Features

- Highly accurate: ±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: ±2.5% × TYP
- Output configuration: N-channel open drain or CMOS

General

The PT7M61xx serials 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_{CC} falls below the internal V_{TH-} and remains asserted until V_{CC} rises above V_{TH+} ($V_{TH+} = V_{TH-} \times 1.05$). 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
PT7M61xxCLTA3	SOT23-3
PT7M61xxCLTA5	SOT23-5
PT7M61xxCLC3	SC70-3
PT7M61xxCLC4	SC70-4
PT7M61xxCLNB	TO92
PT7M61xxCHTA3	SOT23-3
PT7M61xxCHTA5	SOT23-5
PT7M61xxCHC3	SC70-3
PT7M61xxNLTA3	SOT23-3
PT7M61xxNLTA5	SOT23-5
PT7M61xxNLC3	SC70-3
PT7M61xxNLC4	SC70-4
PT7M61xxNLNB	TO92
PT7M61xxCLLNB	TO92
PT7M61xxNLLNB	TO92

Note 1: "xx" refer to voltage range, see below table 1.

Note 2: Lead free package is available by adding "E" after each part no. For example: PT7M61xxCLTA3E is lead free package part no for PT7M61xxCLTA3.

Table 1. Suffix "xx" definition of PT7M61xx

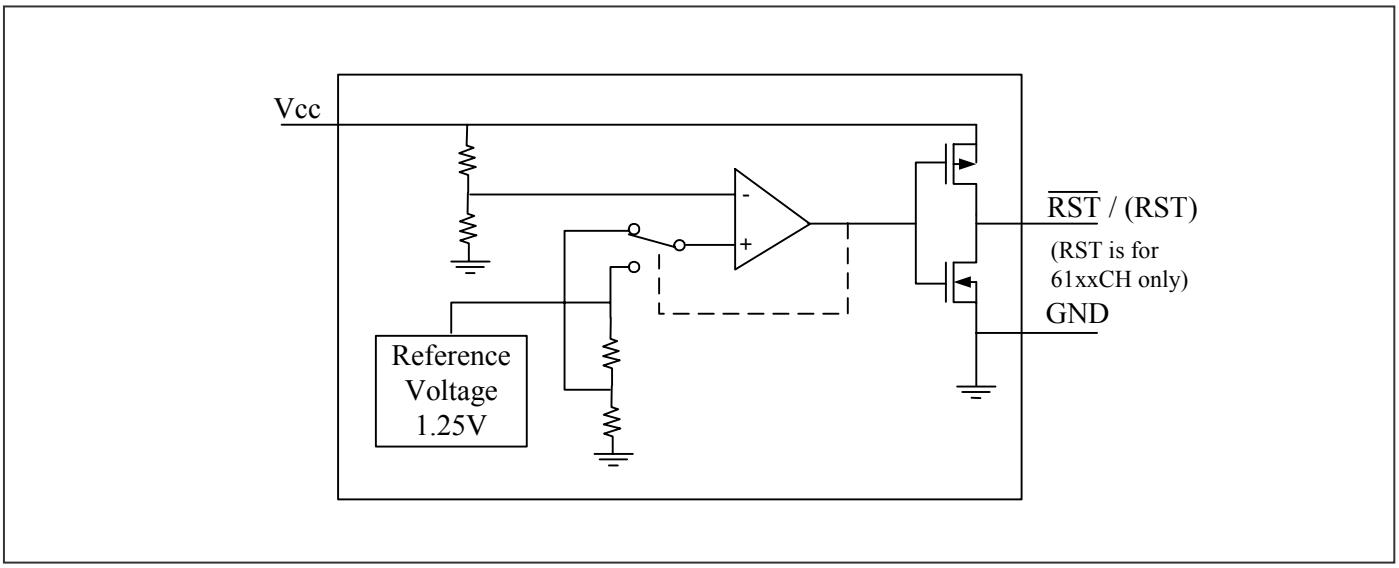
Suffix xx	V_{TH-} (V)	Suffix xx	V_{TH-} (V)	Suffix xx	V_{TH-} (V)	Suffix xx	V_{TH-} (V)	Suffix xx	V_{TH-} (V)
18	1.8	25	2.5	32	3.2	39	3.9	46	4.6
19	1.9	26	2.6	33	3.3	40	4.0	47	4.7
20	2.0	27	2.7	34	3.4	41	4.1	48	4.8
21	2.1	28	2.8	35	3.5	42	4.2	49	4.9
22	2.2	29	2.9	36	3.6	43	4.3	50	5.0
23	2.3	30	3.0	37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

Table 2. Function comparison

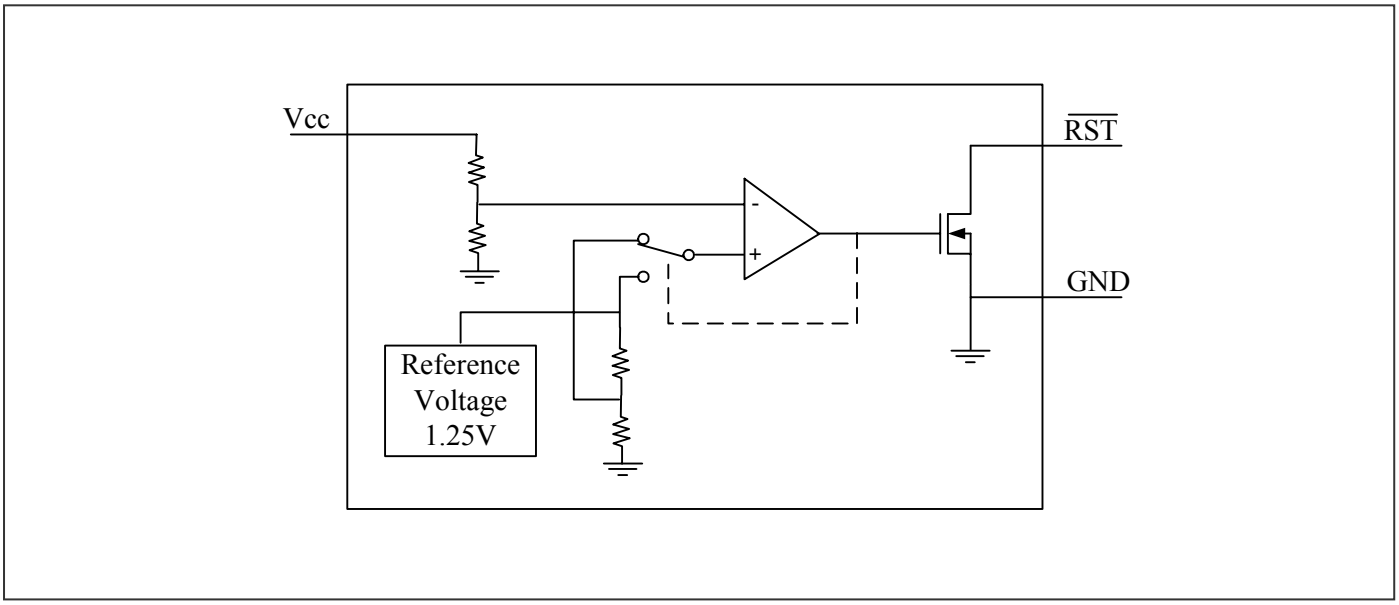
Item	Part No.	Reset Output				Threshold
		Open-Drain		Push-Pull		
		Active high	Active low	Active high	Active low	
1	PT7M61xxCL	-	-	-	√	1.8V to 5.0V in 100mV increments
2	PT7M61xxCH	-	-	√	-	
3	PT7M61xxNL	-	√	-	-	

Block Diagram

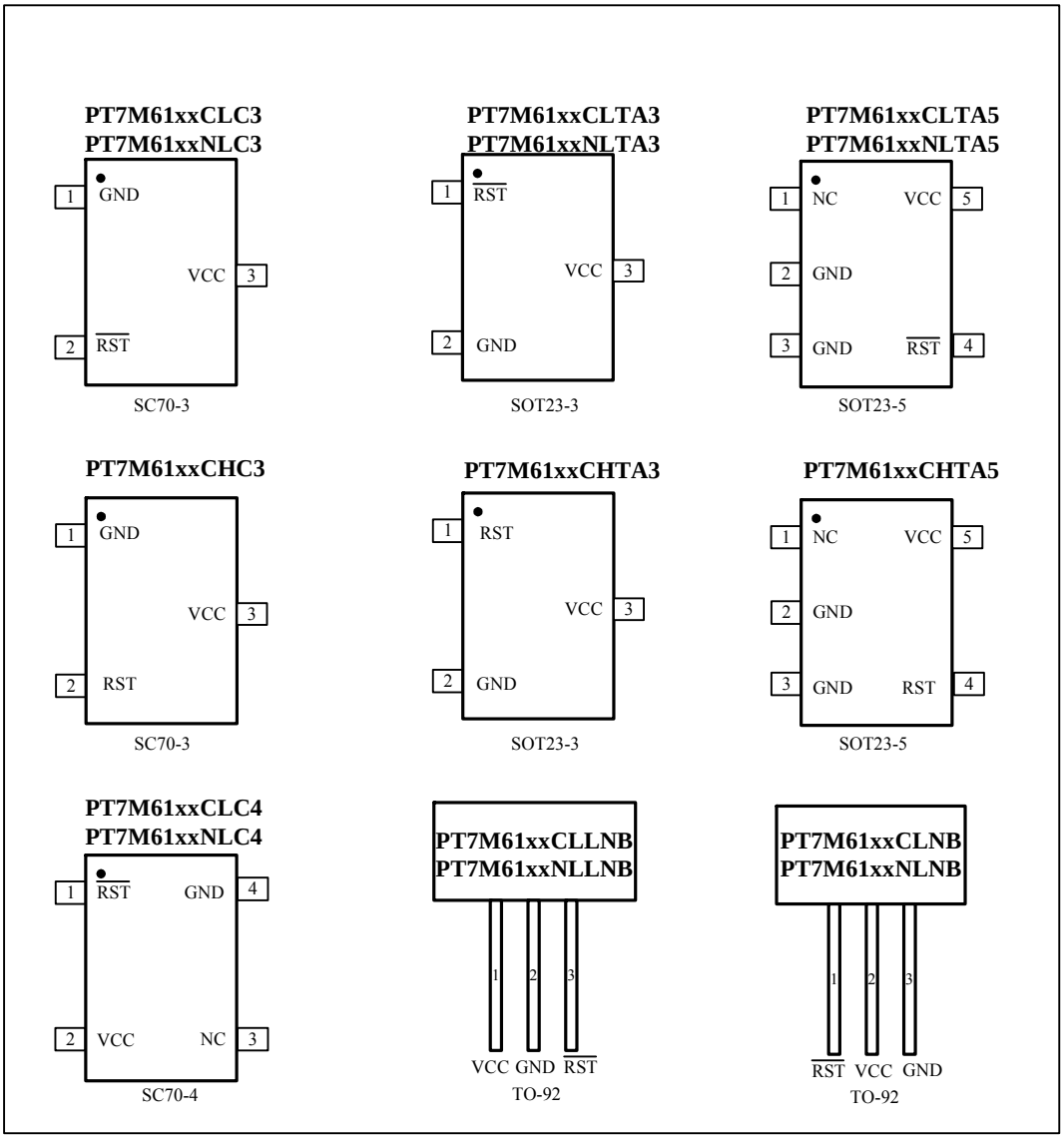
Block Diagram of PT7M61xxCL/CH



Block Diagram of PT7M61xxNL



Pin Configuration

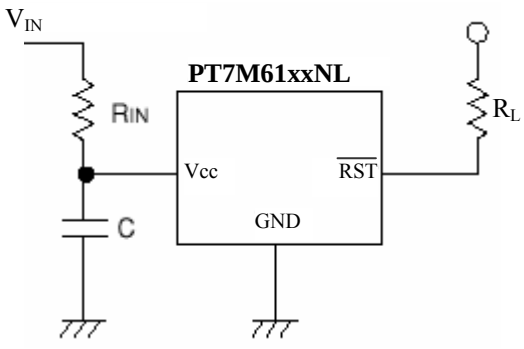


Pin Description

Name	Type	Description
$\overline{RST}$	O	**Reset Output (PT7M61xxCL/NL):** $\overline{RST}$ 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.**

Typical Operation Circuit

PT7M61xxNL Application Example



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

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 AXIMUM 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

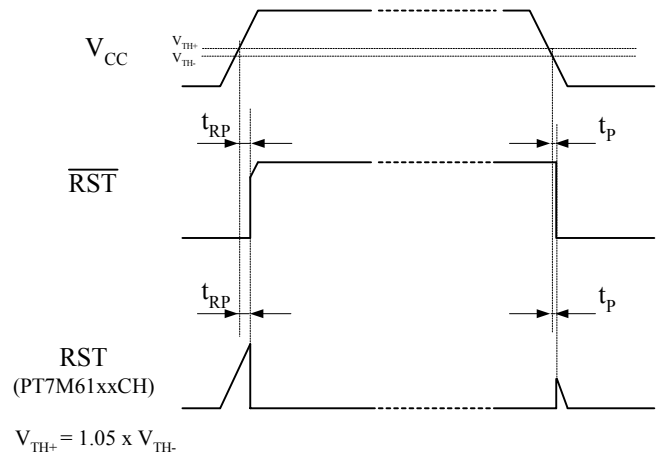
(V_{CC} = 1.2V to 5.5V, T_A= -40~85ºC, unless otherwise noted. Typical values are at T_A = +25ºC)

Description		Sym.	Test Conditions	Min	Typ	Max	Unit
Supply Voltage		V_{CC}	T_A= 0~70ºC	1.0		5.5	V
			T_A= -40~85ºC	1.2		5.5	
Supply Current		I_{CC}	V_{CC} = 3V. No load.		0.9	3.0	µA
			V_{CC} = 5V. No load.		1.3	3.6	µA
Output Driving	Output high	V_{OH}	$V_{CC} \geq$ 1.8V, I_{source} = 1mA	0.8×Vcc			V
			$V_{CC} \geq$ 2.5V, I_{source} = 3mA	0.8×Vcc			
			$V_{CC} \geq$ 4.5V, I_{source} = 8mA	0.8×Vcc			
	Output low	V_{OL}	$V_{CC} \geq$ 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	µA
Voltage Threshold		V_{TH-}	+25°C	(V_{TH-}) ×0.98	V_{TH-}	(V_{TH-}) ×1.02	V
			-40°C~85°C	(V_{TH-}) ×0.975	V_{TH-}	(V_{TH-}) ×1.025	
		V_{TH+}	+25°C	(V_{TH+}) ×0.98	V_{TH+}	(V_{TH+}) ×1.02	
			-40°C~85°C	(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	5	6	%

Note: V_{TH+} = 1.05 × V_{TH-}

AC Electrical Characteristics

Fig 6. Timing diagram

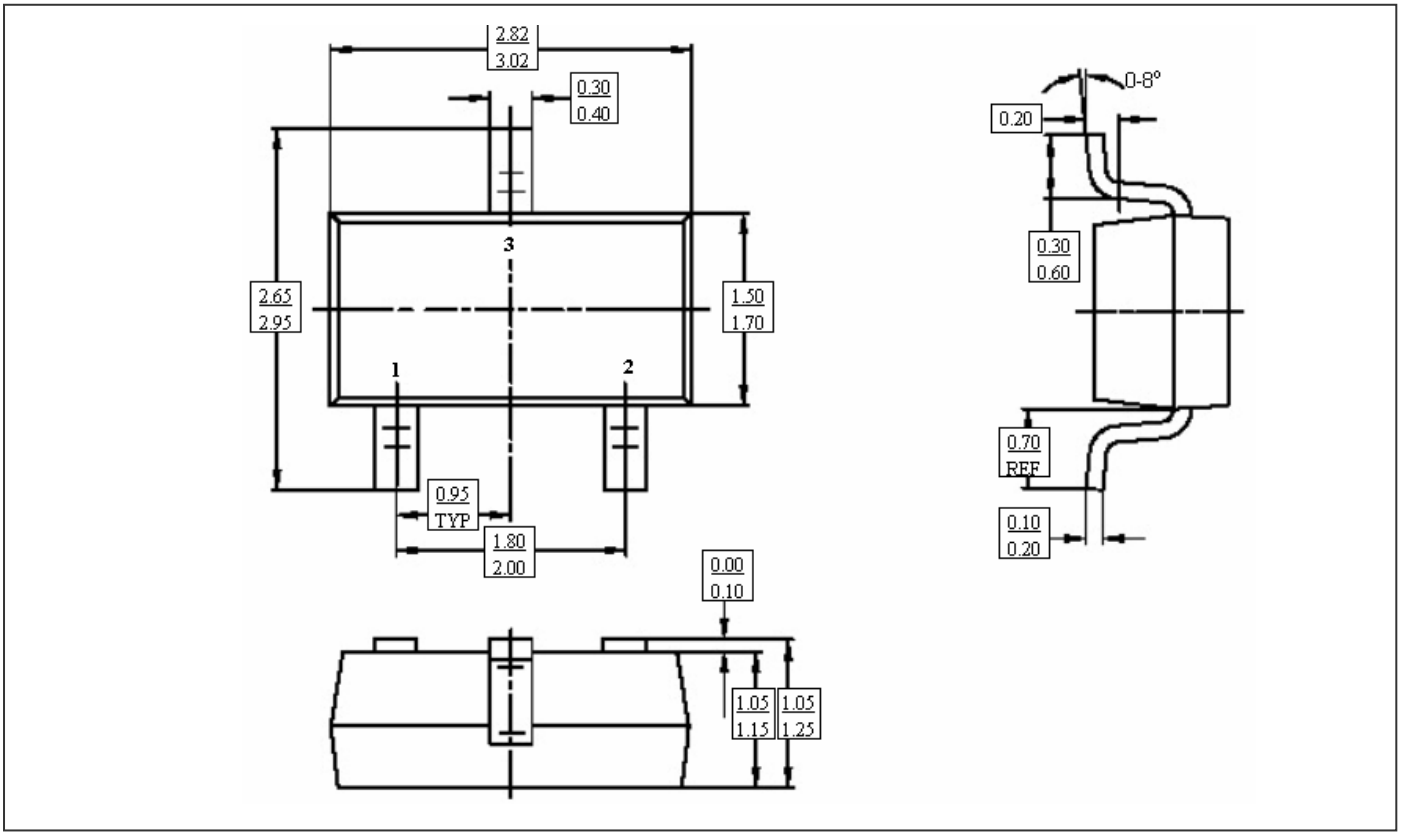


(V_{CC} = 1.2V to 5.5V, T_A= -40~85ºC, unless otherwise noted. Typical values are at T_A = +25ºC)

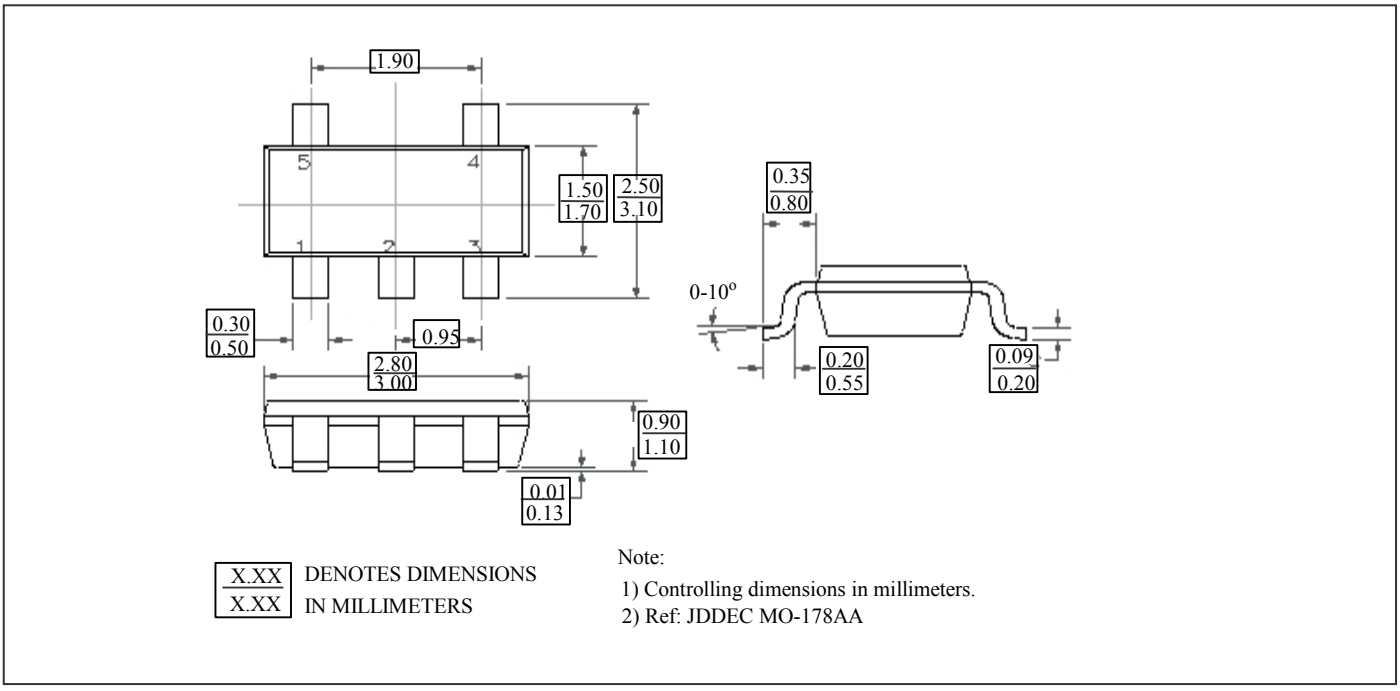
Sym.	Description	Test Conditions	Min	Typ	Max	Unit
t_{RP}	Timeout Period				200	µs
t_P	Delay			17		µs

Mechanical Information

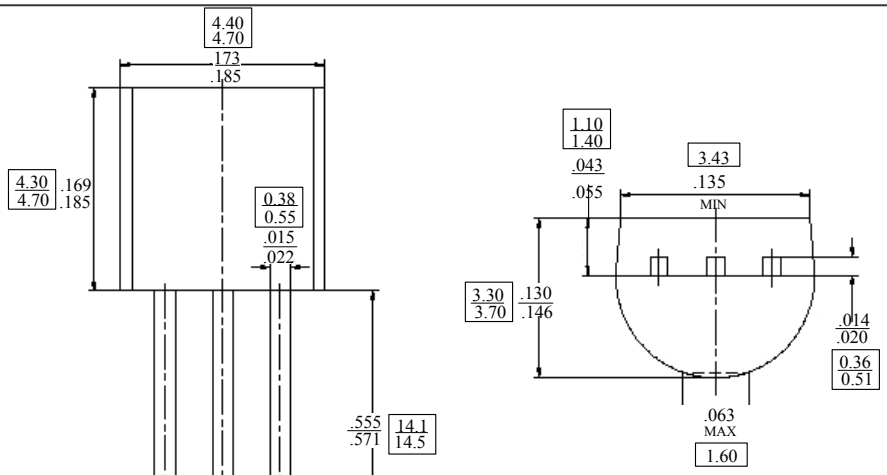
SOT23-3



SOT23-5

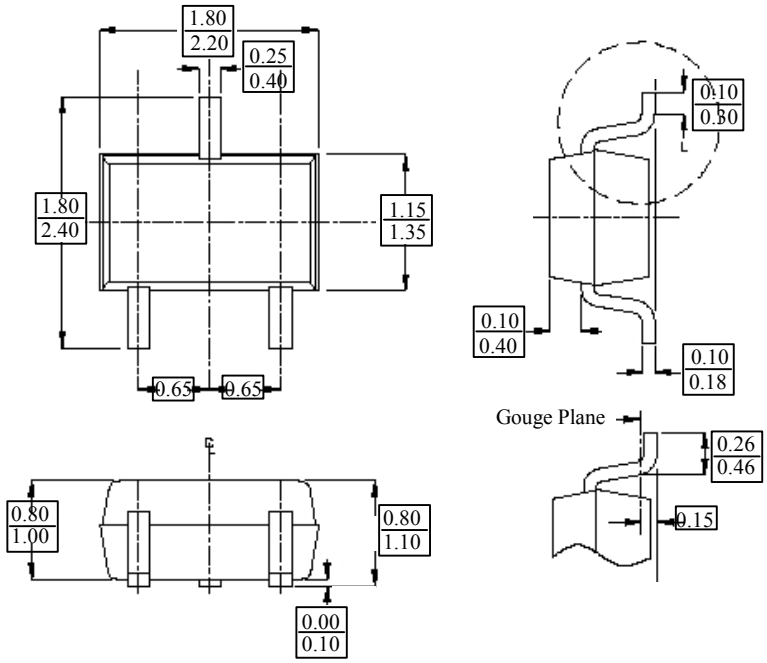


TO92



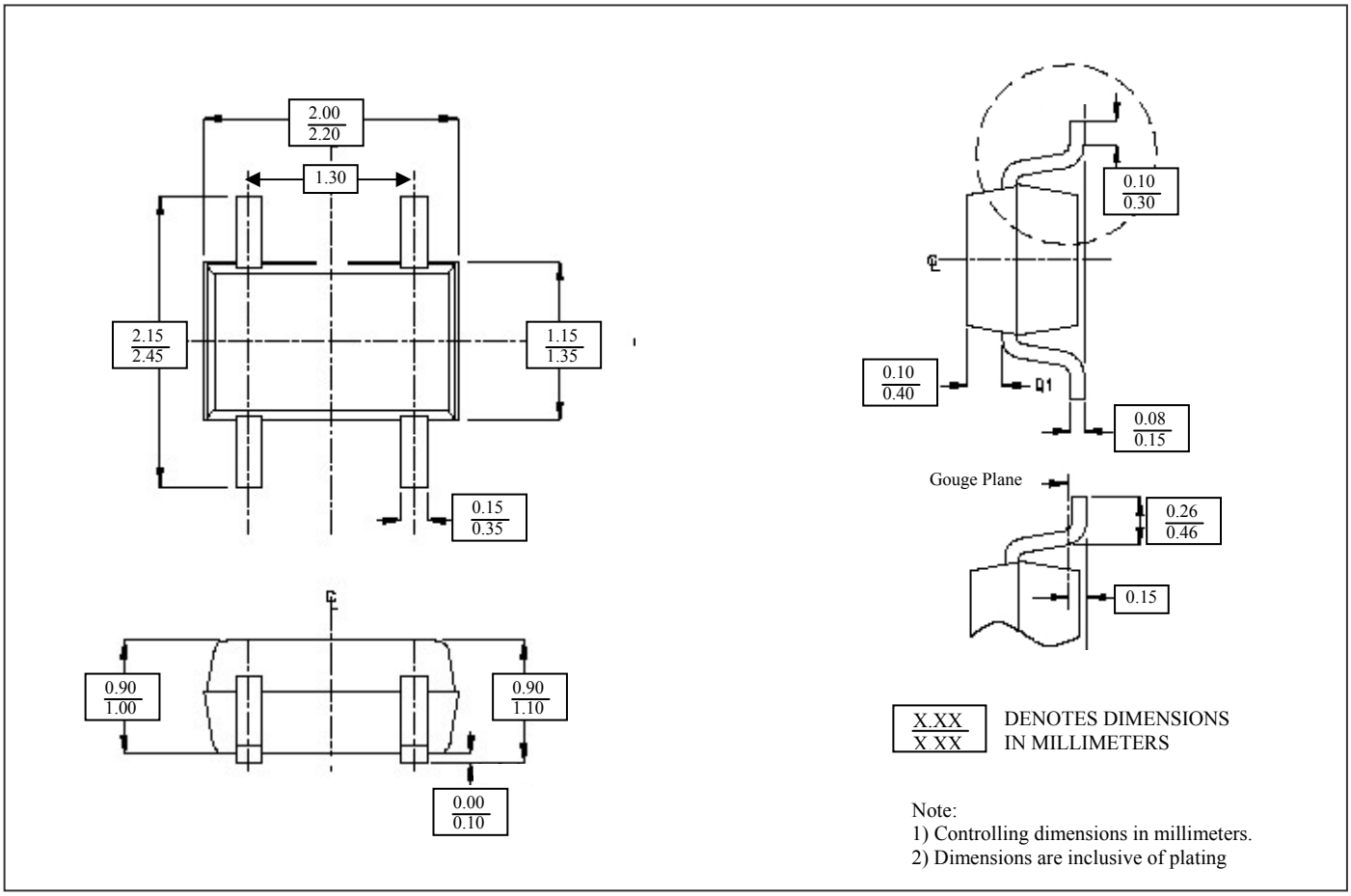
Note:
1) Controlling dimensions in millimeters.

SC70-3



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

SC70-4



SOT-23/SC-70/SOT143 Package Top Marking Instruction

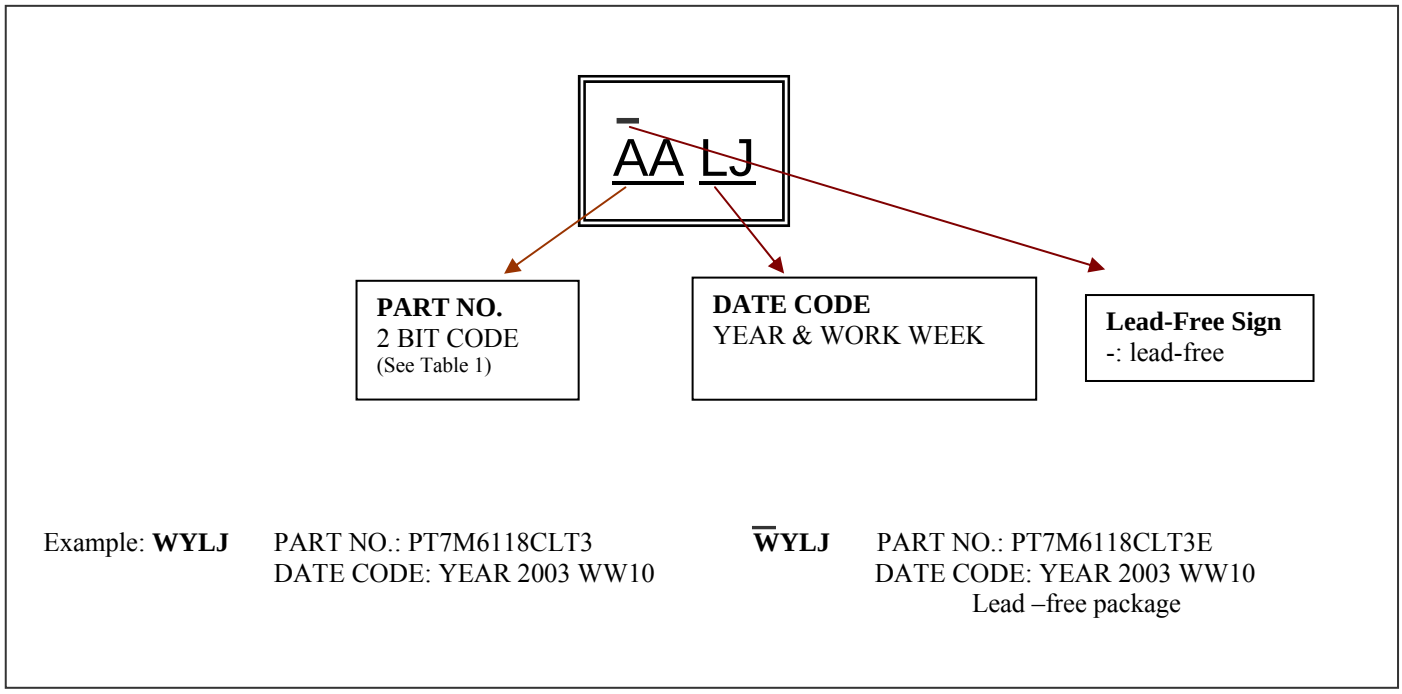


Table 1

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

Notes

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