N -Channel Logic Level Enhancement Mode Power MOSFET

MTBA5N10Q8

BV_{DSS}		100V
I_D		3A
$R_{DSON(TYP)}$	V_{GS}=10V, I_D=3A	123mΩ
	V_{GS}=4.5V, I_D=2A	130mΩ

Description

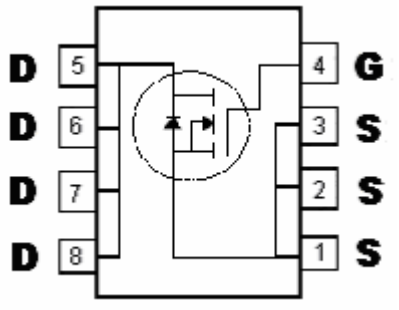
The MTBA5N10Q8 is a N-channel enhancement-mode MOSFET, providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost effectiveness.
The SOP-8 package is universally preferred for all commercial-industrial surface mount applications.

Features

- Low Gate Charge
- Simple Drive Requirement
- Pb-free lead plating package

Symbol

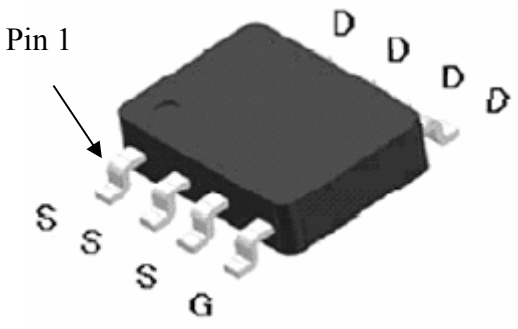
MTBA5N10Q8



G：Gate
D：Drain
S：Source

Outline

SOP-8



Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Limits	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current @V_{GS}=10V, T_A=25°C		I_D	3.5	A
Continuous Drain Current @V_{GS}=10V, T_A=70°C			2.8	
Pulsed Drain Current		I_{DM}	14 *1	
Avalanche Current		I_{AS}	20	
Avalanche Energy @ L=2mH, I_D=3A, V_{GS}=10V, V_{DD}=25V		E_{AS}	9	mJ
Total Power Dissipation *3	T_A=25℃	P_D	2.5	W
	T_A=70℃		1.6	
Operating Junction and Storage Temperature Range		Tj, Tstg	-55~+150	°C

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j\text{-}c}$	4	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j\text{-}a}$	50 *3	°C/W

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, t≤10s ; 125°C/W when mounted on minimum copper pad. The value in any given application depends on the user's specific board design.

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

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	100	-	-	V	V_{GS}=0, I_D=250μA
$V_{GS(th)}$	1.0	1.5	2.5		V_{DS} =V_{GS}, I_D=250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±20, V_{DS}=0
I_{DSS}	-	-	1	μA	V_{DS} =80V, V_{GS} =0
	-	-	25		V_{DS} =80V, V_{GS} =0, T_J=85°C
$R_{DS(ON)}$ *1	-	123	145	mΩ	V_{GS} =10V, I_D=3A
	-	127	155		V_{GS} =4.5V, I_D=2A
G_{FS} *1	-	6	-	S	V_{DS} =5V, I_D=3A
Dynamic					
Qg *1, 2	-	19	-	nC	I_D=3A, V_{DS}=50V, V_{GS}=10V
Qgs *1, 2	-	5	-		
Qgd *1, 2	-	3.7	-		
$t_{d(ON)}$ *1, 2	-	13	-	ns	V_{DS}=50V, I_D=1A, V_{GS}=10V, R_G=6Ω
tr *1, 2	-	15	-		
$t_{d(OFF)}$ *1, 2	-	52	-		
t_f *1, 2	-	8	-		

Ciss	-	1265	-	pF	V_{GS}=0V, V_{DS}=30V, f=1MHz
Coss	-	28	-		
Crss	-	18	-		
Source-Drain Diode					
I_S *1	-	-	3	A	
I_{SM} *3	-	-	12		
V_{SD} *1	-	0.8	1	V	I_S=3A, V_{GS}=0V
trr	-	40	-	ns	I_F=3A, dI_F/dt=100A/μs
Qrr	-	75	-	nC	

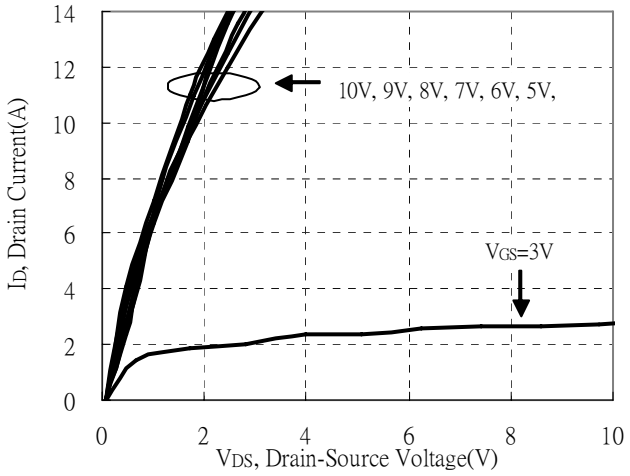
Note : *1.Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%
*2.Independent of operating temperature
*3.Pulse width limited by maximum junction temperature.

Ordering Information

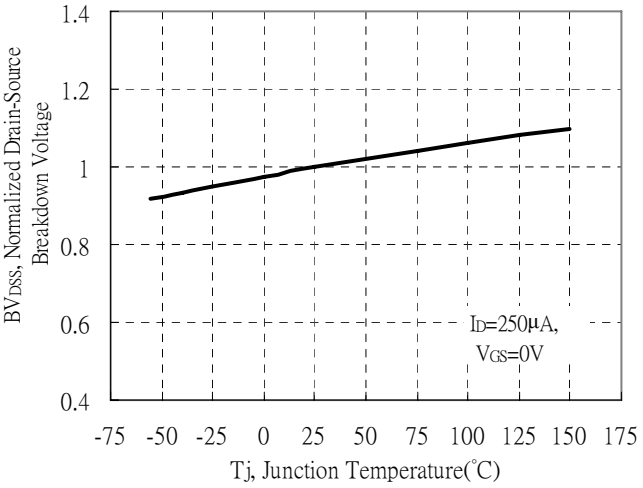
Device	Package	Shipping
MTBA5N10Q8-0-T3-G	SOP-8 (Pb-free lead plating and halogen-free package)	2500 pcs / Tape & Reel

Typical Characteristics

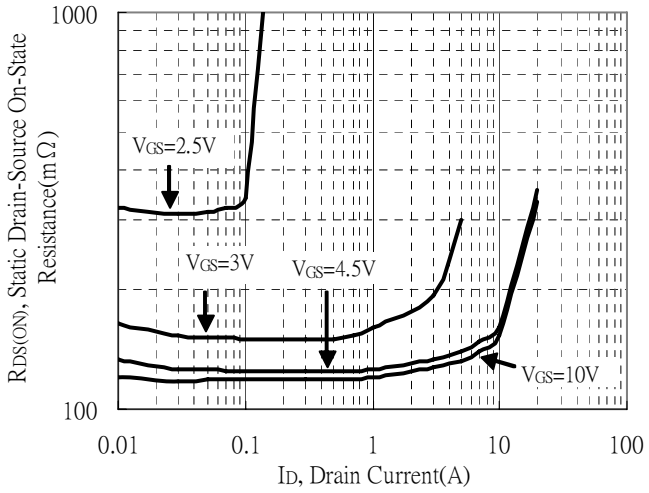
Typical Output Characteristics



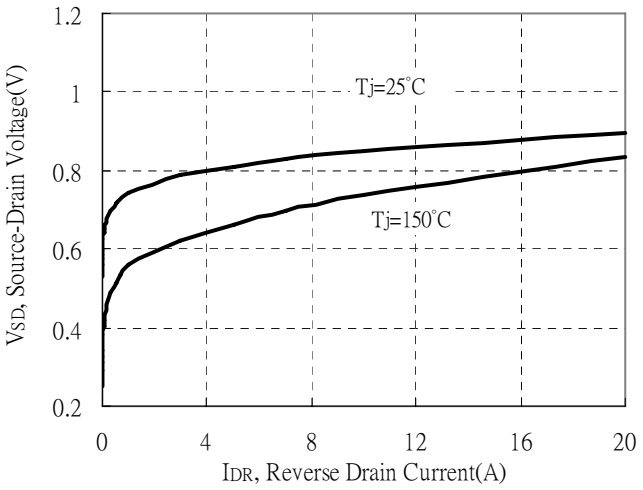
Brekdown Voltage vs Ambient Temperature



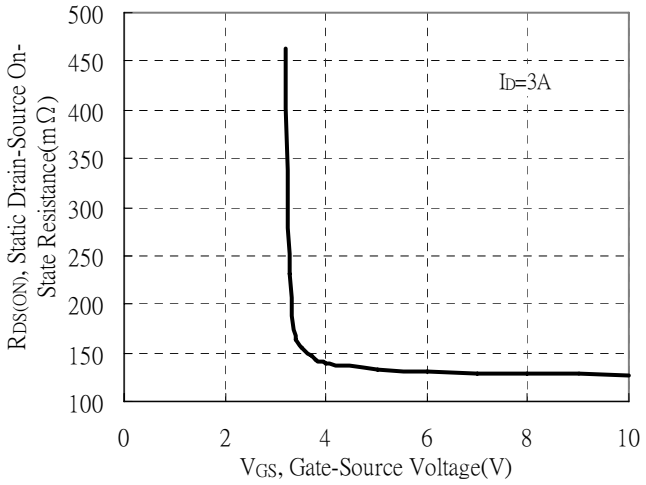
Static Drain-Source On-State resistance vs Drain Current



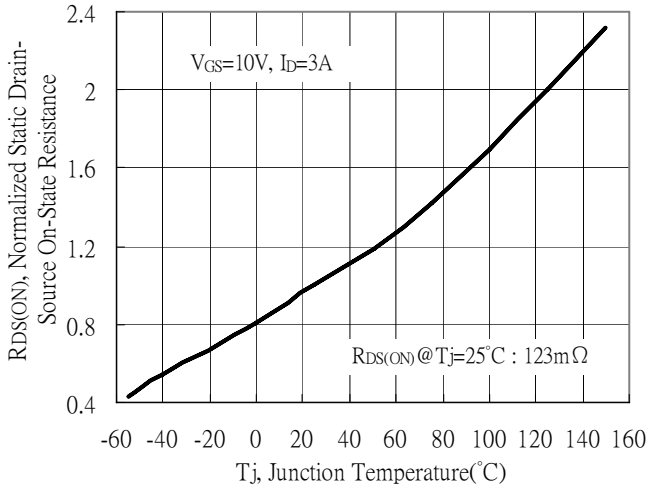
Reverse Drain Current vs Source-Drain Voltage



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

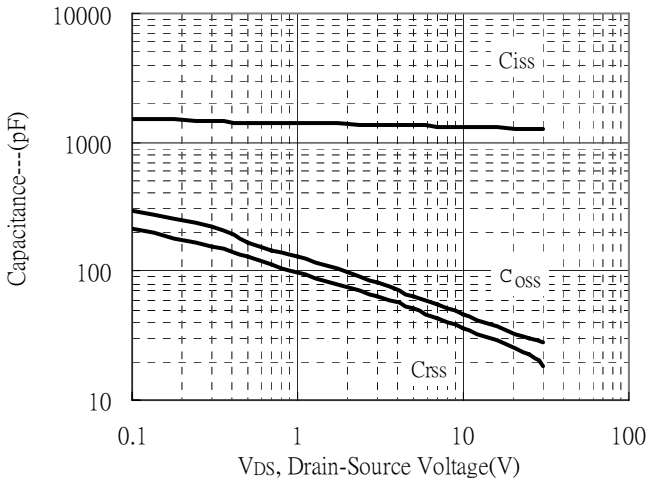


Drain-Source On-State Resistance vs Junction Tempearture

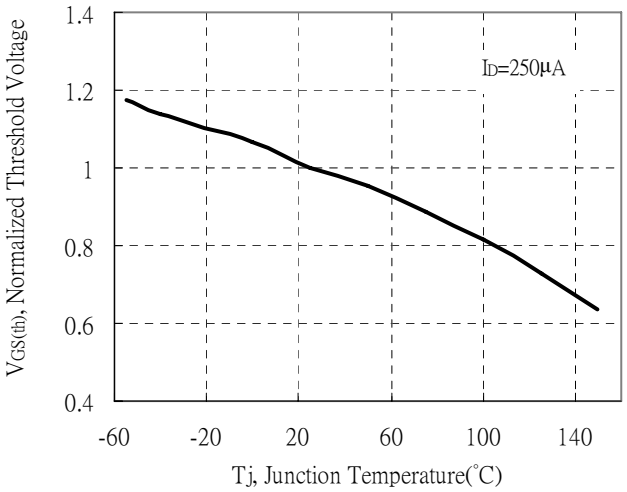


Typical Characteristics(Cont.)

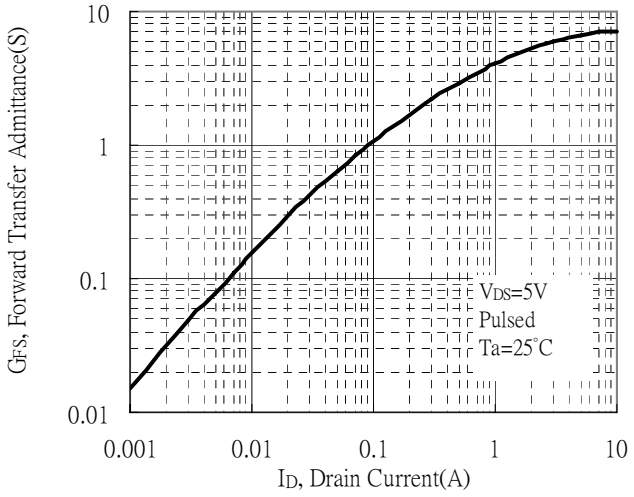
Capacitance vs Drain-to-Source Voltage



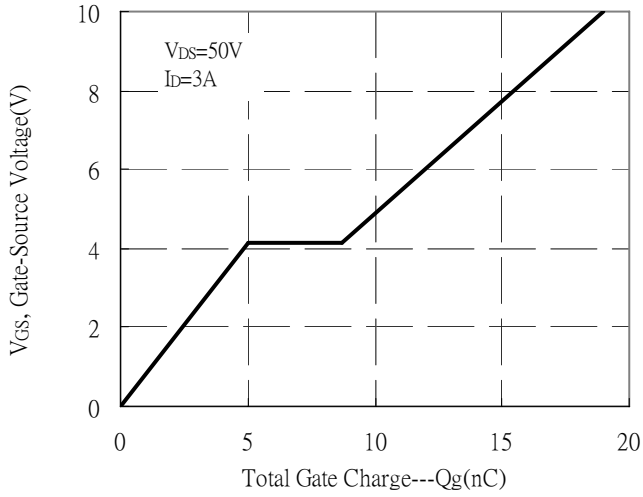
NormalizedThreshold Voltage vs Junction Tempearture



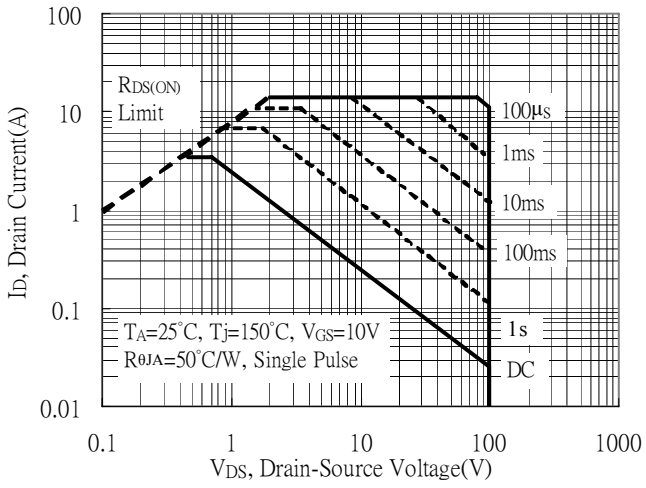
Forward Transfer Admittance vs Drain Current



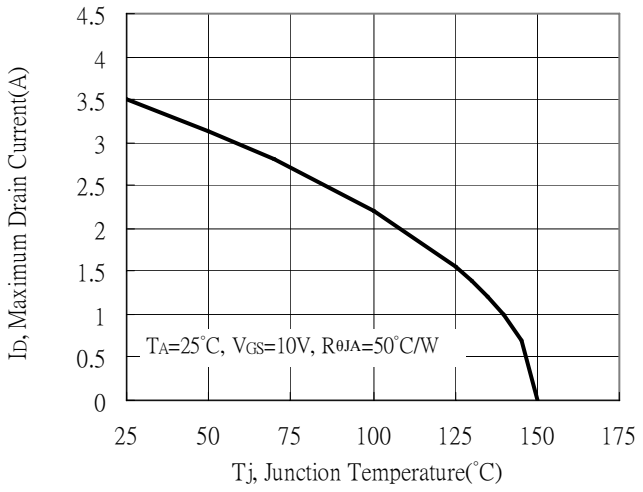
Gate Charge Characteristics



Maximum Safe Operating Area

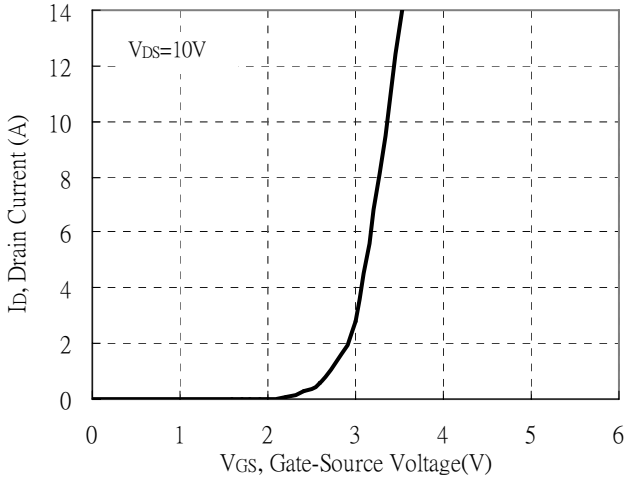


Maximum Drain Current vs Junction Temperature

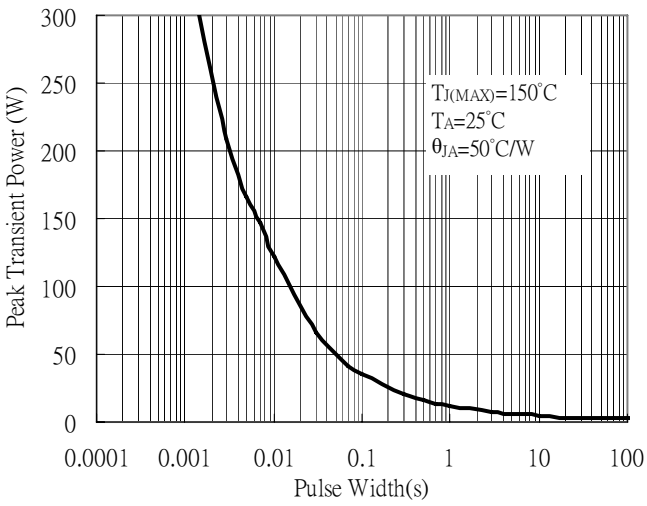


Typical Characteristics(Cont.)

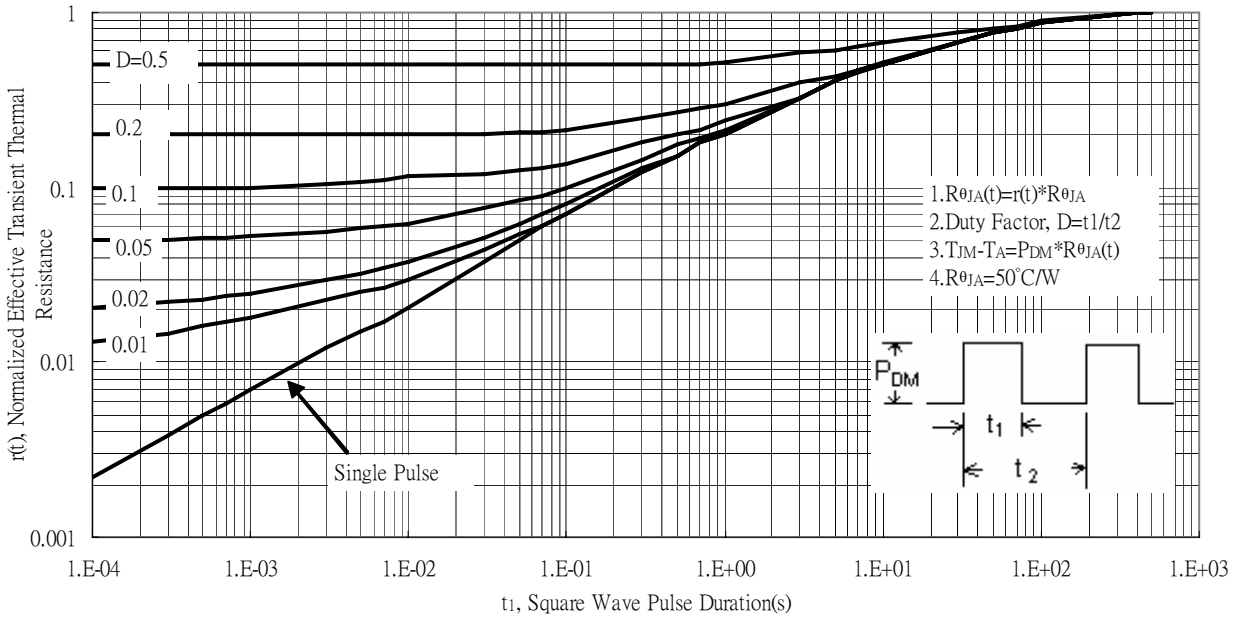
Typical Transfer Characteristics



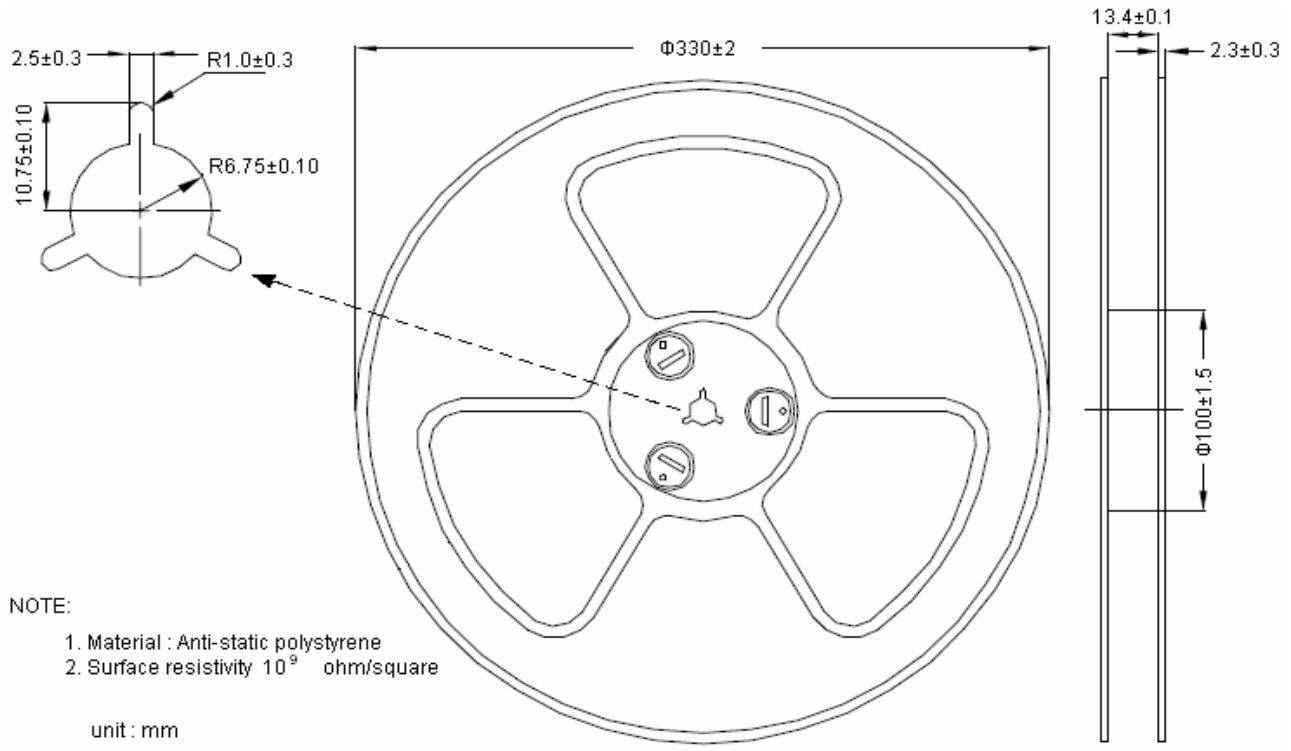
Single Pulse Maximum Power Dissipation



Transient Thermal Response Curves



Reel Dimension

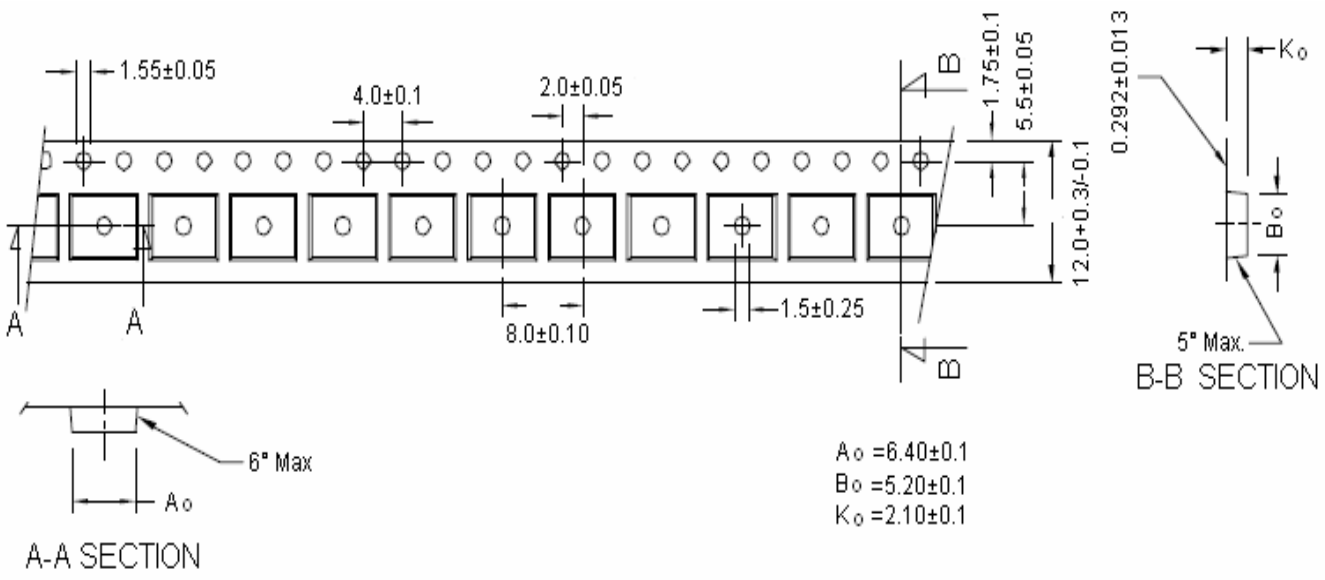


NOTE:

1. Material : Anti-static polystyrene
2. Surface resistivity 10^9 ohm/square

unit : mm

Carrier Tape Dimension



Notes:

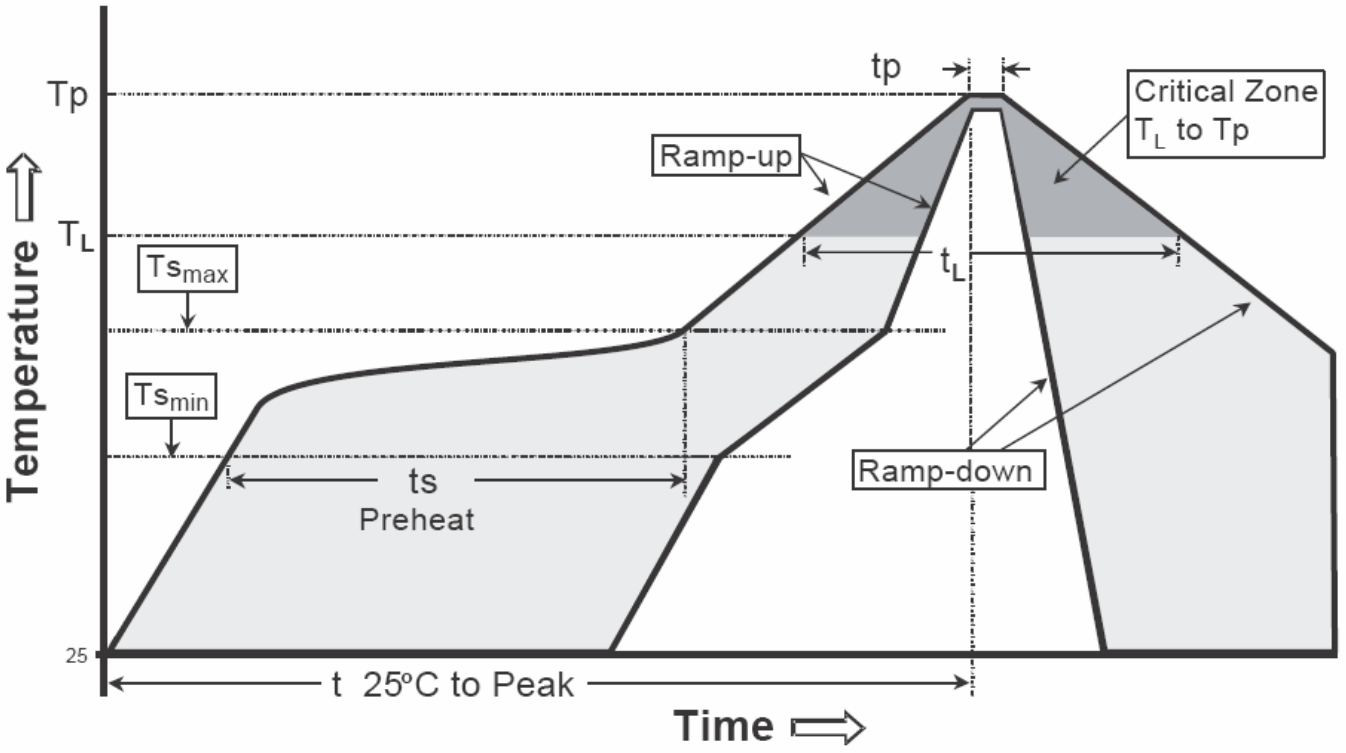
1. 10 sprocket hole pitch cumulative tolerance ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material: conductive black polystyrene
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
6.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

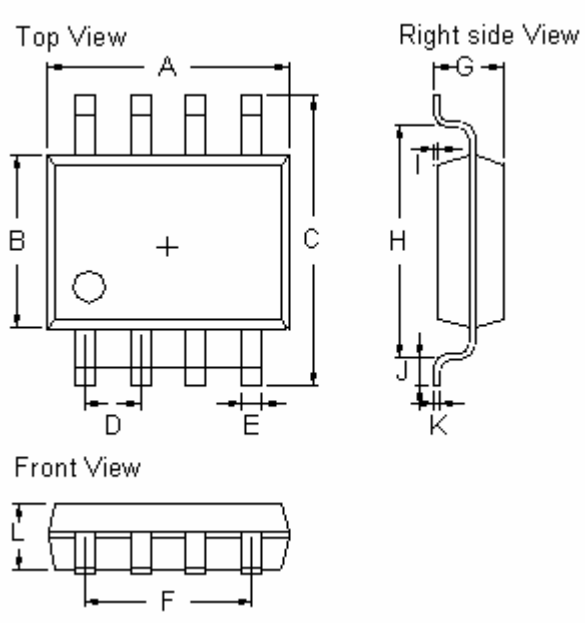
Recommended temperature profile for IR reflow

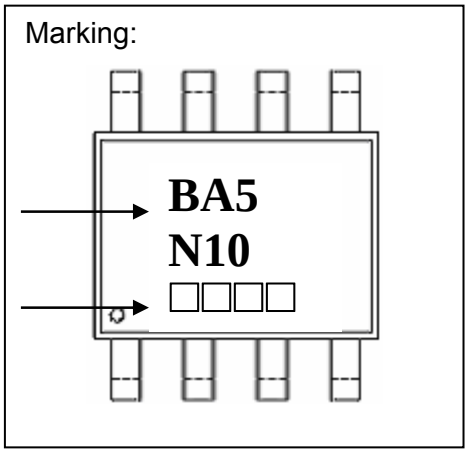


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(Ts min) −Temperature Max(Ts max) −Time(ts min to ts max)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL)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

SOP-8 Dimension





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

*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1850	0.2007	4.70	5.10	G	0.0531	0.0689	1.35	1.75
B	0.1496	0.1575	3.80	4.00	H	0.1889	0.2007	4.80	5.10
C	0.2283	0.2441	5.80	6.20	I	0.0019	0.0098	0.05	0.25
D	0.0500*		1.27 *		J	0.0157	0.0500	0.40	1.27
E	0.0130	0.0201	0.33	0.51	K	0.0067	0.0098	0.17	0.25
F	0.1472	0.1527	3.74	3.88	L	0.0531	0.0610	1.35	1.55

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.