

Voltage Detector

Features

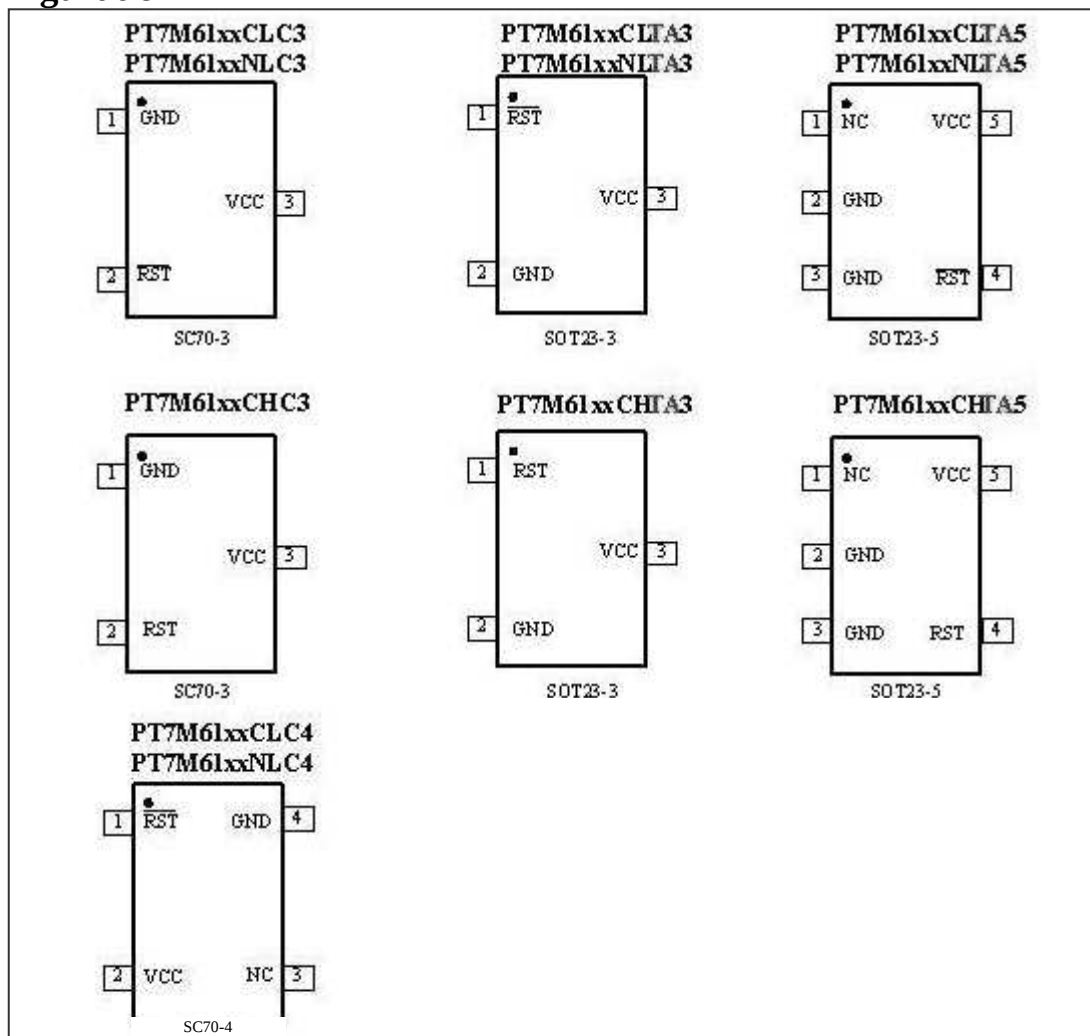
- Highly accurate: $\pm 1.5\%$ (25°C)
- Low power consumption: $1\mu\text{A}$ @ $3.6\text{V V}_{\text{CC}}$
- Detect voltage range: 1.8 to 5V in 100mV increments
- Operating voltage range: $1.2\text{V} \sim 5.5\text{V}$
- Operating temperature range: -40°C to $+85^{\circ}\text{C}$
- Detect voltage accuracy 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 $V_{\text{TH-}}$ and remains asserted until V_{CC} rises above $V_{\text{TH+}}$ ($V_{\text{TH+}} = V_{\text{TH-}} \times 1.05$). These devices provide excellent circuit reliability and low cost by eliminating external components and adjustments when monitoring nominal system voltages from $+1.8\text{V}$ to $+5\text{V}$ in 100mV increments. The series are voltage detectors with a propagation delay of $17\mu\text{s}$.

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 $+85^{\circ}\text{C}$ temperature range.

Pin Configuration

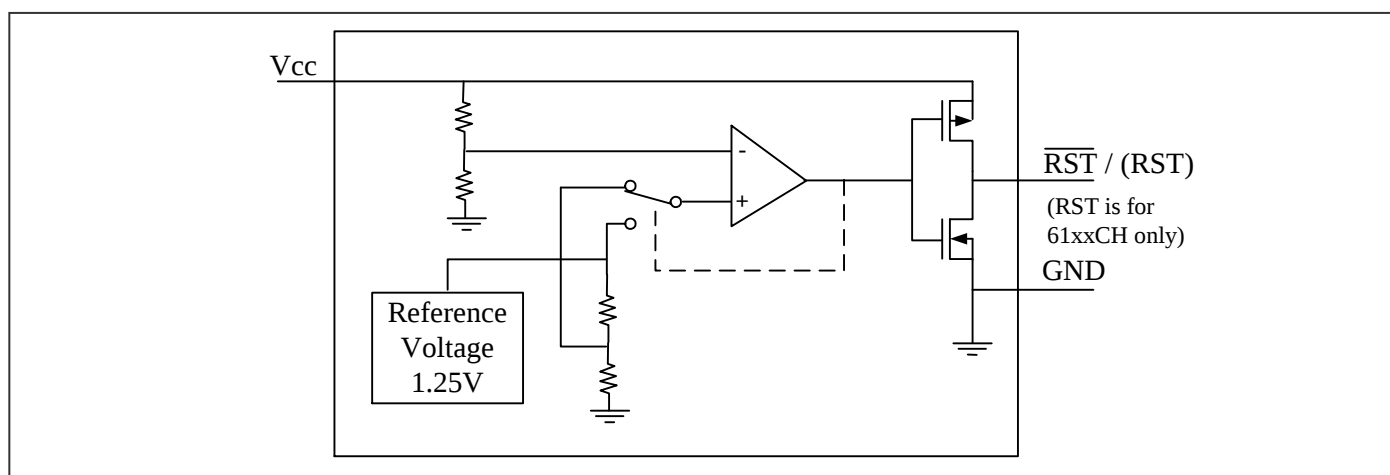


Pin Description

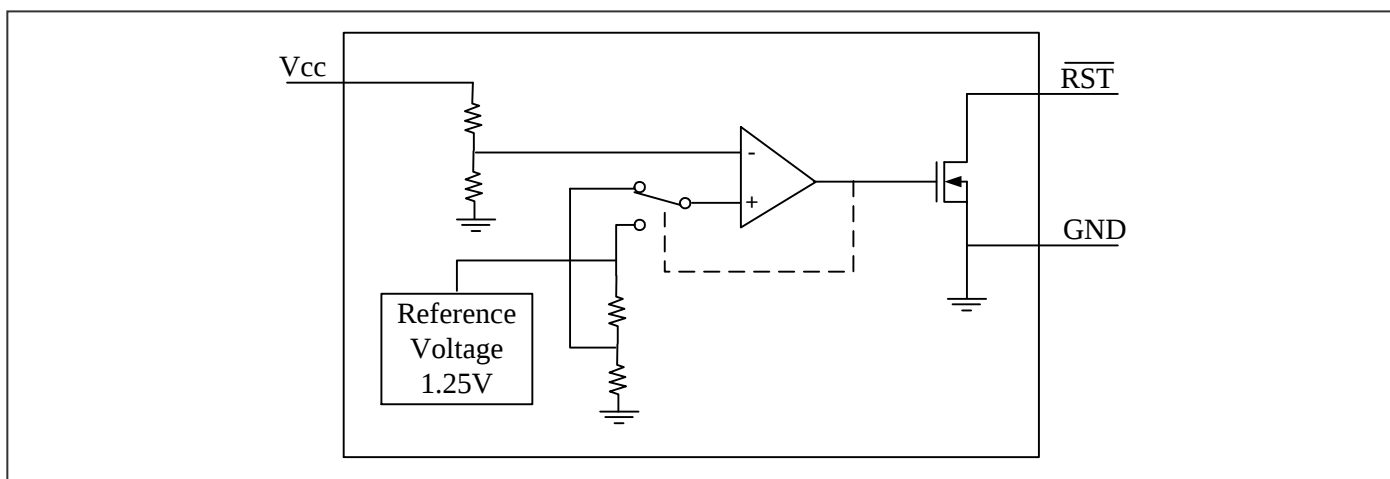
Name	Type	Description
$\overline{\text{RST}}$	O	Reset Output (PT7M61xxCL/NL): $\overline{\text{RST}}$ is asserted when V_{CC} drops below voltage threshold V_{TH} . Active low.
RST	O	Reset Output (PT7M61xxCH): RST is asserted when V_{CC} drops below voltage threshold V_{TH} . Active high.
GND	P	Ground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

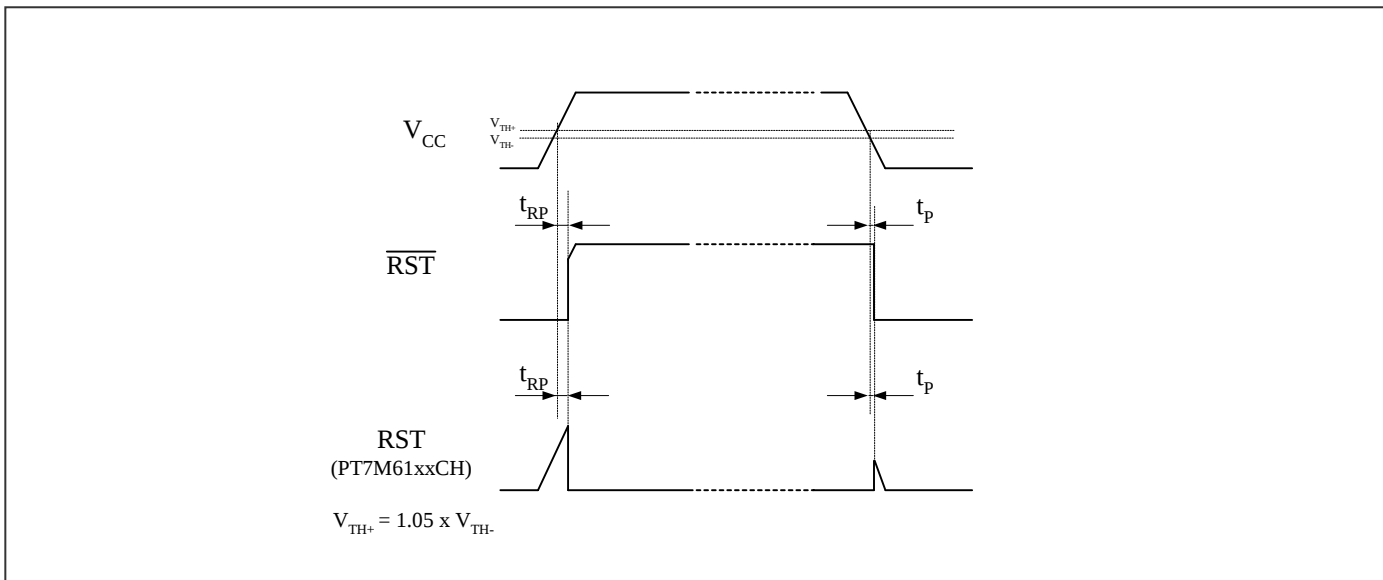
(V_{CC} = 1.2V to 5.5V, T_A = -40~85°C, unless otherwise noted. Typical values are at T_A = +25°C)

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} = 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°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	%
				-	1	-	

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

AC Electrical Characteristics

Timing diagram

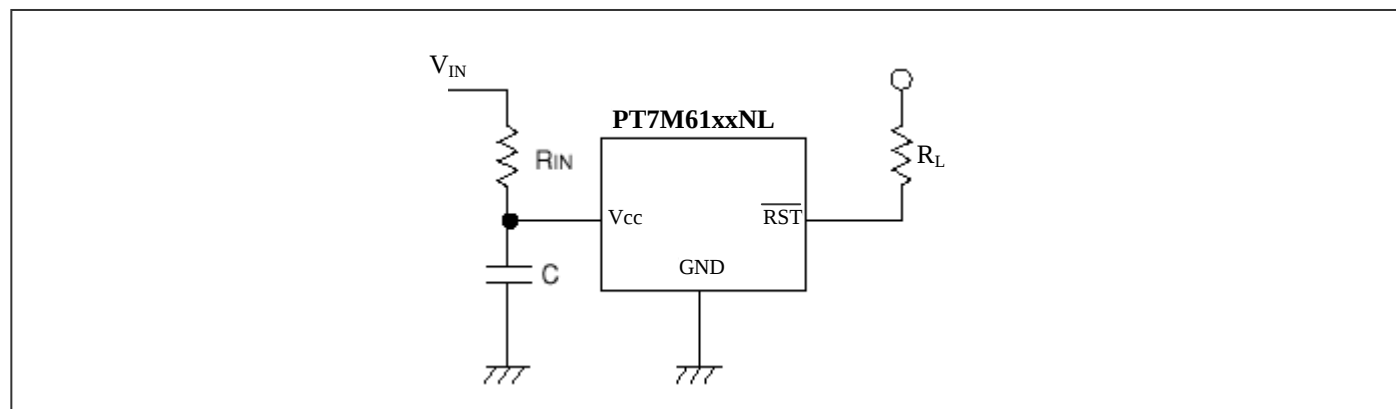


($V_{CC} = 1.2V$ to $5.5V$, $T_A = -40 \sim 85^\circ C$, unless otherwise noted. Typical values are at $T_A = +25^\circ C$)

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

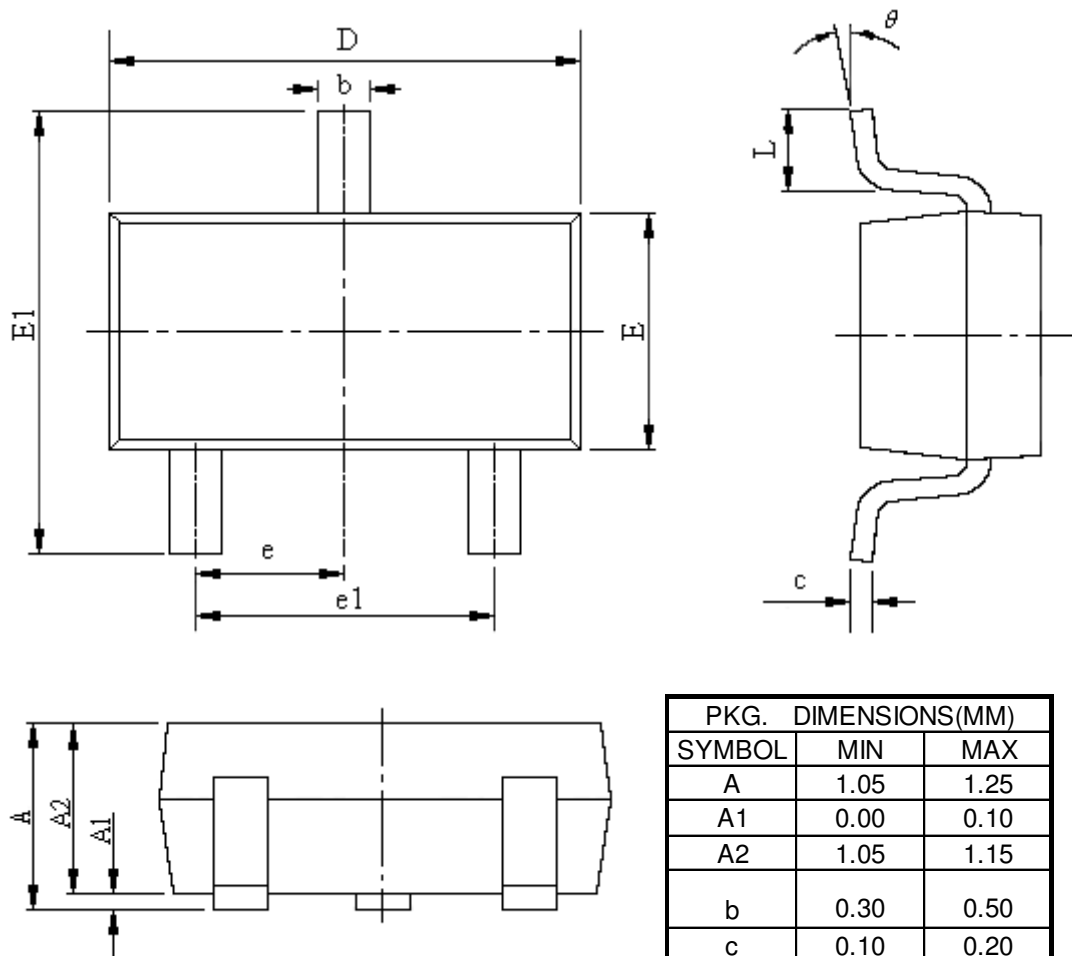
PT7M61xxNL Application Example



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)

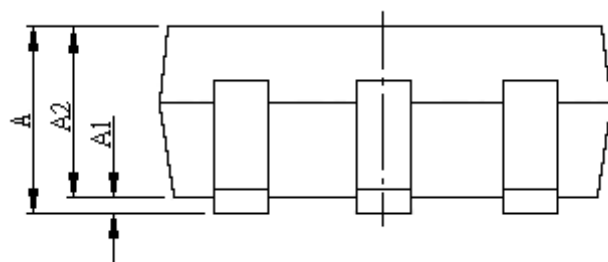
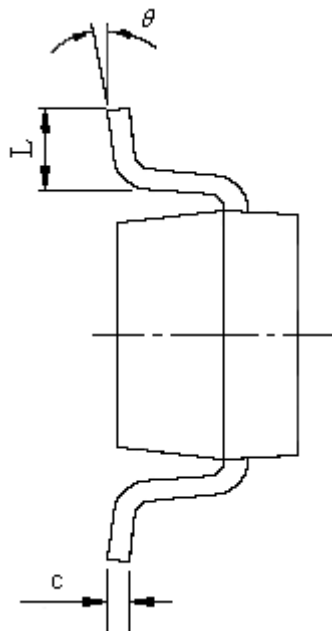
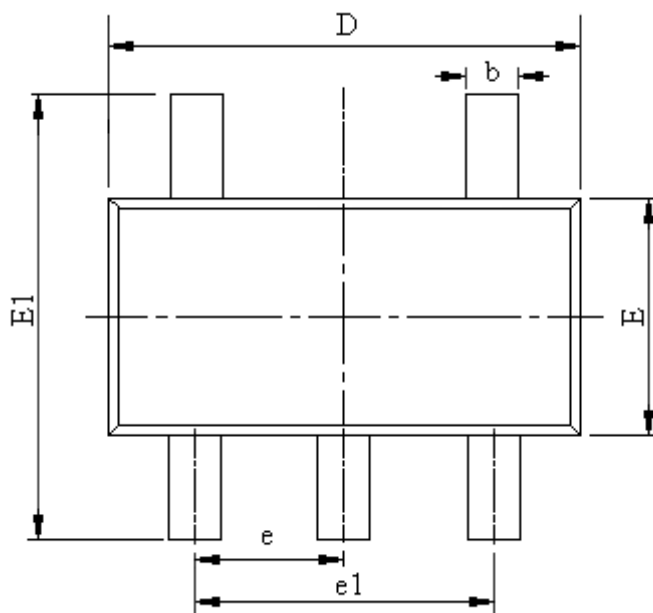


Note:

1) Controlling dimensions in millimeters.

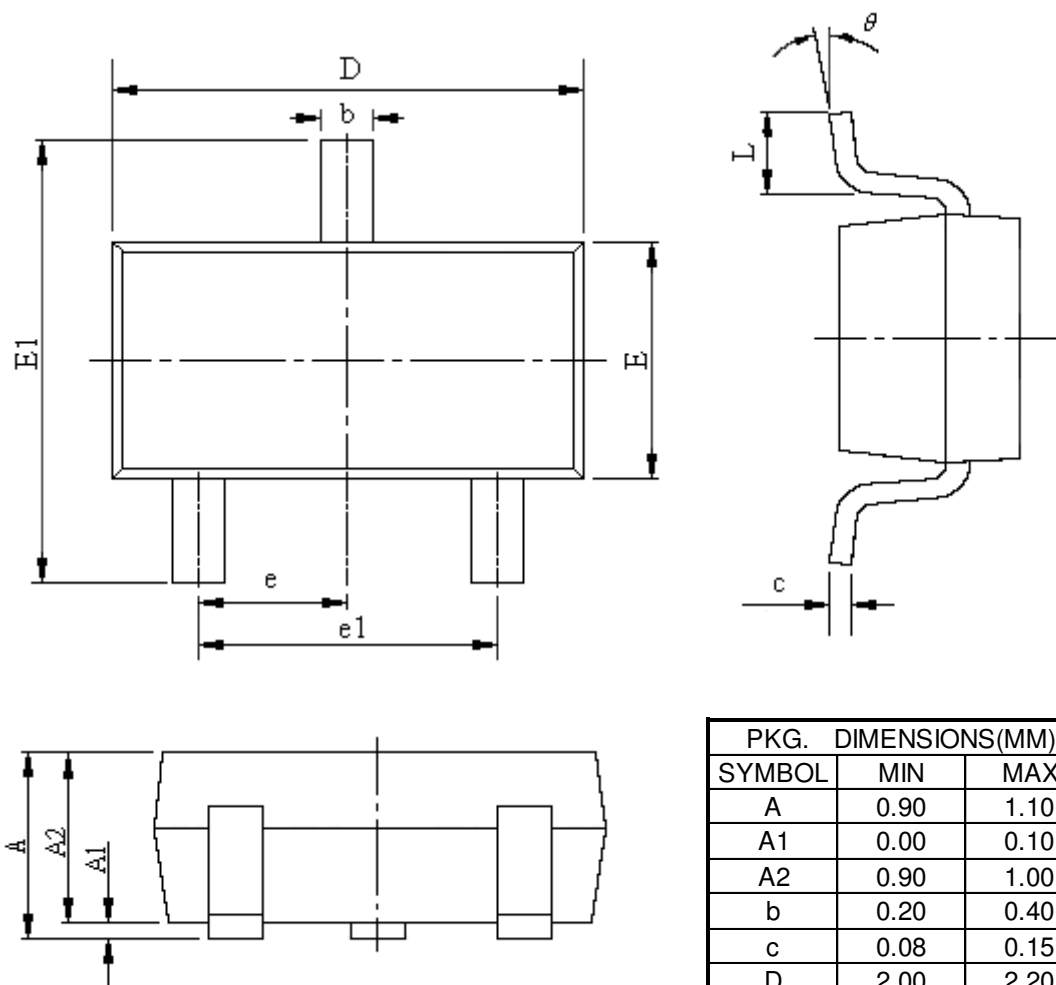
PKG. DIMENSIONS(MM)		
SYMBOL	MIN	MAX
A	1.05	1.25
A1	0.00	0.10
A2	1.05	1.15
b	0.30	0.50
c	0.10	0.20
D	2.82	3.02
E	1.50	1.70
E1	2.65	2.95
e	0.95BSC	
e1	1.80	2.00
L	0.30	0.60
θ	0°	8°

TA5 (SOT23-5)


Note:

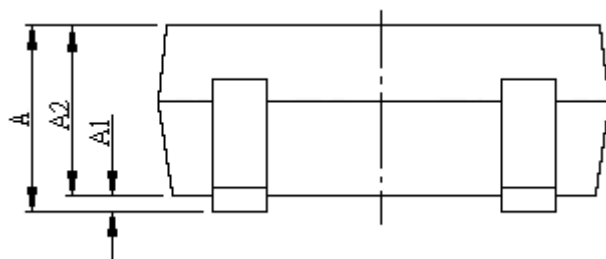
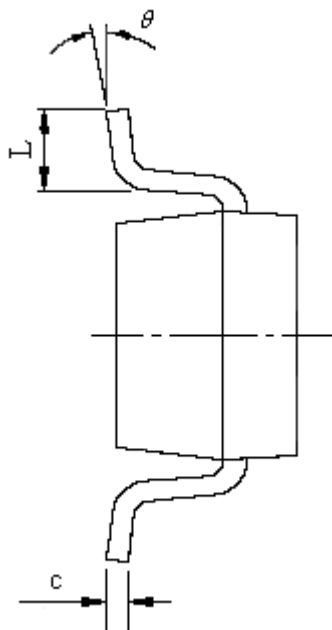
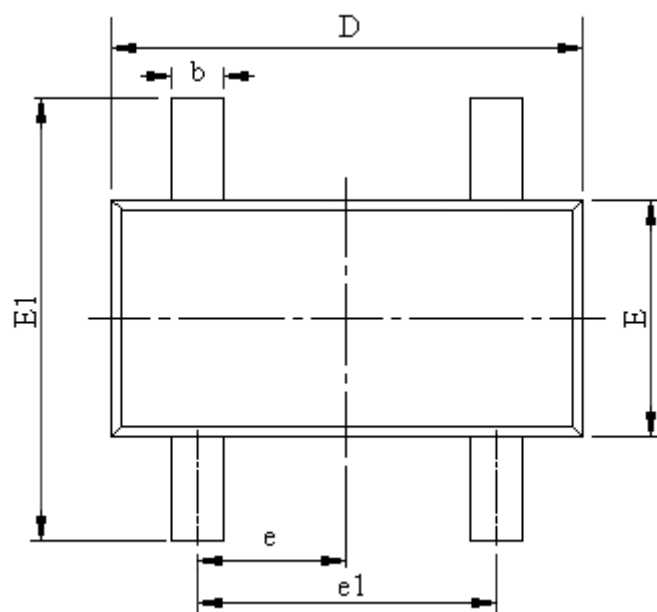
- 1) Controlling dimensions in millimeters.
- 2) Ref: JEDEC MO-178C/AA

PKG. DIMENSIONS(MM)		
SYMBOL	MIN	MAX
A	1.05	1.25
A1	0.00	0.10
A2	1.05	1.15
b	0.30	0.50
c	0.10	0.20
D	2.82	3.02
E	1.50	1.70
E1	2.65	2.95
e	0.95BSC	
e1	1.80	2.00
L	0.30	0.60
θ	0°	8°

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
θ	0°	8°

C4 (SC70-4)

Note:

- 1) Controlling dimensions in millimeters.
- 2) Ref: JEDEC MO-203

PKG. DIMENSIONS(MM)		
SYMBOL	MIN	MAX
A	0.90	1.10
A1	0.00	0.10
A2	0.90	1.00
b	0.15	0.35
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
θ	0°	8°

Ordering Information

Part Number	Package Code	Package
PT7M61xxCLTA3E	TA3	Lead free and Green SOT23-3
PT7M61xxCLTA5E	TA5	Lead free and Green SOT23-5
PT7M61xxCLC3E	C3	Lead free and Green SC70-3
PT7M61xxCLC4E	C4	Lead free and Green SC70-4
PT7M61xxCHTA3E	TA3	Lead free and Green SOT23-3
PT7M61xxCHTA5E	TA5	Lead free and Green SOT23-5
PT7M61xxCHC3E	C3	Lead free and Green SC70-3
PT7M61xxNLTA3E	TA3	Lead free and Green SOT23-3
PT7M61xxNLTA5E	TA5	Lead free and Green SOT23-5
PT7M61xxNLC3E	C3	Lead free and Green SC70-3
PT7M61xxNLC4E	C4	Lead free and Green SC70-4
PT7M61xxCLETA3E	TA3	Lead free and Green SOT23-3
PT7M61xxCLETA5E	TA5	Lead free and Green SOT23-5
PT7M61xxCLEC3E	C3	Lead free and Green SC70-3
PT7M61xxCLEC4E	C4	Lead free and Green SC70-4
PT7M61xxCHETA3E	TA3	Lead free and Green SOT23-3
PT7M61xxCHETA5E	TA5	Lead free and Green SOT23-5
PT7M61xxCHEC3E	C3	Lead free and Green SC70-3
PT7M61xxNLETA3E	TA3	Lead free and Green SOT23-3
PT7M61xxNLETA5E	TA5	Lead free and Green SOT23-5
PT7M61xxNLEC3E	C3	Lead free and Green SC70-3
PT7M61xxNLEC4E	C4	Lead free and Green SC70-4

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:E = Pb-free and Green
- 7:Adding X Suffix= Tape/Reel
- 8: Contact Pericom for availability.

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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