

# Low Additive Phase Noise LVCMOS Clock Buffer Evaluation Board

## NEED ABSTRACT

### Contents

|     |                                         |   |
|-----|-----------------------------------------|---|
| 1   | General Description .....               | 1 |
| 1.1 | Features .....                          | 1 |
| 2   | Signal Path and Control Circuitry ..... | 2 |
| 3   | Getting Started .....                   | 2 |
| 4   | Power-Supply Connections .....          | 2 |
| 5   | Enabling/Disabling the Outputs .....    | 2 |
| 6   | Output Clock .....                      | 2 |
| 7   | Bill of Materials .....                 | 2 |
| 8   | Schematic .....                         | 4 |
| 9   | References .....                        | 6 |

### List of Figures

|   |                                |   |
|---|--------------------------------|---|
| 1 | Schematic (Page 1 of 3) .....  | 4 |
| 2 | Schematic (Page 2 of 3) .....  | 5 |
| 3 | Schematic (Page 31 of 3) ..... | 6 |

### List of Tables

|   |                         |   |
|---|-------------------------|---|
| 1 | Bill of Materials ..... | 2 |
|---|-------------------------|---|

## 1 General Description

The CDCLVC1112 is a high-performance, low additive phase noise LVCMOS clock buffer. It has one LVCMOS input and twelve LVCMOS outputs. It has also an enable pin.

This evaluation module (EVM) is designed to demonstrate the electrical performance of the CDCLVC1112. Throughout this document, the acronym EVM and the phrases evaluation module and evaluation board are synonymous with the CDCLVC1112 EVM. [Figure 1](#) illustrates the CDCLVC1112 EVM.

For optimum performance, the board is equipped with 50Ω SMA connectors and well controlled 50Ω impedance microstrip transmission lines.

### 1.1 Features

- Easy-to-use evaluation board to fan out low phase noise
- Easy device setup
- Enable pin configurable though jumper and SMA
- Board powered at 3.3V

## 2 Signal Path and Control Circuitry

The CDCLVC1112 EVM supports single-ended inputs up to 250MHz. For more information about the CDCLVC1112, see the CDCLVC1112 product data sheet available for download from the TI web site ([www.ti.com](http://www.ti.com)).

## 3 Getting Started

The CDCLVC1112EVM has self-explanatory labeling and uses similar naming conventions as the CDCLVC1112 product datasheet. In this user's guide, all words in boldface and italic print reflect the actual labeling on the EVM.

## 4 Power-Supply Connections

Connect the power-supply source to the banana plug labeled VDD (P1), and connect the ground of the power-supply source to GND (P2). There are decoupling capacitors and a ferrite bead to isolate the EVM power from the CDCLVC1112 device power pins.

The CDCLVC1112EVM can use a supply voltage 3.0 to 3.6 V.

## 5 Enabling/Disabling the Outputs

The Enable pin of the CDCLVC1112 can be controlled using jumper J21 or the SMA J2. The J2 connector is not soldered on the CDCLVC1112EVM but can be soldered if needed. Check the BOM section for part ordering information.

## 6 Output Clock

The CDCLVC1112 generates twelve LVCMOS outputs. The outputs can be loaded using the pull-up and pull-down footprints. No resistor has been soldered in those footprints.

## 7 Bill of Materials

**Table 1. Bill of Materials**

| QTY | Value               | Designator                                                        | PKG/Case       | Manufacturer                | Part Number        |
|-----|---------------------|-------------------------------------------------------------------|----------------|-----------------------------|--------------------|
| 14  | 0                   | C1–C14                                                            | 402            | Panasonic – Ecg             | ERJ-2GE0R00X       |
| 6   | 0.01μF              | C19–C24                                                           | 402            | Venkel                      | C0402X7R500-103KNE |
| 1   | 0.1μF               | C18                                                               | 402            | Venkel                      | C0402X7R160-104KNE |
| 2   | 47 μF               | C15, C16                                                          | 805            | Taiyo Yuden                 | JMK212BJ476MG-T    |
| 1   | 10 μF               | C17                                                               | 3216-18 (EIA)  | Kemet                       | B45196H3106K109    |
| 14  | 0.0 (Zero Ohm)      | R4, R5, R8, R11, R14, R17, R20, R23, R26, R29, R32, R35, R38, R41 | 402            | Panasonic – Ecg             | ERJ-2GE0R00X       |
| 2   | 100                 | R1, R2                                                            | 402            | Venkel                      | CR0402-16W-1000FT  |
| 1   | 150                 | R43                                                               | 402            | Panasonic – Ecg             | ERJ-2RK1500X       |
| 1   | 50                  | L1                                                                | 1206           | Murata Electronics North Am | BLM31PG500SN1L     |
| 1   | LED – Green Clear   | D1                                                                | 1206           | Cml Innovative Technologies | CMD15-21VGC/TR8    |
| 1   | CDCLVC1112          | U1                                                                | 24-TSSOP       | Texas Instruments           | CDCLVC1112         |
| 1   | 1 X 3               | J21                                                               | 0.1 "          | HTSW-150-07-G-S             | K10000013783       |
| 2   | Banana Plug – Metal | P1, P2                                                            | 4mm            | Emerson Network Power Co    | 108-0740-001       |
| 5   | 142-0701-801        | J1, J3, J7, J9, J11                                               | RF SMA EDGE    | Emerson Network Power Co    | 142-0701-801       |
| 4   | 4-40/0.25"          | Screws                                                            |                | Building Fasteners          | PMSSS 440 0025 PH  |
| 4   | 0.75"               | Standoffs                                                         | Round Threaded | 2029                        | K10000010170       |

**Table 1. Bill of Materials (continued)**

| <b>QTY</b> | <b>Value</b> | <b>Designator</b>                                                                                                                           | <b>PKG/Case</b> | <b>Manufacturer</b> | <b>Part Number</b> |
|------------|--------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------------------|--------------------|
| 26         | DNI          | R3, R6, R7, R9, R10,<br>R12, R13, R15, R16,<br>R18, R19, R21, R22,<br>R24, R25, R27, R28,<br>R30, R31, R33, R34,<br>R36, R37, R39, R40, R42 | 402             |                     | DNI                |
| 9          | DNI          | J2, J4–J6, J8, J10,<br>J12–J14                                                                                                              | RF SMA EDGE     |                     | DNI                |

## 8 Schematic

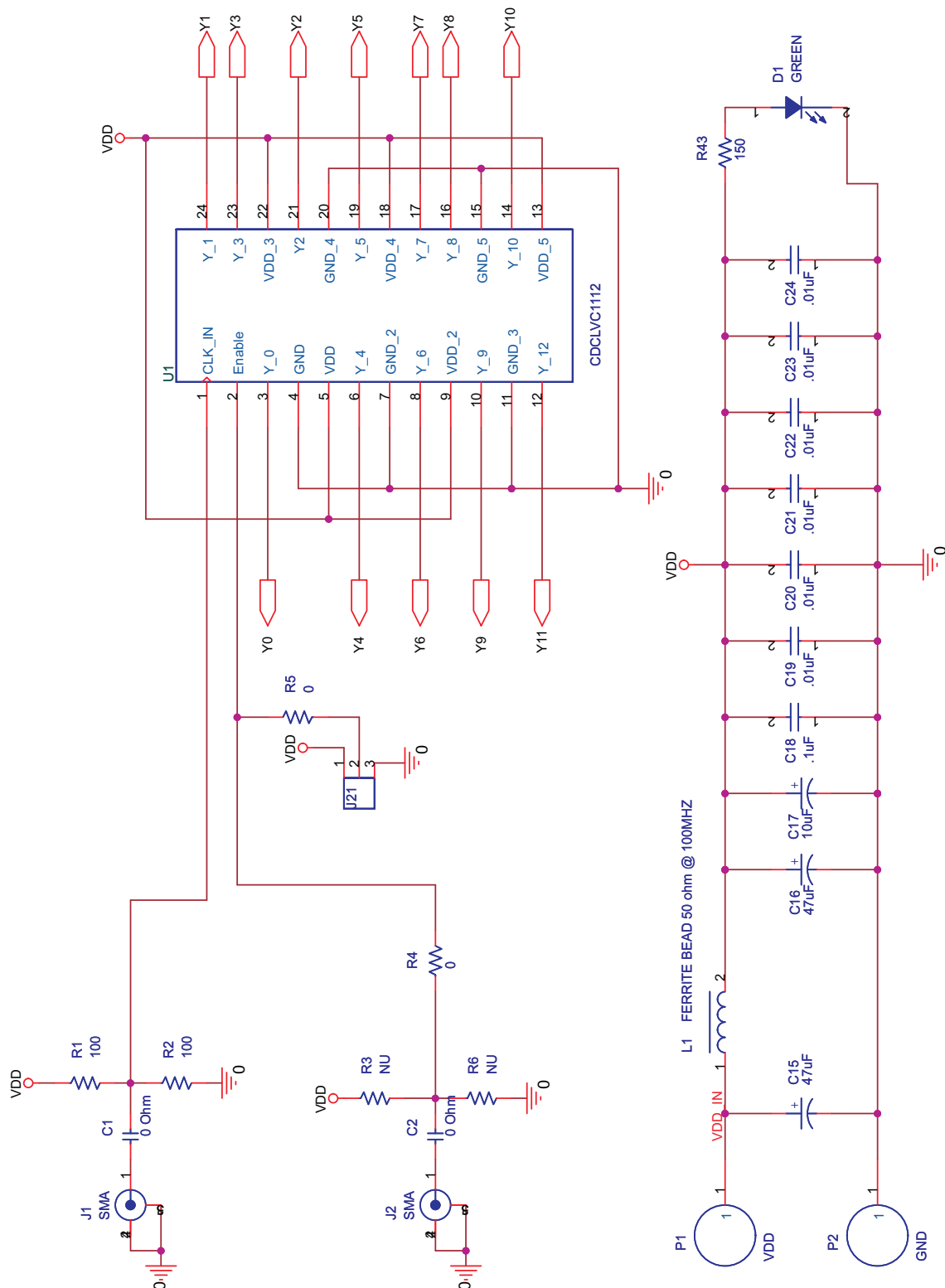


Figure 1. Schematic (Page 1 of 3)

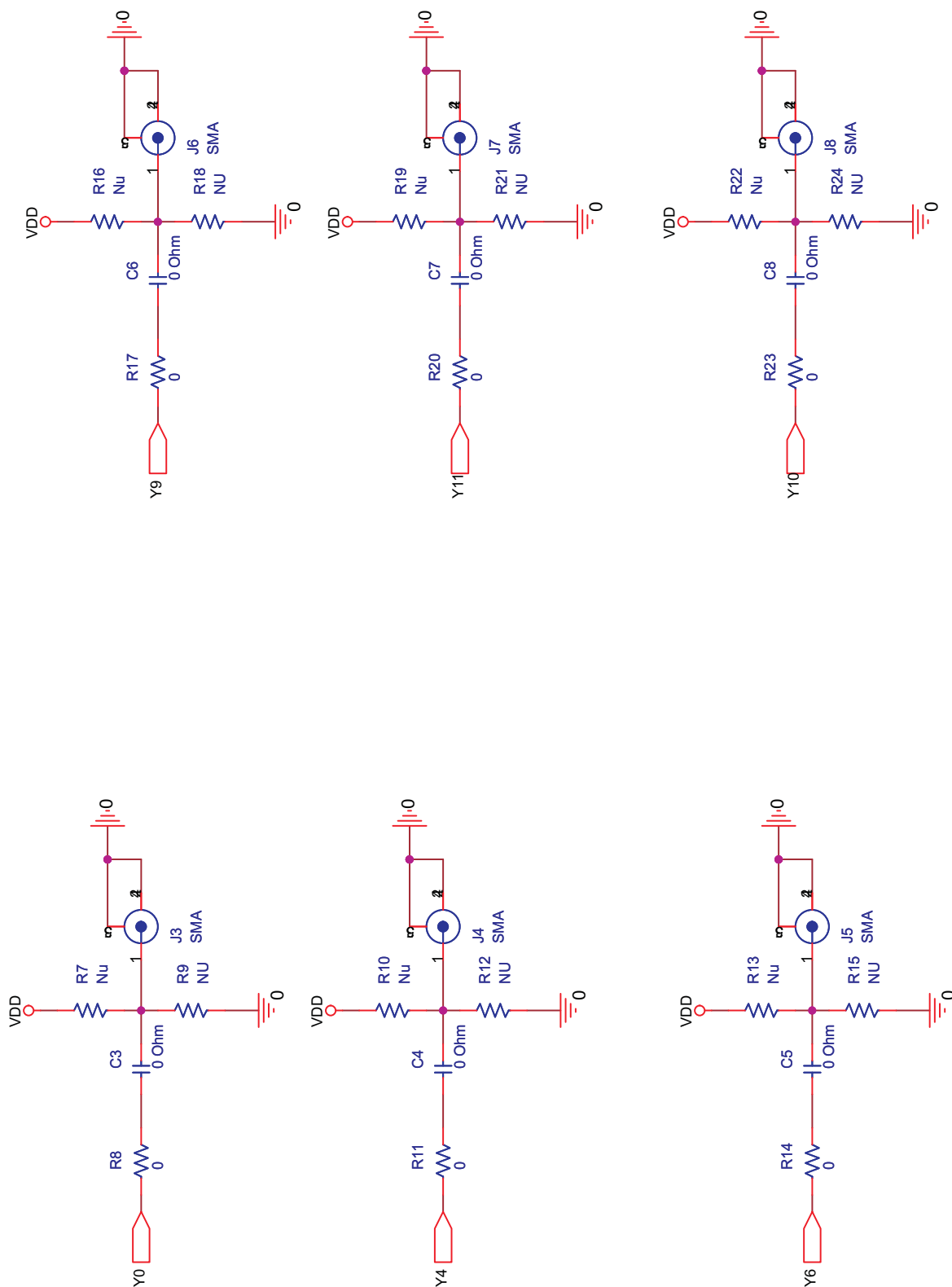


Figure 2. Schematic (Page 2 of 3)

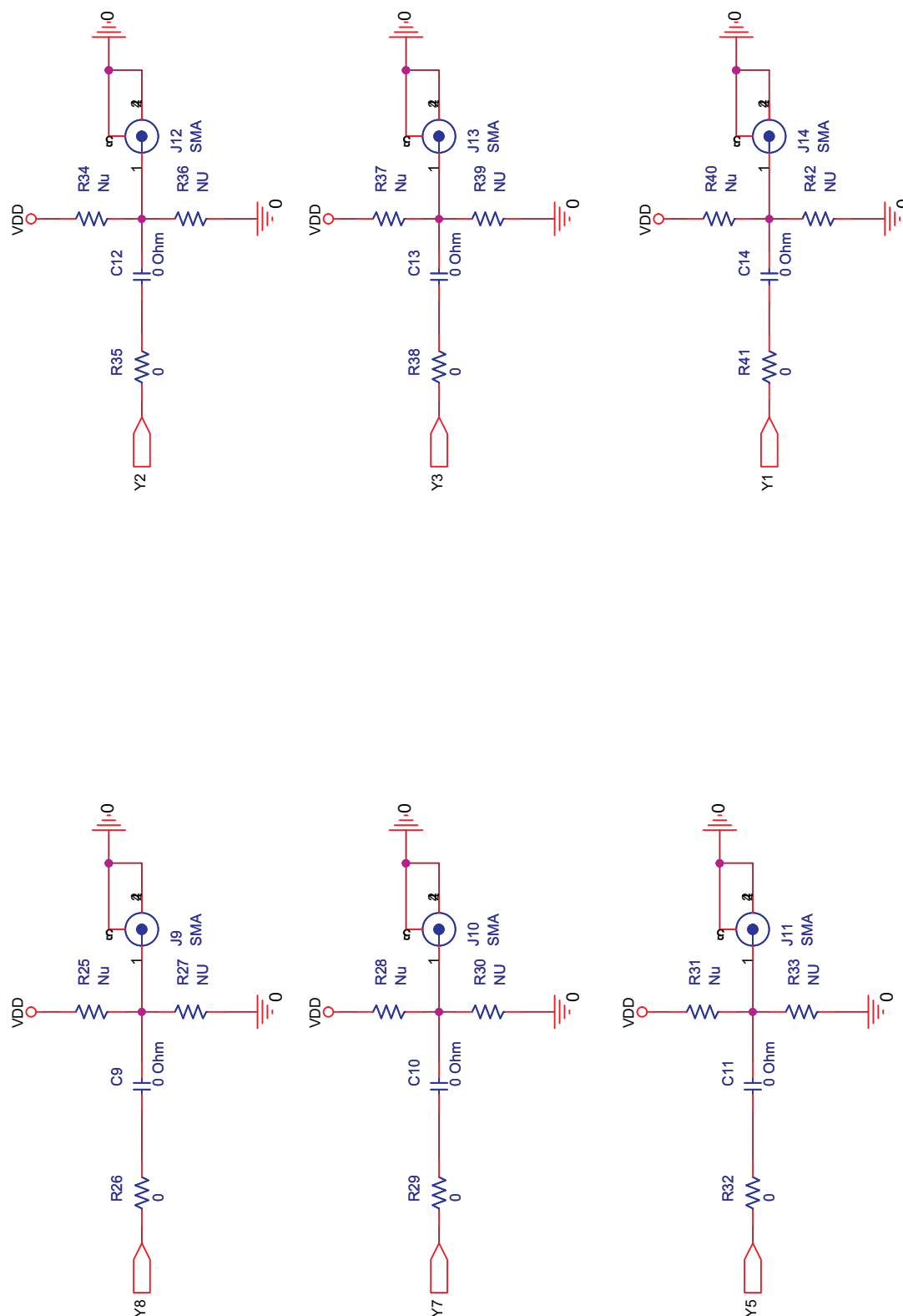


Figure 3. Schematic (Page 31 of 3)

## 9 References

1. CDCLVC1112 datasheet, [SCAS895](#)

## IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

### Products

|                             |                                                                    |
|-----------------------------|--------------------------------------------------------------------|
| Amplifiers                  | <a href="http://amplifier.ti.com">amplifier.ti.com</a>             |
| Data Converters             | <a href="http://dataconverter.ti.com">dataconverter.ti.com</a>     |
| DLP® Products               | <a href="http://www.dlp.com">www.dlp.com</a>                       |
| DSP                         | <a href="http://dsp.ti.com">dsp.ti.com</a>                         |
| Clocks and Timers           | <a href="http://www.ti.com/clocks">www.ti.com/clocks</a>           |
| Interface                   | <a href="http://interface.ti.com">interface.ti.com</a>             |
| Logic                       | <a href="http://logic.ti.com">logic.ti.com</a>                     |
| Power Mgmt                  | <a href="http://power.ti.com">power.ti.com</a>                     |
| Microcontrollers            | <a href="http://microcontroller.ti.com">microcontroller.ti.com</a> |
| RFID                        | <a href="http://www.ti-rfid.com">www.ti-rfid.com</a>               |
| RF/IF and ZigBee® Solutions | <a href="http://www.ti.com/lprf">www.ti.com/lprf</a>               |

### Applications

|                            |                                                                                          |
|----------------------------|------------------------------------------------------------------------------------------|
| Audio                      | <a href="http://www.ti.com/audio">www.ti.com/audio</a>                                   |
| Automotive                 | <a href="http://www.ti.com/automotive">www.ti.com/automotive</a>                         |
| Communications and Telecom | <a href="http://www.ti.com/communications">www.ti.com/communications</a>                 |
| Computers and Peripherals  | <a href="http://www.ti.com/computers">www.ti.com/computers</a>                           |
| Consumer Electronics       | <a href="http://www.ti.com/consumer-apps">www.ti.com/consumer-apps</a>                   |
| Energy                     | <a href="http://www.ti.com/energy">www.ti.com/energy</a>                                 |
| Industrial                 | <a href="http://www.ti.com/industrial">www.ti.com/industrial</a>                         |
| Medical                    | <a href="http://www.ti.com/medical">www.ti.com/medical</a>                               |
| Security                   | <a href="http://www.ti.com/security">www.ti.com/security</a>                             |
| Space, Avionics & Defense  | <a href="http://www.ti.com/space-avionics-defense">www.ti.com/space-avionics-defense</a> |
| Video and Imaging          | <a href="http://www.ti.com/video">www.ti.com/video</a>                                   |
| Wireless                   | <a href="http://www.ti.com/wireless-apps">www.ti.com/wireless-apps</a>                   |