

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: $\pm 2.5\% \times$ TYP
- Output configuration: N-channel open drain or CMOS

General

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_{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
PT7M61xxCLT3	SOT23-3
PT7M61xxCLT5	SOT23-5
PT7M61xxCLC3	SC70-3
PT7M61xxCLC4	SC70-4
PT7M61xxCLE	TO92
PT7M61xxCHT3	SOT23-3
PT7M61xxCHT5	SOT23-5
PT7M61xxCHC3	SC70-3
PT7M61xxNLT3	SOT23-3
PT7M61xxNLT5	SOT23-5
PT7M61xxNLC3	SC70-3
PT7M61xxNLC4	SC70-4
PT7M61xxNLE	TO92
PT7M61xxCLLEE	TO92(lead-free)
PT7M61xxNLLEE	TO92(lead-free)
PT7M61xxCLT3E	SOT23-3(lead-free)
PT7M61xxCLT5E	SOT23-5(lead-free)
PT7M61xxCHT3E	SOT23-3(lead-free)
PT7M61xxCHT5E	SOT23-5(lead-free)
PT7M61xxNLT3E	SOT23-3(lead-free)
PT7M61xxNLT5E	SOT23-5(lead-free)

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

Table 1. Suffix “xx” definition of PT7M61xx

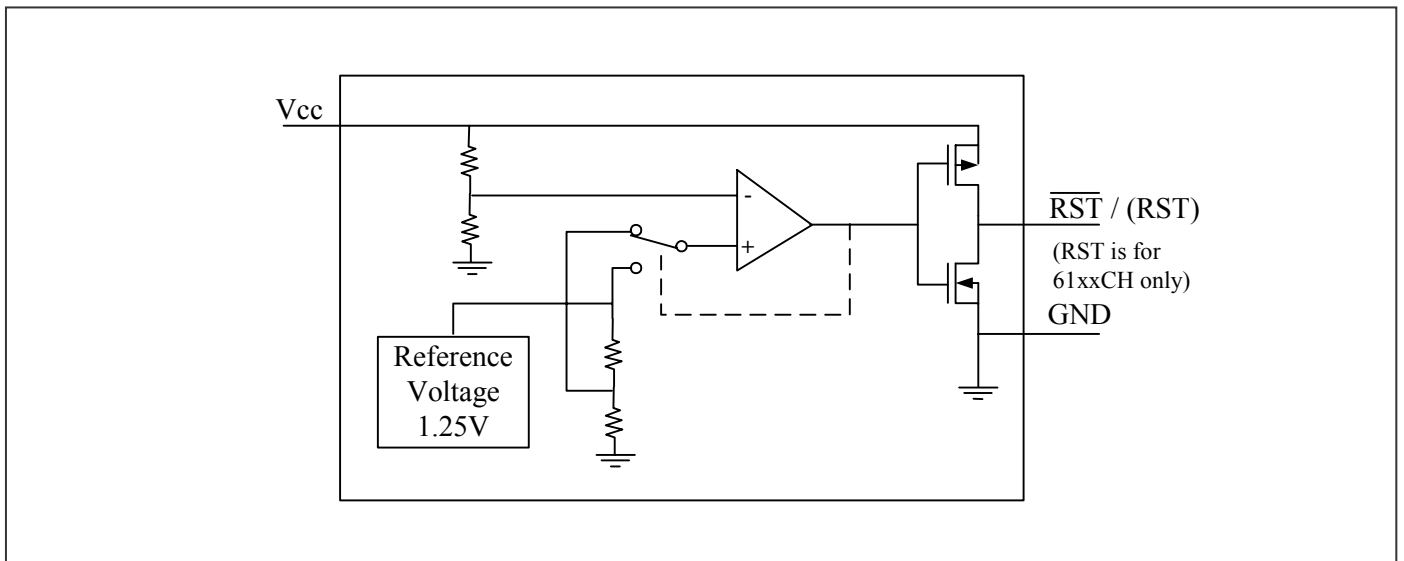
Suffix xx	V_{TH-} (V)	Suffix xx	V_{TH-} (V)	Suffix xx	V_{TH-} (V)	Suffix xx	V_{TH-} (V)	Suffix xx	V_{TH-} (V)
18	1.8	25	2.5	32	3.2	39	3.9	46	4.6
19	1.9	26	2.6	33	3.3	40	4.0	47	4.7
20	2.0	27	2.7	34	3.4	41	4.1	48	4.8
21	2.1	28	2.8	35	3.5	42	4.2	49	4.9
22	2.2	29	2.9	36	3.6	43	4.3	50	5.0
23	2.3	30	3.0	37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

Table 2. Function comparison

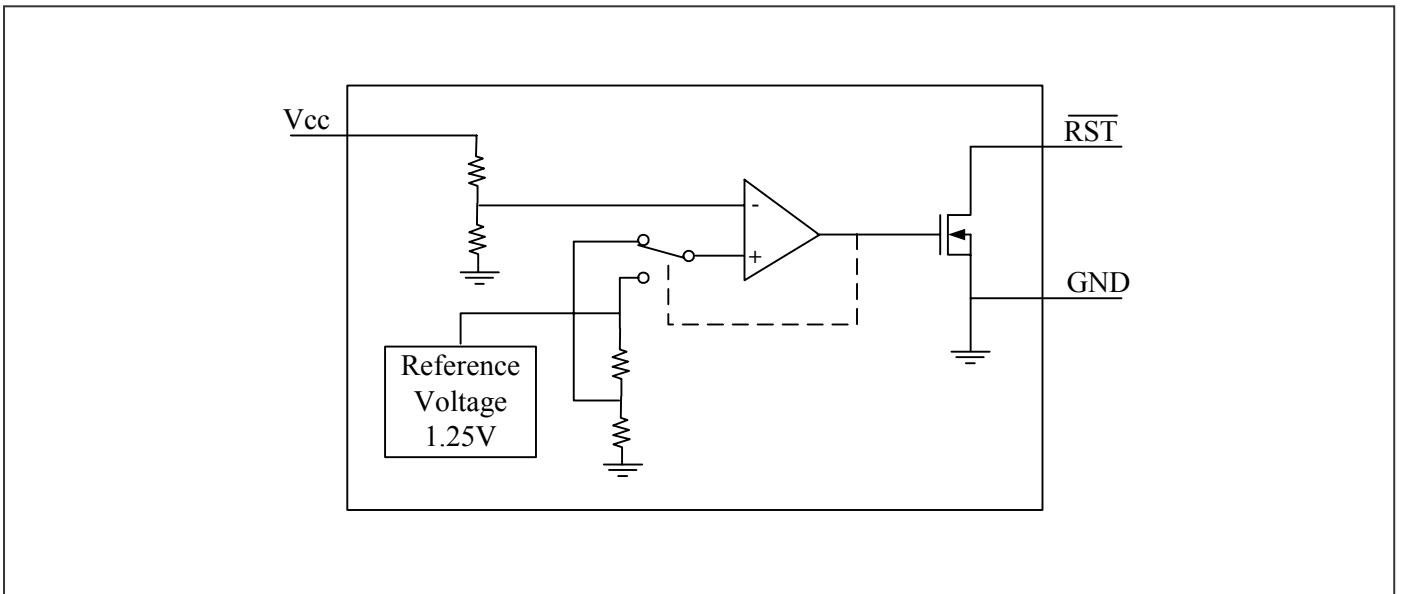
Item	Part No.	Reset Output				Threshold
		Open-Drain		Push-Pull		
		Active high	Active low	Active high	Active low	
1	PT7M61xxCL	-	-	-	√	1.8V to 5.0V in 100mV increments
2	PT7M61xxCH	-	-	√	-	
3	PT7M61xxNL	-	√	-	-	

Block Diagram

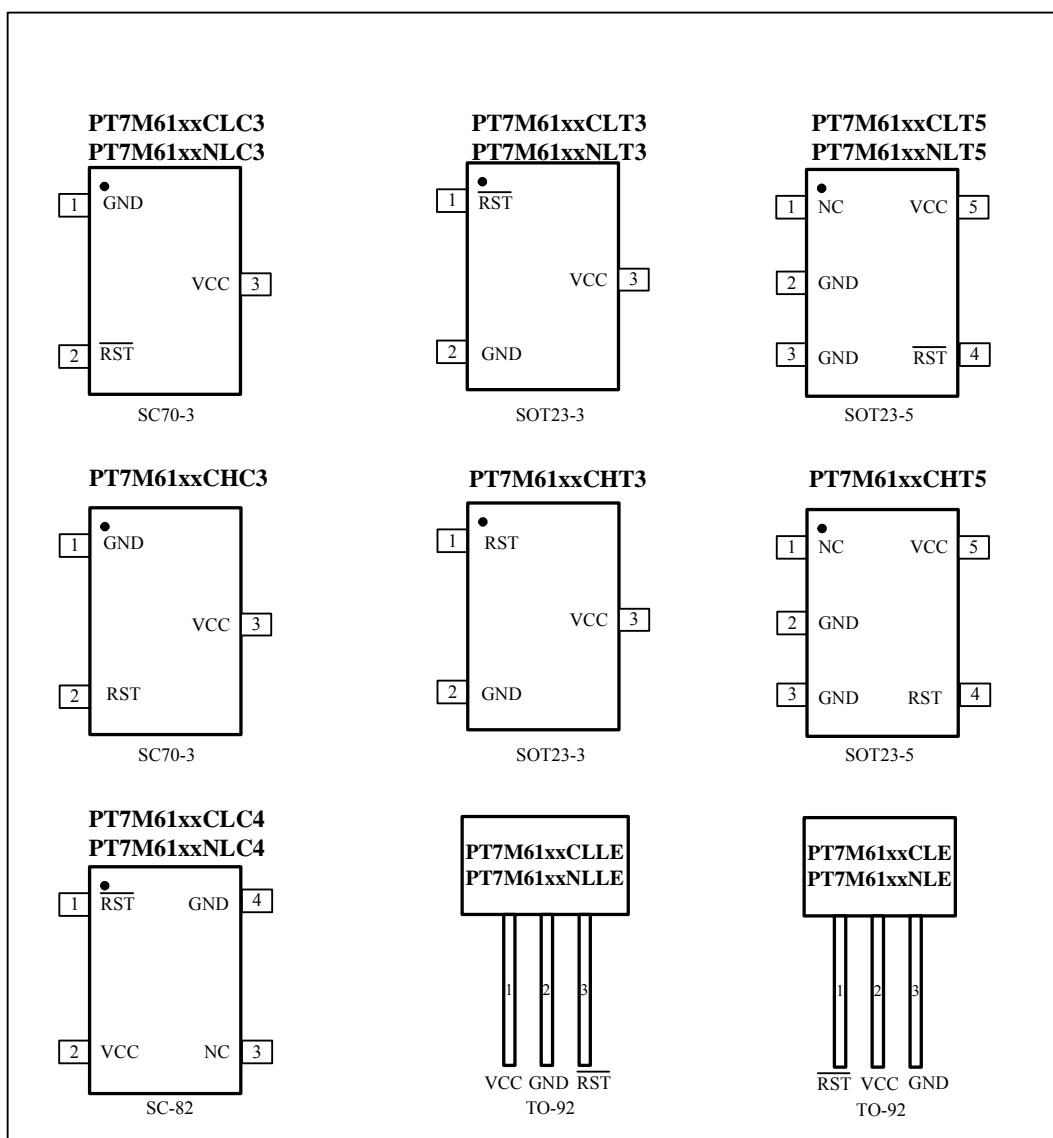
Block Diagram of PT7M61xxCL/CH



Block Diagram of PT7M61xxNL



Pin Configuration

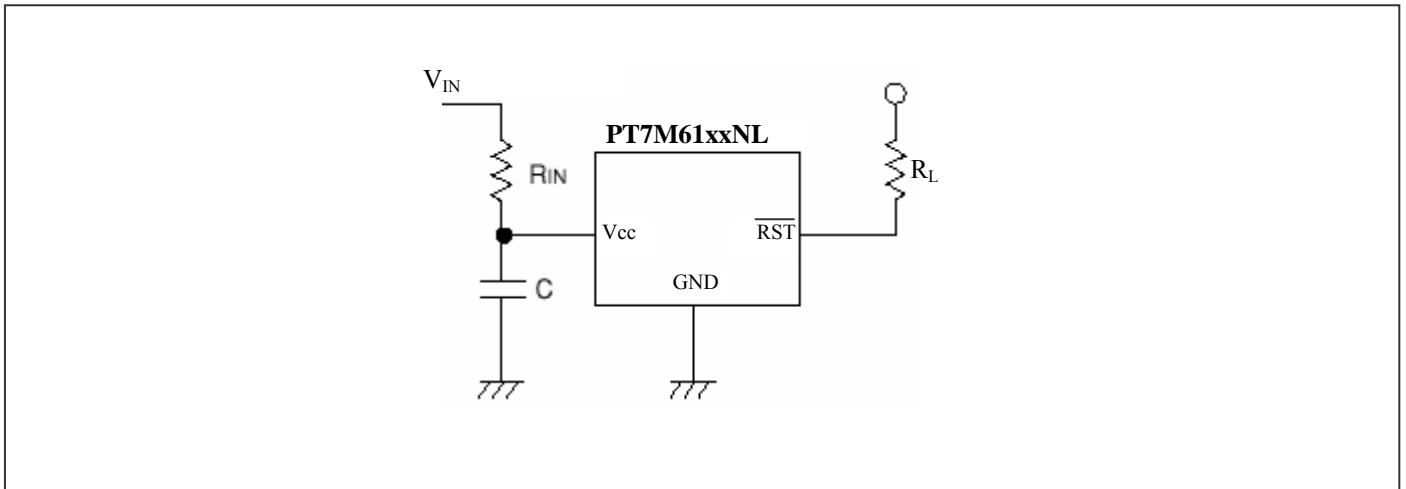


Pin Description

Name	Type	Description
$\overline{\text{RST}}$	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.

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 Ω and that C is more than 0.1 μ F. R_L could be 1k Ω to 510k Ω .

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 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

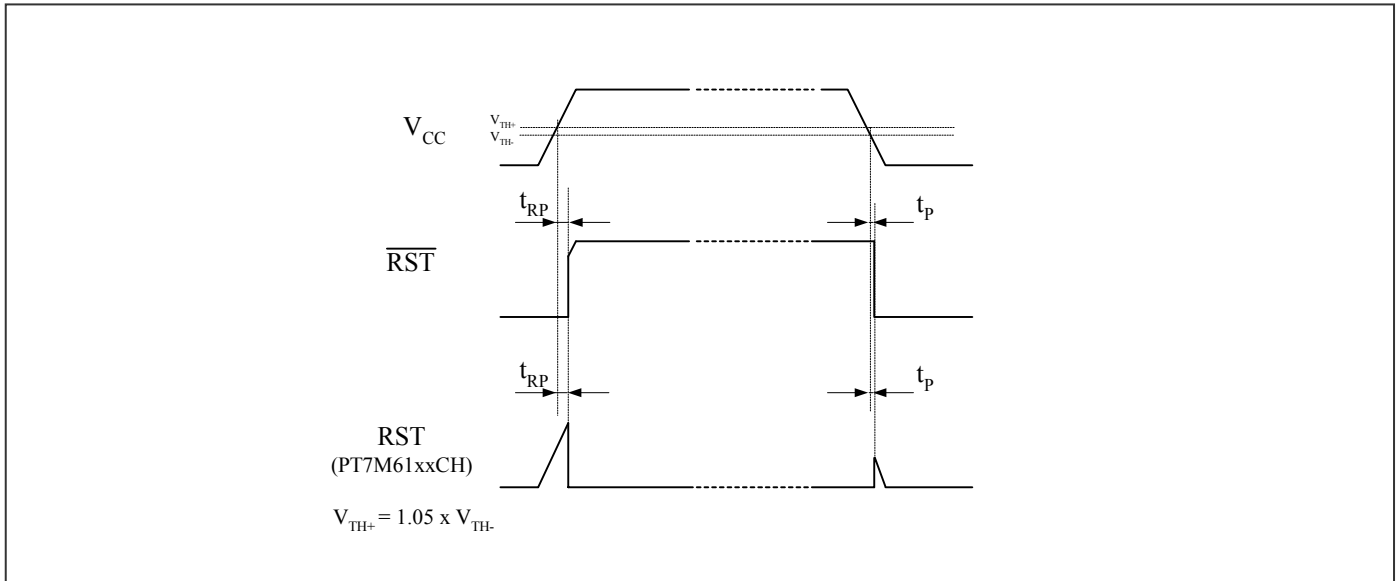
(V_{CC} = 1.2V to 5.5V, T_A = -40~85°C, unless otherwise noted. Typical values are at T_A = +25°C)

Description		Sym.	Test Conditions	Min	Typ	Max	Unit
Supply Voltage		V _{CC}	T _A = 0~70°C	1.0		5.5	V
			T _A = -40~85°C	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} ≥ 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}				100	nA
Voltage Threshold		V _{TH-}	+25°C	(V _{TH-}) ×0.985	V _{TH-}	(V _{TH-}) ×1.015	V
			-40°C~85°C	(V _{TH-}) ×0.975	V _{TH-}	(V _{TH-}) ×1.025	
		V _{TH+}	+25°C	(V _{TH+}) ×0.985	V _{TH+}	(V _{TH+}) ×1.015	
			-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

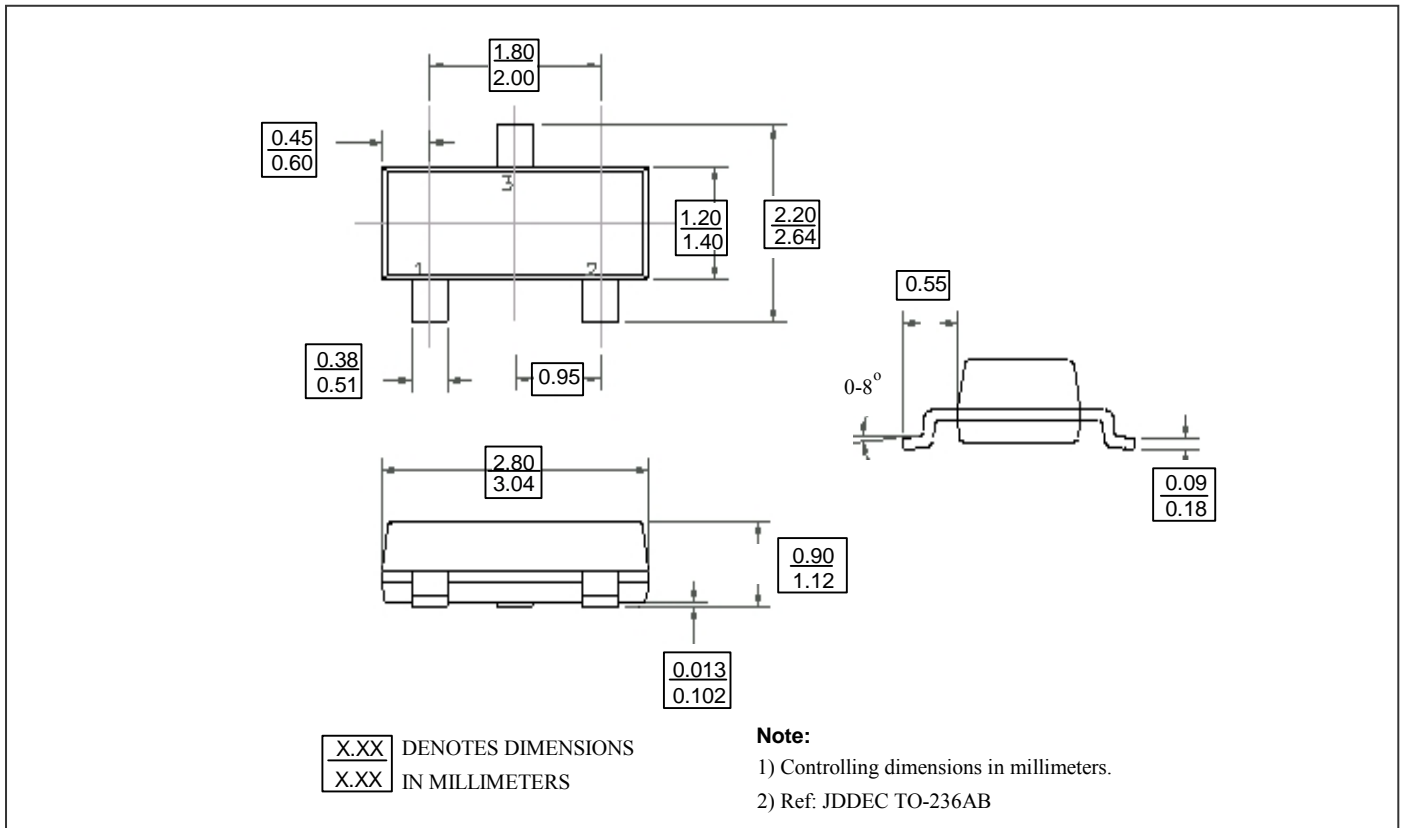


($V_{CC} = 1.2V$ to $5.5V$, $T_A = -40 \sim 85^\circ C$, unless otherwise noted. Typical values are at $T_A = +25^\circ C$)

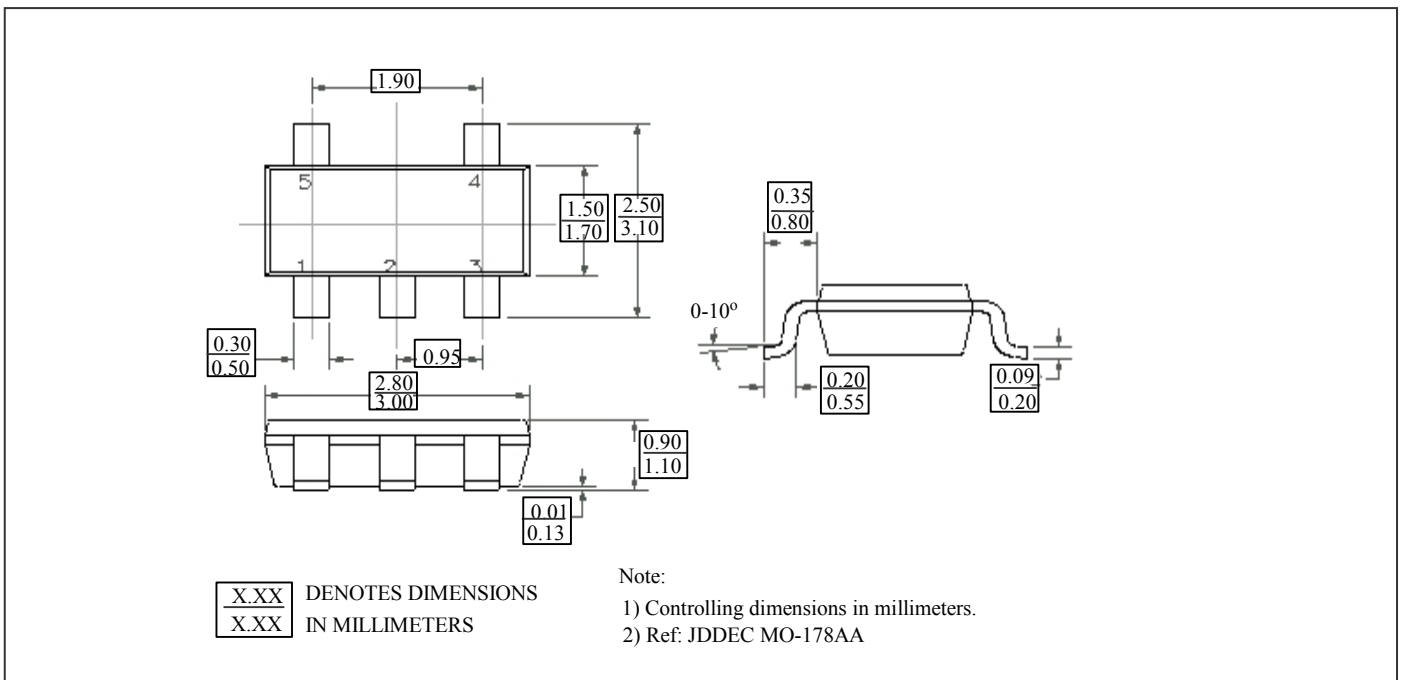
Sym.	Description	Test Conditions	Min	Typ	Max	Unit
t_{RP}	Timeout Period				200	μs
t_p	Delay			17		μs

Mechanical Information

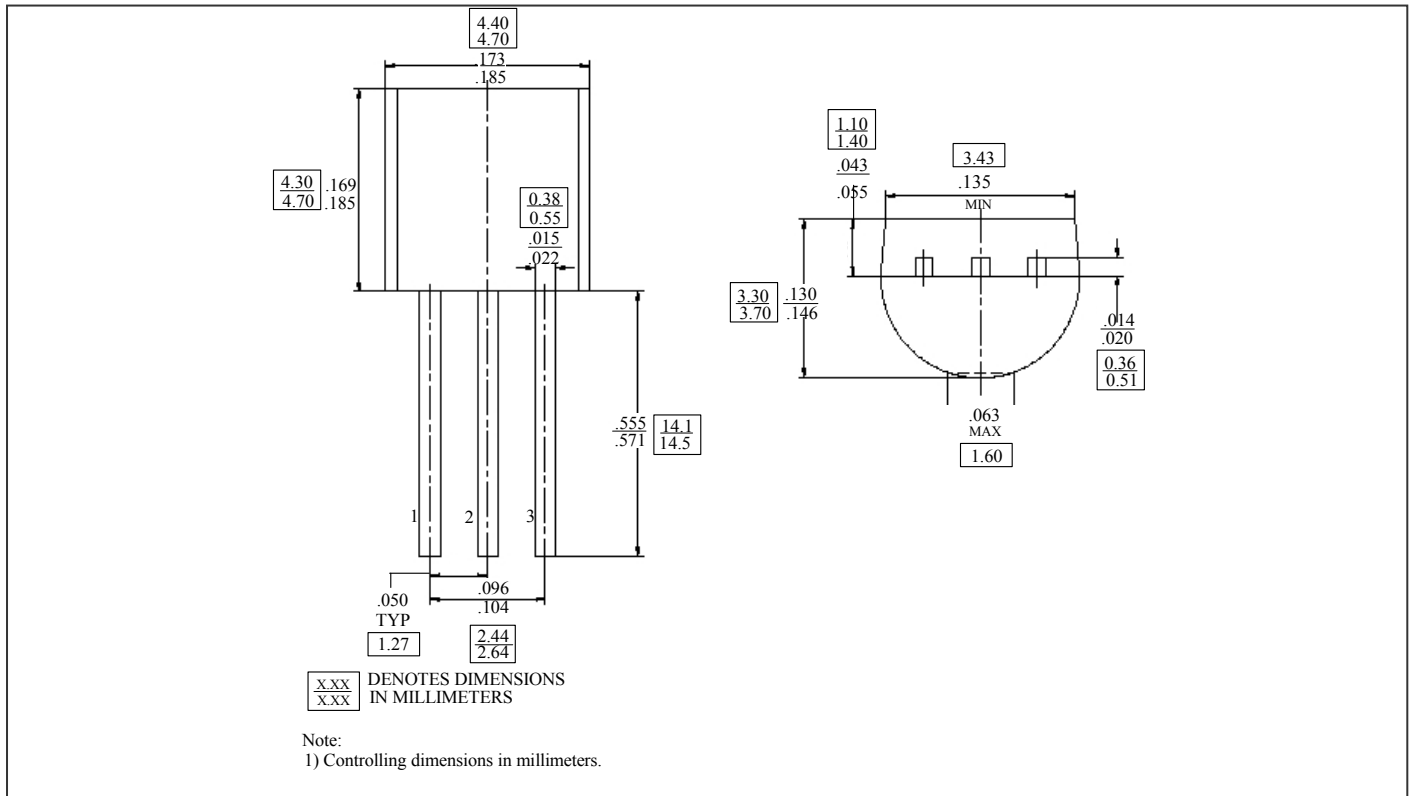
SOT23-3



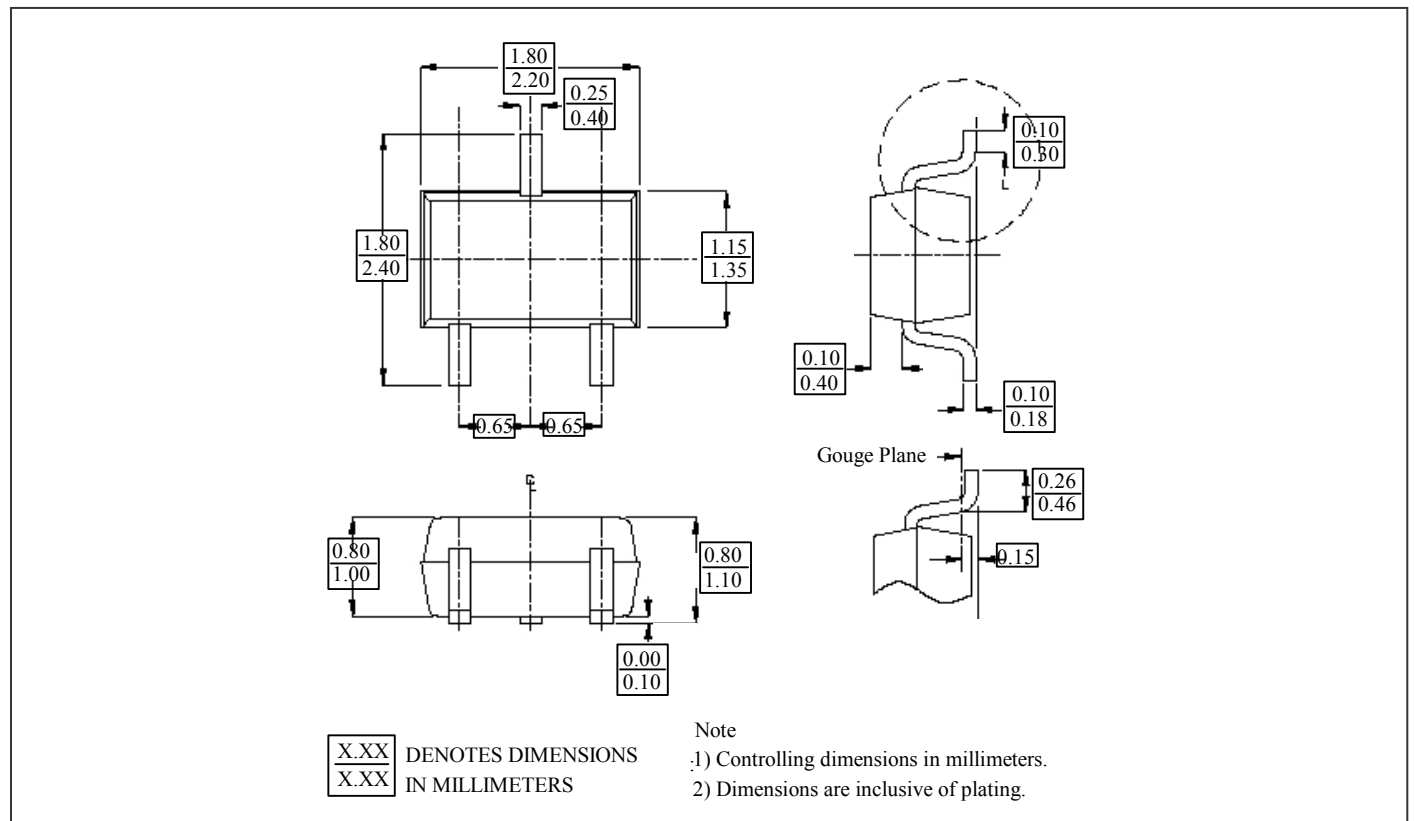
SOT23-5



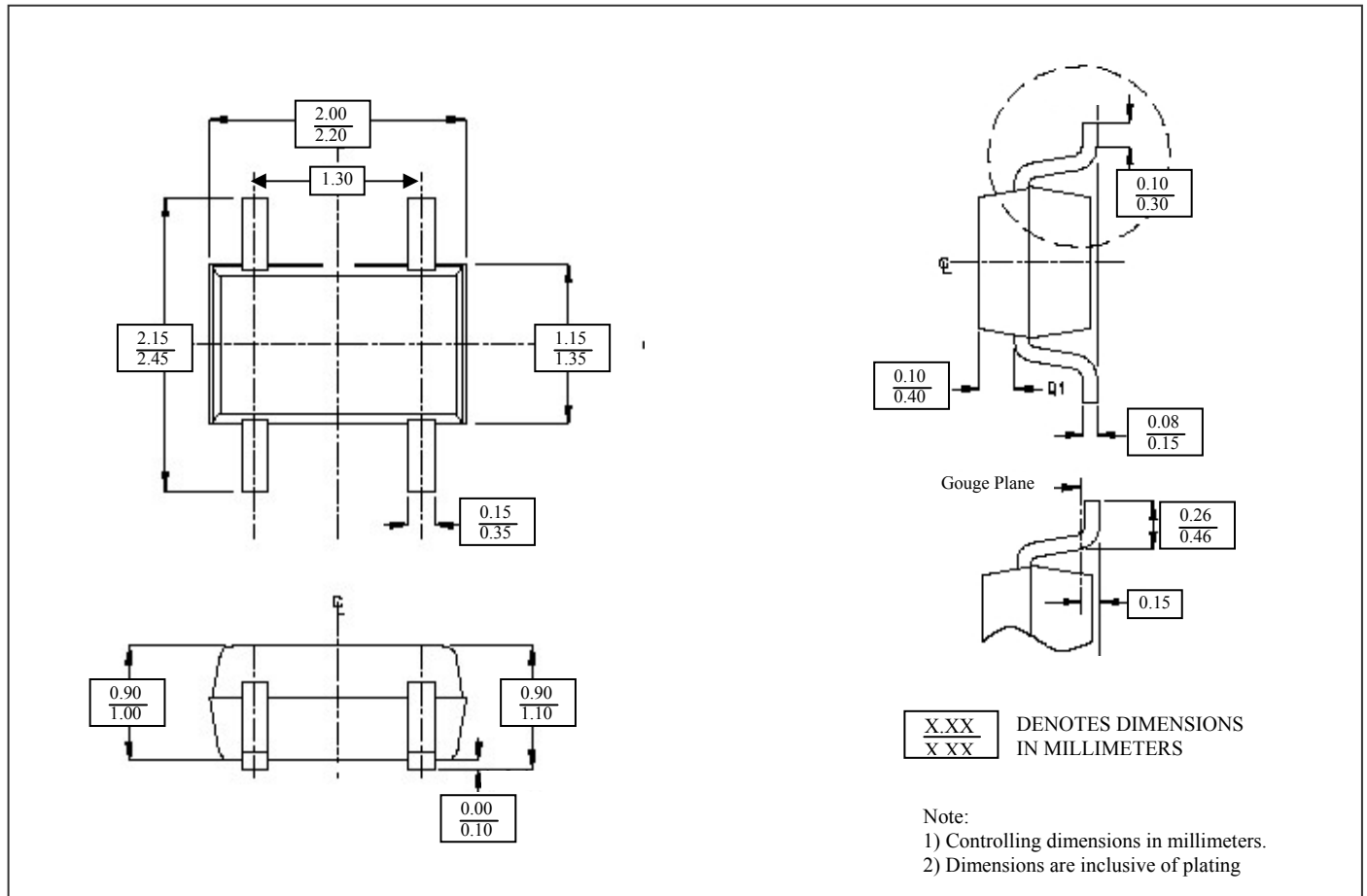
T092



SC70-3



SC70-4



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

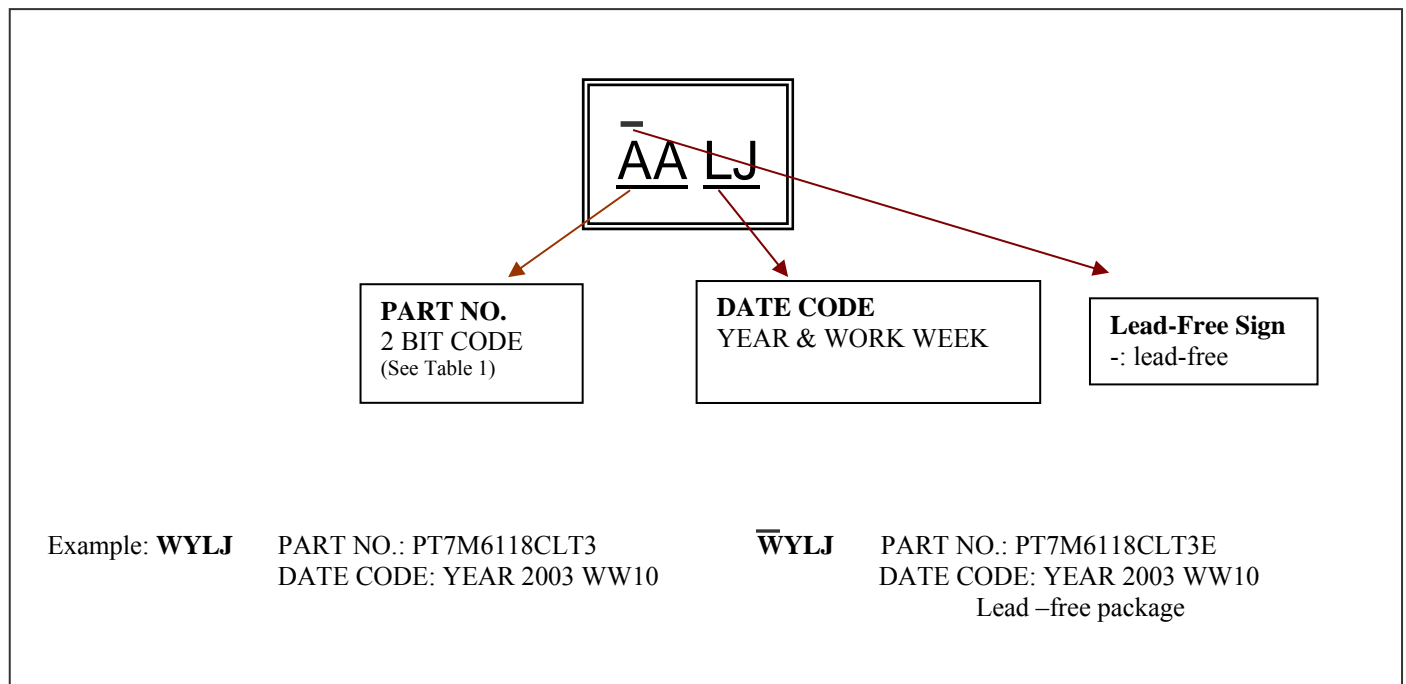


Table 1

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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