

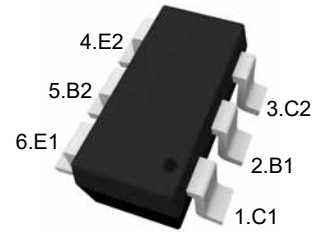
Features

- Low Saturation Voltage
- Low Equivalent On-Resistance
- For switching and amplifier applications

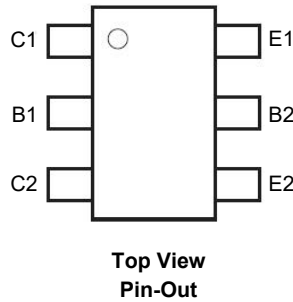
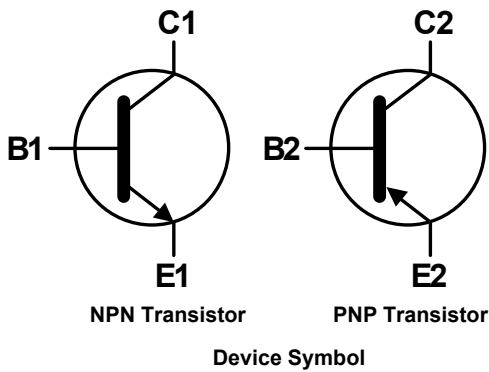
Applications

- MOSFET Gate Driver
- Low Power Motor Drive
- Low Power DC-DC Converters

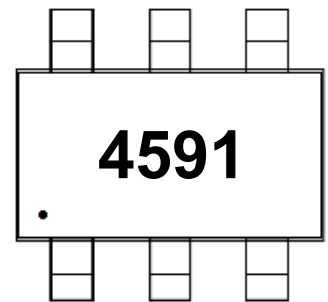
SOT-23-6



Equivalent Circuit



Marking Code



Absolute Maximum Ratings

Ratings at 25°C ambient temperature unless otherwise specified.

Parameter	Symbol	NPN Transistors	PNP Transistors	Unit
Collector Base Voltage	V_{CB0}	80	-80	V
Collector Emitter Voltage	V_{CE0}	60	-60	V
Emitter Base Voltage	V_{EB0}	7	-7	V
Collector Current	I_C	1	-1	A
Peak Collector Current	I_{CM}	2	-2	A
Maximum Power Dissipation ^{Note1}	P_D	1		W
Junction Temperature	T_J	150		°C
Storage Temperature Range	T_{STG}	-55 to +150		°C

Note1: For a device mounted with the collector lead on 25mm x 25mm 1oz copper that is on a single-sided 1.6mm FR4 PCB.



MMDT4591SG

Complementary Medium Power Transistors

NPN Electrical Characteristics (T_A=25°C)

Parameter	Symbol	Min.	Max.	Unit
DC Current Gain at V _{CE} = 5 V, I _C = 1 mA at V _{CE} = 5 V, I _C = 500 mA at V _{CE} = 5 V, I _C = 1 A at V _{CE} = 5 V, I _C = 2 A	H _{FE}	100 100 80 30	-- 300 -- --	--
Collector Base Cutoff Current at V _{CB} = 60V	I _{CBO}	--	100	nA
Emitter Base Cutoff Current at V _{EB} = 5.6 V	I _{EBO}	--	100	nA
Collector Base Breakdown Voltage at I _C = 100 μA	V _{(BR)CBO}	80	--	V
Collector Emitter Breakdown Voltage at I _C = 10 mA	V _{(BR)CEO}	60	--	V
Emitter Base Breakdown Voltage at I _E = 100 μA	V _{(BR)EBO}	7	--	V
Collector Emitter Saturation Voltage at I _C = 500 mA, I _B = 50 mA at I _C = 1 A, I _B = 100 mA	V _{CE(sat)}	-- --	250 500	mV
Base Emitter Saturation Voltage at I _C = 1 A, I _B = 100 mA	V _{BE(sat)}	--	1.1	V
Base Emitter On Voltage at V _{CE} = 5 V, I _C = 1 A	V _{BE(on)}	--	1	V
Transition Frequency at V _{CE} = 10 V, I _C = 50 mA, f = 100 MHz	F _T	150	--	MHz
Output Capacitance at V _{CB} = 10 V, f = 1 MHz	C _{ob}	--	10	pF



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

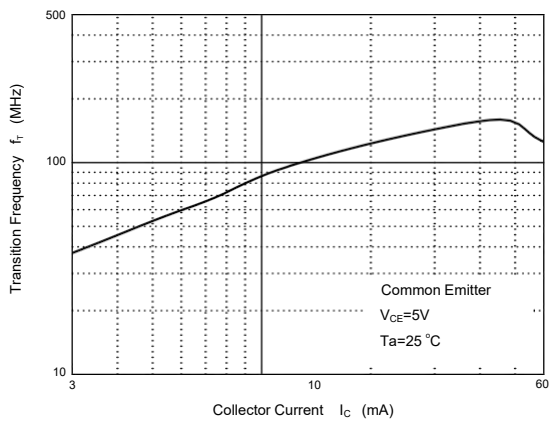
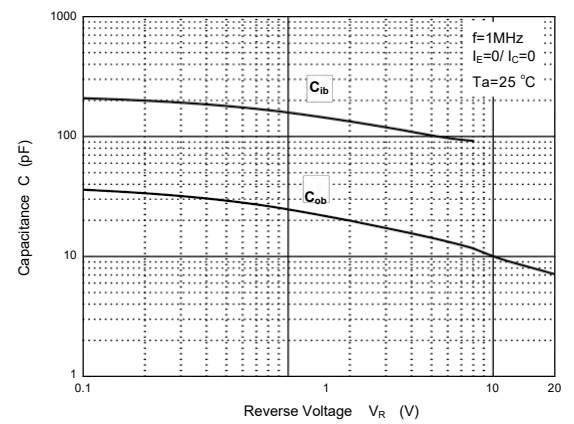
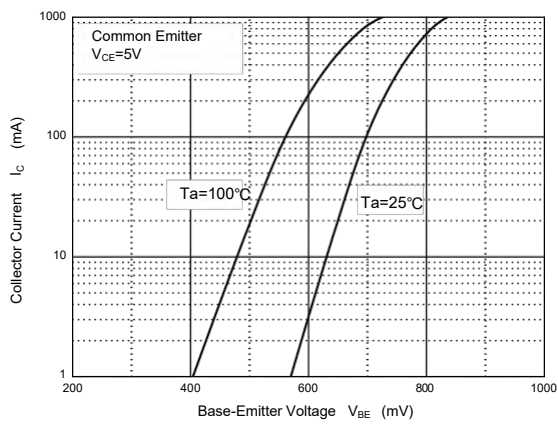
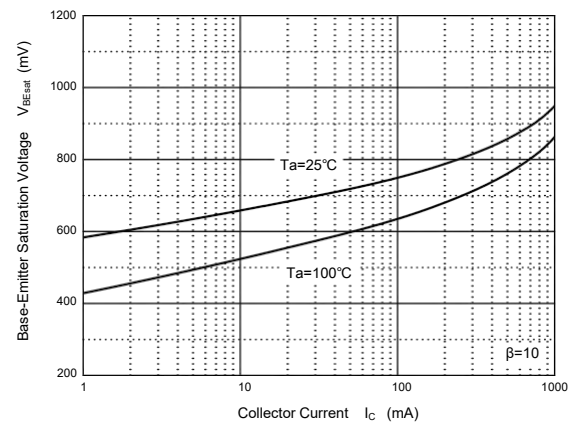
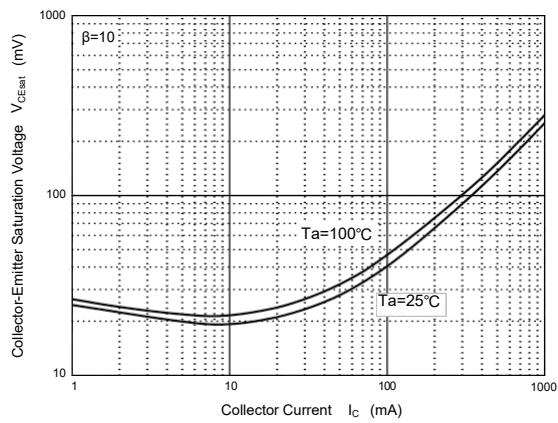
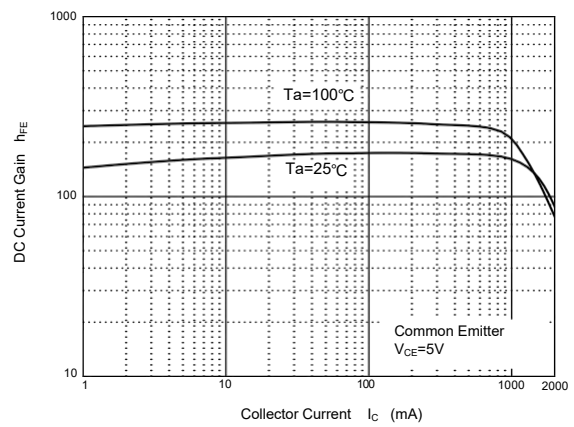
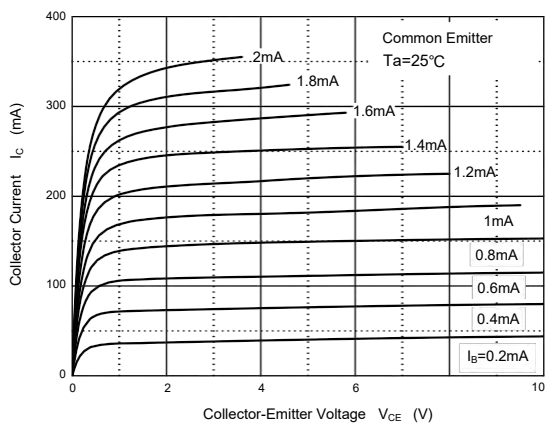
Parameter	Symbol	Min.	Max.	Unit
DC Current Gain at $V_{CE} = -5\text{ V}$, $I_C = -1\text{ mA}$ at $V_{CE} = -5\text{ V}$, $I_C = -500\text{ mA}$ at $V_{CE} = -5\text{ V}$, $I_C = -1\text{ A}$ at $V_{CE} = -5\text{ V}$, $I_C = -2\text{ A}$	H_{FE}	100 100 80 15	-- 300 -- --	--
Collector Base Cutoff Current at $V_{CB} = -60\text{ V}$	$-I_{CBO}$	--	100	nA
Emitter Base Cutoff Current at $V_{EB} = -5.6\text{ V}$	$-I_{EBO}$	--	100	nA
Collector Base Breakdown Voltage at $I_C = -100\text{ }\mu\text{A}$	$-V_{(BR)CBO}$	80	--	V
Collector Emitter Breakdown Voltage at $I_C = -10\text{ mA}$	$-V_{(BR)CEO}$	60	--	V
Emitter Base Breakdown Voltage at $I_E = -100\text{ }\mu\text{A}$	$-V_{(BR)EBO}$	7	--	V
Collector Emitter Saturation Voltage at $I_C = -500\text{ mA}$, $I_B = -50\text{ mA}$ at $I_C = -1\text{ A}$, $I_B = -100\text{ mA}$	$-V_{CE(sat)}$	-- --	300 600	mV
Base Emitter Saturation Voltage at $I_C = -1\text{ A}$, $I_B = -100\text{ mA}$	$-V_{BE(sat)}$	--	1.2	V
Base Emitter On Voltage at $V_{CE} = -5\text{ V}$, $I_C = -1\text{ A}$	$-V_{BE(on)}$	--	1	V
Transition Frequency at $V_{CE} = -10\text{ V}$, $I_C = -50\text{ mA}$, $f = 100\text{ MHz}$	F_T	150	--	MHz
Output Capacitance at $V_{CB} = -10\text{ V}$, $f = 1\text{ MHz}$	C_{ob}	--	10	pF



MMDT4591SG

Complementary Medium Power Transistors

NPN Typical Characteristic Curves

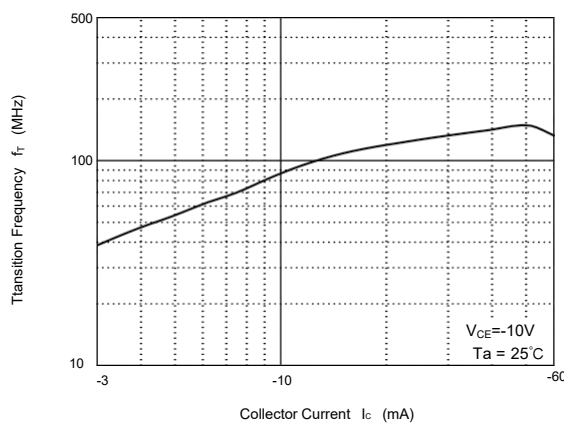
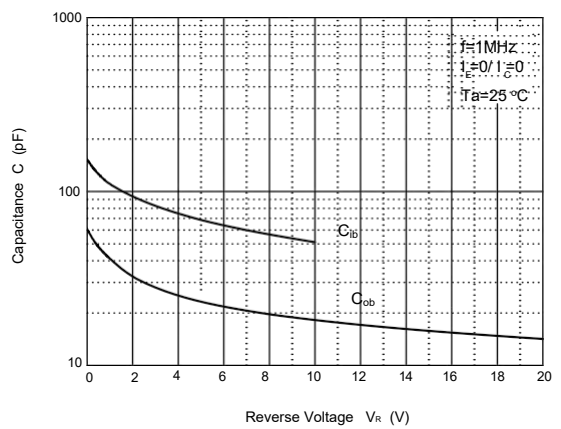
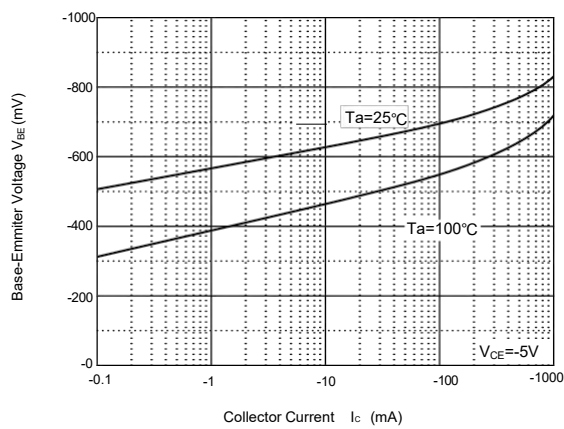
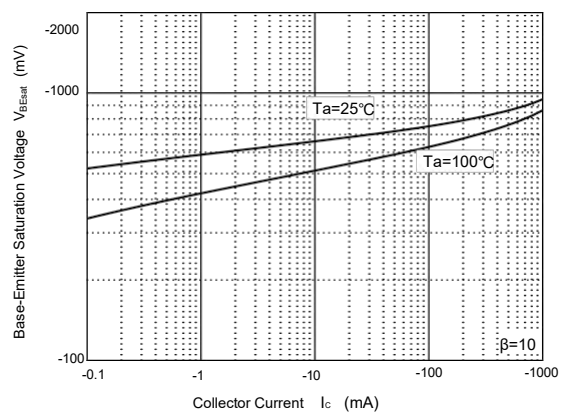
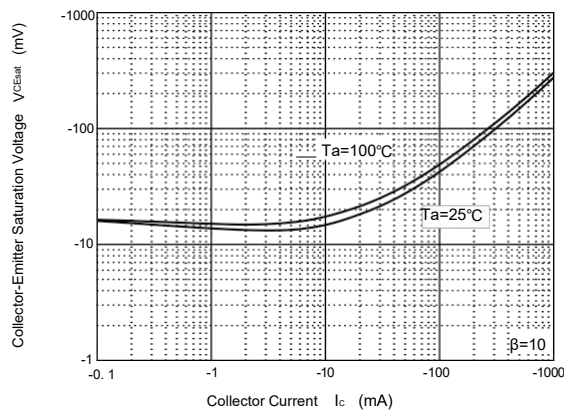
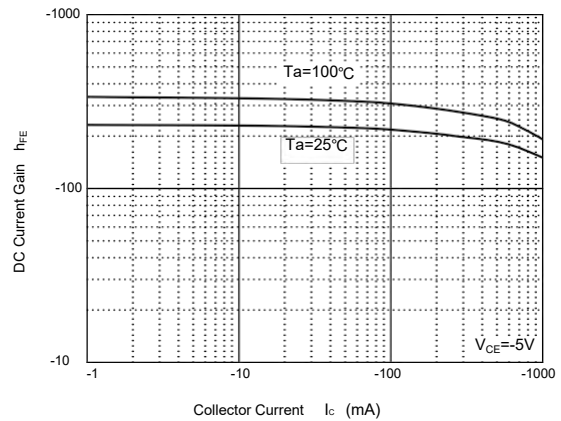
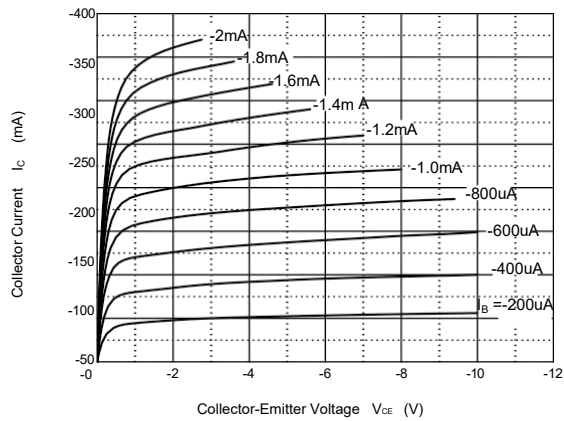




MMDT4591SG

Complementary Medium Power Transistors

PNP Typical Characteristic Curves





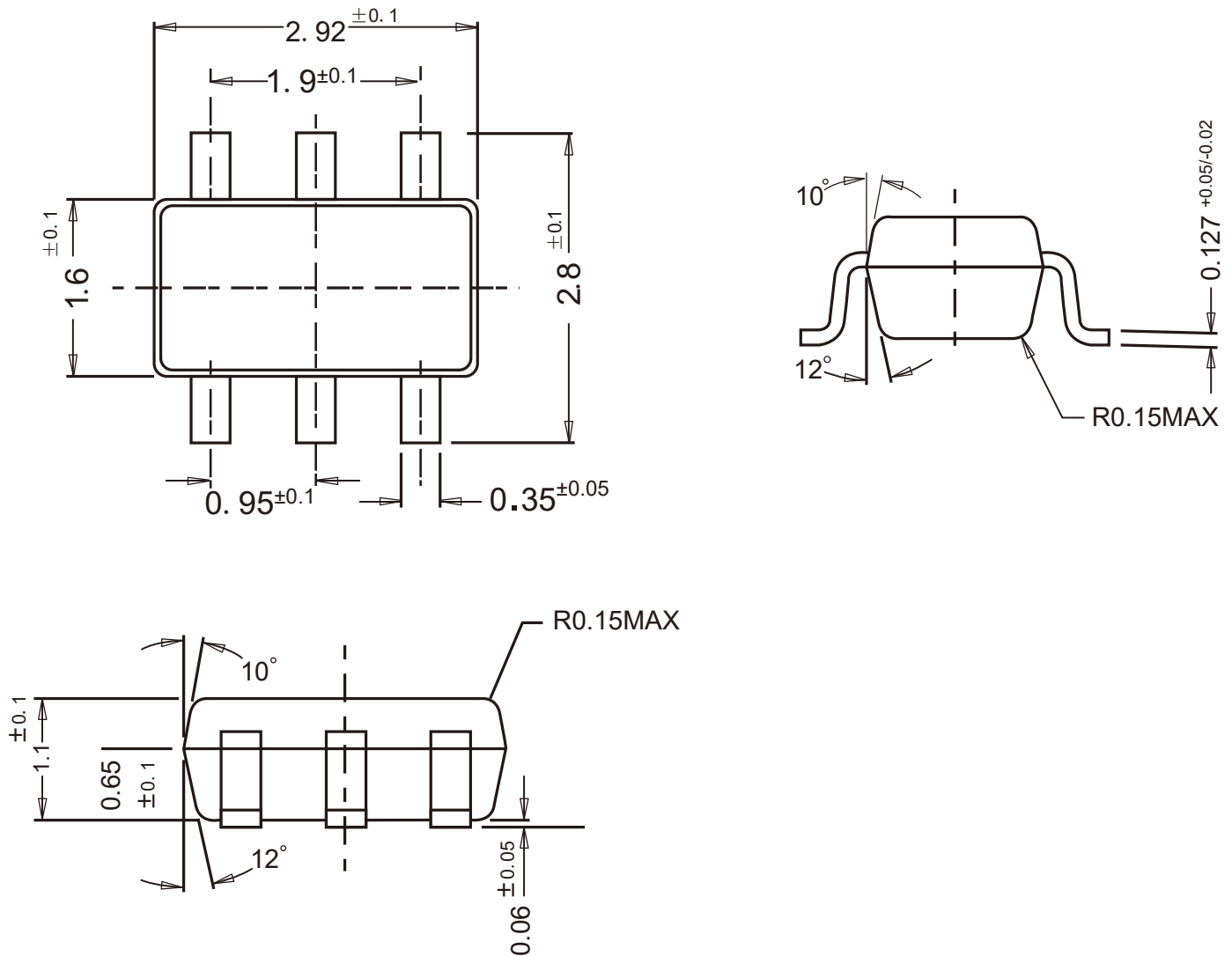
MMDT4591SG

Complementary Medium Power Transistors

Package Outline

SOT-23-6

Dimensions in mm



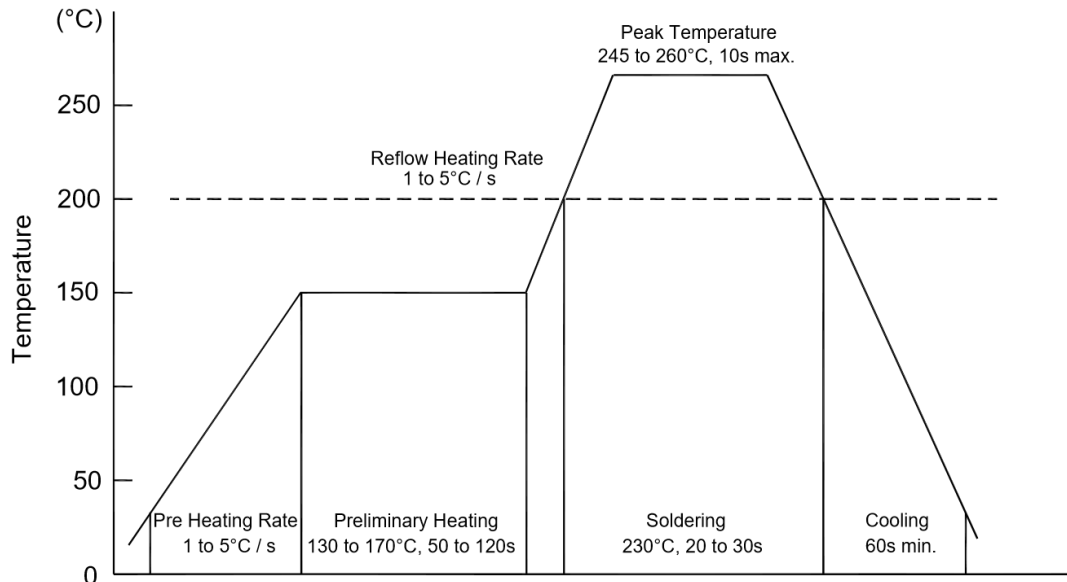
Ordering Information

Device	Package	Shipping
MMDT4591SG	SOT-23-6	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

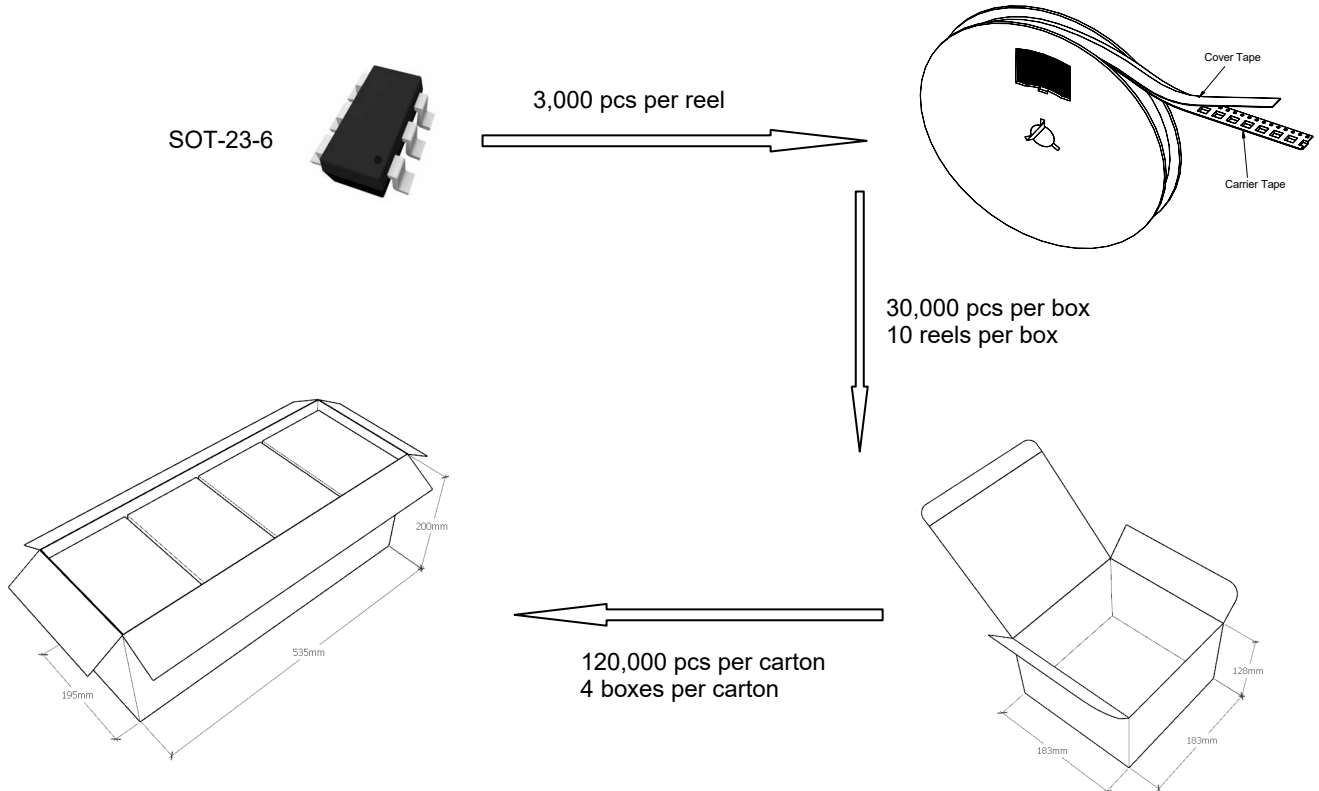
- Temperature: 370 °C
- Time: 3s max.
- Times: one time

◆ Storage conditions

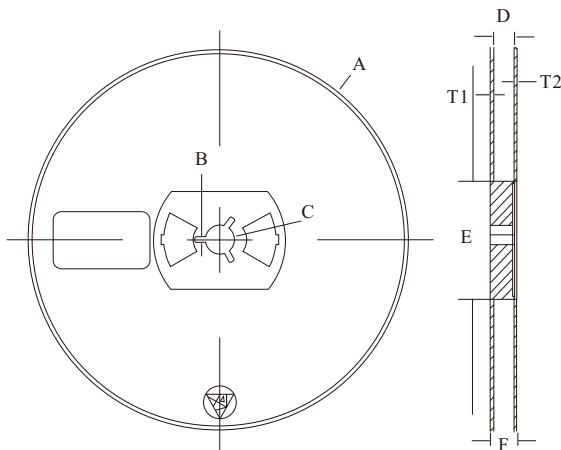
- **Temperature**
5 to 40 °C
- **Humidity**
30 to 80% RH
- **Recommended period**
One year after manufacturing

Package Specifications

- The method of packaging

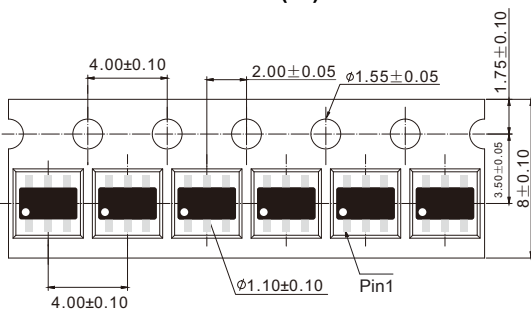


◆ Embossed tape and reel data



Symbol	Value (unit: mm)
A	∅ 177.8±1
B	2.7±0.2
C	∅ 13.5±0.2
E	∅ 54.5±0.2
F	12.3±0.3
D	9.6+2/-0.3
T1	1.0±0.2
T2	1.2±0.2

Reel (7")



Tape (8mm)