

Features

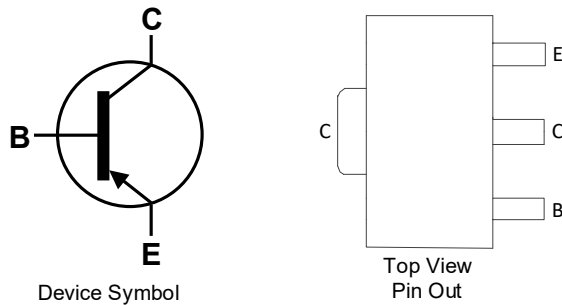
- For switching and amplifier applications

SOT89

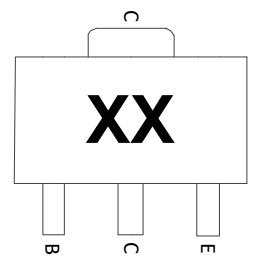


Top View

Equivalent Circuit



Marking Code



XX: Marking Code

Absolute Maximum Ratings

Ratings at 25°C ambient temperature unless otherwise specified.

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-100	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	-4.3	A
Peak Pulse Current	I_{CM}	-15	A

Electrical Characteristics (T_A=25°C)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 1)	P_D	1	W
Linear Derating Factor		8	mW/°C
Power Dissipation (Note 2)	P_D	1.5	W
Linear Derating Factor		12	mW/°C
Power Dissipation (Note 3)	P_D	2.1	W
Linear Derating Factor		16.8	mW/°C
Thermal Resistance, Junction to Ambient (Note 1)	$R_{\theta JA}$	125	°C/W
Thermal Resistance, Junction to Ambient (Note 2)	$R_{\theta JA}$	83	°C/W
Thermal Resistance, Junction to Ambient (Note 3)	$R_{\theta JA}$	60	°C/W
Thermal Resistance, Junction to Case (Note 1)	$R_{\theta JC}$	21	°C/W
Thermal Resistance, Junction to Leads (Note 4)	$R_{\theta JL}$	3.23	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

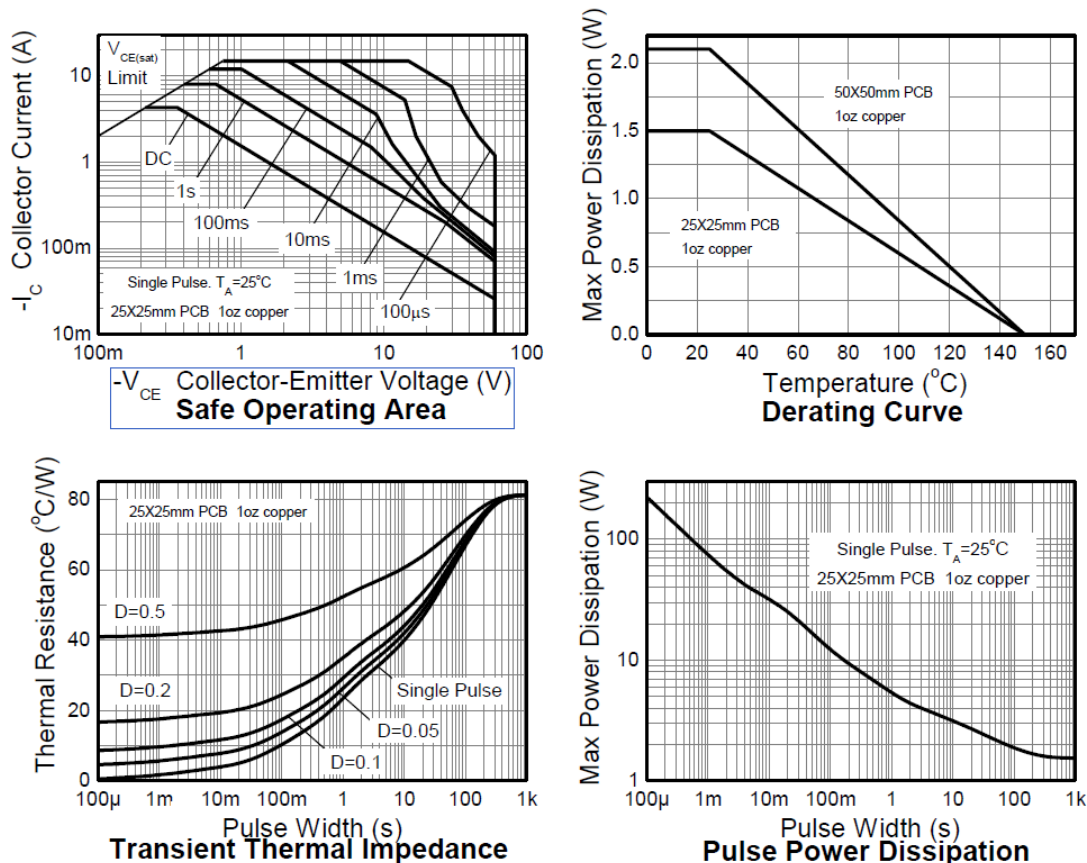
- Notes:
- Minimum recommended pad layout
 - For a device surface mounted on 25mm x 25mm x 1.6mm FR-4 PCB with high coverage of single sided 1oz copper, in still air conditions; device measured when operating in steady state condition.
 - Same as note (6), except the device is mounted on 50mm x 50mm single sided 1oz weight copper.
 - Thermal resistance from junction to solder-point (on the exposed collector pad).

Electrical Characteristics ($T_A=25^\circ\text{C}$)

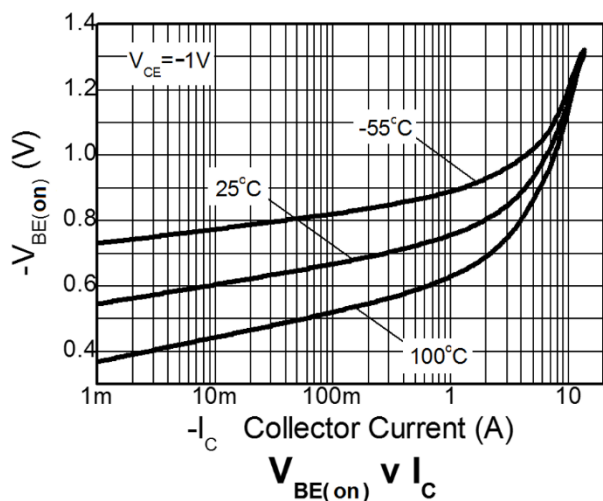
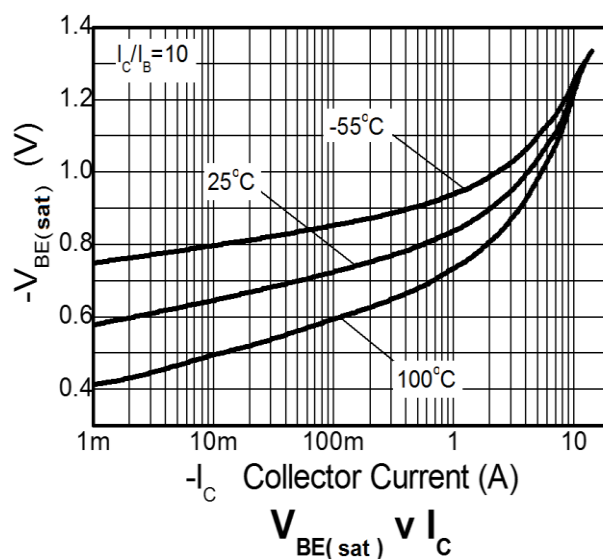
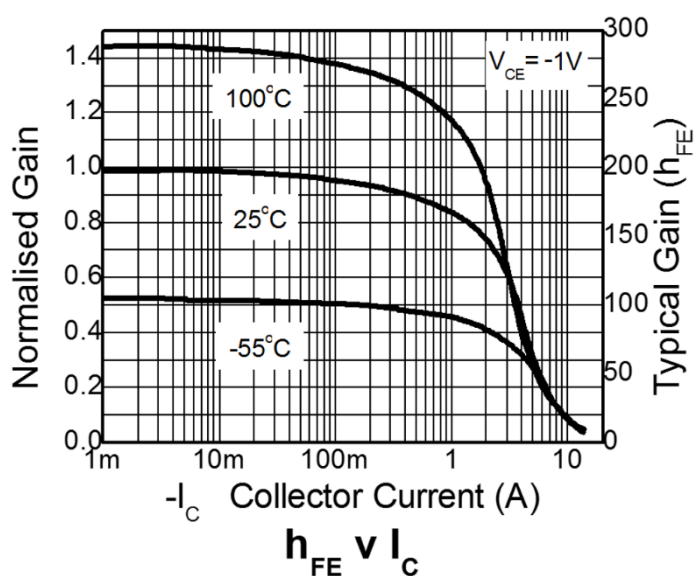
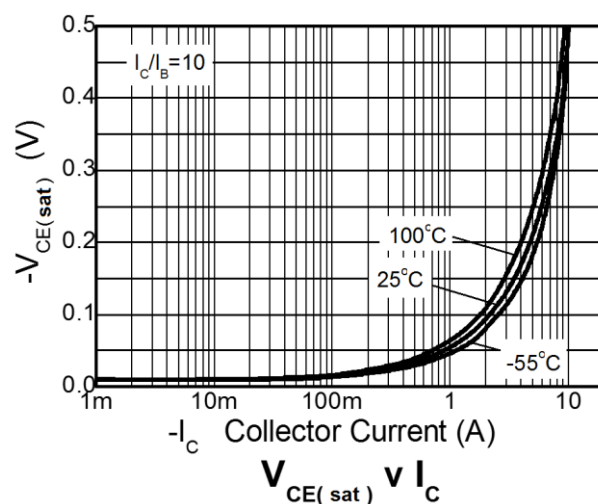
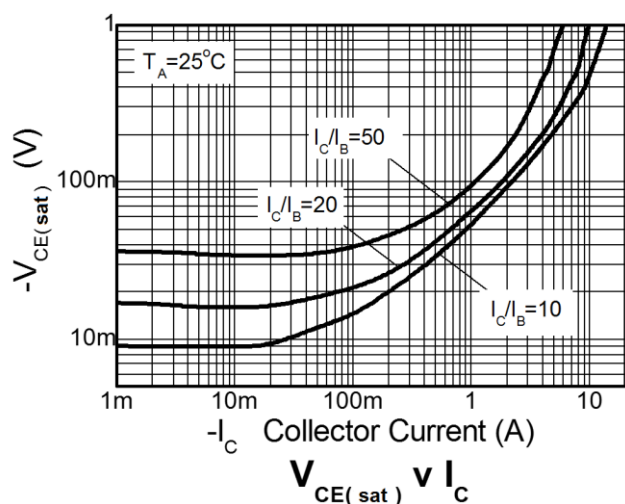
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-100	-120	—	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CER}	-100	-120	—	V	$I_C = -1\mu\text{A}$, $R_B \leq 1\text{k}\Omega$
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	-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	-20	nA	$V_{CB} = -80\text{V}$
Collector Cutoff Current	I_{CER} $R \leq 1\text{k}\Omega$	—	-1	-20	nA	$V_{CB} = -80\text{V}$
Emitter Cutoff Current	I_{EBO}	—	-1	-10	nA	$V_{EB} = -6\text{V}$
DC Current Transfer Static Ratio (Note 9)	h_{FE}	100 100 45 10	250 200 90 25	— 300 — —	—	$I_C = -10\text{mA}$, $V_{CE} = -1\text{V}$ $I_C = -2\text{A}$, $V_{CE} = -1\text{V}$ $I_C = -5\text{A}$, $V_{CE} = -1\text{V}$ $I_C = -10\text{A}$, $V_{CE} = -1\text{V}$
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	—	-14 -50 -75 -160	-20 -65 -110 -215	mV	$I_C = -100\text{mA}$, $I_B = -10\text{mA}$ $I_C = -1\text{A}$, $I_B = -100\text{mA}$ $I_C = -2\text{A}$, $I_B = -200\text{mA}$ $I_C = -5\text{A}$, $I_B = -500\text{mA}$
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)}$	—	-950	-1050	mV	$I_C = -5\text{A}$, $I_B = -500\text{mA}$
Base-Emitter Turn-on Voltage (Note 9)	$V_{BE(on)}$	—	-840	-950	mV	$I_C = -5\text{A}$, $V_{CE} = -1\text{V}$
Transitional Frequency (Note 9)	f_T	—	120	—	MHz	$I_C = -100\text{mA}$, $V_{CE} = -10\text{V}$, $f = 50\text{MHz}$
Output Capacitance	C_{obo}	—	48	—	pF	$V_{CB} = -10\text{V}$, $f = 1\text{MHz}$
Switching Time	t_{on}	—	39	—	ns	$V_{CC} = -10\text{V}$, $I_C = -1\text{A}$, $I_{B1} = -I_{B2} = -100\text{mA}$
	t_{off}	—	370	—		

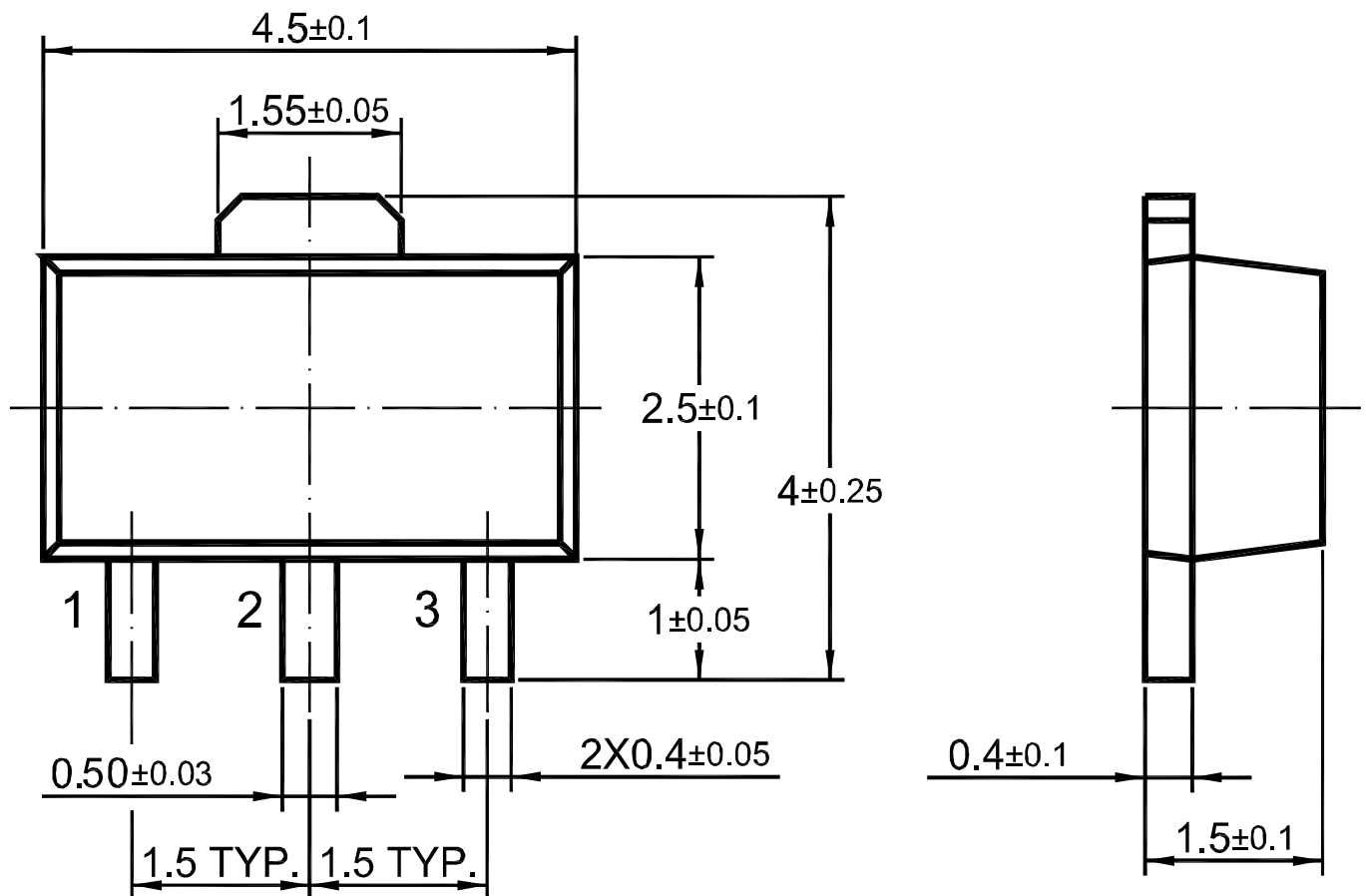
Note: 9. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

Thermal Characteristics and Derating Information



Typical Characteristic Curves

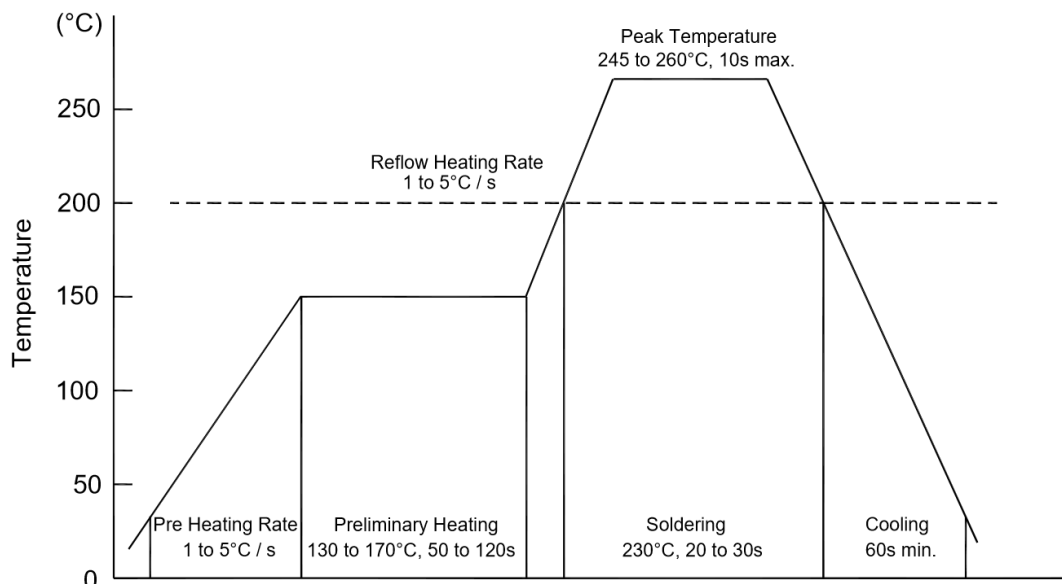




Device	Package	Shipping
TNTP2012SQ	SOT-89	1,000/3,000PCS/Reel&7inches

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

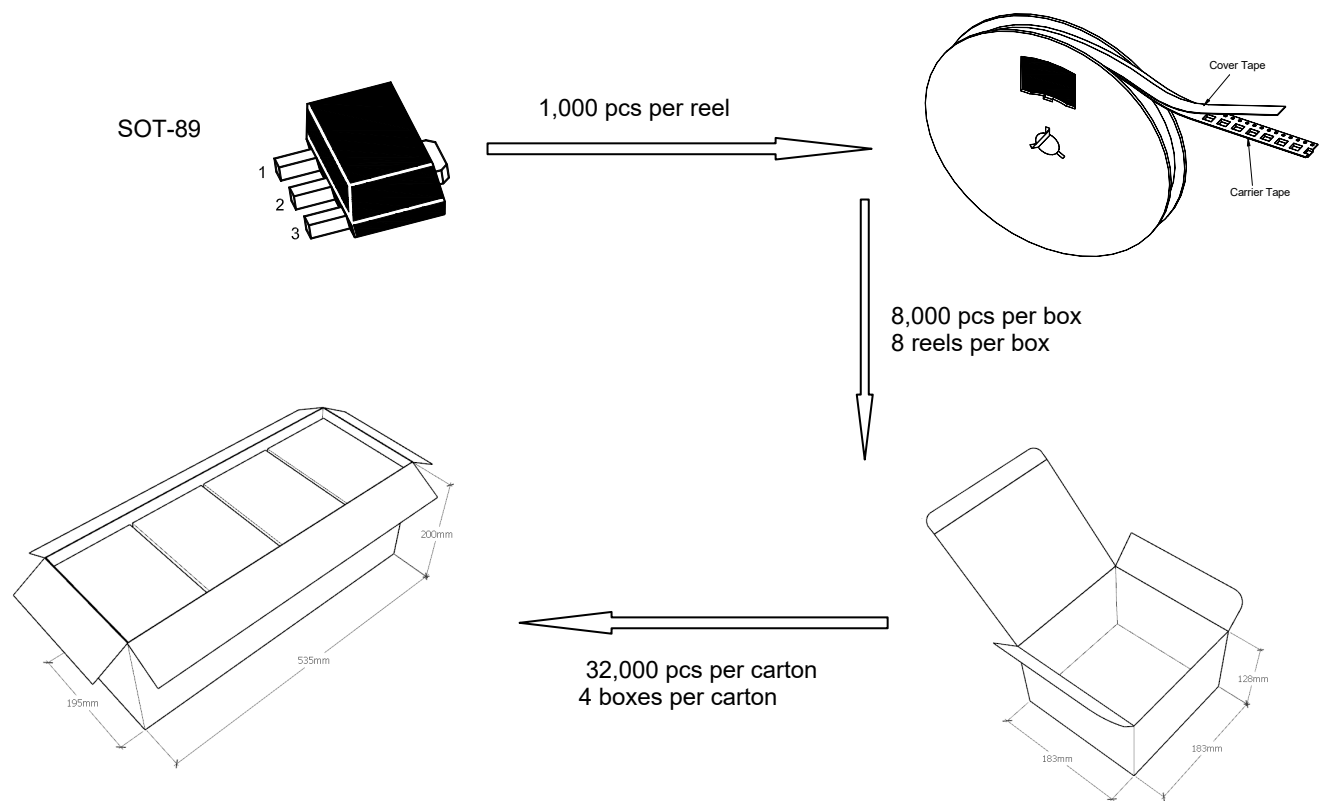
- Temperature: 370 °C
- Time: 3s max.
- Times: one time

◆ Storage conditions

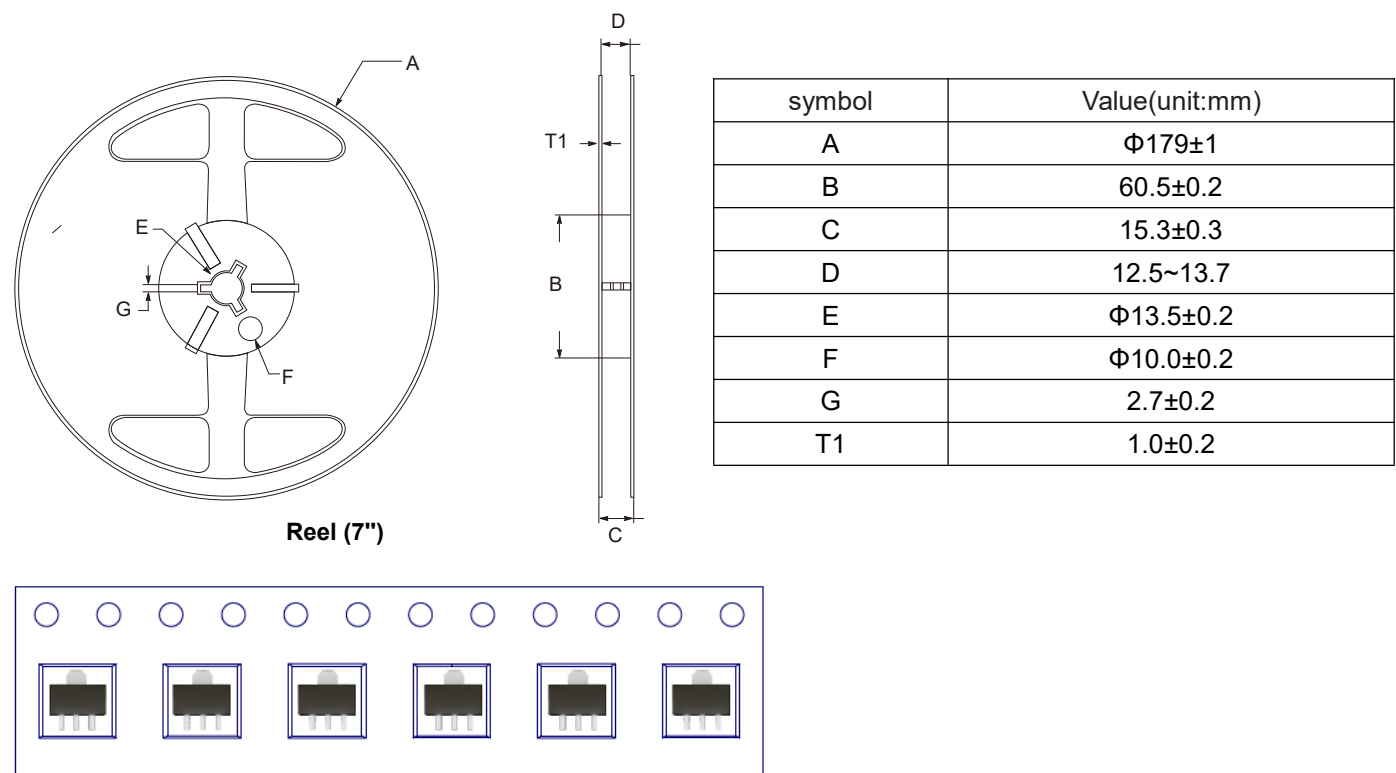
- **Temperature**
5 to 40 °C
- **Humidity**
30 to 80% RH
- **Recommended period**
One year after manufacturing

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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