100V N-Channel Logic Level Enhancement Mode MOSFET

MTBC7N10N3

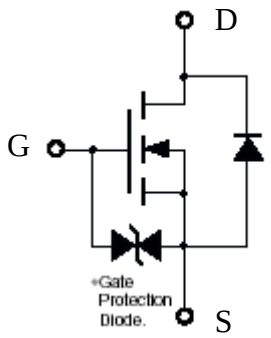
BV_{DSS}	100V
I_D @T_A=25°C, V_{GS}=10V	1A
$R_{DSON(TYP)}$@V_{GS}=10V, I_D=1A	389mΩ
$R_{DSON(TYP)}$@V_{GS}=4.5V, I_D=1A	413mΩ
$R_{DSON(TYP)}$@V_{GS}=4V, I_D=1A	407mΩ

Features

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

Equivalent Circuit

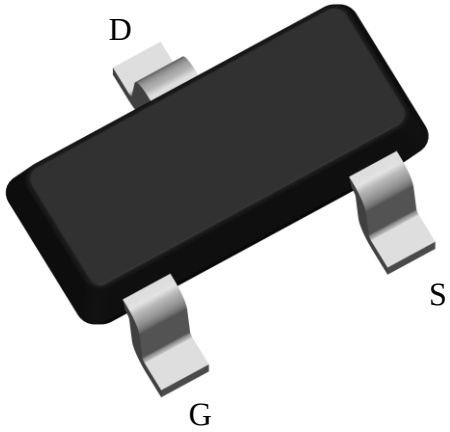
MTBC7N10N3



G：Gate S：Source D：Drain

Outline

SOT-23



Ordering Information

Device	Package	Shipping
MTBC7N10N3-0-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}	100	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current	T_A=25°C, V_{GS}=10V	I_D	1	A
	T_A=70°C, V_{GS}=10V		0.8	
Pulsed Drain Current		I_{DM}	4 (Note 1 & 2)	
Power Dissipation		P_D	1 (Note 3)	W
			0.54 (Note 4)	
Operating Junction and Storage Temperature		Tj, Tstg	-55 ~ +150	°C

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	125 (Note 3)	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	231 (Note 4)	

Note :1. Pulse width limited by maximum junction temperature.
2. Duty cycle ≤ 1%.
3. Surface mounted on a ceramic board (30x30x0.8mm), t≤10s.
4. Surface mounted on a FR-4 board (12x20x0.8mm), t≤10s; 357°C/W when mounted on min. copper pad.

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

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	100	-	-	V	V_{GS}=0V, I_D=250μA
$\triangle BV_{DSS}/\triangle Tj$	-	107	-	mV/°C	I_D=1mA, referenced to 25°C
$V_{GS(th)}$	1	1.3	2.5	V	V_{DS}=10V, I_D=1mA
$\triangle V_{GS(th)}/\triangle Tj$	-	-3	-	mV/°C	I_D=1mA, referenced to 25°C
I_{GSS}	-	-	±10	μA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	1		V_{DS}=100V, V_{GS}=0V
	-	-	10		V_{DS}=80V, V_{GS}=0V, Tj=125°C
$*R_{DS(ON)}$ [1]	-	389	520	mΩ	I_D=1A, V_{GS}=10V
	-	407	560		I_D=1A, V_{GS}=4.5V
	-	413	580		I_D=1A, V_{GS}=4V
$*G_{FS}$ [1]	1	2.4	-	S	I_D=1A, V_{GS}=10V
Dynamic					
Ciss	-	103	150	pF	V_{DS}=25V, V_{GS}=0V, f=1MHz
Coss	-	18	27		
Crss	-	17	24		

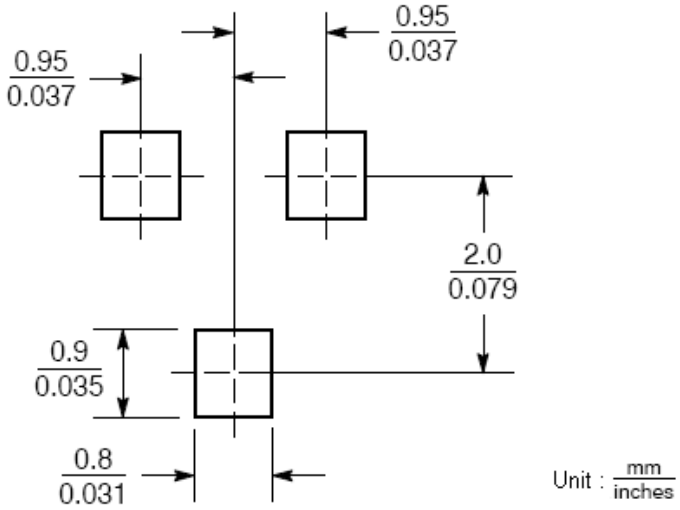
*$t_{d(ON)}$ [1] [2]	-	3.6	7.2	ns	V_{DS}=50V, I_D=0.5A, V_{GS}=10V, R_G=10Ω
*t_r [1] [2]	-	16	24		
*$t_{d(OFF)}$ [1] [2]	-	17.2	26		
*t_f [1] [2]	-	18.8	28		
*Qg [1] [2]	-	1.6	3.2	nC	V_{DS}=50V, I_D=1A, V_{GS}=5V
*Qgs [1] [2]	-	0.8	1.6		
*Qgd [1] [2]	-	0.5	1.5		
Rg	-	18	-	Ω	f=1MHz
Source-Drain Diode					
I_S	-	-	0.8	A	
V_{SD} [1]	-	0.8	1.2	V	I_S=1A, V_{GS}=0V

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

[2] Independent of operating temperature

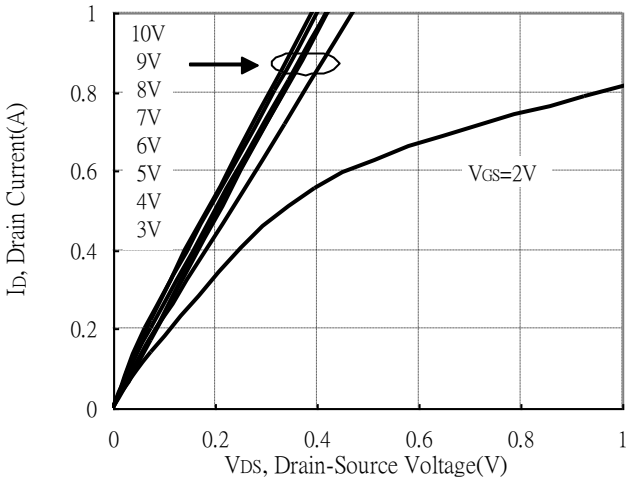
[3] Pulse width limited by maximum junction temperature

Recommended Soldering Footprint

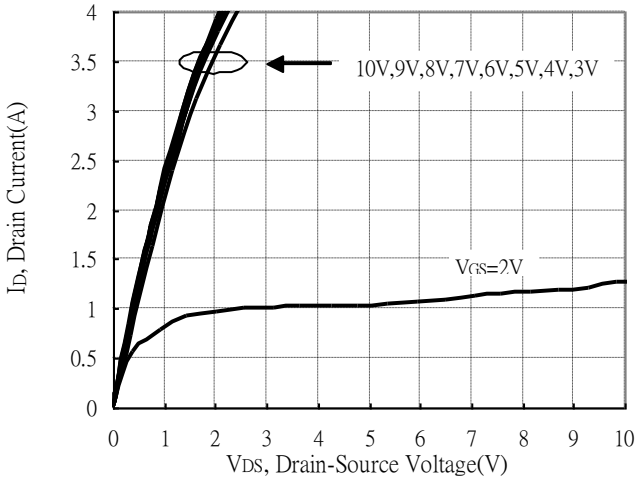


Typical Characteristics

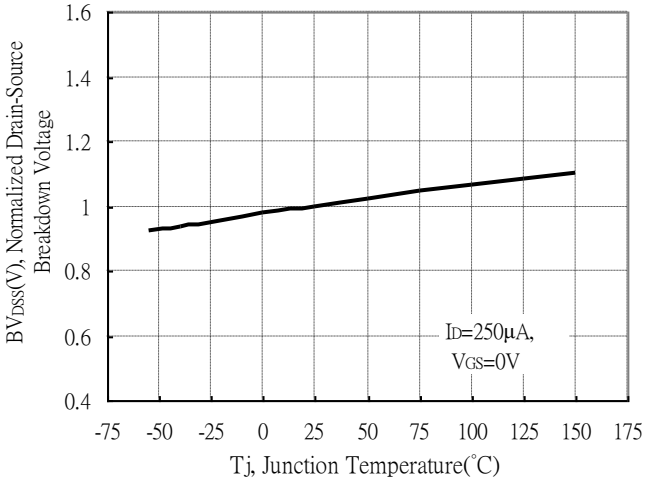
Typical Output Characteristics



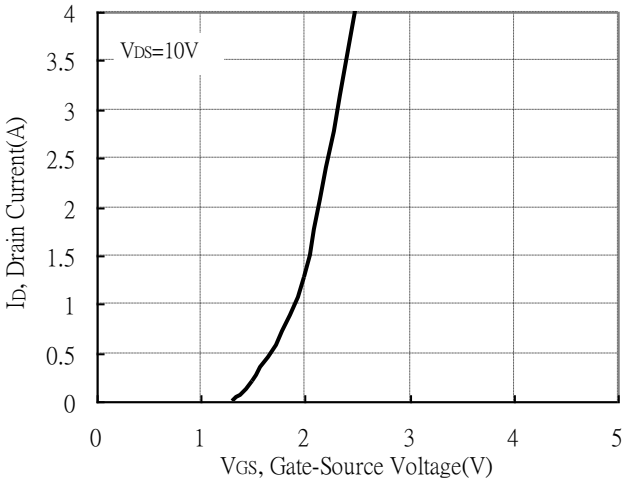
Typical Output Characteristics



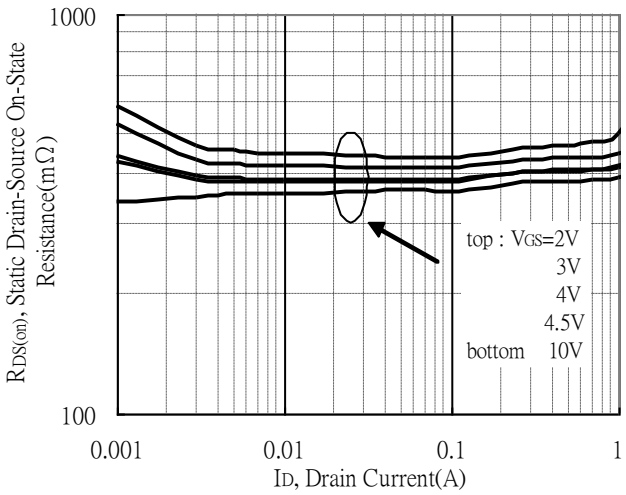
Brekdown Voltage vs Ambient Temperature



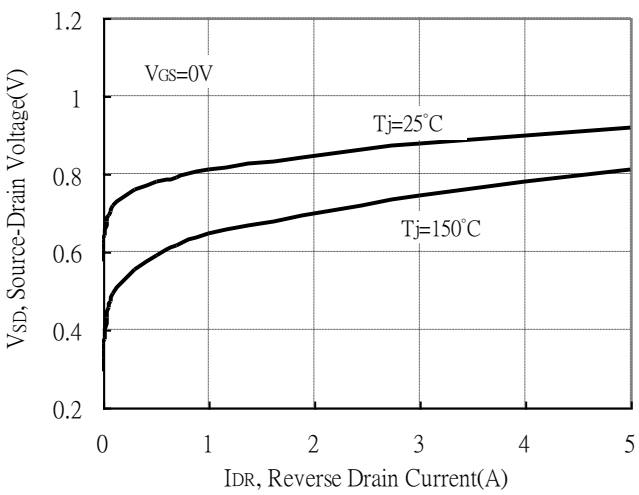
Typical Transfer Characteristics



Static Drain-Source On-State resistance vs Drain Current

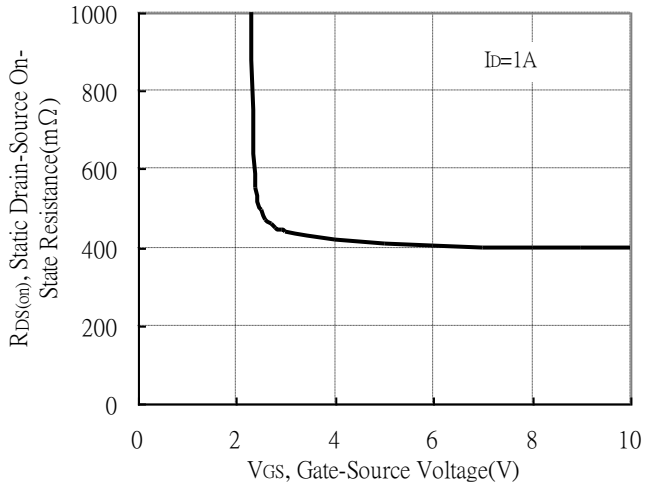


Reverse Drain Current vs Source-Drain Voltage

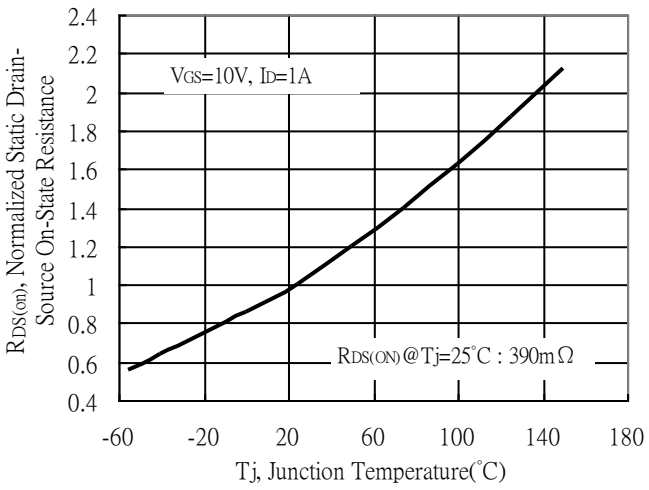


Typical Characteristics(Cont.)

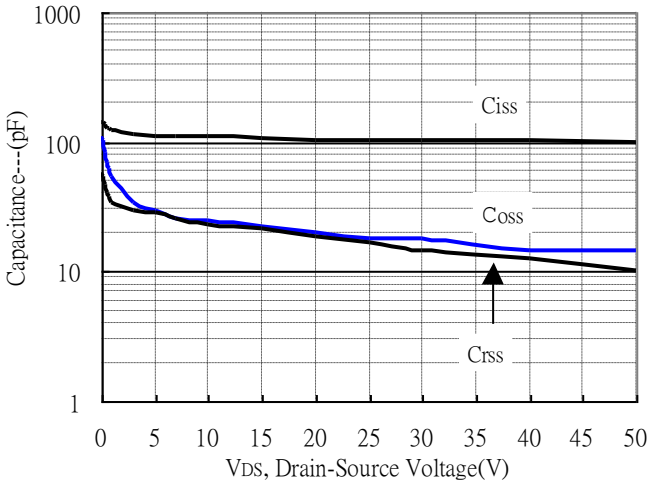
Static Drain-Source On-State Resistance vs Gate-Source Voltage



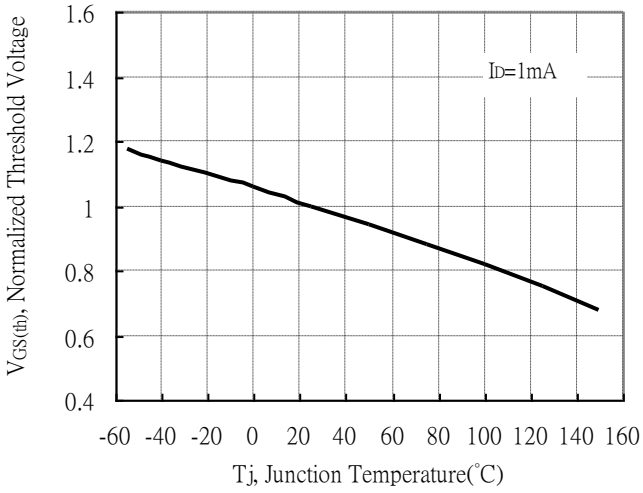
Drain-Source On-State Resistance vs Junction Tempearture



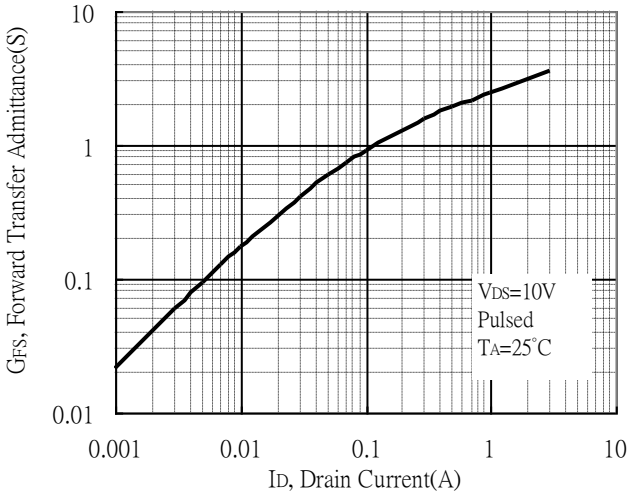
Capacitance vs Drain-to-Source Voltage



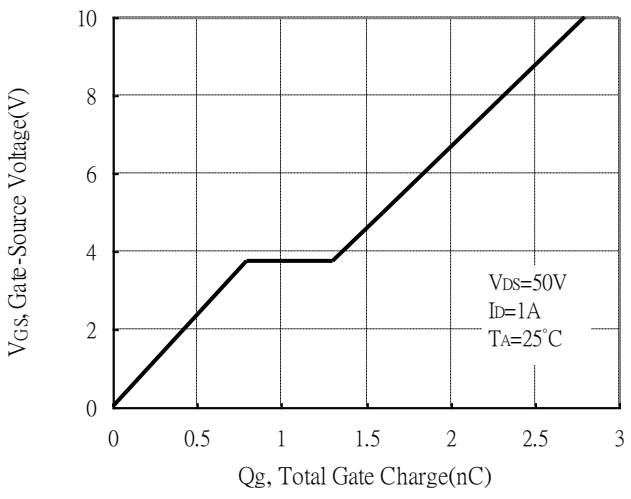
Threshold Voltage vs Junction Tempearture



Forward Transfer Admittance vs Drain Current

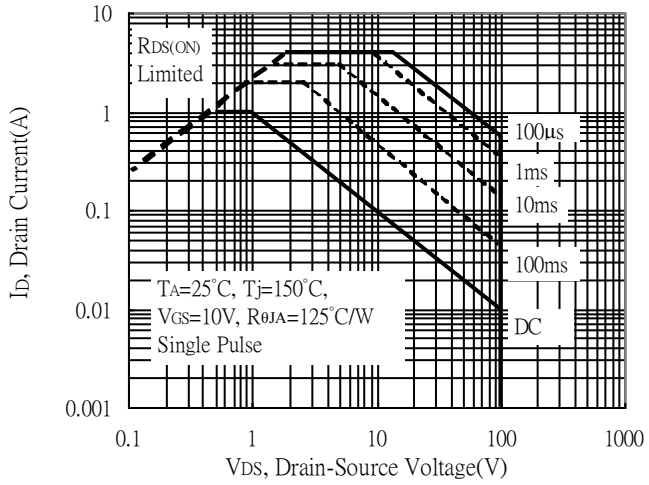


Gate Charge Characteristics

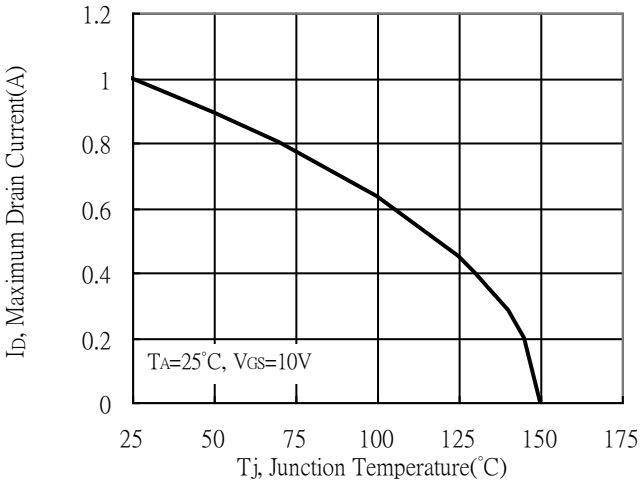


Typical Characteristics(Cont.)

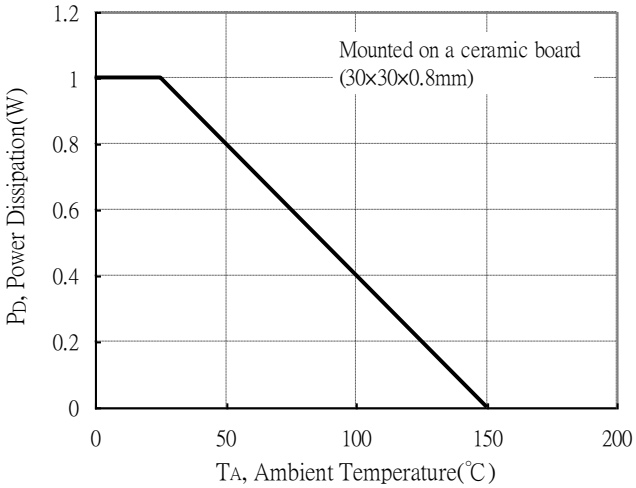
Maximum Safe Operating Area



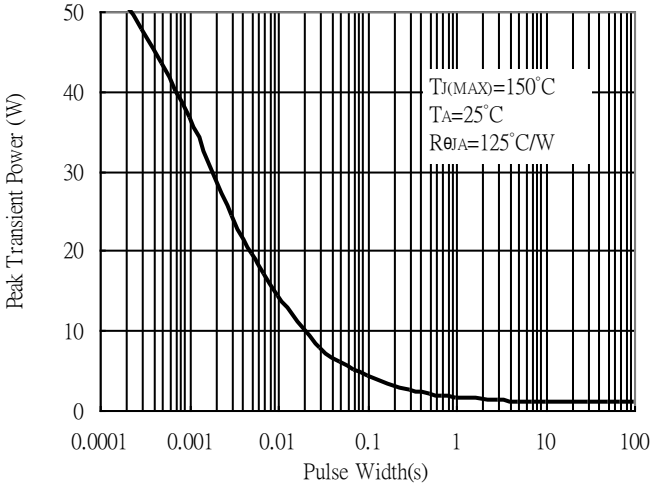
Maximum Drain Current vs JunctionTemperature



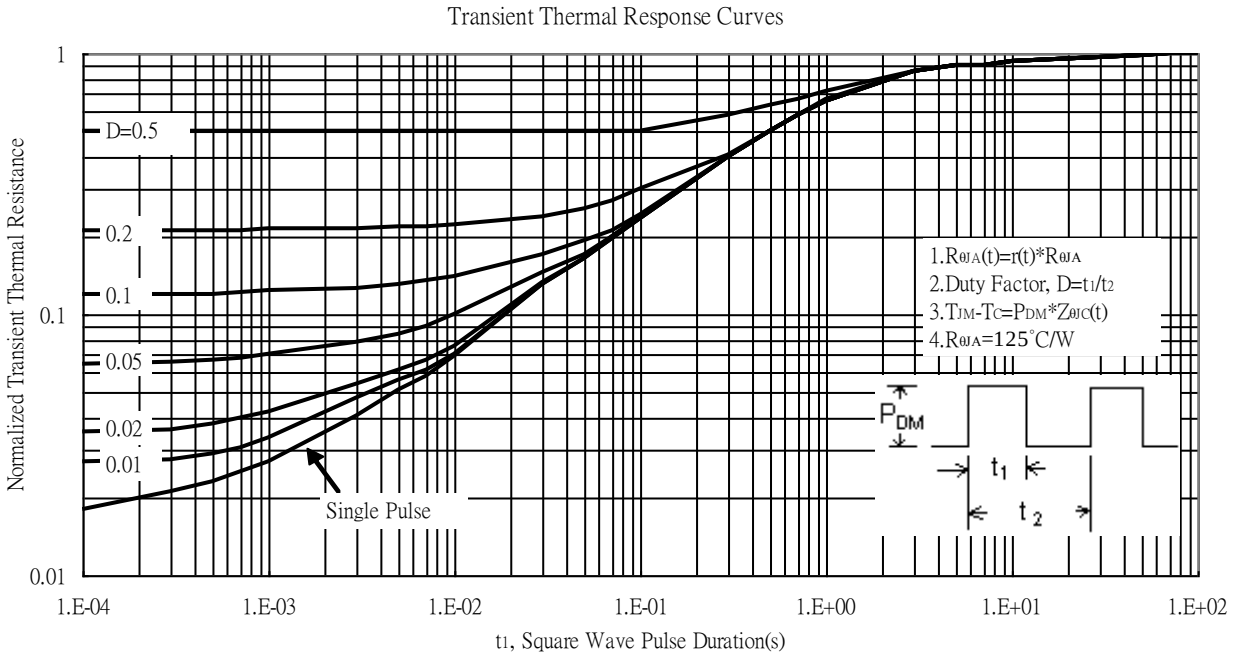
Power Derating Curve



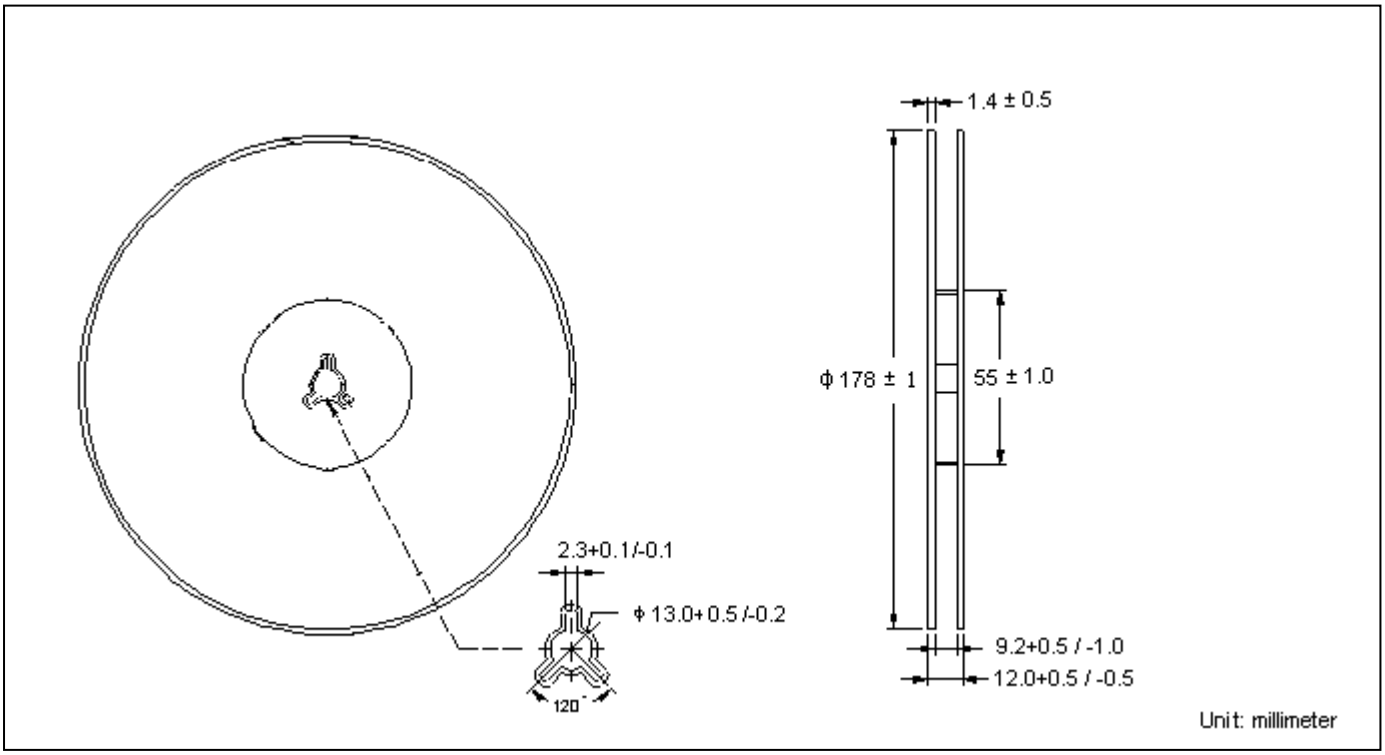
Single Pulse Maximum Power Dissipation



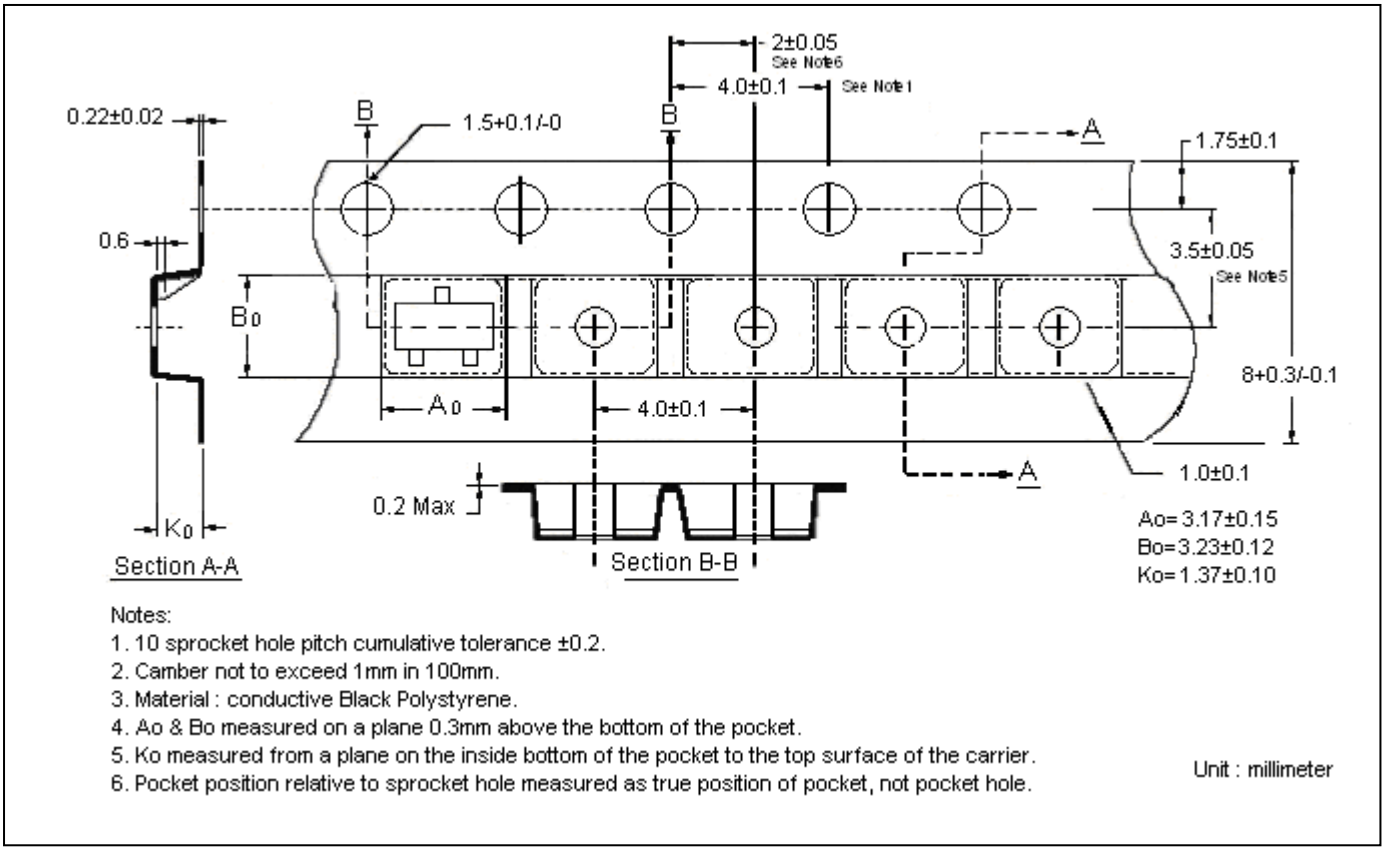
Typical Characteristics(Cont.)



Reel Dimension



Carrier Tape Dimension



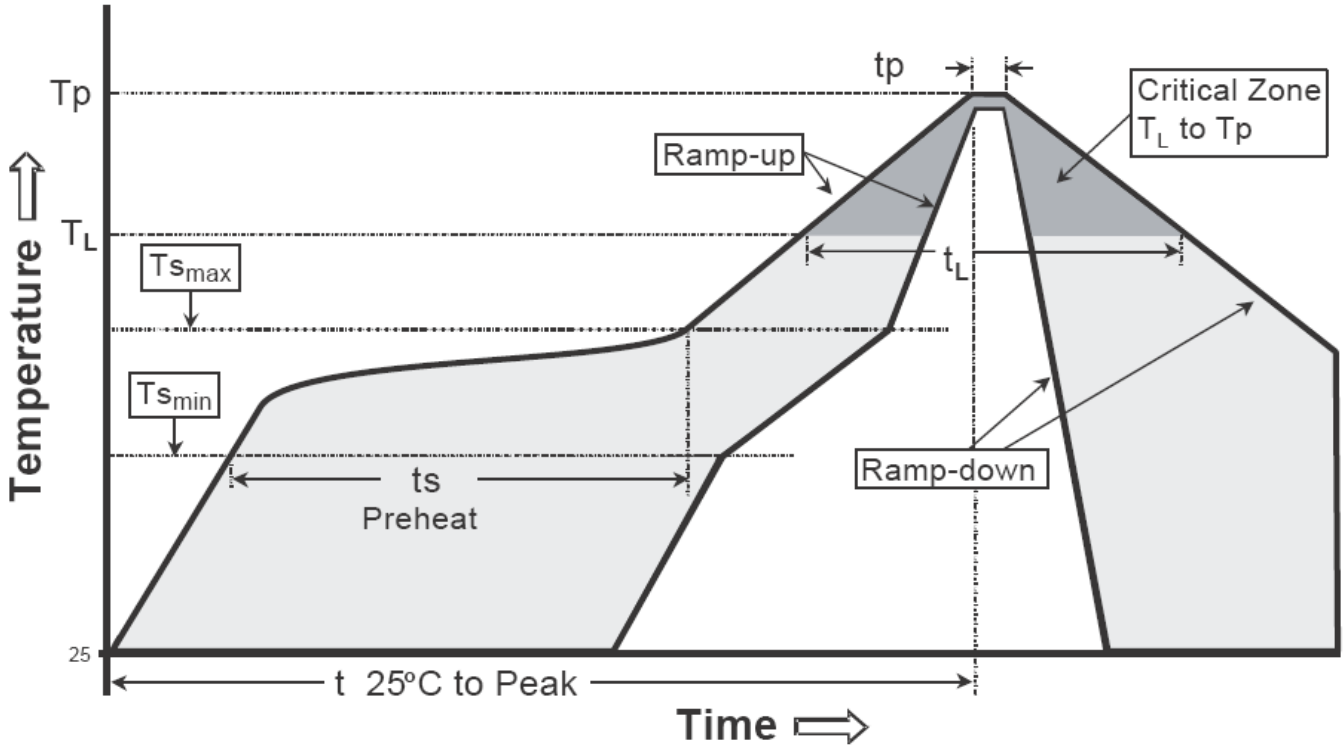
Notes:
1. 10 sprocket hole pitch cumulative tolerance ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material : conductive Black Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.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

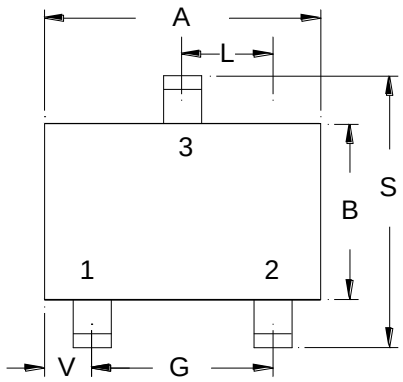
Recommended temperature profile for IR reflow

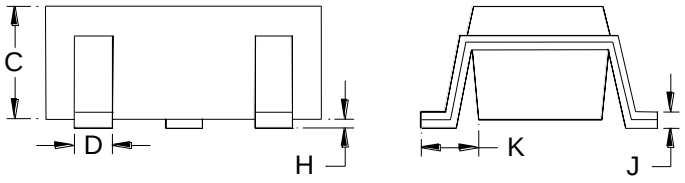


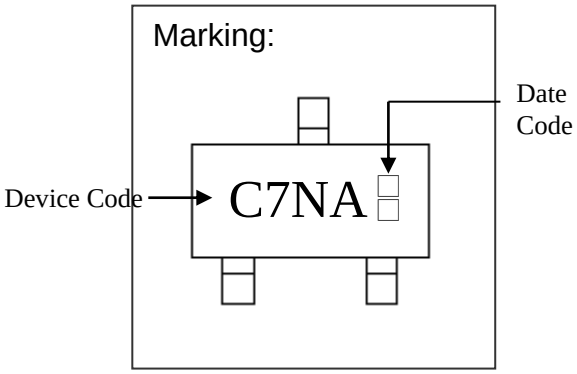
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time(ts min to ts max)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (T_L)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







3-Lead SOT-23 Plastic
Surface Mounted Package
CYStek 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	0.0034	0.0070	0.085	0.177
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	0.0005	0.0040	0.013	0.10					

Notes: 1.Controlling dimension: millimeters.
2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

Material:

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