

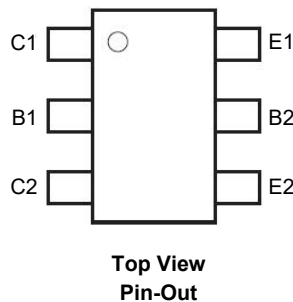
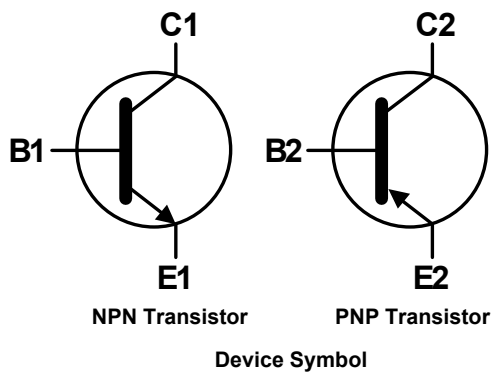
Features

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

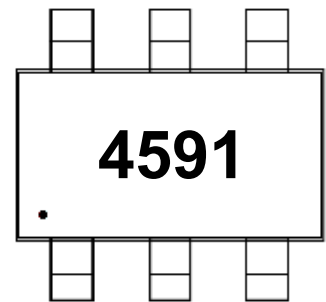
Applications

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

Equivalent Circuit



Marking Code



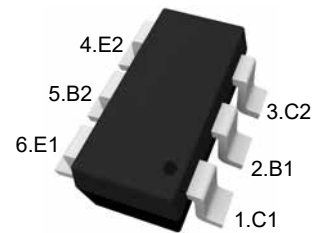
Absolute Maximum Ratings

Ratings at 25°C ambient temperature unless otherwise specified.

Parameter	Symbol	NPN Transistors	PNP Transistors	Unit
Collector Base Voltage	V_{CBO}	80	-80	V
Collector Emitter Voltage	V_{CEO}	60	-60	V
Emitter Base Voltage	V_{EBO}	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.

SOT-23-6



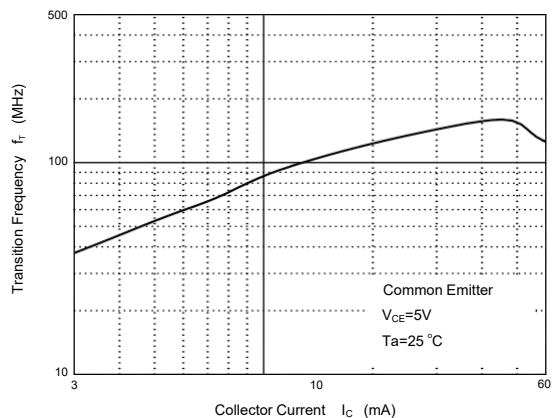
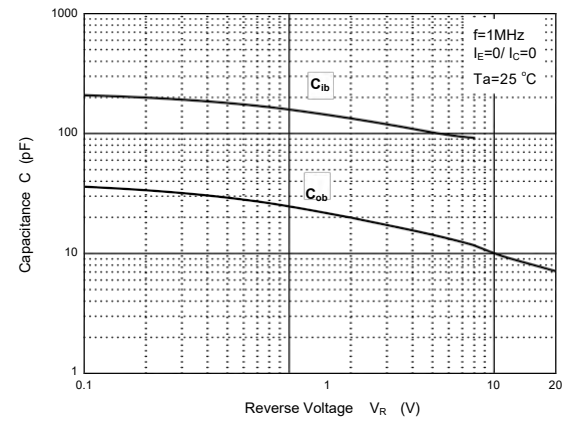
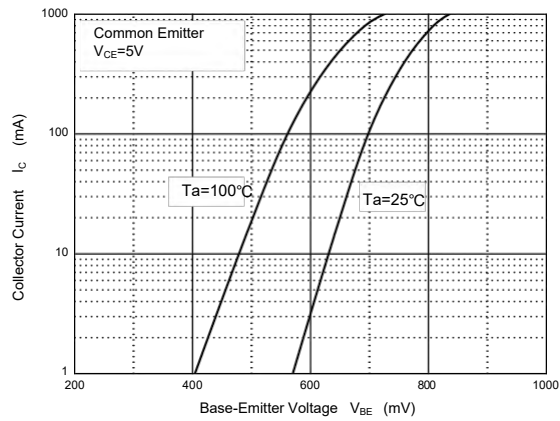
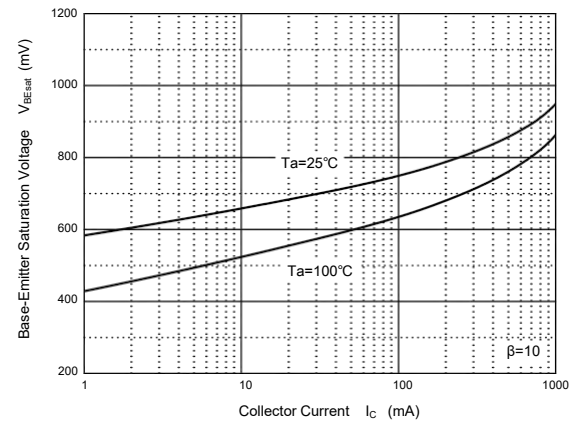
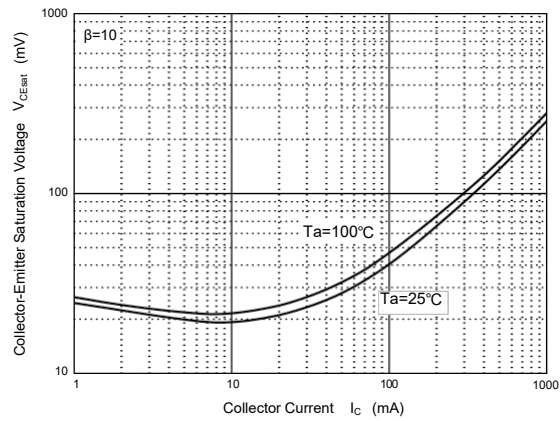
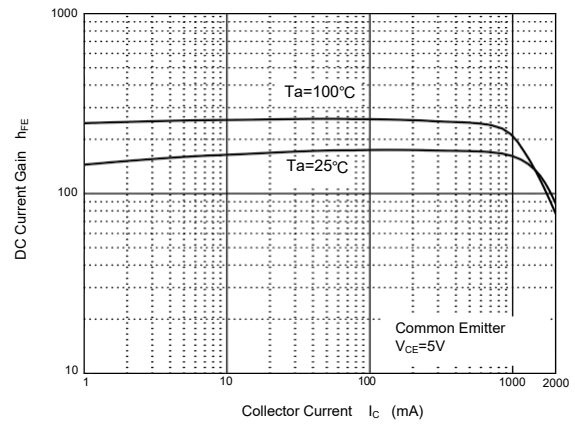
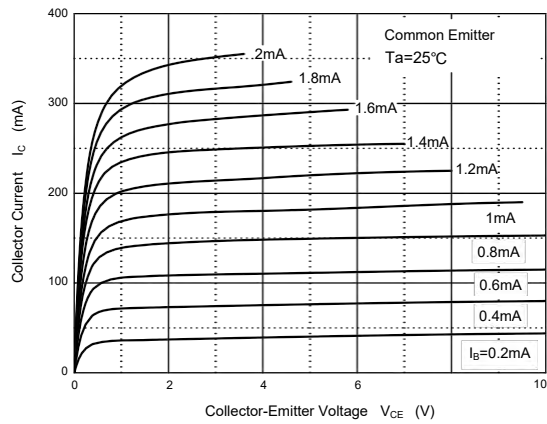
NPN Electrical Characteristics (T_A=25°C)

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

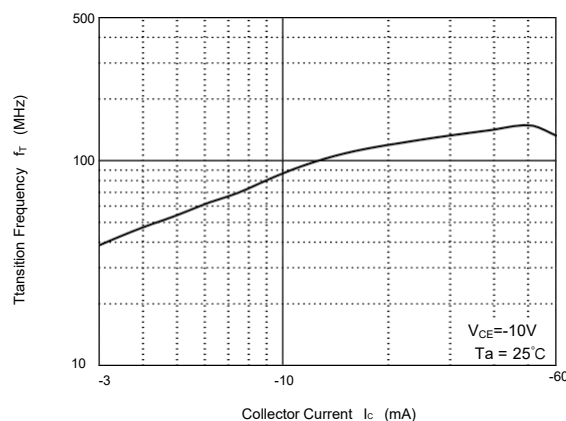
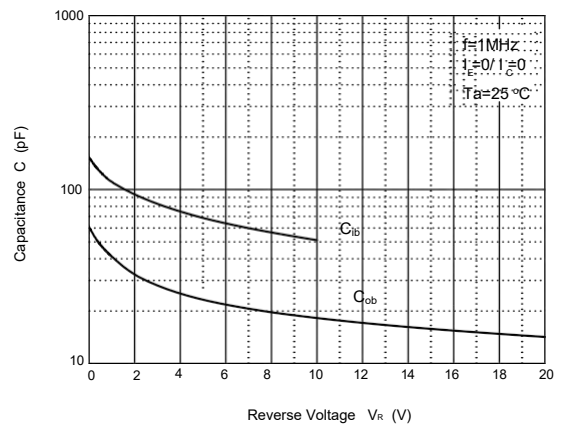
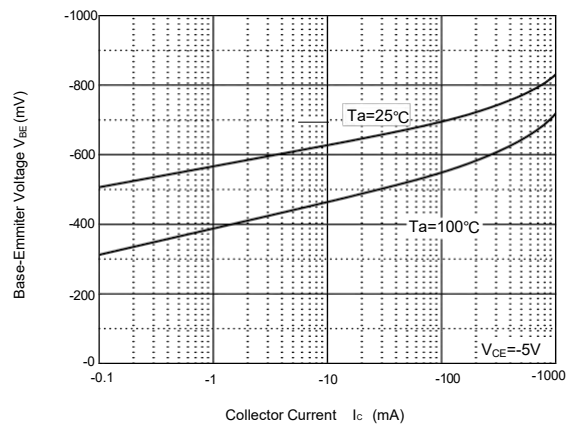
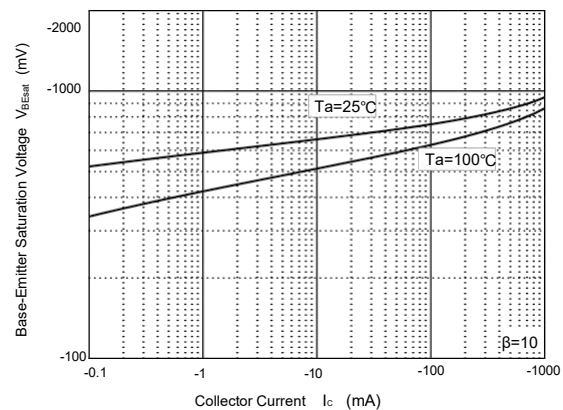
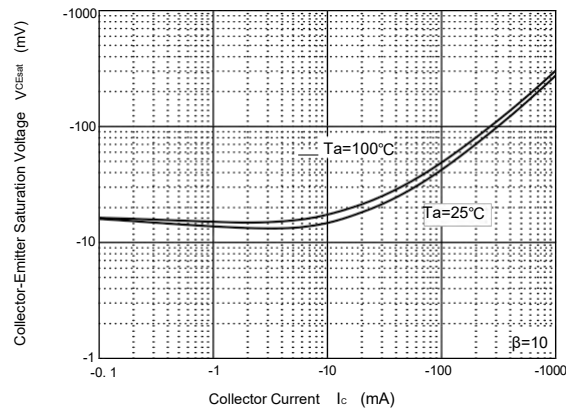
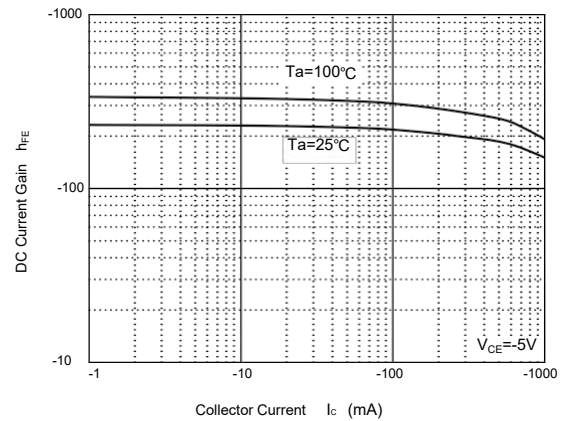
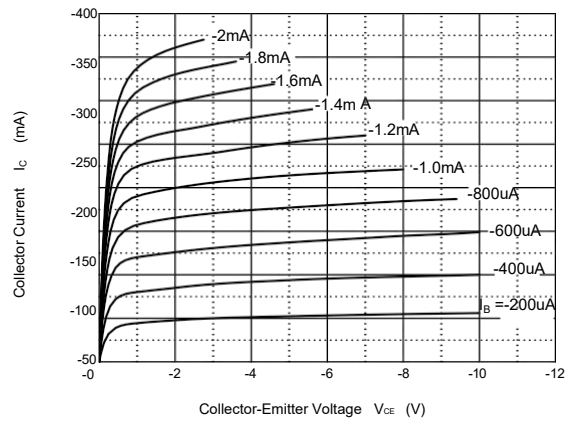
PNP Electrical Characteristics (T_A=25°C)

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 15	-- 300 -- --	--
Collector Base Cutoff Current at V _{CB} = -60V	-I _{CB0}	--	100	nA
Emitter Base Cutoff Current at V _{EB} = -5.6 V	-I _{EB0}	--	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)}	-- --	300 600	mV
Base Emitter Saturation Voltage at I _C = -1 A, I _B = -100 mA	-V _{BE(sat)}	--	1.2	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

NPN Typical Characteristic Curves



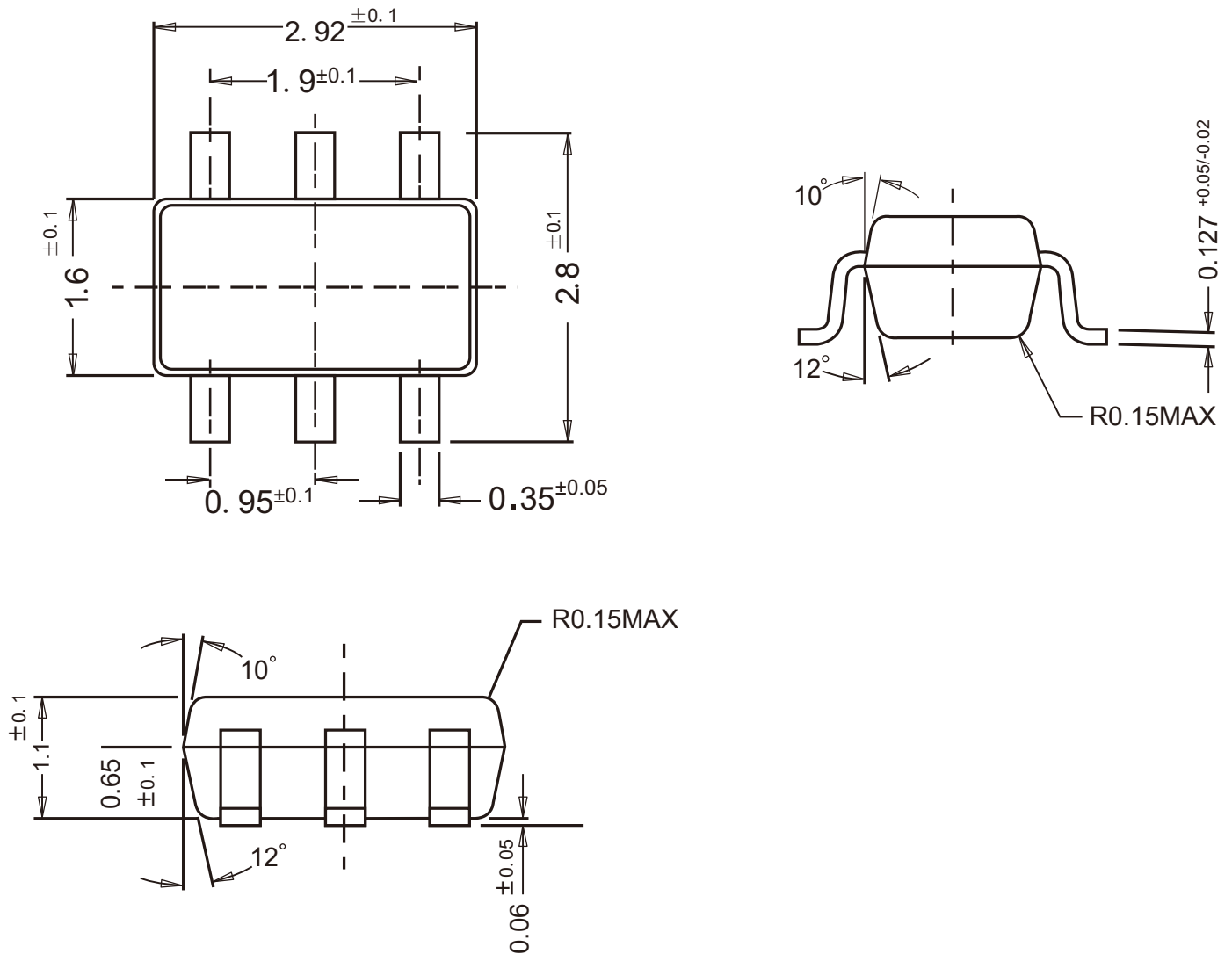
PNP Typical Characteristic Curves



Package Outline

SOT-23-6

Dimensions in mm

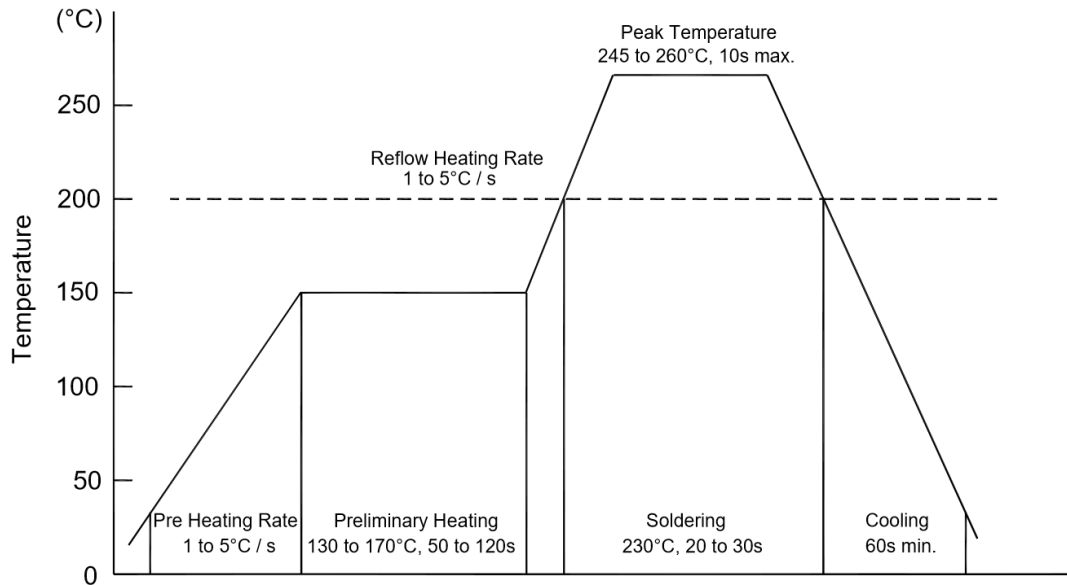


Ordering Information

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

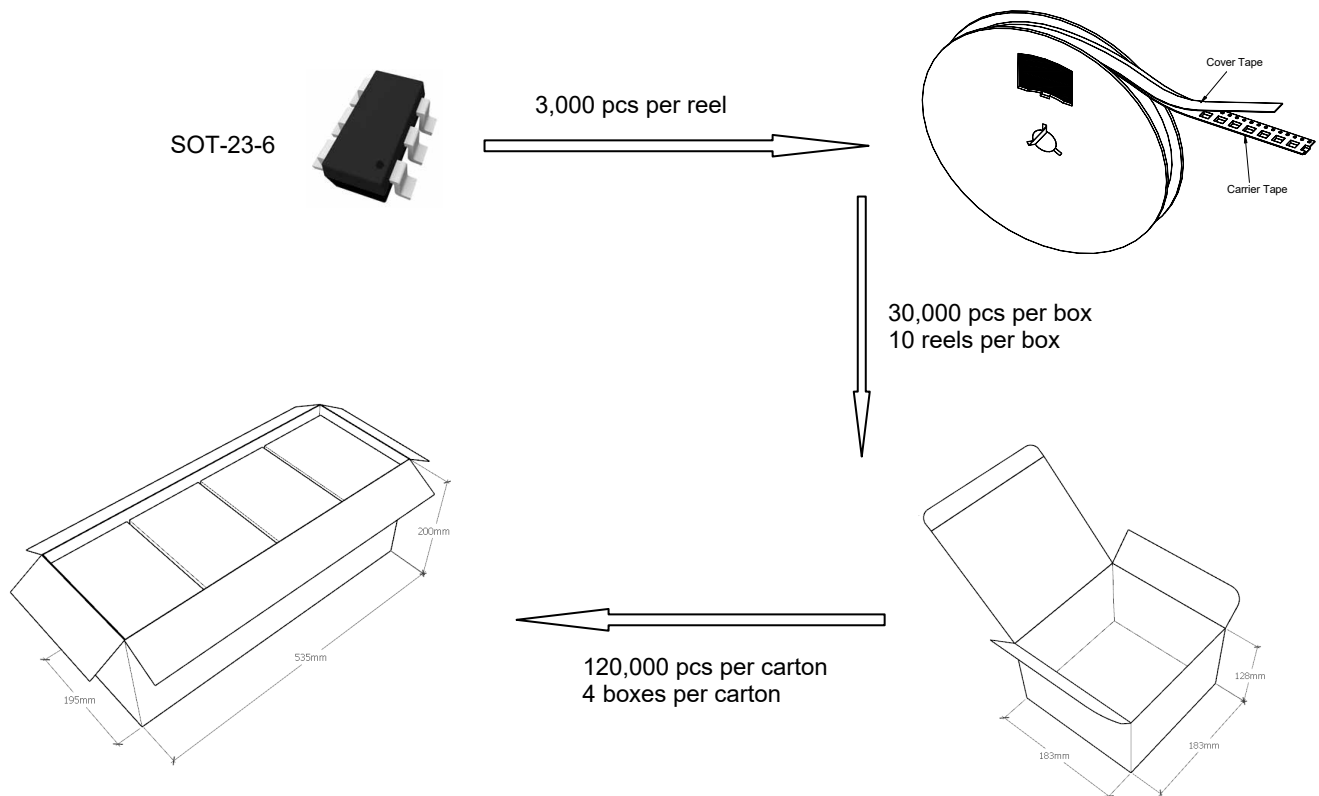
- Temperature: 370 °C
- Time: 3s max.
- Times: one time

◆ Storage conditions

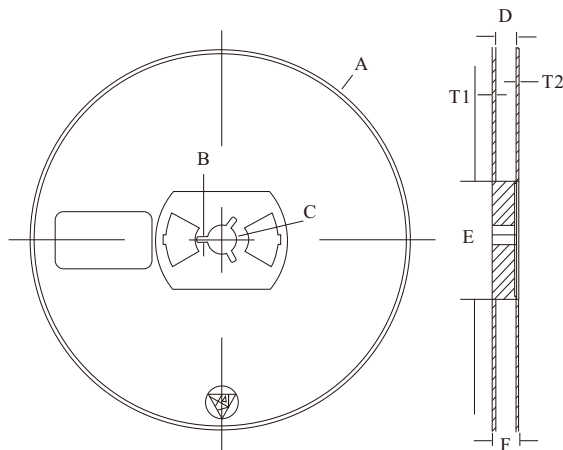
- **Temperature**
5 to 40 °C
- **Humidity**
30 to 80% RH
- **Recommended period**
One year after manufacturing

Package Specifications

- The method of packaging



◆ Embossed tape and reel data



Symbol	Value (unit: mm)
A	Ø 177.8±1
B	2.7±0.2
C	Ø 13.5±0.2
E	Ø 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

Contact Information

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

For additional information, please contact your local Sales Representative.

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Product Specification Statement

The product specification aims to provide users with a reference regarding various product parameters, performance, and usage. It presents certain aspects of the product's performance in graphical form and is intended solely for users to select product and make product comparisons, enabling users to better understand and evaluate the characteristics and advantages of the product. It does not constitute any commitment, warranty, or guarantee.

The product parameters described in the product specification are numerical values, characteristics, and functions obtained through actual testing or theoretical calculations of the product in an independent or ideal state. Due to the complexity of product applications and variations in test conditions and equipment, there may be slight fluctuations in parameter test values. TANI shall not guarantee that the actual performance of the product when installed in the customer's system or equipment will be entirely consistent with the product specification, especially concerning dynamic parameters. It is recommended that users consult with professionals for product selection and system design. Users should also thoroughly validate and assess whether the actual parameters and performance when installed in their respective systems or equipment meet their requirements or expectations. Additionally, users should exercise caution in verifying product compatibility issues, and TANI assumes no responsibility for the application of the product. TANI strives to provide accurate and up-to-date information to the best of our ability. However, due to technical, human, or other reasons, TANI cannot guarantee that the information provided in the product specification is entirely accurate and error-free. TANI shall not be held responsible for any losses or damages resulting from the use or reliance on any information in these product specifications.

TANI reserves the right to revise or update the product specification and the products at any time without prior notice, and the user's continued use of the product specification is considered an acceptance of these revisions and updates. Prior to purchasing and using the product, users should verify the above information with TANI to ensure that the product specification is the most current, effective, and complete. If users are particularly concerned about product parameters, please consult TANI in detail or request relevant product test reports. Any data not explicitly mentioned in the product specification shall be subject to separate agreement.

Users are advised to pay attention to the parameter limit values specified in the product specification and maintain a certain margin in design or application to ensure that the product does not exceed the parameter limit values defined in the product specification. This precaution should be taken to avoid exceeding one or more of the limit values, which may result in permanent irreversible damage to the product, ultimately affecting the quality and reliability of the system or equipment.

The design of the product is intended to meet civilian needs and is not guaranteed for use in harsh environments or precision equipment. It is not recommended for use in systems or equipment such as medical devices, aircraft, nuclear power, and similar systems, where failures in these systems or equipment could reasonably be expected to result in personal injury. TANI shall assume no responsibility for any consequences resulting from such usage.

Users should also comply with relevant laws, regulations, policies, and standards when using the product specification. Users are responsible for the risks and liabilities arising from the use of the product specification and must ensure that it is not used for illegal purposes. Additionally, users should respect the intellectual property rights related to the product specification and refrain from infringing upon any third-party legal rights. TANI shall assume no responsibility for any disputes or controversies arising from the above-mentioned issues in any form.