N-CHANNEL MOSFET

Description

The MTN2328N3L is a N-channel enhancement-mode MOSFET.

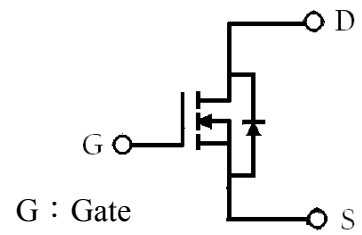
Features

- Low on-resistance
- High speed switching
- Low-voltage drive
- Easily designed drive circuits
- Pb-free lead plating package

BV_{DSS}	**100V**
I_D@V_{GS}=10V, T_A=25°C	**3A**
R_{DSON}@V_{GS}=10V, I_D=3A	**130mΩ(typ)**
R_{DSON}@V_{GS}=4.5V, I_D=3A	**136mΩ(typ)**

Symbol

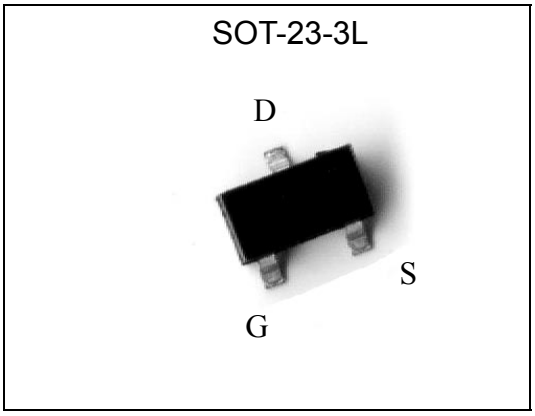
MTN2328N3L



G：Gate
S：Source
D：Drain

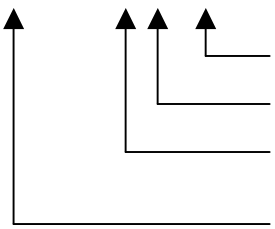
Outline

SOT-23-3L



Ordering Information

Device	Package	Shipping
MTN2328N3L-0-T2-G	SOT-23-3L (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, T2 : 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}	100	V
Gate-Source Voltage	V_{GSS}	±20	
Continuous Drain Current @V_{GS}=10V, T_A=25°C	I_D	3	A
Continuous Drain Current @V_{GS}=10V, T_A=100°C		1.9	
Pulsed Drain Current	I_{DM}	12 *1	
Total Power Dissipation	P_D	2.1 *2	W
Operating Junction and Storage Temperature Range	Tj; Tstg	-55~+150	°C

Note : *1. Pulse Width ≤ 300μs, Duty cycle ≤2%
*2. When the device is surface mounted on 1 in² copper pad of FR-4 board with 2 oz. copper.

Thermal Performance

Parameter	Symbol	Limit	Unit
Thermal Resistance, Junction-to-Ambient	Rth,ja	60	°C/W

Note : Surface mounted on 1 in² copper pad of FR-4 board.

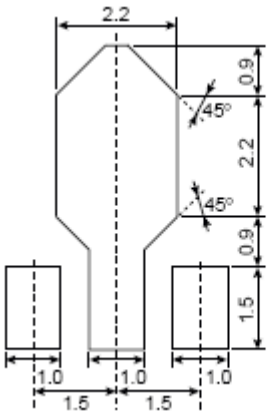
Electrical Characteristics (Ta=25°C)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}*	100	-	-	V	V_{GS}=0V, I_D=10μA
$V_{GS(th)}$	1	1.8	2.5		V_{DS}=V_{GS}, I_D=250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	1	μA	V_{DS}=100V, V_{GS}=0V
$R_{DS(ON)}$*	-	130	150	mΩ	I_D=3A, V_{GS}=10V
	-	136	160		I_D=3A, V_{GS}=4.5V
G_{FS}	-	5	-	S	V_{DS}=10V, I_D=3A
Dynamic					
C_{iss}	-	1188	-	pF	V_{DS}=25V, V_{GS}=0V, f=1MHz
C_{oss}	-	30	-		
C_{rss}	-	17	-		
$td_{(ON)}$	-	7	-	ns	V_{DS}=50V, I_D=3A, V_{GS}=10V, R_{GEN}=6Ω
tr	-	3.2	-		
$td_{(OFF)}$	-	29	-		
tf	-	5	-		
Qg	-	18.4	-	nC	V_{DS}=50V, I_D=3A, V_{GS}=10V
Qgs	-	4	-		
Qgd	-	7.5	-		
Source-Drain Diode					
*I_S	-	-	3	A	
*I_{SM}	-	-	12		

*V_{SD}	-	-	1.2	V	V_{GS}=0V, I_S=3A
*trr	-	45	-	ns	I_F=3A, dI_F/dt=100A/μs
*Qrr	-	70	-	nC	

*Pulse Test : Pulse Width ≤380μs, Duty Cycle≤2%

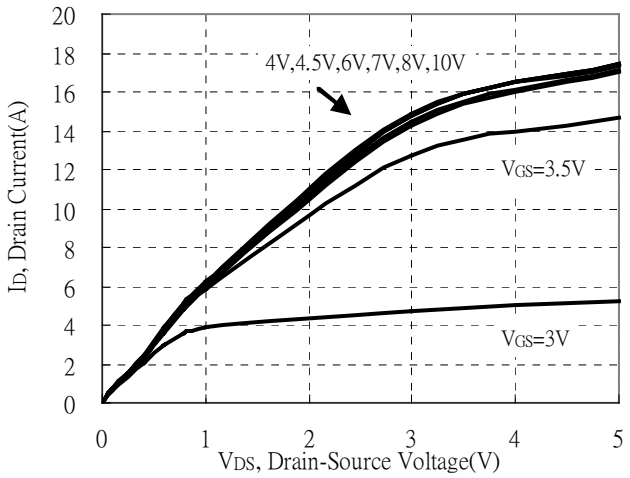
Recommended soldering footprint



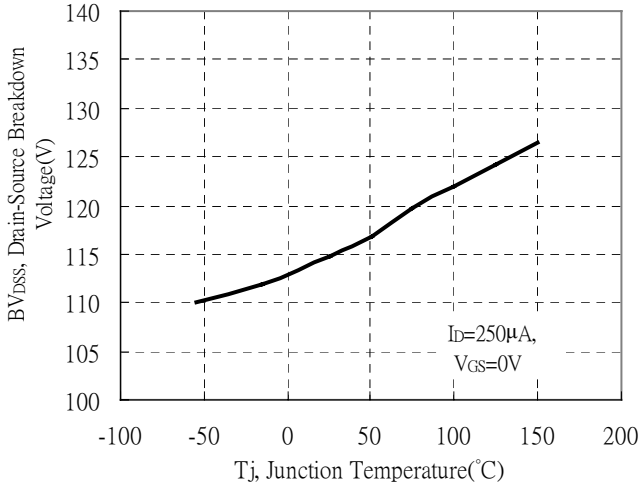
unit : mm

Typical Characteristics

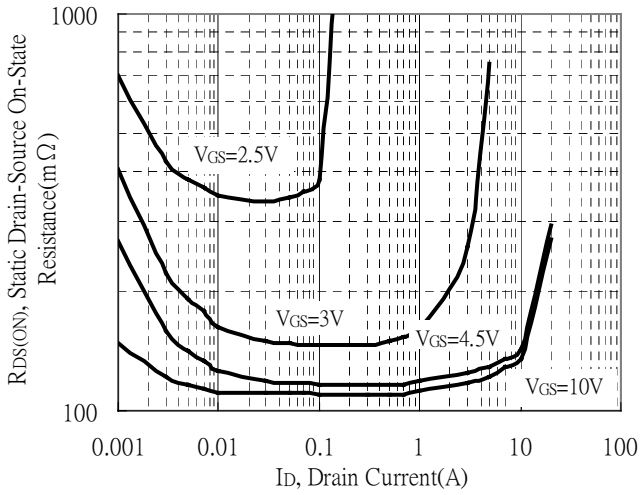
Typical Output Characteristics



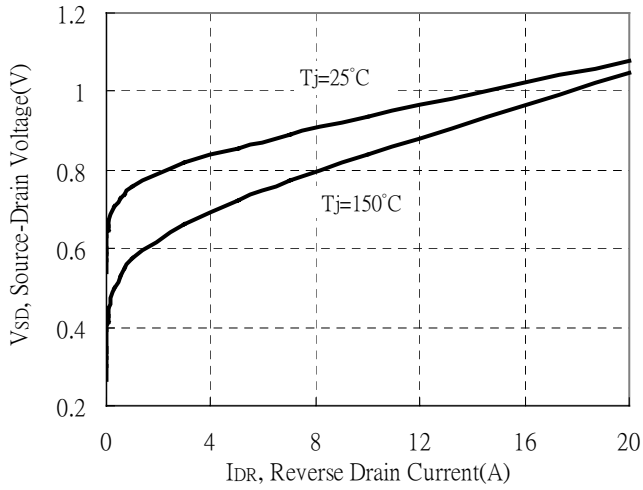
Brekdown Voltage vs Ambient Temperature



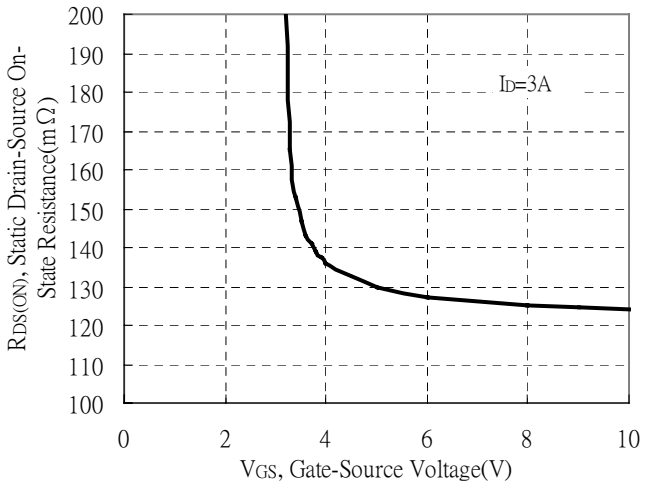
Static Drain-Source On-State resistance vs Drain Current



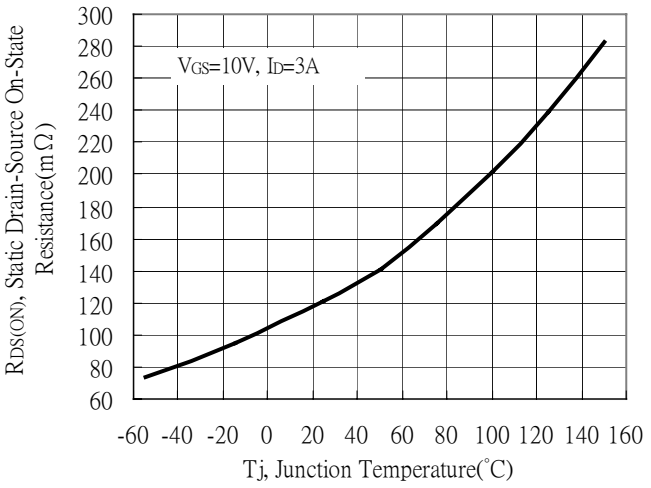
Reverse Drain Current vs Source-Drain Voltage



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

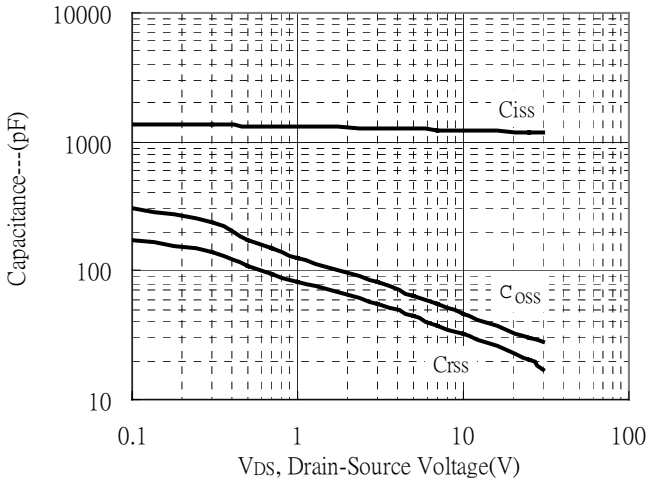


Drain-Source On-State Resistance vs Junction Tempearture

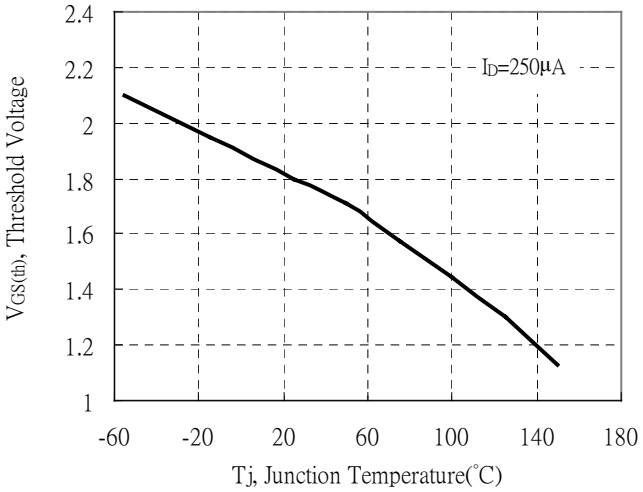


Typical Characteristics(Cont.)

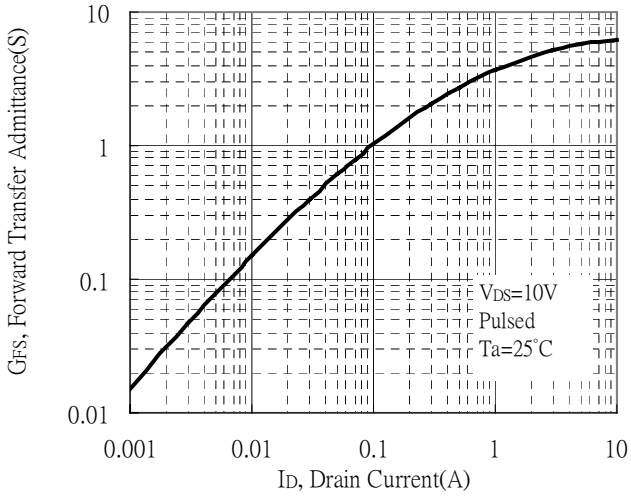
Capacitance vs Drain-to-Source Voltage



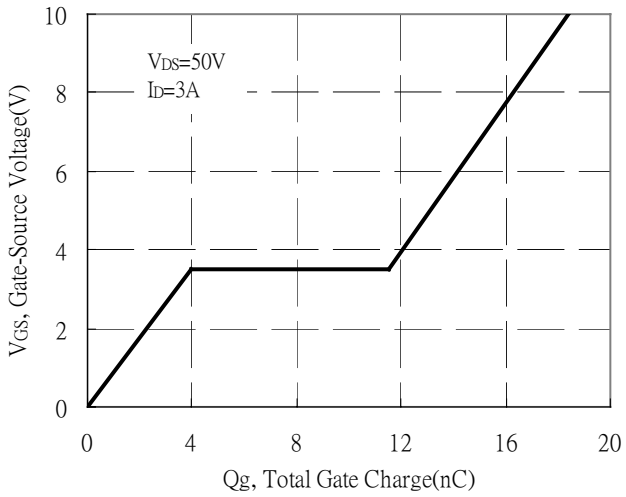
Threshold Voltage vs Junction Tempearture



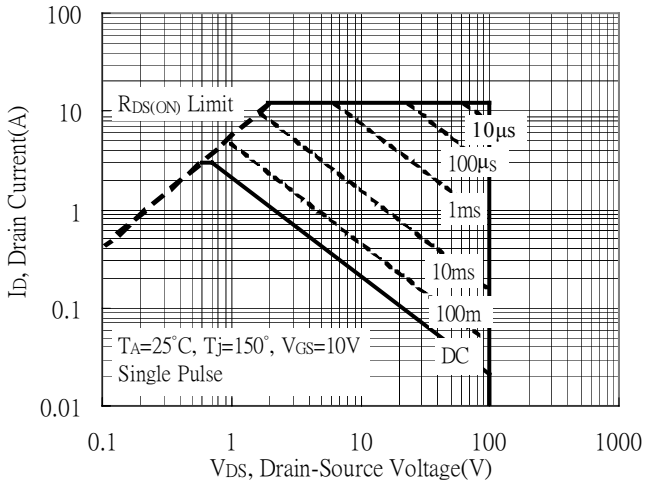
Forward Transfer Admittance vs Drain Current



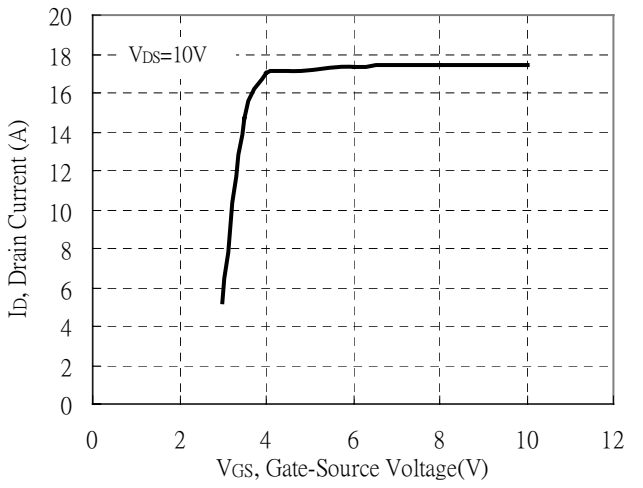
Gate Charge Characteristics



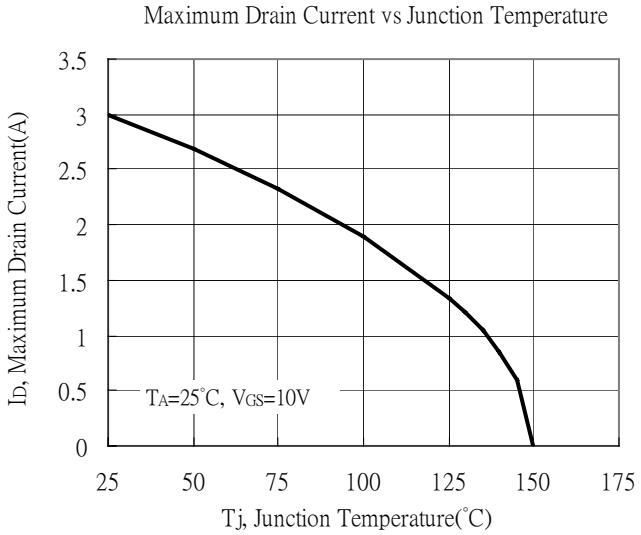
Maximum Safe Operating Area

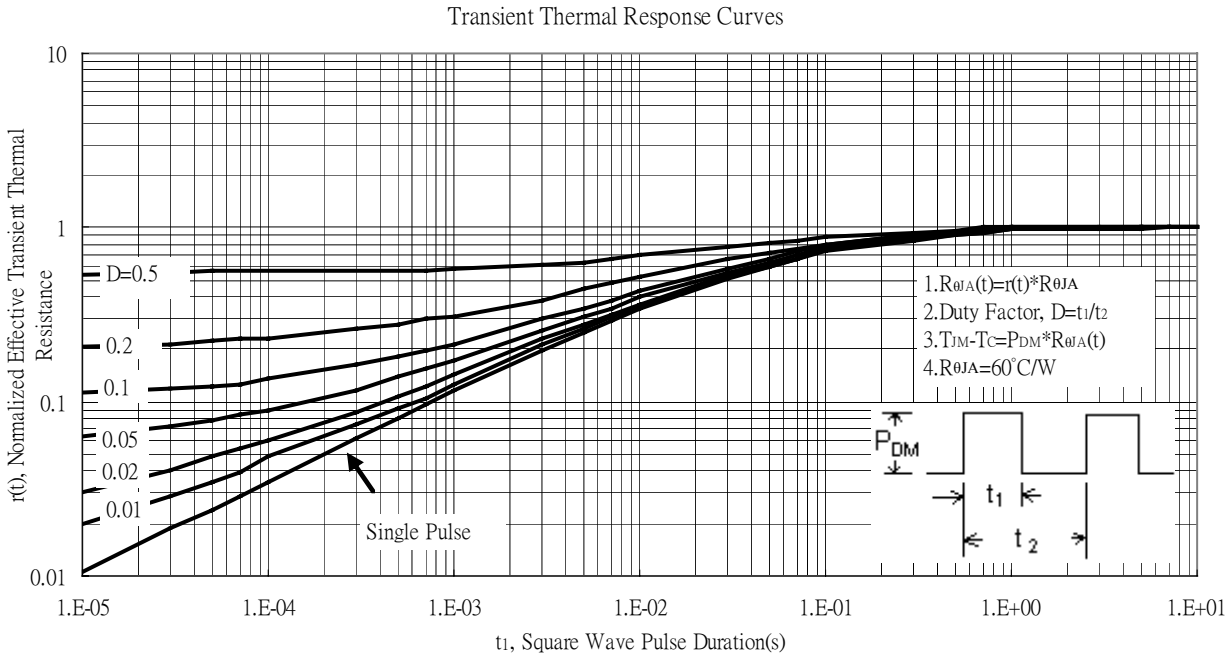


Typical Transfer Characteristics

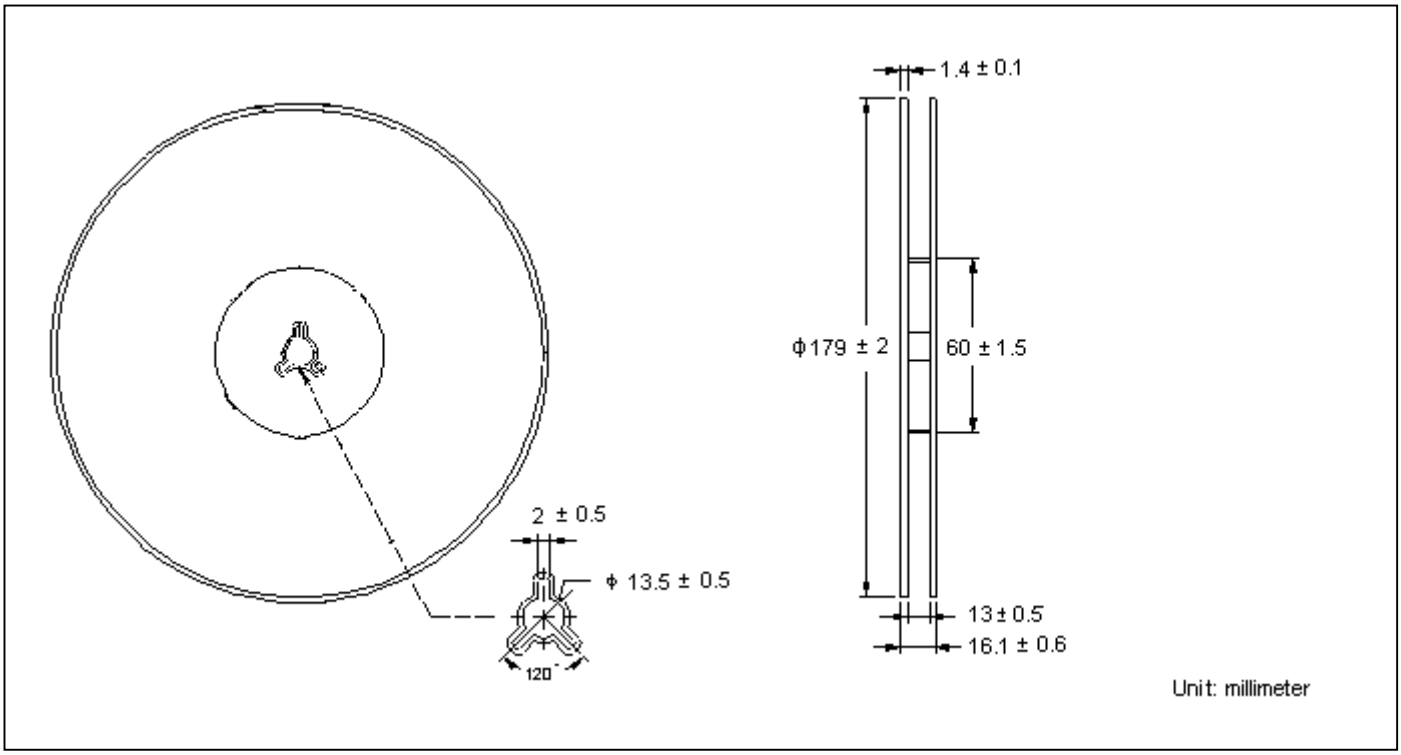


Typical Characteristics(Cont.)

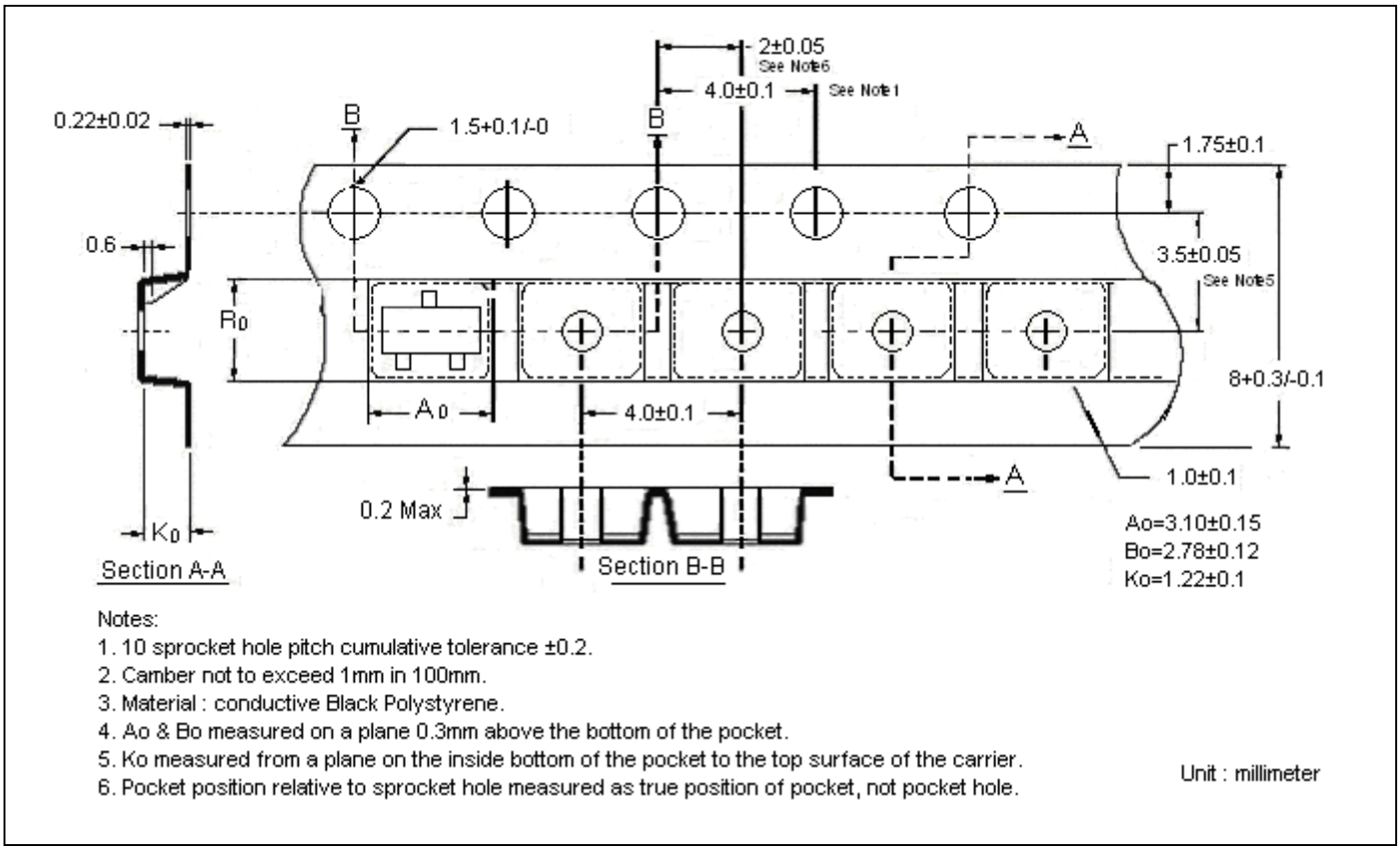




Reel Dimension



Carrier Tape Dimension



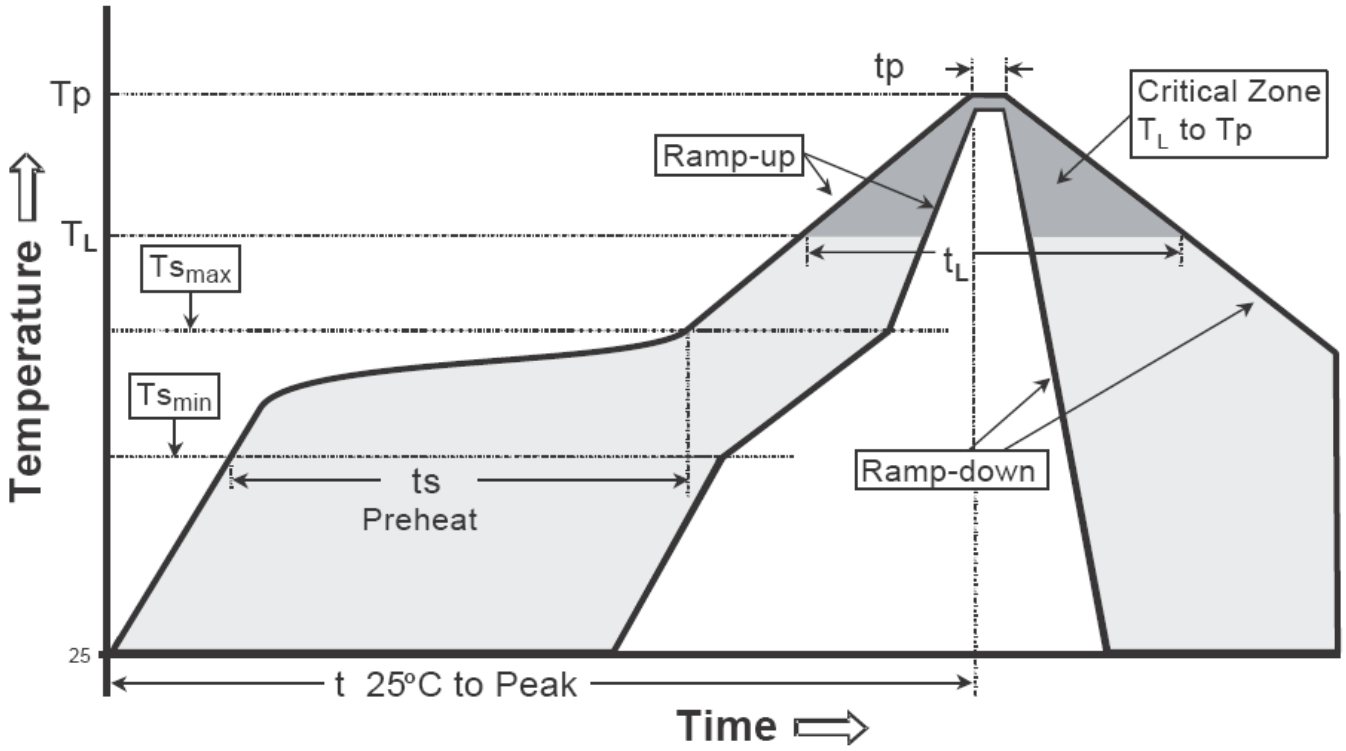
Notes:
1. 10 sprocket hole pitch cumulative tolerance ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material : conductive Black Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.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

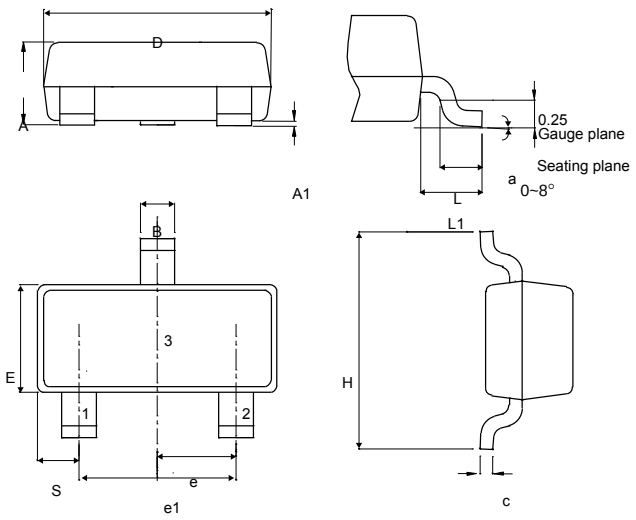
Recommended temperature profile for IR reflow

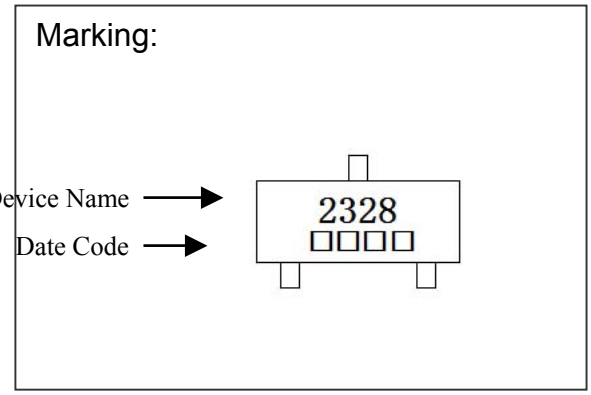


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (T_L) − Time (t_L)	 183°C 60-150 seconds	 217°C 60-150 seconds
Peak Temperature(T_P)	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-23-3L Dimension





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

3-Lead SOT-23-3L Plastic
Surface Mounted Package
Package Code: N3L

*: Typical

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.89	1.25	0.035	0.05	A1	0.00	0.15	0.00	0.006
B	0.30	0.51	0.011	0.021	e	0.85	1.05	0.033	0.042
C	0.085	0.20	0.003	0.008	H	2.1	3.0	0.082	0.119
D	2.75	3.04	0.108	0.12	L	0.25	0.61	0.009	0.025
E	1.20	1.75	0.047	0.069	e1	1.7	2.1	0.066	0.083
L1	0.55	0.55	0.022	0.022	S	0.35	0.65	0.013	0.026

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

Material:

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