

Features

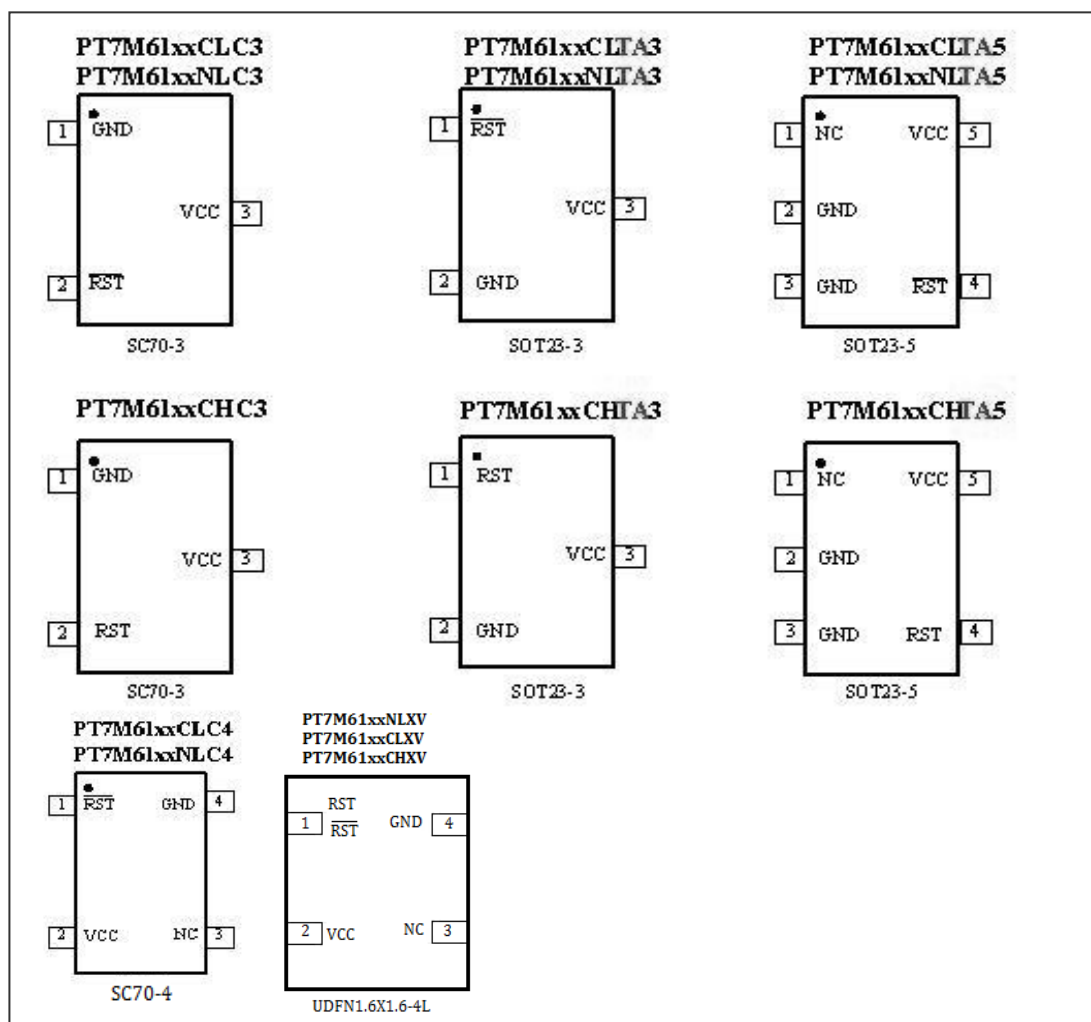
- Highly accurate: $\pm 1.5\%$ (25 °C)
- Low power consumption: 1 μ A @ 3.6V V_{CC}
- Detect voltage range: 1.8 to 5V in 100mV increments
- Operating voltage range: 1.2V ~ 5.5V
- Operating temperature range: -40 °C to +85 °C
- Detect voltage accuracy over temperature: $\pm 2.5\% \times \text{Typ}$
- Output configuration: N-channel open drain or CMOS

Description

The PT7M61xx series of ultra-low-power voltage detectors monitor battery, power-supply and system voltages. Each circuit includes a precision bandgap reference, a comparator, internally trimmed resistor networks that set specified trip thresholds, and an internal 1% and 5% threshold hysteresis circuit. Output is asserted when V_{CC} falls below the internal V_{TH-} and remains asserted until V_{CC} rises above V_{TH+} (V_{TH+} = V_{TH-} × 1.05). These devices provide excellent circuit reliability and low cost by eliminating external components and adjustments when monitoring nominal system voltages from +1.8V to +5V in 100mV increments. The series are voltage detectors with a propagation delay of 17 μ s.

The family is available with three output stage options: push-pull with active-low output, push-pull with active-high output, and open drain with active-low output. These devices specified over the -40 °C to +85 °C temperature range.

Pin Configuration

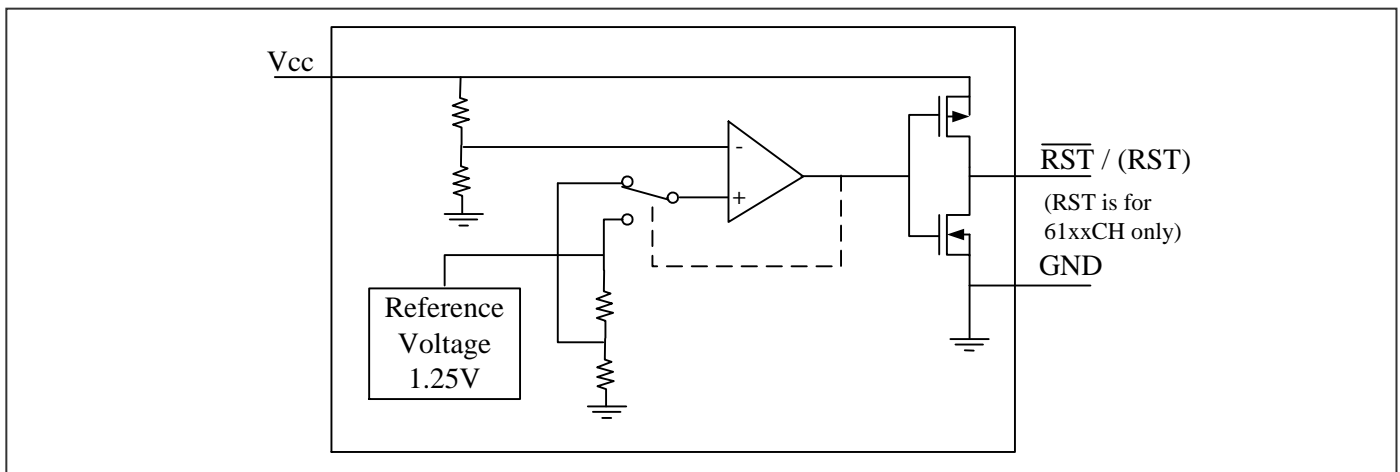


Pin Description

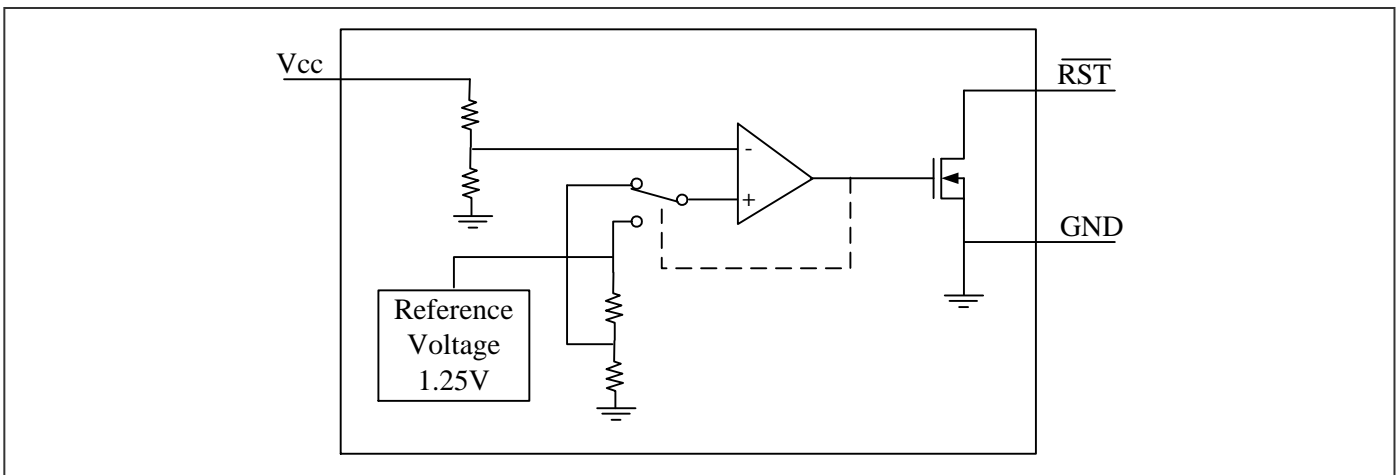
| Name | Type | Description |
|-------------------------|------|---|
| $\overline{\text{RST}}$ | O | Reset Output (PT7M61xxCL/NL): $\overline{\text{RST}}$ is asserted when V_{CC} drops below voltage threshold V_{TH} . Active low. |
| RST | O | Reset Output (PT7M61xxCH): RST is asserted when V_{CC} drops below voltage threshold V_{TH} . Active high. |
| GND | P | Ground |
| V_{CC} | P | Supply Voltage. |

Block Diagram

Block Diagram of PT7M61xxCL/CH



Block Diagram of PT7M61xxNL



Maximum Ratings

| | |
|---|--------------------------------|
| Storage Temperature | -65°C to +150°C |
| Ambient Temperature with Power Applied..... | -40°C to +85°C |
| Supply Voltage to Ground Potential (V _{CC} to GND) | -0.3V to +6.0V |
| DC Input Voltage (All inputs except V _{CC} and GND)..... | -0.3V to V _{CC} +0.3V |
| DC Output Current (All outputs) | 20mA |
| Power Dissipation | 320mW (Depend on package) |

Note:

Stresses greater than those listed under MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

DC Electrical Characteristics

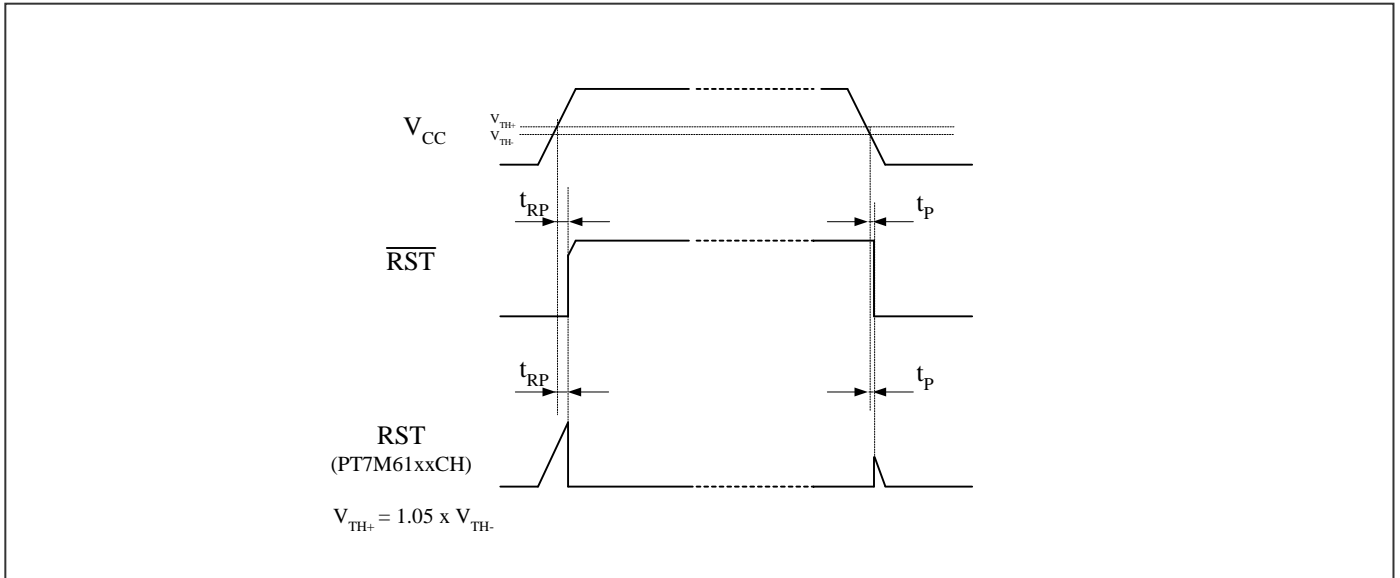
(V_{CC} = 1.2V to 5.5V, T_A = -40~85 °C, unless otherwise noted. Typical values are at T_A = +25 °C)

| Description | | Sym. | Test Conditions | Min | Typ | Max | Unit |
|-----------------------------------|-------------|-------------------|--|-------------------------------|------------------|-------------------------------|------|
| Supply Voltage | | V _{CC} | T _A = 0~70 ℃ | 1.0 | - | 5.5 | V |
| | | | T _A = -40~85 ℃ | 1.2 | - | 5.5 | |
| Supply Current | | I _{CC} | V _{CC} = 3.6V. No load. | - | 1.0 | 3.0 | μA |
| | | | V _{CC} = 5V. No load. | - | 1.3 | 3.6 | μA |
| Output Driving | Output high | V _{OH} | V _{CC} ≥ 1.8V, I _{source} = 1mA | 0.8×V _{CC} | - | - | V |
| | | | V _{CC} ≥ 2.5V, I _{source} = 3mA | 0.8×V _{CC} | - | - | |
| | | | V _{CC} ≥ 4.5V, I _{source} = 8mA | 0.8×V _{CC} | - | - | |
| | Output low | V _{OL} | V _{CC} ≥ 1.2V, I _{sink} = 1mA | - | - | 0.3 | V |
| | | | V _{CC} ≥ 2.5V, I _{sink} = 4mA | - | - | 0.3 | |
| | | | V _{CC} ≥ 4.5V, I _{sink} = 9mA | - | - | 0.4 | |
| Open-Drain Output Leakage Current | | I _{LKG} | - | - | - | 1 | μA |
| Voltage Threshold | | V _{TH-} | +25℃ | (V _{TH-}) ×0.985 | V _{TH-} | (V _{TH-}) ×1.015 | V |
| | | | -40℃~85℃ | (V _{TH-}) ×0.975 | V _{TH-} | (V _{TH-}) ×1.025 | |
| | | V _{TH+} | +25℃ | (V _{TH+}) ×0.985 | V _{TH+} | (V _{TH+}) ×1.015 | |
| | | | -40℃~85℃ | (V _{TH+}) ×0.975 | V _{TH+} | (V _{TH+}) ×1.025 | |
| voltage threshold Hysteresis | | V _{HYST} | V _{HYST} = [(V _{TH+})-(V _{TH-})]/(V _{TH-}) ×100% | 3 | 4.5 | 6 | % |
| | | | | - | 1 | - | |

Note: V_{TH+} = 1.05 × V_{TH-}. V_{TH-} is voltage threshold when V_{CC} falls from high to low. V_{TH+} is voltage threshold when V_{CC} rises from low to high.

AC Electrical Characteristics

Timing diagram

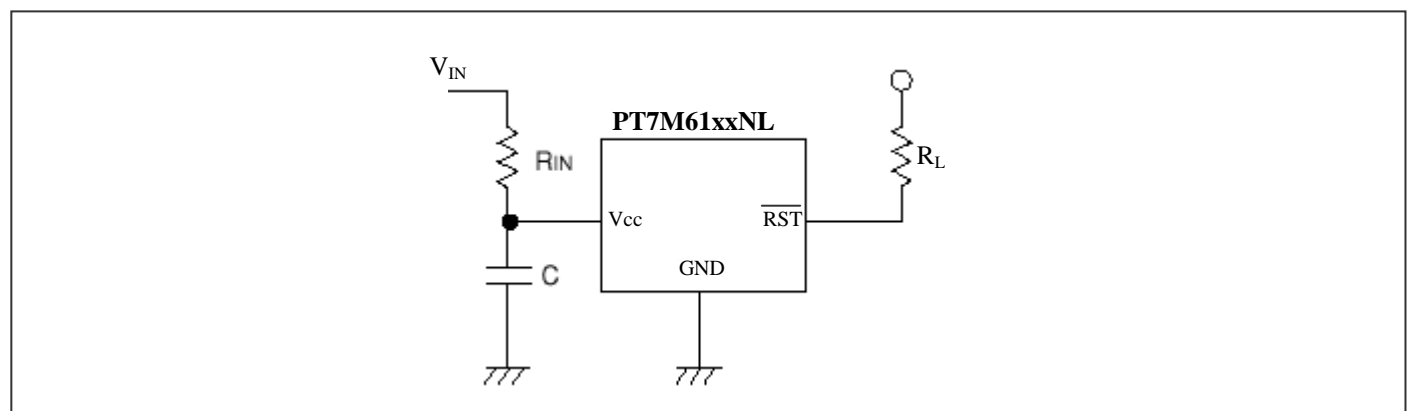


($V_{CC} = 1.2V$ to $5.5V$, $T_A = -40 \sim 85^\circ C$, unless otherwise noted. Typical values are at $T_A = +25^\circ C$)

| Sym. | Description | Test Conditions | Min | Typ | Max | Unit |
|-----------------|-------------------------------------|---|-----|-----|-----|---------|
| t_{RP} | Timeout Period | - | - | - | 200 | μs |
| t_p | Delay | - | - | 50 | - | μs |
| $t_{overdrive}$ | V_{CC} Maximum Transient Duration | Reset threshold overdrive=500mV ($V_{CC} - V_{th} = -500mV$) | - | 20 | - | μs |

Typical Operation Circuit

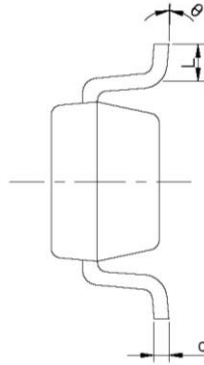
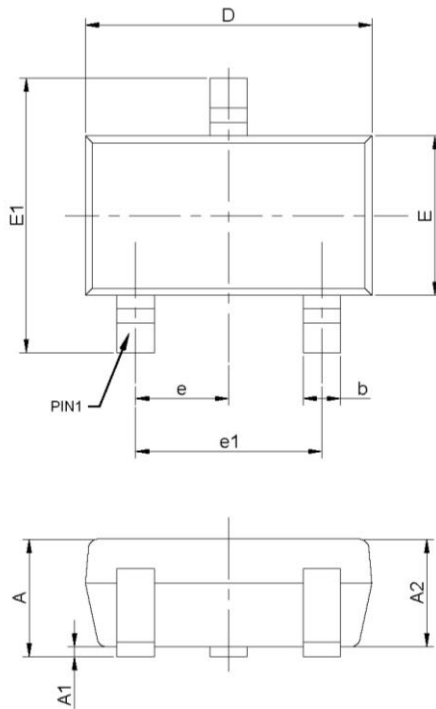
PT7M61xxNL Application Example



Please use N-ch open drains configuration, when a resistor R_{IN} is connected between the V_{CC} pin and power source V_{IN} . In such cases, please ensure that R_{IN} is less than $10k\Omega$ and that C is more than $0.1\mu F$. R_L could be $1k\Omega$ to $510k\Omega$.

Mechanical Information

TA3 (SOT23-3)



| PKG. DIMENSIONS(MM) | | |
|---------------------|----------|------|
| SYMBOL | Min | Max |
| A | - | 1.45 |
| A1 | 0.00 | 0.15 |
| A2 | 0.90 | 1.30 |
| b | 0.30 | 0.50 |
| c | 0.08 | 0.22 |
| D | 2.75 | 3.10 |
| E | 1.45 | 1.75 |
| E1 | 2.60 | 3.00 |
| e | 0.95 BSC | |
| e1 | 1.90 BSC | |
| L | 0.30 | 0.60 |
| θ | 0° | 8° |

Note:

1. Comply with MO-178C, except D Max.
2. PACKAGE OUTLINE DIMENSIONS DO NOT INCLUDE MOLD FLASH AND METAL BURR



DATE: 03/29/16

DESCRIPTION: 3-Pin, Small Outline Transistor Plastic Package (SOT23)

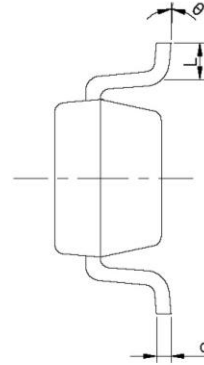
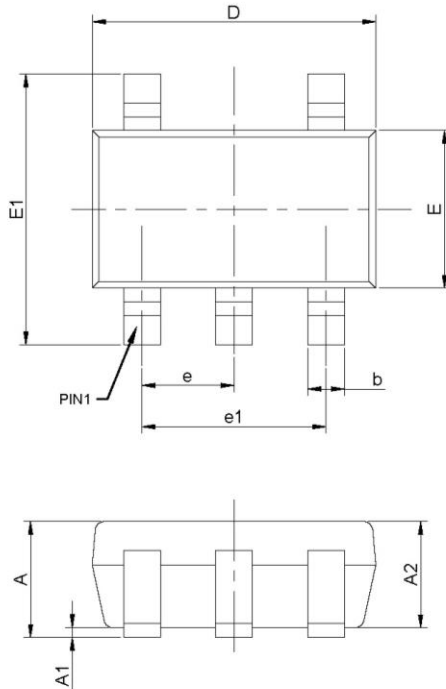
PACKAGE CODE: TA (TA3)

DOCUMENT CONTROL #: PD-2143

REVISION: A

16-0080

TA5 (SOT23-5)



| PKG. DIMENSIONS(MM) | | |
|---------------------|----------|------|
| SYMBOL | Min | Max |
| A | - | 1.45 |
| A1 | 0.00 | 0.15 |
| A2 | 0.90 | 1.30 |
| b | 0.30 | 0.50 |
| c | 0.08 | 0.22 |
| D | 2.75 | 3.05 |
| E | 1.45 | 1.75 |
| E1 | 2.60 | 3.00 |
| e | 0.95 BSC | |
| e1 | 1.90 BSC | |
| L | 0.30 | 0.60 |
| θ | 0° | 8° |

Note:

1. Ref: JEDEC MO-178C/AA
2. PACKAGE OUTLINE DIMENSIONS DO NOT INCLUDE MOLD FLASH AND METAL BUR



DATE: 03/29/16

DESCRIPTION: 5-Pin, Small Outline Transistor Plastic Package (SOT23)

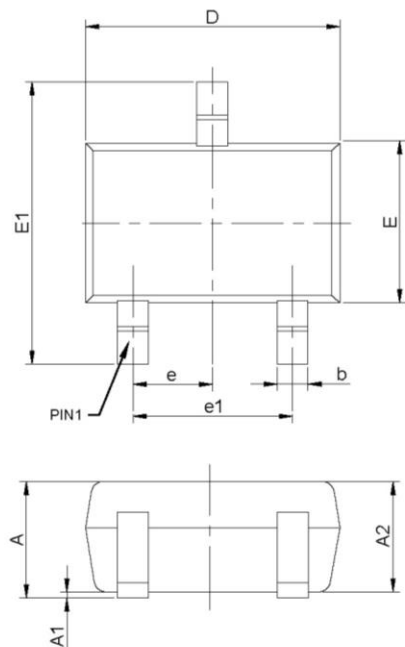
PACKAGE CODE: TA (TA5)

DOCUMENT CONTROL #: PD-2144

REVISION: A

16-0081

C3 (SC70-3)



| PKG. DIMENSIONS(MM) | | |
|---------------------|----------|------|
| SYMBOL | Min | Max |
| A | - | 1.10 |
| A1 | 0.00 | 0.10 |
| A2 | 0.70 | 1.00 |
| b | 0.15 | 0.40 |
| c | 0.08 | 0.22 |
| D | 1.80 | 2.20 |
| E | 1.10 | 1.40 |
| E1 | 1.75 | 2.45 |
| e | 0.65 BSC | |
| e1 | 1.30 BSC | |
| L | 0.26 | 0.46 |
| θ | 0° | 8° |

Note:

1. Comply with MO-203C, except b Max, D Min, D Max, E1 Min and E1 Max.
2. PACKAGE OUTLINE DIMENSIONS DO NOT INCLUDE MOLD FLASH AND METAL BURR



DATE: 03/29/16

DESCRIPTION: 3-Pin, SOT323 (SC70)

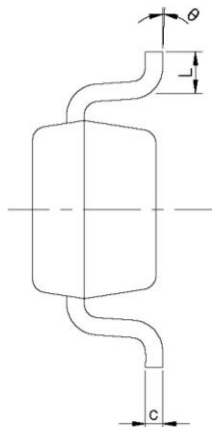
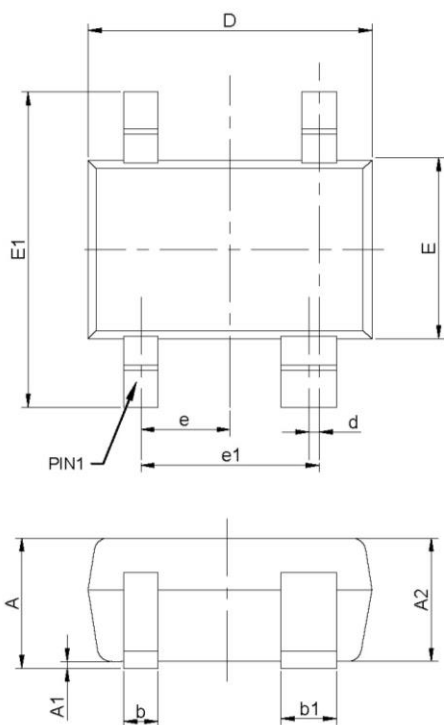
PACKAGE CODE: C (C3)

DOCUMENT CONTROL#: PD-2147

REVISION: A

16-0077

C4 (SC70-4)



| PKG. DIMENSIONS(MM) | | |
|---------------------|----------|------|
| SYMBOL | Min | Max |
| A | 0.90 | 1.10 |
| A1 | 0.00 | 0.10 |
| A2 | 0.90 | 1.00 |
| b | 0.25 | 0.40 |
| b1 | 0.35 | 0.50 |
| c | 0.08 | 0.15 |
| D | 2.00 | 2.20 |
| d | 0.05 TYP | |
| E | 1.15 | 1.35 |
| E1 | 2.15 | 2.45 |
| e | 0.65 TYP | |
| e1 | 1.20 | 1.40 |
| L | 0.26 | 0.46 |
| θ | 0° | 8° |

Notes:

1. Ref: JEDEC MO-203B



DATE: 06/18/13

DESCRIPTION: 4-Pin, SOT343 (SC70)

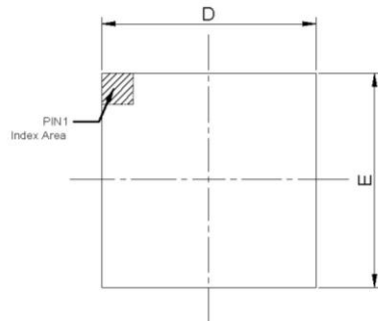
PACKAGE CODE: C (C4)

DOCUMENT CONTROL#: PD-2148

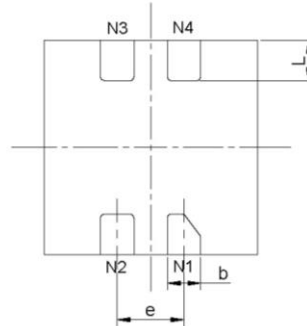
REVISION: --

13-0187

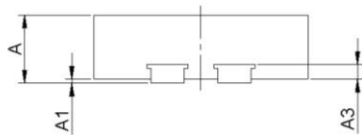
XV (UDFN1.6x1.6-4L)



TOP VIEW



BOTTOM VIEW



SIDE VIEW

| PKG. DIMENSIONS(MM) | | |
|---------------------|----------|------|
| SYMBOL | Min | Max |
| A | 0.45 | 0.55 |
| A1 | 0.00 | 0.05 |
| A3 | 0.11 REF | |
| D | 1.55 | 1.65 |
| E | 1.55 | 1.65 |
| b | 0.20 | 0.30 |
| e | 0.50 TYP | |
| L | 0.25 | 0.35 |

Notes:

1. Ref: JEDEC MO-287A



DATE: 06/18/13

DESCRIPTION: 4-Pin, UDFN, 1.6X1.6, MIS

PACKAGE CODE: XV (XV4)

DOCUMENT CONTROL #: PD-2130

REVISION: --

13-0169

For latest package info.

please check: <http://www.diodes.com/design/support/packaging/pericom-packaging/packaging-mechanicals-and-thermal-characteristics/>

Ordering Information

| Part Number | Package Code | Package |
|------------------|--------------|---|
| PT7M61xxCLTA3E | TA3 | 3-Pin, Small Outline Transistor Plastic Package (SOT23) |
| PT7M61xxCLTA5E | TA5 | 5-Pin, Small Outline Transistor Plastic Package (SOT23) |
| PT7M61xxCLC3E | C3 | 3-Pin, SOT323 (SC70) |
| PT7M61xxCLC4E | C4 | 4-Pin, SOT343 (SC70) |
| *PT7M61xxCHTA3E | TA3 | Lead free and Green SOT23-3 |
| *PT7M61xxCHTA5E | TA5 | 5-Pin, Small Outline Transistor Plastic Package (SOT23) |
| *PT7M61xxCHC3E | C3 | 3-Pin, SOT323 (SC70) |
| *PT7M61xxCHC4E | C4 | 4-Pin, SOT343 (SC70) |
| PT7M61xxNLTA3E | TA3 | 3-Pin, Small Outline Transistor Plastic Package (SOT23) |
| PT7M61xxNLTA5E | TA5 | 5-Pin, Small Outline Transistor Plastic Package (SOT23) |
| PT7M61xxNLC3E | C3 | 3-Pin, SOT323 (SC70) |
| PT7M61xxNLC4E | C4 | 4-Pin, SOT343 (SC70) |
| PT7M61xxCLETA3E | TA3 | 3-Pin, Small Outline Transistor Plastic Package (SOT23) |
| PT7M61xxCLETA5E | TA5 | 5-Pin, Small Outline Transistor Plastic Package (SOT23) |
| PT7M61xxCLEC3E | C3 | 3-Pin, SOT323 (SC70) |
| PT7M61xxCLEC4E | C4 | 4-Pin, SOT343 (SC70) |
| *PT7M61xxCHETA3E | TA3 | 3-Pin, Small Outline Transistor Plastic Package (SOT23) |
| *PT7M61xxCHETA5E | TA5 | 5-Pin, Small Outline Transistor Plastic Package (SOT23) |
| *PT7M61xxCHEC3E | C3 | 3-Pin, SOT323 (SC70) |
| *PT7M61xxCHEC4E | C4 | 4-Pin, SOT343 (SC70) |
| PT7M61xxNLETA3E | TA3 | 3-Pin, Small Outline Transistor Plastic Package (SOT23) |
| PT7M61xxNLETA5E | TA5 | 5-Pin, Small Outline Transistor Plastic Package (SOT23) |
| PT7M61xxNLEC3E | C3 | 3-Pin, SOT323 (SC70) |
| PT7M61xxNLEC4E | C4 | 4-Pin, SOT343 (SC70) |
| PT7M61xxNLEXVE | XV | 4-Pin, 1.6x1.6, MIS (UDFN) |
| PT7M61xxNLXVE | XV | 4-Pin, 1.6x1.6, MIS (UDFN) |
| PT7M61xxCLXVE | XV | 4-Pin, 1.6x1.6, MIS (UDFN) |
| PT7M61xxCLEXVE | XV | 4-Pin, 1.6x1.6, MIS (UDFN) |
| *PT7M61xxCHXVE | XV | 4-Pin, 1.6x1.6, MIS (UDFN) |
| *PT7M61xxCHEXVE | XV | 4-Pin, 1.6x1.6, MIS (UDFN) |

Notes:

- 1: "xx" refer to voltage range, see below table 1.
- 2: Adding E suffix=1% Hysteresis. For example: PT7M61xxCLETA3E.
- 3: None E suffix=5% Hysteresis. For example: PT7M61xxCLTA3E.
- 4: E = Pb-free and Green
- 5: Adding X Suffix= Tape/Reel
- 6: Contact Pericom for availability
- 7: "*" for CH part, please check the storage with related sales.

Table 1 Function comparison

| Item | Part No. | Reset Output | | | | Threshold |
|------|------------|--------------|------------|-------------|------------|----------------------------------|
| | | Open-Drain | | Push-Pull | | |
| | | Active high | Active low | Active high | Active low | |
| 1 | PT7M61xxCL | - | - | - | √ | 1.8V to 5.0V in 100mV increments |
| 2 | PT7M61xxCH | - | - | √ | - | |
| 3 | PT7M61xxNL | - | √ | - | - | |

Table 2 Suffix “xx” definition of PT7M61xx

| Suffix xx | V _{TH} (V) | Suffix xx | V _{TH} (V) | Suffix xx | V _{TH} (V) | Suffix xx | V _{TH} (V) | Suffix xx | V _{TH} (V) |
|-----------|---------------------|-----------|---------------------|-----------|---------------------|-----------|---------------------|-----------|---------------------|
| 18 | 1.8 | 25 | 2.5 | 32 | 3.2 | 39 | 3.9 | 46 | 4.6 |
| 19 | 1.9 | 26 | 2.6 | 33 | 3.3 | 40 | 4.0 | 47 | 4.7 |
| 20 | 2.0 | 27 | 2.7 | 34 | 3.4 | 41 | 4.1 | 48 | 4.8 |
| 21 | 2.1 | 28 | 2.8 | 35 | 3.5 | 42 | 4.2 | 49 | 4.9 |
| 22 | 2.2 | 29 | 2.9 | 36 | 3.6 | 43 | 4.3 | 50 | 5.0 |
| 23 | 2.3 | 30 | 3.0 | 37 | 3.7 | 44 | 4.4 | | |
| 24 | 2.4 | 31 | 3.1 | 38 | 3.8 | 45 | 4.5 | | |

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