

**Low Power Voltage Detector**
**Features**

- High accuracy:  $\pm 2\%$  (25 °C)
- Low power consumption: 0.6 $\mu$ A @ 3V Vcc
- Detecting voltage range: 1.8 to 5V in 100mV increments
- Operating voltage range: 1.2V ~ 5.5V
- Operating temperature range: -40 °C to + 85 °C
- Detecting voltage accuracy over temperature:  $\pm 2.5\%$   $\times$  TYP
- Output configuration: N-channel open drain or CMOS
- Reset timeout period at least 120ms

**Description**

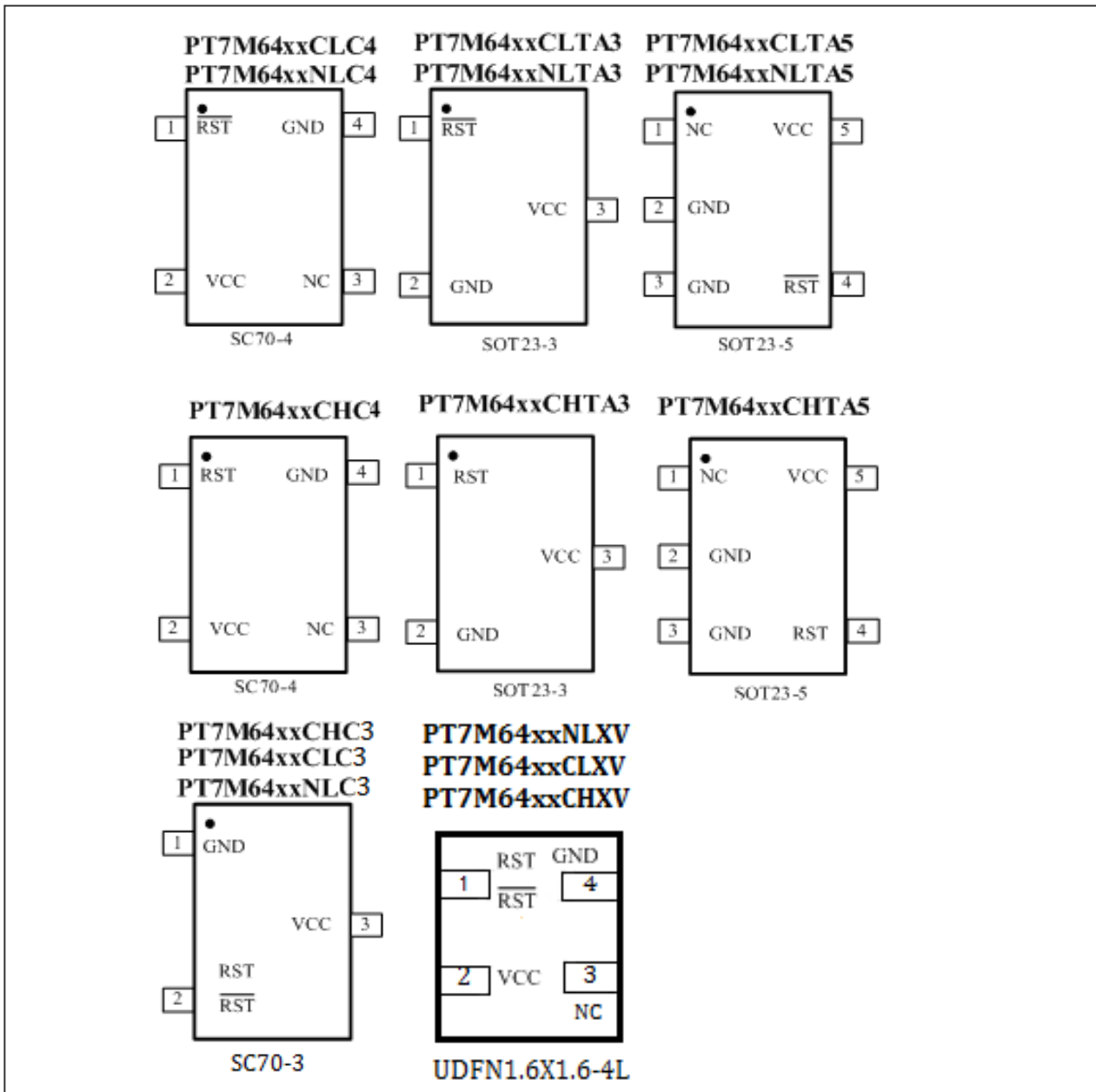
The PT7M64xx series are  $\mu$ P supervisory circuits with a minimum reset timeout period of 120ms. Each circuit includes a precise bandgap reference; a comparator, a reset timeout circuit, internally trimmed resistor networks that set specified trip thresholds, and an internal 5% threshold hysteresis circuit (see the *Block Diagram*). 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>  $\times$  1.05) after a reset timeout period. These devices provide excellent circuit reliability and low cost by eliminating external components and adjustments when monitoring normal systems voltage from +1.8V to +5V in 100mV increments. The series are voltage detectors with a propagation delay of 35  $\mu$ s.

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

**Table 1. Function comparison**

Item	Part No.	Reset Output				Reset bi-direction	Threshold
		Open-Drain		Push-Pull			
		Active high	Active low	Active high	Active low		
1	PT7M64xxCL	-	-	-	√	-	1.8V to 5.0V in 100mV increments
2	PT7M64xxCH	-	-	√	-	-	
3	PT7M64xxNL	-	√	-	-	-	

## Pin Configuration

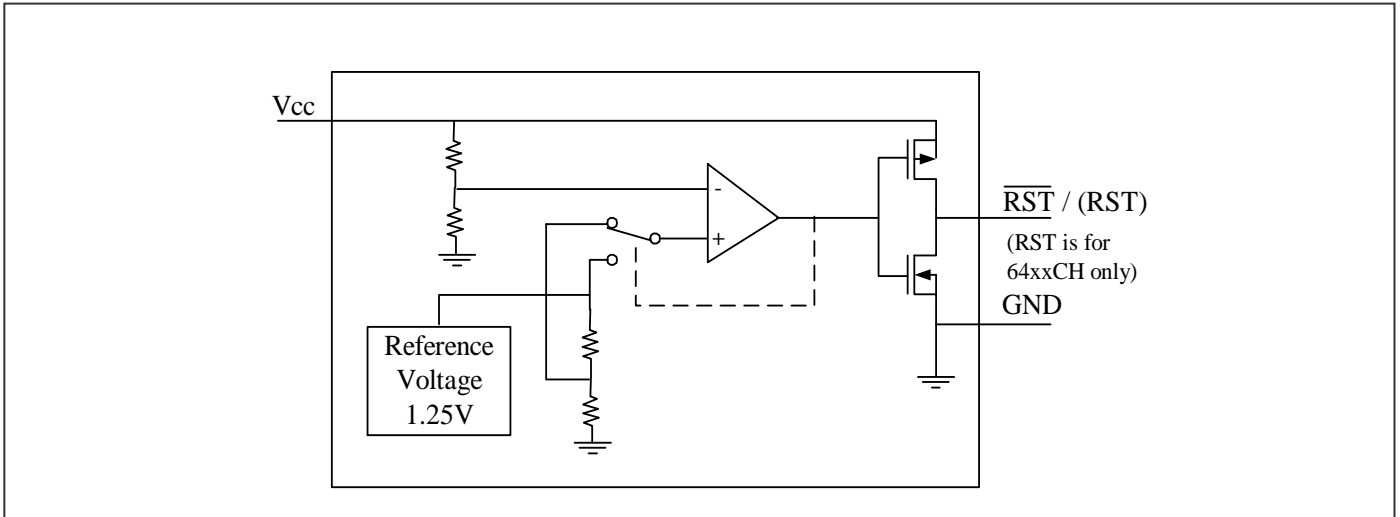


## Pin Description

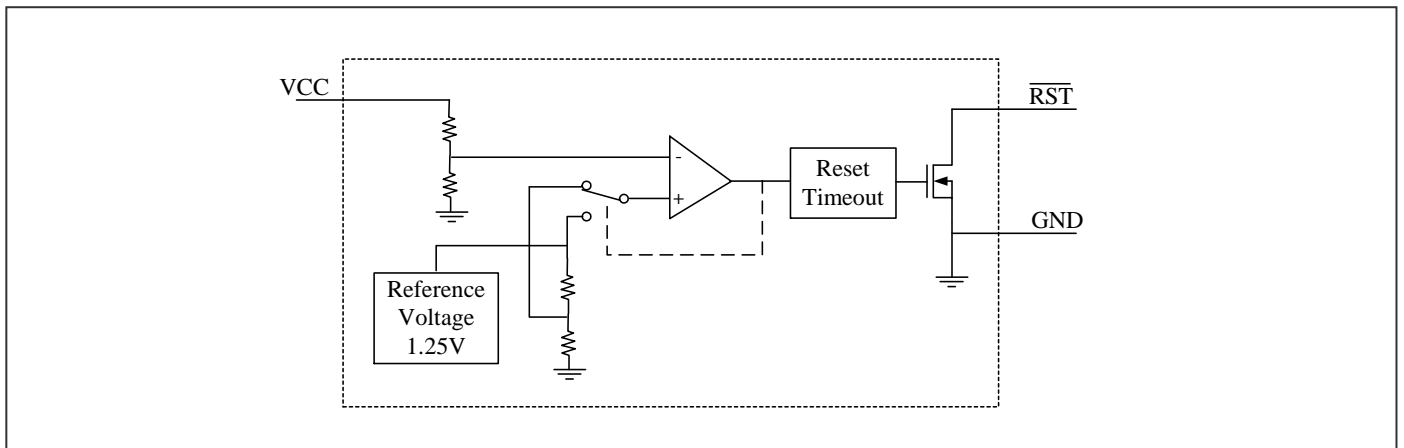
Name	Type	Description
$\overline{\text{RST}}$	O	<b>Reset Output (PT7M64xxCL/NL/BL/NLL):</b> $\overline{\text{RST}}$ is asserted when $V_{CC}$ drops below voltage threshold $V_{TH}$ : Active low. For PT7M64xxBL, RST is also pushbutton reset input
RST	O	<b>Reset Output (PT7M64xxCH):</b> RST is asserted when $V_{CC}$ drops below voltage threshold $V_{TH}$ : Active high.
GND	P	<b>Ground</b>
$V_{CC}$	P	<b>Supply Voltage</b>

### Block Diagram

Block Diagram of PT7M64xxCL/CH



Block Diagram of PT7M64xxNL



## 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 <sub>CC</sub> to GND) .....	-0.3V to +6.0V
DC Input Voltage (All inputs except V <sub>CC</sub> and GND).....	-0.3V to V <sub>CC</sub> +0.3V
DC Output Current (All outputs) .....	20mA
ESD(HBM) for 64xxNL/NLL.....	1KV
ESD(HBM) for 64xxCL/CH/BL.....	2KV
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

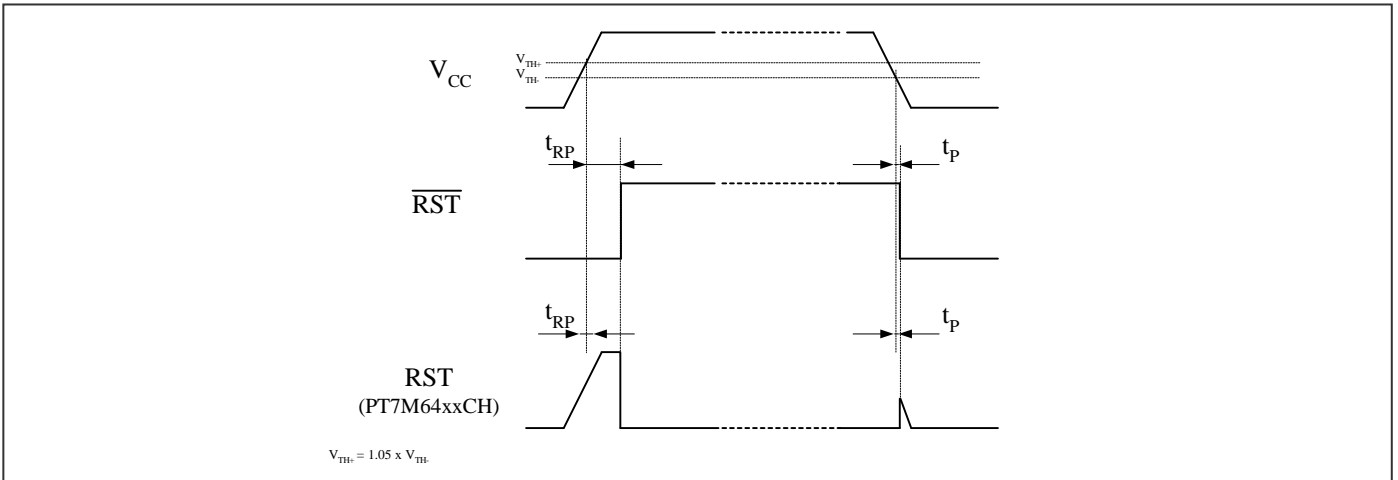
(V<sub>CC</sub> = 1.2V to 5.5V, T<sub>A</sub> = -40~85 °C, unless otherwise noted. Typical values are at T<sub>A</sub> = +25 °C)

Description		Sym	Test Conditions	Min	Typ	Max	Unit
Supply Voltage		V <sub>CC</sub>	T <sub>A</sub> = 0~70 °C	1.0	-	5.5	V
			T <sub>A</sub> = -40~85 °C	1.2	-	5.5	
Supply Current		I <sub>CC</sub>	V <sub>CC</sub> = 3V. No load.	-	0.6	1.2	μA
			V <sub>CC</sub> = 5V. No load.	-	0.9	2.0	μA
Output Driving	Output high (Push-Pull only)	V <sub>OH</sub>	V <sub>CC</sub> ≥ 1.8V, I <sub>source</sub> = 1mA	0.8 × V <sub>CC</sub>	-	-	V
			V <sub>CC</sub> ≥ 2.5V, I <sub>source</sub> = 3mA	0.8 × V <sub>CC</sub>	-	-	
			V <sub>CC</sub> ≥ 4.5V, I <sub>source</sub> = 8mA	0.8 × V <sub>CC</sub>	-	-	
	Output low	V <sub>OL</sub>	V <sub>CC</sub> ≥ 1.2V, I <sub>sink</sub> = 1mA	-	-	0.3	V
			V <sub>CC</sub> ≥ 2.5V, I <sub>sink</sub> = 4mA	-	-	0.3	
			V <sub>CC</sub> ≥ 4.5V, I <sub>sink</sub> = 9mA	-	-	0.4	
Open-Drain Output Leakage Current		I <sub>LKG</sub>	-	-	-	1	μA
Voltage Threshold*		V <sub>TH-</sub>	+25°C	(V <sub>TH-</sub> ) × 0.985	V <sub>TH-</sub>	(V <sub>TH-</sub> ) × 1.015	V
			-40°C~85°C	(V <sub>TH-</sub> ) × 0.975	V <sub>TH-</sub>	(V <sub>TH-</sub> ) × 1.025	
		V <sub>TH+</sub>	+25°C	(V <sub>TH+</sub> ) × 0.985	V <sub>TH+</sub>	(V <sub>TH+</sub> ) × 1.015	
			-40°C~85°C	(V <sub>TH+</sub> ) × 0.975	V <sub>TH+</sub>	(V <sub>TH+</sub> ) × 1.025	
Voltage threshold Hysteresis		V <sub>HYST</sub>	V <sub>HYST</sub> = [(V <sub>TH+</sub> ) - (V <sub>TH-</sub> )] / (V <sub>TH-</sub> ) × 100%	3	4.5	6	%
Pushbutton Detect		P <sub>BDV</sub>	-40°C~85°C, V <sub>CC</sub> = 5V	0.7	-	1.2	V
Internal Pull-Up Resistor		R <sub>P</sub>	-	3.75	5	6.25	kΩ

\* V<sub>TH+</sub> = 1.05 × V<sub>TH-</sub>. V<sub>TH-</sub> is V<sub>CC</sub> dropping from high to low voltage. V<sub>TH+</sub> is V<sub>CC</sub> rising from low to high voltage.

## AC Electrical Characteristics

### Timing Diagram

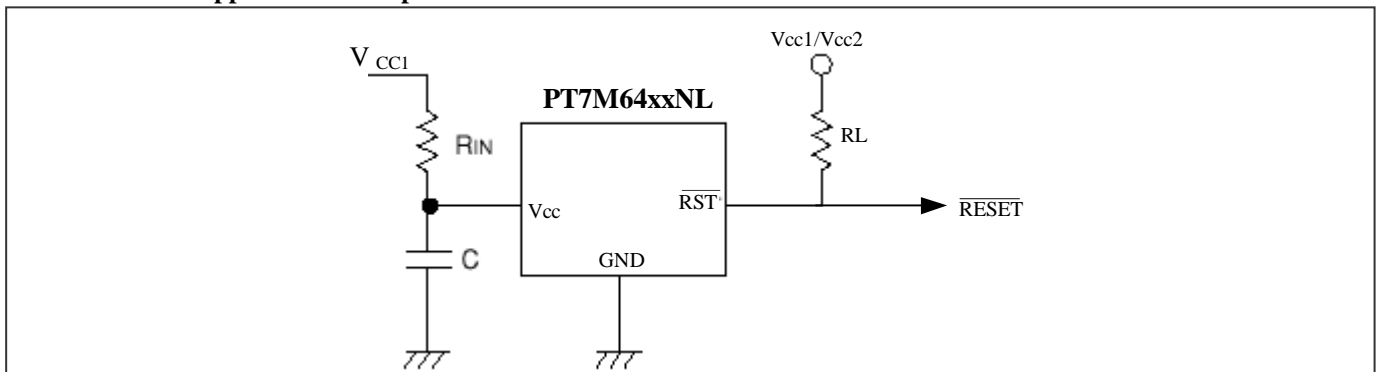


( $V_{CC} = 1.2V$  to  $5.5V$ ,  $T_A = -40 \sim 85 \text{ }^\circ\text{C}$ , unless otherwise noted. Typical values are at  $T_A = +25 \text{ }^\circ\text{C}$ )

Sym	Description	Test Conditions	Min	Typ	Max	Unit
$t_{RP}$	Timeout Period	$T_A = +25 \text{ }^\circ\text{C}$	120	260	430	ms
$t_P$	Delay	-	-	35	-	$\mu\text{s}$

## Typical Operation Circuit

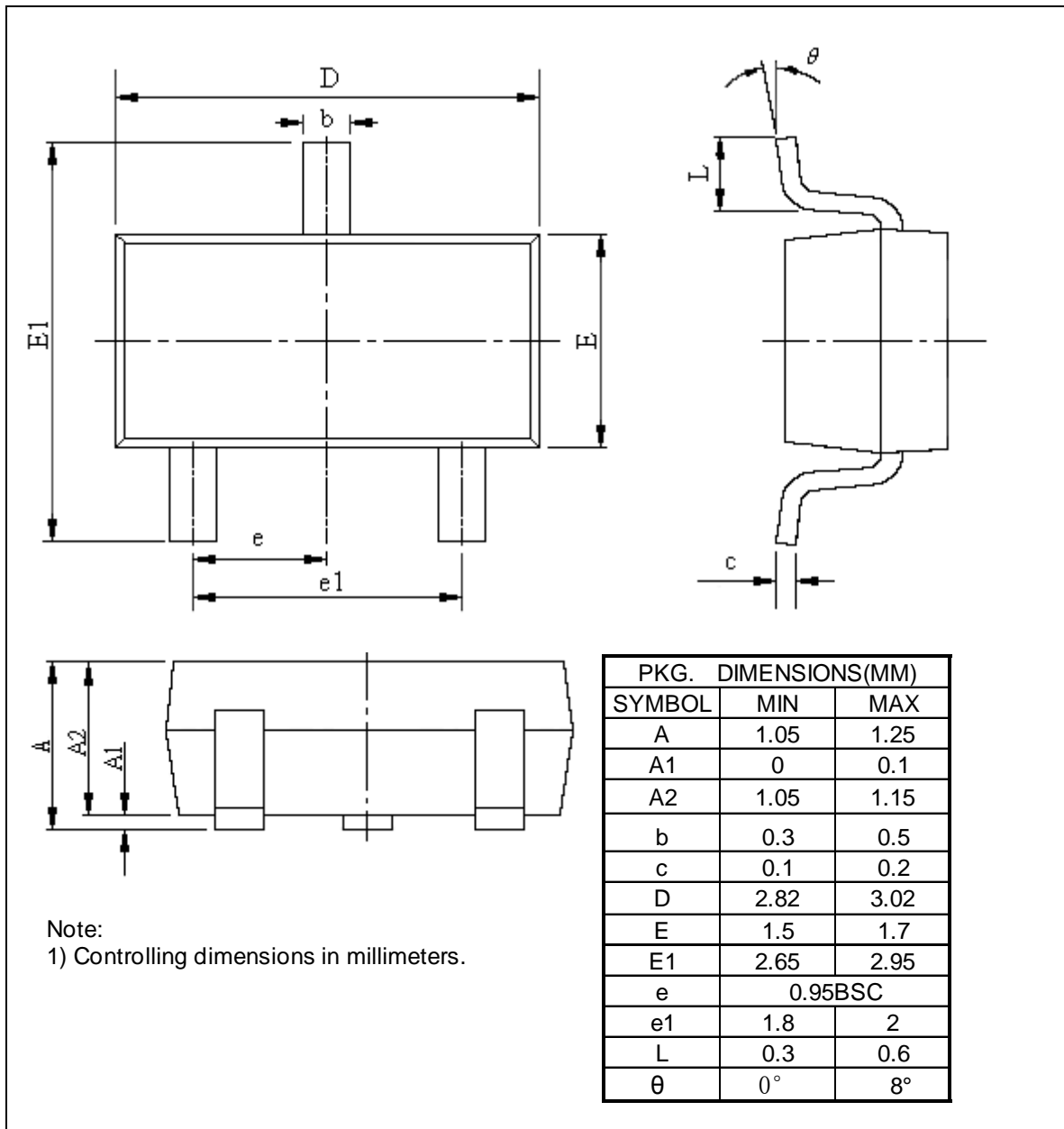
### PT7M64xxNL Application Example



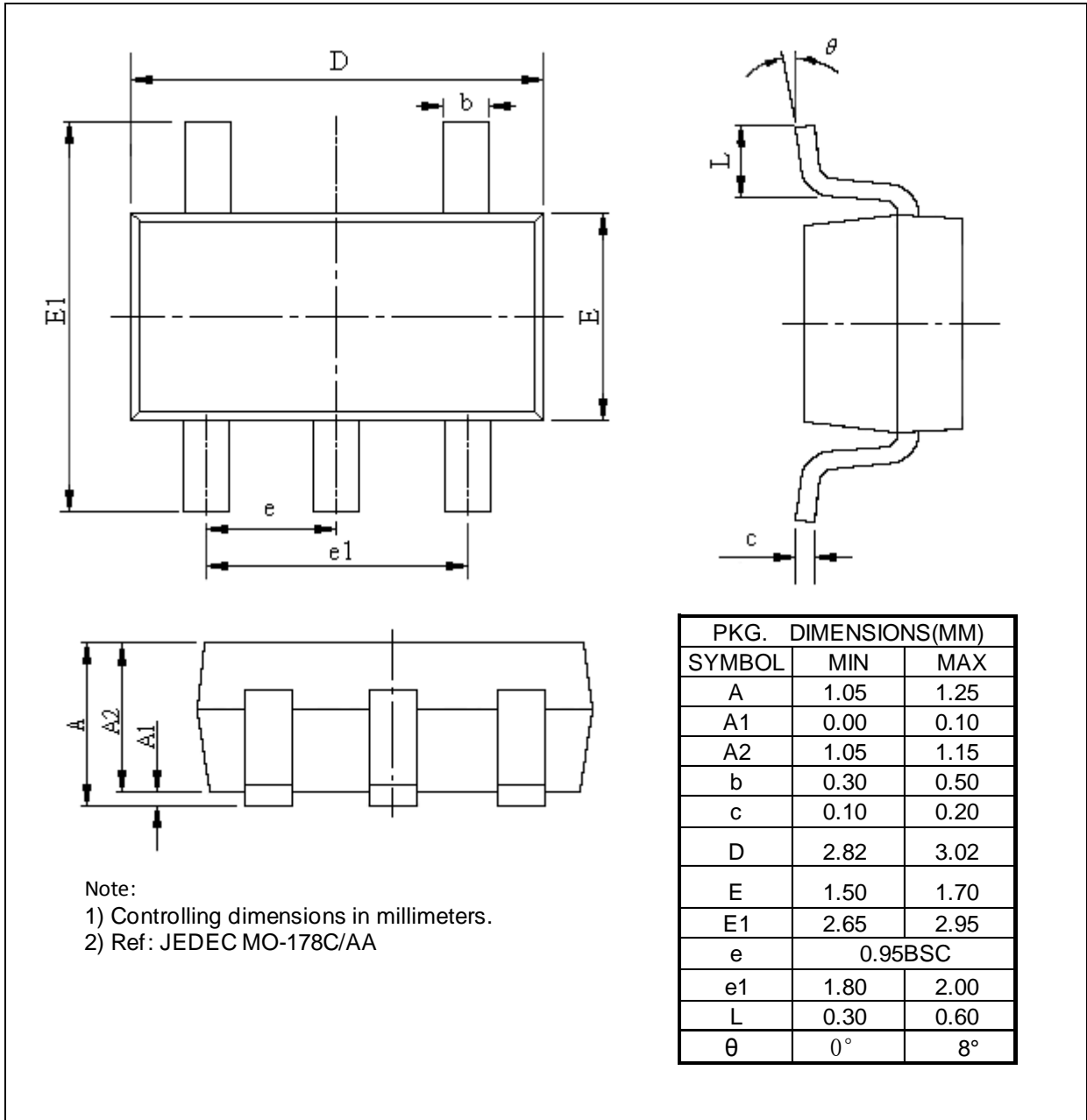
For typical application,  $R_L$  could be  $100\text{k}\Omega$ ,  $R_{IN}$  less than  $10\text{k}\Omega$  and that  $C$  more than  $0.1\mu\text{F}$ .

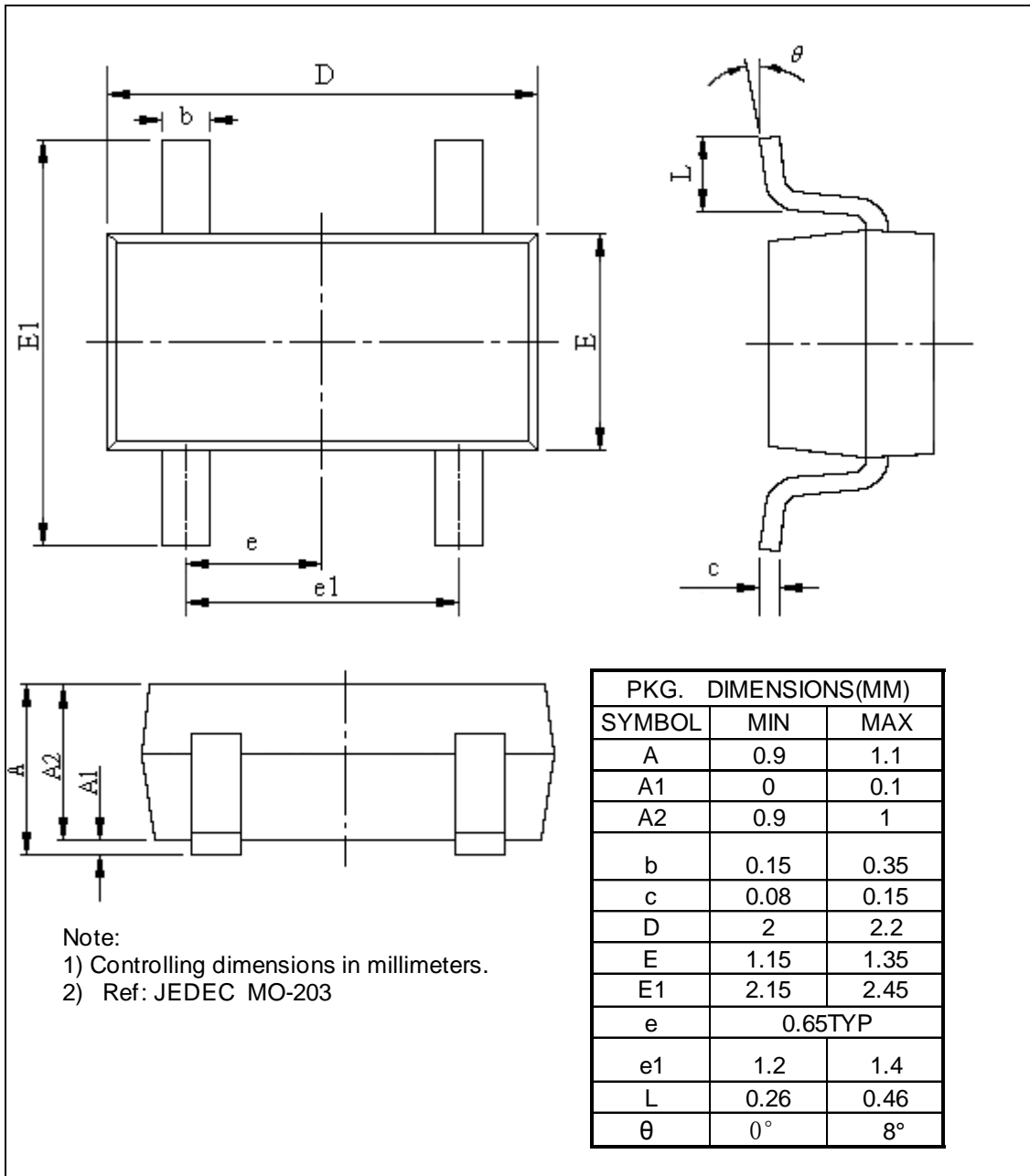
**Mechanical Information**

TA3 (SOT23-3)

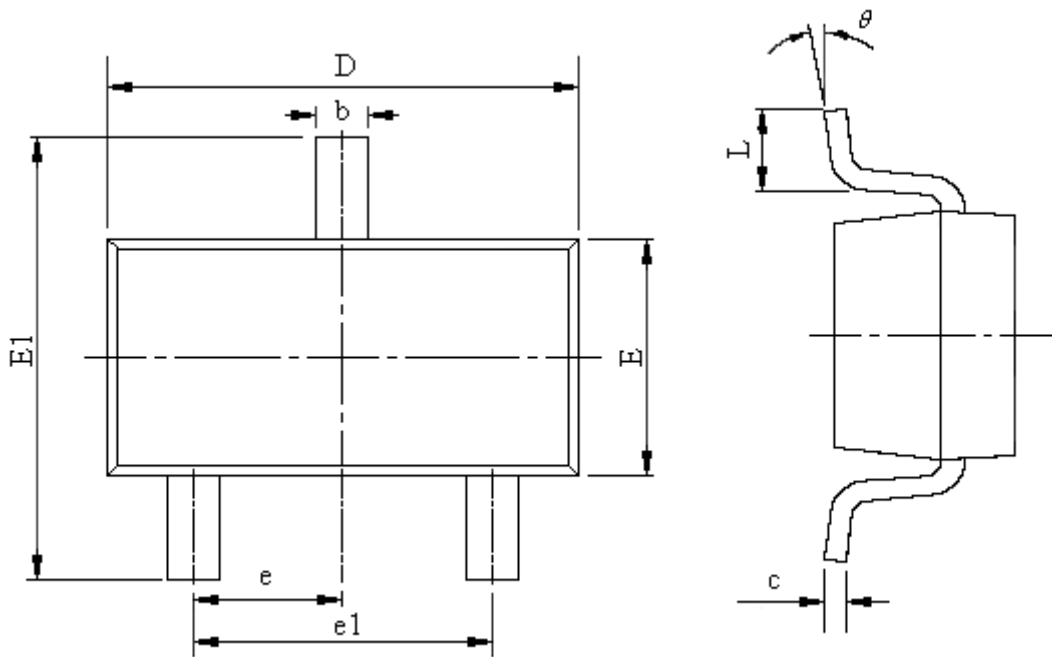


TA5 (SOT23-5)



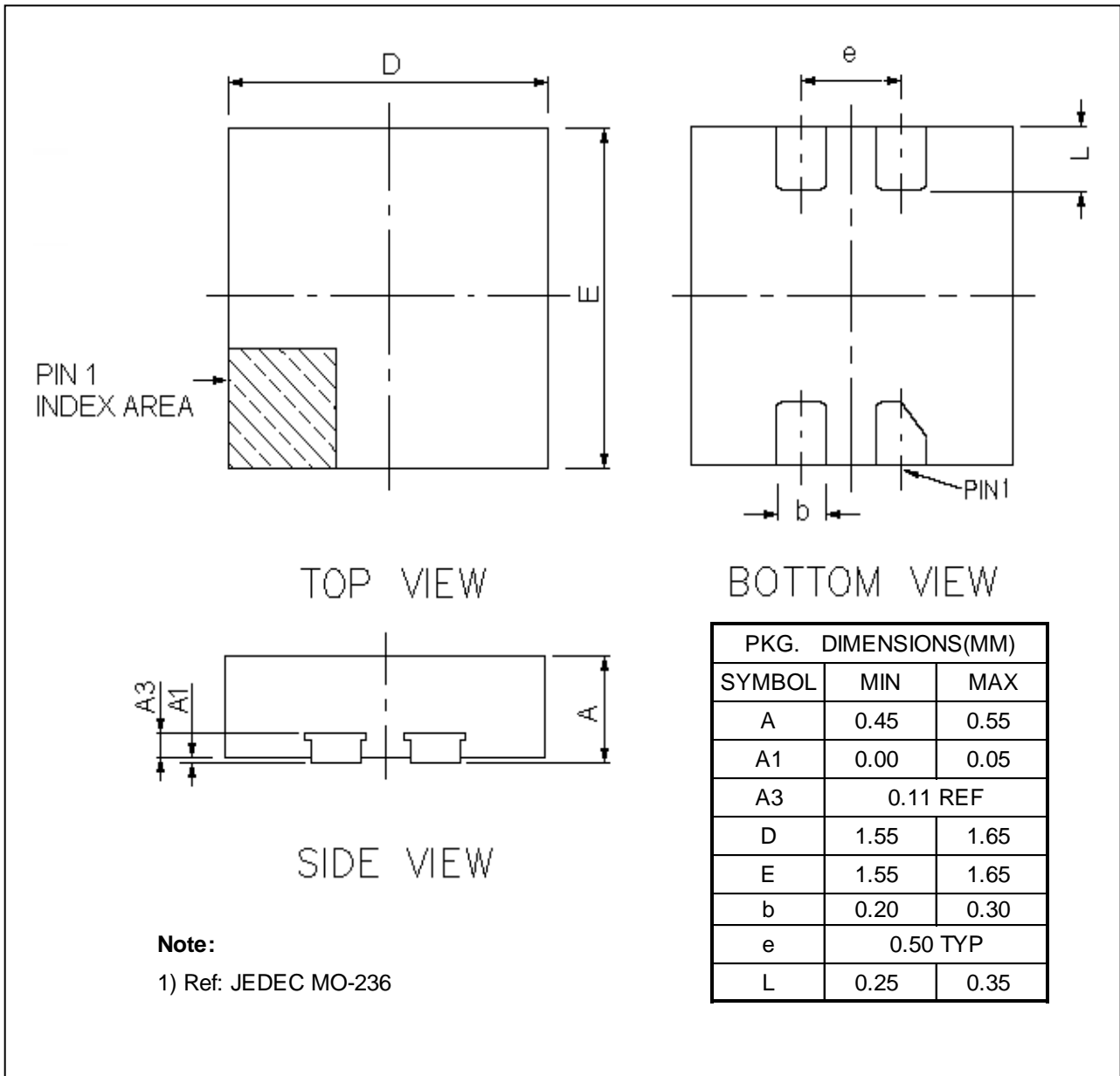
**C4 (SC70-4)**




**C3 (SC70-3)**

**Note:**

1) Controlling dimensions in millimeters.

PKG. DIMENSIONS(MM)		
SYMBOL	MIN	MAX
A	0.90	1.10
A1	0.00	0.10
A2	0.90	1.00
b	0.20	0.40
c	0.08	0.15
D	2.00	2.20
E	1.15	1.35
E1	2.15	2.45
e	0.65TYP	
e1	1.20	1.40
L	0.26	0.46
$\theta$	0°	8°

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


### Ordering Information

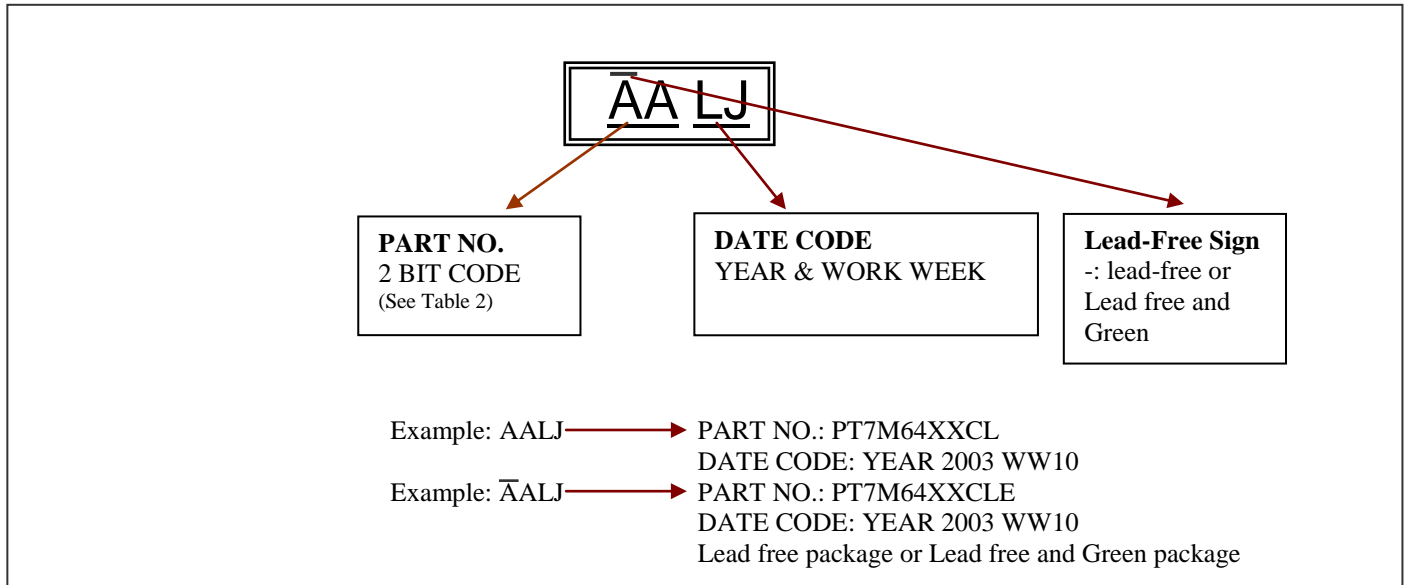
Part Number	Package Code	Package
PT7M64xxCLTA3E	TA3	Lead free and Green SOT23-3
PT7M64xxCLTA5E	TA5	Lead free and Green SOT23-5
PT7M64xxCLC3E	C3	Lead free and Green SC70-3
PT7M64xxCLC4E	C4	Lead free and Green SC70-4
PT7M64xxCHTA3E	TA3	Lead free and Green SOT23-3
PT7M64xxCHTA5E	TA5	Lead free and Green SOT23-5
PT7M64xxCHC3E	C3	Lead free and Green SC70-3
PT7M64xxCHC4E	C4	Lead free and Green SC70-4
PT7M64xxNLTA3E	TA3	Lead free and Green SOT23-3
PT7M64xxNLTA5E	TA5	Lead free and Green SOT23-5
PT7M64xxNLC3E	C3	Lead free and Green SC70-3
PT7M64xxNLC4E	C4	Lead free and Green SC70-4
PT7M64xxNLXV4E	XV	Lead Free and Green DFN1.6X1.6-4L
PT7M64xxCLXV4E	XV	Lead Free and Green DFN1.6X1.6-4L
PT7M64xxCHXV4E	XV	Lead Free and Green DFN1.6X1.6-4L

**Note:**

- “xx” refer to voltage range, see below table 1.
- E = Pb-free or Pb-free and Green
- Adding X Suffix= Tape/Reel
- Contact Pericom for availability.

**Table.2 Suffix “xx” definition of PT7M64xx**

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		

**SOT-23/SC-70 Package Top Marking Instruction**

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