

Features

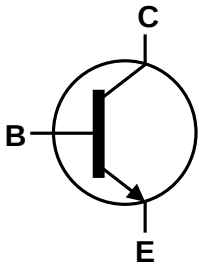
- For switching and amplifier applications

SOT89



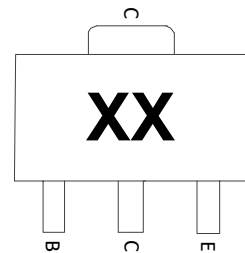
Top View

Equivalent Circuit



Device Symbol

Marking Code



XX: Marking Code

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	150	V
Collector-Emitter Voltage	V _{CEO}	60	V
Emitter-Base Voltage	V _{EBO}	7	V
Base Current	I _B	2	A
Continuous Collector Current	I _C	5	A
Peak Pulse Current	I _{CM}	20	A

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 1)	P _D	1.5	W
Linear Derating Factor		12	mW/°C
Power Dissipation (Note 2)	P _D	2.1	W
Linear Derating Factor		16.8	mW/°C
Thermal Resistance, Junction to Ambient (Note 1)	R _{θJA}	83	°C/W
Thermal Resistance, Junction to Ambient (Note 2)	R _{θJA}	60	°C/W
Thermal Resistance, Junction to Case (Note 1)	R _{θJC}	5.3	°C/W
Thermal Resistance, Junction to Leads (Note 4)	R _{θJL}	3.23	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

ESD Ratings (Note 8)

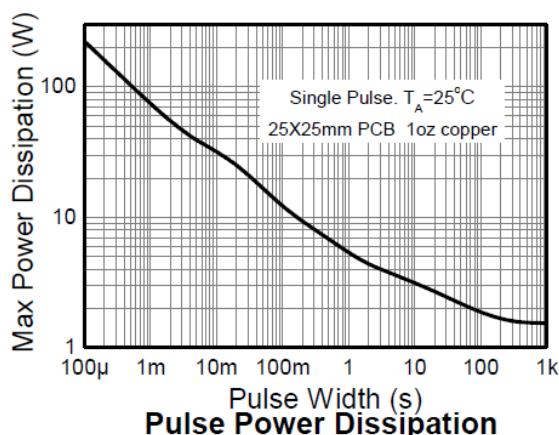
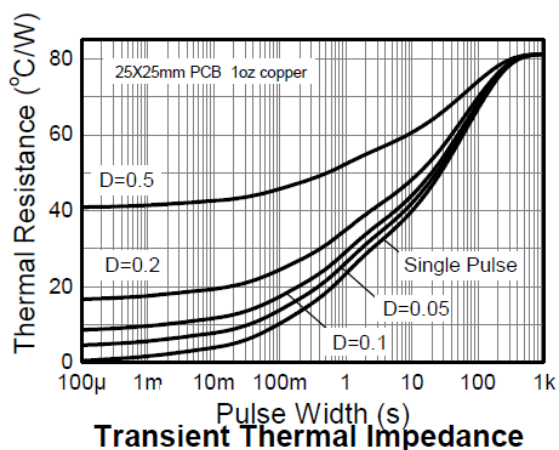
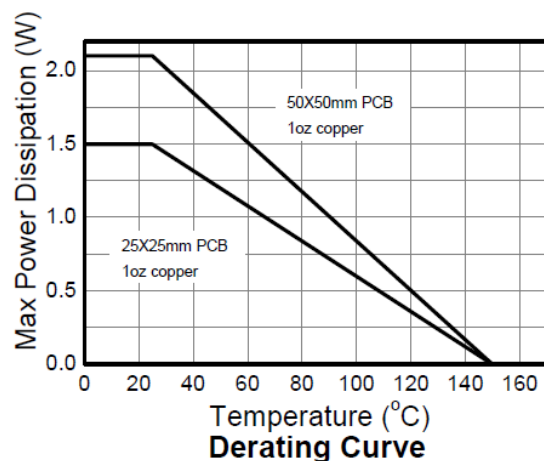
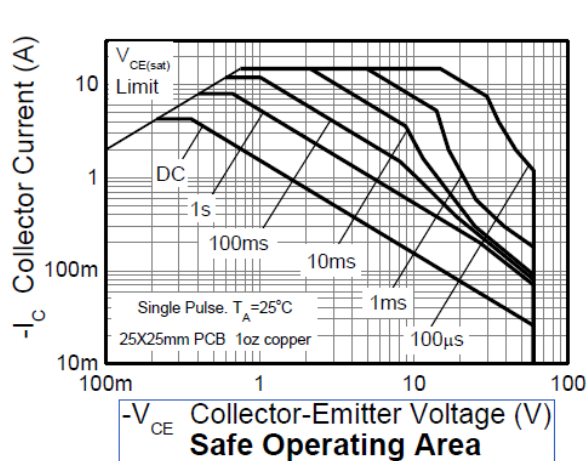
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
1. For a device mounted with the exposed collector pad on 25mm x 25mm 1oz copper that is on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 2. Same as note (5), except the device is mounted on 50mm x 50mm 1oz copper.
 3. Thermal resistance from junction to solder-point (on the exposed collector pad).
 4. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

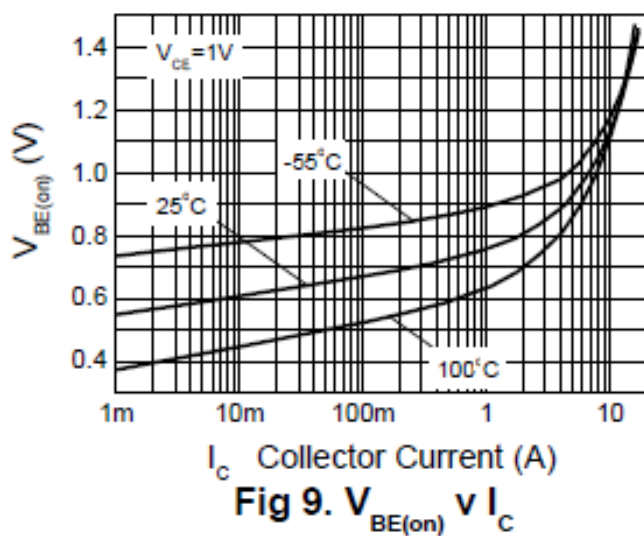
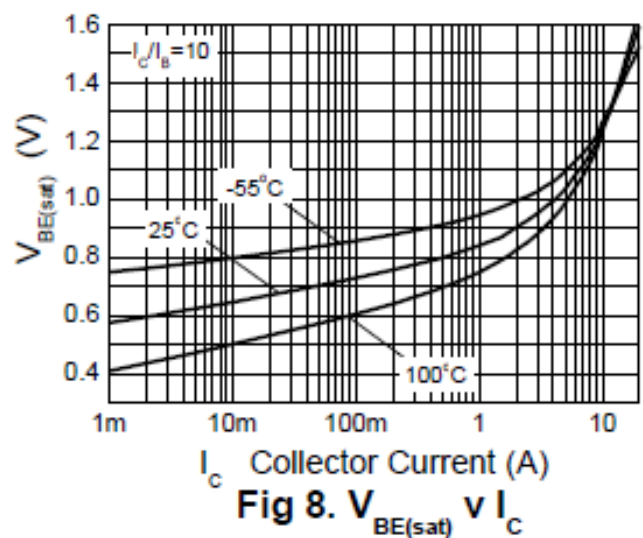
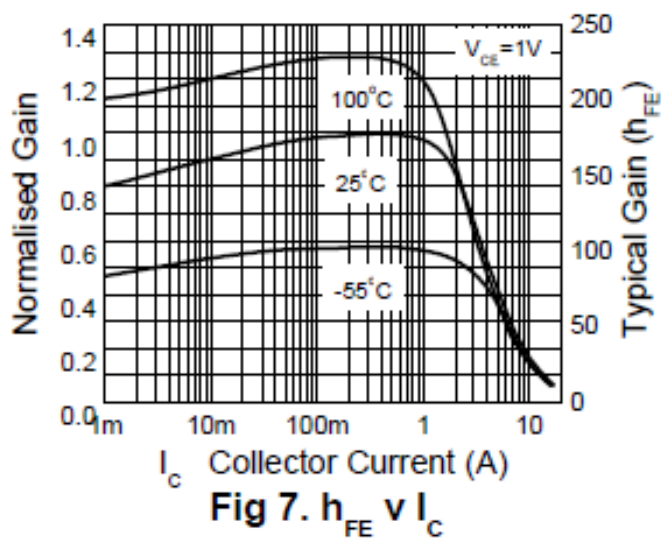
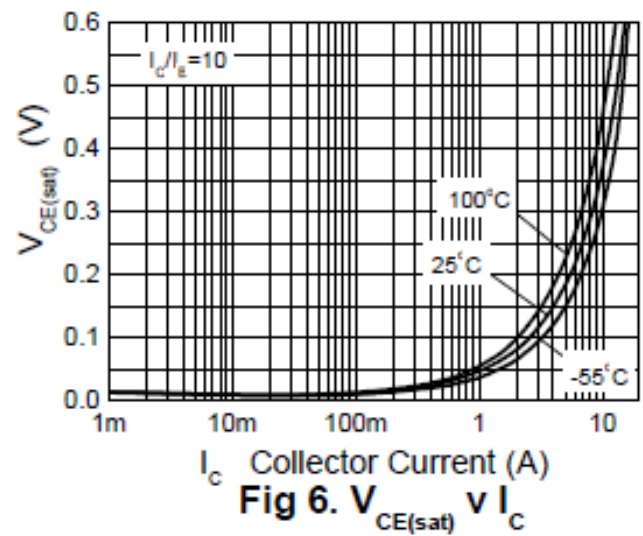
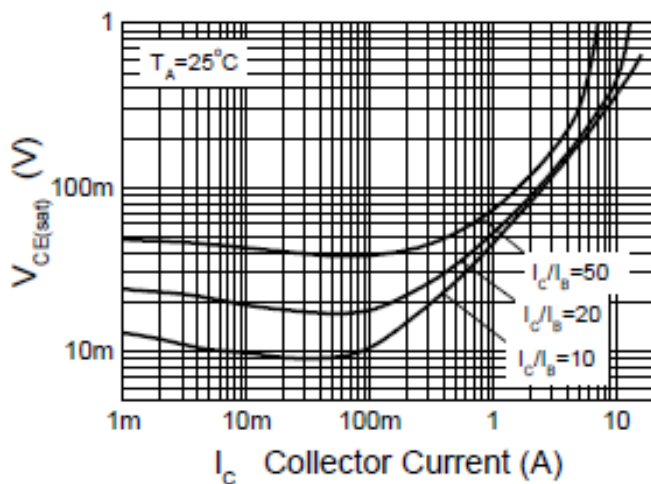
Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	150	190	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CER}	150	190	—	V	$I_C = 1\mu\text{A}$, $R_B \leq 1\text{k}\Omega$
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	60	80	—	V	$I_C = 10\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.1	—	V	$I_E = 100\mu\text{A}$
Collector Cutoff Current	I_{CBO}	—	< 1	50 500	nA nA	$V_{CB} = 120\text{V}$ $V_{CB} = 120\text{V}$, $T_A = +100^\circ\text{C}$
Collector Cutoff Current	I_{CER} $R \leq 1\text{k}\Omega$	—	< 1	100 500	nA nA	$V_{CB} = 120\text{V}$ $V_{CB} = 120\text{V}$, $T_A = +100^\circ\text{C}$
Emitter Cutoff Current	I_{EBO}	—	< 1	10	nA	$V_{EB} = 6\text{V}$
DC Current Transfer Static Ratio (Note 9)	h_{FE}	100	200	—	—	$I_C = 10\text{mA}$, $V_{CE} = 1\text{V}$
		100	200	300		$I_C = 2\text{A}$, $V_{CE} = 1\text{V}$
		55	105	—		$I_C = 5\text{A}$, $V_{CE} = 1\text{V}$
		20	40	—		$I_C = 10\text{A}$, $V_{CE} = 1\text{V}$
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	—	17	30	mV	$I_C = 100\text{mA}$, $I_B = 5\text{mA}$
		—	35	55		$I_C = 1\text{A}$, $I_B = 100\text{mA}$
		—	40	65		$I_C = 1\text{A}$, $I_B = 50\text{mA}$
		—	90	125		$I_C = 2\text{A}$, $I_B = 50\text{mA}$
		—	170	230		$I_C = 6\text{A}$, $I_B = 300\text{mA}$
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)}$	—	970	1100	mV	$I_C = 6\text{A}$, $I_B = 300\text{mA}$
Base-Emitter Turn-on Voltage (Note 9)	$V_{BE(on)}$	—	910	1050	mV	$I_C = 6\text{A}$, $V_{CE} = 1\text{V}$
Transitional Frequency	f_T	—	130	—	MHz	$I_C = 100\text{mA}$, $V_{CE} = 10\text{V}$, $f = 50\text{MHz}$
Output Capacitance	C_{OBO}	—	31	—	pF	$V_{CB} = 10\text{V}$, $f = 1\text{MHz}$,
Switching Time	t_{on}	—	42	—	ns	$V_{CC} = 10\text{V}$, $I_C = 1\text{A}$ $I_{B1} = -I_{B2} = 100\text{mA}$
	t_{off}	—	760	—		

Note: 9. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

Thermal Characteristics and Derating Information

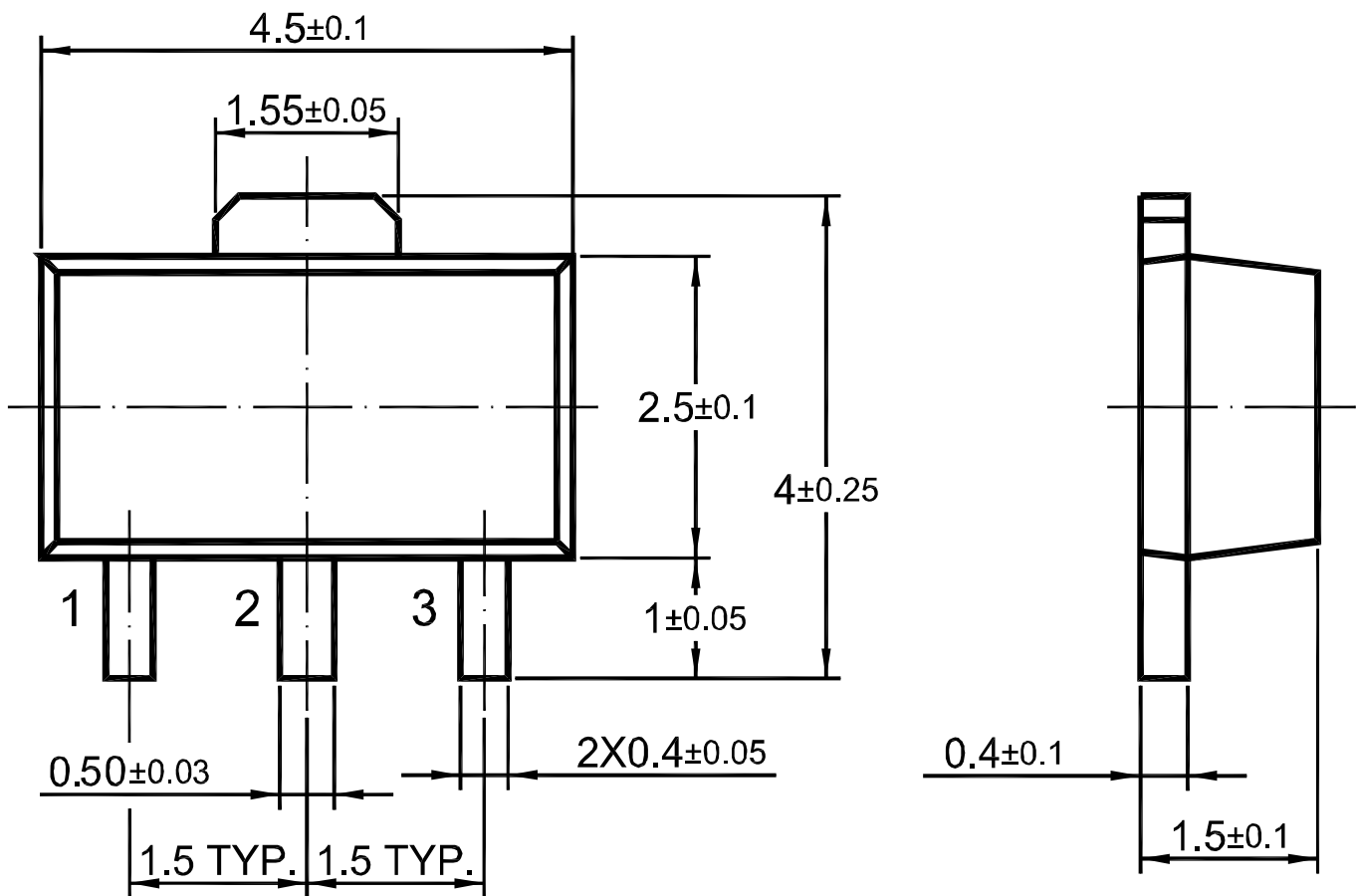
Typical Characteristic Curves



Package Outline

SOT-89

Dimensions in mm

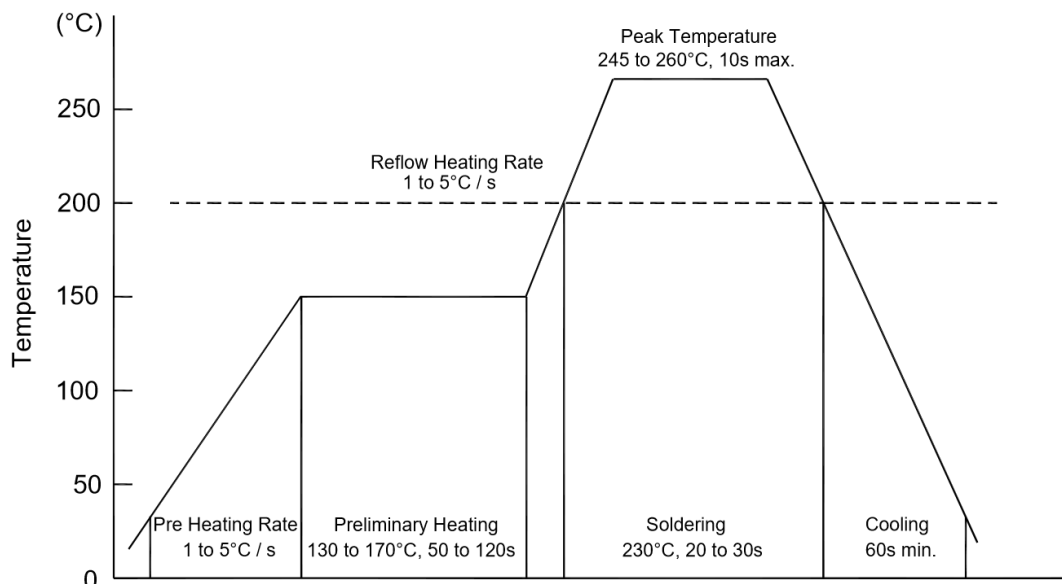


Ordering Information

Device	Package	Shipping
TNTN2010SQ	SOT-89	1,000/3,000PCS/Reel&7inches

Conditions of Soldering and Storage

◆ Recommended condition of reflow soldering



Recommended peak temperature is over 245 °C. If peak temperature is below 245 °C, you may adjust the following parameters:

- Time length of peak temperature (longer)
- Time length of soldering (longer)
- Thickness of solder paste (thicker)

◆ Conditions of hand soldering

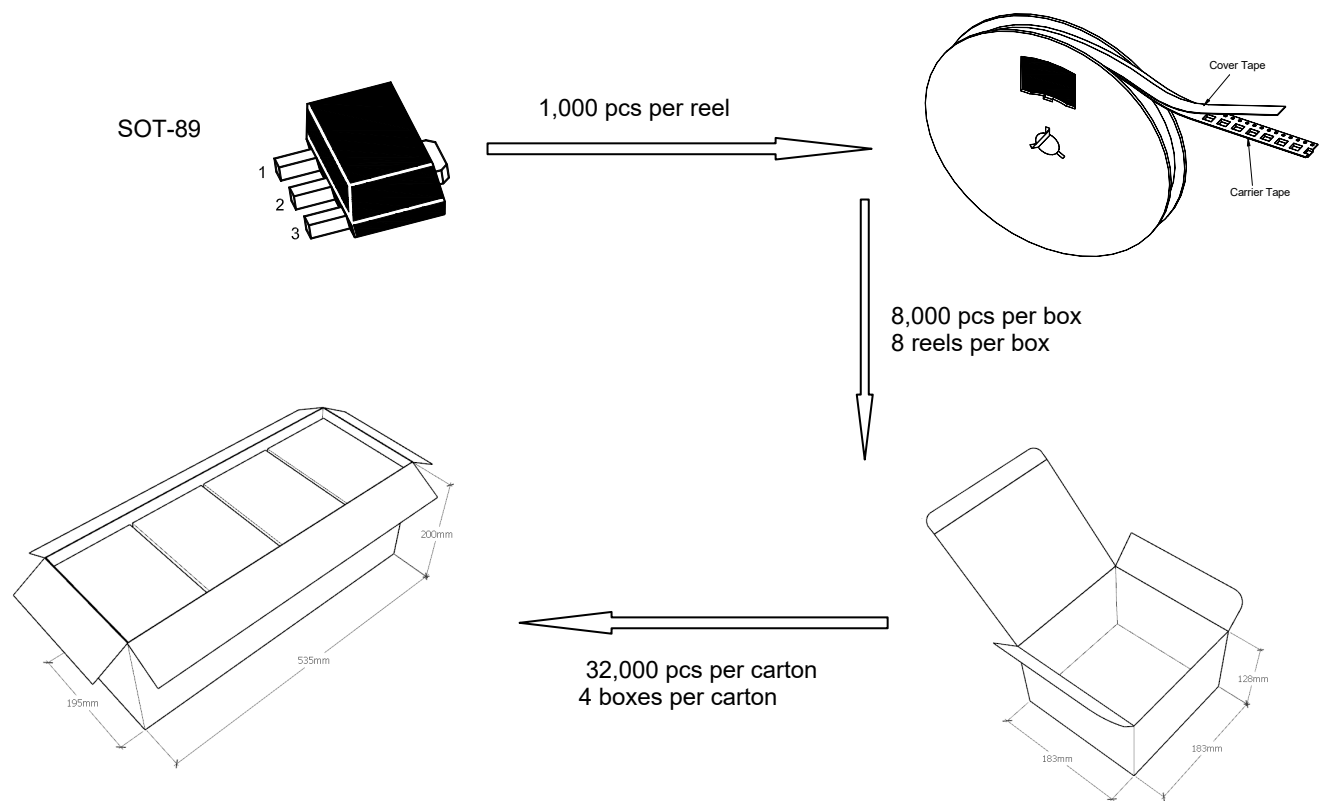
- Temperature: 370 °C
- Time: 3s max.
- Times: one time

◆ Storage conditions

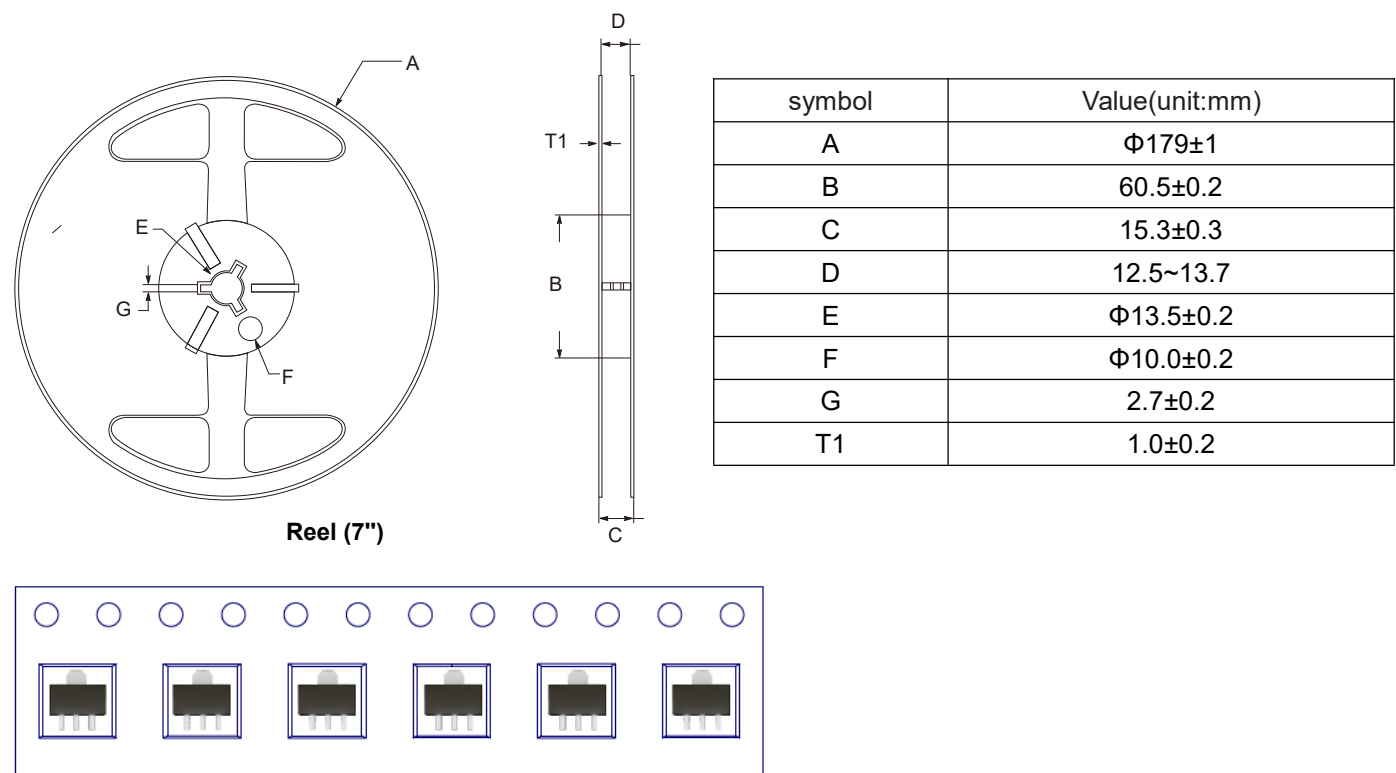
- **Temperature**
5 to 40 °C
- **Humidity**
30 to 80% RH
- **Recommended period**
One year after manufacturing

Package Specifications

- The method of packaging



◆ Embossed tape and reel data



Contact Information

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For additional information, please contact your local Sales Representative.



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Product Specification Statement

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