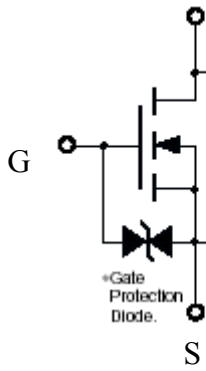
N-CHANNEL MOSFET

Features

- Low on-resistance
- High ESD
- High speed switching
- Low-voltage drive(4V)
- Easily designed drive circuits
- Easy to use in parallel
- Pb-free lead plating and halogen-free package

Symbol

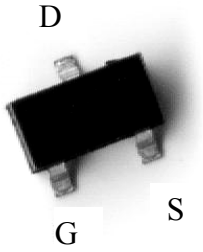
MTN7002N3



G：Gate
S：Source
D：Drain

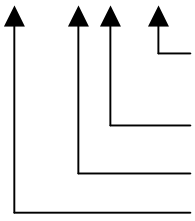
Outline

SOT-23



Ordering Information

Device	Package	Shipping
MTN7002N3-0-T1-G	SOT-23 (Pb-free lead plating and halogen-free package)	3000 pcs / tape & reel



Environment friendly grade : S for RoHS compliant products, G for RoHS compliant and green compound products

Packing spec, T1 : 3000 pcs / tape & reel, 7” reel

Product rank, zero for no rank products

Product name

Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Limits	Unit
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current	T_A=25°C@V_{GS}=10V	I_D	640	mA
	T_A=70°C@V_{GS}=10V		500	mA
Pulsed Drain Current *1, 2		I_{DM}	950 *1	mA
Total Power Dissipation		P_D	1.38 *2	W
Linear Derating Factor			0.01	W/°C
Thermal Resistance, Junction to Ambient		Rth,j-a	90 *2	°C/W
ESD susceptibility			2000 *3	V
Operating Junction Temperature Range		T_J	-55~+150	°C
Storage Temperature Range		Tstg	-55~+150	°C

Note : *1. Pulse Width ≤ 300μs, Duty cycle ≤2%
*2. When the device is mounted on 1in² copper pad of FR-4 board; 270°C/W when mounted on minimum copper pad.
*3. Human body model, 1.5kΩ in series with 100pF

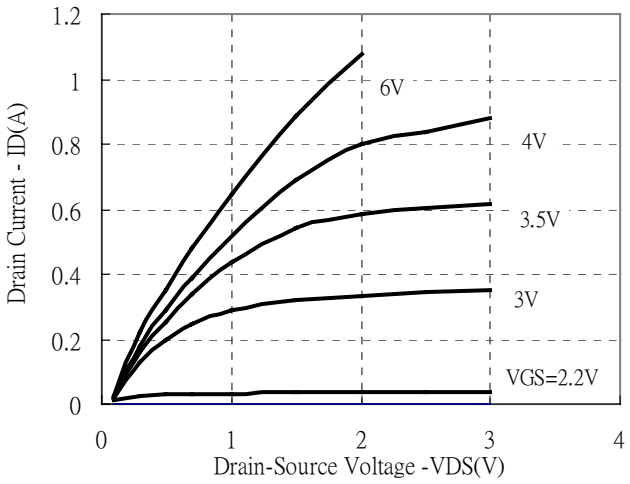
Electrical Characteristics (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
BV_{DSS}*	60	-	-	V	V_{GS}=0, I_D=250μA
$BV_{DSS}/\Delta Tj$	-	0.06	-	V/℃	Reference to 25℃, I_D=1mA
$V_{GS(th)}$	1	-	2.5	V	V_{DS}=V_{GS}, I_D=250μA
I_{GSS}	-	-	±10	μA	V_{GS}=±20V, V_{DS}=0
I_{DSS}	-	-	1	μA	V_{DS}=60V, V_{GS}=0
	-	-	100		V_{DS}=48V, V_{GS}=0, Tj=70℃
$R_{DS(ON)}$*	-	1.8	2	Ω	I_D=200mA, V_{GS}=4.5V
	-	1.23	5		I_D=100mA, V_{GS}=10V
	-	1.25	4		I_D=500mA, V_{GS}=10V
V_{SD}	-	-	1.2	V	I_S=1.2A, V_{GS}=0V
G_{FS}	-	600	-	mS	V_{DS}=10V, I_D=600mA
C_{iss}	-	32	50	pF	V_{DS}=25V, V_{GS}=0, f=1MHz
C_{oss}	-	8	-		
C_{rss}	-	6	-		
Qg	-	1	-	nC	I_D=600mA, V_{DS}=50V, V_{GS}=4.5V
Qgs	-	0.5	-		
Qgd	-	0.5	-		
$t_{d(on)}$	-	12	-	ns	V_{DS}=30V, I_D=600mA, R_G=3.3Ω, V_{GS}=10V, R_D=52Ω
t_r	-	10	-		
$t_{d(off)}$	-	56	-		
t_f	-	29	-		

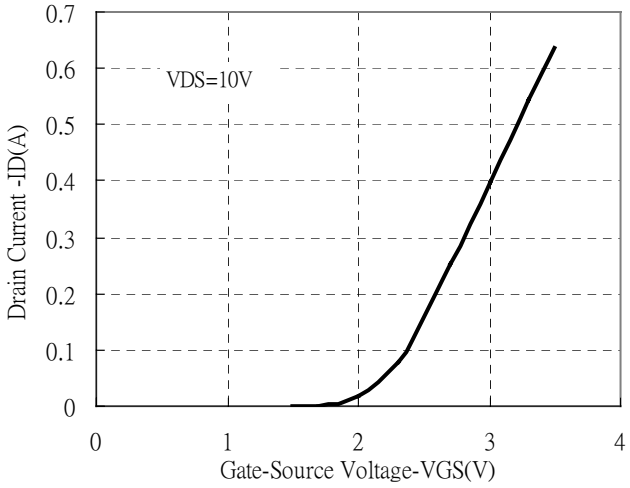
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Typical Characteristic Curves

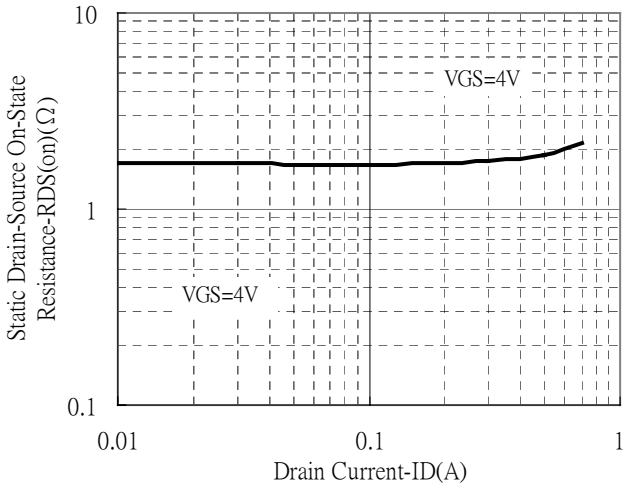
Typical Output Characteristics



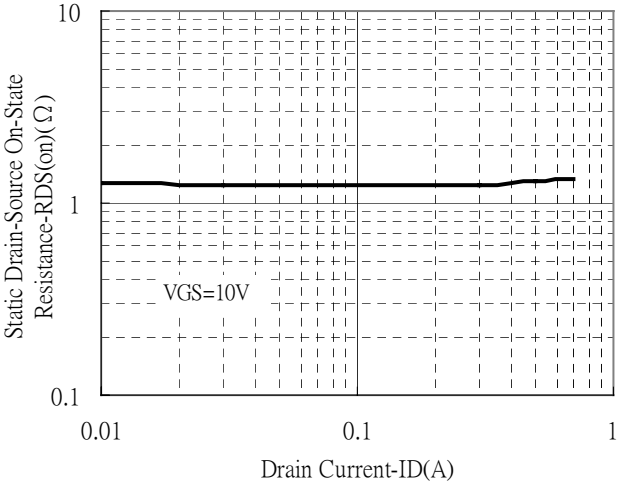
Typical Transfer Characteristics



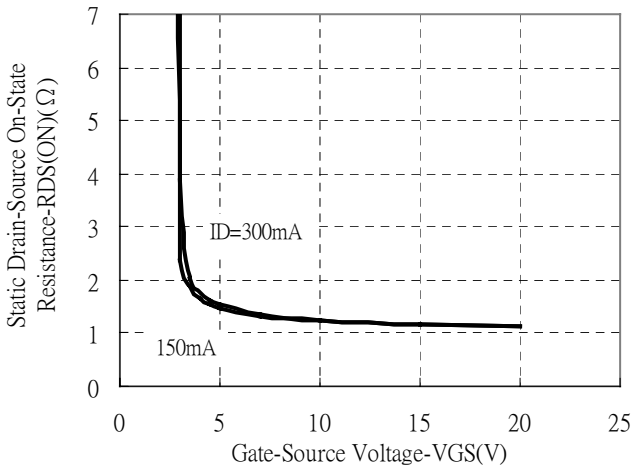
Static Drain-Source On-State resistance vs Drain Current



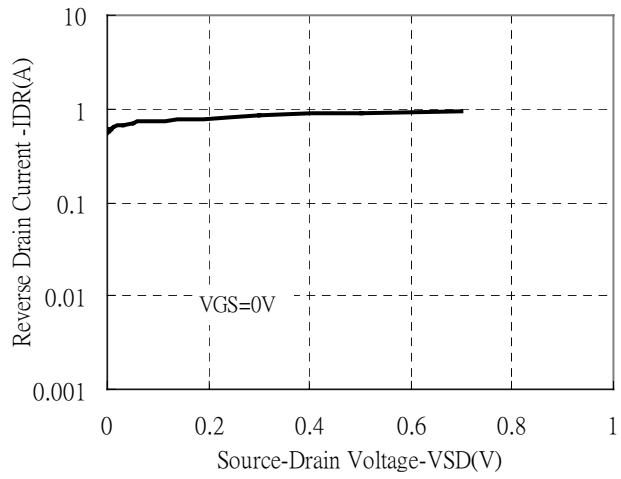
Static Drain-Source On-State resistance vs Drain Current



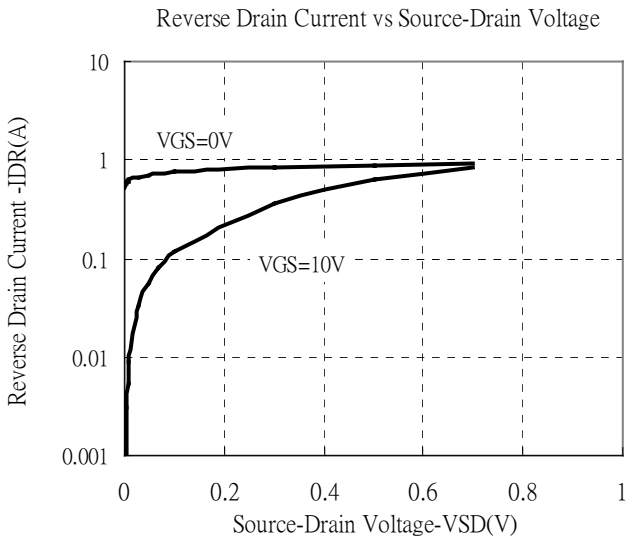
Static Drain-Source On-State Resistance vs Gate-Source Voltage

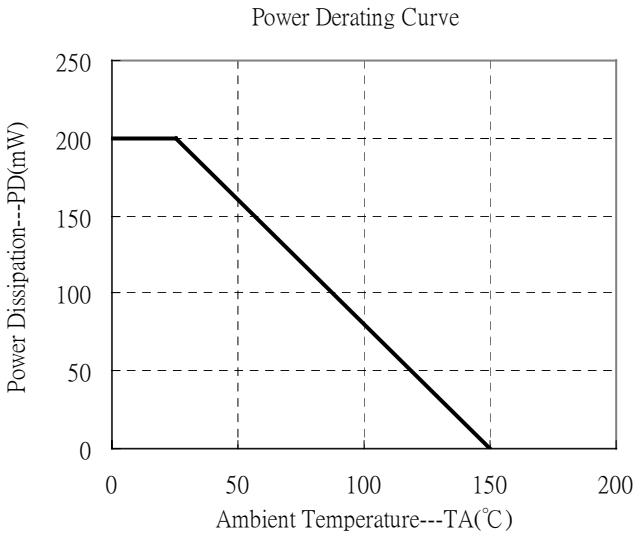


Reverse Drain Current vs Source-Drain Voltage

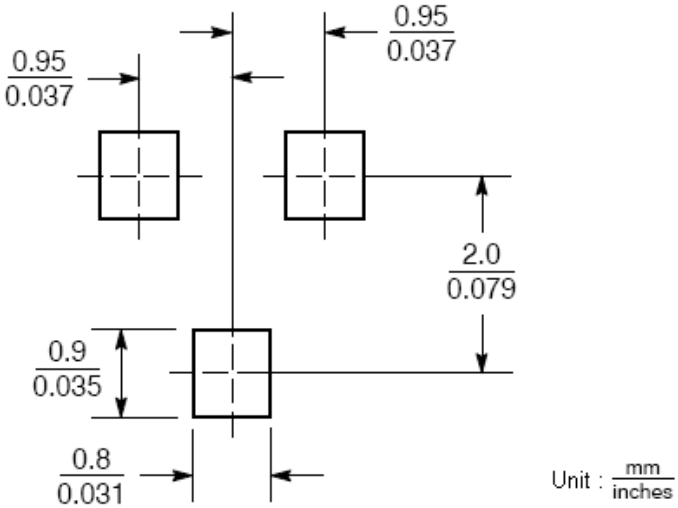


Characteristic Curves(Cont.)

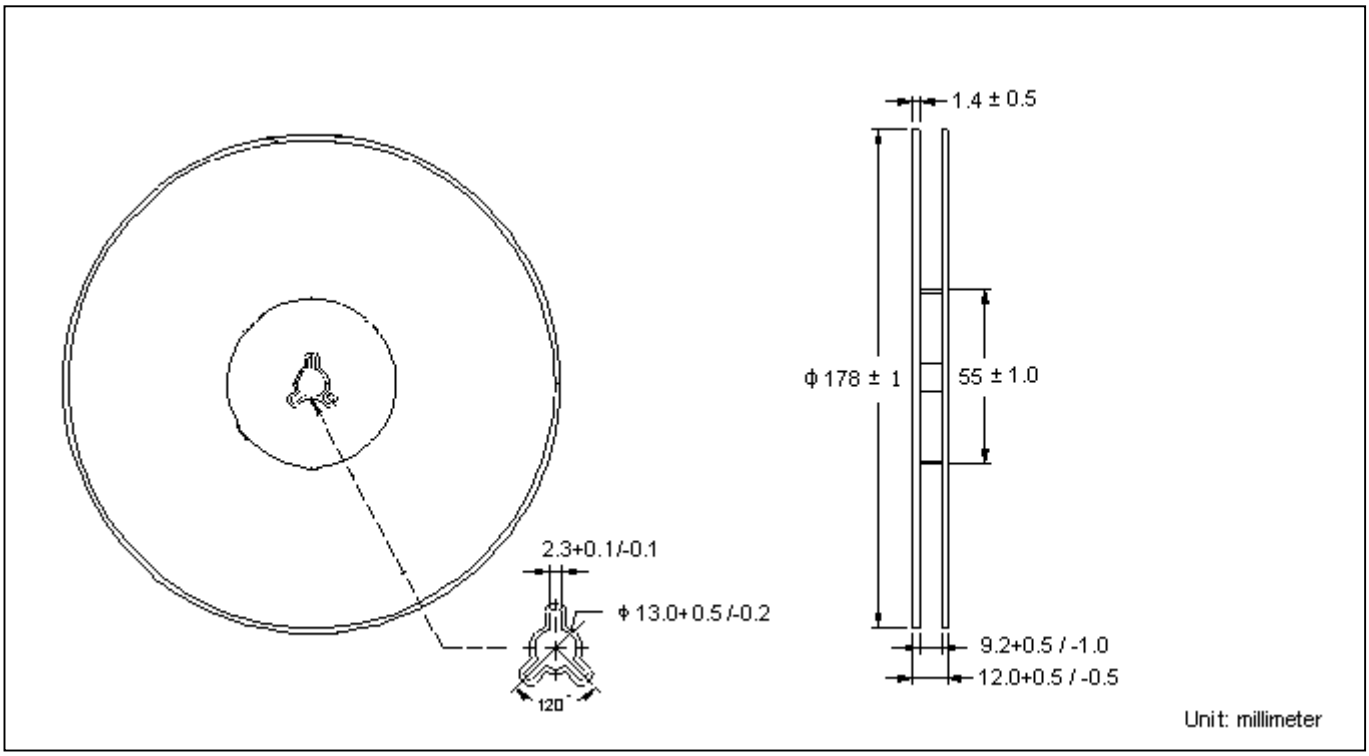




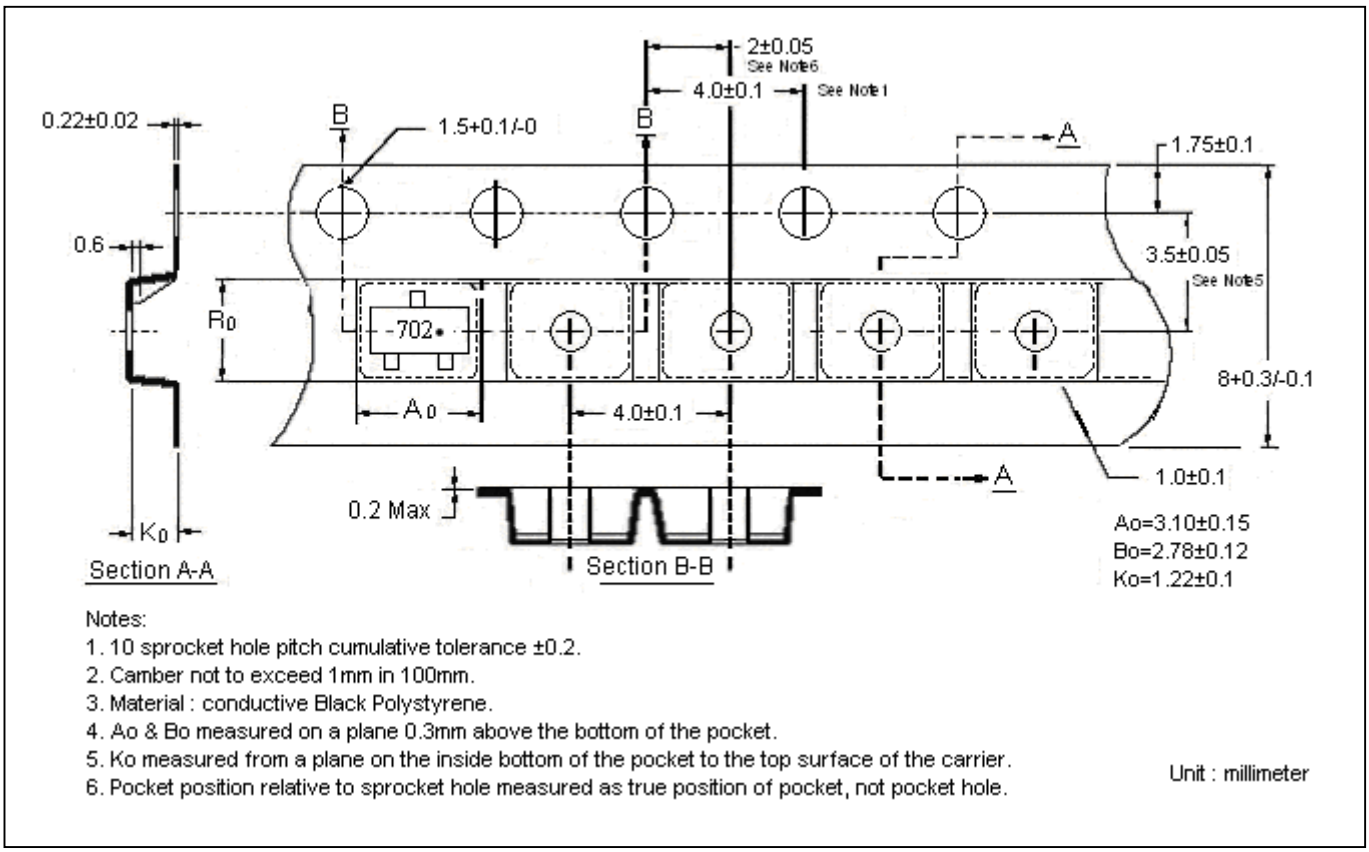
Recommended Soldering Footprint



Reel Dimension



Carrier Tape Dimension



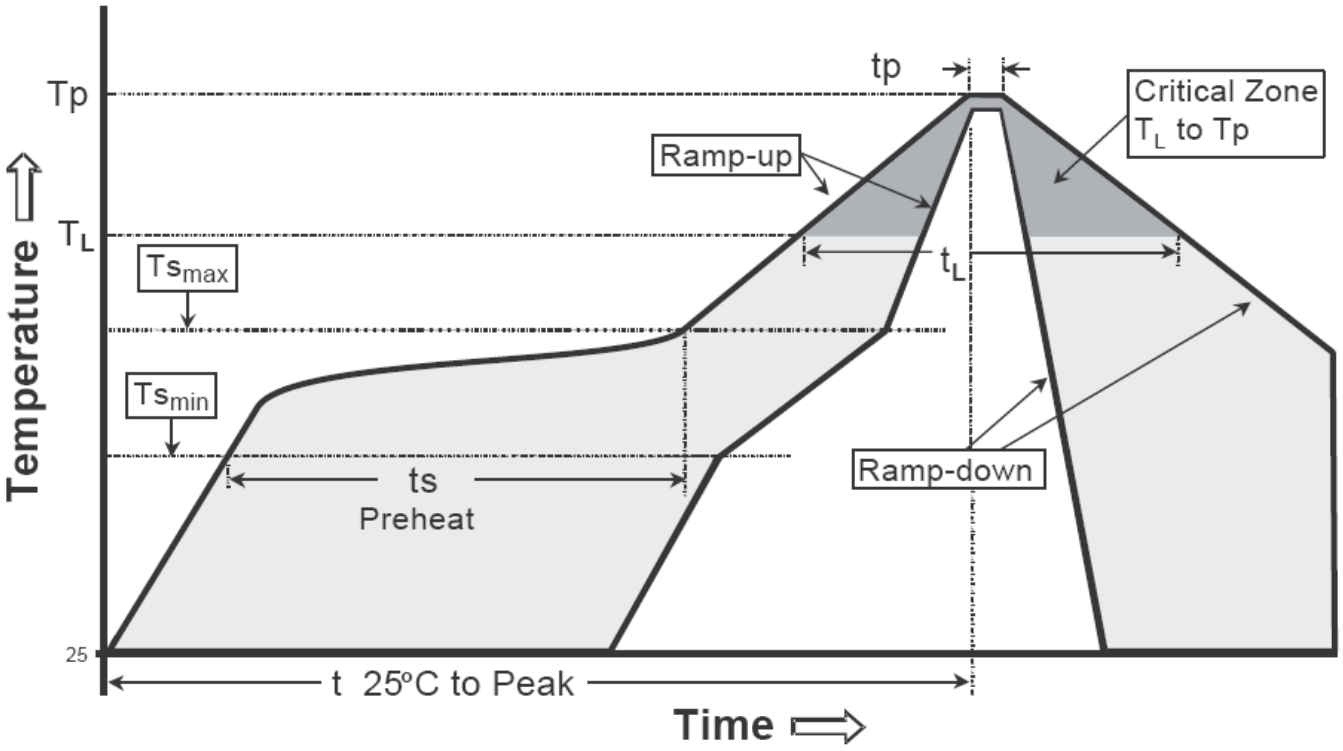
Notes:
1. 10 sprocket hole pitch cumulative tolerance ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material : conductive Black Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

Unit : millimeter

Recommended wave soldering condition

Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

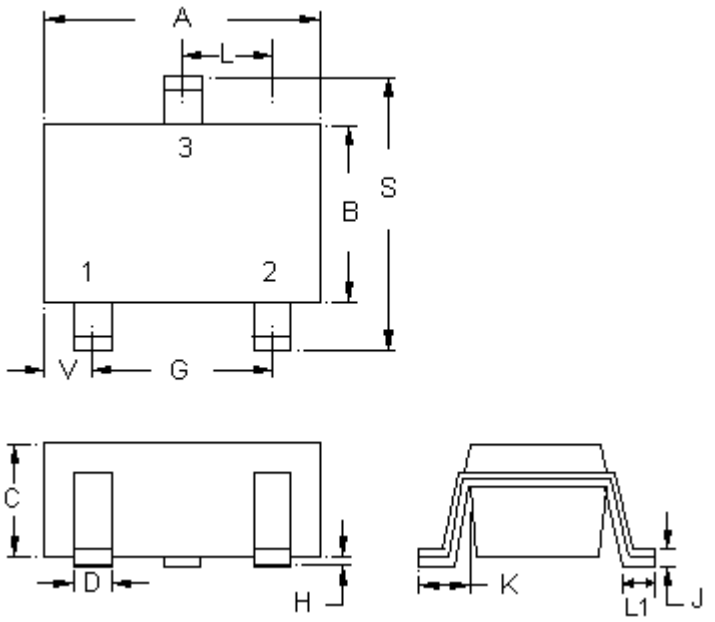
Recommended temperature profile for IR reflow

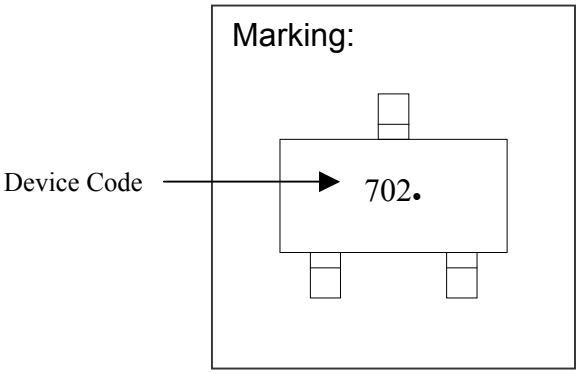


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(Ts min) −Temperature Max(Ts max) −Time(ts min to ts max)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL) − Time (tL)	 183°C 60-150 seconds	 217°C 60-150 seconds
Peak Temperature(TP)	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(tp)	10-30 seconds	20-40 seconds
Ramp down rate	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

Note : All temperatures refer to topside of the package, measured on the package body surface.

SOT-23 Dimension





3-Lead SOT-23 Plastic
Surface Mounted Package
Package Code: N3

Style: Pin 1.Gate 2.Source 3.Drain

*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1102	0.1204	2.80	3.04	J	0.0032	0.0079	0.08	0.20
B	0.0472	0.0669	1.20	1.70	K	0.0118	0.0266	0.30	0.67
C	0.0335	0.0512	0.89	1.30	L	0.0335	0.0453	0.85	1.15
D	0.0118	0.0197	0.30	0.50	S	0.0830	0.1161	2.10	2.95
G	0.0669	0.0910	1.70	2.30	V	0.0098	0.0256	0.25	0.65
H	0.0000	0.0040	0.00	0.10	L1	0.0118	0.0197	0.30	0.50

Notes: 1.Controlling dimension: millimeters.
2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.

Material:

- Lead: Pure tin plated.
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0.