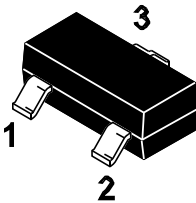


Features

- Surface mount package
- Low gate charge and $R_{DS(on)}$
- ESD protected(HBM) up to 2KV
- $V_{DS}= 100V, I_D= 0.17A$
 $R_{DS(on)} < 6\Omega @ V_{GS}= 10V$

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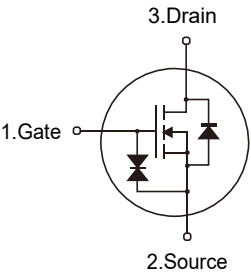
1. Gate 2.Source 3.Drain

Marking Code:B123

Applications

- Switching application
- Small servo motor controls

Schematic Diagram



Absolute Maximum Ratings

Ratings at 25°C ambient temperature unless otherwise specified.

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	0.17	A
Drain Current-Pulsed $t_p=10\mu s$	I_{DM}	0.68	A
Maximum Power Dissipation	P_D	0.9	W
Junction Temperature	T_J	150	°C
Storage Temperature Range	T_{STG}	-55 to +150	°C

Thermal Characteristics

Thermal Resistance,Junction-to-Ambient ^{Note1}	$R_{\theta JA}$	139	°C/W
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Electrical Characteristics

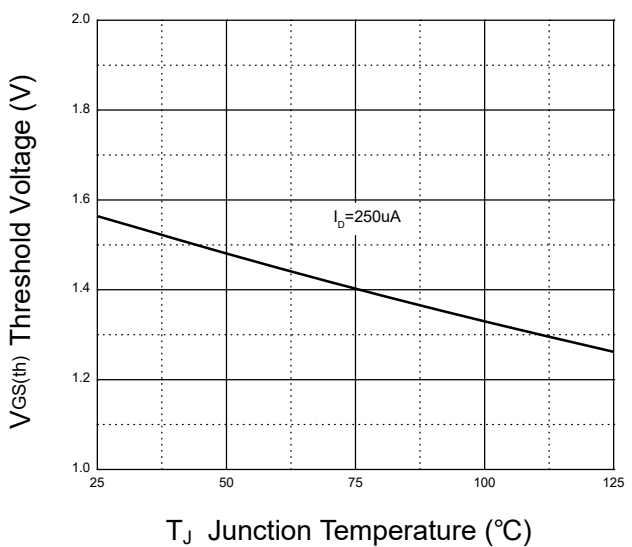
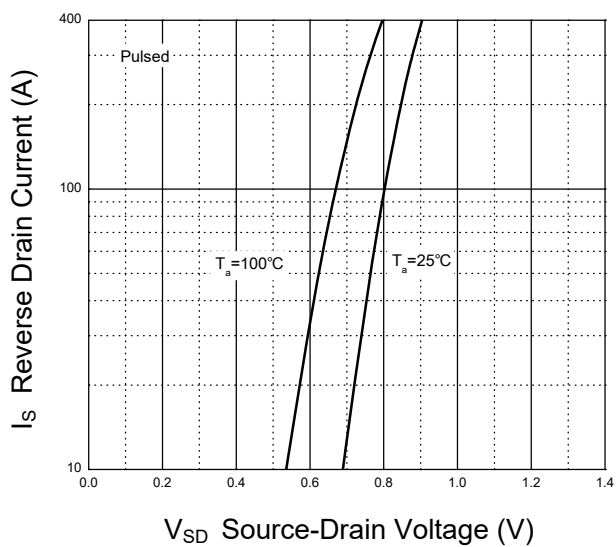
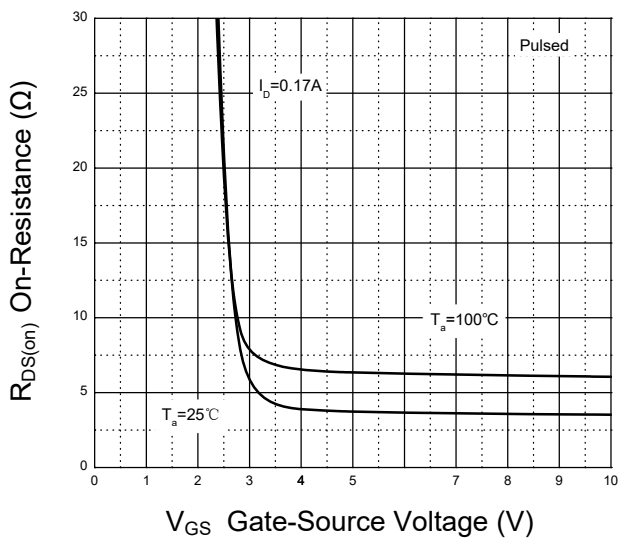
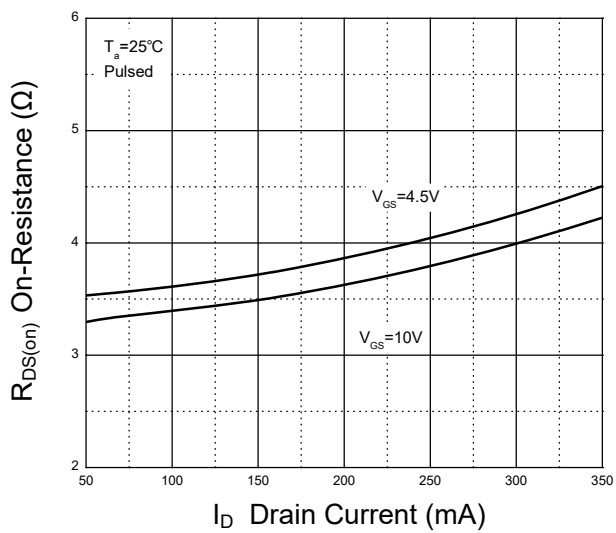
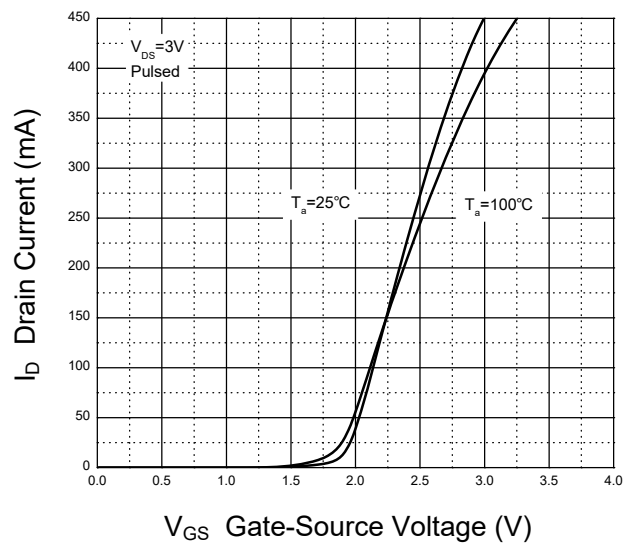
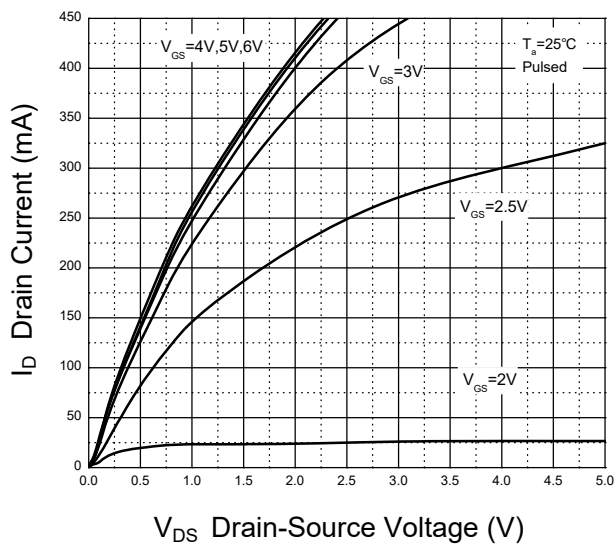
(Ta=25°C unless otherwise specified)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	100	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=100V, V_{GS}=0V$	--	--	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	--	--	± 10	μA
Gate Threshold Voltage ^{Note2}	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	--	3.0	V
Drain-Source On-Resistance ^{Note2}	$R_{DS(on)}$	$V_{GS}=10V, I_D=0.17A$	--	3.5	6	Ω
		$V_{GS}=4.5V, I_D=0.17A$	--	3.8	10	Ω
Forward Transconductance ^{Note2}	g_{FS}	$V_{DS}=10V, I_D=0.17A$	80	--	--	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS}=25V, V_{GS}=0V, f=1MHz$	--	29	60	pF
Output Capacitance	C_{oss}		--	10	15	pF
Reverse Transfer Capacitance	C_{rss}		--	2	6	pF
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=30V, I_D=0.28A$ $V_{GS}=10V, R_{GEN}=50\Omega$	--	--	8	nS
Turn-on Rise Time	t_r		--	--	8	nS
Turn-off Delay Time	$t_{d(off)}$		--	--	13	nS
Turn-off Fall Time	t_f		--	--	16	nS
Total Gate Charge	Q_g	$V_{DS}=10V, I_D=0.22A,$ $V_{GS}=10V$	--	1.4	2	nC
Gate-Source Charge	Q_{gs}		--	0.15	0.25	nC
Gate-Drain Charge	Q_{gd}		--	0.2	0.4	nC
Source-Drain Diode Characteristics						
Diode Forward Voltage ^{Note2}	V_{SD}	$V_{GS}=0V, I_S=0.34A$	--	0.75	1.3	V
Diode Forward Current ^{Note1}	I_S		--	--	0.17	A

Note: 1. Surface mounted on FR4 board using the minimum recommended pad size.

2. Pulse Test: Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

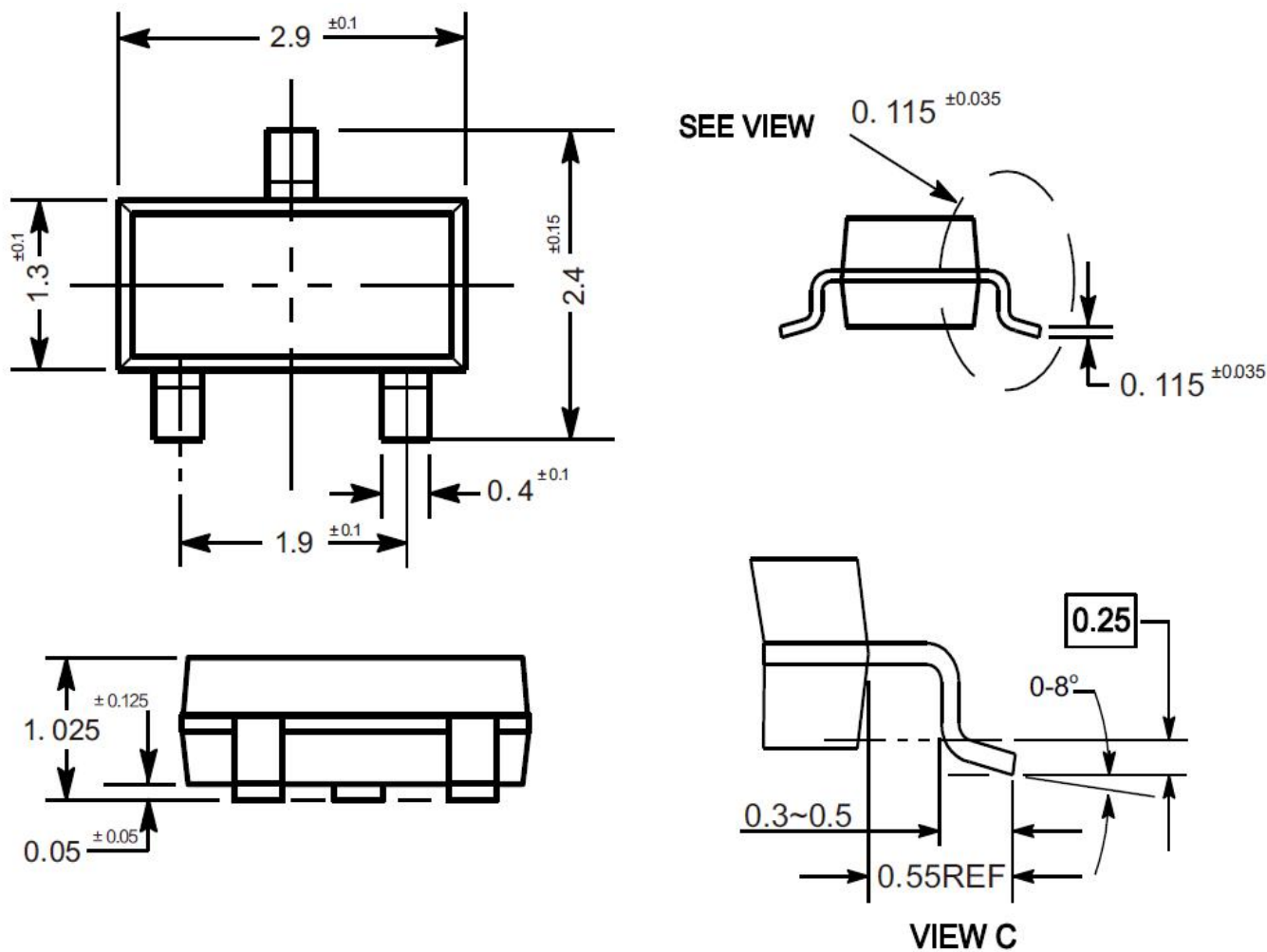
Typical Characteristic Curves



Package Outline

SOT-23

Dimensions in mm

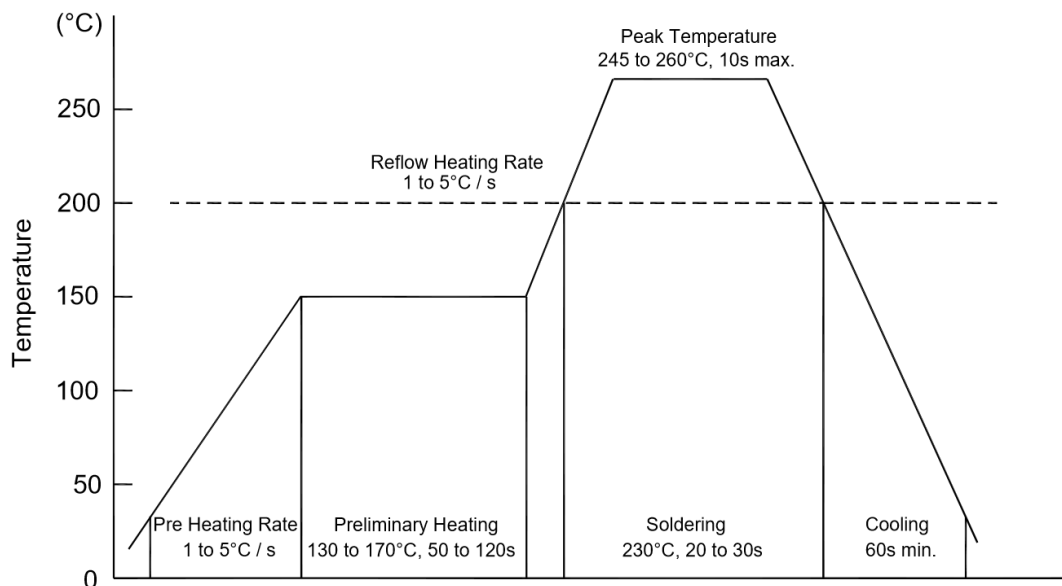


Ordering Information

Device	Package	Shipping
TN123NSA	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

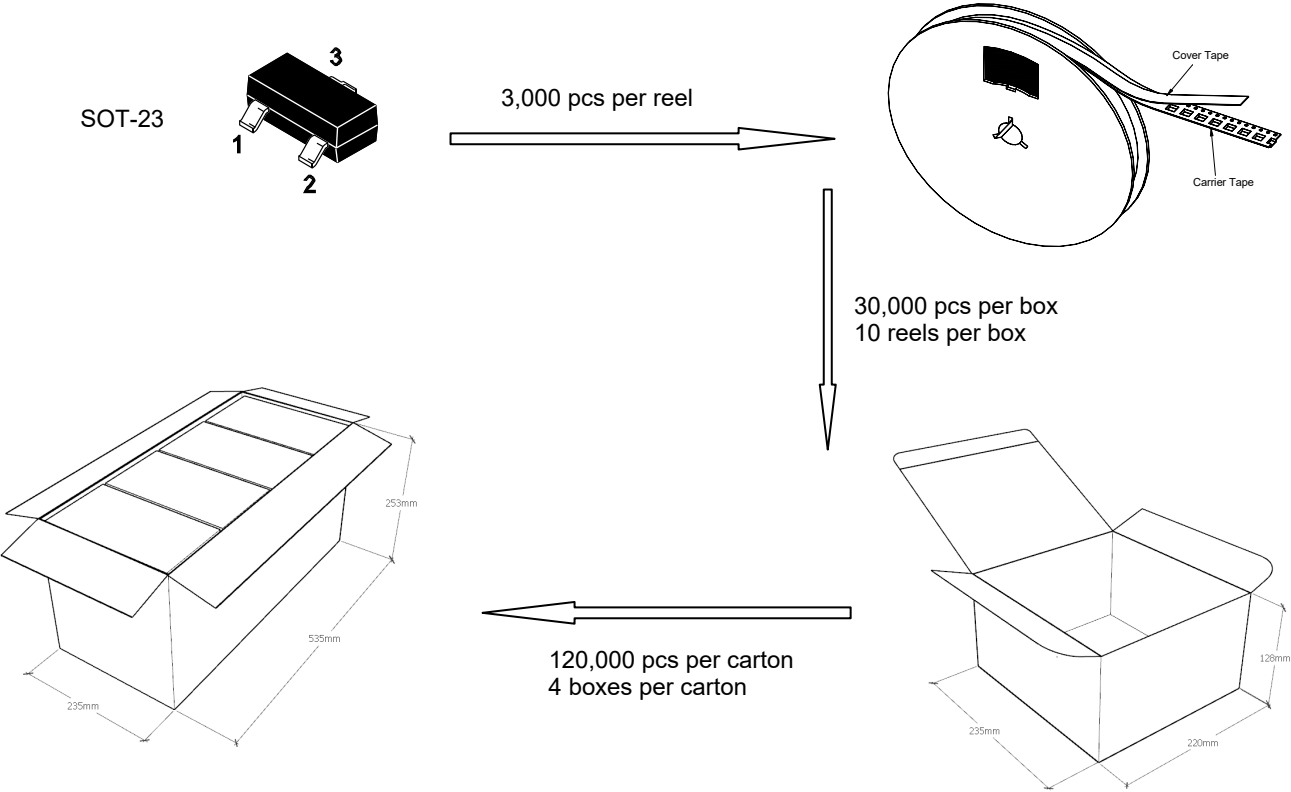
- Temperature: 370 °C
- Time: 3s max.
- Times: one time

◆ Storage conditions

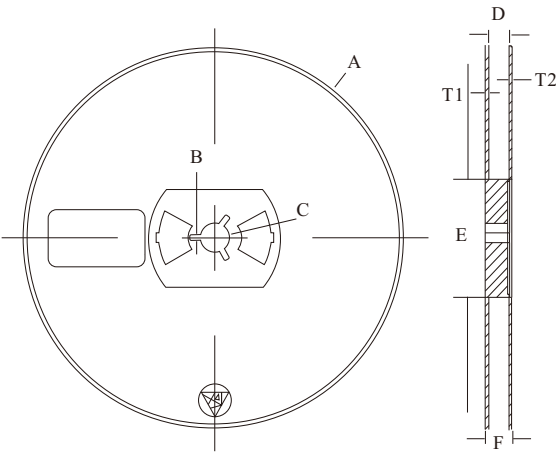
- **Temperature**
5 to 40 °C
- **Humidity**
30 to 80% RH
- **Recommended period**
One year after manufacturing

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

Reel (7")

