



TN60H12MNSA

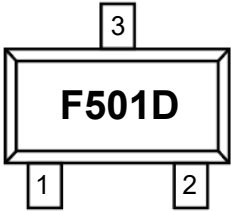
Product Summary

- $V_{DS}= 600V, I_D= 0.03A$
- $R_{DS(on)}< 700\Omega @V_{GS}= 0V$
- $R_{DS(on)}< 800\Omega @V_{GS}= 10V$

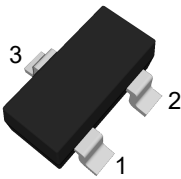
Features

- Depletion Mode
- ESD Improved Capability
- RoHS and Reach Compliant
- Halogen and Antimony Free
- Moisture Sensitivity Level 1

Marking Code



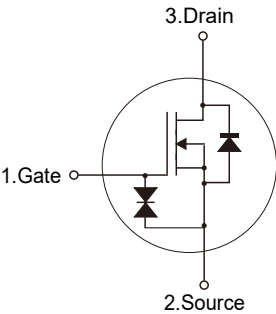
SOT-23



(Top View)

Pin	Description
1	Gate
2	Source
3	Drain

Schematic Diagram



Absolute Maximum Ratings

Ratings at 25°C ambient temperature unless otherwise specified.

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	600	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	0.03	A
Drain Current-Pulsed	I_{DM}	0.12	A
Maximum Power Dissipation	P_D	0.5	W
Gate Source ESD (HBM-C=100pF, R=1.5kΩ)	$V_{ESD(G-S)}$	300	V
Junction Temperature	T_J	150	°C
Storage Temperature Range	T_{STG}	-55 to +150	°C

Thermal Characteristics

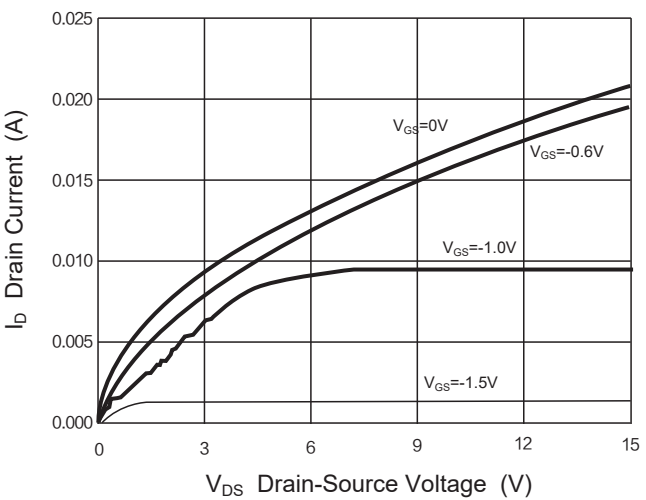
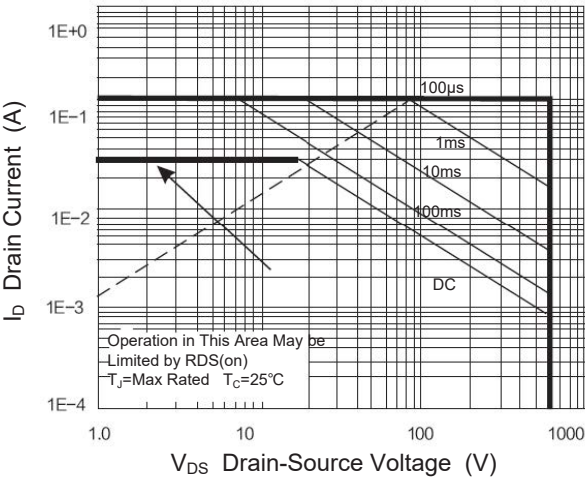
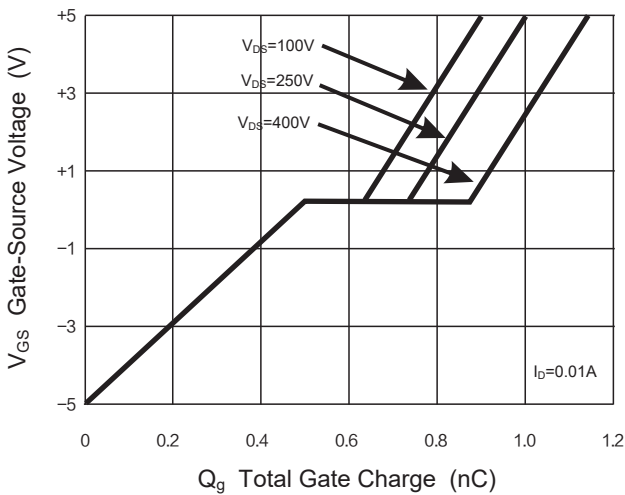
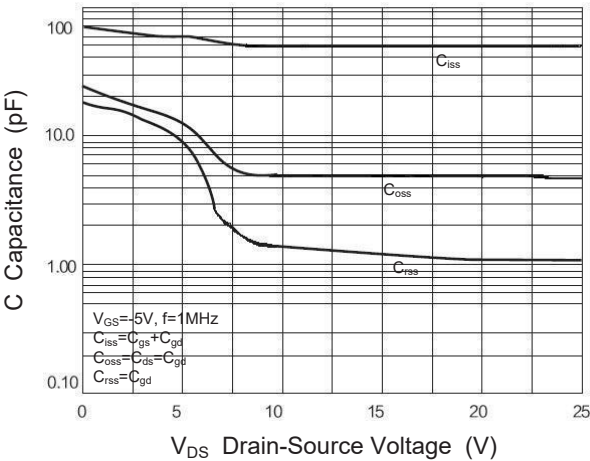
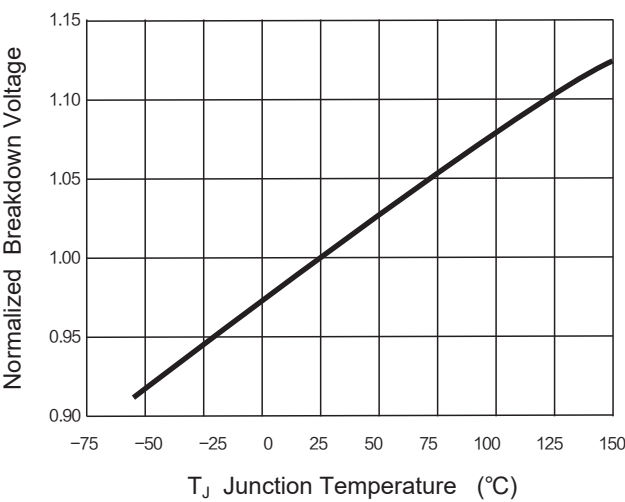
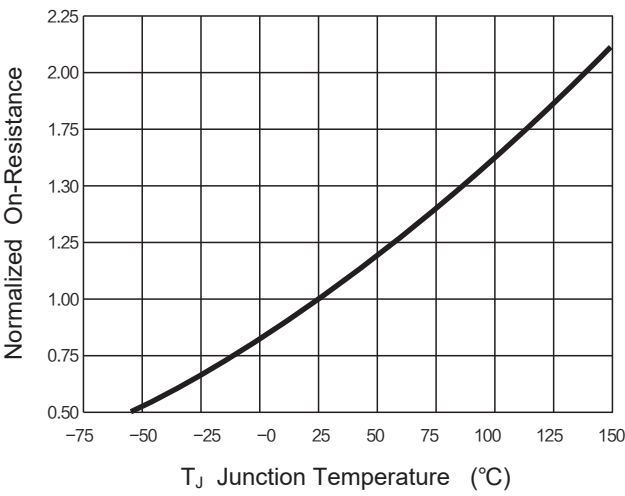
Thermal Resistance,Junction-to-Ambient	$R_{\theta JA}$	250	°C/W
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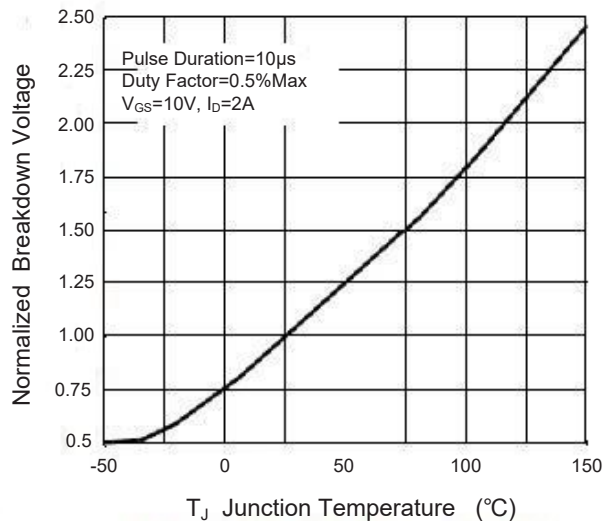
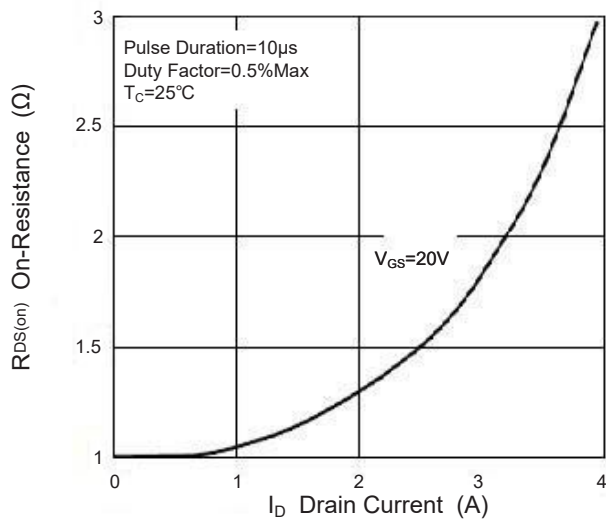
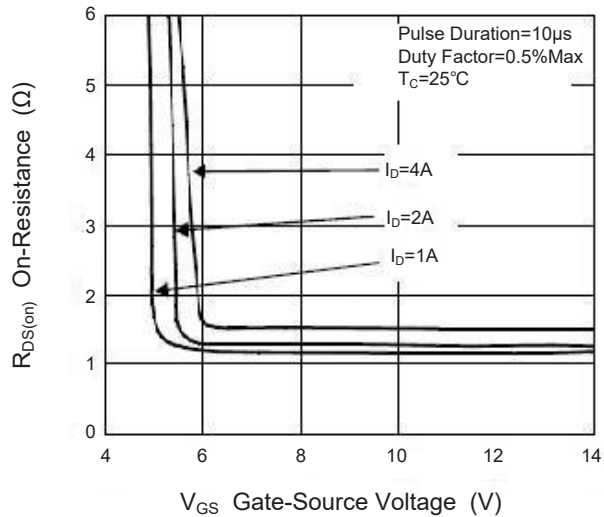
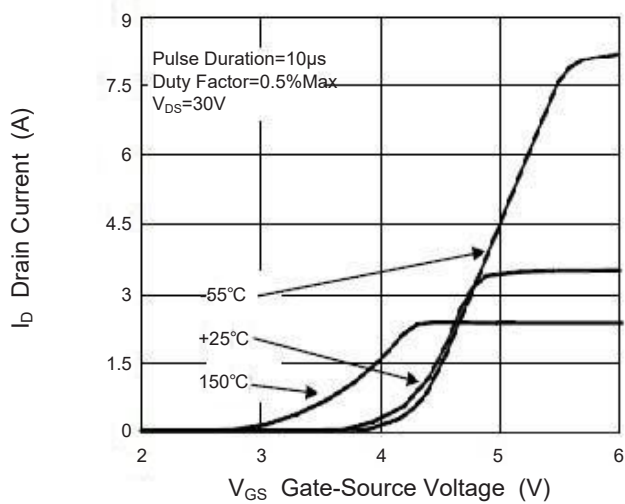
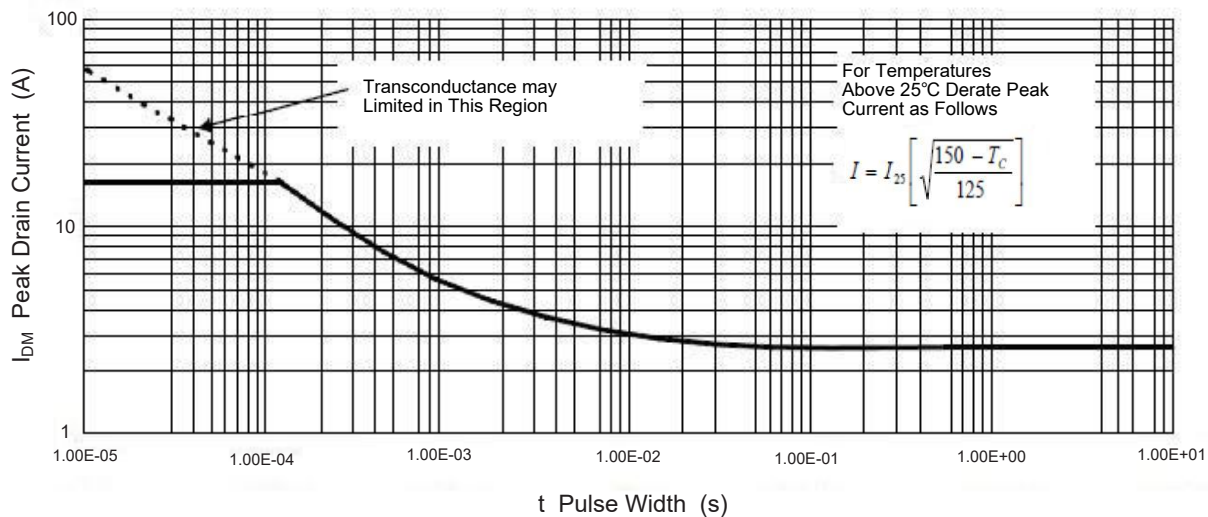
Electrical Characteristics

(Ta=25°C unless otherwise specified)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
OFF Characteristics						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =-5V, I _D =250μA	600	--	--	V
Gate-Body Leakage Current	I _{D(off)}	V _{DS} =600V, V _{GS} =-5V	--	--	0.1	μA
		V _{DS} =480V, V _{GS} =-5V, T _A =125°C	--	--	10	μA
Gate Leakage Current	I _{GSS}	V _{GS} =±10V	--	--	±200	nA
ON Characteristics						
Gate-to-Source Cut-off Voltage	V _{GS(off)}	V _{DS} =3V, I _D =8μA	-2.7	-1.8	-1	V
On-State Drain Current	I _{DSS}	V _{GS} =0V, V _{DS} =25V	12	--	--	mA
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =0V, I _D =3mA	--	350	700	Ω
		V _{GS} =10V, I _D =16mA	--	400	800	Ω
Dynamic Characteristics						
Forward Transconductance	g _{FS}	V _{DS} =50V, I _D =0.01A	8	17	--	mS
Input Capacitance	C _{iss}	V _{DS} =25V, V _{GS} =-5V, f=1MHz	--	50	--	pF
Output Capacitance	C _{oss}		--	4.53	--	pF
Reverse Transfer Capacitance	C _{rss}		--	1.08	--	pF
Total Gate Charge	Q _g	V _{DD} =400V, I _D =0.01A, V _{GS} =-5V~5V	--	1.14	--	nC
Gate-Source Charge	Q _{gs}		--	0.5	--	nC
Gate-Drain Charge	Q _{gd}		--	0.37	--	nC
Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	V _{DD} =300V, I _D =0.01A V _{GS} =-5V~7V, R _G =6Ω	--	9.9	--	nS
Turn-on Rise Time	t _r		--	55.8	--	nS
Turn-off Delay Time	t _{d(off)}		--	56.4	--	nS
Turn-off Fall Time	t _f		--	136	--	nS
Drain-Source Diode Characteristics						
Diode Forward Voltage	V _{SD}	V _{GS} =-5V, I _F =16mA	--	--	1.2	V
Diode Forward Current	I _S		--	--	0.025	A
Gate-Source Zener Diode						
Gate-Source Breakdown Voltage	V _{GSO}	I _{GS} =±1mA (Open Drain)	--	0.75	1.2	V

Typical Characteristic Curves

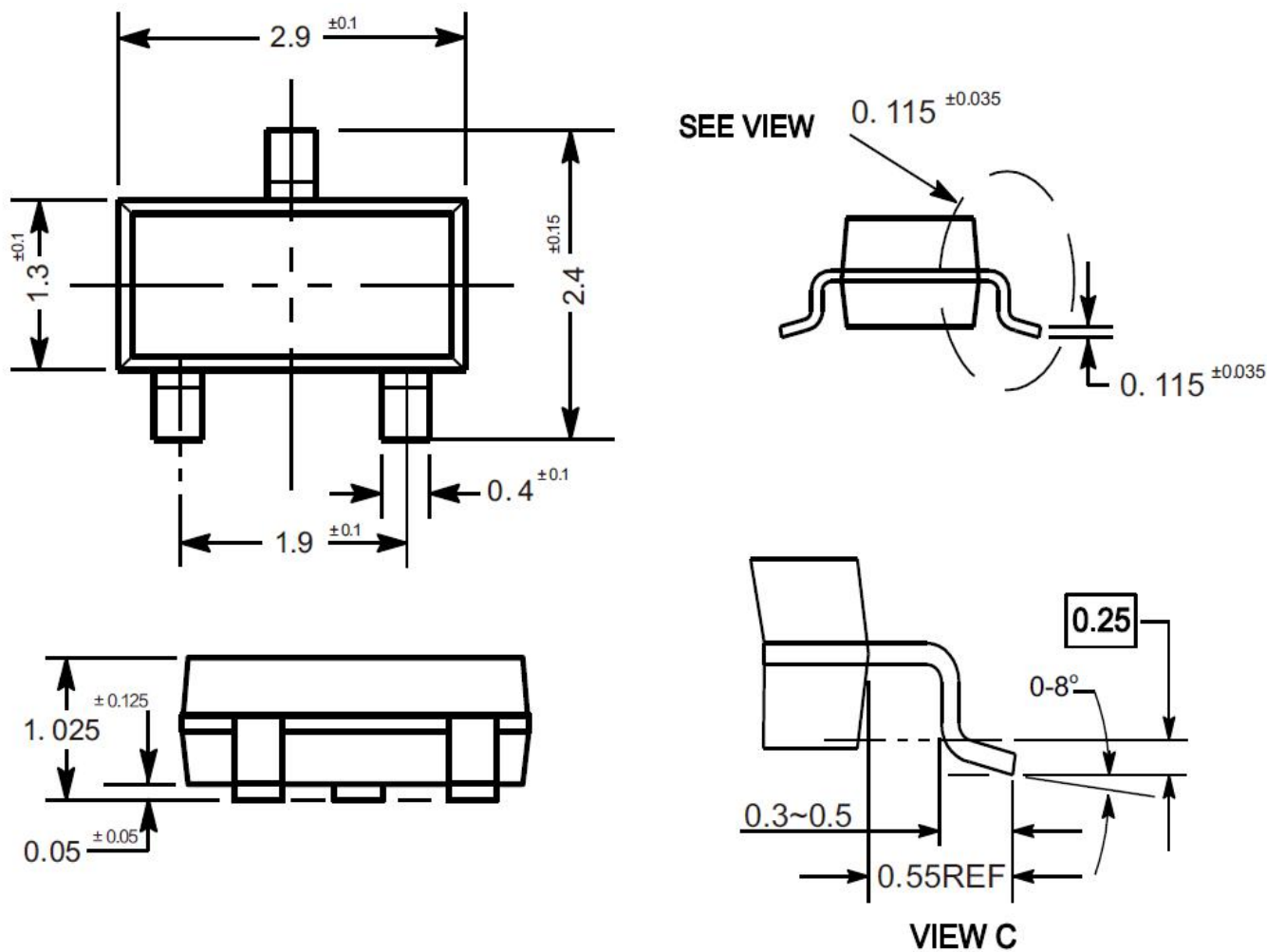




Package Outline

SOT-23

Dimensions in mm

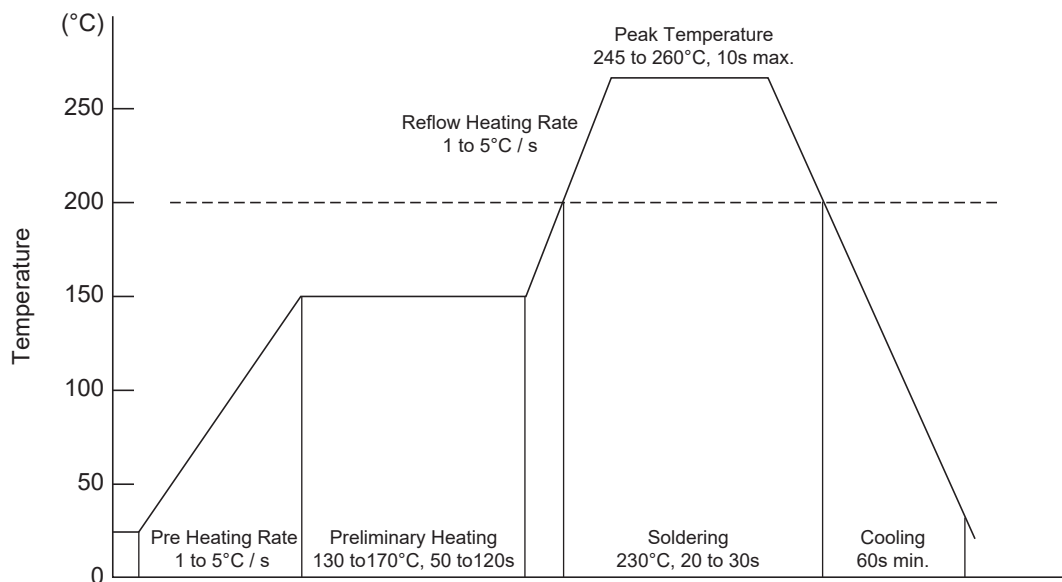


Ordering Information

Device	Package	Shipping
TN60H12MNSA	SOT-23	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

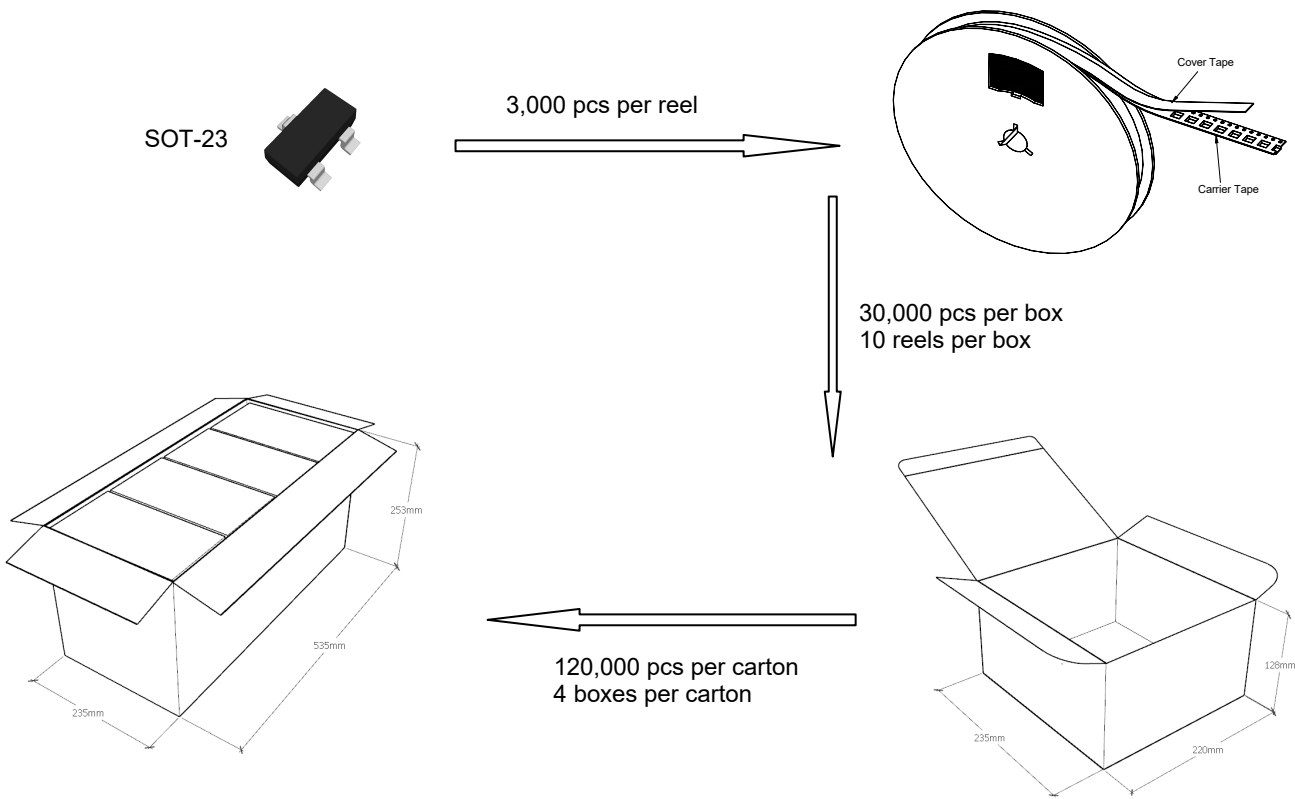
- Temperature: 300°C
- Time: 3s max.
- Times: one time

◆ Storage conditions

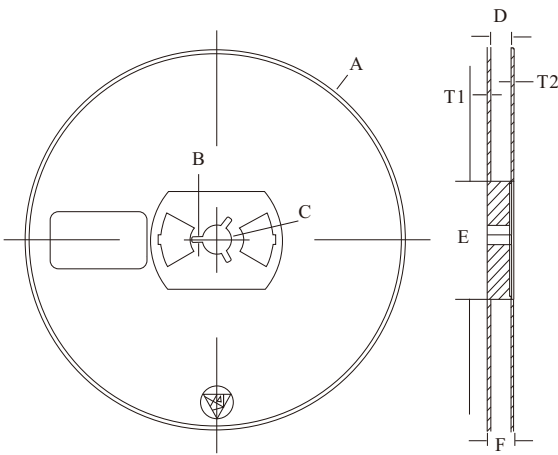
- **Temperature**
5 to 40°C
- **Humidity**
30 to 80% RH
- **Recommended period**
One year after manufacturing

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

Reel (7")

