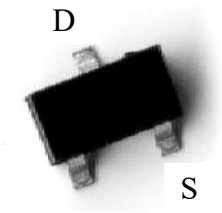
600V N-Channel Enhancement Mode MOSFET

Outline

SOT-23



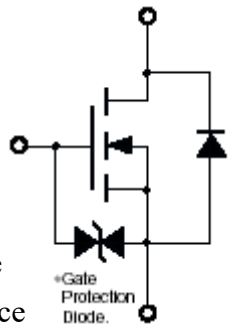
Features:

- Lower gate charge
- ESD protected gate
- Pb-free lead plating and Halogen-free package

BV_{DSS}	600V
I_D @V_{GS}=10V, T_A=25°C	33mA
$R_{DSON(TYP)}$@V_{GS}=10V, I_D=16mA	165Ω
$R_{DSON(TYP)}$@V_{GS}=4.5V, I_D=16mA	166Ω

Equivalent Circuit

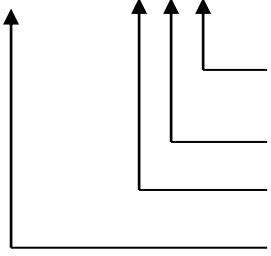
KWN127KN3



G：Gate
S：Source
D：Drain

Ordering Information

Device	Package	Shipping
KWN127KN3-0-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 (Tc=25°C, unless otherwise noted)

Parameter		Symbol	Limits	Unit
Drain-Source Voltage		V_{DS}	600	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current	T_A=25°C, V_{GS}=10V	I_D	33	mA
	T_A=70°C, V_{GS}=10V		26	
Pulsed Drain Current		I_{DM}	132 (Note 1 & 2)	
Power Dissipation	T_A=25°C	P_D	0.5 (Note 3)	W
	T_A=70°C		0.32 (Note 3)	
Gate Source ESD susceptibility		$V_{ESD(G-S)}$	3000 (Note 4)	V
Operating Junction and Storage Temperature		Tj, Tstg	-55 ~ +150	°C

Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction to Ambient , max	$R_{\theta JA}$	250 *3	°C/W
Thermal Resistance, Junction to Case, max	$R_{\theta JC}$	60	

Note : 1. Pulse width limited by maximum junction temperature.
2. Duty cycle ≤ 1%.
3. Surface mounted on min. copper pad.
4. Human body model, 1.5kΩ in series with 100pF.

Electrical Characteristics (T_A=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	600	-	-	V	V_{GS}=0V, I_D=250μA
$V_{GS(th)}$	1.5	-	3		V_{DS}=V_{GS}, I_D=250μA
I_{GSS}	-	-	±10	μA	V_{GS}=±16V, V_{DS}=0V
I_{DSS}	-	-	1		V_{DS}=600V, V_{GS}=0V
	-	-	10		V_{DS}=600V, V_{GS}=0V, Tj=55°C
*$R_{DS(ON)}$ [1]	-	165	250	Ω	I_D=16mA, V_{GS}=10V
	-	166	260		I_D=16mA, V_{GS}=4.5V
*G_{FS} [1]	-	57	-	mS	V_{DS}=40V, I_D=10mA
Dynamic					
Ciss	-	21.4	32	pF	V_{DS}=25V, V_{GS}=0V, f=1MHz
Coss	-	2.7	4		
Crss	-	2.5	3.8		
*$t_{d(ON)}$ [1] [2]	-	7.8	12	ns	V_{DS}=300V, I_D=10mA,V_{GS}=10V, R_G=6Ω
*t_r [1] [2]	-	22	33		
*$t_{d(OFF)}$ [1] [2]	-	18.4	27.6		
*t_f [1] [2]	-	92.8	139.2		

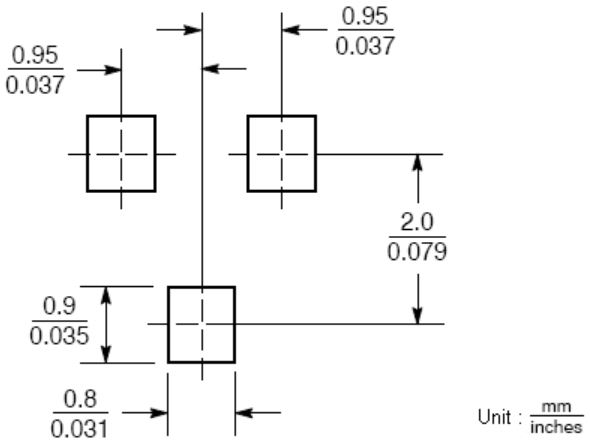
*Qg [1] [2]	-	1.6	2.4	nC	V_{DS}=300V, I_D=10mA, V_{GS}=10V
*Qgs [1] [2]	-	0.5	0.8		
*Qgd [1] [2]	-	0.6	0.9		
Source-Drain Diode					
I_S	-	-	33	mA	
I_{SM} [3]	-	-	132		
V_{SD} [1]	-	0.75	1	V	I_S=16mA, V_{GS}=0V
trr [1]	-	210	315	ns	I_F=16mA, dI_F/dt=100A/μs
Qrr [1]	-	20	30	nC	

[1] Pulse test : Pulse width≤300μs, Duty cycle≤2%

[2] Independent of operating temperature

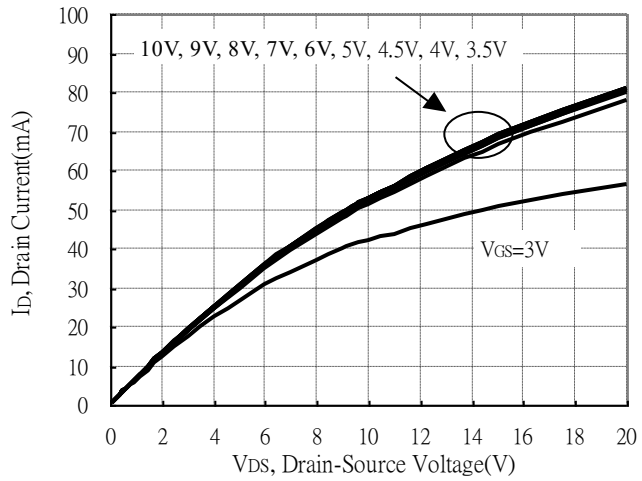
[3] Pulse width limited by maximum junction temperature

Recommended Soldering Footprint

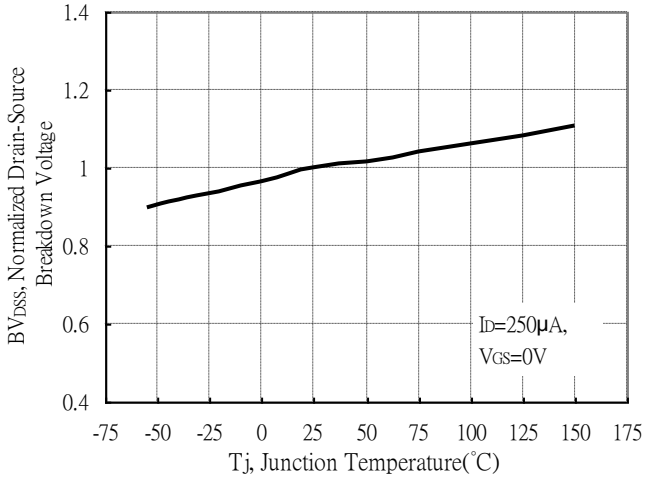


Typical Characteristics

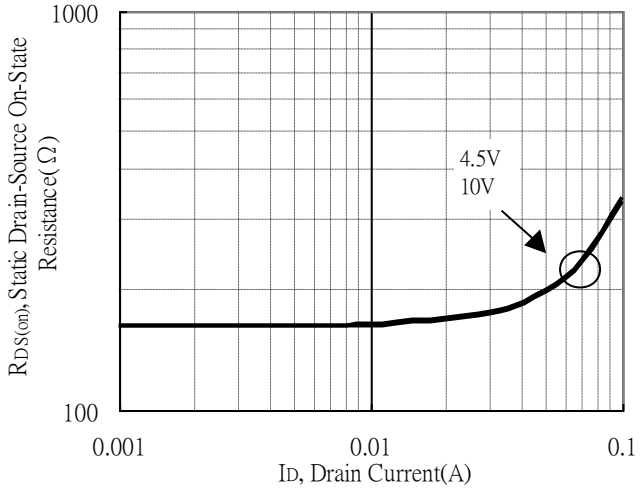
Typical Output Characteristics



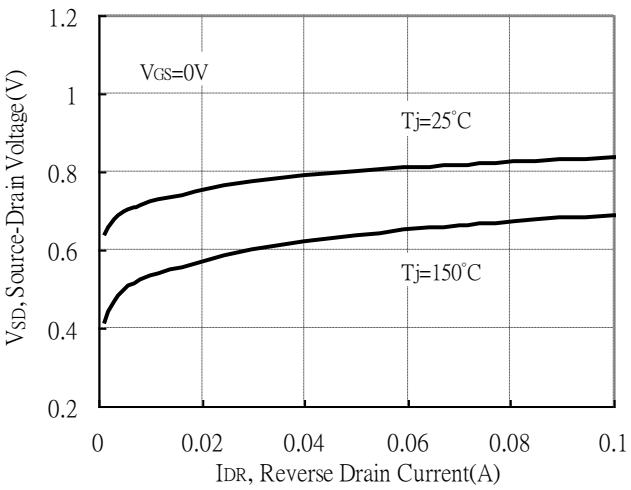
Brekdown Voltage vs Ambient Temperature



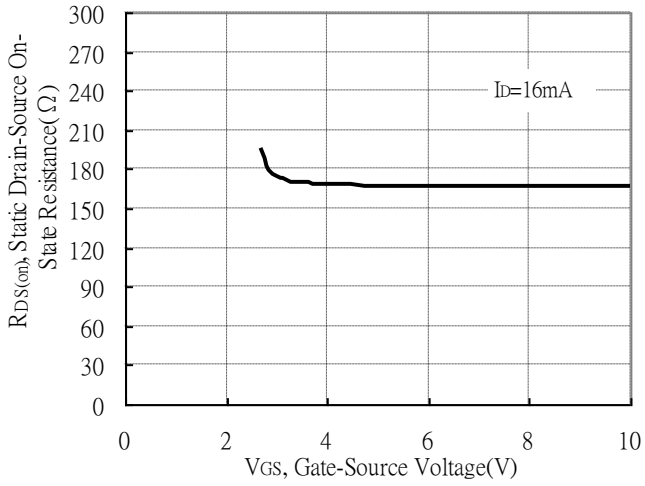
Static Drain-Source On-State resistance vs Drain Current



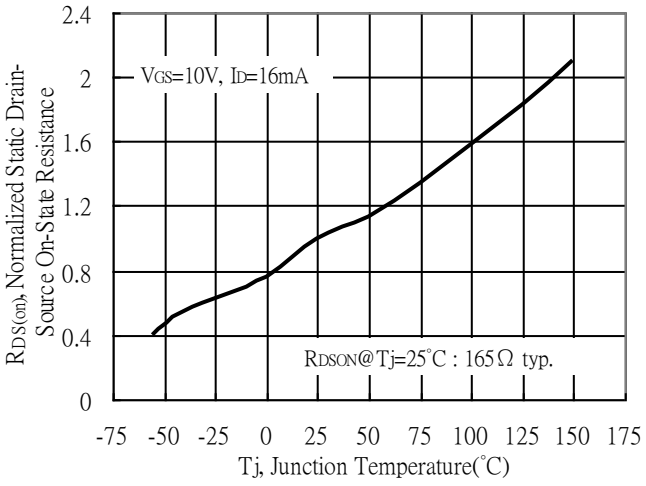
Reverse Drain Current vs Source-Drain Voltage



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

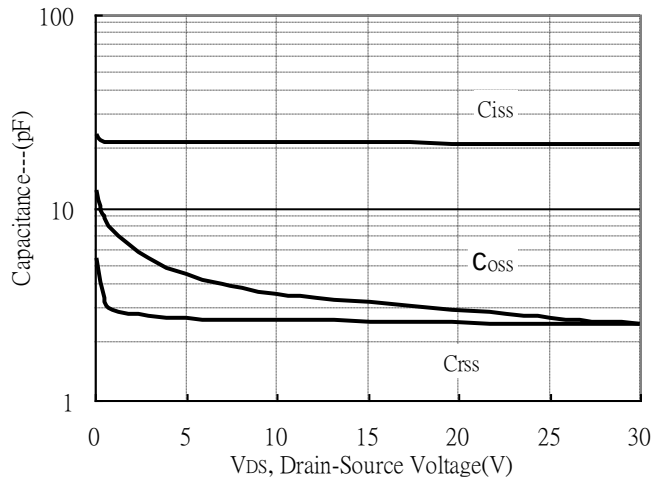


Drain-Source On-State Resistance vs Junction Tempearture

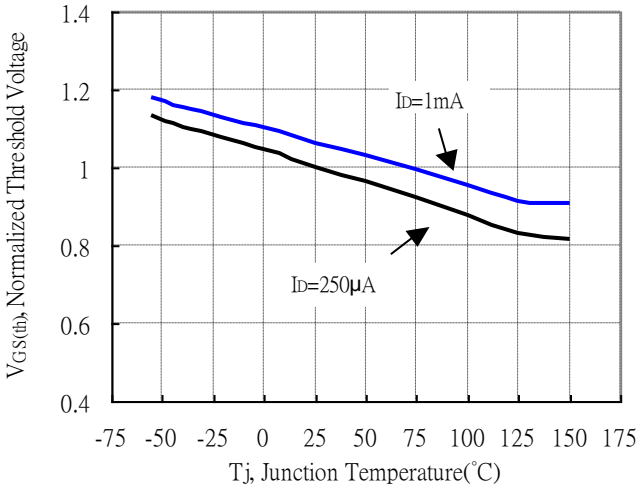


Typical Characteristics(Cont.)

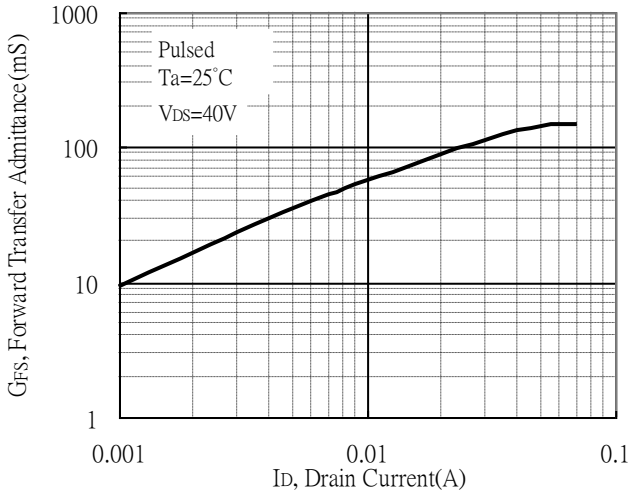
Capacitance vs Drain-to-Source Voltage



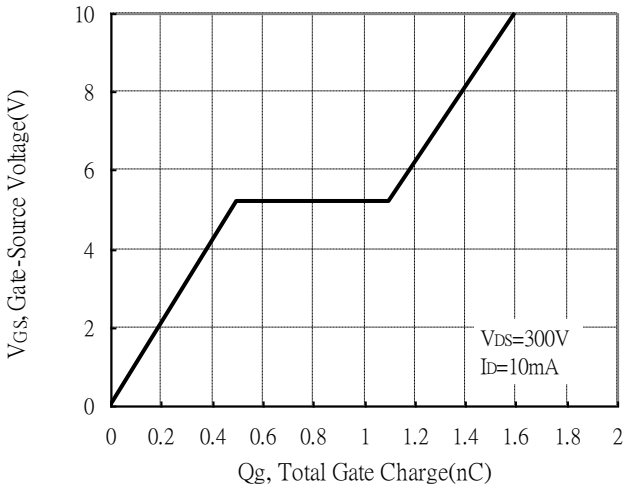
Threshold Voltage vs Junction Tempearture



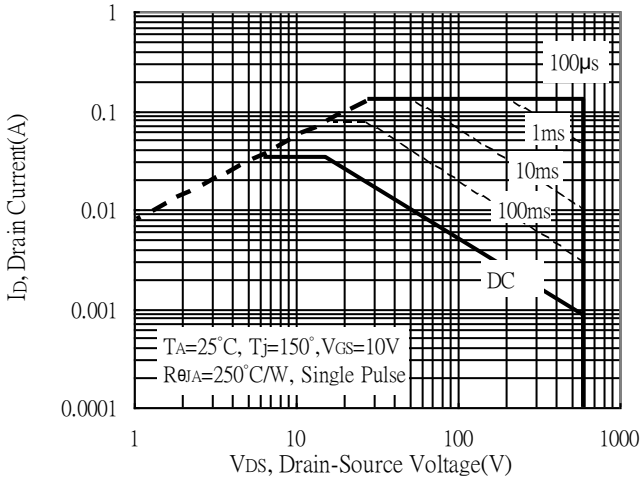
Forward Transfer Admittance vs Drain Current



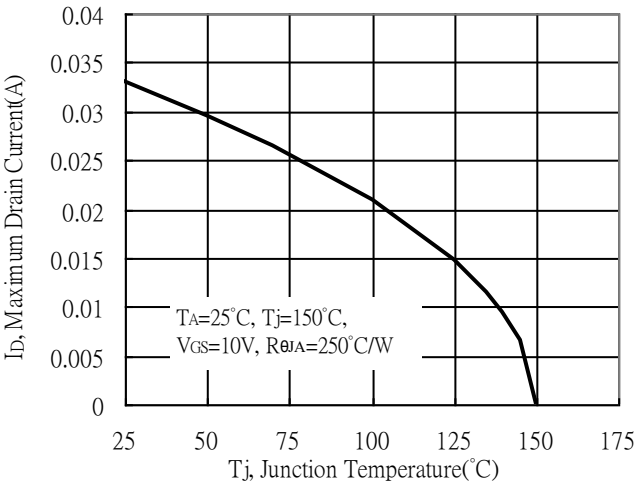
Gate Charge Characteristics



Maximum Safe Operating Area

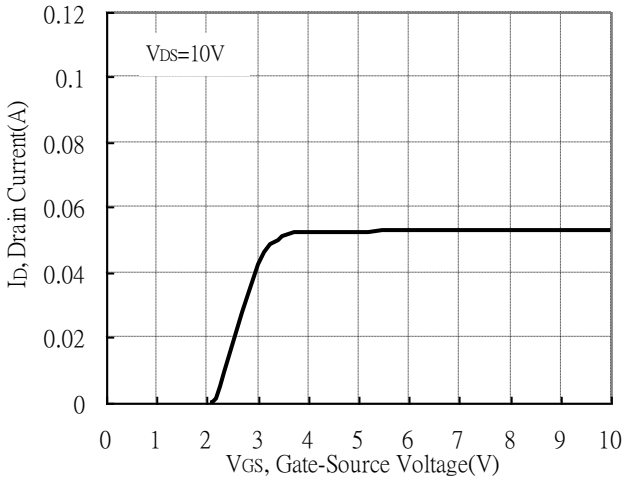


Maximum Drain Current vs Jnuction Temperature

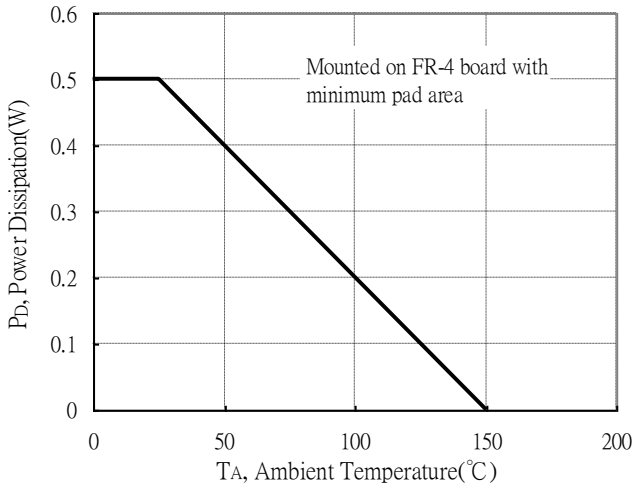


Typical Characteristics(Cont.)

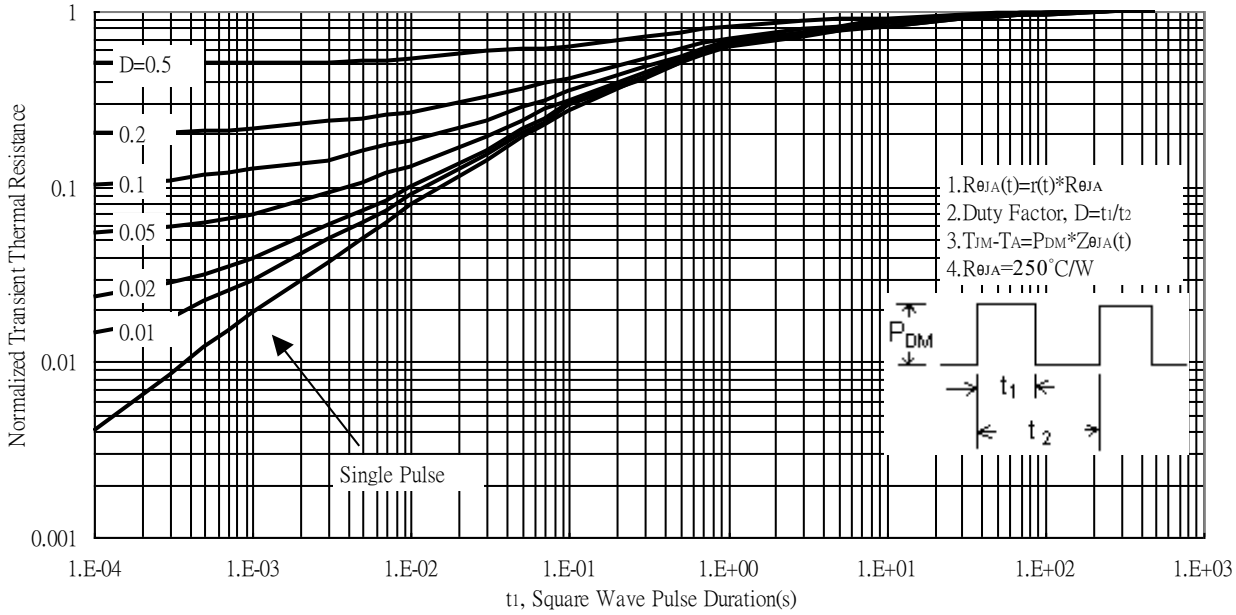
Typical Transfer Characteristics



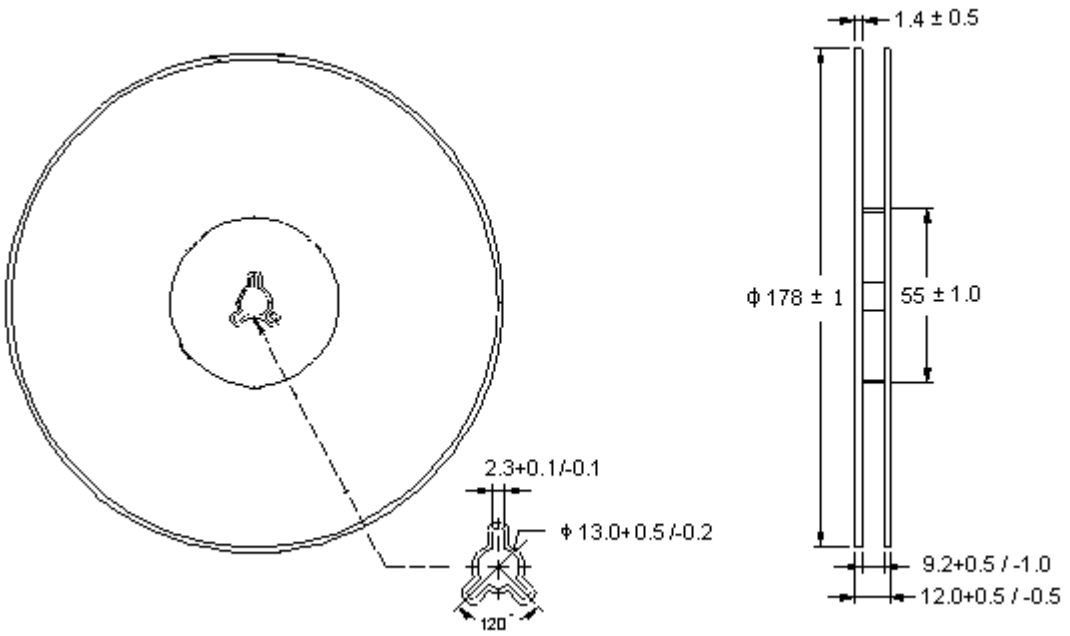
Power Derating Curve



Transient Thermal Response Curves

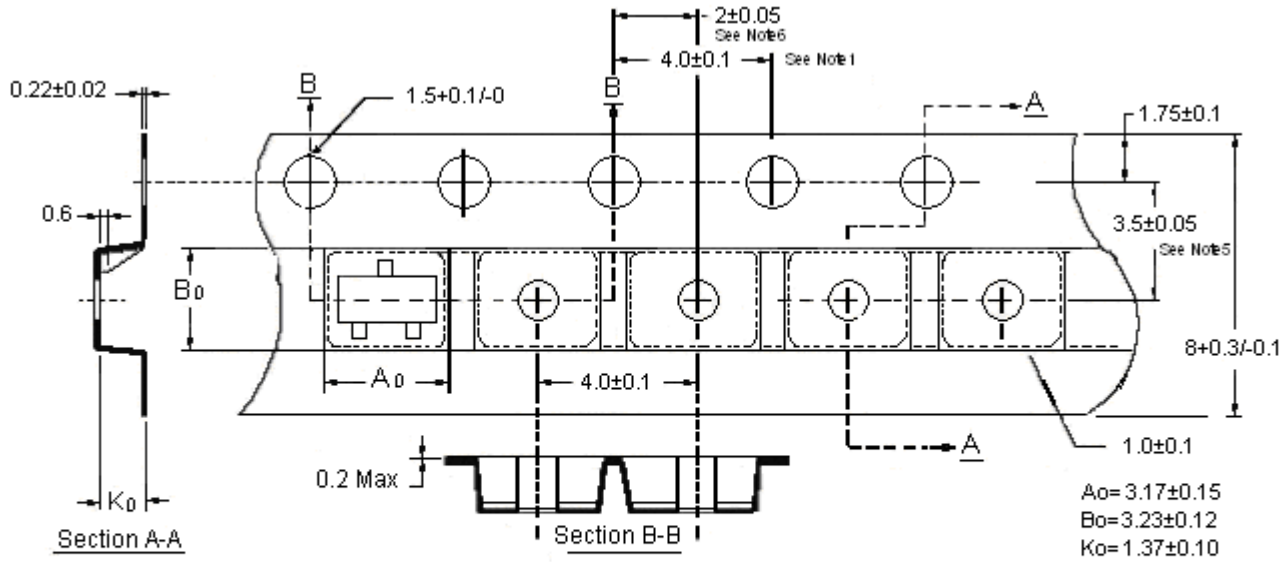


Reel Dimension



Unit: millimeter

Carrier Tape Dimension



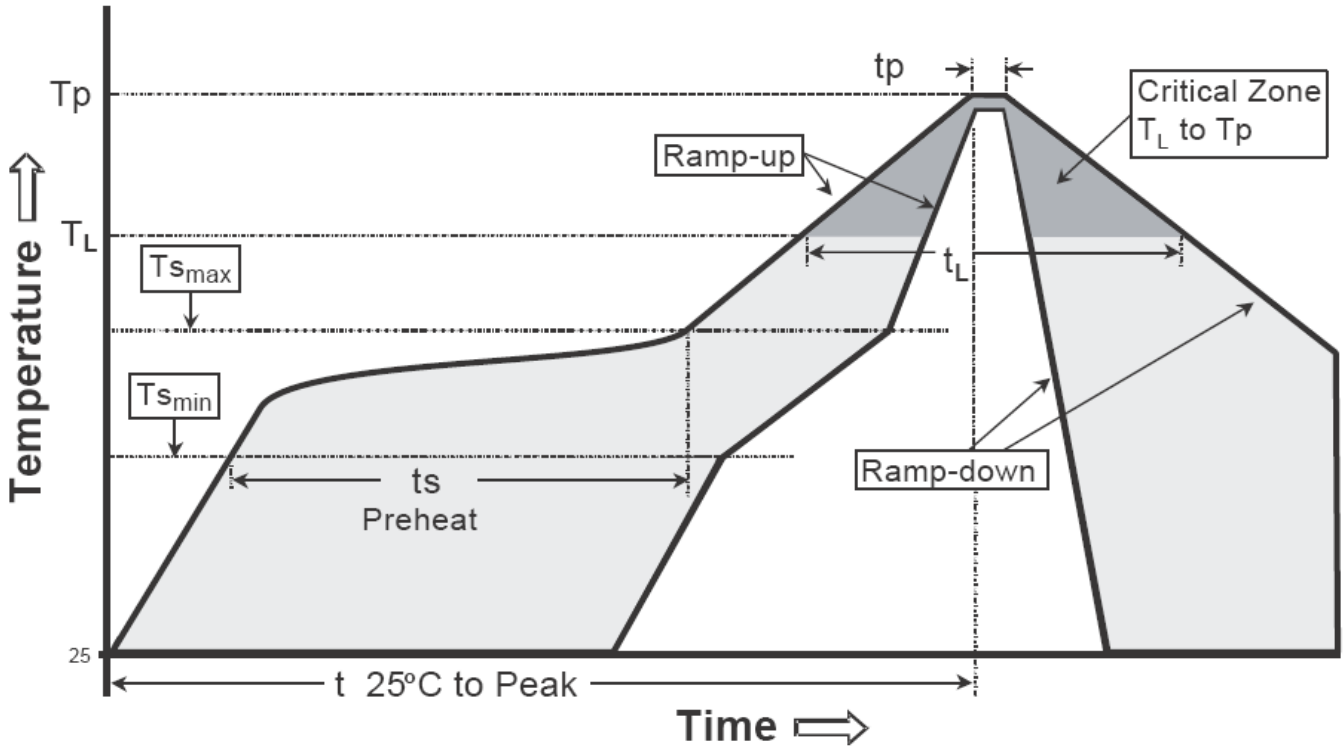
Notes:
1. 10 sprocket hole pitch cumulative tolerance ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material : conductive Black Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.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

Unit : millimeter

Recommended wave soldering condition

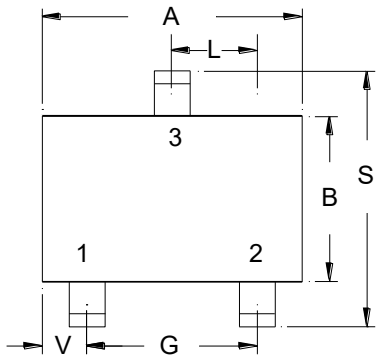
Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

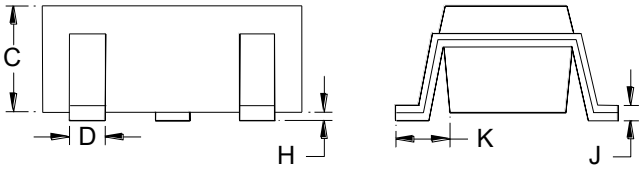
Recommended temperature profile for IR reflow

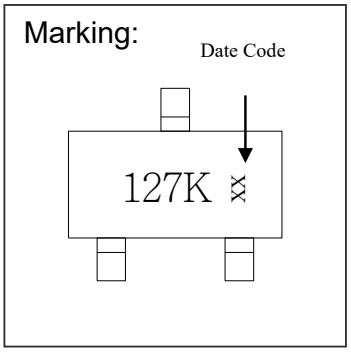


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(Ts min) −Temperature Max(Ts max) −Time(ts min to ts max)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL) − 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.







3-Lead SOT-23 Plastic
Surface Mounted 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	0.1063	0.1220	2.70	3.10	J	0.0034	0.0079	0.085	0.20
B	0.0472	0.0630	1.20	1.60	K	0.0128	0.0266	0.32	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					