

**Features**

- Highly accurate:  $\pm 1.5\%$  (25°C)
- Low power consumption: 0.9uA @ 3V Vcc
- 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 5% threshold hysteresis circuit. Output is asserted when V<sub>CC</sub> falls below the internal V<sub>TH-</sub> and remains asserted until V<sub>CC</sub> rises above V<sub>TH+</sub> (V<sub>TH+</sub> = V<sub>TH-</sub> × 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 17μs.

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.

**Ordering Information**

| Part Number     | Package                     |
|-----------------|-----------------------------|
| PT7M61xxCLTA3E  | Lead free and Green SOT23-3 |
| PT7M61xxCLTA5E  | Lead free and Green SOT23-5 |
| PT7M61xxCLC3E   | Lead free and Green SC70-3  |
| PT7M61xxCLC4E   | Lead free and Green SC70-4  |
| PT7M61xxCLNBE   | Lead free TO92              |
| PT7M61xxCLTDE   | Lead free SOT89             |
| PT7M61xxCHTA3E  | Lead free and Green SOT23-3 |
| PT7M61xxCHTA5E  | Lead free and Green SOT23-5 |
| PT7M61xxCHC3E   | Lead free and Green SC70-3  |
| PT7M61xxCHTDE   | Lead free SOT89             |
| PT7M61xxNLTA3E  | Lead free and Green SOT23-3 |
| PT7M61xxNLTA5E  | Lead free and Green SOT23-5 |
| PT7M61xxNLC3E   | Lead free and Green SC70-3  |
| PT7M61xxNLC4E   | Lead free and Green SC70-4  |
| PT7M61xxNLNBE   | Lead free TO92              |
| PT7M61xxNLTDE   | Lead free SOT89             |
| PT7M61xxCLLNBE  | Lead free TO92              |
| PT7M61xxNLLNBE  | Lead free TO92              |
| PT7M61xxCLBTA5E | Lead free and Green SOT23-5 |
| PT7M61xxCHBTA5E | Lead free and Green SOT23-5 |
| PT7M61xxNLBTA5E | Lead free and Green SOT23-5 |

- Note**
- “xx” refer to voltage range, see below table 1.
  - E=Lead-free and Green Packaging
  - Adding X suffix= Tape/Reel

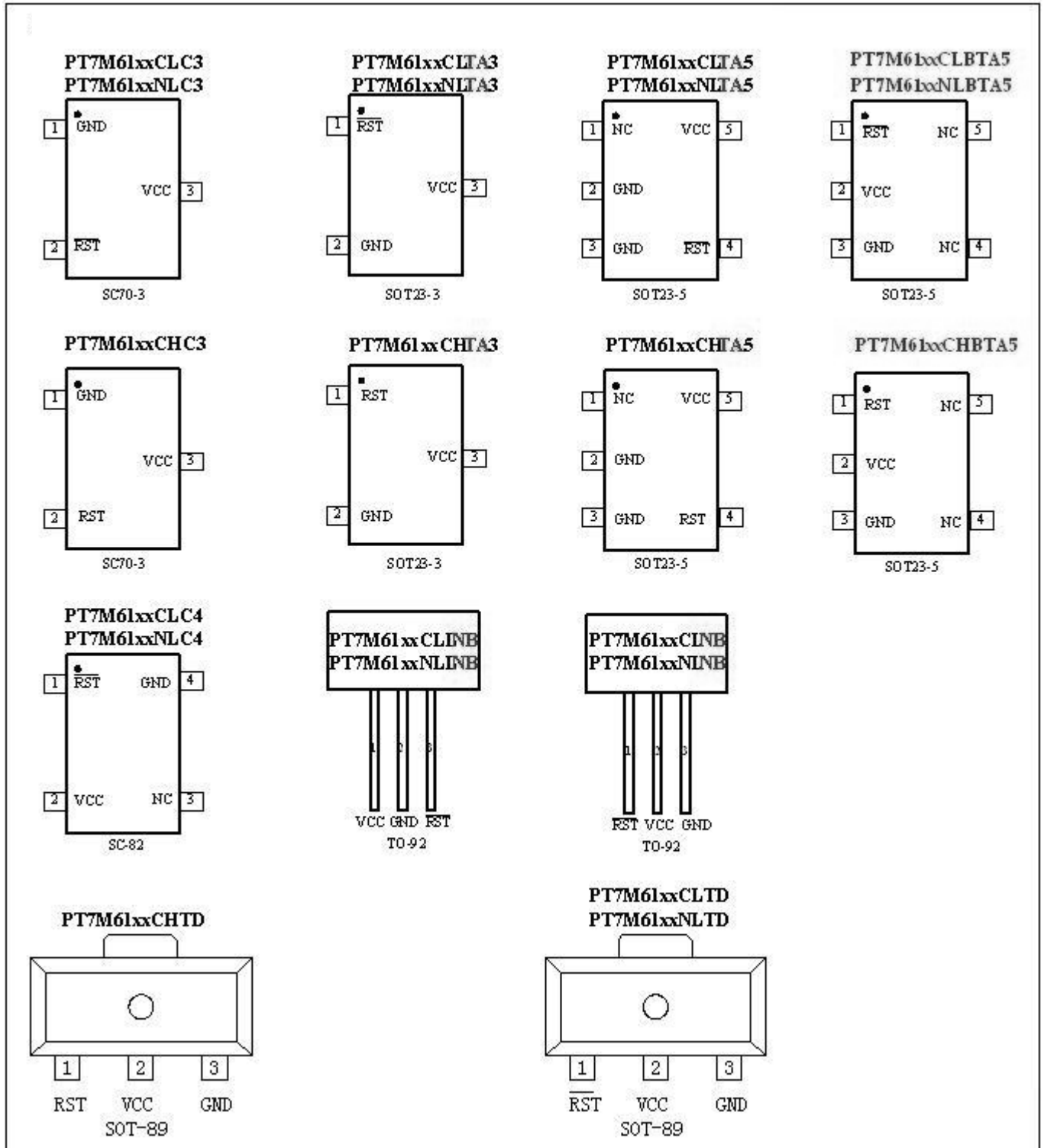
**Table 1 Suffix “xx” definition of PT7M61xx**

| Suffix xx | V <sub>TH-</sub> (V) | Suffix xx | V <sub>TH-</sub> (V) | Suffix xx | V <sub>TH-</sub> (V) | Suffix xx | V <sub>TH-</sub> (V) | Suffix xx | V <sub>TH-</sub> (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                  |           |                      |

Table 2 Function comparison Table

| Item | Part No.    | Reset Output Open-Drain |            | Reset Output Push-Pull |            | Threshold                        |
|------|-------------|-------------------------|------------|------------------------|------------|----------------------------------|
|      |             | Active high             | Active low | Active high            | Active low |                                  |
| 1    | PT7M61xxCL  | -                       | -          | -                      | √          | 1.8V to 5.0V in 100mV increments |
| 2    | PT7M61xxCLL | -                       | -          | -                      | √          |                                  |
| 3    | PT7M61xxCH  | -                       | -          | √                      | -          |                                  |
| 4    | PT7M61xxNL  | -                       | √          | -                      | -          |                                  |
| 5    | PT7M61xxNLL | -                       | √          | -                      | -          |                                  |

Pin Configuration



### Pin Description

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

### Maximum Ratings

|   |                           |
|---|---------------------------|
| Storage Temperature .....                             | -65°C to +150°C           |
| Ambient Temperature with Power Applied.....           | -40°C to +85°C            |
| Supply Voltage to Ground Potential (Vcc to GND) ..... | -0.3V to +6.0V            |
| DC Input Voltage (All inputs except Vcc 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

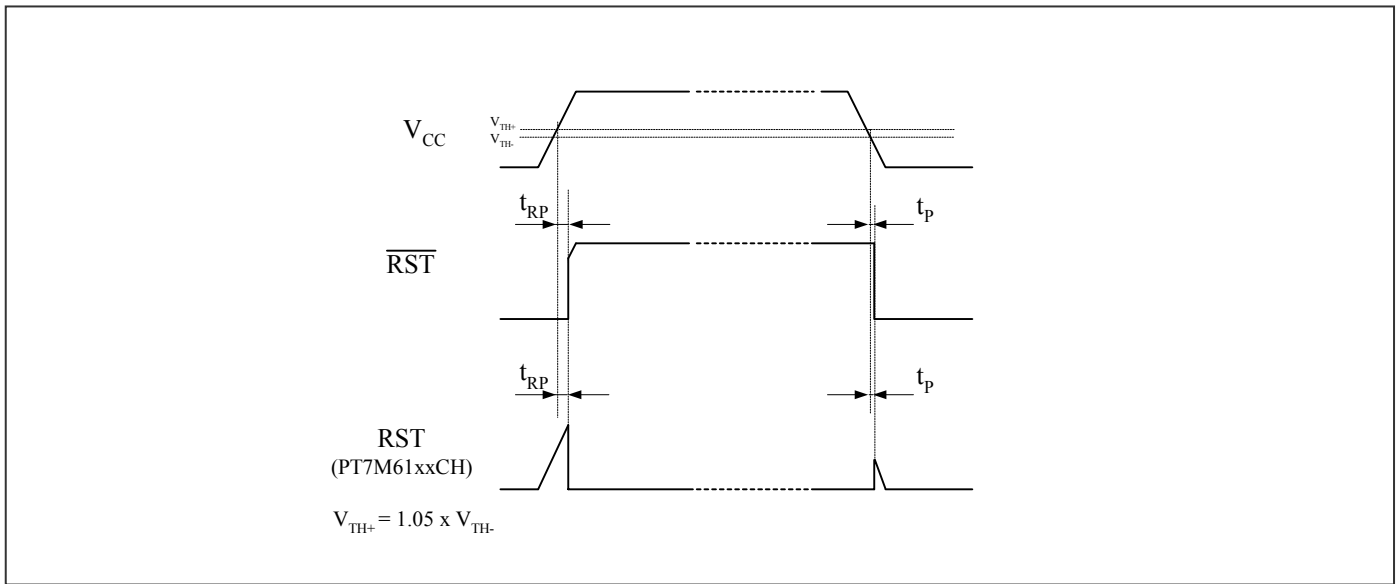
( $V_{CC} = 1.2V$  to  $5.5V$ ,  $T_A = -40\sim 85^\circ C$ , unless otherwise noted. Typical values are at  $T_A = +25^\circ C$ )

| Description                       | Sym.        | Test Conditions   | Min                      | Typ       | Max                      | Unit    |
|-----------------------------------|-------------|---|--------------------------|-----------|--------------------------|---------|
| Supply Voltage                    | $V_{CC}$    | $T_A = 0\sim 70^\circ C$                                      | 1.0                      | -         | 5.5                      | V       |
|                                   |             | $T_A = -40\sim 85^\circ C$                                    | 1.2                      | -         | 5.5                      |         |
| Supply Current                    | $I_{CC}$    | $V_{CC} = 3V$ . No load.                                      | -                        | 0.9       | 3.0                      | $\mu A$ |
|                                   |             | $V_{CC} = 5V$ . No load.                                      | -                        | 1.3       | 3.6                      | $\mu A$ |
| Output Driving                    | Output high | $V_{CC} \geq 1.8V$ , $I_{source} = 1mA$                       | $0.8 \times V_{CC}$      | -         | -                        | V       |
|                                   |             | $V_{CC} \geq 2.5V$ , $I_{source} = 3mA$                       | $0.8 \times V_{CC}$      | -         | -                        |         |
|                                   |             | $V_{CC} \geq 4.5V$ , $I_{source} = 8mA$                       | $0.8 \times V_{CC}$      | -         | -                        |         |
|                                   | Output low  | $V_{CC} \geq 1.2V$ , $I_{sink} = 1mA$                         | -                        | -         | 0.3                      | V       |
|                                   |             | $V_{CC} \geq 2.5V$ , $I_{sink} = 4mA$                         | -                        | -         | 0.3                      |         |
|                                   |             | $V_{CC} \geq 4.5V$ , $I_{sink} = 9mA$                         | -                        | -         | 0.4                      |         |
| Open-Drain Output Leakage Current | $I_{LKG}$   | -   | -                        | -         | 1                        | $\mu A$ |
| Voltage Threshold                 | $V_{TH-}$   | +25°C   | $(V_{TH-}) \times 0.98$  | $V_{TH-}$ | $(V_{TH-}) \times 1.02$  | V       |
|                                   |             | -40°C~85°C  | $(V_{TH-}) \times 0.975$ | $V_{TH-}$ | $(V_{TH-}) \times 1.025$ |         |
|                                   | $V_{TH+}$   | +25°C   | $(V_{TH+}) \times 0.98$  | $V_{TH+}$ | $(V_{TH+}) \times 1.02$  |         |
|                                   |             | -40°C~85°C  | $(V_{TH+}) \times 0.975$ | $V_{TH+}$ | $(V_{TH+}) \times 1.025$ |         |
| voltage threshold Hysteresis      | $V_{HYST}$  | $V_{HYST} = [(V_{TH+}) - (V_{TH-})] / (V_{TH-}) \times 100\%$ | 3                        | 5         | 6                        | %       |

**Note:**  $V_{TH+} = 1.05 \times V_{TH-}$ .  $V_{TH-}$  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

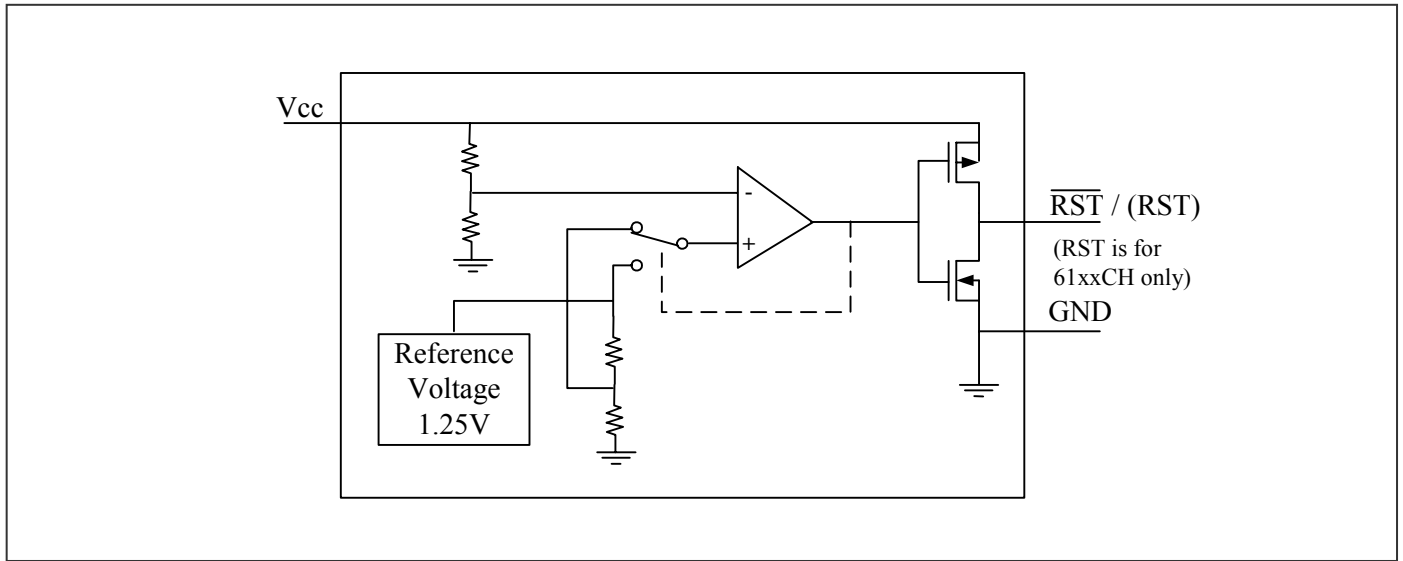


( $V_{CC} = 1.2V$  to  $5.5V$ ,  $T_A = -40 \sim 85^\circ C$ , unless otherwise noted. Typical values are at  $T_A = +25^\circ C$ )

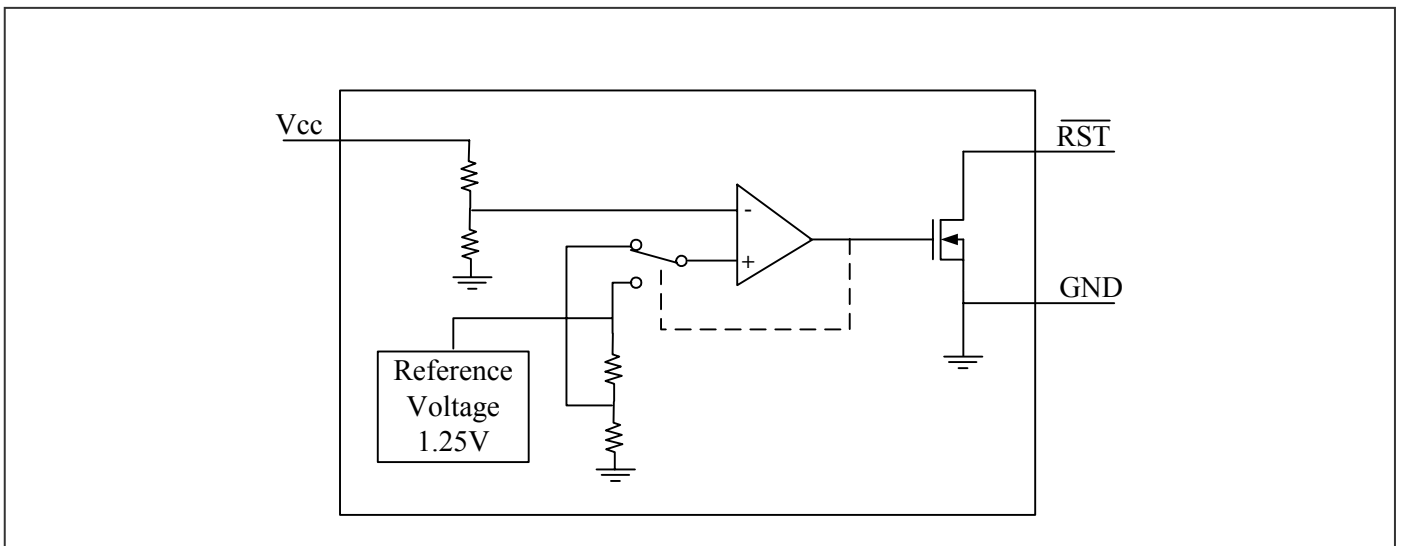
| Sym.            | Description                         | Test Conditions   | Min | Typ | Max | Unit    |
|-----------------|-------------------------------------|---|-----|-----|-----|---------|
| $t_{RP}$        | Timeout Period                      | -   | -   | -   | 200 | $\mu s$ |
| $t_p$           | Delay                               | -   | -   | 40  | -   | $\mu s$ |
| $t_{overdrive}$ | $V_{CC}$ Maximum Transient Duration | Reset threshold overdrive=500mV<br>( $V_{CC} - V_{th} = -500mV$ ) | -   | 35  | -   | $\mu s$ |

### Block Diagram

Block Diagram of PT7M61xxCL/CH/CLL

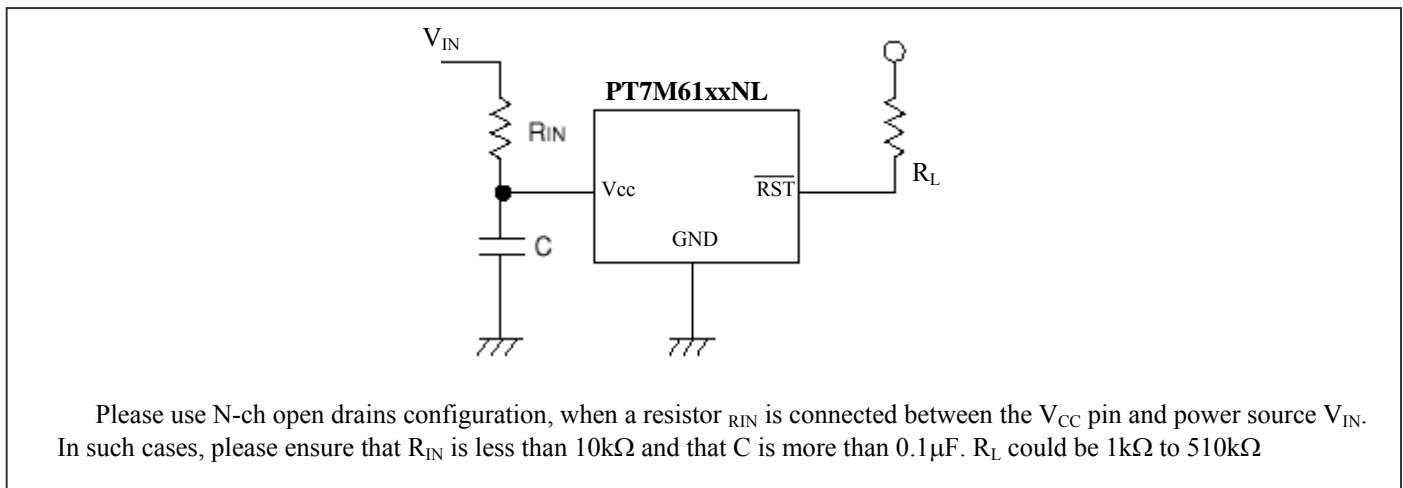


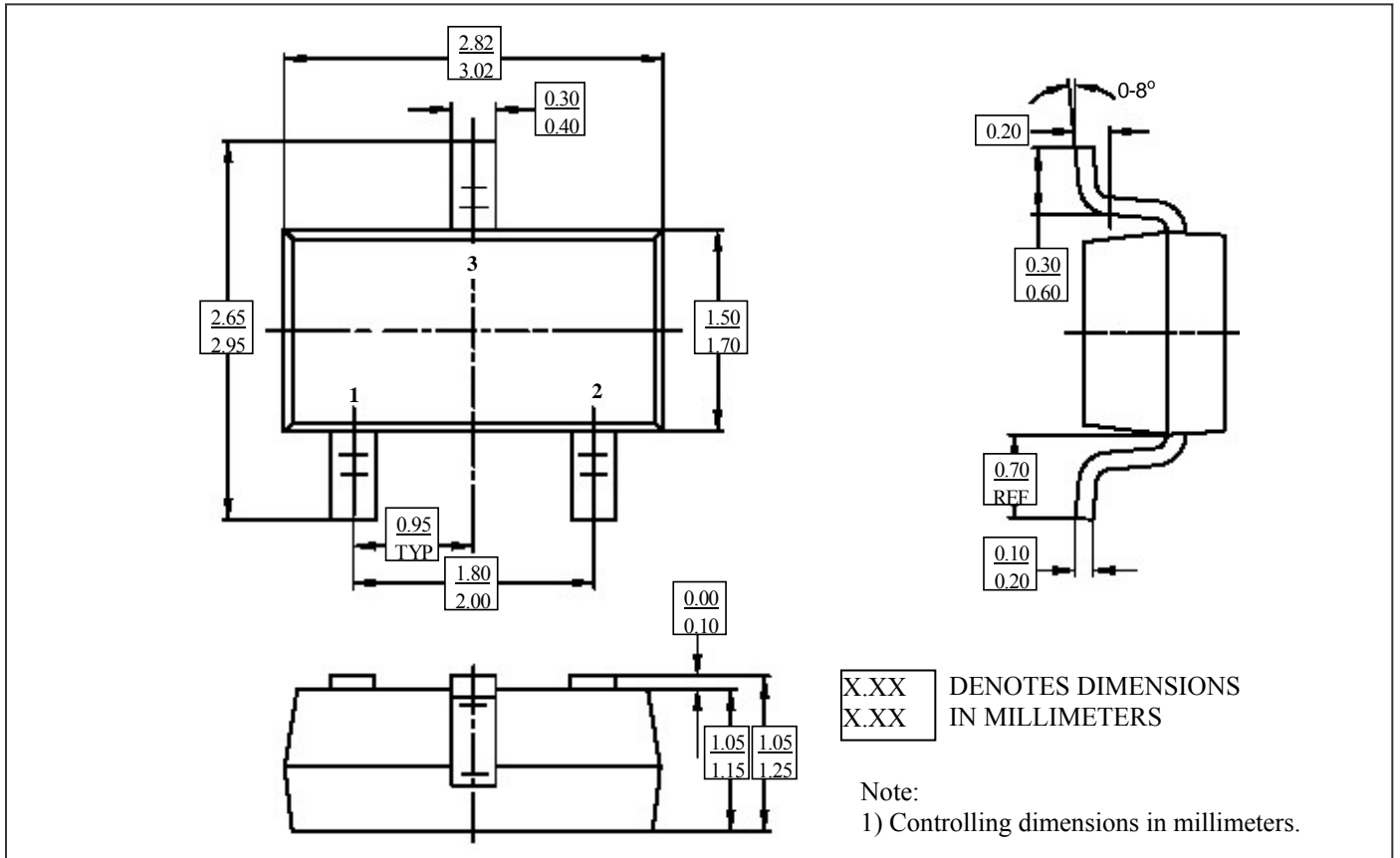
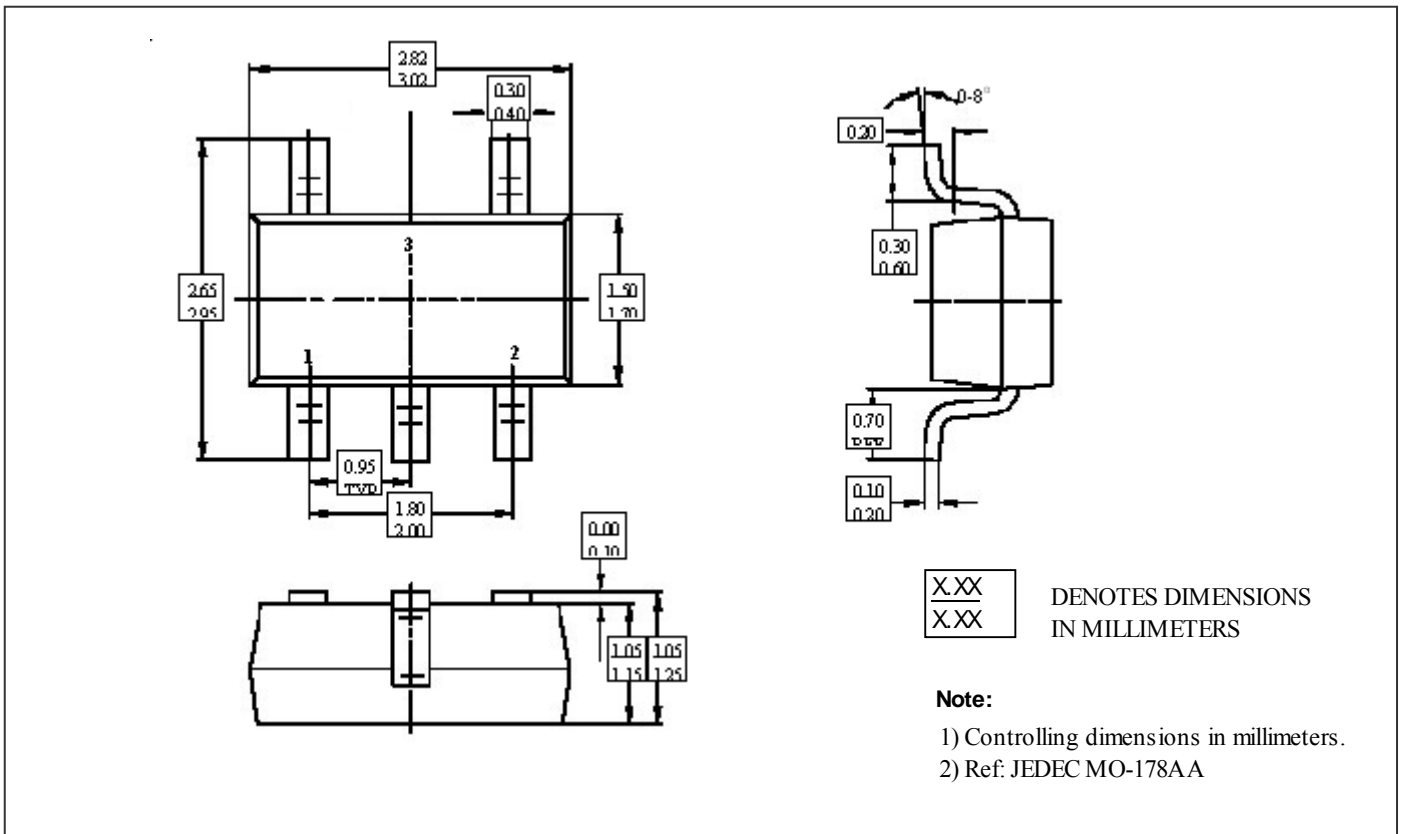
Block Diagram of PT7M61xxNL/NLL

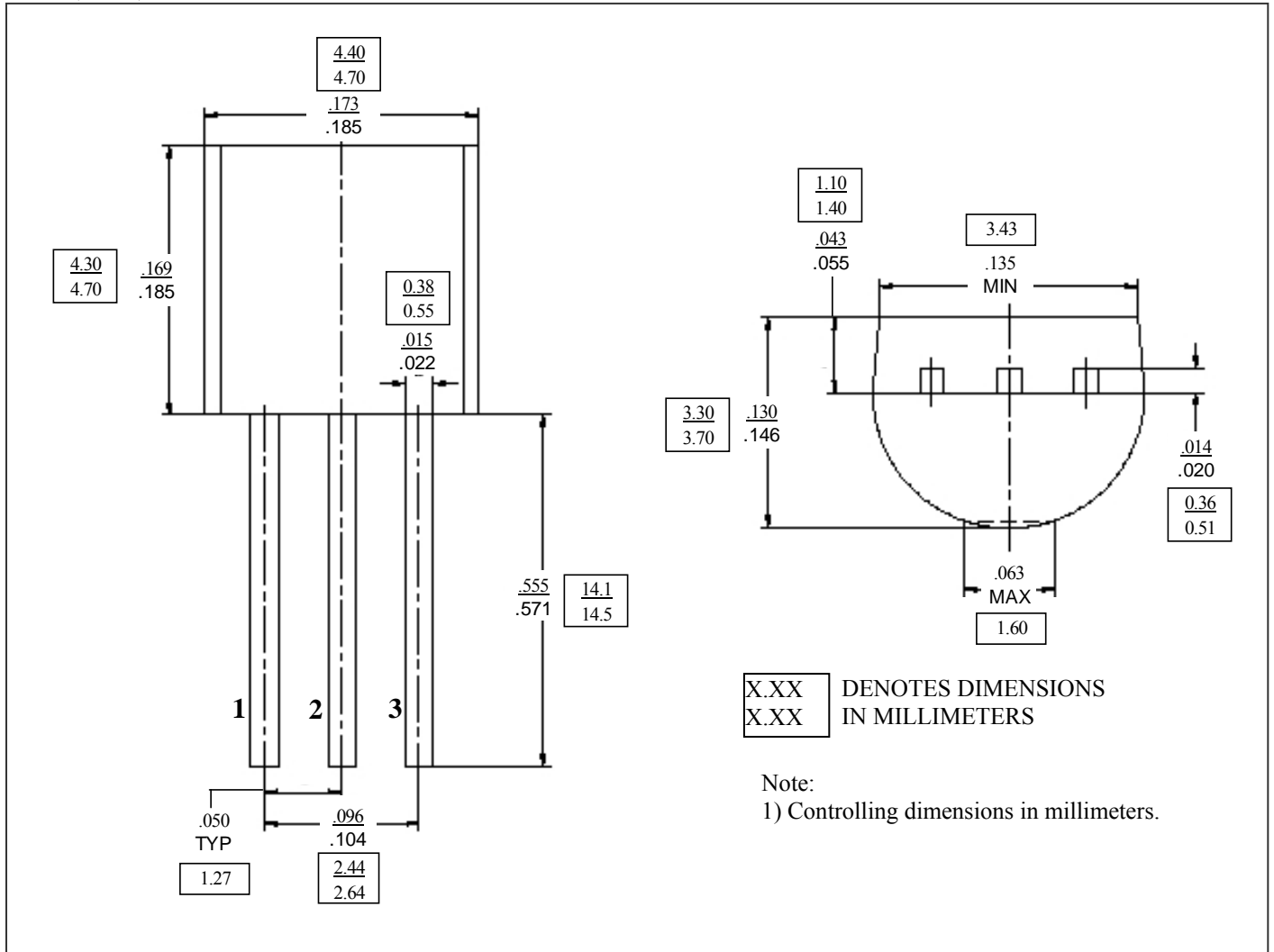


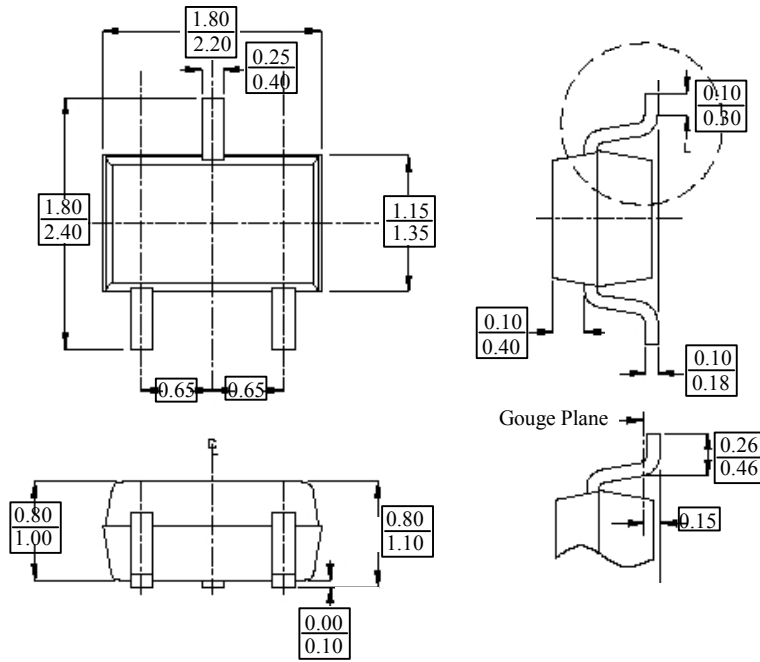
### Typical Operation Circuit

PT7M61xxNL Application Example



**Mechanical Information**
**TA3 (SOT23-3)**

**TA5 (SOT23-5)**


**NB (TO92)**


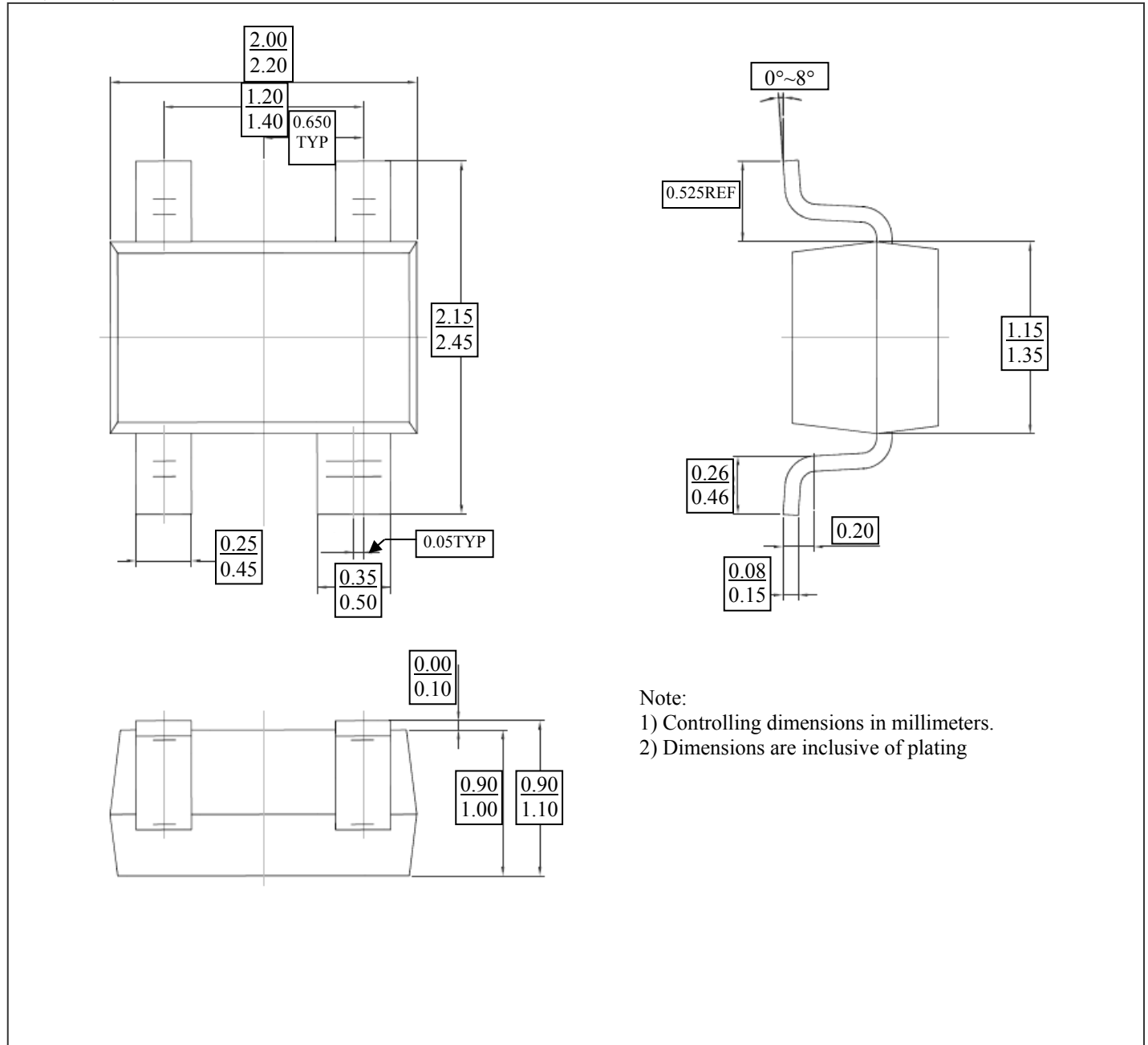
**C3 (SC70-3)**


|      |                    |
|------|--------------------|
| X.XX | DENOTES DIMENSIONS |
| X.XX | IN MILLIMETERS     |

**Note**

- 1.) Controlling dimensions in millimeters.
- 2.) Dimensions are inclusive of plating.

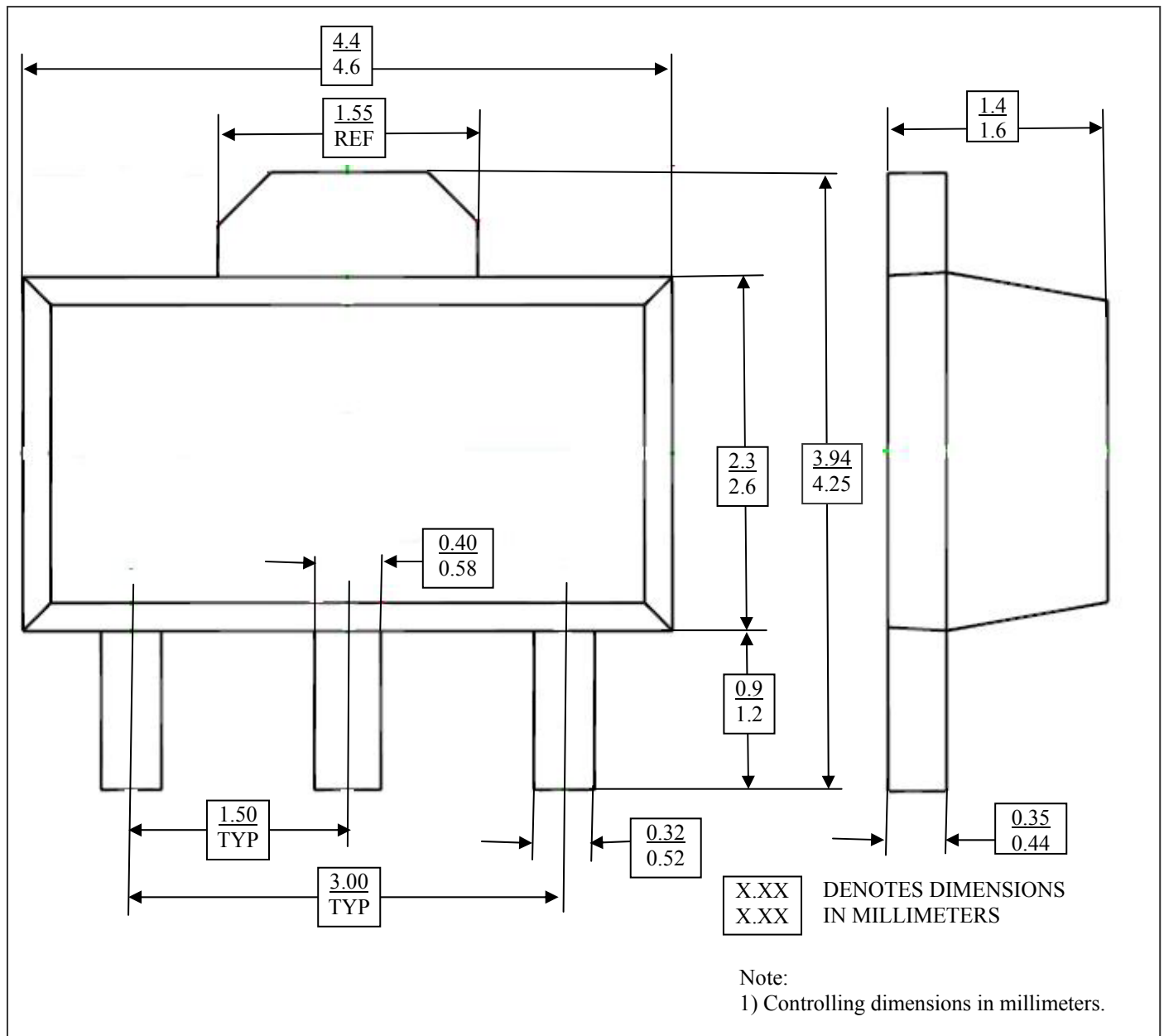


**C4 (SC70-4)**


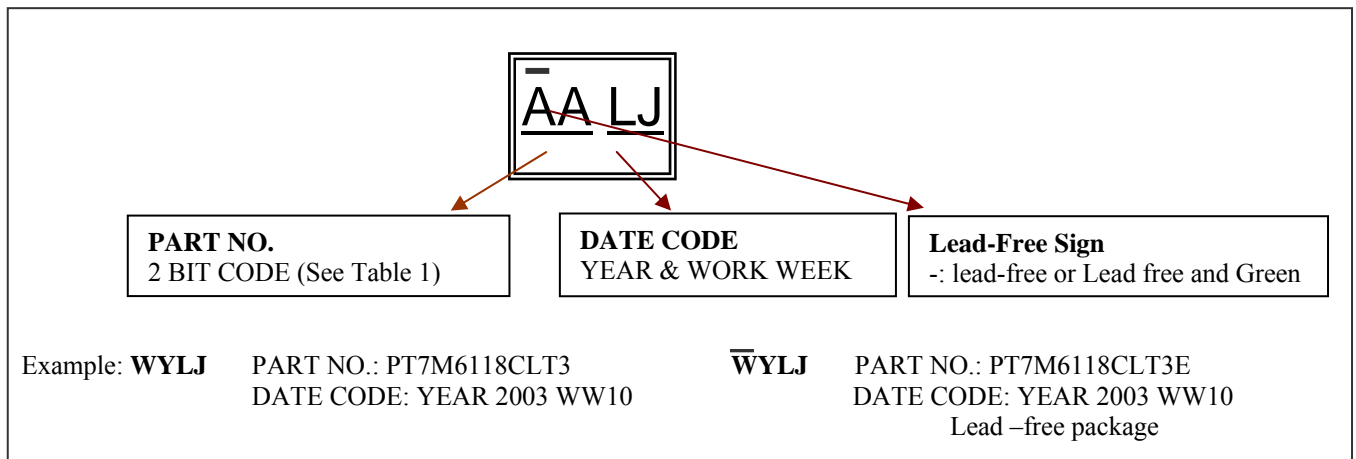
Note:

- 1) Controlling dimensions in millimeters.
- 2) Dimensions are inclusive of plating

TD (SOT89)



### SOT23/SC70/SOT143 Package Top Marking Instruction



**Table 1 Part No code comparison table**

| No. | Part No.   | Code | No. | Part No.   | Code | No. | Part No.   | Code |
|-----|------------|------|-----|------------|------|-----|------------|------|
| 1   | PT7M6118CL | WY   | 34  | PT7M6129CL | YF   | 67  | PT7M6140CL | ZM   |
| 2   | PT7M6118CH | WZ   | 35  | PT7M6129CH | YG   | 68  | PT7M6140CH | ZN   |
| 3   | PT7M6118NL | XA   | 36  | PT7M6129NL | YH   | 69  | PT7M6140NL | ZO   |
| 4   | PT7M6119CL | XB   | 37  | PT7M6130CL | YI   | 70  | PT7M6141CL | ZP   |
| 5   | PT7M6119CH | XC   | 38  | PT7M6130CH | YJ   | 71  | PT7M6141CH | ZQ   |
| 6   | PT7M6119NL | XD   | 39  | PT7M6130NL | YK   | 72  | PT7M6141NL | ZR   |
| 7   | PT7M6120CL | XE   | 40  | PT7M6131CL | YL   | 73  | PT7M6142CL | ZS   |
| 8   | PT7M6120CH | XF   | 41  | PT7M6131CH | YM   | 74  | PT7M6142CH | ZT   |
| 9   | PT7M6120NL | XG   | 42  | PT7M6131NL | YN   | 75  | PT7M6142NL | ZU   |
| 10  | PT7M6121CL | XH   | 43  | PT7M6132CL | YO   | 76  | PT7M6143CL | ZV   |
| 11  | PT7M6121CH | XI   | 44  | PT7M6132CH | YP   | 77  | PT7M6143CH | ZW   |
| 12  | PT7M6121NL | XJ   | 45  | PT7M6132NL | YQ   | 78  | PT7M6143NL | ZX   |
| 13  | PT7M6122CL | XK   | 46  | PT7M6133CL | YR   | 79  | PT7M6144CL | ZY   |
| 14  | PT7M6122CH | XL   | 47  | PT7M6133CH | YS   | 80  | PT7M6144CH | ZZ   |
| 15  | PT7M6122NL | XM   | 48  | PT7M6133NL | YT   | 81  | PT7M6144NL | aa   |
| 16  | PT7M6123CL | XN   | 49  | PT7M6134CL | YU   | 82  | PT7M6145CL | ab   |
| 17  | PT7M6123CH | XO   | 50  | PT7M6134CH | YV   | 83  | PT7M6145CH | ac   |
| 18  | PT7M6123NL | XP   | 51  | PT7M6134NL | YW   | 84  | PT7M6145NL | ad   |
| 19  | PT7M6124CL | XQ   | 52  | PT7M6135CL | YX   | 85  | PT7M6146CL | ae   |
| 20  | PT7M6124CH | XR   | 53  | PT7M6135CH | YY   | 86  | PT7M6146CH | af   |
| 21  | PT7M6124NL | XS   | 54  | PT7M6135NL | YZ   | 87  | PT7M6146NL | ag   |
| 22  | PT7M6125CL | XT   | 55  | PT7M6136CL | ZA   | 88  | PT7M6147CL | ah   |
| 23  | PT7M6125CH | XU   | 56  | PT7M6136CH | ZB   | 89  | PT7M6147CH | ai   |
| 24  | PT7M6125NL | XV   | 57  | PT7M6136NL | ZC   | 90  | PT7M6147NL | aj   |
| 25  | PT7M6126CL | XW   | 58  | PT7M6137CL | ZD   | 91  | PT7M6148CL | ak   |
| 26  | PT7M6126CH | XX   | 59  | PT7M6137CH | ZE   | 92  | PT7M6148CH | al   |
| 27  | PT7M6126NL | XY   | 60  | PT7M6137NL | ZF   | 93  | PT7M6148NL | am   |
| 28  | PT7M6127CL | XZ   | 61  | PT7M6138CL | ZG   | 94  | PT7M6149CL | an   |
| 29  | PT7M6127CH | YA   | 62  | PT7M6138CH | ZH   | 95  | PT7M6149CH | ao   |
| 30  | PT7M6127NL | YB   | 63  | PT7M6138NL | ZI   | 96  | PT7M6149NL | ap   |
| 31  | PT7M6128CL | YC   | 64  | PT7M6139CL | ZJ   | 97  | PT7M6150CL | aq   |
| 32  | PT7M6128CH | YD   | 65  | PT7M6139CH | ZK   | 98  | PT7M6150CH | ar   |
| 33  | PT7M6128NL | YE   | 66  | PT7M6139NL | ZL   | 99  | PT7M6150NL | as   |

To be continued.

**Continued.**

| No. | Part No.    | Code | No. | Part No.    | Code | No. | Part No.    | Code |
|-----|-------------|------|-----|-------------|------|-----|-------------|------|
| 100 | PT7M6118CLB | wj   | 133 | PT7M6118NLB | xq   | 166 | PT7M6118CHB | bL   |
| 101 | PT7M6119CLB | wk   | 134 | PT7M6119NLB | xr   | 167 | PT7M6119CHB | bM   |
| 102 | PT7M6120CLB | wl   | 135 | PT7M6120NLB | xs   | 168 | PT7M6120CHB | bN   |
| 103 | PT7M6121CLB | wm   | 136 | PT7M6121NLB | xt   | 169 | PT7M6121CHB | bO   |
| 104 | PT7M6122CLB | wn   | 137 | PT7M6122NLB | xu   | 170 | PT7M6122CHB | bP   |
| 105 | PT7M6123CLB | wo   | 138 | PT7M6123NLB | xv   | 171 | PT7M6123CHB | bQ   |
| 106 | PT7M6124CLB | wp   | 139 | PT7M6124NLB | xw   | 172 | PT7M6124CHB | bR   |
| 107 | PT7M6125CLB | wq   | 140 | PT7M6125NLB | xx   | 173 | PT7M6125CHB | bS   |
| 108 | PT7M6126CLB | wr   | 141 | PT7M6126NLB | xy   | 174 | PT7M6126CHB | bT   |
| 109 | PT7M6127CLB | ws   | 142 | PT7M6127NLB | xz   | 175 | PT7M6127CHB | bU   |
| 110 | PT7M6128CLB | wt   | 143 | PT7M6128NLB | ya   | 176 | PT7M6128CHB | bV   |
| 111 | PT7M6129CLB | wu   | 144 | PT7M6129NLB | yb   | 177 | PT7M6129CHB | bW   |
| 112 | PT7M6130CLB | wv   | 145 | PT7M6130NLB | yc   | 178 | PT7M6130CHB | bX   |
| 113 | PT7M6131CLB | ww   | 146 | PT7M6131NLB | yd   | 179 | PT7M6131CHB | bY   |
| 114 | PT7M6132CLB | wx   | 147 | PT7M6132NLB | ye   | 180 | PT7M6132CHB | bZ   |
| 115 | PT7M6133CLB | wy   | 148 | PT7M6133NLB | yf   | 181 | PT7M6133CHB | cA   |
| 116 | PT7M6134CLB | wz   | 149 | PT7M6134NLB | yg   | 182 | PT7M6134CHB | cB   |
| 117 | PT7M6135CLB | xa   | 150 | PT7M6135NLB | yh   | 183 | PT7M6135CHB | cC   |
| 118 | PT7M6136CLB | xb   | 151 | PT7M6136NLB | yi   | 184 | PT7M6136CHB | cD   |
| 119 | PT7M6137CLB | xc   | 152 | PT7M6137NLB | yj   | 185 | PT7M6137CHB | cE   |
| 120 | PT7M6138CLB | xd   | 153 | PT7M6138NLB | yk   | 186 | PT7M6138CHB | cF   |
| 121 | PT7M6139CLB | xe   | 154 | PT7M6139NLB | yl   | 187 | PT7M6139CHB | cG   |
| 122 | PT7M6140CLB | xf   | 155 | PT7M6140NLB | ym   | 188 | PT7M6140CHB | cH   |
| 123 | PT7M6141CLB | xg   | 156 | PT7M6141NLB | yn   | 189 | PT7M6141CHB | cI   |
| 124 | PT7M6142CLB | xh   | 157 | PT7M6142NLB | yo   | 190 | PT7M6142CHB | cJ   |
| 125 | PT7M6143CLB | xi   | 158 | PT7M6143NLB | yp   | 191 | PT7M6143CHB | cK   |
| 126 | PT7M6144CLB | xj   | 159 | PT7M6144NLB | yq   | 192 | PT7M6144CHB | cL   |
| 127 | PT7M6145CLB | xk   | 160 | PT7M6145NLB | yr   | 193 | PT7M6145CHB | cM   |
| 128 | PT7M6146CLB | xl   | 161 | PT7M6146NLB | ys   | 194 | PT7M6146CHB | cN   |
| 129 | PT7M6147CLB | xm   | 162 | PT7M6147NLB | yt   | 195 | PT7M6147CHB | cO   |
| 130 | PT7M6148CLB | xn   | 163 | PT7M6148NLB | yu   | 196 | PT7M6148CHB | cQ   |
| 131 | PT7M6149CLB | xo   | 164 | PT7M6149NLB | yv   | 197 | PT7M6149CHB | cR   |
| 132 | PT7M6150CLB | xp   | 165 | PT7M6150NLB | yw   | 198 | PT7M6150CHB | cS   |



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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