N-Channel Logic Level Enhancement Mode Power MOSFET

MTB11N03BQ8

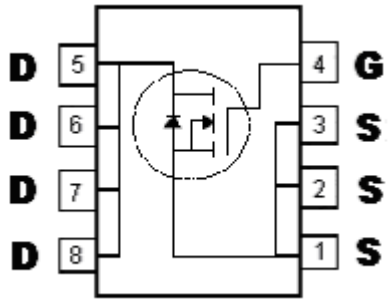
BV_{DSS}	30V
I_D@V_{GS}=10V, T_A=25°C	12A
R_{DSON}(typ)@V_{GS}=10V, I_D=12A	8.8mΩ
R_{DSON}(typ)@V_{GS}=4.5V, I_D=12A	12.8mΩ

Features

- Single Drive Requirement
- Low On-resistance
- Fast Switching Characteristic
- Repetitive Avalanche Rated
- Pb-free and Halogen-free package

Symbol

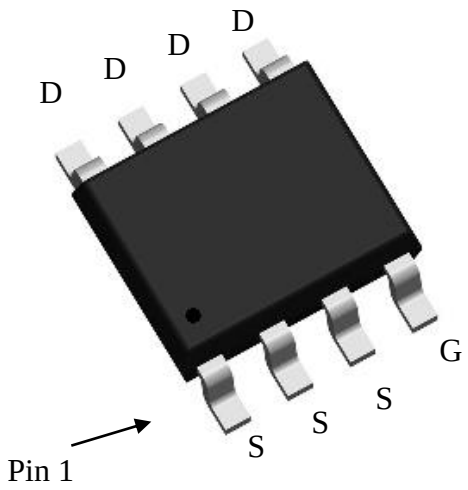
MTB11N03BQ8



G：Gate D：Drain S：Source

Outline

SOP-8



Ordering Information

Device	Package	Shipping
MTB11N03BQ8-0-T3-G	SOP-8 (Pb-free lead plating & halogen-free package)	2500 pcs / Tape & Reel
MTB11N03BQ8-0-TF-G	SOP-8 (Pb-free lead plating & halogen-free package)	4000 pcs / Tape & Reel

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

Packing spec, T3 : 2500 pcs / tape & reel,13” reel, TF : 4000 pcs/tape & reel, 13” reel

Product rank, zero for no rank products

Product name

Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	10s	Steady State	Unit
Drain-Source Voltage		V_{DS}	30		V
Gate-Source Voltage		V_{GS}	±25		
Continuous Drain Current @ T_A=25°C, V_{GS}=10V*3		I_D	12	8.3	A
Continuous Drain Current @ T_A=70°C, V_{GS}=10V*3			7.6	6.6	
Pulsed Drain Current		I_{DM}	48 *1		
Avalanche Current		I_{AS}	12		
Avalanche Energy @ L=1mH, I_D=12A, R_G=25Ω		E_{AS}	72		mJ
Repetitive Avalanche Energy @ L=0.05mH		E_{AR}	5 *2		
Total Power Dissipation *3	T_A=25℃	P_D	2.5	1.4	W
	T_A=70℃		1.6	0.9	
Operating Junction and Storage Temperature Range		Tj, Tstg	-55~+150		°C

Thermal Data

Parameter		Symbol	Typical	Maximum	Unit
Thermal Resistance, Junction-to-ambient *3	t≤10s	$R_{\theta JA}$	35	40	°C/W
	Steady State		70	85	
Thermal Resistance, Junction-to case	Steady State	$R_{\theta JC}$	16	25	

Note : 1. Pulse width limited by maximum junction temperature.
2. Duty cycle≤1%.
3. Surface mounted on 1 in² copper pad of FR-4 board; 125°C/W when mounted on minimum copper pad.

Characteristics (T_C=25°C, unless otherwise specified)

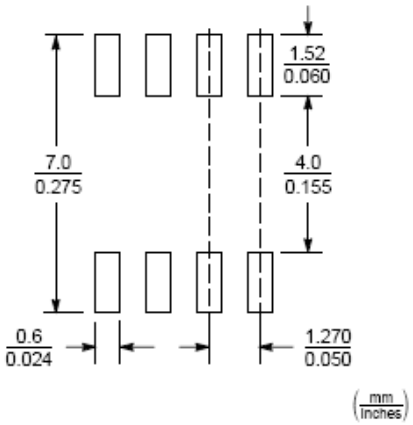
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	30	-	-	V	V_{GS}=0V, I_D=250μA
$V_{GS(th)}$	1.0	-	2.5		V_{DS} = V_{GS}, I_D=250μA
G_{FS} *1	-	19	-	S	V_{DS} =5V, I_D=11A
I_{GSS}	-	-	±100	nA	V_{GS}=±25V, V_{DS}=0V
I_{DSS}	-	-	1	μA	V_{DS} =30V, V_{GS} =0V
	-	-	5		V_{DS} =24V, V_{GS} =0V, Tj=55°C
$R_{DS(ON)}$ *1	-	8.8	12	mΩ	V_{GS} =10V, I_D=12A
	-	12.8	17	mΩ	V_{GS} =4.5V, I_D=12A
Dynamic					
Ciss	-	751	-	pF	V_{GS}=0V, V_{DS}=10V, f=1MHz
Coss	-	199	-		
Crss	-	106	-		

Characteristics (T_C=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Qg (V_{GS}=10V) *1, 2	-	15.9	-	nC	V_{DS}=24V, V_{GS}=10V, I_D=11A
Qg (V_{GS}=5V) *1, 2	-	9.6	-		
Qgs *1, 2	-	2.7	-		
Qgd *1, 2	-	4.7	-		
$t_{d(ON)}$ *1, 2	-	9	-	ns	V_{DS}=15V, I_D=5.5A, V_{GS}=10V, R_{GS}=4.7Ω
tr *1, 2	-	17.4	-		
$t_{d(OFF)}$ *1, 2	-	32.4	-		
t_f *1, 2	-	10	-		
Rg	-	1.8	-	Ω	f=1MHz
Source-Drain Diode					
I_S *1	-	-	12	A	
I_{SM} *3	-	-	48		
V_{SD} *1	-	0.84	1.3	V	I_S=12A, V_{GS}=0V
trr	-	10.3	-	ns	I_F=11A, dI_F/dt=100A/μs
Qrr	-	4.2	-	nC	

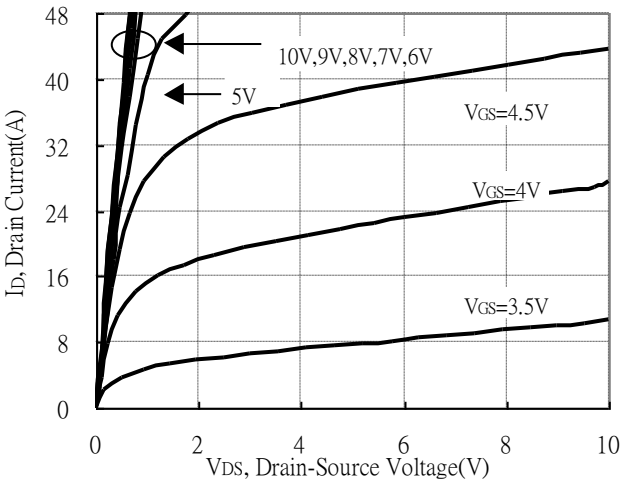
Note : *1.Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%
*2.Independent of operating temperature
*3.Pulse width limited by maximum junction temperature.

Recommended Soldering Footprint

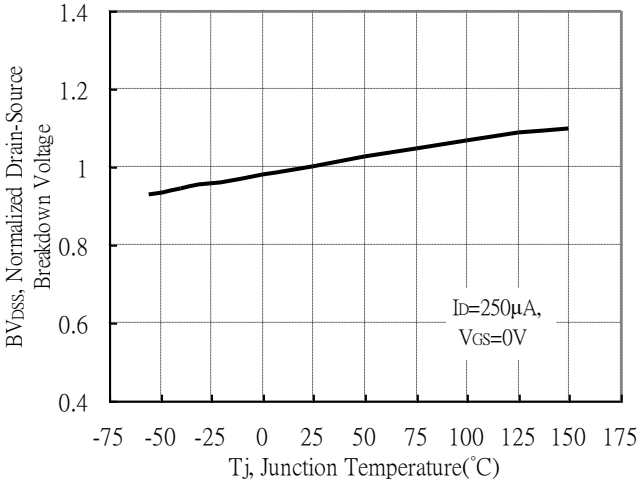


Typical Characteristics

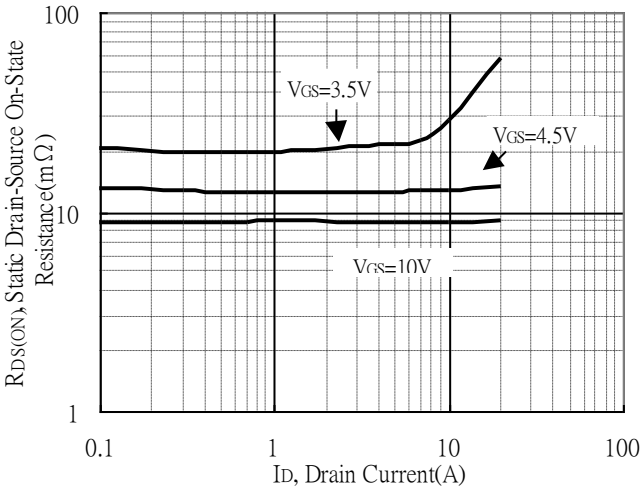
Typical Output Characteristics



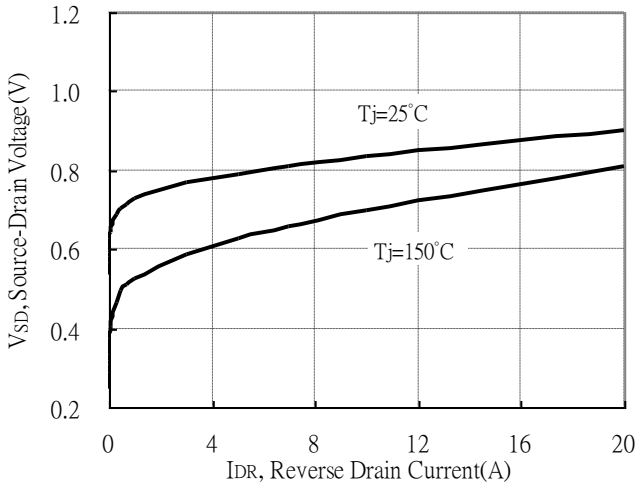
Brekdown Voltage vs Ambient Temperature



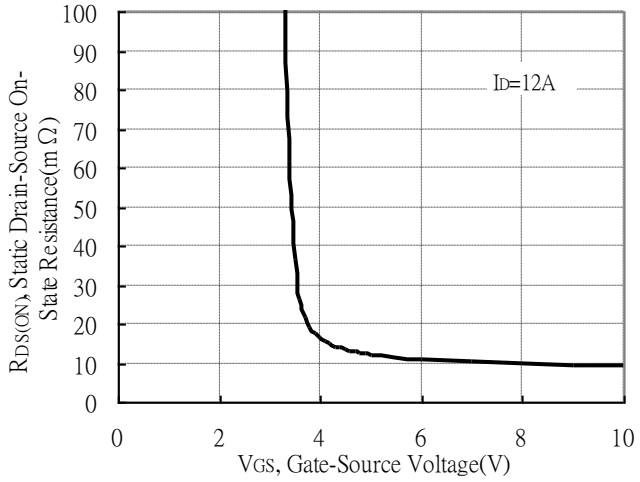
Static Drain-Source On-State resistance vs Drain Current



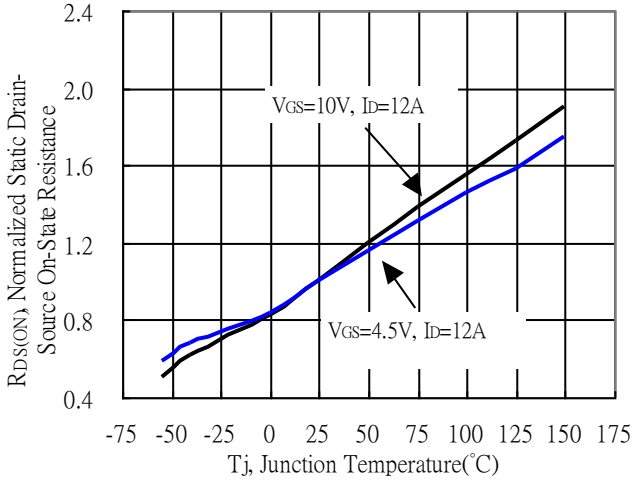
Reverse Drain Current vs Source-Drain Voltage



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

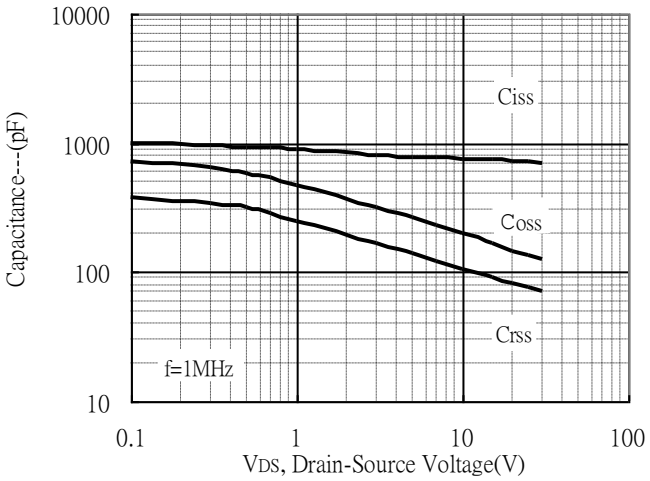


Drain-Source On-State Resistance vs Junction Tempearture

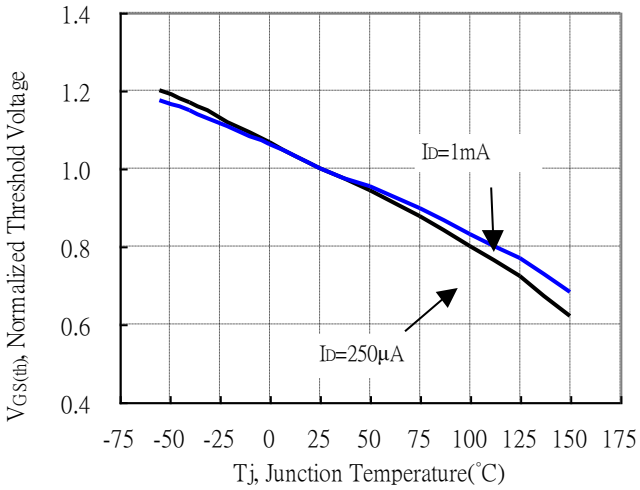


Typical Characteristics(Cont.)

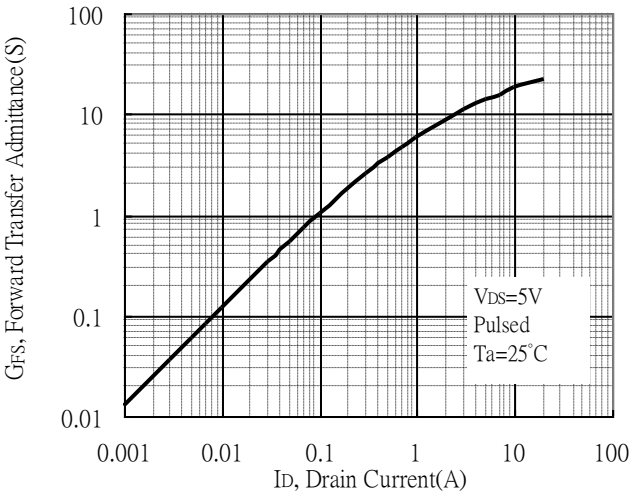
Capacitance vs Drain-to-Source Voltage



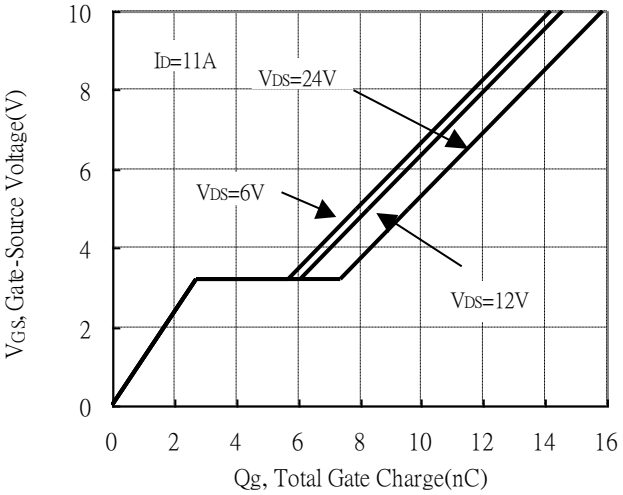
Threshold Voltage vs Junction Tempearture



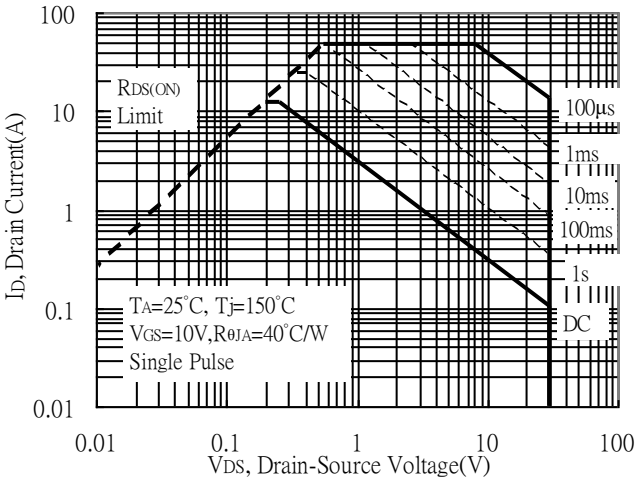
Forward Transfer Admittance vs Drain Current



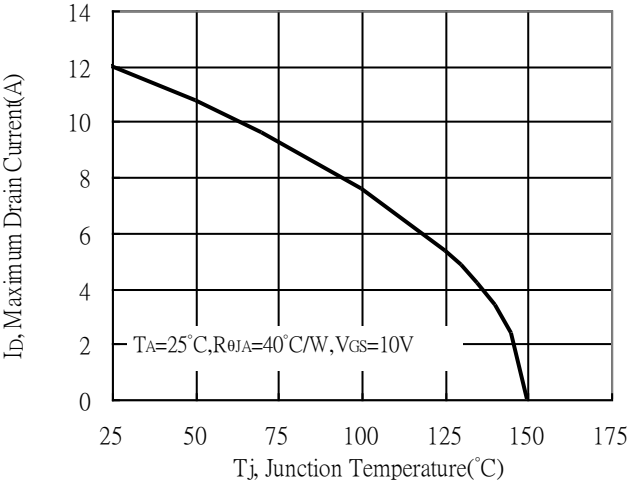
Gate Charge Characteristics



Maximum Safe Operating Area

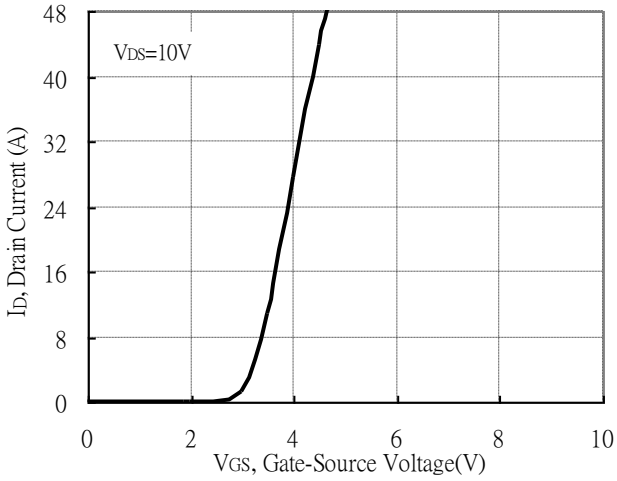


Maximum Drain Current vs Junction Temperature

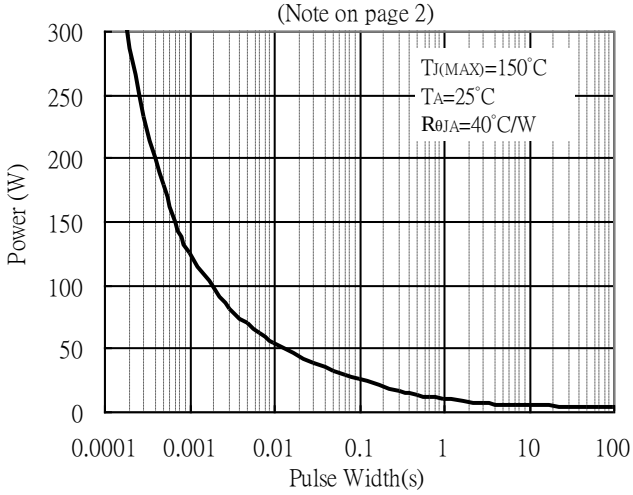


Typical Characteristics(Cont.)

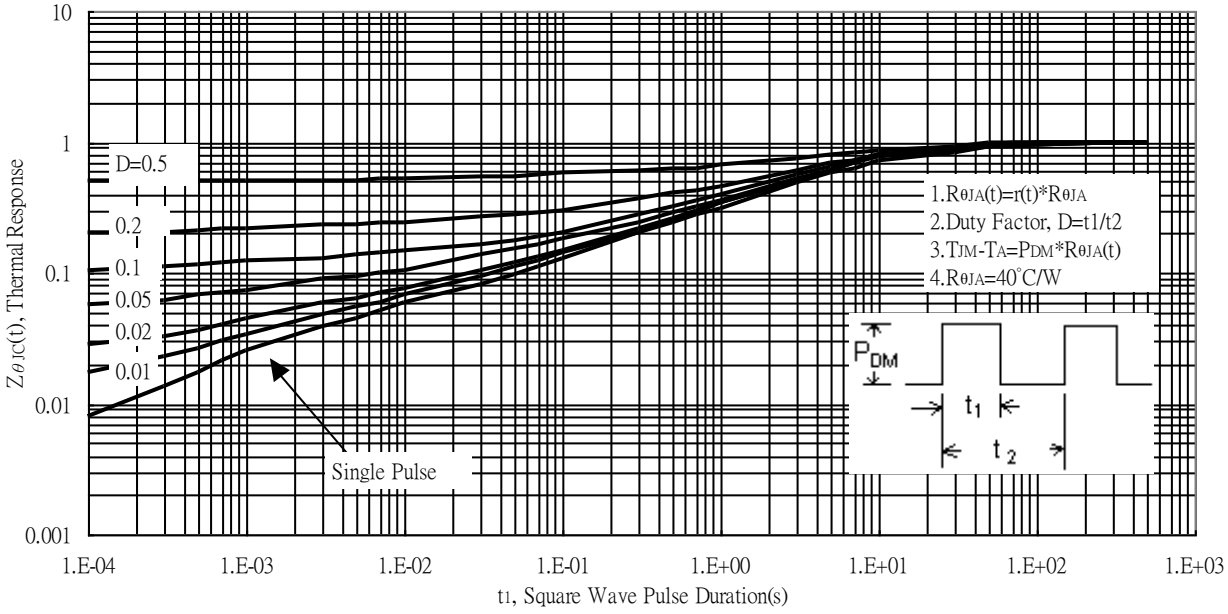
Typical Transfer Characteristics



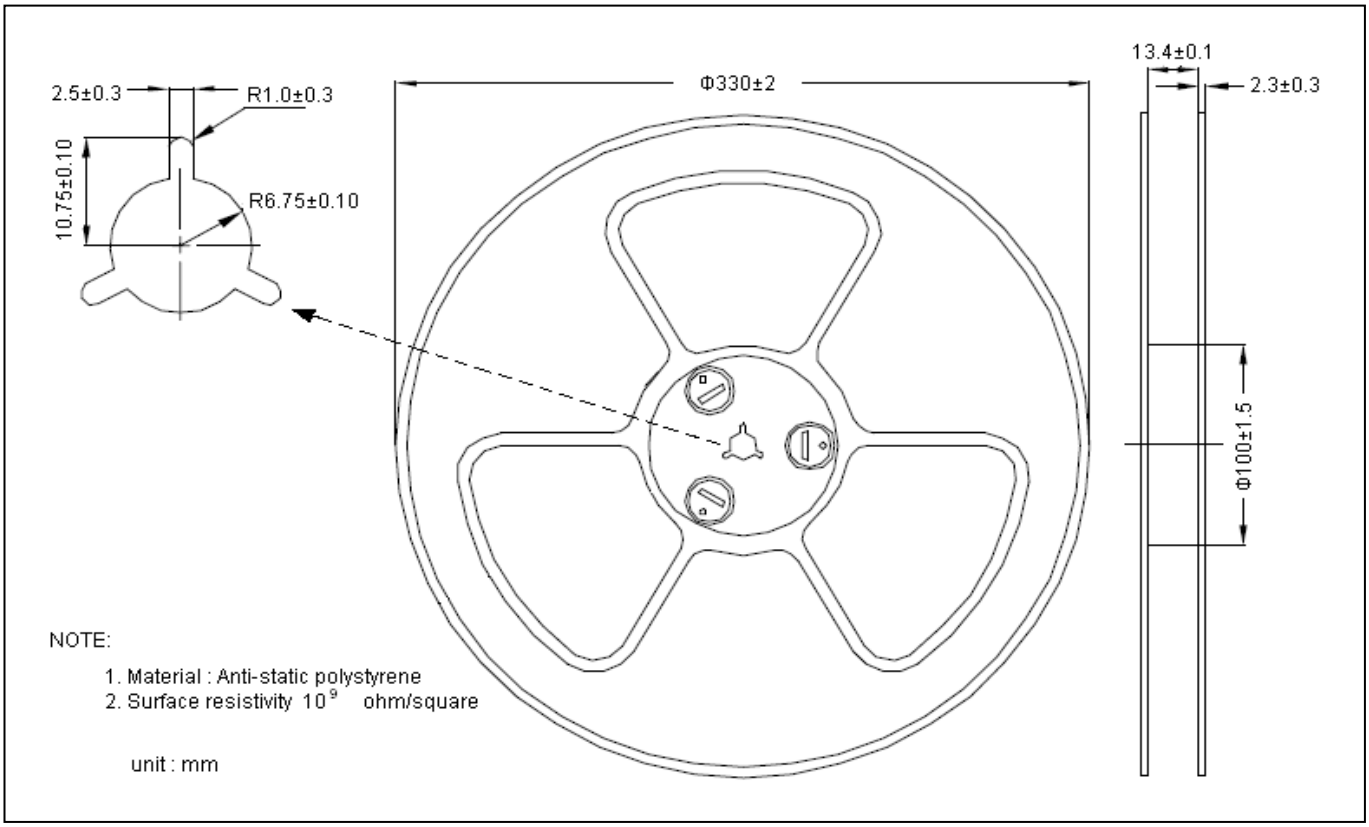
Single Pulse Power Rating, Junction to Ambient
(Note on page 2)



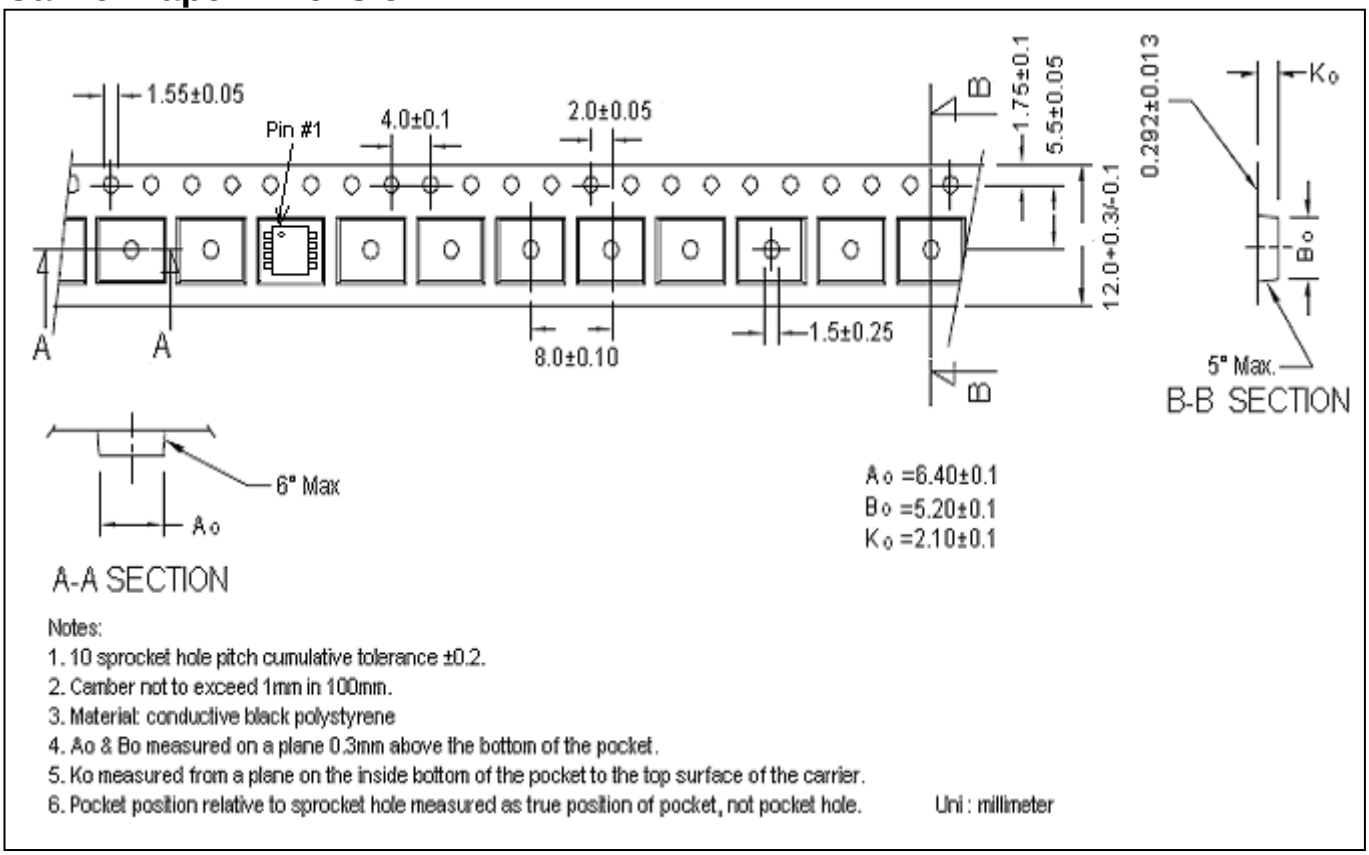
Transient Thermal Response Curves



Reel Dimension



Carrier Tape Dimension



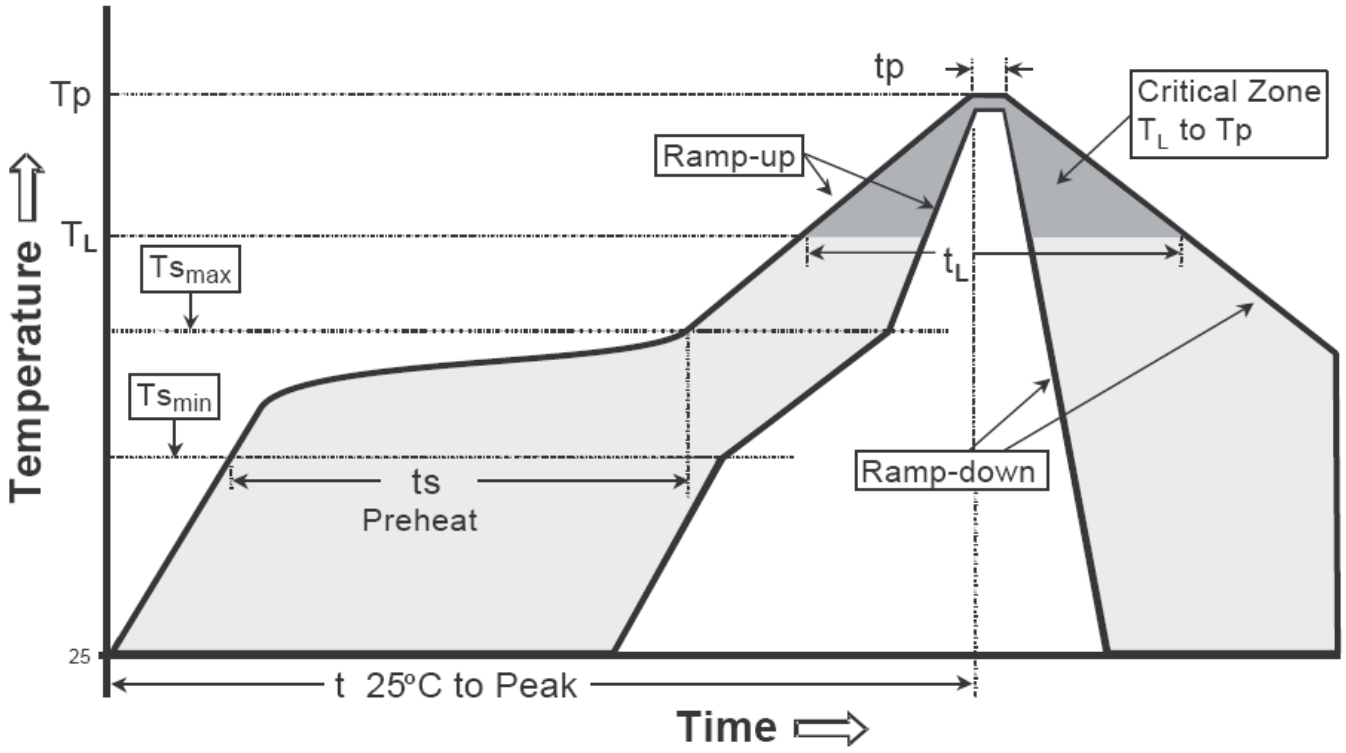
Notes:
1. 10 sprocket hole pitch cumulative tolerance ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material: conductive black polystyrene
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.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

Uni : millimeter

Recommended wave soldering condition

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

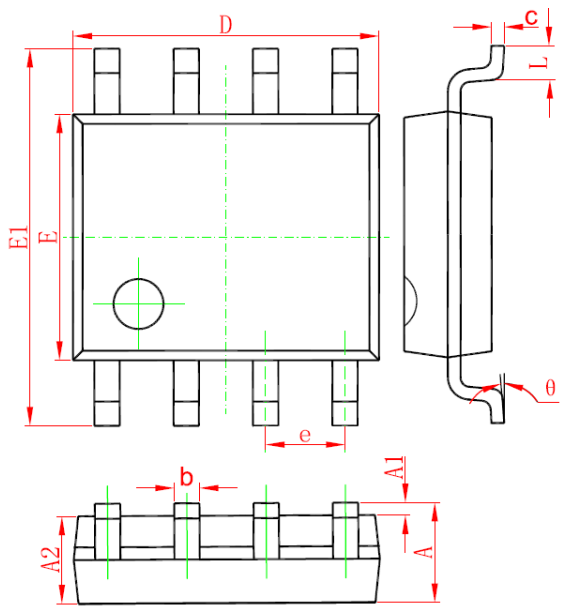
Recommended temperature profile for IR reflow



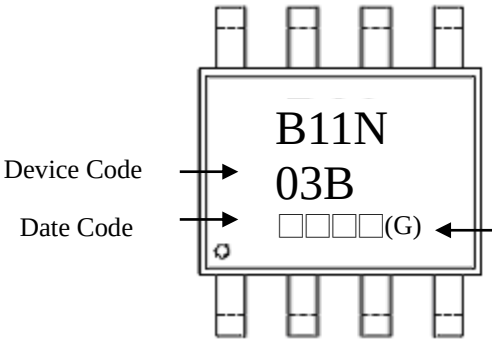
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature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

SOP-8 Dimension



Marking:



Date Code(counting from left to right) :
1st code: year code, the last digit of Christian year
2nd code : month code, Jan→A, Feb→B, Mar→C, Apr→D
May→E, Jun→F, Jul→G, Aug→H, Sep→J,
Oct→K, Nov→L, Dec→M
3rd and 4th codes : production serial number, 01~99

Production site code : blank→ JCET, G →GEM

8-Lead SOP-8 Plastic Package
CYStek Package Code: Q8

*: Typical

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069	E	3.800	4.000	0.150	0.157
A1	0.100	0.250	0.004	0.010	E1	5.800	6.200	0.228	0.244
A2	1.350	1.550	0.053	0.061	e	*1.270		*0.050	
b	0.330	0.510	0.013	0.020	L	0.400	1.270	0.016	0.050
c	0.170	0.250	0.006	0.010	θ	0°	8°	0°	8°
D	4.700	5.100	0.185	0.200					

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.