N-Channel Enhancement Mode Power MOSFET

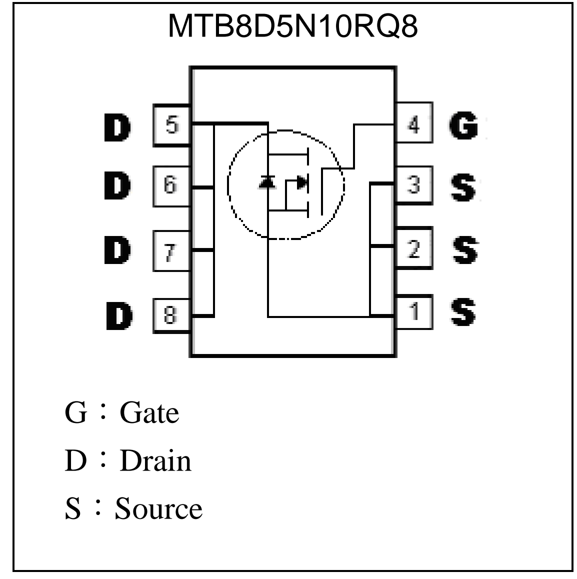
MTB8D5N10RQ8

Features

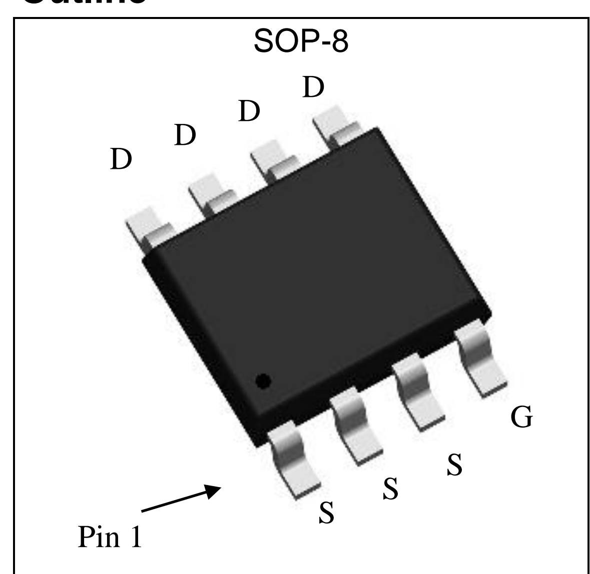
- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- RoHS compliant package

BV_{DSS}	**100V**
I_D@V_{GS}=10V, T_C=25℃	**25A**
I_D@V_{GS}=10V, T_A=25℃	**9A**
$R_{DS(ON)}$@V_{GS}=10V, I_D=6A	**7.5mΩ(typ)**
$R_{DS(ON)}$@V_{GS}=4.5V, I_D=4A	**12mΩ(typ)**

Symbol



Outline



Ordering Information

Device	Package	Shipping
MTB8D5N10RQ8-0-TF-G	SOP-8 (Pb-free lead plating and 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, TF : 4000 pcs / tape & reel, 13" reel

Product rank, zero for no rank products

Product name

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 @ T_C=25°C, V_{GS}=10V		I_D	25	A
Continuous Drain Current @ T_C=100°C, V_{GS}=10V			15.8	
Continuous Drain Current @ T_A=25°C, V_{GS}=10V			9 *2	
Continuous Drain Current @ T_A=70°C, V_{GS}=10V			7.2 *2	
Pulsed Drain Current		I_{DM}	100 *3	
Avalanche Current @ L=0.1mH		I_{AS}	24	
Avalanche Energy @ L=0.5mH, I_D=16A, V_{DD}=50V		E_{AS}	64 *5	mJ
Total Power Dissipation	T_C=25℃	P_D	16 *1	W
	T_C=100℃		6.4 *1	
	T_A=25℃		2.1 *2,4	
	T_A=70℃		1.3 *2,4	
Operating Junction and Storage Temperature Range		T_J, Tstg	-55~+150	°C

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{\theta JC}$	7.8	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{\theta JA}$	60 *4	

Note : 1.The power dissipation P_D is based on $T_{J(MAX)}$=150˚C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

2.The value of $R_{\theta JA}$ is measured with the device mounted on 1 in² FR-4 board with 2 oz. copper, in a still air environment with T_A=25˚C. The value in any given application depends on the user's specific board design. The power dissipation P_{DSM} is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150˚C.

3. Ratings are based on low frequency and low duty cycles to keep initial T_J=25˚C.

4. When mounted on1 in² copper pad of FR-4 board ; 125°C/W when mounted on minimum copper pad.

5. 100% tested by conditions of L=0.5mH, I_{AS}=6A, V_{GS}=10V, V_{DD}=50V

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

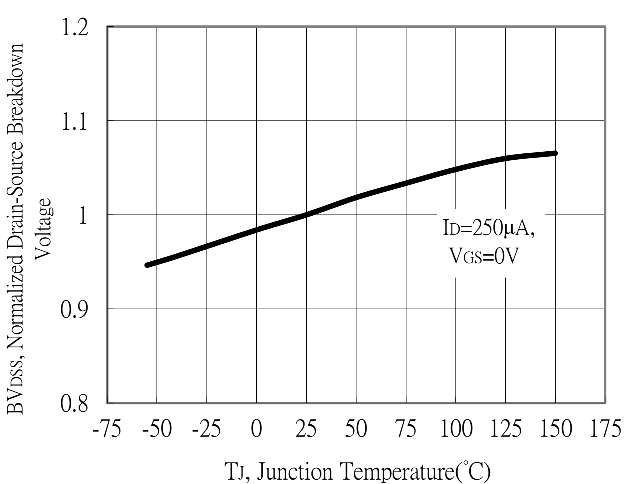
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	100	-	-	V	V_{GS}=0V, I_D=250μA
$\Delta BV_{DSS}/\Delta Tj$	-	0.06	-	V/°C	Reference to 25°C, I_D=250μA
$V_{GS(th)}$	1	-	2.5	V	V_{DS}=V_{GS}, I_D=250μA
*G_{FS}	-	38	-	S	V_{DS}=5V, I_D=20A
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	1	μA	V_{DS}=80V, V_{GS}=0V
	-	-	5		V_{DS}=80V, V_{GS}=0V, Tj=55°C
*$R_{DS(ON)}$	-	7.5	9	mΩ	V_{GS}=10V, I_D=6A

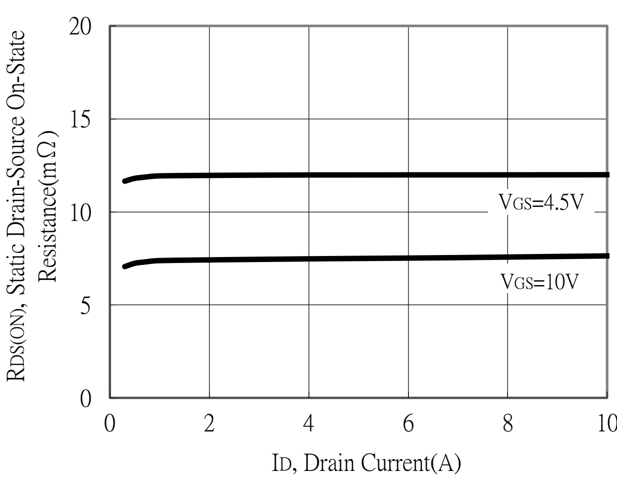
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
*$R_{DS(ON)}$	-	12	17	mΩ	V_{GS}=4.5V, I_D=4A
Dynamic					
*Qg	-	44	-	nC	V_{DS}=50V, I_D=6A, V_{GS}=10V
*Qgs	-	8.6	-		
*Qgd	-	8.3	-		
*$t_{d(ON)}$	-	20	-	ns	V_{DS}=50V, I_D=4A, V_{GS}=10V, R_{GS}=1Ω
*tr	-	18	-		
*$t_{d(OFF)}$	-	53	-		
*t_f	-	8.8	-		
Ciss	-	2712	-	pF	V_{GS}=0V, V_{DS}=50V, f=1MHz
Coss	-	283	-		
Crss	-	23	-		
Rg	-	0.64	-	Ω	f=1MHz
Source-Drain Diode					
*I_S	-	-	13	A	
*I_{SM}	-	-	52		
*V_{SD}	-	0.78	1.2	V	I_S=6A, V_{GS}=0V
*trr	-	40	-	ns	V_{GS}=0V, I_F=4A, dI_F/dt=100A/μs
*Qrr	-	56	-	nC	

*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

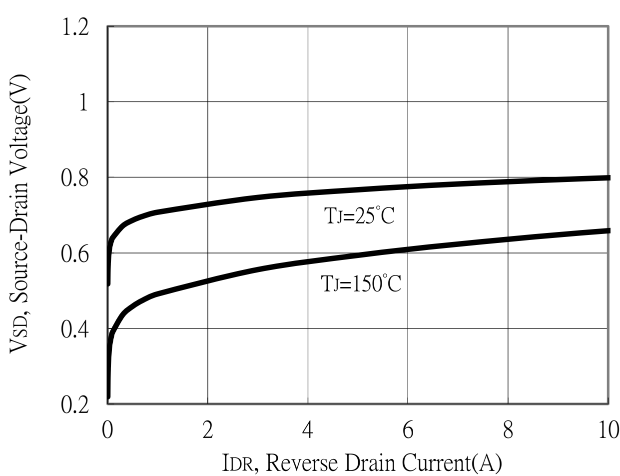
Typical Characteristics

Typical Output Characteristics

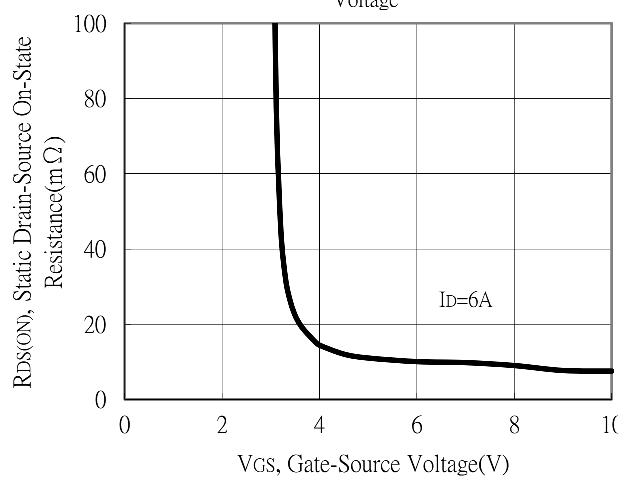




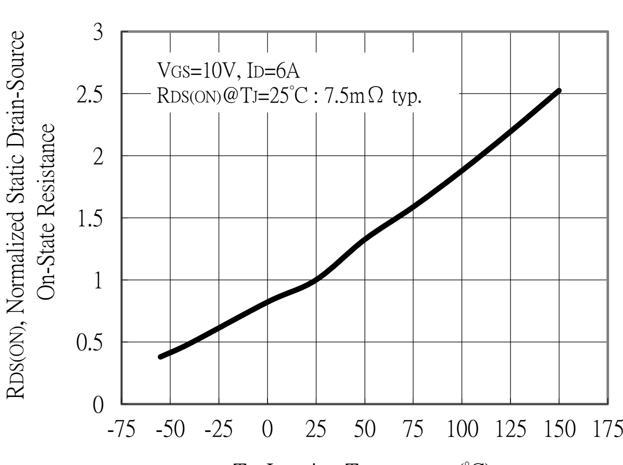
Reverse Drain Current vs Source-Drain Voltage



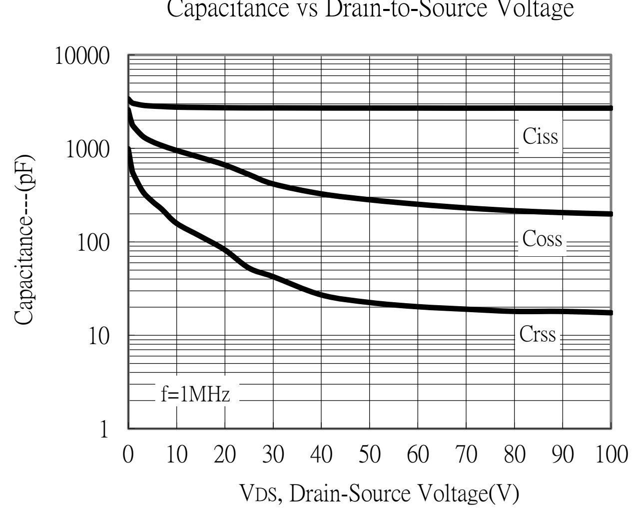
Static Drain-Source On-State Resistance vs Gate-Source Voltage

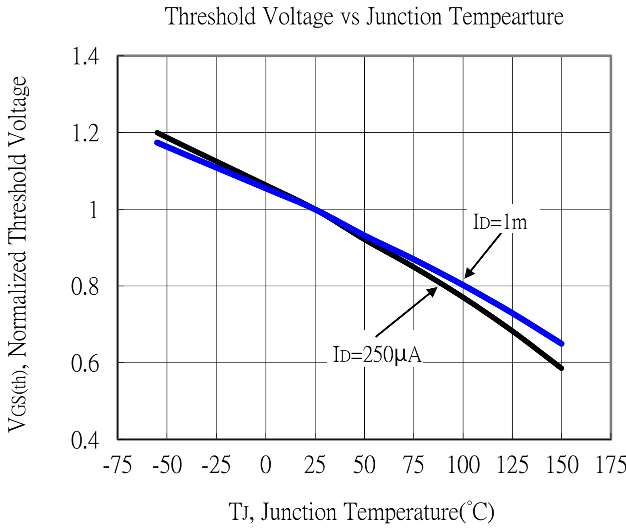


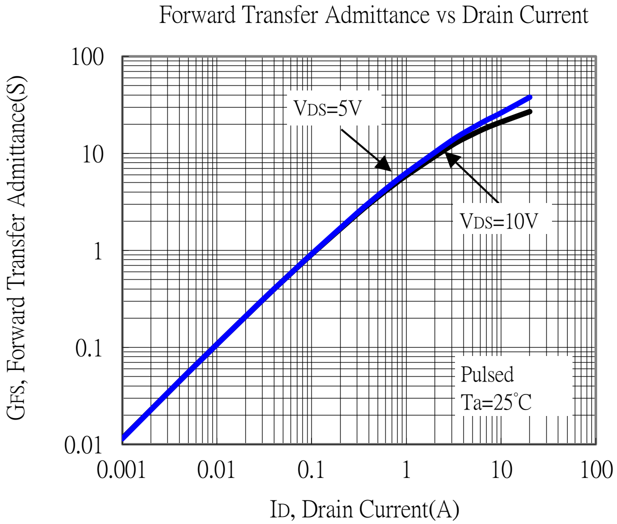
Drain-Source On-State Resistance vs Junction Tempearture

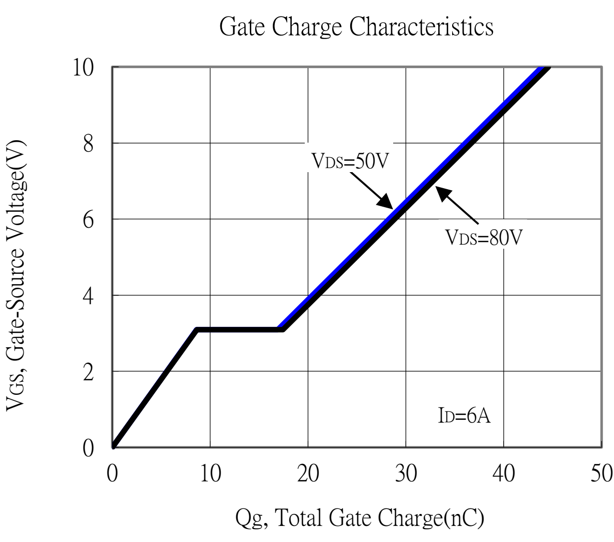


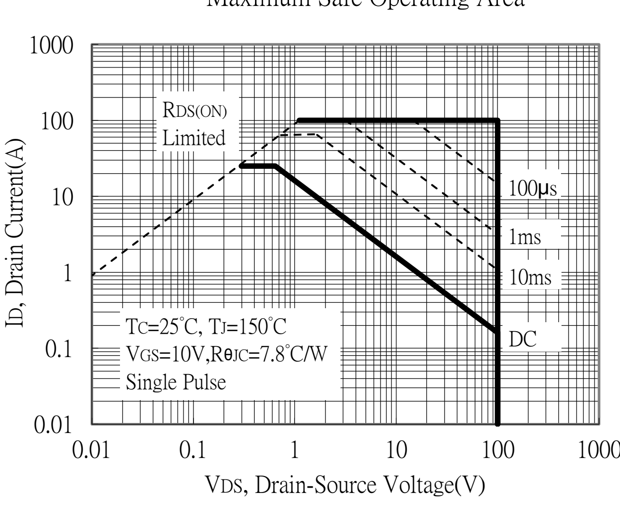
Typical Characteristics(Cont.)

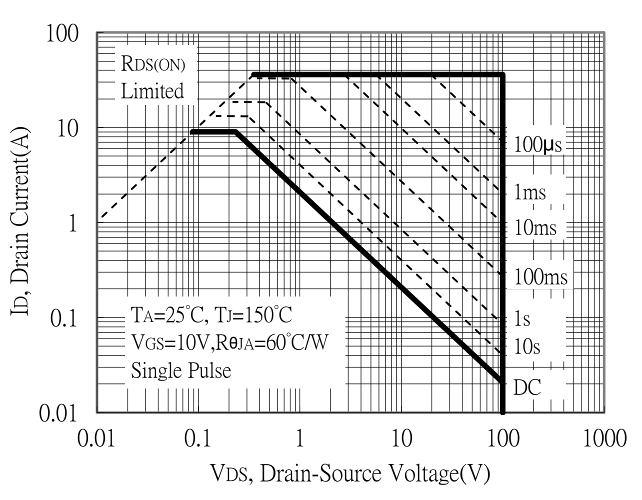




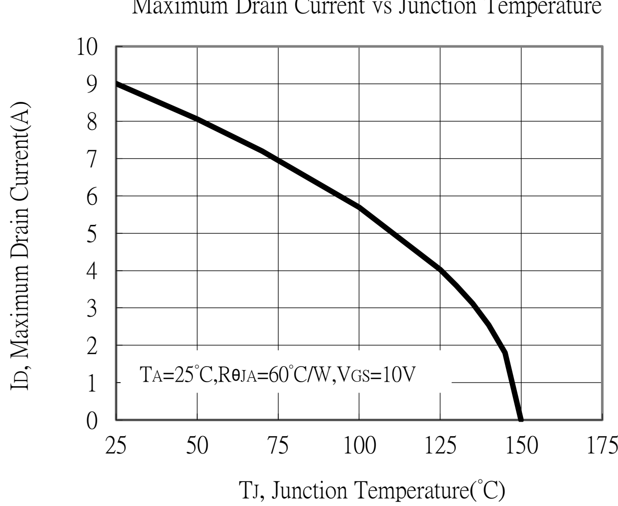








Typical Characteristics (Cont.)

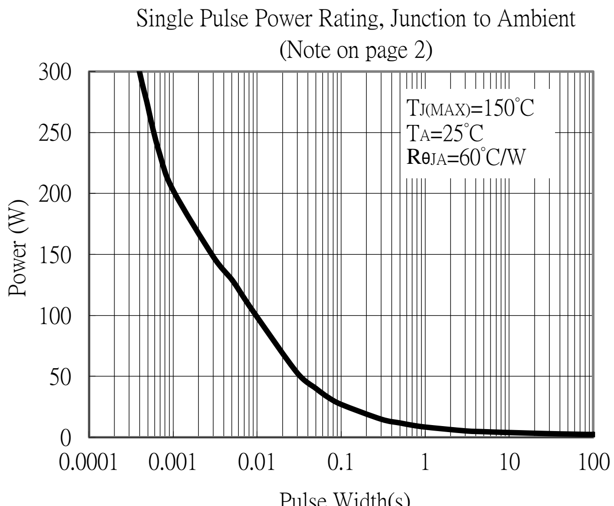


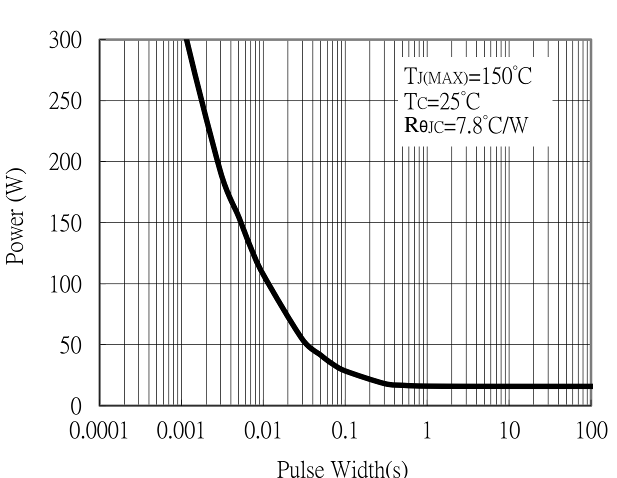
Maximum Drain Current vs Case Temperature

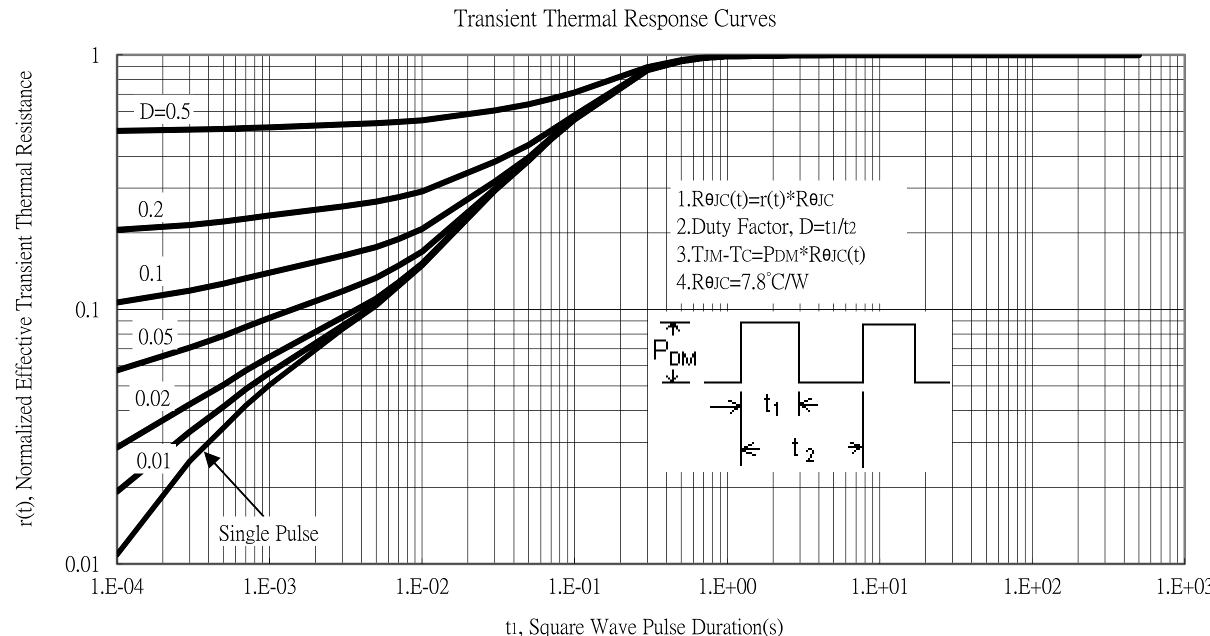
ID, Maximum Drain Current(A)

TC=25°C,,RθJC=7.8°C/W,VGS=10V,

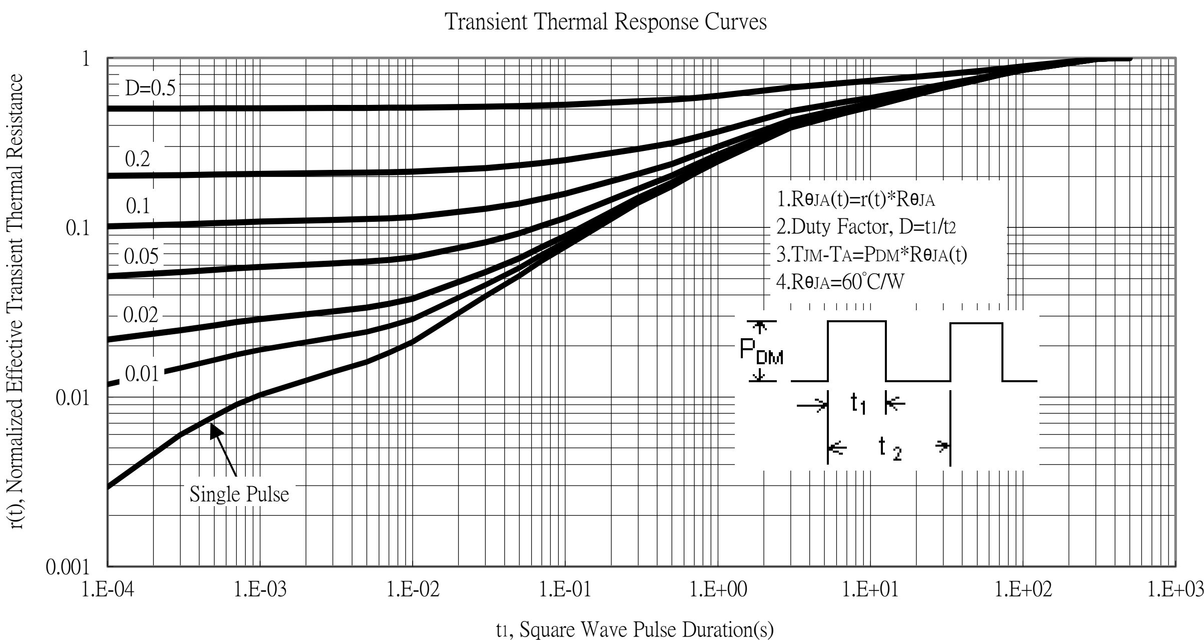
TC, Case Temperature(°C)



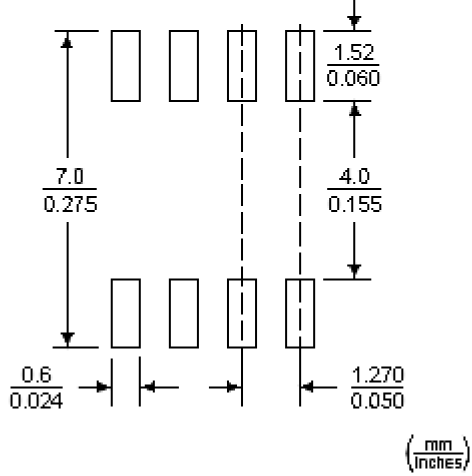




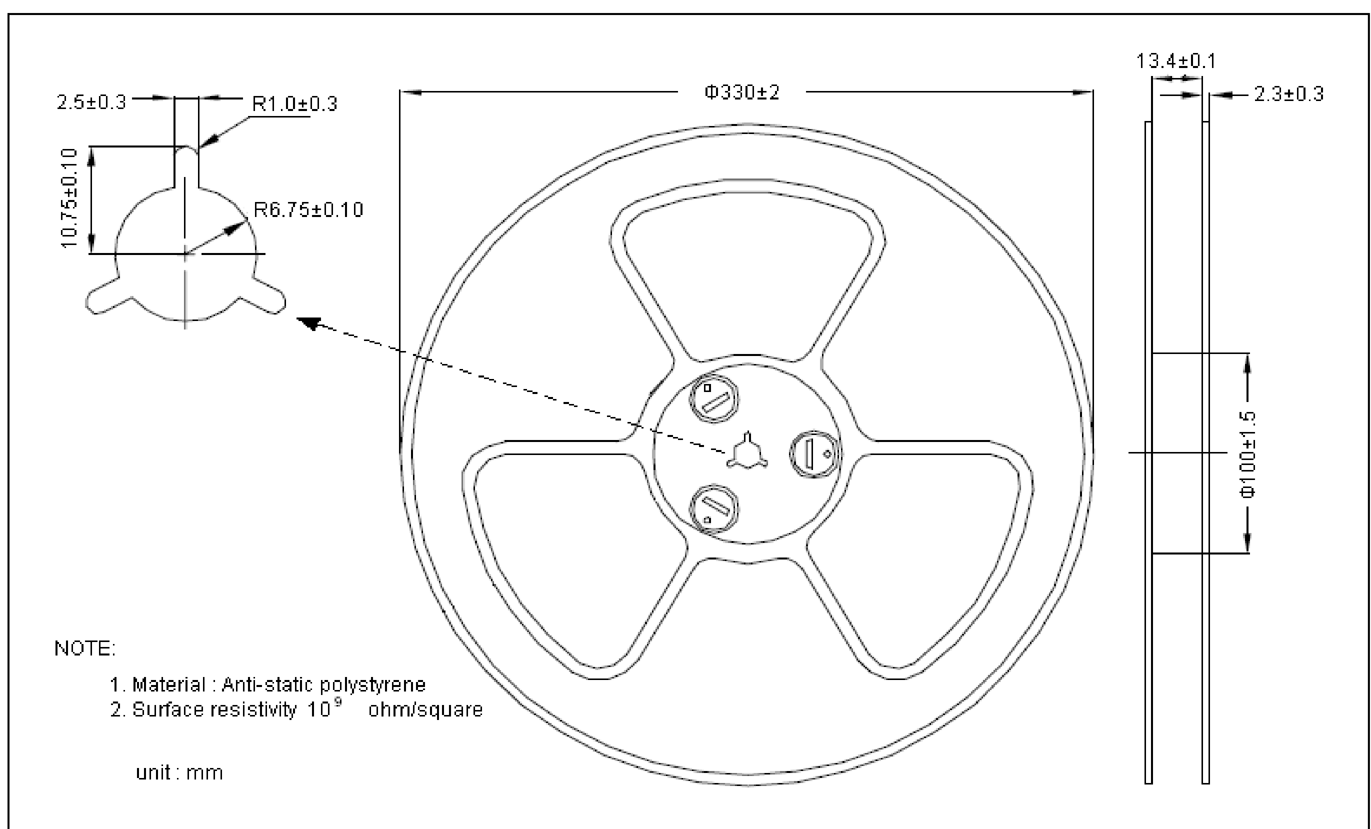
Typical Characteristics (Cont.)



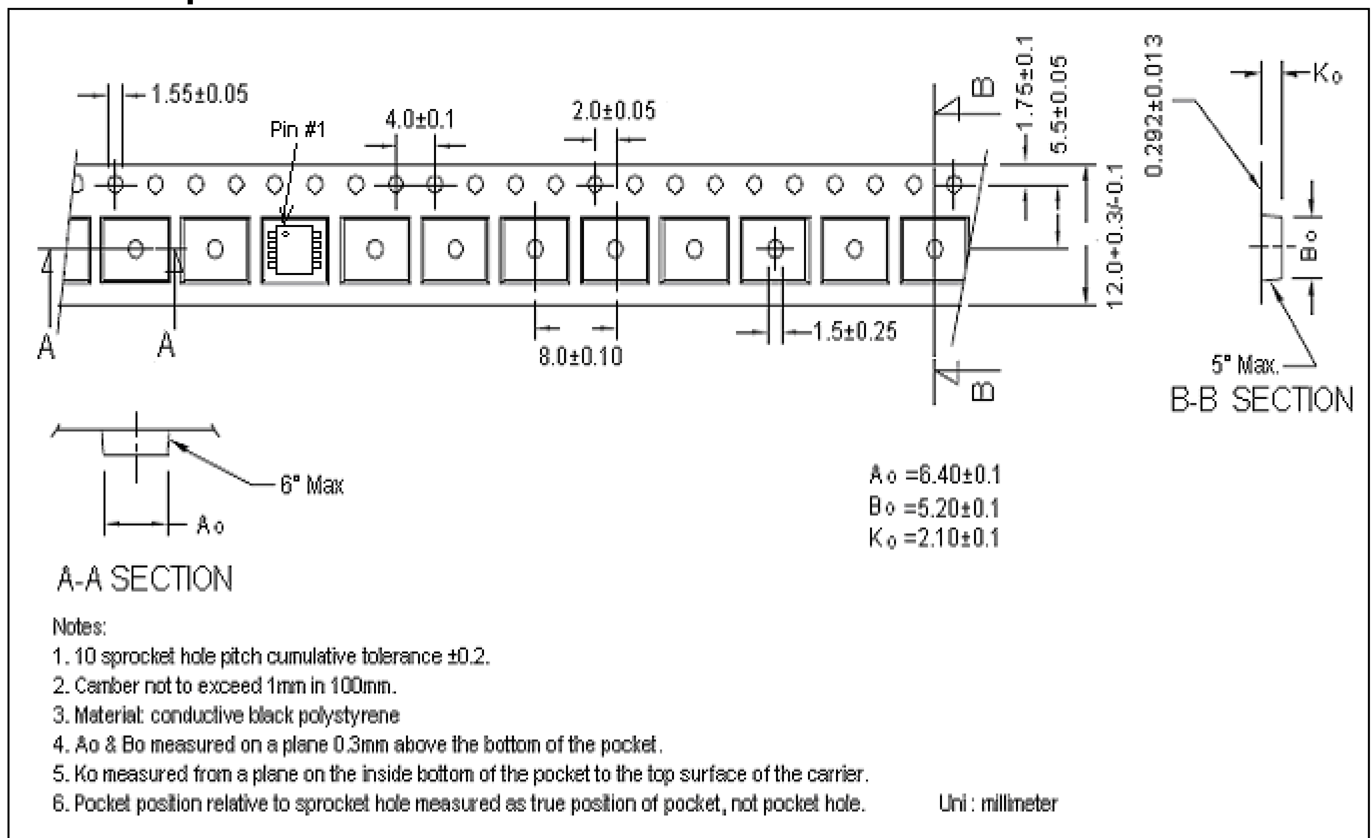
Recommended Soldering Footprint



Reel Dimension



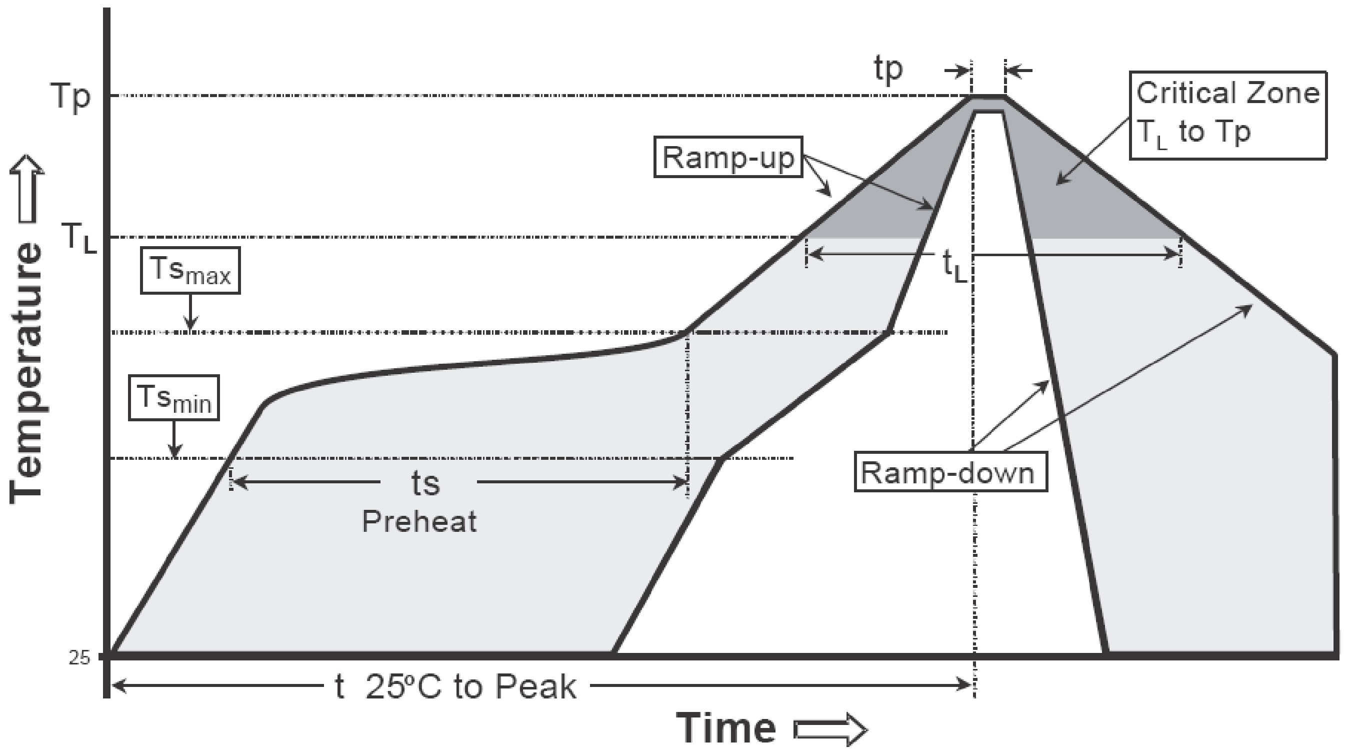
Carrier Tape Dimension



Recommended wave soldering condition

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

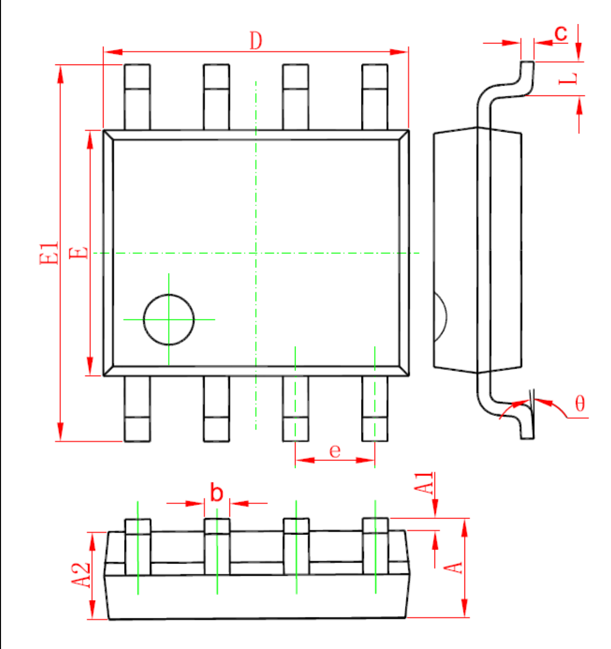
Recommended temperature profile for IR reflow

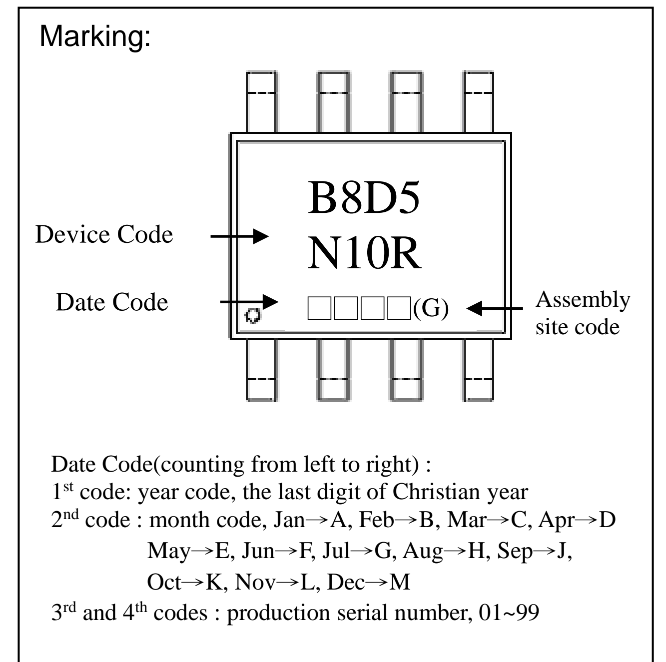


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(Ts min) −Temperature Max(Ts max) −Time(ts min to ts max)	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL)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

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