               | –40 to +125               | Rail-to-Rail Input/Output              | 14-pin SOIC, 14-pin TSSOP                                       |
| MCP6031 | 1                | 10 kHz | 0.9                            | 0.15                        | 1                                     | 165 <sup>(1)</sup>                          | 1.8 to 5.5               | –40 to +125               | Rail-to-Rail Input/Output              | 8-pin SOIC, 8-pin MSOP, 8-pin 2 × 3 DFN, 5-pin SOT-23           |
| MCP6032 | 2                | 10 kHz | 0.9                            | 0.15                        | 1                                     | 165 <sup>(1)</sup>                          | 1.8 to 5.5               | –40 to +125               | Rail-to-Rail Input/Output              | 8-pin SOIC, 8-pin MSOP                                          |
| MCP6033 | 1                | 10 kHz | 0.9                            | 0.15                        | 1                                     | 165 <sup>(1)</sup>                          | 1.8 to 5.5               | –40 to +125               | Rail-to-Rail Input/Output, Chip select | 8-pin SOIC, 8-pin MSOP, 8-pin 2 × 3 DFN                         |
| MCP6034 | 4                | 10 kHz | 0.9                            | 0.15                        | 1                                     | 165 <sup>(1)</sup>                          | 1.8 to 5.5               | –40 to +125               | Rail-to-Rail Input/Output              | 14-pin SOIC, 14-pin TSSOP                                       |
| MCP6041 | 1                | 14 kHz | 0.6                            | 3                           | 1                                     | 170 <sup>(1)</sup>                          | 1.4 to 6.0               | –40 to +125               | Rail-to-Rail Input/Output              | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 5-pin SOT-23 <sup>(S)</sup> |

**Legend:** S = Standard Pinout; R = Reverse Pinout; U = Alternative Pinout**Note 1:** Values are typical at 1 kHz  
**2:** Values are typical at 10 kHz

## LINEAR: Op Amps (Continued)

| Part #  | # Per Package | GBWP    | I <sub>q</sub> Typical (μA) | V <sub>os</sub> Max (mV) | Typical Input Bias Current (pA) | Input Voltage Noise Density (nV/√Hz) | Operating Voltage (V)                                | Temperature Range (°C) | Features                                             | Packages                                                                                                             |
|---------|---------------|---------|-----------------------------|--------------------------|---------------------------------|--------------------------------------|------------------------------------------------------|------------------------|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| MCP6042 | 2             | 14 kHz  | 0.6                         | 3                        | 1                               | 170 <sup>(1)</sup>                   | 1.4 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                            | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP                                                                                   |
| MCP6043 | 1             | 14 kHz  | 0.6                         | 3                        | 1                               | 170 <sup>(1)</sup>                   | 1.4 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output, Chip select               | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 6-pin SOT-23 <sup>(S)</sup>                                                      |
| MCP6044 | 4             | 14 kHz  | 0.6                         | 3                        | 1                               | 170 <sup>(1)</sup>                   | 1.4 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                            | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP                                                                               |
| MCP6421 | 1             | 90 kHz  | 4.4                         | 1                        | 1                               | 95 <sup>(1)</sup>                    | 1.8 to 5.5                                           | –40 to +125            | Rail-to-Rail Input/Output, Enhanced EMI Rejection    | 5-pin SOT-23 <sup>(S)</sup> , 5-pin SC-70 <sup>(S)</sup>                                                             |
| MCP6422 | 2             | 90 kHz  | 4.4                         | 1                        | 1                               | 95 <sup>(1)</sup>                    | 1.8 to 5.5                                           | –40 to +125            | Rail-to-Rail Input/Output, Enhanced EMI Rejection    | 8-pin SOIC, 8-pin MSOP                                                                                               |
| MCP6424 | 4             | 90 kHz  | 4.4                         | 1                        | 1                               | 95 <sup>(1)</sup>                    | 1.8 to 5.5                                           | –40 to +125            | Rail-to-Rail Input/Output, Enhanced EMI Rejection    | 14-pin SOIC, 14-pin TSSOP                                                                                            |
| MCP6141 | 1             | 100 kHz | 0.6                         | 3                        | 1                               | 170 <sup>(1)</sup>                   | 1.4 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output, G >10 stable              | 5-pin SOT-23 <sup>(S)</sup> , 8-pin PDIP, 8-pin SOIC, 8-pin MSOP                                                     |
| MCP6142 | 2             | 100 kHz | 0.6                         | 3                        | 1                               | 170 <sup>(1)</sup>                   | 1.4 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output, G >10 stable              | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP                                                                                   |
| MCP6143 | 1             | 100 kHz | 0.6                         | 3                        | 1                               | 170 <sup>(1)</sup>                   | 1.4 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output, G >10 stable, Chip select | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 6-pin SOT-23 <sup>(S)</sup>                                                      |
| MCP6144 | 4             | 100 kHz | 0.6                         | 3                        | 1                               | 170 <sup>(1)</sup>                   | 1.4 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output, G >10 stable              | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP                                                                               |
| MCP606  | 1             | 155 kHz | 19                          | 0.25                     | 1                               | 38 <sup>(1)</sup>                    | 2.5 to 6.0                                           | –40 to +85             | Rail-to-Rail Output                                  | 8-pin PDIP, 8-pin SOIC, 8-pin TSSOP, 5-pin SOT23 <sup>(S)</sup>                                                      |
| MCP607  | 2             | 155 kHz | 19                          | 0.25                     | 1                               | 38 <sup>(1)</sup>                    | 2.5 to 6.0                                           | –40 to +85             | Rail-to-Rail Output                                  | 8-pin PDIP, 8-pin SOIC, 8-pin TSSOP                                                                                  |
| MCP608  | 1             | 155 kHz | 19                          | 0.25                     | 1                               | 38 <sup>(1)</sup>                    | 2.5 to 6.0                                           | –40 to +85             | Rail-to-Rail Output, Chip select                     | 8-pin PDIP, 8-pin SOIC, 8-pin TSSOP                                                                                  |
| MCP609  | 4             | 155 kHz | 19                          | 0.25                     | 1                               | 38 <sup>(1)</sup>                    | 2.5 to 6.0                                           | –40 to +85             | Rail-to-Rail Output                                  | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP                                                                               |
| MCP616  | 1             | 190 kHz | 19                          | 0.15                     | 15000                           | 32 <sup>(1)</sup>                    | 2.3 to 5.5                                           | –40 to +85             | Rail-to-Rail Output, PNP input                       | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP                                                                                   |
| MCP617  | 2             | 190 kHz | 19                          | 0.15                     | 15000                           | 32 <sup>(1)</sup>                    | 2.3 to 5.5                                           | –40 to +85             | Rail-to-Rail Output, PNP input                       | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP                                                                                   |
| MCP618  | 1             | 190 kHz | 19                          | 0.15                     | 15000                           | 32 <sup>(1)</sup>                    | 2.3 to 5.5                                           | –40 to +85             | Rail-to-Rail Output, Chip select, PNP input          | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP                                                                                   |
| MCP619  | 4             | 190 kHz | 19                          | 0.15                     | 15000                           | 32 <sup>(1)</sup>                    | 2.3 to 5.5                                           | –40 to +85             | Rail-to-Rail Output, PNP input                       | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP                                                                               |
| MCP6231 | 1             | 300 kHz | 20                          | 5                        | 1                               | 52 <sup>(1)</sup>                    | 1.8 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                            | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 8-pin 2 × 3 TDFN, 5-pin SC-70 <sup>(U)</sup> , 5-pin SOT-23 <sup>(S, R, U)</sup> |
| MCP6232 | 2             | 300 kHz | 20                          | 5                        | 1                               | 52 <sup>(1)</sup>                    | 1.8 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                            | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 8-pin 2 × 3 TDFN                                                                 |
| MCP6234 | 4             | 300 kHz | 20                          | 5                        | 1                               | 52 <sup>(1)</sup>                    | 1.8 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                            | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP                                                                               |
| MCP6051 | 1             | 385 kHz | 30                          | 0.15                     | 1                               | 34 <sup>(2)</sup>                    | 1.8 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                            | 8-pin SOIC, 8-pin 2 × 3 DFN, 5-pin SOT-23(S)                                                                         |
| MCP6052 | 2             | 385 kHz | 30                          | 0.15                     | 1                               | 34 <sup>(2)</sup>                    | 1.8 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                            | 8-pin SOIC, 8-pin 2 × 3 DFN                                                                                          |
| MCP6054 | 4             | 385 kHz | 30                          | 0.15                     | 1                               | 34 <sup>(2)</sup>                    | 1.8 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                            | 14-pin SOIC, 14-pin TSSOP                                                                                            |
| MCP6241 | 1             | 550 kHz | 50                          | 5                        | 1                               | 45 <sup>(1)</sup>                    | 1.8 to 5.5                                           | –40 to +125            | Rail-to-Rail Input/Output                            | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 8-pin 2 × 3 TDFN, 5-pin SC-70 <sup>(U)</sup> , 5-pin SOT-23 <sup>(S, R, U)</sup> |
| MCP6242 | 2             | 550 kHz | 50                          | 5                        | 1                               | 45 <sup>(1)</sup>                    | 1.8 to 5.5                                           | –40 to +125            | Rail-to-Rail Input/Output                            | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP                                                                                   |
| MCP6244 | 4             | 550 kHz | 50                          | 5                        | 1                               | 45 <sup>(1)</sup>                    | 1.8 to 5.5                                           | –40 to +125            | Rail-to-Rail Input/Output                            | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP                                                                               |
| MCP6061 | 1             | 730 kHz | 60                          | 0.15                     | 1                               | 25 <sup>(2)</sup>                    | 1.8 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                            | 8-pin SOIC, 8-pin 2 × 3 DFN, 5-pin SOT-23 <sup>(S)</sup>                                                             |
| MCP6062 | 2             | 730 kHz | 60                          | 0.15                     | 1                               | 25 <sup>(2)</sup>                    | 1.8 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                            | 8-pin SOIC, 8-pin 2 × 3 DFN                                                                                          |
| MCP6064 | 4             | 730 kHz | 60                          | 0.15                     | 1                               | 25 <sup>(2)</sup>                    | 1.8 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                            | 14-pin SOIC, 14-pin TSSOP                                                                                            |
| MCP6001 | 1             | 1 MHz   | 100                         | 4.5                      | 1                               | 28 <sup>(1)</sup>                    | 1.8 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                            | 5-pin SOT-23 <sup>(S, R, U)</sup> , 5-pin SC-70 <sup>(R)</sup>                                                       |
| MCP6002 | 2             | 1 MHz   | 100                         | 4.5                      | 1                               | 28 <sup>(1)</sup>                    | 1.8 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                            | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 8-pin 2 × 3 DFN                                                                  |
| MCP6004 | 4             | 1 MHz   | 100                         | 4.5                      | 1                               | 28 <sup>(1)</sup>                    | 1.8 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                            | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP                                                                               |
| MCP6401 | 1             | 1 MHz   | 45                          | 4.5                      | 1                               | 28 <sup>(1)</sup>                    | 1.8 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                            | 5-pin SOT-23 <sup>(S, R, U)</sup> , 5-pin SC-70 <sup>(R)</sup>                                                       |
| MCP6402 | 2             | 1 MHz   | 45                          | 4.5                      | 1                               | 28 <sup>(1)</sup>                    | 1.8 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                            | 8-pin SOIC, 8-pin 2 × 3 TDFN                                                                                         |
| MCP6404 | 4             | 1 MHz   | 45                          | 4.5                      | 1                               | 28 <sup>(1)</sup>                    | 1.8 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                            | 14-pin SOIC, 14-pin TSSOP                                                                                            |
| MCP6L01 | 1             | 1 MHz   | 85                          | 5                        | 2                               | 24 <sup>(2)</sup>                    | 1.8 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                            | 5-pin SOT-23 <sup>(S, R, U)</sup> , 5-pin SC-70 <sup>(S)</sup>                                                       |
| MCP6L02 | 2             | 1 MHz   | 85                          | 5                        | 2                               | 24 <sup>(2)</sup>                    | 1.8 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                            | 8-pin SOIC, 8-pin MSOP                                                                                               |
| MCP6L04 | 4             | 1 MHz   | 85                          | 5                        | 2                               | 24 <sup>(2)</sup>                    | 1.8 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                            | 14-pin SOIC, 14-pin TSSOP                                                                                            |
| MCP6071 | 1             | 1.2 MHz | 110                         | 0.15                     | 1                               | 19 <sup>(2)</sup>                    | 1.8 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                            | 8-pin SOIC, 8-pin 2 × 3 DFN, 5-pin SOT-23 <sup>(S)</sup>                                                             |
| MCP6072 | 2             | 1.2 MHz | 110                         | 0.15                     | 1                               | 19 <sup>(2)</sup>                    | 1.8 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                            | 8-pin SOIC, 8-pin 2 × 3 DFN                                                                                          |
| MCP6074 | 4             | 1.2 MHz | 110                         | 0.15                     | 1                               | 19 <sup>(2)</sup>                    | 1.8 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                            | 14-pin SOIC, 14-pin TSSOP                                                                                            |
| MCP6H01 | 1             | 1.2 MHz | 135                         | 3.5                      | 10                              | 35 <sup>(1)</sup>                    | Single Supply: 3.5 to 16<br>Dual Supply: ±1.75 to ±8 | –40 to +125            | Rail-to-Rail Output                                  | 8-pin SOIC, 8-pin 2 × 3 TDFN, 5-pin SOT-23 <sup>(S)</sup> , 5-pin SC-70 <sup>(S)</sup>                               |
| MCP6H02 | 2             | 1.2 MHz | 135                         | 3.5                      | 10                              | 35 <sup>(1)</sup>                    | Single Supply: 3.5 to 16<br>Dual Supply: ±1.75 to ±8 | –40 to +125            | Rail-to-Rail Output                                  | 8-pin SOIC, 8-pin 2 × 3 TDFN                                                                                         |
| MCP6H04 | 4             | 1.2 MHz | 135                         | 3.5                      | 10                              | 35 <sup>(1)</sup>                    | Single Supply: 3.5 to 16<br>Dual Supply: ±1.75 to ±8 | –40 to +125            | Rail-to-Rail Output                                  | 14-pin SOIC, 14-pin TSSOP                                                                                            |

Legend: S = Standard Pinout; R = Reverse Pinout; U = Alternative Pinout

Note 1: Values are typical at 1 kHz

2: Values are typical at 10 kHz

## LINEAR: Op Amps (Continued)

| Part #  | # per Package | GBWP    | I <sub>Q</sub> Typical (μA) | V <sub>OS</sub> Max (mV) | Typical Input Bias Current (pA) | Input Voltage Noise Density (nV/√Hz) | Operating Voltage (V)                                | Temperature Range (°C) | Features                                                                     | Packages                                                                               |
|---------|---------------|---------|-----------------------------|--------------------------|---------------------------------|--------------------------------------|------------------------------------------------------|------------------------|------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| MCP6271 | 1             | 2 MHz   | 170                         | 3                        | 1                               | 20 <sup>(1)</sup>                    | 2.0 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                                                    | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 5-pin SOT-23 <sup>(S, R)</sup>                     |
| MCP6272 | 2             | 2 MHz   | 170                         | 3                        | 1                               | 20 <sup>(1)</sup>                    | 2.0 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                                                    | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP                                                     |
| MCP6273 | 1             | 2 MHz   | 170                         | 3                        | 1                               | 20 <sup>(1)</sup>                    | 2.0 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output, Chip select                                       | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 6-pin SOT-23 <sup>(S)</sup>                        |
| MCP6274 | 4             | 2 MHz   | 170                         | 3                        | 1                               | 20 <sup>(1)</sup>                    | 2.0 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                                                    | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP                                                 |
| MCP6275 | 2             | 2 MHz   | 150                         | 3                        | 1                               | 20 <sup>(1)</sup>                    | 2.0 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output, Dual connected, Chip select                       | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP                                                     |
| MCP6471 | 1             | 2 MHz   | 100                         | 1.5                      | 1                               | 27 <sup>(1)</sup>                    | 2.0 to 5.5                                           | –40 to +125            | Rail-to-Rail Input/Output                                                    | 5-pin SOT-23 <sup>(S)</sup> , 5-pin SC-70 <sup>(S)</sup>                               |
| MCP6472 | 2             | 2 MHz   | 100                         | 1.5                      | 1                               | 27 <sup>(1)</sup>                    | 2.0 to 5.5                                           | –40 to +125            | Rail-to-Rail Input/Output                                                    | 8-pin SOIC, 8-pin MSOP, 8-pin 2 × 3 TDFN                                               |
| MCP6474 | 4             | 2 MHz   | 100                         | 1.5                      | 1                               | 27 <sup>(1)</sup>                    | 2.0 to 5.5                                           | –40 to +125            | Rail-to-Rail Input/Output                                                    | 14-pin SOIC, 14-pin TSSOP                                                              |
| MCP6L71 | 1             | 2 MHz   | 150                         | 4                        | 1                               | 19 <sup>(2)</sup>                    | 2.0 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                                                    | 8-pin SOIC <sup>(S)</sup> , 8-pin MSOP <sup>(S)</sup> , 5-pin SOT-23 <sup>(S, R)</sup> |
| MCP6L72 | 2             | 2 MHz   | 150                         | 4                        | 1                               | 19 <sup>(2)</sup>                    | 2.0 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                                                    | 8-pin SOIC, 8-pin MSOP                                                                 |
| MCP6L74 | 4             | 2 MHz   | 150                         | 4                        | 1                               | 19 <sup>(2)</sup>                    | 2.0 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                                                    | 14-pin SOIC, 14-pin TSSOP                                                              |
| MCP6H71 | 1             | 2.7 MHz | 480                         | 4                        | 10                              | 28 <sup>(1)</sup>                    | Single Supply: 3.5 to 12<br>Dual Supply: ±1.75 to ±6 | –40 to +125            | Rail-to-Rail Output                                                          | 8-pin SOIC, 8-pin 2 × 3 TDFN                                                           |
| MCP6H72 | 2             | 2.7 MHz | 480                         | 4                        | 10                              | 28 <sup>(1)</sup>                    | Single Supply: 3.5 to 12<br>Dual Supply: ±1.75 to ±6 | –40 to +125            | Rail-to-Rail Output                                                          | 8-pin SOIC, 8-pin 2 × 3 TDFN                                                           |
| MCP6H74 | 4             | 2.7 MHz | 480                         | 4                        | 10                              | 28 <sup>(1)</sup>                    | Single Supply: 3.5 to 12<br>Dual Supply: ±1.75 to ±6 | –40 to +125            | Rail-to-Rail Output                                                          | 14-pin SOIC, 14-pin TSSOP                                                              |
| MCP601  | 1             | 2.8 MHz | 230                         | 2                        | 1                               | 29 <sup>(1)</sup>                    | 2.7 to 6.0                                           | –40 to +125            | Rail-to-Rail Output                                                          | 8-pin PDIP, 8-pin SOIC, 8-pin TSSOP, 5-pin SOT-23 <sup>(S, R)</sup>                    |
| MCP602  | 2             | 2.8 MHz | 230                         | 2                        | 1                               | 29 <sup>(1)</sup>                    | 2.7 to 6.0                                           | –40 to +125            | Rail-to-Rail Output                                                          | 8-pin PDIP, 8-pin SOIC, 8-pin TSSOP                                                    |
| MCP603  | 1             | 2.8 MHz | 230                         | 2                        | 1                               | 29 <sup>(1)</sup>                    | 2.7 to 6.0                                           | –40 to +125            | Rail-to-Rail Output, Chip select                                             | 8-pin PDIP, 8-pin SOIC, 8-pin TSSOP, 6-pin SOT-23 <sup>(S)</sup>                       |
| MCP604  | 4             | 2.8 MHz | 230                         | 2                        | 1                               | 29 <sup>(1)</sup>                    | 2.7 to 6.0                                           | –40 to +125            | Rail-to-Rail Output                                                          | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP                                                 |
| MCP6L1  | 1             | 2.8 MHz | 200                         | 3                        | 1                               | 21 <sup>(2)</sup>                    | 2.7 to 6.0                                           | –40 to +125            | Rail-to-Rail Output                                                          | 8-pin SOIC <sup>(S)</sup> , 8-pin MSOP <sup>(S)</sup> , 5-pin SOT-23 <sup>(S, R)</sup> |
| MCP6L2  | 2             | 2.8 MHz | 200                         | 3                        | 1                               | 21 <sup>(2)</sup>                    | 2.7 to 6.0                                           | –40 to +125            | Rail-to-Rail Output                                                          | 8-pin SOIC, 8-pin MSOP                                                                 |
| MCP6L4  | 4             | 2.8 MHz | 200                         | 3                        | 1                               | 21 <sup>(2)</sup>                    | 2.7 to 6.0                                           | –40 to +125            | Rail-to-Rail Output                                                          | 14-pin SOIC, 14-pin TSSOP                                                              |
| MCP6286 | 1             | 3.5 MHz | 540                         | 1.5                      | 1                               | 5.4 <sup>(2)</sup>                   | 2.2 to 5.5                                           | –40 to +125            | Rail-to-Rail Output, Low noise                                               | 5-pin SOT-23 <sup>(S, R)</sup>                                                         |
| MCP6481 | 1             | 4 MHz   | 240                         | 1.5                      | 1                               | 23 <sup>(1)</sup>                    | 2.2 to 5.5                                           | –40 to +125            | Rail-to-Rail Input/Output                                                    | 5-pin SOT-23 <sup>(S)</sup> , 5-pin SC-70 <sup>(S)</sup>                               |
| MCP6482 | 2             | 4 MHz   | 240                         | 1.5                      | 1                               | 23 <sup>(1)</sup>                    | 2.2 to 5.5                                           | –40 to +125            | Rail-to-Rail Input/Output                                                    | 8-pin SOIC, 8-pin MSOP, 8-pin 2 × 3 TDFN                                               |
| MCP6484 | 4             | 4 MHz   | 240                         | 1.5                      | 1                               | 23 <sup>(1)</sup>                    | 2.2 to 5.5                                           | –40 to +125            | Rail-to-Rail Input/Output                                                    | 14-pin SOIC, 14-pin TSSOP                                                              |
| MCP6281 | 1             | 5 MHz   | 445                         | 3                        | 1                               | 16 <sup>(1)</sup>                    | 2.2 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                                                    | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 5-pin SOT-23 <sup>(S, R)</sup>                     |
| MCP6282 | 2             | 5 MHz   | 445                         | 3                        | 1                               | 16 <sup>(1)</sup>                    | 2.2 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                                                    | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP                                                     |
| MCP6283 | 1             | 5 MHz   | 445                         | 3                        | 1                               | 16 <sup>(1)</sup>                    | 2.2 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output, Chip select                                       | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 6-pin SOT-23 <sup>(S, R)</sup>                     |
| MCP6284 | 4             | 5 MHz   | 445                         | 3                        | 1                               | 16 <sup>(1)</sup>                    | 2.2 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                                                    | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP                                                 |
| MCP6285 | 2             | 5 MHz   | 400                         | 3                        | 1                               | 16 <sup>(1)</sup>                    | 2.2 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output, Dual connected, Chip select                       | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP                                                     |
| MCP6H81 | 1             | 5.5 MHz | 700                         | 4                        | 10                              | 23 <sup>(1)</sup>                    | Single Supply: 3.5 to 12<br>Dual Supply: ±1.75 to ±6 | –40 to +125            | Rail-to-Rail Output                                                          | 8-pin SOIC, 8-pin 2 × 3 TDFN                                                           |
| MCP6H82 | 2             | 5.5 MHz | 700                         | 4                        | 10                              | 23 <sup>(1)</sup>                    | Single Supply: 3.5 to 12<br>Dual Supply: ±1.75 to ±6 | –40 to +125            | Rail-to-Rail Output                                                          | 8-pin SOIC, 8-pin 2 × 3 TDFN                                                           |
| MCP6H84 | 4             | 5.5 MHz | 700                         | 4                        | 10                              | 23 <sup>(1)</sup>                    | Single Supply: 3.5 to 12<br>Dual Supply: ±1.75 to ±6 | –40 to +125            | Rail-to-Rail Output                                                          | 14-pin SOIC, 14-pin 2 × 3 TDFN                                                         |
| MCP6491 | 1             | 7.5 MHz | 530                         | 1.5                      | 1                               | 19 <sup>(1)</sup>                    | 2.4 to 5.5                                           | –40 to +125            | Rail-to-Rail Input/Output                                                    | 5-pin SOT-23 <sup>(S)</sup> , 5-pin SC-70 <sup>(S)</sup>                               |
| MCP6492 | 2             | 7.5 MHz | 530                         | 1.5                      | 1                               | 19 <sup>(1)</sup>                    | 2.4 to 5.5                                           | –40 to +125            | Rail-to-Rail Input/Output                                                    | 8-pin SOIC, 8-pin MSOP, 8-pin 2 × 3 TDFN                                               |
| MCP6494 | 4             | 7.5 MHz | 530                         | 1.5                      | 1                               | 19 <sup>(1)</sup>                    | 2.4 to 5.5                                           | –40 to +125            | Rail-to-Rail Input/Output                                                    | 14-pin SOIC, 14-pin TSSOP                                                              |
| MCP6021 | 1             | 10 MHz  | 1000                        | 0.5                      | 1                               | 8.7 <sup>(2)</sup>                   | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Input/Output, 1/2 V <sub>CC</sub> V <sub>REF</sub>              | 8-pin PDIP, 8-pin SOIC, 8-pin TSSOP, 8-pin MSOP, 5-pin SOT-23 <sup>(S, R)</sup>        |
| MCP6022 | 2             | 10 MHz  | 1000                        | 0.5                      | 1                               | 8.7 <sup>(2)</sup>                   | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Input/Output                                                    | 8-pin PDIP, 8-pin SOIC, 8-pin TSSOP                                                    |
| MCP6023 | 1             | 10 MHz  | 1000                        | 0.5                      | 1                               | 8.7 <sup>(2)</sup>                   | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Input/Output, Chip select, 1/2 V <sub>CC</sub> V <sub>REF</sub> | 8-pin PDIP, 8-pin SOIC, 8-pin TSSOP                                                    |
| MCP6024 | 4             | 10 MHz  | 1000                        | 0.5                      | 1                               | 8.7 <sup>(2)</sup>                   | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Input/Output                                                    | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP                                                 |
| MCP6291 | 1             | 10 MHz  | 1000                        | 3                        | 1                               | 8.7 <sup>(2)</sup>                   | 2.4 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                                                    | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 5-pin SOT-23 <sup>(S, R)</sup>                     |
| MCP6292 | 2             | 10 MHz  | 1000                        | 3                        | 1                               | 8.7 <sup>(2)</sup>                   | 2.4 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                                                    | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP                                                     |

Legend: S = Standard Pinout; R = Reverse Pinout; U = Alternative Pinout

Note 1: Values are typical at 1 kHz

2: Values are typical at 10 kHz

**LINEAR: Op Amps (Continued)**

| Part #  | # per Package | GBWP   | I <sub>q</sub> Typical (μA) | V <sub>os</sub> Max (mV) | Typical Input Bias Current (pA) | Input Voltage Noise Density (nV/√Hz) | Operating Voltage (V)                                | Temperature Range (°C) | Features                                               | Packages                                                                               |
|---------|---------------|--------|-----------------------------|--------------------------|---------------------------------|--------------------------------------|------------------------------------------------------|------------------------|--------------------------------------------------------|----------------------------------------------------------------------------------------|
| MCP6293 | 1             | 10 MHz | 1000                        | 3                        | 1                               | 8.7 <sup>(2)</sup>                   | 2.4 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output, Chip select                 | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 6-pin SOT-23 <sup>(S)</sup>                        |
| MCP6294 | 4             | 10 MHz | 1000                        | 3                        | 1                               | 8.7 <sup>(2)</sup>                   | 2.4 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                              | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP                                                 |
| MCP6295 | 2             | 10 MHz | 1100                        | 3                        | 1                               | 8.7 <sup>(2)</sup>                   | 2.4 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output, Dual connected, Chip select | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP                                                     |
| MCP6H91 | 1             | 10 MHz | 2000                        | 4                        | 10                              | 23 <sup>(1)</sup>                    | Single Supply: 3.5 to 12<br>Dual Supply: ±1.75 to ±6 | –40 to +125            | Rail-to-Rail Output                                    | 8-pin SOIC, 8-pin 2 × 3 TDFN                                                           |
| MCP6H92 | 2             | 10 MHz | 2000                        | 4                        | 10                              | 23 <sup>(1)</sup>                    | Single Supply: 3.5 to 12<br>Dual Supply: ±1.75 to ±6 | –40 to +125            | Rail-to-Rail Output                                    | 8-pin SOIC, 8-pin 2 × 3 TDFN                                                           |
| MCP6H94 | 4             | 10 MHz | 2000                        | 4                        | 10                              | 23 <sup>(1)</sup>                    | Single Supply: 3.5 to 12<br>Dual Supply: ±1.75 to ±6 | –40 to +125            | Rail-to-Rail Output                                    | 14-pin SOIC, 14-pin TSSOP                                                              |
| MCP6L91 | 1             | 10 MHz | 850                         | 4                        | 1                               | 9.4 <sup>(2)</sup>                   | 2.4 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                              | 8-pin SOIC <sup>(S)</sup> , 8-pin MSOP <sup>(S)</sup> , 5-pin SOT-23 <sup>(S, R)</sup> |
| MCP6L92 | 2             | 10 MHz | 850                         | 4                        | 1                               | 9.4 <sup>(2)</sup>                   | 2.4 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                              | 8-pin SOIC, 8-pin MSOP                                                                 |
| MCP6L94 | 4             | 10 MHz | 850                         | 4                        | 1                               | 9.4 <sup>(2)</sup>                   | 2.4 to 6.0                                           | –40 to +125            | Rail-to-Rail Input/Output                              | 14-pin SOIC, 14-pin TSSOP                                                              |
| MCP621  | 1             | 20 MHz | 2500                        | 0.2                      | 5                               | 13 <sup>(3)</sup>                    | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output, Chip select, mCal Technology      | 8-pin SOIC, 8-pin 2 × 3 TDFN                                                           |
| MCP621S | 1             | 20 MHz | 2500                        | 0.2                      | 5                               | 13 <sup>(3)</sup>                    | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output, mCal Technology                   | 5-pin SOT-23 <sup>(S)</sup>                                                            |
| MCP622  | 2             | 20 MHz | 2500                        | 0.2                      | 5                               | 13 <sup>(3)</sup>                    | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output, mCal Technology                   | 8-pin SOIC, 8-pin 3 × 3 DFN                                                            |
| MCP623  | 1             | 20 MHz | 2500                        | 0.2                      | 5                               | 13 <sup>(3)</sup>                    | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output, Chip select, mCal Technology      | 6-pin SOT-23 <sup>(S)</sup>                                                            |
| MCP624  | 4             | 20 MHz | 2500                        | 0.2                      | 5                               | 13 <sup>(3)</sup>                    | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output, mCal Technology                   | 14-pin SOIC, 14-pin TSSOP                                                              |
| MCP625  | 2             | 20 MHz | 2500                        | 0.2                      | 5                               | 13 <sup>(3)</sup>                    | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output, Chip selects, mCal Technology     | 10-pin MSOP, 10-pin 3 × 3 DFN                                                          |
| MCP629  | 4             | 20 MHz | 2500                        | 0.2                      | 5                               | 13 <sup>(3)</sup>                    | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output, Chip selects, mCal Technology     | 16-pin 4 × 4 QFN                                                                       |
| MCP631  | 1             | 24 MHz | 2500                        | 8                        | 4                               | 10 <sup>(3)</sup>                    | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output                                    | 8-pin SOIC, 8-pin 2 × 3 TDFN, 5-pin SOT-23 <sup>(S)</sup>                              |
| MCP632  | 2             | 24 MHz | 2500                        | 8                        | 4                               | 10 <sup>(3)</sup>                    | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output                                    | 8-pin SOIC, 8-pin 3 × 3 DFN                                                            |
| MCP633  | 1             | 24 MHz | 2500                        | 8                        | 4                               | 10 <sup>(3)</sup>                    | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output, Chip select                       | 8-pin SOIC, 6-pin SOT-23                                                               |
| MCP634  | 4             | 24 MHz | 2500                        | 8                        | 4                               | 10 <sup>(3)</sup>                    | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output                                    | 14-pin SOIC, 14-pin TSSOP                                                              |
| MCP635  | 2             | 24 MHz | 2500                        | 8                        | 4                               | 10 <sup>(3)</sup>                    | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output, Chip selects                      | 10-pin MSOP, 10-pin 3 × 3 DFN                                                          |
| MCP639  | 4             | 24 MHz | 2500                        | 8                        | 4                               | 10 <sup>(3)</sup>                    | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output, Chip selects                      | 16-pin 4 × 4 QFN                                                                       |
| MCP651  | 1             | 50 MHz | 6000                        | 0.2                      | 6                               | 7.5 <sup>(3)</sup>                   | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output, Chip select, mCal Technology      | 8-pin SOIC, 8-pin 2 × 3 TDFN                                                           |
| MCP651S | 1             | 50 MHz | 6000                        | 0.2                      | 6                               | 7.5 <sup>(3)</sup>                   | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output, mCal Technology                   | 5-pin SOT-23 <sup>(S)</sup>                                                            |
| MCP652  | 2             | 50 MHz | 6000                        | 0.2                      | 6                               | 7.5 <sup>(3)</sup>                   | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output, mCal Technology                   | 8-pin SOIC, 8-pin 3 × 3 DFN                                                            |
| MCP653  | 1             | 50 MHz | 6000                        | 0.2                      | 6                               | 7.5 <sup>(3)</sup>                   | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output, Chip select, mCal Technology      | 6-pin SOT-23 <sup>(S)</sup>                                                            |
| MCP654  | 4             | 50 MHz | 6000                        | 0.2                      | 6                               | 7.5 <sup>(3)</sup>                   | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output, mCal Technology                   | 14-pin SOIC, 14-pin TSSOP                                                              |
| MCP655  | 2             | 50 MHz | 6000                        | 0.2                      | 6                               | 7.5 <sup>(3)</sup>                   | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output, Chip selects, mCal Technology     | 10-pin MSOP, 10-pin 3 × 3 DFN                                                          |
| MCP659  | 4             | 50 MHz | 6000                        | 0.2                      | 6                               | 7.5 <sup>(3)</sup>                   | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output, Chip selects, mCal Technology     | 16-pin 4 × 4 QFN                                                                       |
| MCP660  | 3             | 60 MHz | 6000                        | 8                        | 6                               | 6.8 <sup>(3)</sup>                   | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output                                    | 14-pin SOIC, 14-pin TSSOP                                                              |
| MCP661  | 1             | 60 MHz | 6000                        | 8                        | 6                               | 6.8 <sup>(3)</sup>                   | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output                                    | 8-pin SOIC, 8-pin 2 × 3 TDFN, 5-pin SOT-23 <sup>(S)</sup>                              |
| MCP662  | 2             | 60 MHz | 6000                        | 8                        | 6                               | 6.8 <sup>(3)</sup>                   | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output                                    | 8-pin SOIC, 8-pin 3 × 3 DFN                                                            |
| MCP663  | 1             | 60 MHz | 6000                        | 8                        | 6                               | 6.8 <sup>(3)</sup>                   | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output, Chip select                       | 8-pin SOIC, 6-pin SOT-23                                                               |
| MCP664  | 4             | 60 MHz | 6000                        | 8                        | 6                               | 6.8 <sup>(3)</sup>                   | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output                                    | 14-pin SOIC, 14-pin TSSOP                                                              |
| MCP665  | 2             | 60 MHz | 6000                        | 8                        | 6                               | 6.8 <sup>(3)</sup>                   | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output, Chip selects                      | 10-pin MSOP, 10-pin 3 × 3 DFN                                                          |
| MCP669  | 4             | 60 MHz | 6000                        | 8                        | 6                               | 6.8 <sup>(3)</sup>                   | 2.5 to 5.5                                           | –40 to +125            | Rail-to-Rail Output, Chip selects                      | 16-pin 4 × 4 QFN                                                                       |

**Legend:** S = Standard Pinout; R = Reverse Pinout; U = Alternative Pinout

**Note 1:** Values are typical at 1 kHz  
**2:** Values are typical at 10 kHz  
**3:** Values are typical at 1 MHz

## LINEAR: Zero-Drift Operational Amplifiers

| Part #         | # per Package | GBWP         | I <sub>Q</sub> Max (mA) | V <sub>OS</sub> Max (μV) | V <sub>OS</sub> Drift Max (μV/°C) | Operating Voltage (V) | Temperature Range (°C) | Features                                                 | Packages                                                    |
|----------------|---------------|--------------|-------------------------|--------------------------|-----------------------------------|-----------------------|------------------------|----------------------------------------------------------|-------------------------------------------------------------|
| MCP6V11        | 1             | 80 kHz       | 0.011                   | 8                        | 0.05                              | 1.6 to 5.5            | −40 to +125            | Rail-to-Rail Input/Output                                | 5-pin SOT-23 <sup>(S, U)</sup> , 5-pin SC-70 <sup>(U)</sup> |
| MCP6V12        | 2             | 80 kHz       | 0.011                   | 8                        | 0.05                              | 1.6 to 5.5            | −40 to +125            | Rail-to-Rail Input/Output                                | 8-pin 2 × 3 TDFN, 8-pin MSOP                                |
| MCP6V14        | 4             | 80 kHz       | 0.011                   | 8                        | 0.05                              | 1.6 to 5.5            | −40 to +125            | Rail-to-Rail Input/Output                                | 14-pin TSSOP                                                |
| MCP6V31        | 1             | 300 kHz      | 0.034                   | 8                        | 0.05                              | 1.8 to 5.5            | −40 to +125            | Rail-to-Rail Input/Output                                | 5-pin SOT-23 <sup>(S, U)</sup> , 5-pin SC-70 <sup>(U)</sup> |
| MCP6V32        | 2             | 300 kHz      | 0.034                   | 8                        | 0.05                              | 1.8 to 5.5            | −40 to +125            | Rail-to-Rail Input/Output                                | 8-pin 2 × 3 TDFN, 8-pin MSOP                                |
| MCP6V34        | 4             | 300 kHz      | 0.034                   | 8                        | 0.05                              | 1.8 to 5.5            | −40 to +125            | Rail-to-Rail Input/Output                                | 14-pin TSSOP                                                |
| TC7652         | 1             | 0.4 MHz      | 3                       | 5                        | 0.05                              | 5 to 16               | 0 to +70               | Single and Split Supply, Low Noise                       | 8-pin PDIP, 14-pin PDIP                                     |
| MCP6V61        | 1             | 1 MHz        | 0.13                    | 8                        | 0.015                             | 1.8 to 5.5            | −40 to +125            | Rail-to-Rail Input/Output, Enhanced EMI Rejection        | 5-pin SOT-23 <sup>(S, U)</sup> , 5-pin SC-70 <sup>(U)</sup> |
| MCP6V01        | 1             | 1.3 MHz      | 0.4                     | 2                        | 0.05                              | 1.8 to 5.5            | −40 to +125            | Rail-to-Rail Input/Output                                | 8-pin SOIC, 8-pin 2 × 3 TDFN                                |
| MCP6V02        | 2             | 1.3 MHz      | 0.4                     | 2                        | 0.05                              | 1.8 to 5.5            | −40 to +125            | Rail-to-Rail Input/Output                                | 8-pin SOIC, 8-pin 4 × 4 DFN                                 |
| MCP6V03        | 1             | 1.3 MHz      | 0.4                     | 2                        | 0.05                              | 1.8 to 5.5            | −40 to +125            | Rail-to-Rail Input/Output, Chip select                   | 8-pin SOIC, 8-pin 2 × 3 TDFN                                |
| MCP6V06        | 1             | 1.3 MHz      | 0.4                     | 3                        | 0.05                              | 1.8 to 5.5            | −40 to +125            | Rail-to-Rail Input/Output                                | 8-pin SOIC, 8-pin 2 × 3 TDFN                                |
| MCP6V07        | 2             | 1.3 MHz      | 0.4                     | 3                        | 0.05                              | 1.8 to 5.5            | −40 to +125            | Rail-to-Rail Input/Output                                | 8-pin SOIC, 8-pin 4 × 4 DFN                                 |
| MCP6V08        | 1             | 1.3 MHz      | 0.4                     | 3                        | 0.05                              | 1.8 to 5.5            | −40 to +125            | Rail-to-Rail Input/Output, Chip select                   | 8-pin SOIC, 8-pin 2 × 3 TDFN                                |
| TC913A/B       | 2             | 1.5 MHz      | 1.1                     | 15                       | 0.15/0.30                         | 7 to 16               | 0 to +70               | Single and Split Supply                                  | 8-pin PDIP, 8-pin SOIC                                      |
| TC7650         | 1             | 2 MHz        | 3.5                     | 5                        | 0.05                              | 4.5 to 16             | 0 to +70               | Single and Split Supply                                  | 8-pin PDIP, 14-pin PDIP                                     |
| MCP6V26        | 1             | 2 MHz        | 0.8                     | 2                        | 0.05                              | 2.3 to 5.5            | −40 to +125            | Rail-to-Rail Input/Output                                | 8-pin SOIC, 8-pin MSOP, 8-pin 2 × 3 TDFN                    |
| MCP6V27        | 2             | 2 MHz        | 0.8                     | 2                        | 0.05                              | 2.3 to 5.5            | −40 to +125            | Rail-to-Rail Input/Output                                | 8-pin SOIC, 8-pin MSOP, 8-pin 4 × 4 DFN                     |
| MCP6V28        | 1             | 2 MHz        | 0.8                     | 2                        | 0.05                              | 2.3 to 5.5            | −40 to +125            | Rail-to-Rail Input/Output, Chip select                   | 8-pin SOIC, 8-pin MSOP, 8-pin 2 × 3 TDFN                    |
| <b>MCP6V71</b> | <b>1</b>      | <b>2 MHz</b> | <b>0.26</b>             | <b>8</b>                 | <b>0.015</b>                      | <b>1.8 to 5.5</b>     | <b>−40 to +125</b>     | <b>Rail-to-Rail Input/Output, Enhanced EMI Rejection</b> | <b>5-pin SOT-23 (S, U), 5-pin SC-70</b>                     |

## LINEAR: Programmable Gain Amplifiers (PGA)

| Part #  | Channels | −3dB BW (MHz) | I <sub>Q</sub> Typ. (mA) | V <sub>OS</sub> (μV) | Operating Voltage (V) | Temperature Range (°C) | Features                                                        | Packages                               |
|---------|----------|---------------|--------------------------|----------------------|-----------------------|------------------------|-----------------------------------------------------------------|----------------------------------------|
| MCP6S21 | 1        | 2 to 12       | 1.1                      | 275                  | 2.5 to 5.5            | −40 to +85             | SPI, Eight Gain steps, Software shutdown                        | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP     |
| MCP6S22 | 2        | 2 to 12       | 1.1                      | 275                  | 2.5 to 5.5            | −40 to +85             | SPI, Eight Gain steps, Software shutdown                        | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP     |
| MCP6S26 | 6        | 2 to 12       | 1.1                      | 275                  | 2.5 to 5.5            | −40 to +85             | SPI, Eight Gain steps, Software shutdown                        | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP |
| MCP6S28 | 8        | 2 to 12       | 1.1                      | 275                  | 2.5 to 5.5            | −40 to +85             | SPI, Eight Gain steps, Software shutdown                        | 16-pin PDIP, 16-pin SOIC               |
| MCP6S91 | 1        | 1 to 18       | 1.0                      | 4000                 | 2.5 to 5.5            | −40 to +125            | SPI, Eight Gain steps, Software shutdown, V <sub>REF</sub>      | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP     |
| MCP6S92 | 2        | 1 to 18       | 1.0                      | 4000                 | 2.5 to 5.5            | −40 to +125            | SPI, Eight Gain steps, Software shutdown                        | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP     |
| MCP6S93 | 2        | 1 to 18       | 1.0                      | 4000                 | 2.5 to 5.5            | −40 to +125            | SPI, Eight Gain steps, Software shutdown, V <sub>REF</sub> , SO | 10-pin MSOP                            |

## LINEAR: Selectable Gain Amplifiers (SGA)

| Part #  | Channels | −3dB BW (kHz) | I <sub>Q</sub> (μA) | V <sub>OS</sub> (mV) | Operating Voltage (V) | Temperature Range (°C) | Gain Steps (V/V) | Features                           | Packages                                                  |
|---------|----------|---------------|---------------------|----------------------|-----------------------|------------------------|------------------|------------------------------------|-----------------------------------------------------------|
| MCP6G01 | 1        | 900           | 110                 | 4.5                  | 1.8 to 5.5            | −40 to +125            | 1, 10, 50        | Tri-State control pin              | 8-pin SOIC, 8-pin MSOP, 5-pin SOT-23 <sup>(S, R, U)</sup> |
| MCP6G02 | 2        | 900           | 110                 | 4.5                  | 1.8 to 5.5            | −40 to +125            | 1, 10, 50        | Tri-State control pin              | 8-pin SOIC, 8-pin MSOP                                    |
| MCP6G03 | 1        | 900           | 110                 | 4.5                  | 1.8 to 5.5            | −40 to +125            | 1, 10, 50        | Tri-State control pin, chip select | 8-pin SOIC, 8-pin MSOP                                    |
| MCP6G04 | 4        | 900           | 110                 | 4.5                  | 1.8 to 5.5            | −40 to +125            | 1, 10, 50        | Tri-State control pin              | 14-pin SOIC, 14-pin TSSOP                                 |

## LINEAR: Instrumentation Amplifiers

| Part #  | # Per Package | Bandwidth (kHz) | I <sub>Q</sub> Max (mA) | Max V <sub>OS</sub> (μV) | V <sub>OS</sub> Drift Max (μV/°C) | Operating Voltage (V) | Temperature Range (°C) | Features                                                      | Packages                     |
|---------|---------------|-----------------|-------------------------|--------------------------|-----------------------------------|-----------------------|------------------------|---------------------------------------------------------------|------------------------------|
| MCP6N11 | 1             | 500             | 1.1                     | 350                      | 2.7                               | 1.8 to 5.5            | −40 to +125            | Rail-to-Rail Input/Output, mCal Technology                    | 8-pin SOIC, 8-pin 2 × 3 TDFN |
| MCP6N16 | 1             | 500             | 1.6                     | 17                       | 0.06                              | 1.8 to 5.5            | −40 to +125            | Rail-to-Rail Input/Output, Enable Pin, Enhanced EMI Rejection | 8-pin MSOP, 8-pin 3 × 3 DFN  |

Legend: S = Standard Pinout; R = Reverse Pinout; U = Alternative Pinout

| LINEAR: Comparators |               |                      |                                |                             |                          |                       |                        |                                                         |                                                                                                        |
|---------------------|---------------|----------------------|--------------------------------|-----------------------------|--------------------------|-----------------------|------------------------|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| Part #              | # Per Package | V <sub>REF</sub> (V) | Typical Propagation Delay (μs) | I <sub>Q</sub> Typical (μA) | V <sub>OS</sub> Max (mV) | Operating Voltage (V) | Temperature Range (°C) | Features                                                | Packages                                                                                               |
| MCP6541             | 1             | –                    | 4                              | 1                           | 5                        | 1.6 to 5.5            | –40 to +125            | Push-Pull, Rail-to-Rail Input/Output                    | 5-pin SOT-23 <sup>(S, R, U)</sup> , 5-pin SC-70 <sup>(S, U)</sup> , 8-pin PDIP, 8-pin SOIC, 8-pin MSOP |
| MCP6542             | 2             | –                    | 4                              | 1                           | 5                        | 1.6 to 5.5            | –40 to +125            | Push-Pull, Rail-to-Rail Input/Output                    | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP                                                                     |
| MCP6543             | 1             | –                    | 4                              | 1                           | 5                        | 1.6 to 5.5            | –40 to +125            | Push-Pull, Rail-to-Rail Input/Output, Chip select       | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP                                                                     |
| MCP6544             | 4             | –                    | 4                              | 1                           | 5                        | 1.6 to 5.5            | –40 to +125            | Push-Pull, Rail-to-Rail Input/Output                    | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP                                                                 |
| MCP6546             | 1             | –                    | 4                              | 1                           | 5                        | 1.6 to 5.5            | –40 to +125            | Open-drain, 9V, Rail-to-Rail Input/Output               | 5-pin SOT-23 <sup>(S, R, U)</sup> , 5-pin SC-70 <sup>(S, U)</sup> , 8-pin PDIP, 8-pin SOIC, 8-pin MSOP |
| MCP6547             | 2             | –                    | 4                              | 1                           | 5                        | 1.6 to 5.5            | –40 to +125            | Open-drain, 9V, Rail-to-Rail Input/Output               | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP                                                                     |
| MCP6548             | 1             | –                    | 4                              | 1                           | 5                        | 1.6 to 5.5            | –40 to +125            | Open-drain, 9V, Rail-to-Rail Input/Output, Chip select  | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP                                                                     |
| MCP6549             | 4             | –                    | 4                              | 1                           | 5                        | 1.6 to 5.5            | –40 to +125            | Open-drain, 9V, Rail-to-Rail Input/Output               | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP                                                                 |
| MCP65R41            | 1             | 1.21/2.4             | 4                              | 2.5                         | 10                       | 1.8 to 5.5            | –40 to +125            | Push-Pull, Rail-to-Rail Input/Output, V <sub>REF</sub>  | 6-pin SOT-23                                                                                           |
| MCP65R46            | 1             | 1.21/2.4             | 4                              | 2.5                         | 10                       | 1.8 to 5.5            | –40 to +125            | Open Drain, Rail-to-Rail Input/Output, V <sub>REF</sub> | 6-pin SOT-23                                                                                           |
| MCP6561             | 1             | –                    | 0.047                          | 100                         | 10                       | 1.8 to 5.5            | –40 to +125            | Push-Pull, Rail-to-Rail Input/Output                    | 5-pin SOT-23 <sup>(S, R, U)</sup> , 5-pin SC-70 <sup>(S)</sup>                                         |
| MCP6562             | 2             | –                    | 0.047                          | 100                         | 10                       | 1.8 to 5.5            | –40 to +125            | Push-Pull, Rail-to-Rail Input/Output                    | 8-pin SOIC, 8-pin MSOP                                                                                 |
| MCP6564             | 4             | –                    | 0.047                          | 100                         | 10                       | 1.8 to 5.5            | –40 to +125            | Push-Pull, Rail-to-Rail Input/Output                    | 14-pin SOIC, 14-pin TSSOP                                                                              |
| MCP6566             | 1             | –                    | 0.047                          | 100                         | 10                       | 1.8 to 5.5            | –40 to +125            | Open-Drain, Rail-to-Rail Input/Output                   | 5-pin SOT-23 <sup>(S, R, U)</sup> , 5-pin SC-70 <sup>(S)</sup>                                         |
| MCP6567             | 2             | –                    | 0.047                          | 100                         | 10                       | 1.8 to 5.5            | –40 to +125            | Open-Drain, Rail-to-Rail Input/Output                   | 8-pin SOIC, 8-pin MSOP                                                                                 |
| MCP6569             | 4             | –                    | 0.047                          | 100                         | 10                       | 1.8 to 5.5            | –40 to +125            | Open-Drain, Rail-to-Rail Input/Output                   | 14-pin SOIC, 14-pin TSSOP                                                                              |

Legend: S = Standard Pinout; R = Reverse Pinout; U = Alternative Pinout

## MIXED SIGNAL

| MIXED SIGNAL: Successive Approximation Register (SAR) A/D Converters |                   |                                      |                     |              |                   |                         |                          |          |                        |                                                 |
|----------------------------------------------------------------------|-------------------|--------------------------------------|---------------------|--------------|-------------------|-------------------------|--------------------------|----------|------------------------|-------------------------------------------------|
| Part #                                                               | Resolution (bits) | Maximum Sampling Rate (ksamples/sec) | # of Input Channels | Input Type   | Interface         | Input Voltage Range (V) | Max. Supply Current (μA) | Max. INL | Temperature Range (°C) | Packages                                        |
| MCP3021                                                              | 10                | 22                                   | 1                   | Single-ended | I <sup>2</sup> C™ | 2.7 to 5.5              | 250                      | ±1 LSB   | –40 to +125            | 5-pin SOT-23A                                   |
| MCP3001                                                              | 10                | 200                                  | 1                   | Single-ended | SPI               | 2.7 to 5.5              | 500                      | ±1 LSB   | –40 to +85             | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 8-pin TSSOP |
| MCP3002                                                              | 10                | 200                                  | 2                   | Single-ended | SPI               | 2.7 to 5.5              | 650                      | ±1 LSB   | –40 to +85             | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 8-pin TSSOP |
| MCP3004                                                              | 10                | 200                                  | 4                   | Single-ended | SPI               | 2.7 to 5.5              | 550                      | ±1 LSB   | –40 to +85             | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP          |
| MCP3008                                                              | 10                | 200                                  | 8                   | Single-ended | SPI               | 2.7 to 5.5              | 550                      | ±1 LSB   | –40 to +85             | 16-pin PDIP, 16-pin SOIC                        |
| MCP3221                                                              | 12                | 22                                   | 1                   | Single-ended | I <sup>2</sup> C  | 2.7 to 5.5              | 250                      | ±2 LSB   | –40 to +125            | 5-pin SOT-23A                                   |
| MCP3201                                                              | 12                | 100                                  | 1                   | Single-ended | SPI               | 2.7 to 5.5              | 400                      | ±1 LSB   | –40 to +85             | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 8-pin TSSOP |
| MCP3202                                                              | 12                | 100                                  | 2                   | Single-ended | SPI               | 2.7 to 5.5              | 550                      | ±1 LSB   | –40 to +85             | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 8-pin TSSOP |
| MCP3204                                                              | 12                | 100                                  | 4                   | Single-ended | SPI               | 2.7 to 5.5              | 400                      | ±1 LSB   | –40 to +85             | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP          |
| MCP3208                                                              | 12                | 100                                  | 8                   | Single-ended | SPI               | 2.7 to 5.5              | 400                      | ±1 LSB   | –40 to +85             | 16-pin PDIP, 16-pin SOIC                        |
| MCP3301                                                              | 13                | 100                                  | 1                   | Differential | SPI               | 2.7 to 5.5              | 450                      | ±1 LSB   | –40 to +85             | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 8-pin TSSOP |
| MCP3302                                                              | 13                | 100                                  | 2                   | Differential | SPI               | 2.7 to 5.5              | 450                      | ±1 LSB   | –40 to +85             | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP          |
| MCP3304                                                              | 13                | 100                                  | 4                   | Differential | SPI               | 2.7 to 5.5              | 450                      | ±1 LSB   | –40 to +85             | 16-pin PDIP, 16-pin SOIC                        |

| MIXED SIGNAL: Delta-Sigma A/D Converters |                   |                                     |                     |                   |                          |                             |                   |                        |                                                                |                                         |
|------------------------------------------|-------------------|-------------------------------------|---------------------|-------------------|--------------------------|-----------------------------|-------------------|------------------------|----------------------------------------------------------------|-----------------------------------------|
| Part #                                   | Resolution (bits) | Maximum Sampling Rate (samples/sec) | # of Input Channels | Interface         | Supply Voltage Range (V) | Typical Supply Current (μA) | Typical INL (ppm) | Temperature Range (°C) | Features                                                       | Packages                                |
| MCP3421                                  | 18 to 12          | 4 to 240                            | 1 Diff              | I <sup>2</sup> C™ | 2.7 to 5.5               | 155                         | 10                | –40 to +125            | PGA, V <sub>REF</sub>                                          | 6-pin SOT-23A                           |
| MCP3422                                  | 18 to 12          | 4 to 240                            | 2 Diff              | I <sup>2</sup> C  | 2.7 to 5.5               | 145                         | 10                | –40 to +125            | PGA, V <sub>REF</sub>                                          | 8-pin SOIC, 8-pin MSOP, 8-pin 2 × 3 DFN |
| MCP3423                                  | 18 to 12          | 4 to 240                            | 2 Diff              | I <sup>2</sup> C  | 2.7 to 5.5               | 145                         | 10                | –40 to +125            | PGA, V <sub>REF</sub> , Selectable I <sup>2</sup> C addressing | 10-pin MSOP, 10-pin 3 × 3 DFN           |
| MCP3424                                  | 18 to 12          | 4 to 240                            | 4 Diff              | I <sup>2</sup> C  | 2.7 to 5.5               | 145                         | 10                | –40 to +125            | PGA, V <sub>REF</sub> , Selectable I <sup>2</sup> C addressing | 14-pin SOIC, 14-pin TSSOP               |
| MCP3425                                  | 16 to 12          | 15 to 240                           | 1 Diff              | I <sup>2</sup> C  | 2.7 to 5.5               | 155                         | 10                | –40 to +125            | PGA, V <sub>REF</sub>                                          | 6-pin SOT-23A                           |
| MCP3426                                  | 16 to 12          | 15 to 240                           | 2 Diff              | I <sup>2</sup> C  | 2.7 to 5.5               | 145                         | 10                | –40 to +125            | PGA, V <sub>REF</sub>                                          | 8-pin SOIC, 8-pin MSOP, 8-pin 2 × 3 DFN |
| MCP3427                                  | 16 to 12          | 15 to 240                           | 2 Diff              | I <sup>2</sup> C  | 2.7 to 5.5               | 145                         | 10                | –40 to +125            | PGA, V <sub>REF</sub> , Selectable I <sup>2</sup> C addressing | 10-pin MSOP, 10-pin 3 × 3 DFN           |

**MIXED SIGNAL: Delta-Sigma A/D Converters (Continued)**

| Part #     | Resolution (bits) | Maximum Sampling Rate (samples/sec) | # of Input Channels | Interface        | Supply Voltage Range (V) | Typical Supply Current (μA) | Typical INL (ppm) | Temperature Range (°C) | Features                                                       | Packages                  |
|------------|-------------------|-------------------------------------|---------------------|------------------|--------------------------|-----------------------------|-------------------|------------------------|----------------------------------------------------------------|---------------------------|
| MCP3428    | 16 to 12          | 15 to 240                           | 4 Diff              | I <sup>2</sup> C | 2.7 to 5.5               | 145                         | 10                | −40 to +125            | PGA, V <sub>REF</sub> , Selectable I <sup>2</sup> C addressing | 14-pin SOIC, 14-pin TSSOP |
| MCP3550-50 | 22                | 13                                  | 1 Diff              | SPI              | 2.7 to 5.5               | 120                         | 2                 | −40 to +125            | 50 Hz rejection                                                | 8-pin SOIC, 8-pin MSOP    |
| MCP3550-60 | 22                | 15                                  | 1 Diff              | SPI              | 2.7 to 5.5               | 140                         | 2                 | −40 to +125            | 60 Hz rejection                                                | 8-pin SOIC, 8-pin MSOP    |
| MCP3551    | 22                | 14                                  | 1 Diff              | SPI              | 2.7 to 5.5               | 120                         | 2                 | −40 to +125            | Simultaneous 50/60 Hz rejection                                | 8-pin SOIC, 8-pin MSOP    |
| MCP3553    | 20                | 60                                  | 1 Diff              | SPI              | 2.7 to 5.5               | 140                         | 2                 | −40 to +125            |                                                                | 8-pin SOIC, 8-pin MSOP    |

**MIXED SIGNAL: Pipelined A/D Converters**

| Part #              | Resolution | Max Sample Rate (Msamples/sec) | # of Input Channels | Input Type          | Interface                            | Supply Voltage (V) | Power Dissipation (mW) | Input Channel BW (MHz) | SNR (dB)    | SFDR (dB) | Input Range (V <sub>p-p</sub> ) | Feature                                                                      | Temperature Range (°C) | Packages            |
|---------------------|------------|--------------------------------|---------------------|---------------------|--------------------------------------|--------------------|------------------------|------------------------|-------------|-----------|---------------------------------|------------------------------------------------------------------------------|------------------------|---------------------|
| MCP37D31-200        | 16         | 200                            | 1, 2, 4, 8          | Differential        | Serial DDR LVDS or Parallel CMOS     | 1.2, 1.8           | 490                    | 500                    | 74.7        | 90        | 2.98                            | Decimation filters, digital down-converter                                   | −40 to +85             | 124-pin VTLA        |
| MCP37231-200        | 16         | 200                            | 1, 2, 4, 8          | Differential        | Serial DDR LVDS or Parallel CMOS     | 1.2, 1.8           | 490                    | 500                    | 74.7        | 90        | 2.98                            | Decimation filters                                                           | −40 to +85             | 124-pin VTLA        |
| <b>MCP37D20-200</b> | <b>14</b>  | <b>200</b>                     | <b>1</b>            | <b>Differential</b> | <b>Parallel CMOS/Serial DDR LVDS</b> | <b>1.2, 1.8</b>    | <b>348</b>             | <b>650</b>             | <b>67.8</b> | <b>96</b> | <b>1.8</b>                      | <b>Decimation filters, digital down-converter</b>                            | <b>−40 to +85</b>      | <b>124-pin VTLA</b> |
| <b>MCP37220-200</b> | <b>14</b>  | <b>200</b>                     | <b>1</b>            | <b>Differential</b> | <b>Parallel CMOS/Serial DDR LVDS</b> | <b>1.2, 1.8</b>    | <b>348</b>             | <b>650</b>             | <b>67.8</b> | <b>96</b> | <b>1.8</b>                      | <b>Decimation filters</b>                                                    | <b>−40 to +85</b>      | <b>124-pin VTLA</b> |
| MCP37D21-200        | 14         | 200                            | 1, 2, 4, 8          | Differential        | Serial DDR LVDS or Parallel CMOS     | 1.2, 1.8           | 490                    | 500                    | 74.2        | 90        | 2.98                            | Decimation filters, digital down-converter                                   | −40 to +85             | 124-pin VTLA        |
| MCP37221-200        | 14         | 200                            | 1, 2, 4, 8          | Differential        | Serial DDR LVDS or Parallel CMOS     | 1.2, 1.8           | 490                    | 500                    | 74.2        | 90        | 2.98                            | Decimation filters                                                           | −40 to +85             | 124-pin VTLA        |
| <b>MCP37D10-200</b> | <b>12</b>  | <b>200</b>                     | <b>1</b>            | <b>Differential</b> | <b>Parallel CMOS/Serial DDR LVDS</b> | <b>1.2, 1.8</b>    | <b>338</b>             | <b>650</b>             | <b>67</b>   | <b>96</b> | <b>1.8</b>                      | <b>Decimation filters, digital down-converter, noise-shaping requantizer</b> | <b>−40 to +85</b>      | <b>124-pin VTLA</b> |
| <b>MCP37210-200</b> | <b>12</b>  | <b>200</b>                     | <b>1</b>            | <b>Differential</b> | <b>Parallel CMOS/Serial DDR LVDS</b> | <b>1.2, 1.8</b>    | <b>338</b>             | <b>650</b>             | <b>67</b>   | <b>96</b> | <b>1.8</b>                      | <b>Decimation filters, noise-shaping requantizer</b>                         | <b>−40 to +85</b>      | <b>124-pin VTLA</b> |
| MCP37D11-200        | 12         | 200                            | 1, 2, 4, 8          | Differential        | Serial DDR LVDS or Parallel CMOS     | 1.2, 1.8           | 468                    | 500                    | 71.3        | 90        | 2.98                            | Decimation filters, digital down-converter                                   | −40 to +85             | 124-pin VTLA        |
| MCP37211-200        | 12         | 200                            | 1, 2, 4, 8          | Differential        | Serial DDR LVDS or Parallel CMOS     | 1.2, 1.8           | 468                    | 500                    | 71.3        | 90        | 2.98                            | Decimation filters, noise shaping requantizer                                | −40 to +85             | 124-pin VTLA        |

**MIXED SIGNAL: Energy Measurement ICs**

| Part #           | ADC Channels | ADC SINAD | Dynamic Range          | Gain Selection  | Output Type            | Typical Voltage Reference Drift (ppm/°C) | Analog Voltage Range (V) | Digital Voltage Range (V) | Typical Accuracy | Temperature Range (°C) | Features                                                                                                                                                                                              | Packages                       |
|------------------|--------------|-----------|------------------------|-----------------|------------------------|------------------------------------------|--------------------------|---------------------------|------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| MCP3918          | 1            | 93.5 dB   | 10000:1                | up to 32        | SPI/2-wire serial      | 9                                        | 2.7 to 3.6               | 2.7 to 3.6                | 0.1%             | −40 to +125            | AFE with phase correction, Programmable data rate, 16-bit CRC, Register map lock, 2-wire interface                                                                                                    | 20-pin SSOP, 20-pin 4 × 4 QFN  |
| MCP3910          | 2            | –         | 10000:1                | up to 32        | SPI/2-wire serial      | 9                                        | 2.7 to 3.6               | 2.7 to 3.6                | 0.1%             | −40 to +125            | Phase correction, Programmable data rate, 16-bit CRC, Register map lock, 2-wire interface                                                                                                             | 20-pin SSOP, 20-pin 4 × 4 QFN  |
| MCP3911          | 2            | 94.5 dB   | 10000:1 <sup>(1)</sup> | up to 32        | SPI                    | 7                                        | 2.7 to 3.6               | 2.7 to 3.6                | 0.1%             | −40 to +125            | AFE with phase correction, Programmable data rate                                                                                                                                                     | 20-pin SSOP, 20-pin 4 × 4 QFN  |
| MCP3901          | 2            | 91 dB     | — <sup>(1)</sup>       | up to 32        | SPI                    | 12                                       | 4.5 to 5.5               | 2.7 to 5.5                | 0.1%             | −40 to +125            | AFE with phase correction, Programmable data rate                                                                                                                                                     | 20-pin SSOP, 20-pin 4 × 4 QFN  |
| MCP3913          | 6            | 94.5 dB   | 10000:1                | up to 32        | SPI                    | 9                                        | 2.7 to 3.6               | 2.7 to 3.6                | 0.1%             | −40 to +125            | AFE with phase correction, Programmable data rate, 16-bit CRC, Register map lock                                                                                                                      | 28-pin SSOP, 40-pin 5 × 5 μQFN |
| MCP3903          | 6            | 91 dB     | — <sup>(1)</sup>       | up to 32        | SPI                    | 5                                        | 4.5 to 5.5               | 2.7 to 3.6                | 0.1%             | −40 to +125            | AFE with phase correction, Programmable data rate                                                                                                                                                     | 28-pin SSOP                    |
| MCP3914          | 8            | 94.5 dB   | 10000:1                | up to 32        | SPI                    | 9                                        | 2.7 to 3.6               | 2.7 to 3.6                | 0.1%             | −40 to +125            | AFE with phase correction, Programmable data rate, 16-bit CRC, Register map lock                                                                                                                      | 40-pin 5 × 5 μQFN              |
| MCP3912          | 4            | 93.5 dB   | 10000:1                | up to 32        | SPI                    | 9                                        | 2.7 to 3.6               | 2.7 to 3.6                | 0.1%             | −40 to +125            | AFE with phase correction, Programmable data rate, 16-bit CRC, Register map lock                                                                                                                      | 28-pin SSOP, 28-pin 5 × 5 QFN  |
| MCP3919          | 3            | 93.5 dB   | 10000:1                | up to 32        | SPI/2-wire serial      | 9                                        | 2.7 to 3.6               | 2.7 to 3.6                | 0.1%             | −40 to +125            | AFE with phase correction, Programmable data rate, 16-bit CRC, Register map lock, 2-wire interface                                                                                                    | 28-pin SSOP, 28-pin 5 × 5 QFN  |
| MCP3905A         | 2            | –         | 500:1                  | up to 16        | Active power pulse     | 15                                       | 4.5 to 5.5               | 4.5 to 5.5                | 0.1%             | −40 to +125            | Active power calculation                                                                                                                                                                              | 24-pin SSOP                    |
| MCP3909          | 2            | –         | 1000:1                 | up to 16        | Active power pulse/SPI | 15                                       | 4.5 to 5.5               | 4.5 to 5.5                | 0.1%             | −40 to +125            | Active power calculation                                                                                                                                                                              | 24-pin SSOP                    |
| MCP39F501        | 3            | –         | 4000:1                 | up to 32        | UART                   | 10                                       | 2.7 to 3.6               | 2.7 to 3.6                | 0.1%             | −40 to +125            | Power monitoring IC with active, reactive and apparent power, PF, RMS current/voltage, Frequency, event notifications, EEPROM                                                                         | 28-pin 5 × 5 QFN               |
| <b>MCP39F511</b> | <b>3</b>     | <b>–</b>  | <b>4000:1</b>          | <b>up to 32</b> | <b>UART</b>            | <b>10</b>                                | <b>2.7 to 3.6</b>        | <b>2.7 to 3.6</b>         | <b>0.1%</b>      | <b>−40 to +125</b>     | <b>Power monitoring IC with active, reactive and apparent power, active and reactive energy, PF, RMS current/voltage, frequency, event notifications, EEPROM, zero crossing detection, PWM output</b> | <b>28-pin 5 × 5 QFN</b>        |

Note 1: Not tested for this device

#### MIXED SIGNAL: Current/DC Power Measurement ICs

| Part #    | # of Current Sensors | Description                                                                   | Full Scale Range (mV) | Current Measurement Max Accr (%) | Effective Sampling Interval Min to Max (msec) | Bus Voltage Range (V) | # of Temp. Monitors (Ambient, Remote) | Temp. Accuracy Typ/Max (°C) | Alert/ THERM | Peak Detection | Address Select | Package          |
|-----------|----------------------|-------------------------------------------------------------------------------|-----------------------|----------------------------------|-----------------------------------------------|-----------------------|---------------------------------------|-----------------------------|--------------|----------------|----------------|------------------|
| PAC1710   | 1                    | SMBus/I <sup>2</sup> C™ Current/DC Power Sensor                               | 10, 20, 40, 80        | ±1                               | 2.5 to 2,600                                  | 0 to + 40             | –                                     | –                           | 1            | –              | Yes            | 10-pin DFN       |
| PAC1720   | 2                    | Dual SMBus/I <sup>2</sup> C Current/DC Power Sensor                           | 10, 20, 40, 80        | ±1                               | 2.5 to 2,600                                  | 0 to + 40             | –                                     | –                           | 1            | –              | Yes            | 10-pin DFN       |
| EMC1701-1 | 1                    | SMBus/I <sup>2</sup> C Current/DC Power Sensor with Temperature Monitoring    | 10, 20, 40, 80        | ±1                               | 2.5 to 2,600                                  | +3 to +24             | 1, 0                                  | ±0.25/±1                    | 2            | Hardware       | Yes            | 12-pin 4 × 4 QFN |
| EMC1701-2 | 1                    | SMBus/I <sup>2</sup> C Current/DC Power Sensor with Temperature Monitoring    | 10, 20, 40, 80        | ±1                               | 2.5 to 2,600                                  | +3 to +24             | 1, 0                                  | ±0.25/±1                    | 2            | Software       | Yes            | 10-pin MSOP      |
| EMC1702-1 | 1                    | SMBus/I <sup>2</sup> C Current/DC Power Sensor with Two Temperature Monitors  | 10, 20, 40, 80        | ±1                               | 2.5 to 2,600                                  | +3 to +24             | 1, 1                                  | ±0.25/±1                    | 2            | Hardware       | Yes            | 12-pin 4 × 4 QFN |
| EMC1704-1 | 1                    | SMBus/I <sup>2</sup> C Current/DC Power Sensor with Four Temperature Monitors | 10, 20, 40, 80        | ±1                               | 2.5 to 2,600                                  | +3 to +24             | 1, 3                                  | ±0.25/±1                    | 2            | Software       | Yes            | 14-pin SOIC      |
| EMC1704-2 | 1                    | SMBus/I <sup>2</sup> C Current/DC Power Sensor with Four Temperature Monitors | 10, 20, 40, 80        | ±1                               | 2.5 to 2,600                                  | +3 to +24             | 1, 3                                  | ±0.25/±1                    | 2            | Hardware       | Yes            | 16-pin 4 × 4 QFN |

#### MIXED SIGNAL: Dual Slope A/D Converters

| Part #  | Supply Voltage (V) | Input Voltage Range                              | Resolution            | Sampling Rate (Conv/s) | Input Channels | Data Interface          | Temperature Range (°C) | Features                                                                                       | Packages                              |
|---------|--------------------|--------------------------------------------------|-----------------------|------------------------|----------------|-------------------------|------------------------|------------------------------------------------------------------------------------------------|---------------------------------------|
| TC500   | ±4.5 to ±7.5       | V <sub>SS</sub> + 1.5V to V <sub>DD</sub> – 1.5V | Up to 16 bits         | 4 to 10                | 1              | 3-Wire                  | 0 to +70               | Differential input range, Programmable resolution/conversion time                              | 16-pin PDIP, 16-pin SOIC              |
| TC500A  | ±4.5 to ±7.5       | V <sub>SS</sub> + 1.5V to V <sub>DD</sub> – 1.5V | Up to 17 bits         | 4 to 10                | 1              | 3-Wire                  | 0 to +70               | Differential input range, Programmable resolution/conversion time                              | 16-pin PDIP, 16-pin SOIC              |
| TC510   | +4.5 to +5.5       | V <sub>SS</sub> + 1.5V to V <sub>DD</sub> – 1.5V | Up to 17 bits         | 4 to 10                | 1              | 3-Wire                  | 0 to +70               | Differential input range, Programmable resolution/conversion time, Charge pump (–V) output pin | 24-pin PDIP, 24-pin SOIC              |
| TC514   | +4.5 to +5.5       | V <sub>SS</sub> + 1.5V to V <sub>DD</sub> – 1.5V | Up to 17 bits         | 4 to 10                | 4              | 3-Wire                  | 0 to +70               | Differential input range, Programmable resolution/conversion time, Charge pump (–V) output pin | 28-pin PDIP, 28-pin SOIC              |
| TC520A  | +4.5 to +5.5       | –                                                | –                     | –                      | –              | Serial port             | 0 to +70               | Optional serial interface adapter for TC500/500A/510/514                                       | 14-pin PDIP, 16-pin SOIC              |
| TC7109  | ±4.5 to ±5.5       | V <sub>SS</sub> + 1.5V to V <sub>DD</sub> – 1.0V | 12 bits plus sign bit | 2 to 10                | 1              | Parallel or Serial port | –25 to +85             | Differential input range                                                                       | 40-pin PDIP, 44-pin PLCC, 44-pin MQFP |
| TC7109A | ±4.5 to ±5.5       | V <sub>SS</sub> + 1.5V to V <sub>DD</sub> – 1.0V | 12 bits plus sign bit | 2 to 10                | 1              | Parallel or Serial port | –25 to +85             | Differential input range                                                                       | 40-pin PDIP, 44-pin PLCC, 44-pin MQFP |

#### MIXED SIGNAL: Binary and BCD A/D Converters

| Part #   | Description | Supply Voltage (V) | Input Voltage Range                              | Resolution (Digits) | Resolution (Counts) | Max Power (mW) | Data Interface | Temperature Range (°C) | Features                               | Packages                              |
|----------|-------------|--------------------|--------------------------------------------------|---------------------|---------------------|----------------|----------------|------------------------|----------------------------------------|---------------------------------------|
| TC850    | Binary A/D  | ±5                 | V <sub>SS</sub> + 1.5V to V <sub>DD</sub> – 1.5V | 15-bit              | ±32,768             | 35             | 8-bit parallel | –25 to +70             | Highest conversion speed (40 conv/sec) | 44-pin PLCC, 40-pin PDIP              |
| TC14433  | BCD A/D     | ±4.5 to ±8         | ±199.9 mV to 1.999V                              | 3½                  | ±2,000              | 20             | MUXed BCD      | –40 to +85             | For DMM, DPM, Data loggers             | 24-pin SOIC, 24-pin PDIP, 28-pin PLCC |
| TC14433A | BCD A/D     | ±4.5 to ±8         | ±199.9 mV to 1.999V                              | 3½                  | ±2,000              | 20             | MUXed BCD      | –40 to +85             | For DMM, DPM, Data loggers             | 24-pin PDIP, 28-pin PLCC              |

#### MIXED SIGNAL: Display A/D Converters

| Part #  | Display Type | Supply Voltage (V) | Resolution (Digits) | Resolution (Counts) | Power (mW) | Temperature Range (°C) | Features                               | Packages                              |
|---------|--------------|--------------------|---------------------|---------------------|------------|------------------------|----------------------------------------|---------------------------------------|
| TC7106  | LCD          | 9                  | 3½                  | ±2,000              | 10         | –25 to +85             | For DMM, DPM, Data logger applications | 40-pin PDIP, 44-pin PLCC, 44-pin MQFP |
| TC7106A | LCD          | 9                  | 3½                  | ±2,000              | 10         | –25 to +85             | For DMM, DPM, Data logger applications | 40-pin PDIP, 44-pin PLCC, 44-pin MQFP |
| TC7107  | LED          | ±5                 | 3½                  | ±2,000              | 10         | –25 to +85             | For DMM, DPM, Data logger applications | 40-pin PDIP, 44-pin PLCC, 44-pin MQFP |
| TC7107A | LED          | ±5                 | 3½                  | ±2,000              | 10         | –25 to +85             | For DMM, DPM, Data logger applications | 40-pin PDIP, 44-pin PLCC, 44-pin MQFP |
| TC7116  | LCD          | 9                  | 3½                  | ±2,000              | 10         | –25 to +85             | Hold function                          | 40-pin PDIP, 44-pin PLCC, 44-pin MQFP |
| TC7116A | LCD          | 9                  | 3½                  | ±2,000              | 10         | –25 to +85             | Hold function                          | 40-pin PDIP, 44-pin PLCC, 44-pin MQFP |
| TC7117  | LED          | ±5                 | 3½                  | ±2,000              | 10         | –25 to +85             | Hold function                          | 40-pin PDIP, 44-pin PLCC, 44-pin MQFP |
| TC7117A | LED          | ±5                 | 3½                  | ±2,000              | 10         | –25 to +85             | Hold function                          | 40-pin PDIP, 44-pin PLCC, 44-pin MQFP |
| TC7126  | LCD          | 9                  | 3½                  | ±2,000              | 0.5        | –25 to +85             | Low-power TC7106                       | 40-pin PDIP, 44-pin PLCC, 44-pin MQFP |
| TC7126A | LCD          | 9                  | 3½                  | ±2,000              | 0.5        | –25 to +85             | Low-power TC7106                       | 40-pin PDIP, 44-pin PLCC, 44-pin MQFP |
| TC7129  | LCD          | 9                  | 4½                  | ±20,000             | 4.5        | 0 to +70               | Lowest noise ±3 mV sensitivity         | 40-pin PDIP, 44-pin PLCC, 44-pin MQFP |

## MIXED SIGNAL: Digital Potentiometers

| Part #    | # of Taps | Memory      | # Per Package | Interface         | Resistance (kOhms) | INL (Max) | DNL (Max) | Temperature Range (°C) | Comments                                                                                         | Packages                                                 |
|-----------|-----------|-------------|---------------|-------------------|--------------------|-----------|-----------|------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| MCP4011   | 64        | Volatile    | 1             | Up/Down           | 2.1, 5, 10, 50     | 0.5       | 0.5       | -40 to +125            | Potentiometer mode                                                                               | 8-pin SOIC, 8-pin MSOP, 8-pin 2 × 3 DFN                  |
| MCP4012   | 64        | Volatile    | 1             | Up/Down           | 2.1, 5, 10, 50     | 0.5       | 0.5       | -40 to +125            | Rheostat mode                                                                                    | 6-pin SOT-23                                             |
| MCP4013   | 64        | Volatile    | 1             | Up/Down           | 2.1, 5, 10, 50     | 0.5       | 0.5       | -40 to +125            | Potentiometer to Vss                                                                             | 6-pin SOT-23                                             |
| MCP4014   | 64        | Volatile    | 1             | Up/Down           | 2.1, 5, 10, 50     | 0.5       | 0.5       | -40 to +125            | Rheostat to Vss                                                                                  | 5-pin SOT-23                                             |
| MCP4017   | 128       | Volatile    | 1             | I <sup>2</sup> C™ | 5, 10, 50, 100     | 0.5       | 0.25      | -40 to +125            | 7-bit, Volatile, I <sup>2</sup> C digital potentiometer                                          | 6-pin SC-70                                              |
| MCP4018   | 128       | Volatile    | 1             | I <sup>2</sup> C  | 5, 10, 50, 100     | 0.5       | 0.25      | -40 to +125            | 7-bit, Volatile, I <sup>2</sup> C digital potentiometer                                          | 6-pin SC-70                                              |
| MCP4019   | 128       | Volatile    | 1             | I <sup>2</sup> C  | 5, 10, 50, 100     | 0.5       | 0.25      | -40 to +125            | 7-bit, Volatile, I <sup>2</sup> C digital potentiometer                                          | 5-pin SC-70                                              |
| MCP40D17  | 128       | Volatile    | 1             | I <sup>2</sup> C  | 5, 10, 50, 100     | 0.5       | 0.25      | -40 to +125            | 7-bit, Volatile, I <sup>2</sup> C digital potentiometer                                          | 6-pin SC-70                                              |
| MCP40D18  | 128       | Volatile    | 1             | I <sup>2</sup> C  | 5, 10, 50, 100     | 0.5       | 0.25      | -40 to +125            | 7-bit, Volatile, I <sup>2</sup> C digital potentiometer                                          | 6-pin SC-70                                              |
| MCP40D19  | 128       | Volatile    | 1             | I <sup>2</sup> C  | 5, 10, 50, 100     | 0.5       | 0.25      | -40 to +125            | 7-bit, Volatile, I <sup>2</sup> C digital potentiometer                                          | 5-pin SC-70                                              |
| MCP4021   | 64        | Nonvolatile | 1             | Up/Down           | 2.1, 5, 10, 50     | 0.5       | 0.5       | -40 to +125            | Potentiometer mode, Shutdown, WiperLock™ Technology                                              | 8-pin SOIC, 8-pin MSOP, 8-pin 2 × 3 DFN                  |
| MCP4022   | 64        | Nonvolatile | 1             | Up/Down           | 2.1, 5, 10, 50     | 0.5       | 0.5       | -40 to +125            | Rheostat mode, Shutdown, WiperLock Technology                                                    | 6-pin SOT-23                                             |
| MCP4023   | 64        | Nonvolatile | 1             | Up/Down           | 2.1, 5, 10, 50     | 0.5       | 0.5       | -40 to +125            | Potentiometer to Vss, WiperLock Technology                                                       | 6-pin SOT-23                                             |
| MCP4024   | 64        | Nonvolatile | 1             | Up/Down           | 2.1, 5, 10, 50     | 0.5       | 0.5       | -40 to +125            | Rheostat to Vss, Shutdown, WiperLock Technology                                                  | 5-pin SOT-23                                             |
| MCP4141   | 128       | Nonvolatile | 1             | SPI               | 5, 10, 50, 100     | 0.5       | 0.25      | -40 to +125            | Potentiometer mode, Shutdown                                                                     | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 8-pin 3 × 3 DFN      |
| MCP4142   | 128       | Nonvolatile | 1             | SPI               | 5, 10, 50, 100     | 0.8       | 0.25      | -40 to +125            | Rheostat mode, Shutdown                                                                          | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 8-pin 3 × 3 DFN      |
| MCP4241   | 128       | Nonvolatile | 2             | SPI               | 5, 10, 50, 100     | 0.5       | 0.25      | -40 to +125            | Potentiometer mode, Shutdown, WiperLock Technology                                               | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP, 16-pin 4 × 4 QFN |
| MCP4242   | 128       | Nonvolatile | 2             | SPI               | 5, 10, 50, 100     | 0.8       | 0.25      | -40 to +125            | Rheostat mode, Shutdown                                                                          | 10-pin MSOP, 10-pin 3 × 3 DFN                            |
| MCP4131   | 129       | Volatile    | 1             | SPI               | 5, 10, 50, 100     | 0.5       | 0.25      | -40 to +125            | Potentiometer mode, Shutdown                                                                     | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 8-pin 3 × 3 DFN      |
| MCP41HV31 | 128       | Volatile    | 1             | SPI               | 5, 10, 50, 100     | 0.5       | 0.125     | -40 to +125            | 7-bit Volatile digital potentiometer with specified operation from 10V to 36V and SPI interface  | 14-pin TSSOP, 5 × 5 QFN                                  |
| MCP4132   | 129       | Volatile    | 1             | SPI               | 5, 10, 50, 100     | 0.8       | 0.25      | -40 to +125            | Rheostat mode, Shutdown                                                                          | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 8-pin 3 × 3 DFN      |
| MCP4231   | 128       | Volatile    | 2             | SPI               | 5, 10, 50, 100     | 0.5       | 0.25      | -40 to +125            | Potentiometer mode, Shutdown, WiperLock Technology                                               | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP, 16-pin 4 × 4 QFN |
| MCP4232   | 128       | Volatile    | 2             | SPI               | 5, 10, 50, 100     | 0.8       | 0.25      | -40 to +125            | Rheostat mode, Shutdown                                                                          | 10-pin MSOP, 10-pin 3 × 3 DFN                            |
| MCP41010  | 256       | Volatile    | 1             | SPI               | 10                 | 1         | 1         | -40 to +85             | Potentiometer mode, Shutdown                                                                     | 8-pin PDIP, 8-pin SOIC                                   |
| MCP41050  | 256       | Volatile    | 1             | SPI               | 50                 | 1         | 1         | -40 to +85             | Potentiometer mode, Shutdown                                                                     | 8-pin PDIP, 8-pin SOIC                                   |
| MCP41100  | 256       | Volatile    | 1             | SPI               | 100                | 1         | 1         | -40 to +85             | Potentiometer mode, Shutdown                                                                     | 8-pin PDIP, 8-pin SOIC                                   |
| MCP4151   | 256       | Volatile    | 1             | SPI               | 5, 10, 50, 100     | 1         | 0.5       | -40 to +125            | Potentiometer mode, Shutdown                                                                     | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 8-pin 3 × 3 DFN      |
| MCP41HV51 | 256       | Volatile    | 1             | SPI               | 5, 10, 50, 100     | 1         | 0.25      | -40 to +125            | 8-bit Volatile digital potentiometer with specified operation from 10V to 36V and SPI interface. | 14-pin TSSOP, 5 × 5 QFN                                  |
| MCP4152   | 256       | Volatile    | 1             | SPI               | 5, 10, 50, 100     | 1         | 0.5       | -40 to +125            | Rheostat mode, Shutdown                                                                          | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 8-pin 3 × 3 DFN      |
| MCP4161   | 256       | Nonvolatile | 1             | SPI               | 5, 10, 50, 100     | 1         | 0.5       | -40 to +125            | Potentiometer mode, Shutdown                                                                     | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 8-pin 3 × 3 DFN      |
| MCP4162   | 256       | Nonvolatile | 1             | SPI               | 5, 10, 50, 100     | 1         | 0.5       | -40 to +125            | Rheostat mode, Shutdown                                                                          | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 8-pin 3 × 3 DFN      |
| MCP42010  | 256       | Volatile    | 2             | SPI               | 10                 | 1         | 1         | -40 to +85             | Potentiometer mode, Shutdown                                                                     | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP                   |
| MCP42100  | 256       | Volatile    | 2             | SPI               | 100                | 1         | 1         | -40 to +85             | Potentiometer mode, Shutdown                                                                     | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP                   |
| MCP4251   | 256       | Volatile    | 2             | SPI               | 5, 10, 50, 100     | 1         | 0.5       | -40 to +125            | Potentiometer mode, Shutdown, WiperLock Technology                                               | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP, 16-pin 4 × 4 QFN |
| MCP4252   | 256       | Volatile    | 2             | SPI               | 5, 10, 50, 100     | 1         | 0.5       | -40 to +125            | Rheostat mode, Shutdown                                                                          | 10-pin MSOP, 10-pin 3 × 3 DFN                            |
| MCP4261   | 256       | Nonvolatile | 2             | SPI               | 5, 10, 50, 100     | 1         | 0.5       | -40 to +125            | Potentiometer mode, Shutdown, WiperLock Technology                                               | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP, 16-pin 4 × 4 QFN |
| MCP4262   | 256       | Nonvolatile | 2             | SPI               | 5, 10, 50, 100     | 1         | 0.5       | -40 to +125            | Rheostat mode, Shutdown                                                                          | 10-pin MSOP, 10-pin 3 × 3 DFN                            |
| MCP4341   | 129       | Nonvolatile | 4             | SPI               | 5, 10, 50, 100     | 0.8       | 0.375     | -40 to +125            | 7-bit, Volatile potentiometer with an SPI interface                                              | 20-pin TSSOP, 20-pin 4 × 4 QFN                           |
| MCP4342   | 129       | Nonvolatile | 4             | SPI               | 5, 10, 50, 100     | 0.8       | 0.375     | -40 to +125            | 7-bit, Volatile rheostat with an SPI interface                                                   | 14-pin TSSOP                                             |
| MCP4361   | 257       | Nonvolatile | 4             | SPI               | 5, 10, 50, 100     | 1         | 0.5       | -40 to +125            | 8-bit, Non-volatile potentiometer with an SPI interface                                          | 20-pin TSSOP, 20-pin 4 × 4 QFN                           |
| MCP4362   | 257       | Nonvolatile | 4             | SPI               | 5, 10, 50, 100     | 1         | 0.5       | -40 to +125            | 8-bit, Non-volatile rheostat with an SPI interface                                               | 14-pin TSSOP                                             |
| MCP4331   | 129       | Volatile    | 4             | SPI               | 5, 10, 50, 100     | 0.8       | 0.375     | -40 to +125            | 7-bit, Volatile potentiometer with an SPI interface                                              | 20-pin TSSOP, 20-pin 4 × 4 QFN                           |
| MCP4332   | 129       | Volatile    | 4             | SPI               | 5, 10, 50, 100     | 0.8       | 0.375     | -40 to +125            | 7-bit, Volatile rheostat with an SPI interface                                                   | 14-pin TSSOP                                             |
| MCP4351   | 257       | Volatile    | 4             | SPI               | 5, 10, 50, 100     | 1         | 0.5       | -40 to +125            | 8-bit, Non-volatile potentiometer with an SPI interface                                          | 20-pin TSSOP, 20-pin 4 × 4 QFN                           |
| MCP4352   | 257       | Volatile    | 4             | SPI               | 5, 10, 50, 100     | 1         | 0.5       | -40 to +125            | 8-bit, Non-volatile rheostat with an SPI interface                                               | 14-pin TSSOP                                             |
| MCP4441   | 129       | Nonvolatile | 4             | I <sup>2</sup> C™ | 5, 10, 50, 100     | 0.5       | 0.25      | -40 to +125            | Potentiometer mode, WiperLock Technology                                                         | 20-pin TSSOP, 20-pin 4 × 4 QFN                           |
| MCP4442   | 129       | Nonvolatile | 4             | I <sup>2</sup> C  | 5, 10, 50, 101     | 0.8       | 0.375     | -40 to +125            | Rheostat mode, WiperLock Technology                                                              | 14-pin TSSOP                                             |
| MCP4461   | 257       | Nonvolatile | 4             | I <sup>2</sup> C  | 5, 10, 50, 102     | 1         | 0.5       | -40 to +125            | Potentiometer mode, WiperLock Technology                                                         | 20-pin TSSOP, 20-pin 4 × 4 QFN                           |
| MCP4462   | 257       | Nonvolatile | 4             | I <sup>2</sup> C  | 5, 10, 50, 103     | 1         | 0.5       | -40 to +125            | Rheostat mode, WiperLock Technology                                                              | 14-pin TSSOP                                             |
| MCP4531   | 128       | Volatile    | 1             | I <sup>2</sup> C  | 5, 10, 50, 100     | 0.5       | 0.25      | -40 to +125            | Potentiometer mode                                                                               | 8-pin MSOP                                               |

MIXED SIGNAL: Digital Potentiometers (Continued)

| Part #    | # of Taps | Memory      | # Per Package | Interface        | Resistance (kOhms) | INL (Max) | DNL (Max) | Temperature Range (°C) | Comments                                                                                                     | Packages                       |
|-----------|-----------|-------------|---------------|------------------|--------------------|-----------|-----------|------------------------|--------------------------------------------------------------------------------------------------------------|--------------------------------|
| MCP45HV31 | 128       | Volatile    | 1             | I <sup>2</sup> C | 5, 10, 50, 100     | 0.5       | 0.125     | −40 to +125            | 7-bit Volatile digital potentiometer with specified operation from 10V to 36V and I <sup>2</sup> C interface | 14-pin TSSOP, 5 × 5 DFN        |
| MCP45HV51 | 256       | Volatile    | 1             | I <sup>2</sup> C | 5, 10, 50, 100     | 1         | 0.25      | −40 to +125            | 8-bit Volatile digital potentiometer with specified operation from 10V to 36V and I <sup>2</sup> C interface | 14-pin TSSOP, 5 × 5 DFN        |
| MCP4631   | 128       | Volatile    | 2             | I <sup>2</sup> C | 5, 10, 50, 100     | 0.5       | 0.25      | −40 to +125            | Potentiometer mode                                                                                           | 14-pin TSSOP, 16-pin 4 × 4 QFN |
| MCP4541   | 128       | Nonvolatile | 1             | I <sup>2</sup> C | 5, 10, 50, 100     | 0.5       | 0.25      | −40 to +125            | Potentiometer mode, WiperLock™ Technology                                                                    | 8-pin MSOP                     |
| MCP4641   | 128       | Nonvolatile | 2             | I <sup>2</sup> C | 5, 10, 50, 100     | 0.5       | 0.25      | −40 to +125            | Potentiometer mode, WiperLock Technology                                                                     | 14-pin TSSOP, 16-pin 4x4 QFN   |
| MCP4651   | 256       | Volatile    | 2             | I <sup>2</sup> C | 5, 10, 50, 100     | 1         | 0.5       | −40 to +125            | Potentiometer mode                                                                                           | 14-pin TSSOP, 16-pin 4 × 4 QFN |
| MCP4561   | 256       | Nonvolatile | 1             | I <sup>2</sup> C | 5, 10, 50, 100     | 1         | 0.5       | −40 to +125            | Potentiometer mode, WiperLock Technology                                                                     | 8-pin MSOP                     |
| MCP4661   | 256       | Nonvolatile | 2             | I <sup>2</sup> C | 5, 10, 50, 100     | 1         | 0.5       | −40 to +125            | Potentiometer mode, WiperLock Technology                                                                     | 14-pin TSSOP, 16-pin 4 × 4 QFN |
| MCP4532   | 128       | Nonvolatile | 1             | I <sup>2</sup> C | 5, 10, 50, 100     | 0.8       | 0.375     | −40 to +125            | Rheostat mode                                                                                                | 8-pin MSOP, 8-pin 3 × 3 DFN    |
| MCP4632   | 128       | Volatile    | 2             | I <sup>2</sup> C | 5, 10, 50, 100     | 0.8       | 0.375     | −40 to +125            | Rheostat mode                                                                                                | 10-pin MSOP, 10-pin 3 × 3 DFN  |
| MCP4542   | 128       | Nonvolatile | 1             | I <sup>2</sup> C | 5, 10, 50, 100     | 0.8       | 0.375     | −40 to +125            | Rheostat mode, WiperLock Technology                                                                          | 8-pin MSOP, 8-pin 3 × 3 DFN    |
| MCP4552   | 256       | Volatile    | 1             | I <sup>2</sup> C | 5, 10, 50, 100     | 1         | 0.5       | −40 to +125            | Rheostat mode                                                                                                | 8-pin MSOP, 8-pin 3 × 3 DFN    |
| MCP4652   | 256       | Nonvolatile | 2             | I <sup>2</sup> C | 5, 10, 50, 100     | 1         | 0.5       | −40 to +125            | Rheostat mode                                                                                                | 10-pin MSOP, 10-pin 3 × 3 DFN  |
| MCP4562   | 256       | Nonvolatile | 1             | I <sup>2</sup> C | 5, 10, 50, 100     | 1         | 0.5       | −40 to +125            | Rheostat mode, WiperLock Technology                                                                          | 8-pin MSOP, 8-pin 3 × 3 DFN    |
| MCP4662   | 256       | Nonvolatile | 2             | I <sup>2</sup> C | 5, 10, 50, 100     | 1         | 0.5       | −40 to +125            | Rheostat mode, WiperLock Technology                                                                          | 10-pin MSOP, 10-pin 3 × 3 DFN  |

MIXED SIGNAL: Frequency-to-Voltage/Voltage-to-Frequency Converters

| Part # | Frequency Range (kHz) | Full Scale (ppm FS/°C) | Non-linearity (%FS) | Temperature Range (°C) | Packages                 |
|--------|-----------------------|------------------------|---------------------|------------------------|--------------------------|
| TC9400 | 100                   | ±40                    | ±0.05               | −40 to +85             | 14-pin PDIP, 14-pin SOIC |
| TC9401 | 100                   | ±40                    | ±0.02               | −40 to +85             | 14-pin PDIP, 14-pin SOIC |
| TC9402 | 100                   | ±100                   | ±0.25               | −40 to +85             | 14-pin PDIP, 14-pin SOIC |

MIXED SIGNAL: D/A Converters

| Part #            | Resolution (Bits) | DACs Per Package | Interface               | V <sub>REF</sub>    | Output Settling Time (μs) | DNL (LSB)   | Typical Standby Current (μA) | Typical Operating Current (μA) | Temperature Range (°C) | Packages                                      |
|-------------------|-------------------|------------------|-------------------------|---------------------|---------------------------|-------------|------------------------------|--------------------------------|------------------------|-----------------------------------------------|
| TC1320            | 8                 | 1                | SMbus                   | Ext                 | 10                        | 0.8         | 0.1                          | 350                            | −40 to +85             | 8-pin MSOP, 8-pin SOIC                        |
| TC1321            | 10                | 1                | SMbus                   | Ext                 | 10                        | 2           | 0.1                          | 350                            | −40 to +85             | 8-pin MSOP, 8-pin SOIC                        |
| MCP47A1           | 6                 | 1                | I <sup>2</sup> C™/SMbus | Ext                 | 15                        | 0.5         | 90                           | 130                            | −40 to +125            | 6-pin SC-70                                   |
| MCP4706           | 8                 | 1                | I <sup>2</sup> C        | Ext                 | 6                         | 0.05        | 0.06                         | 210                            | −40 to +125            | 6-pin SOT-23                                  |
| MCP4716           | 10                | 1                | I <sup>2</sup> C        | Ext                 | 6                         | 0.188       | 0.06                         | 210                            | −40 to +125            | 6-pin SOT-23                                  |
| MCP4725           | 12                | 1                | I <sup>2</sup> C        | V <sub>DD</sub>     | 6                         | 0.75        | 1                            | 210                            | −40 to +125            | 6-pin SOT-23                                  |
| MCP4726           | 12                | 1                | I <sup>2</sup> C        | Ext                 | 6                         | 0.75        | 0.06                         | 210                            | −40 to +125            | 6-pin SOT-23                                  |
| MCP4728           | 12                | 4                | I <sup>2</sup> C        | Int/V <sub>DD</sub> | 6                         | 0.75        | 0.04                         | 800                            | −40 to +125            | 10-pin MSOP                                   |
| <b>MCP47FEB01</b> | <b>8</b>          | <b>1</b>         | <b>I2C</b>              | <b>Int/Vdd/Ext</b>  | <b>6</b>                  | <b>0.25</b> | <b>0.65</b>                  | <b>130</b>                     | <b>−40 to +125</b>     | <b>8-pin TSSOP</b>                            |
| <b>MCP47FEB02</b> | <b>8</b>          | <b>2</b>         | <b>I2C</b>              | <b>Int/Vdd/Ext</b>  | <b>6</b>                  | <b>0.25</b> | <b>0.65</b>                  | <b>260</b>                     | <b>−40 to +125</b>     | <b>8-pin TSSOP</b>                            |
| <b>MCP47FEB11</b> | <b>10</b>         | <b>1</b>         | <b>I2C</b>              | <b>Int/Vdd/Ext</b>  | <b>6</b>                  | <b>0.5</b>  | <b>0.65</b>                  | <b>130</b>                     | <b>−40 to +125</b>     | <b>8-pin TSSOP</b>                            |
| <b>MCP47FEB12</b> | <b>10</b>         | <b>2</b>         | <b>I2C</b>              | <b>Int/Vdd/Ext</b>  | <b>6</b>                  | <b>0.5</b>  | <b>0.65</b>                  | <b>260</b>                     | <b>−40 to +125</b>     | <b>8-pin TSSOP</b>                            |
| <b>MCP47FEB21</b> | <b>12</b>         | <b>1</b>         | <b>I2C</b>              | <b>Int/Vdd/Ext</b>  | <b>6</b>                  | <b>1</b>    | <b>0.65</b>                  | <b>130</b>                     | <b>−40 to +125</b>     | <b>8-pin TSSOP</b>                            |
| <b>MCP47FEB22</b> | <b>12</b>         | <b>2</b>         | <b>I2C</b>              | <b>Int/Vdd/Ext</b>  | <b>6</b>                  | <b>1</b>    | <b>0.65</b>                  | <b>260</b>                     | <b>−40 to +125</b>     | <b>8-pin TSSOP</b>                            |
| MCP4801           | 8                 | 1                | SPI                     | Int                 | 4.5                       | 0.5         | 0.3                          | 330                            | −40 to +125            | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 8-pin DFN |
| MCP4802           | 8                 | 2                | SPI                     | Int                 | 4.5                       | 0.5         | 3.3                          | 415                            | −40 to +125            | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP            |
| MCP4811           | 10                | 1                | SPI                     | Int                 | 4.5                       | 0.5         | 0.3                          | 330                            | −40 to +125            | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 8-pin DFN |
| MCP4812           | 10                | 2                | SPI                     | Int                 | 4.5                       | 0.5         | 3.3                          | 415                            | −40 to +125            | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP            |
| MCP4821           | 12                | 1                | SPI                     | Int                 | 4.5                       | 1           | 0.3                          | 330                            | −40 to +125            | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 8-pin DFN |
| MCP4822           | 12                | 2                | SPI                     | Int                 | 4.5                       | 1           | 3.3                          | 415                            | −40 to +125            | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP            |
| MCP4901           | 8                 | 1                | SPI                     | Ext                 | 4.5                       | 0.5         | 3.3                          | 175                            | −40 to +125            | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 8-pin DFN |
| MCP4902           | 8                 | 2                | SPI                     | Ext                 | 4.5                       | 0.5         | 0.3                          | 350                            | −40 to +125            | 14-pin PDIP, 14-pin SOIC, 14-pinTSSOP         |
| MCP4911           | 10                | 1                | SPI                     | Ext                 | 4.5                       | 0.5         | 3.3                          | 175                            | −40 to +125            | 8-pin DFN, 8-pin MSOP, 8-pin PDIP, 8-pin SOIC |
| MCP4912           | 10                | 2                | SPI                     | Ext                 | 4.5                       | 0.5         | 0.3                          | 350                            | −40 to +125            | 14-pin PDIP, 14-pin SOIC, 14-pinTSSOP         |
| MCP4921           | 12                | 1                | SPI                     | Ext                 | 4.5                       | 0.75        | 3.3                          | 175                            | −40 to +125            | 8-pin PDIP, 8-pin SOIC, 8-pin MSOP, 8-pin DFN |
| MCP4922           | 12                | 2                | SPI                     | Ext                 | 4.5                       | 0.75        | 0.3                          | 350                            | −40 to +125            | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP        |

Note: The analog output is voltage.

## INTERFACE

### INTERFACE: Controller Area Network (CAN) Products

| Part #                 | Operating Voltage (V) | Temperature Range (°C) | Tx Buffers | Rx Buffers | Filters | Masks | Interrupt Output | Unique Features                                                                                                                                                                  | Packages                                |
|------------------------|-----------------------|------------------------|------------|------------|---------|-------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| MCP2510 <sup>(1)</sup> | 2.7 to 5.5            | −40 to +125            | 3          | 2          | 6       | 2     | Yes              | CAN 2.0B Active controller with SPI interface to MCU, three transmit buffers, two receive buffers, HW and SW message triggers                                                    | 18-pin PDIP, 18-pin SOIC, 20-pin TSSOP  |
| MCP2515                | 2.7 to 5.5            | −40 to +125            | 3          | 2          | 6       | 2     | Yes              | MCP2510 pin-compatible upgrade with enhanced features including higher throughput and data byte filtering                                                                        | 18-pin PDIP, 18-pin SOIC, 20-pin TSSOP  |
| MCP25020               | 2.7 to 5.5            | −40 to +125            | 3          | 2          | 2       | 1     | N/A              | CAN 2.0B Active I/O Expander, Configurable I/O, two PWM outputs                                                                                                                  | 14-pin PDIP, 14-pin SOIC                |
| MCP25025               | 2.7 to 5.5            | −40 to +85             | 3          | 2          | 2       | 1     | N/A              | CAN 2.0B Active I/O Expander, Configurable I/O, two PWM outputs, One-wire CAN option                                                                                             | 14-pin PDIP, 14-pin SOIC                |
| MCP25050               | 2.7 to 5.5            | −40 to +125            | 3          | 2          | 2       | 1     | N/A              | Mixed-Signal CAN 2.0B Active I/O Expander, Configurable I/O, four 10-bit ADCs, two PWM outputs                                                                                   | 14-pin PDIP, 14-pin SOIC                |
| MCP25055               | 2.7 to 5.5            | −40 to +85             | 3          | 2          | 2       | 1     | N/A              | Mixed-Signal CAN 2.0B Active I/O Expander, Configurable I/O, four 10-bit ADCs, two PWM outputs, One-wire CAN option                                                              | 14-pin PDIP, 14-pin SOIC                |
| MCP2551                | 4.5 to 5.5            | −40 to +125            | N/A        | N/A        | N/A     | N/A   | N/A              | High-speed CAN Transceiver (1 Mbps max. CAN bus speed), ISO11898 compatible, Industry-standard pinout                                                                            | 8-pin PDIP, 8-pin SOIC                  |
| MCP2561                | 4.5 to 5.5            | −40 to +150            | N/A        | N/A        | N/A     | N/A   | N/A              | HS CAN Transceiver; 1 Mbps, ISO11898-5, meets automotive EMC and CAN conformance requirements, MCP2561 = SPLIT Option for common mode stabilization                              | 8-pin PDIP, 8-pin SOIC, 8-pin 3 × 3 DFN |
| MCP2562                | 4.5 to 5.5            | −40 to +150            | N/A        | N/A        | N/A     | N/A   | N/A              | HS CAN Transceiver; 1 Mbps, ISO11898-5, meets automotive EMC and CAN conformance requirements, MCP2562 = V <sub>IO</sub> Option for digital I/O level shifting from 1.8V to 5.5V | 8-pin PDIP, 8-pin SOIC, 8-pin 3 × 3 DFN |
| MCP25625               | 2.7 to 5.5            | −40 to +125            | 3          | 2          | 6       | 2     | 1                | Integrated High-Speed CAN Transceiver and CAN 2.0B Controller                                                                                                                    | 28-pin SSOP, 28-pin 6 × 6 QFN           |
| MCP2561FD              | 4.5 to 5.5            | −40 to +150            | N/A        | N/A        | N/A     | N/A   | N/A              | CAN Flexible Data Rate Transceiver                                                                                                                                               | 8-pin PDIP, 8-pin SOIC, 8-pin 3 × 3 DFN |
| MCP2562FD              | 4.5 to 5.5            | −40 to +150            | N/A        | N/A        | N/A     | N/A   | N/A              | CAN Flexible Data Rate Transceiver                                                                                                                                               | 8-pin PDIP, 8-pin SOIC, 8-pin 3 × 3 DFN |

**Note 1:** Not recommended for new designs.

### INTERFACE: LIN Transceiver Products

| Part #   | Description                                                  | V <sub>REG</sub> Output Voltage (V) | Operating Temp. Range (°C) | V <sub>REG</sub> Output Current (mA) | V <sub>CC</sub> Range (V) | Max Baud Rate | LIN Specification Supported       | Packages                                |
|----------|--------------------------------------------------------------|-------------------------------------|----------------------------|--------------------------------------|---------------------------|---------------|-----------------------------------|-----------------------------------------|
| MCP2003A | Stand-alone LIN Transceiver (industry-standard pinout)       | None                                | −40 to +125                | None                                 | 6 to 27                   | 20 Kbaud      | Revision 1.3, 2.0, 2.1, SAE J2602 | 8-pin PDIP, 8-pin SOIC, 8-pin 4 × 4 DFN |
| MCP2004A | Stand-alone LIN Transceiver with TXE/Fault I/O               | None                                | −40 to +125                | None                                 | 6 to 27                   | 20 Kbaud      | Revision 1.3, 2.0, 2.1, SAE J2602 | 8-pin PDIP, 8-pin SOIC, 8-pin 4 × 4 DFN |
| MCP2021A | LIN Transceiver with integrated V <sub>REG</sub>             | 5.0 ± 3%,<br>3.3 ± 3%               | −40 to +125                | 70                                   | 6 to 18                   | 20 Kbaud      | Revision 1.3, 2.0, 2.1, SAE J2602 | 8-pin PDIP, 8-pin SOIC, 8-pin 4 × 4 DFN |
| MCP2022A | LIN Transceiver with integrated V <sub>REG</sub> , RESET pin | 5.0 ± 3%,<br>3.3 ± 3%               | −40 to +125                | 70                                   | 6 to 18                   | 20 Kbaud      | Revision 1.3, 2.0, 2.1, SAE J2602 | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP  |
| MCP2025  | LIN Transceiver with integrated V <sub>REG</sub>             | 5.0 ± 3%,<br>3.3 ± 3%               | −40 to +125                | 70                                   | 6 to 18                   | 20 Kbaud      | Revision 2.0                      | 8-pin PDIP, 8-pin SOIC, 8-pin 4 × 4 DFN |
| MCP2050  | LIN Transceiver with integrated V <sub>REG</sub> , WWDT      | 5.0 ± 3%,<br>3.3 ± 3%               | −40 to +125                | 70                                   | 6 to 18                   | 20 Kbaud      | Revision 1.3, 2.0, 2.1, SAE J2602 | 14-pin PDIP, 14-pin SOIC, 20-pin QFN    |

### INTERFACE: Ethernet Products

| Part #                      | Description                                                             | Interface (Upstream) | Wake-On-LAN | EEE | Industrial Version | Packages                      |
|-----------------------------|-------------------------------------------------------------------------|----------------------|-------------|-----|--------------------|-------------------------------|
| <b>Ethernet Controllers</b> |                                                                         |                      |             |     |                    |                               |
| ENC28J60                    | 10Base-T Ethernet Controller                                            | SPI                  | –           | –   | ✓                  | 28-pin SPDIP, SSOP, SOIC, QFN |
| ENC624J600                  | 10Base-T/100Base-TX Ethernet Controller with Security                   | SPI/Parallel         | –           | –   | ✓                  | 24-pin TQFN, QFN, 64-pin TQFN |
| LAN9217                     | 10Base-T/100Base-TX Ethernet Controller with 16-bit/MII interface       | 16-bit Host Bus/MII  | –           | –   | –                  | 100-pin TQFP                  |
| LAN9218                     | 10Base-T/100Base-TX Ethernet Controller with 32-bit interface           | 32-bit Host Bus      | –           | –   | ✓                  | 100-pin TQFP                  |
| LAN9220                     | 10Base-T/100Base-TX Ethernet Controller with 16-bit interface           | 16-bit Host Bus      | –           | –   | –                  | 56-pin QFN                    |
| LAN9221                     | 10Base-T/100Base-TX Ethernet Controller with 16-bit interface           | 16-bit Host Bus      | –           | –   | ✓                  | 56-pin QFN                    |
| LAN9420                     | 10Base-T/100Base-TX Ethernet Controller with 32-bit PCI interface       | 32-bit PCI 3.0       | –           | –   | ✓                  | 128-pin VTQFP                 |
| LAN89218                    | TrueAuto, 10Base-T/100Base-TX Ethernet Controller with 32-bit interface | 32-bit Host Bus      | –           | –   | Automotive         | 100-pin TQFP                  |

\*Note: All products above are supported with 3.3V operating voltage

| INTERFACE: Ethernet Products |                                                                                              |                      |             |     |                    |                       |
|------------------------------|----------------------------------------------------------------------------------------------|----------------------|-------------|-----|--------------------|-----------------------|
| Part #                       | Description                                                                                  | Interface (Upstream) | Wake-On-LAN | EEE | Industrial Version | Packages              |
| Ethernet Switches            |                                                                                              |                      |             |     |                    |                       |
| LAN9303                      | 10/100 3-port Managed Ethernet Switches                                                      | MII/RMII/Turbo MII   | –           | –   | ✓                  | 56-pin QFN            |
| LAN9303M                     | 10/100 3-port Managed Ethernet Switches                                                      | MII/RMII/Turbo MII   | –           | –   | ✓                  | 72-pin QFN            |
| LAN9311                      | 10/100 2-port Managed Ethernet Switches with Local Bus interface                             | 16-bit Host Bus      | –           | –   | ✓                  | 128-pin VTQFP, XVTQFP |
| LAN9312                      | 10/100 2-port Managed Ethernet Switches with Local Bus interface                             | 32-bit Host Bus      | –           | –   | –                  | 128-pin VTQFP, XVTQFP |
| LAN9313                      | 10/100 3-port Managed Ethernet Switches                                                      | MII/RMII/Turbo MII   | –           | –   | ✓                  | 128-pin VTQFP, XVTQFP |
| LAN89303                     | TrueAuto, 10/100 3-port Managed Ethernet Switches                                            | MII/RMII/Turbo MII   | –           | –   | Automotive         | 56-pin QFN            |
| USB to Ethernet              |                                                                                              |                      |             |     |                    |                       |
| LAN9500A                     | USB 2.0 to 10/100 Ethernet Controllers                                                       | USB 2.0              | –           | –   | ✓                  | 56-pin QFN            |
| LAN9730                      | USB HSIC 2.0 to 10/100 Ethernet Controllers                                                  | USB 2.0 (HSIC), MII  | –           | –   | ✓                  | 56-pin QFN            |
| LAN7500                      | USB 2.0 to 10/100/1000 Ethernet Controllers                                                  | USB2.0               | –           | –   | ✓                  | 56-pin QFN            |
| LAN9512                      | USB 2.0 to 10/100 Ethernet Controllers with 2-port USB 2.0 Hub                               | USB2.0               | –           | –   | ✓                  | 64-pin QFN            |
| LAN9513                      | USB 2.0 to 10/100 Ethernet Controllers with 3-port USB 2.0 Hub                               | USB2.0               | –           | –   | ✓                  | 64-pin QFN            |
| LAN9514                      | USB 2.0 to 10/100 Ethernet Controllers with 4-port USB 2.0 Hub                               | USB2.0               | –           | –   | ✓                  | 64-pin QFN            |
| LAN89530                     | TrueAuto, USB 2.0 to 10/100 Ethernet Controllers                                             | USB2.0               | –           | –   | Automotive         | 56-pin QFN            |
| Ethernet Transceivers        |                                                                                              |                      |             |     |                    |                       |
| LAN8710A                     | Small-Footprint, Low Power Consumption, Full-Featured 10/100 Ethernet Transceivers           | MII/RMII             | –           | –   | ✓                  | 32-pin QFN            |
| LAN8720A                     | Small-Footprint, Low Power Consumption, Full-Featured 10/100 Ethernet Transceivers           | RMII                 | –           | –   | ✓                  | 24-pin QFN            |
| LAN8740A                     | Small-Footprint, 10/100 PHY Family Featuring Energy Efficient Ethernet and Wake-On-LAN       | MII/RMII             | ✓           | ✓   | ✓                  | 32-pin QFN            |
| LAN8741A                     | Small-Footprint, 10/100 PHY Family Featuring Energy Efficient Ethernet                       | MII/RMII             | –           | ✓   | ✓                  | 32-pin QFN            |
| LAN8742A                     | Small-Footprint, 10/100 PHY Family Featuring Wake-On-LAN                                     | RMII                 | ✓           | –   | ✓                  | 24-pin QFN            |
| LAN8810                      | GMII 10/100/1000 Ethernet Transceiver with HP Auto-MDIX Support                              | GMII                 | –           | –   | ✓                  | 72-pin QFN            |
| LAN8820                      | RGMII 10/100/1000 Ethernet Transceiver with HP Auto-MDIX Support                             | RGMII                | –           | –   | ✓                  | 56-pin QFN            |
| LAN88730                     | TrueAuto, Small Footprint, Low Power Consumption, Full-Featured 10/100 Ethernet Transceivers | MII/RMII             | –           | –   | Automotive         | 32-pin QFN            |

\*Note: All products above are supported with 3.3V operating voltage

| INTERFACE: Passive Access Products |                       |                           |          |                      |             |                                                                                                                             |
|------------------------------------|-----------------------|---------------------------|----------|----------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------|
| Part #                             | Operating Voltage (V) | Operating Temp.Range (°C) | Bus Type | RF Carrier Frequency | Data Format | Features                                                                                                                    |
| MCP2030                            | 1.8 to 3.6            | –40 to +85                | SPI      | 125 kHz              | NRZ         | Three axis signal conditioning devices for passive access applications, high-sensitivity, configurable smart wake-up filter |
|                                    |                       |                           |          |                      |             | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP                                                                                      |

| INTERFACE: Infrared Products |                       |                            |                           |                                                                                                           |  |                                       |
|------------------------------|-----------------------|----------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------|--|---------------------------------------|
| Part #                       | Operating Voltage (V) | Operating Temp. Range (°C) | Max Baud Rate (Kbaud)     | Unique Features                                                                                           |  | Packages                              |
| MCP2120                      | 2.5 to 5.5            | –40 to +85                 | 325                       | UART to IR encoder/decoder with both hardware and software baud rate selection                            |  | 14-pin PDIP, 14-pin SOIC              |
| MCP2122                      | 1.8 to 5.5            | –40 to +85                 | 16× less than clock input | UART to IR encoder/decoder                                                                                |  | 8-pin PDIP, 8-pin SOIC                |
| MCP2140A                     | 2.0 to 5.5            | –40 to +85                 | 9.6                       | IrDA® Standard protocol handler plus bit encoder/decoder, fixed baud rate, low cost                       |  | 18-pin PDIP, 18-pin SOIC, 20-pin SSOP |
| MCP2150                      | 3.0 to 5.5            | –40 to +85                 | 115.2                     | IrDA Standard protocol handler plus bit encoder/decoder on one chip for DTE applications, programmable ID |  | 18-pin PDIP, 18-pin SOIC, 20-pin SSOP |
| MCP2155                      | 3.0 to 5.5            | –40 to +85                 | 115.2                     | IrDA Standard protocol handler plus bit encoder/decoder on one chip for DCE applications, programmable ID |  | 18-pin PDIP, 18-pin SOIC, 20-pin SSOP |

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**INTERFACE: Serial Peripherals**

| Part #   | Description              | Operating Voltage (V) | Operating Temp. Range (°C) | Bus Type          | Max Bus Frequency (kHz) | Features                                                                                                                    | Packages                                                |
|----------|--------------------------|-----------------------|----------------------------|-------------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| MCP23008 | 8-bit I/O Port Expander  | 1.8 to 5.5            | −40 to +85                 | I <sup>2</sup> C™ | 1700                    | Three HW address pins, HW interrupt, 25 mA source/sink capability per I/O                                                   | 18-pin PDIP, 18-pin SOIC, 20-pin SSOP, 20-pin 4 × 4 QFN |
| MCP23S08 | 8-bit I/O Port Expander  | 1.8 to 5.5            | −40 to +85                 | SPI               | 10000                   | Two HW address pins, HW interrupt, 25 mA source/sink capability per I/O                                                     | 18-pin PDIP, 18-pin SOIC, 20-pin SSOP, 20-pin 4 × 4 QFN |
| MCP23009 | 8-bit I/O Port Expander  | 1.8 to 5.5            | −40 to +125                | I <sup>2</sup> C  | 3400                    | One HW address pin, HW interrupt, 25 mA source/sink per I/O, 100 kHz, 400 kHz and 3.4 MHz I <sup>2</sup> C™ supported       | 18-pin PDIP, 18-pin SOIC, 20-pin SSOP                   |
| MCP23S09 | 8-bit I/O Port Expander  | 1.8 to 5.5            | −40 to +125                | SPI               | 10000                   | HW interrupt, 25 mA source/sink per I/O                                                                                     | 18-pin PDIP, 18-pin SOIC                                |
| MCP23016 | 16-bit I/O Port Expander | 2.0 to 5.5            | −40 to +85                 | I <sup>2</sup> C  | 400                     | Three HW address inputs, HW interrupt, 25 mA source/sink capability per I/O                                                 | 28-pin PDIP, 28-pin SOIC, 28-pin SSOP, 28-pin 6 × 6 QFN |
| MCP23017 | 16-bit I/O Expander      | 1.8 to 5.5            | −40 to +125                | I <sup>2</sup> C  | 1700                    | Three HW address pins, 25 mA sink/source per I/O, 100 kHz, 400 kHz and 3-4 MHz I <sup>2</sup> C supported, Interrupt output | 28-pin PDIP, 28-pin SOIC, 28-pin SSOP, 28-pin QFN       |
| MCP23S17 | 16-bit I/O Expander      | 1.8 to 5.5            | −40 to +125                | SPI               | 10000                   | Three HW address pins, 25 mA sink/source per I/O, Interrupt output                                                          | 28-pin PDIP, 28-pin SOIC, 28-pin SSOP, 28-pin QFN       |
| MCP23018 | 16-bit I/O Port Expander | 1.8 to 5.5            | −40 to +125                | I <sup>2</sup> C  | 3400                    | One HW address pin, 2 HW interrupts, 25 mA source/sink per I/O, 100 kHz, 400 kHz and 3.4 MHz I <sup>2</sup> C supported     | 24-pin SSOP, 28-pin SOIC, 28-pin SDIP                   |
| MCP23S18 | 16-bit I/O Port Expander | 1.8 to 5.5            | −40 to +125                | SPI               | 10000                   | Two HW interrupts, 25 mA source/sink per I/O                                                                                | 28-pin SOIC, 28-pin SDIP                                |

**INTERFACE: IEEE 802.11™ Modules**

| Part #     | Pin Count | Antenna         | Frequency Range (GHz) | Sensitivity (dBm) | Power Output (dBm) | RSSI | Tx Power Consumption (mA) | Rx Power Consumption (mA) | Clock (MHz) | Sleep                 | MAC | MAC Features                         | Protocols                                                                                                                 | Encryption                              | Interface  | Packages                          |
|------------|-----------|-----------------|-----------------------|-------------------|--------------------|------|---------------------------|---------------------------|-------------|-----------------------|-----|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|------------|-----------------------------------|
| MRF24WBOMA | 36        | PCB             | 2.412–2.484           | −91               | +10                | Yes  | 154                       | 85                        | 25          | 0.1 µA <sup>(1)</sup> | Yes | 802.11b, long range, low power       | Wi-Fi® Connection Manager, Announce, DNS, DDNS, DHCP, FTP, HTTP, NBNS, SNMP, SNTP, SSL, TCP, UDP, ZeroConf <sup>(2)</sup> | WPA2-PSK, WPA-PSK, WEP                  | 4-wire SPI | 36/Module                         |
| MRF24WBOMB | 36        | U.FL            | 2.412–2.484           | −91               | +10                | Yes  | 154                       | 85                        | 25          | 0.1 µA <sup>(1)</sup> | Yes | 802.11b, long range, low power       | Wi-Fi Connection Manager, Announce, DNS, DDNS, DHCP, FTP, HTTP, NBNS, SNMP, SNTP, SSL, TCP, UDP, ZeroConf <sup>(2)</sup>  | WPA2-PSK, WPA-PSK, WEP                  | 4-wire SPI | 36/Module                         |
| MRF24WGOMA | 36        | PCB             | 2.412–2.484           | −95               | +18                | Yes  | 240                       | 156                       | 25          | 0.1 mA <sup>(1)</sup> | Yes | 802.11b/g, Wi-Fi Direct, SoftAP, WPS | Wi-Fi Connection Manager, Announce, DNS, DDNS, DHCP, FTP, HTTP, NBNS, SNMP, SNTP, SSL, TCP, UDP, ZeroConf <sup>(2)</sup>  | WPA2-PSK, WPA-PSK, WEP, WPA2-Enterprise | 4-wire SPI | 36/Module                         |
| MRF24WGOMB | 36        | U.FL            | 2.412–2.484           | −95               | +18                | Yes  | 240                       | 156                       | 25          | 0.1 mA <sup>(1)</sup> | Yes | 802.11b/g, Wi-Fi Direct, SoftAP, WPS | Wi-Fi Connection Manager, Announce, DNS, DDNS, DHCP, FTP, HTTP, NBNS, SNMP, SNTP, SSL, TCP, UDP, ZeroConf <sup>(2)</sup>  | WPA2-PSK, WPA-PSK, WEP, WPA2-Enterprise | 4-wire SPI | 36/Module                         |
| RN171      | 49        | RF PAD          | 2.412–2.484           | −83               | 0 to +12           | Yes  | 190 (+12 dBm)             | 38                        | 44          | 4 µA                  | Yes | 802.11b/g, SoftAP, WPS, Webscan      | DHCP, DNS, ARP, ICMP, FTP client, HTTP client, TCP, UDP                                                                   | WEP, WPA, WPA2, EAP                     | UART       | 49/Module                         |
| RN131      | 44        | Chip, U.FL      | 2.412–2.484           | −85               | +18                | Yes  | 210 (+18 dBm)             | 40                        | 44          | 4 µA                  | Yes | 802.11b/g, SoftAP, WPS, Webscan      | DHCP, DNS, ARP, ICMP, FTP client, HTTP client, TCP, UDP                                                                   | WEP, WPA, WPA2, EAP                     | UART       | 44/Module                         |
| RN171XV    | 49        | Wire, U.FL, SMA | 2.412–2.484           | −83               | 0 to +12           | Yes  | 190 (+12 dBm)             | 38                        | 44          | 4 µA                  | Yes | 802.11b/g, SoftAP, WPS, Webscan      | DHCP, DNS, ARP, ICMP, FTP client, HTTP client, TCP, UDP                                                                   | WEP, WPA, WPA2, EAP                     | UART       | 2 × 10 (2 mm) Through hole module |

**Note 1:** Indicates “off” current**Note 2:** Supported in the provided stack**INTERFACE: Bluetooth® Modules**

| Part # | Module Type                 | Pin Count | Frequency Range (GHz) | Sensitivity (dBm)         | Power Output (dBm) | Power Consumption                                                                                                                      | Sleep                                    | MAC | Profiles                                         | Interface                  | Packages                          |
|--------|-----------------------------|-----------|-----------------------|---------------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-----|--------------------------------------------------|----------------------------|-----------------------------------|
| RN4020 | Bluetooth Low Energy Module | 24        | 2.412–2.484           | −92.5                     | +7 (avg)           | Idle < 1.5 mA, Tx/Rx active 16 mA at 0 dBm                                                                                             | Dormant < 700 nA, Deep Sleep < 5.0 µA    | Yes | GAP, GATT, SM, L2CAP, Integrated Public Profiles | UART, PIO, AIO, SPI        | 24/Module                         |
| RN41   | Data                        | 35        | 2.412–2.484           | −80                       | 15                 | Standby/Idle 25 mA, Connected (normal mode) 30 mA, Connected (low power Sniff) 8 mA                                                    | Standby/Idle (Deep sleep enabled) 250 µA | Yes | SPP, DUN, HID, iAP, HCI, RFCOMM, L2CAP, SDP      | UART, USB, Bluetooth       | 35/Module                         |
| RN42   | Data                        | 35        | 2.412–2.484           | −80                       | 4                  | Standby/Idle 25 mA, Connected (normal mode) 3 mA, Connected (low power Sniff) 8 mA                                                     | Standby/Idle (Deep sleep enabled) 26 µA  | Yes | SPP, DUN, HID, iAP, HCI, RFCOMM, L2CAP, SDP      | UART, USB, Bluetooth       | 35/Module                         |
| RN52   | Audio                       | 50        | 2.412–2.484           | −85                       | 4                  | Idle 12 mA, Connected A2DP 26 mA, HFP/HSP 23.5 mA                                                                                      | N/A                                      | Yes | A2DP, AVRCP, HFP, HSP, SPP, iAP                  | UART, USB, Bluetooth, GPIO | 50/Module                         |
| RN41XV | Data                        | 35        | 2.412–2.484           | −80                       | 15                 | Standby/Idle 25 mA, Connected (normal mode) 30 mA, Connected (low power Sniff) 8 mA                                                    | Standby/Idle (Deep sleep enabled) 250 µA | Yes | SPP, DUN, HID, iAP, HCI, RFCOMM, L2CAP, SDP      | UART, USB, Bluetooth       | 2 × 10 (2 mm) Through hole module |
| RN42XV | Data                        | 35        | 2.412–2.484           | −80                       | 4                  | Standby/Idle 25 mA, Connected (normal mode) 3 mA, Connected (low power Sniff) 8 mA                                                     | Standby/Idle (Deep sleep enabled) 26 µA  | Yes | SPP, DUN, HID, iAP, HCI, RFCOMM, L2CAP, SDP      | UART, USB, Bluetooth       | 2 × 10 (2 mm) Through hole module |
| BM77   | Dual-Mode                   | 33        | 2.401–2.480           | −80 (Classic)<br>−92 (LE) | 2                  | Idle 1.2 mA, Deep power down 0.35 mA, Connected (transfer data) 18.6 mA (BTLE), Idle 2.5 mA, Connected (transfer data) 23 mA (Classic) | N/A                                      | Yes | GAP, SDP, SPP, GATT                              | UART                       | 33/Module                         |

INTERFACE: IEEE 802.15.4 ZigBee® RF Transceiver Products

| Part #     | Pin Count | Frequency Range (GHz) | Sensitivity (dBm) | Power Output (dBm) | RSSI | Tx Power Consumption (mA) | Rx Power Consumption (mA) | Clock (MHz) | Sleep   | MAC | MAC Features | Encryption | Interface  | Packages   |
|------------|-----------|-----------------------|-------------------|--------------------|------|---------------------------|---------------------------|-------------|---------|-----|--------------|------------|------------|------------|
| MRF24J40   | 40        | 2.405 to 2.48         | −95               | 0                  | Yes  | 23                        | 19                        | 20          | 2 µA    | Yes | CSMA-CA      | AES128     | 4-wire SPI | 40-pin QFN |
| MRF24J40MA | 12        | 2.405 to 2.48         | −94               | 0                  | Yes  | 23                        | 19                        | 20          | 2 µA    | Yes | CSMA-CA      | AES128     | 4-wire SPI | 12/Module  |
| MRF24J40MC | 12        | 2.405 to 2.48         | −108              | +19                | Yes  | 120                       | 25                        | 20          | 12 µA   | Yes | CSMA-CA      | AES128     | 4-wire SPI | 12/Module  |
| MRF24J40MD | 12        | 2.405 to 2.48         | −102              | +20                | Yes  | 130                       | 25                        | 20          | 5 µA    | Yes | CSMA-CA      | AES128     | 4-wire SPI | 12/Module  |
| MRF24XA    | 32        | 2.405 to 2.48         | −103              | 0                  | Yes  | 25                        | 13.5                      | 16          | 0.04 µA | Yes | CSMA-CA      | AES128     | 4-wire SPI | 32-pin QFN |

INTERFACE: Sub-GHz Transceivers

| Part #     | Pin Count | Frequency Range (MHz) | Sensitivity (dBm) | Power Output (dBm) | RSSI | Tx Power Consumption (mA) | Rx Power Consumption (mA) | Clock (MHz) | Sleep  | Interface  | Packages     |
|------------|-----------|-----------------------|-------------------|--------------------|------|---------------------------|---------------------------|-------------|--------|------------|--------------|
| MRF49XA    | 16        | 433/868/915           | −110              | +7                 | Yes  | 15 mA @ 0 dBm             | 11                        | 10 MHz      | 0.3 µA | 4-wire SPI | 16-pin TSSOP |
| MRF89XA    | 32        | 868/915/950           | −113              | +12.5              | Yes  | 25 mA @ +10 dBm           | 3                         | 12.8 MHz    | 0.1 µA | 4-wire SPI | 32-pin TQFN  |
| MRF89XAM8A | 12        | 868                   | −113              | +12.5              | Yes  | 25 mA @ +10 dBm           | 3                         | 12.8 MHz    | 0.1 µA | 4-wire SPI | 12/Module    |
| MRF89XAM9A | 12        | 915                   | −113              | +12.5              | Yes  | 25 mA @ +10 dBm           | 3                         | 12.8 MHz    | 0.1 µA | 4-wire SPI | 12/Module    |

INTERFACE: Sub-GHz Receivers

| Part #  | Pin Count | Frequency Range (MHz) | Sensitivity (dBm) | Power Output (dBm) | RSSI | Tx Power Consumption (mA) | Rx Power Consumption (mA) | Clock (MHz) | Sleep | Interface  | Packages   |
|---------|-----------|-----------------------|-------------------|--------------------|------|---------------------------|---------------------------|-------------|-------|------------|------------|
| MRF39RA | 24        | 433/868/915           | −120              | +6                 | Yes  | N/A                       | 16                        | N/A         | 100   | 4-wire SPI | 24-pin QFN |

INTERFACE: Sub-GHz Transmitters

| Part #          | Pin Count | Frequency Range (MHz) | Program Memory (Bytes) | EEPROM (bytes) | RAM (bytes) | Digital Timer | Watch Dog Timer | Max Speed (MHz) | ICSP | Modulation | Data Rate (kbps) | Output Power (dBm) | Operating Voltage (V) | Packages     |
|-----------------|-----------|-----------------------|------------------------|----------------|-------------|---------------|-----------------|-----------------|------|------------|------------------|--------------------|-----------------------|--------------|
| PIC12F529T39A   | 6         | 310–928               | 2.3K                   | 64             | 201         | 1             | 1               | 8               | Yes  | OOK/FSK    | 100              | 10                 | 2.0–3.7               | 14-pin TSSOP |
| PIC12LF1840T39A | 6         | 310–928               | 7.1K                   | 256            | 256         | 2             | 1               | 32              | Yes  | OOK/FSK    | 100              | 10                 | 1.8–3.6               | 14-pin TSSOP |
| PIC16LF1824T39A | 20        | 310–928               | 4K                     | 256            | 256         | 1             | 1               | 32              | Yes  | OOK/FSK    | 100              | 10                 | 1.8–3.6               | 20-pin TSSOP |
| rfPIC12F675F    | 6         | 380–450               | 1.7K                   | 128            | 64          | 1             | 1               | 20              | Yes  | ASK/FSK    | 40               | 10                 | 2.0–5.5               | 20-pin SSOP  |
| rfPIC12F675H    | 6         | 850–930               | 1.7K                   | 128            | 64          | 1             | 1               | 20              | Yes  | ASK/FSK    | 40               | 10                 | 2.0–5.5               | 20-pin SSOP  |
| rfPIC12F675K    | 6         | 290–350               | 1.7K                   | 128            | 64          | 1             | 1               | 20              | Yes  | ASK/FSK    | 40               | 10                 | 2.0–5.5               | 20-pin SSOP  |

INTERFACE: USB Bridge Devices

| Part #  | USB Speed                                          | USB Compliant | PHY | MCU Interface     | Tx/Rx Buffer Size (bytes) | Number of GPIO | Operating Voltage (V) | Packages                                           |
|---------|----------------------------------------------------|---------------|-----|-------------------|---------------------------|----------------|-----------------------|----------------------------------------------------|
| MCP2200 | Full-Speed USB (12 Mb/s), Low-Speed USB (1.5 Mb/s) | Yes           | Yes | UART              | 128/128                   | 8              | 2.7 to 5.5            | 20-pin SOIC, 20-pin TSSOP, 20-pin QFN              |
| MCP2210 | Full-Speed USB (12 Mb/s), Low-Speed USB (1.5 Mb/s) | Yes           | Yes | SPI               | 64                        | 9              | 3.3 to 5.5            | 20-pin SOIC, 20-pin TSSOP, 20-pin QFN              |
| MCP2221 | Full-Speed USB (12 Mb/s), Low-Speed USB (1.5 Mb/s) | Yes           | Yes | I <sup>2</sup> C™ | 64                        | 4              | 3.0 to 5.5            | 14-pin PDIP, 14-pin SOIC, 14-pin TSSOP, 16-pin QFN |

INTERFACE: USB Products

| Part #              | Description                                                                                            | Processor Interface | # of Downstream Ports                   | Card Formats | Industrial Version | Packages         |
|---------------------|--------------------------------------------------------------------------------------------------------|---------------------|-----------------------------------------|--------------|--------------------|------------------|
| USB Hub Controllers |                                                                                                        |                     |                                         |              |                    |                  |
| USB2412             | 2-Port USB 2.0 Hi-Speed Hub                                                                            | USB 2.0             | 2                                       | –            | –                  | 28-pin QFN       |
| USB2422             | Small-footprint, 2-Port value hub, commercial and industrial temperature with USB battery charging 1.1 | USB 2.0             | 2                                       | –            | ✓                  | 24-pin QFN       |
| USB251XB            | USB 2.0 Hi-Speed Hub with Battery Charger Detection                                                    | USB 2.0             | 2, 3, 4, 7 port options                 | –            | Automotive         | 36 or 64-pin QFN |
| USB2524             | 4-Port USB 2.0 Hi-Speed Multi-Switch Hub                                                               | USB 2.0 × 2         | 4                                       | –            | –                  | 56-pin QFN       |
| USB3503A            | 3-Port USB 2.0 Hi-Speed HSIC Hub for Mobile Applications                                               | HSIC                | 3                                       | –            | ✓                  | 25-ball WLCSP    |
| USB3803B            | 3-Port USB 2.0 Hi-Speed Hub for Mobile Applications                                                    | USB 2.0             | 3                                       | –            | ✓                  | 25-ball WLCSP    |
| USB553XB            | USB 3.0 SuperSpeed Hub with Battery Charger Detection                                                  | USB 3.0             | 4, 7 port options                       | –            | ✓                  | 64 or 72-pin QFN |
| USB3X13             | 3-Port USB 2.0 Hi-Speed Controller Hub for Mobile Applications                                         | USB 2.0 or HSIC     | 3<br>(USB 2.0 ×2/ HSIC ×1)              | –            | ✓                  | 30-ball WLCSP    |
| USB253X             | USB 2.0 Hi-Speed Controller Hub with Battery Charger Detection                                         | USB 2.0             | 2, 3, 4 port options                    | –            | ✓                  | 36-pin QFN       |
| USB46X4             | USB 2.0 Hi-Speed Controller Hub with USB and HSIC Interfaces                                           | USB 2.0 or HSIC     | 4<br>(USB 2.0 ×4 or USB 2.0 ×2/HSIC ×2) | –            | ✓                  | 48-pin QFN       |

## INTERFACE: USB Products

| Part #                             | Description                                                        | Processor Interface | # of Downstream Ports | Card Formats           | Industrial Version | Packages         |
|------------------------------------|--------------------------------------------------------------------|---------------------|-----------------------|------------------------|--------------------|------------------|
| <b>USB Transceivers/Switches</b>   |                                                                    |                     |                       |                        |                    |                  |
| USB333X                            | Mobile Hi-Speed USB 2.0 Transceiver with Multi-Frequency Support   | ULPI                | –                     | –                      | ✓                  | 25-ball WLCSP    |
| USB3340                            | Hi-Speed USB 2.0 Transceiver with Multi-Frequency Support          | ULPI                | –                     | –                      | Automotive         | 24 or 32-pin QFN |
| USB3320                            | Hi-Speed USB 2.0 Transceiver with Multi-Frequency Support          | ULPI                | –                     | –                      | Automotive         | 32-pin QFN       |
| USB3300                            | Hi-Speed USB 2.0 Transceiver (24 Mhz reference clock support)      | ULPI                | –                     | –                      | ✓                  | 32-pin QFN       |
| USB3740B                           | Hi-Speed USB 2.0 Switch with Extremely Low Power                   | USB 2.0             | –                     | –                      | ✓                  | 10-pin QFN       |
| USB375XA-X                         | Hi-Speed USB 2.0 Port Protection with Switch and Charger Detection | USB 2.0             | –                     | –                      | ✓                  | 16-pin QFN       |
| <b>USB Flash Media Controllers</b> |                                                                    |                     |                       |                        |                    |                  |
| USB224X                            | Hi-Speed USB 2.0 Multi-Format Flash Media Controller               | USB 2.0             | –                     | SD™/MMC/eMMC™/MS/xD    | ✓                  | 36-pin QFN       |
| USB225X                            | Hi-Speed USB 2.0 Multi-Format Flash Media Controller               | USB 2.0             | –                     | SD/MMC/eMMC/MS/xD/CF   | ✓                  | 128-pin VTQFP    |
| USB264X                            | Hi-Speed USB 2.0 Multi-Format Flash Media Hub Controller           | USB 2.0             | 2                     | SD/MMC/eMMC/MS/xD      | Automotive         | 48-pin QFN       |
| USB2660                            | Hi-Speed USB 2.0 Multi-Format Flash Media Hub Controller           | USB 2.0             | 2                     | SD/MMC/eMMC/MS/xD (×2) | ✓                  | 64-pin QFN       |
| USB4640                            | Hi-Speed USB 2.0 Multi-Format Flash Media HSIC Hub Controller      | HSIC                | 2                     | SD/MMC/eMMC/MS/xD      | ✓                  | 48-pin QFN       |
| <b>USB Security</b>                |                                                                    |                     |                       |                        |                    |                  |
| SEC1110                            | Smart Card Controller                                              | USB 2.0             | –                     | –                      | ✓                  | 16-pin QFN       |
| SEC1210                            | Smart Card Controller with Multi-Interface Support                 | USB 2.0             | –                     | –                      | ✓                  | 24 or 48-pin QFN |

## INTERFACE: USB Products

| Part #                        | Description                                                   | USB Port Power Switch (55 mW) | Hi-Speed USB 2.0 Switch | Battery Charger Emulation Profiles | 8 Resistor Set Current Limits | Charging Indicator Output | Attach Detection Output | Current Measurement | Power Allocation | Interface    | Packages         |
|-------------------------------|---------------------------------------------------------------|-------------------------------|-------------------------|------------------------------------|-------------------------------|---------------------------|-------------------------|---------------------|------------------|--------------|------------------|
| <b>USB Power and Charging</b> |                                                               |                               |                         |                                    |                               |                           |                         |                     |                  |              |                  |
| UCS1001-1                     | USB Port Power Controller with Charger Emulation              | 1                             | 1                       | 9                                  | Up to 2.4A                    | ✓                         | –                       | –                   | –                | Discrete I/O | 20-pin 4 × 4 QFN |
| UCS1001-2                     | USB Port Power Controller with Charger Emulation              | 1                             | 1                       | 9                                  | Up to 2.4A                    | –                         | ✓                       | –                   | –                | Discrete I/O | 20-pin 4 × 4 QFN |
| UCS1001-3                     | USB Port Power Controller with Charger Emulation              | 1                             | 1                       | 9                                  | Up to 2.4A                    | ✓                         | –                       | –                   | –                | Discrete I/O | 20-pin 4 × 4 QFN |
| UCS1001-4                     | USB Port Power Controller with Charger Emulation              | 1                             | 1                       | 9                                  | Up to 2.4A                    | –                         | ✓                       | –                   | –                | Discrete I/O | 20-pin 4 × 4 QFN |
| UCS1002-1                     | Programmable USB Port Power Controller with Charger Emulation | 1                             | 1                       | 9 + 1 programmable                 | Up to 2.4A                    | ✓                         | –                       | ✓                   | ✓                | I²C™/SMBus   | 20-pin 4 × 4 QFN |
| UCS1002-2                     | Programmable USB Port Power Controller with Charger Emulation | 1                             | 1                       | 9 + 1 programmable                 | Up to 2.4A                    | ✓                         | –                       | ✓                   | ✓                | I²C/SMBus    | 20-pin 4 × 4 QFN |
| UCS1003-1                     | Programmable USB Port Power Controller with Charger Emulation | 1                             | 1                       | 9 + 1 programmable                 | Up to 3A                      | –                         | ✓                       | ✓                   | ✓                | I²C/SMBus    | 20-pin 4 × 4 QFN |
| UCS1003-2                     | Programmable USB Port Power Controller with Charger Emulation | 1                             | 1                       | 9                                  | Up to 3A                      | ✓                         | –                       | –                   | –                | Discrete I/O | 20-pin 4 × 4 QFN |
| UCS1003-3                     | Programmable USB Port Power Controller with Charger Emulation | 1                             | 1                       | 9                                  | Up to 3A                      | –                         | ✓                       | –                   | –                | Discrete I/O | 20-pin 4 × 4 QFN |
| UCS81003                      | Programmable USB Port Power Controller Automotive             | 1                             | 1                       | 9 + 1 programmable                 | Up to 3A                      | ✓                         | ✓                       | ✓                   | ✓                | I²C/SMBus    | 28-pin 5 × 5 QFN |

## INTERFACE: Real-Time Clock/Calendar (RTCC)

| Bus  | Product   | Pins | Timing Features               |                |     |                                | Memory <sup>(1)</sup> |                |                         | Power   |                      | Unique Features <sup>(2)</sup>            | 5 ku Pricing† | Packages                                               |
|------|-----------|------|-------------------------------|----------------|-----|--------------------------------|-----------------------|----------------|-------------------------|---------|----------------------|-------------------------------------------|---------------|--------------------------------------------------------|
|      |           |      | Digital Trimming (Adj./Range) | Alarm Settings | WDT | Outputs                        | SRAM (Bytes)          | EEPROM (Kbits) | Protected EEPROM (bits) | Min Vcc | Min I <sub>BAT</sub> |                                           |               |                                                        |
| I²C™ | MCP7940M  | 8    | ±127 ppm                      | 1 sec.         | –   | IRQ/CLK                        | 64                    | 0              | 0                       | 1.8     | –                    | –                                         | \$0.46        | SOIC (SN), TSSOP (ST), MSOP (MS), TDFN (MNY), PDIP (P) |
|      | MCP7940N  | 8    | ±127 ppm                      | 1 sec.         | –   | IRQ/CLK                        | 64                    | 0              | 0                       | 1.8     | 1.3                  | Power Fail Timestamp                      | \$0.59        | SOIC (SN), TSSOP (ST), MSOP (MS), TDFN (MNY), PDIP (P) |
|      | MCP7940X  | 8    | ±127 ppm                      | 1 sec.         | –   | IRQ/CLK                        | 64                    | 0              | 64                      | 1.8     | 1.3                  | Power Fail Timestamp                      | \$0.66        | SOIC (SN), TSSOP (ST), MSOP (MS), TDFN (MNY)           |
|      | MCP7941X  | 8    | ±127 ppm                      | 1 sec.         | –   | IRQ/CLK                        | 64                    | 1              | 64                      | 1.8     | 1.3                  | Power Fail Timestamp                      | \$0.72        | SOIC (SN), TSSOP (ST), MSOP (MS), TDFN (MNY)           |
| SPI  | MCP7951X  | 10   | ±255 ppm                      | 0.01 sec.      | –   | IRQ/CLK                        | 64                    | 1              | 128                     | 1.8     | 1.3                  | Power Fail Timestamp                      | \$0.90        | SOIC (SL), TSSOP (ST)                                  |
|      | MCP7952X  | 10   | ±255 ppm                      | 0.01 sec.      | –   | IRQ/CLK                        | 64                    | 2              | 128                     | 1.8     | 1.3                  | Power Fail Timestamp                      | \$0.96        | MSOP (MS), TDFN (MN)                                   |
|      | MCP795W1X | 14   | ±255 ppm                      | 0.01 sec.      | ü   | 1. CLK<br>2. IRQ<br>3. WDT RST | 64                    | 1              | 128                     | 1.8     | 1.3                  | Power Fail Timestamp, Event Detects (× 2) | \$1.22        | SOIC (SL), TSSOP (ST)                                  |
|      | MCP795W2X | 14   | ±255 ppm                      | 0.01 sec.      | ü   | 1. CLK<br>2. IRQ<br>3. WDT RST | 64                    | 2              | 128                     | 1.8     | 1.3                  | Power Fail Timestamp, Event Detects (× 2) | \$1.28        | SOIC (SL), TSSOP (ST)                                  |

Note 1: All part numbers with an "X" have three protected EEPROM programming options: [0 = Blank ID], [1 = EUI-48™ MAC Address], [2 = EUI-64™ MAC Address]

2: The Power Fail Timestamp in all RTCCs occur at Battery Switchover.

## SAFETY AND SECURITY

### SAFETY AND SECURITY: Photoelectric Smoke Detector ICs

| Part #   | Horn Driver Alarm Pattern        | Alarm Memory | Low Battery Detection | Chamber Test | Alarm Interconnect | Sensitivity Timer | Internal POR | Alternate Diagnostic Mode | Operating Temp. Range (°C) | Packages                 |
|----------|----------------------------------|--------------|-----------------------|--------------|--------------------|-------------------|--------------|---------------------------|----------------------------|--------------------------|
| RE46C140 | NFPA Temporal                    | No           | Yes                   | Yes          | Yes                | Yes               | Yes          | –                         | –25 to +75                 | 16-pin PDIP, 16-pin SOIC |
| RE46C141 | NFPA Temporal                    | No           | Yes                   | Yes          | Yes                | –                 | Yes          | –                         | –25 to +75                 | 16-pin PDIP, 16-pin SOIC |
| RE46C143 | Continuous Tone                  | No           | Yes                   | Yes          | Yes                | –                 | Yes          | –                         | –25 to +75                 | 16-pin PDIP, 16-pin SOIC |
| RE46C144 | Continuous Tone                  | No           | Yes                   | Yes          | Yes                | Yes               | Yes          | –                         | –25 to +75                 | 16-pin PDIP, 16-pin SOIC |
| RE46C145 | NFPA Temporal                    | No           | Yes                   | Yes          | Yes                | Yes               | Yes          | Yes                       | –25 to +75                 | 16-pin PDIP, 16-pin SOIC |
| RE46C165 | NFPA Temporal                    | Yes          | Yes                   | Yes          | Yes                | Yes               | Yes          | Yes                       | –25 to +75                 | 16-pin PDIP, 16-pin SOIC |
| RE46C166 | Continuous Tone                  | Yes          | Yes                   | Yes          | Yes                | Yes               | Yes          | Yes                       | –25 to +75                 | 16-pin PDIP, 16-pin SOIC |
| RE46C167 | NFPA Temporal                    | Yes          | Yes                   | Yes          | Yes                | Yes               | Yes          | Yes                       | –25 to +75                 | 16-pin PDIP, 16-pin SOIC |
| RE46C168 | Continuous Tone                  | Yes          | Yes                   | Yes          | Yes                | Yes               | Yes          | Yes                       | –25 to +75                 | 16-pin PDIP, 16-pin SOIC |
| RE46C190 | NFPA Temporal or Continuous Tone | Yes          | Yes                   | Yes          | Yes                | Yes               | Yes          | –                         | –10 to +60                 | 16-pin SOIC              |

### SAFETY AND SECURITY: Ionization Smoke Detector ICs

| Part #   | Horn Driver Alarm Pattern        | Alarm Memory | Low Battery Detection | Reverse Battery Protection | Alarm Interconnect | Hush Timer | Power-up Low Battery Test | Operating Temp. Range (°C) | Packages                 |
|----------|----------------------------------|--------------|-----------------------|----------------------------|--------------------|------------|---------------------------|----------------------------|--------------------------|
| RE46C120 | NFPA Temporal or Continuous Tone | No           | Yes                   | Yes                        | –                  | –          | –                         | –10 to +60                 | 16-pin PDIP              |
| RE46C121 | NFPA Temporal                    | No           | Yes                   | Yes                        | Yes                | –          | –                         | –10 to +60                 | 16-pin PDIP              |
| RE46C122 | NFPA Temporal                    | No           | Yes                   | Yes                        | Yes                | Yes        | Yes                       | –10 to +60                 | 16-pin PDIP              |
| RE46C126 | Continuous Tone                  | No           | Yes                   | Yes                        | Yes                | –          | –                         | –10 to +60                 | 16-pin PDIP              |
| RE46C127 | Continuous Tone                  | No           | Yes                   | Yes                        | Yes                | Yes        | Yes                       | –10 to +60                 | 16-pin PDIP              |
| RE46C128 | NFPA Temporal                    | No           | Yes                   | Yes                        | Yes                | –          | Yes                       | –10 to +60                 | 16-pin PDIP              |
| RE46C129 | Continuous Tone                  | No           | Yes                   | Yes                        | Yes                | –          | Yes                       | –10 to +60                 | 16-pin PDIP              |
| RE46C152 | NFPA Temporal or Continuous Tone | No           | Yes                   | Yes                        | Yes                | Yes        | Yes                       | –10 to +60                 | 16-pin PDIP              |
| RE46C162 | NFPA Temporal or Continuous Tone | Yes          | Yes                   | Yes                        | Yes                | Yes        | Yes                       | –10 to +60                 | 16-pin PDIP              |
| RE46C163 | NFPA Temporal or Continuous Tone | Yes          | Yes                   | Yes                        | Yes                | Yes        | Yes                       | –10 to +60                 | 16-pin PDIP              |
| RE46C180 | NFPA Temporal or Continuous Tone | Yes          | Yes                   | No                         | Yes                | Yes        | Yes                       | –10 to +60                 | 16-pin PDIP, 16-pin SOIC |

### SAFETY AND SECURITY: Ionization Smoke Detector Front Ends

| Part #   | Microprocessor Compatible Output | Output Options                                                                  | Typical Application                 | Operating Temperature Range (°C) | Packages               |
|----------|----------------------------------|---------------------------------------------------------------------------------|-------------------------------------|----------------------------------|------------------------|
| RE46C112 | Yes                              | V <sub>OUT</sub> 1/4 of V <sub>DD</sub> or V <sub>OUT</sub> 1/4 of Detect Input | 3V or 3.3V Microprocessor           | –10 to +60                       | 8-pin PDIP             |
| RE46C114 | Yes                              | V <sub>OUT</sub> 1/2 of V <sub>DD</sub> or V <sub>OUT</sub> 1/2 of Detect Input | 5V Microprocessor                   | –10 to +60                       | 8-pin PDIP             |
| RE46C311 | Yes                              | Op Amp                                                                          | Ionization Smoke Detector Front End | –10 to +60                       | 8-pin PDIP, 8-pin SOIC |
| RE46C312 | Yes                              | Op Amp                                                                          | Ionization Smoke Detector Front End | –10 to +60                       | 8-pin PDIP, 8-pin SOIC |

### SAFETY AND SECURITY: CO Detectors

| Part #   | Operating Voltage (Vdc) | Voltage Regulator (Vdc) | LED Driver | Horn Driver | Interconnect | Low Battery Detection | Brown Out | Boost Regulator | Op Amp Vos Max (μV) | Op Amp Ib Max (pA) | Op Amp GBWP (kHz) | Op Amp Aol (dB) | Op Amp Slew Rate (V/μS) | Op Amp Unity Gain Stable | Op Amp CMRR Min (dB) | Op Amp Rail-to-Rail | Operating Temp. Range (°C) |
|----------|-------------------------|-------------------------|------------|-------------|--------------|-----------------------|-----------|-----------------|---------------------|--------------------|-------------------|-----------------|-------------------------|--------------------------|----------------------|---------------------|----------------------------|
| RE46C800 | 2 to 12                 | 3.3                     | Yes        | Yes         | Yes          | Yes                   | Yes       | Yes             | 1000                | 200                | 10                | 115             | 0.003                   | Yes                      | 80                   | In/Out              | –10 to +60                 |

### SAFETY AND SECURITY: Piezoelectric Horn Drivers

| Part #   | Operating Voltage (V) | LED Driver | Voltage Regulator (V) | Low Battery Detection | Interconnect | Power Good | Operating Temp. Range (°C) | Packages                 |
|----------|-----------------------|------------|-----------------------|-----------------------|--------------|------------|----------------------------|--------------------------|
| RE46C100 | 6 to 16               | –          | –                     | –                     | –            | –          | –40 to +85                 | 8-pin PDIP, 8-pin SOIC   |
| RE46C101 | 6 to 16               | Yes        | –                     | –                     | –            | –          | –40 to +85                 | 8-pin PDIP, 8-pin SOIC   |
| RE46C104 | 4 to 8                | –          | –                     | –                     | –            | –          | 0 to +50                   | 14-pin PDIP, 14-pin SOIC |
| RE46C105 | 6 to 12               | Yes        | 3.3 or 5              | Yes                   | –            | –          | –40 to +85                 | 14-pin PDIP, 14-pin SOIC |
| RE46C107 | 2 to 5                | Yes        | 3 or 3.3              | Yes                   | –            | –          | 0 to +50                   | 16-pin PDIP, 16-pin SOIC |
| RE46C108 | 6 to 12               | –          | 3.3 or 5              | –                     | –            | –          | –40 to +85                 | 8-pin PDIP, 8-pin SOIC   |
| RE46C109 | 6 to 12               | –          | 3                     | Yes                   | Yes          | Yes        | –40 to +85                 | 16-pin PDIP, 16-pin SOIC |
| RE46C117 | 2 to 5                | –          | –                     | –                     | –            | –          | 0 to +50                   | 8-pin PDIP, 8-pin SOIC   |
| RE46C119 | 6 to 12               | –          | 3                     | Yes                   | Yes          | Yes        | –40 to +85                 | 16-pin PDIP, 16-pin SOIC |
| RE46C317 | 2 to 5                | –          | –                     | –                     | –            | –          | –10 to +60                 | 8-pin PDIP, 8-pin SOIC   |
| RE46C318 | 2 to 5                | –          | –                     | –                     | –            | –          | –10 to +60                 | 8-pin PDIP, 8-pin SOIC   |

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## Thermal Management Products

### RTD Reference Design Board (TMPSNSRD-RTD2)



The RTD Reference Design demonstrates how to instrument Resistive Temperature Detector (RTD) and accurately measure temperature. This solution uses the MCP3551 22-bit Analog-to-Digital

Converter (ADC) to measure voltage across the RTD. The ADC and the RTD are referenced using an on-board reference voltage and the ADC inputs are directly connected to the RTD terminals.

### Thermocouple Reference Design (TMPSNSRD-TCPL1)



This reference design demonstrates how to instrument a thermocouple and accurately sense temperature over

the entire thermocouple measurement range. This solution uses the MCP3421 18-bit Analog-to-Digital Converter (ADC) to measure voltage across the thermocouple.

## Power Management Products

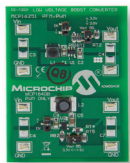
### MCP19111 Evaluation Board (ADM00397)



The MCP19111 is a digitally-enhanced PWM controller. It combines a pure-analog PWM controller with a supervisory microcontroller making it a fast, cost-effective and configurable power conversion solution. The MCP19111 is

ideal for standard power conversion, LED drivers and battery charging applications. This board demonstrates how the MCP19111 device operates in a synchronous buck topology over a wide input voltage and load range.

### MCP16251 and MCP1640B Synchronous Boost Converters Evaluation Board (ADM00458)



This board demonstrates the MCP16251/MCP1640B in two boost-converter applications with multiple output voltages and was developed to help reduce product design cycle time. Three common output voltages can be selected: 2.0V, 3.3V and 5.0V.

### MCP8025 TQFP BLDC Motor Driver Evaluation Board (ADM00600)



This demonstrates our MCP8025 3-phase BLDC motor gate driver with power module, used in a BLDC motor drive application. When used in conjunction with a microcontroller, the MCP8025 will provide

the necessary drive signals for a 3-phase BLDC motor. The MCP8025 contains the high-side and low-side drivers for external N-channel MOSFETs. A dsPIC33EP256MC504 processor is used to supply the PWM inputs to the MCP8025 as well as handle the high-speed analog-to-digital conversion required for 50 kHz PWM operation. The MCP8025 UART interface is used to configure the MCP8025 device and to send fault information to the dsPIC® DSC.

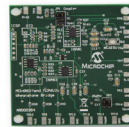
## Linear Products

### MCP6V01 Thermocouple Auto-Zeroed Reference Design Board (MCP6V01RD-TCPL)



The MCP6V01 design board demonstrates how to use a different amplifier system to measure Electromotive Force (EMF) voltage at the cold junction of thermocouple in order to accurately measure temperature of the thermocouple bead. This can be done by using the MCP6V01 auto-zeroed op amp because of its ultra low offset Voltage ( $V_{os}$ ) and high Common Mode Rejection Ratio (CMRR).

### MCP6N11 and MCP6V2X Wheatstone Bridge Reference Design (ARD00354)



This board demonstrates the performance of the MCP6N11 instrumentation amplifier (INA) and a traditional three op amp INA using the MCP6V26 and MCP6V27 auto-zeroed op amps. The input signal comes from an

RTD temperature sensor in a Wheatstone bridge. Real-world interference is added to the bridge's output to provide realistic performance comparisons. Data is gathered and displayed on a PC for ease of use.

### MCP6421 EMIRR Evaluation Board (ADM00443)

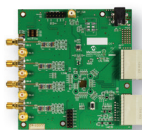


The MCP6421 EMIRR Evaluation Board is intended to support the electromagnetic interference rejection ratio (EMIRR) measurement and

to show the electromagnetic interference (EMI) rejection capability of the MCP6421 operational amplifier.

## Mixed Signal Products

### MCP37X3X-200 16-bit 200 Msps ADC VTLA Evaluation Board (ADM00505)



This board provides the opportunity to evaluate the performance of the MCP37X3X-200 device family. With the on-board MCP37D31-200 16-bit 200 Msps pipelined ADC, it allows you to evaluate the

functionality of the 16-bit 200 Msps ADCs and the digital signal processing features. With the help of a compatible data capture card, the evaluation board can provide you with performance analysis features through the PC GUI.

### MCP37X1X-200 12-bit Msps ADC VTLA Evaluation Board (ADM00619)



This board provides the opportunity to evaluate the performance of the MCP37X1X-200 device family. With the on-board MCP37D11-200, 12-bit 200 Msps pipelined ADC, it allows you evaluate the functionality of the 12-bit 200 Msps ADCs and the digital signal processing features. With the help of a compatible data capture card, the evaluation board can provide the user with performance analysis features through the PC GUI.

# Featured Analog Development Tools

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## MCP39F501 Energy Metering and Power Monitoring Demonstration Board (ARD00455)



The MCP39F501 Power Monitor Demonstration Board is a fully functional single-phase power monitor. This low-cost design does not use any transformers and requires few external components. The device calculates active power, reactive power, RMS current, RMS voltage, power

factor, line frequency and other typical power quantities as defined in the MCP39F501 data sheet. The MCP39F501 Power Monitor Utility software is used to calibrate and monitor the system and can be used to create custom calibration setups. For some accuracy requirements, only a single point calibration may be needed.

## Interface Products

### UCS81003 Evaluation Board (ADM00561)



This board provides the ability to evaluate the features of the UCS81003 Automotive USB Port Power Controller with Charger Emulation. It allows the UCS81003

to be tested in different configurations by populating jumpers on specific header locations. The Evaluation Board contains the MCP2221 USB to I<sup>2</sup>C bridge, which allows communication via USB between the UCS81003 and the GUI running on the PC.

### LAN7500 Hi-Speed USB 2.0 to Gigabit Ethernet Bridge Controller (EVB-LAN7500)



The EVB-LAN7500 is used to evaluate our LAN7500 Hi-Speed USB 2.0 to Gigabit Ethernet Bridge Controller solution. System architectures requiring Ethernet connectivity can utilize an existing USB port with our LAN7500 to achieve this requirement. A USB dongle version is also available (EVB-LAN7500-LC).

### LAN874X 10/100 Ethernet Transceiver with EEE and Wake-On-LAN (EVB8740)



The EVB8740 is a PHY evaluation board for our LAN874X family, which integrates Energy Efficient Ethernet and Wake-on-LAN features. It interfaces to a MAC

controller via a standard MII or RMII interface.

### LAN9500A Hi-Speed USB 2.0 to 10/100 Ethernet Bridge Controller (EVB-LAN9500A-MII/ EVB-LAN9500A-LC)



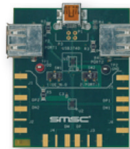
The EVB-LAN9500A-MII is used to evaluate our LAN9500A Hi-Speed USB 2.0 to Fast Ethernet Bridge Controller solution. Using an existing USB port with our LAN9500A allows you to add Ethernet connectivity to your system architecture.

### USB3340 Hi-Speed USB 2.0 Transceiver with ULPI Interface (EVB-USB3340)



The EVB-USB3340 is used to evaluate our USB334X family of highly integrated USB 2.0 transceivers with ULPI interface. The features and functions are identical to those of the USB333X family except the USB334X comes in a convenient, widely used 32-pin QFN package.

### USB3740 Hi-Speed USB 2.0 2-Port Switch (EVB-USB3740)



The EVB-USB3740 is used to evaluate our USB3740 USB 2.0 compliant 2-port switch. Some applications require a single USB port to be shared with other functions. The USB3740 is a small and simple 2-port switch providing system design flexibility.

### USB2640 USB 2.0 Port Hub with Ultra Fast Flash Media Controller Evaluation Board (EVB-USB2640)



The USB2640 is an Ultra Fast USB 2.0 Hub, Flash media controller, and protocol bridge combo. The EVB-USB2640 Evaluation Board demonstrates a stand-alone application for developers of

applications such as Flash media card reader/writer, printers, desktop and mobile PCs, consumer A/V and flat panel displays.

### MCP2515 CAN Bus Monitor Demo Board (MCP2515DM-BM)



The MCP2515 CAN Bus Monitor Demo board kit contains two identical boards that can be connected together to create a simple two-node Controller Area Network (CAN) bus, which can be controlled and/or monitored via the included PC interface. The board(s) can also be connected to an existing CAN bus.

### USB to UART Converter Evaluation Board (MCP2200EV-VCP)



The MCP2200EV-VCP is a USB-to-RS232 development and evaluation board for the MCP2200 USB-to-UART device. The board allows for easy demonstration and evaluation of the MCP2200. The accompanying software allows the special device features to be configured and controlled. The board is powered from USB and has a test point associated with each GPIO pin. In addition, two of these pins are connected to LEDs which can be used to indicate USB-to-UART traffic when the associated pins are configured as TxLED and RxLED pins respectively.

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