TNTN2010SQ

NPN Transistor

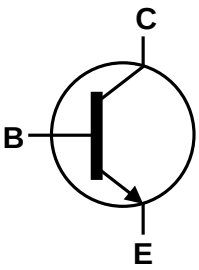
Features

- For switching and amplifier applications

SOT89

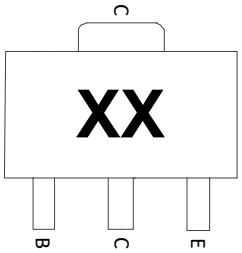
Top View

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) Linear Derating Factor	P_D	1.5 12	W mW/°C
Power Dissipation (Note 2) Linear Derating Factor	P_D	2.1 16.8	W mW/°C
Thermal Resistance, Junction to Ambient (Note 1)	$R_{\theta JA}$	83	°C/W
Thermal Resistance, Junction to Ambient (Note 2)	$R_{\theta JA}$	60	°C/W
Thermal Resistance, Junction to Case (Note 1)	$R_{\theta JC}$	5.3	°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

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

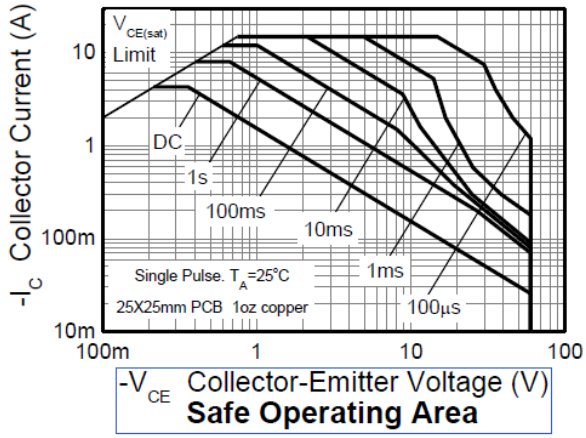
Notes:
1.For a device mounted with the exposed collector pad on 25mm x 25mm 1oz copper that is on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in a steady-state.
2.Same as note (5), except the device is mounted on 50mm x 50mm 1oz copper.
3.Thermal resistance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

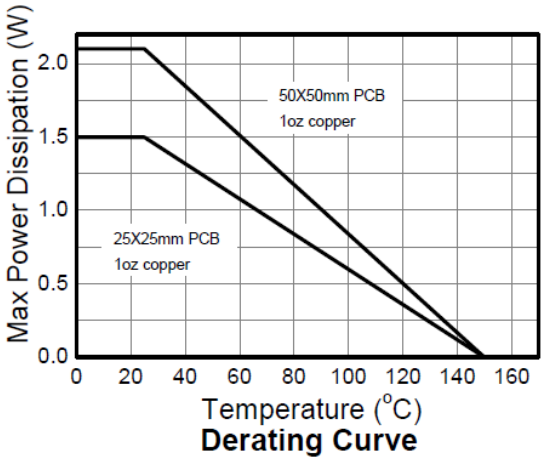
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

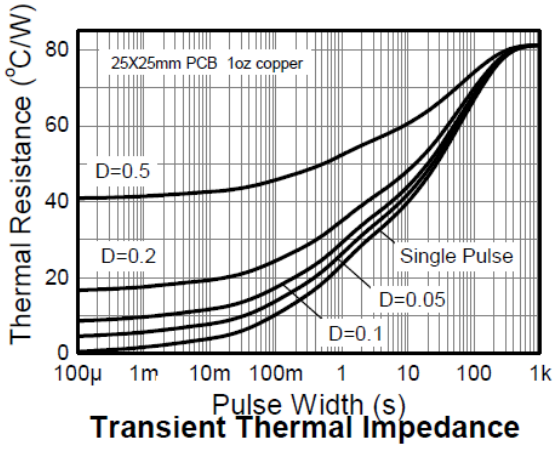
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	150	190	—	V	I_C = 100μA
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CER}	150	190	—	V	I_C = 1μA, R_B ≤ 1kΩ
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	60	80	—	V	I_C = 10mA
Emitter-Base Breakdown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

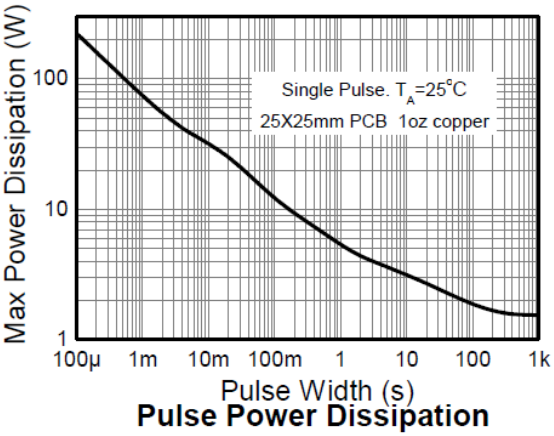
Note: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

Thermal Characteristics and Derating Information









Typical Characteristic Curves

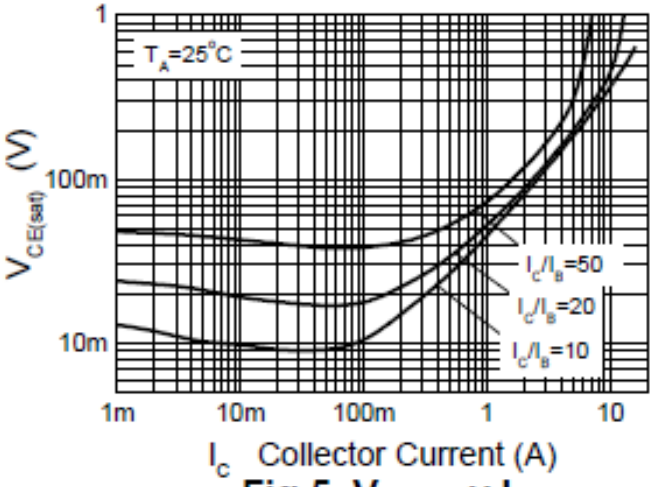


Fig 5. $V_{CE(sat)}$ v I_C

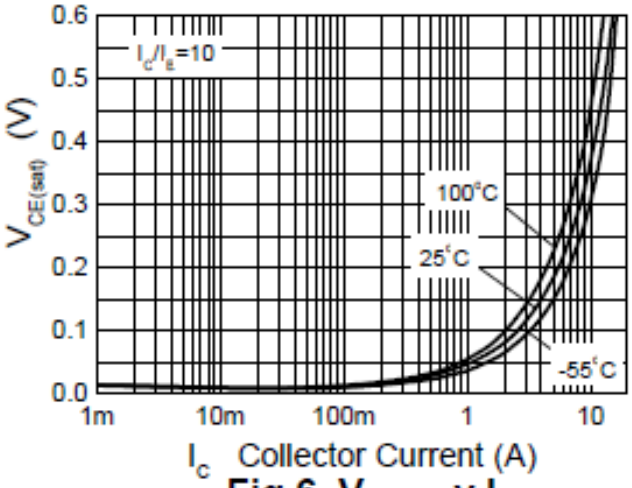


Fig 6. $V_{CE(sat)}$ v I_C

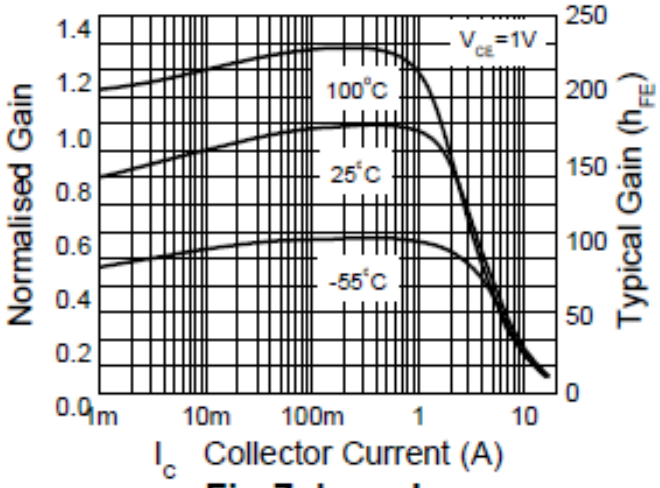


Fig 7. h_{FE} v I_C

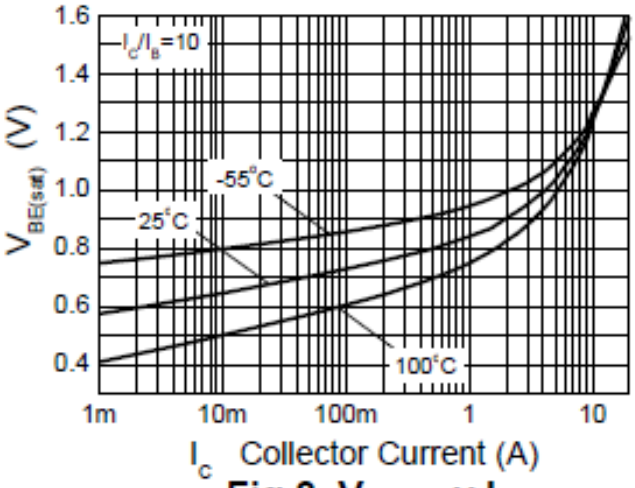


Fig 8. $V_{BE(sat)}$ v I_C

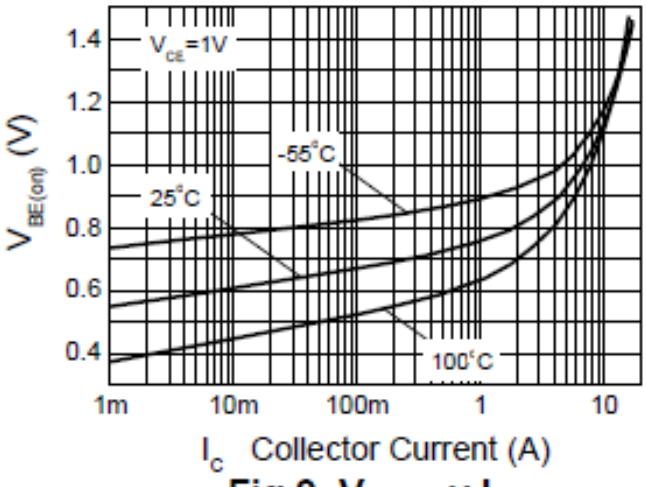
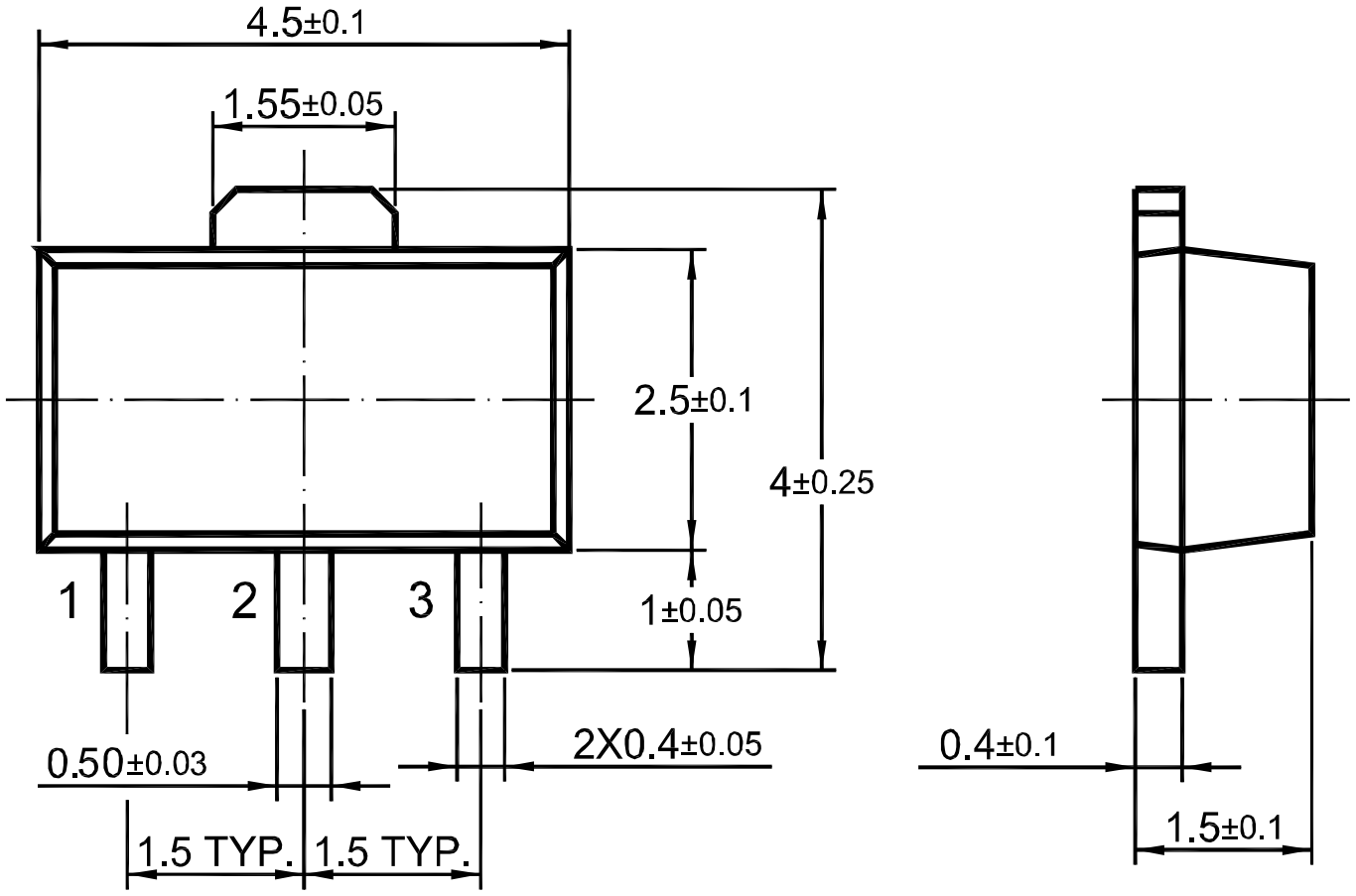


Fig 9. $V_{BE(on)}$ v I_C

Package Outline

SOT-89

Dimensions in mm

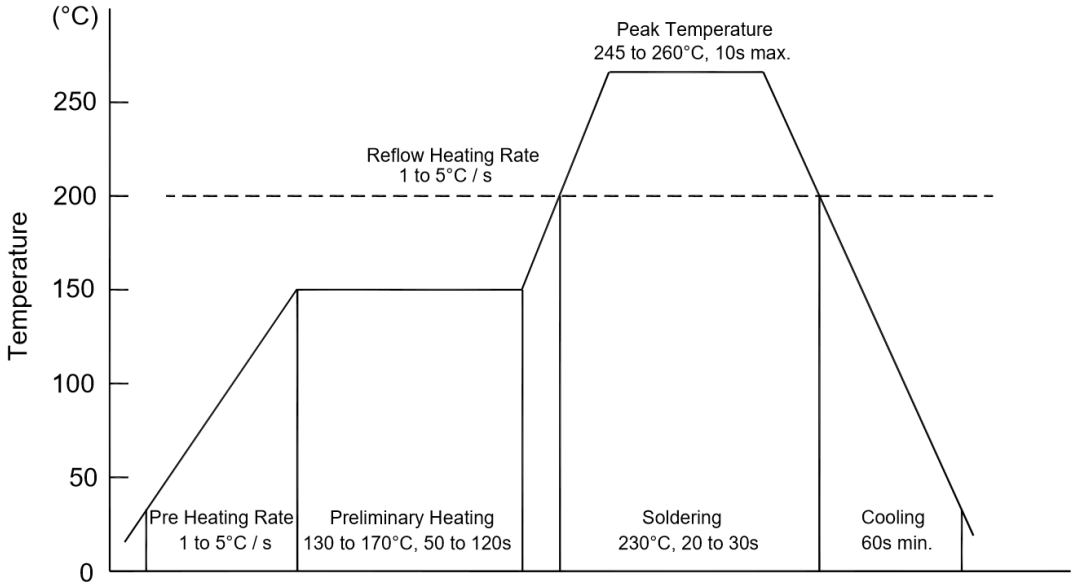


Ordering Information

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 ^{O}C. If peak temperature is below 245 ^{O}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

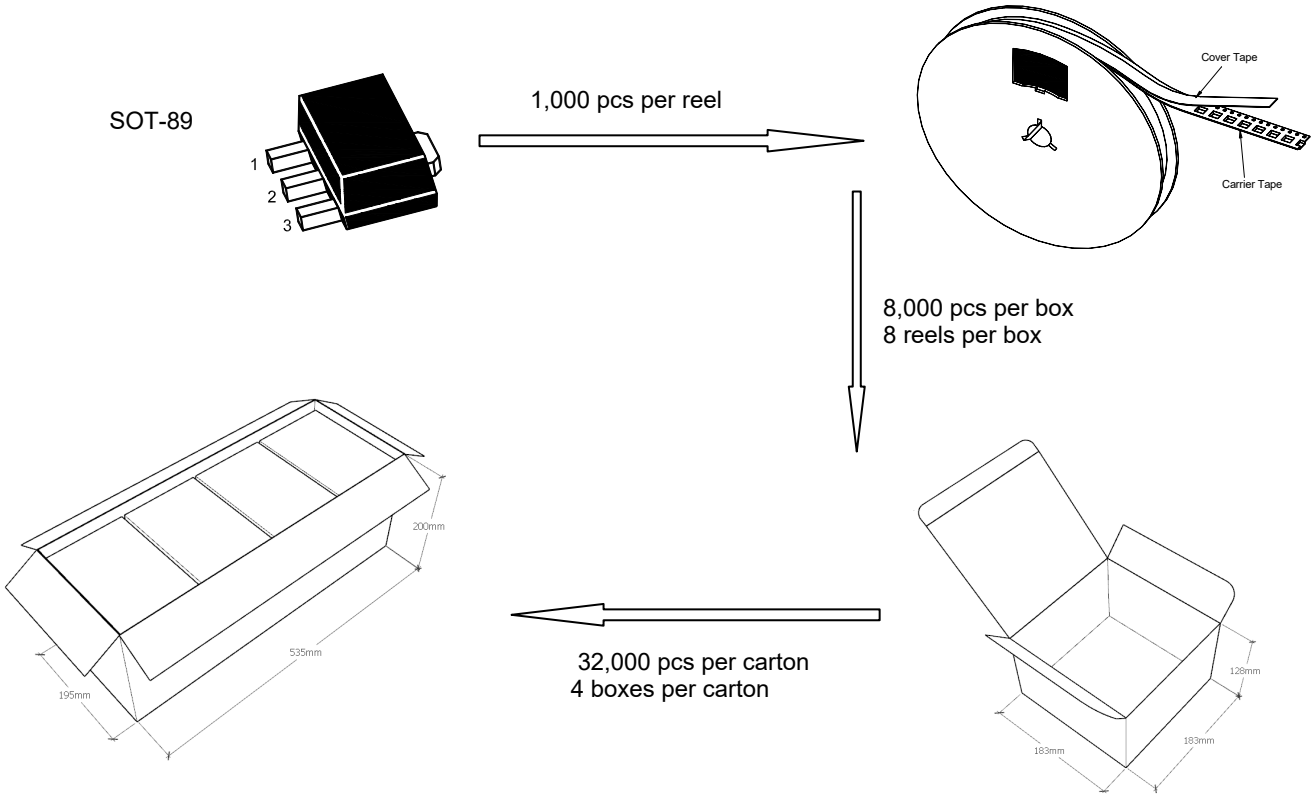
- Temperature: 370 ^{O}C
- Time: 3s max.
- Times: one time

◆ Storage conditions

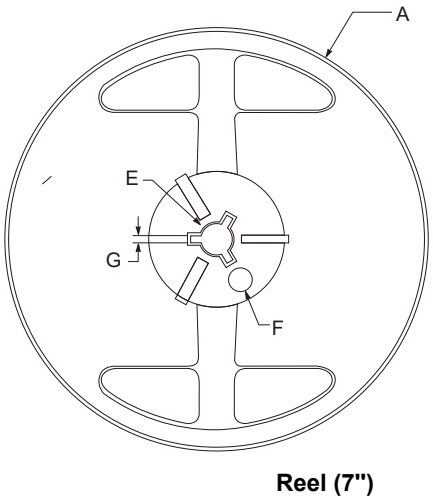
- **Temperature**
  5 to 40 ^{O}C
- **Humidity**
  30 to 80% RH
- **Recommended period**
  One year after manufacturing

Package Specifications

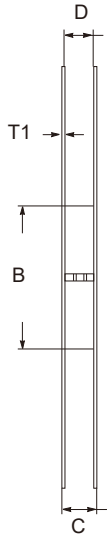
- The method of packaging



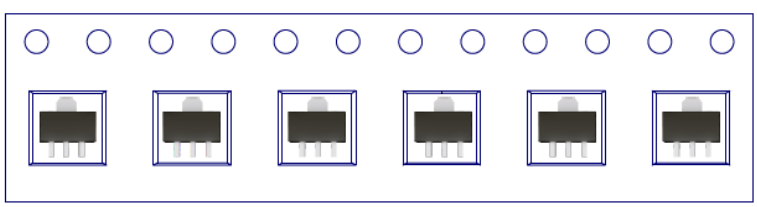
◆ **Embossed tape and reel data**



Reel (7")



symbol	Value(unit:mm)
A	Φ179±1
B	60.5±0.2
C	15.3±0.3
D	12.5~13.7
E	Φ13.5±0.2
F	Φ10.0±0.2
G	2.7±0.2
T1	1.0±0.2



Contact Information

TANI website: **http://www.tanisemi.com** Email:tani@tanisemi.com

For additional information, please contact your local Sales Representative.

