N-Channel Enhancement Mode Power MOSFET

MTD30N10Q8

BV_{DSS}	100V
I_D@V_{GS}=10V, T_A=25°C	6A
R_{DSON}@V_{GS}=10V, I_D=6A	33mΩ(typ)
R_{DSON}@V_{GS}=4.5V, I_D=5A	35mΩ(typ)

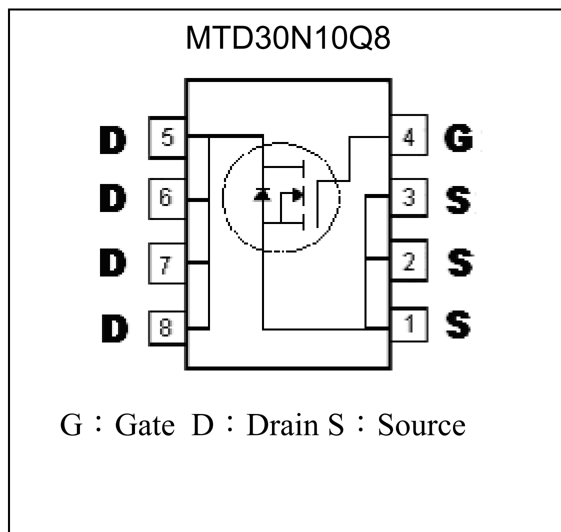
Description

The MTD30N10Q8 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.

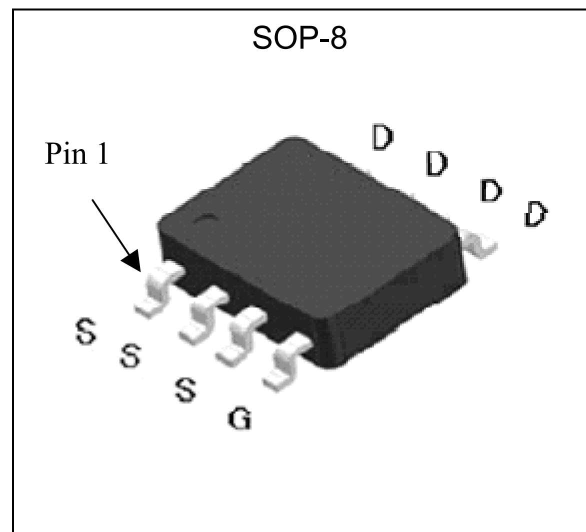
Features

- Single Drive Requirement
- Fast Switching Characteristic
- Repetitive Avalanche Rated
- Pb-free lead plating package

Symbol

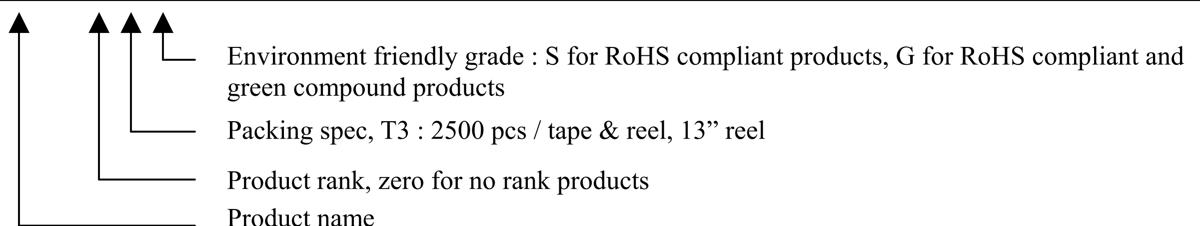


Outline



Ordering Information

Device	Package	Shipping
MTD30N10Q8-0-T3-G	SOP-8 (Pb-free lead plating and halogen-free package)	2500 pcs / tape & reel



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	6	A
Continuous Drain Current @V_{GS}=10V, T_A=70°C			4.8	
Pulsed Drain Current		I_{DM}	40 *1	
Avalanche Current		I_{AS}	6	
Avalanche Energy @ L=1mH, I_D=6A, R_G=25Ω		E_{AS}	18	mJ
Repetitive Avalanche Energy @ L=0.05mH		E_{AR}	0.5 *2	
Total Power Dissipation *3	T_A=25℃	P_D	3.1	W
	T_A=70℃		2	
Operating Junction and Storage Temperature Range		Tj, Tstg	-55~+150	°C

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	20	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	40 *3	

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 (T_C=25°C, unless otherwise specified)

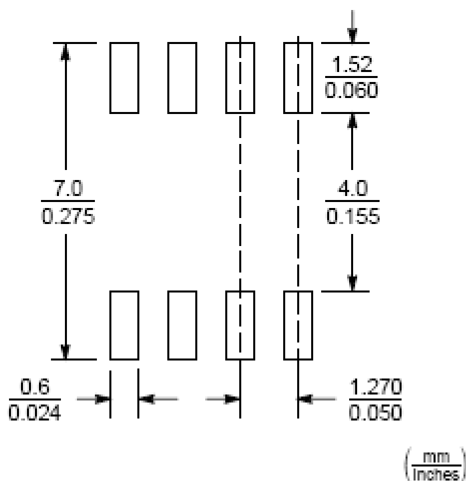
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	100	-	-	V	V_{GS}=0V, I_D=250μA
$V_{GS(th)}$	1.4	2	2.7		V_{DS} = V_{GS}, I_D=250μA
G_{FS} *1	-	20	-	S	V_{DS} =5V, I_D=6A
I_{GSS}	-	-	±100	nA	V_{GS}=±20V
I_{DSS}	-	-	1	μA	V_{DS} =100V, V_{GS} =0V
	-	-	25		V_{DS} =100V, V_{GS} =0V, Tj=125°C
$R_{DS(ON)}$ *1	-	33	45	mΩ	V_{GS} =10V, I_D=6A
	-	35	50		V_{GS} =4.5V, I_D=5A
Dynamic					
Ciss	-	1170	-	pF	V_{GS}=0V, V_{DS}=30V, f=1MHz
Coss	-	104	-		
Crss	-	53	-		

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

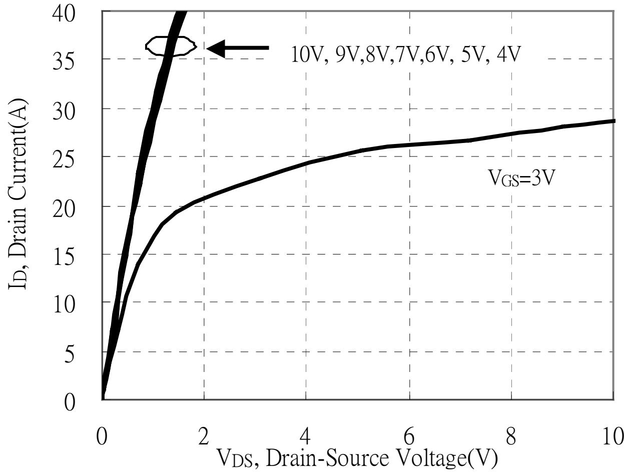
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Q_g *1, 2	-	21	-	nC	V_{DS}=50V, V_{GS}=10V, I_D=6A
Q_{gs} *1, 2	-	3.5	-		
Q_{gd} *1, 2	-	6	-		
$t_{d(ON)}$ *1, 2	-	11	-	ns	V_{DS}=50V, I_D=6A, V_{GS}=10V, R_{GS}=3Ω
t_r *1, 2	-	7	-		
$t_{d(OFF)}$ *1, 2	-	28	-		
t_f *1, 2	-	12	-		
R_g	-	3.3	-	Ω	V_{GS}=15mV, V_{DS}=0V, f=1MHz
Source-Drain Diode					
I_S *1	-	-	3	A	
I_{SM} *3	-	-	12		
V_{SD} *1	-	0.7	1.2	V	I_F=1A, V_{GS}=0V
t_{rr}	-	40	-	ns	I_F=I_S, dI_F/dt=100A/μs
Q_{rr}	-	150	-	nC	

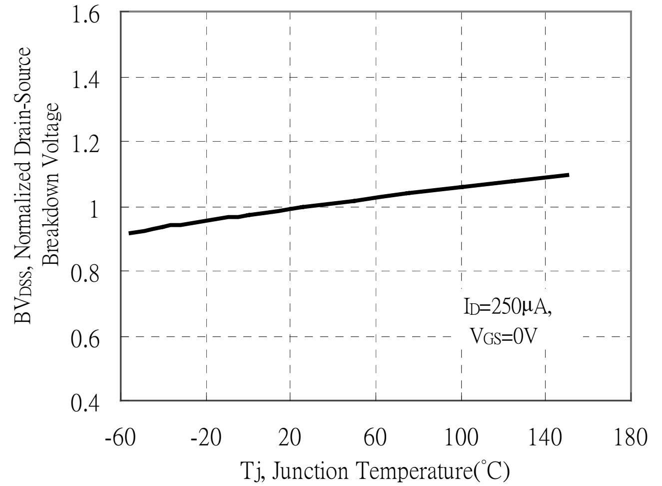
Note : *1.Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%
*2.Independent of operating temperature
*3.Pulse width limited by maximum junction temperature.

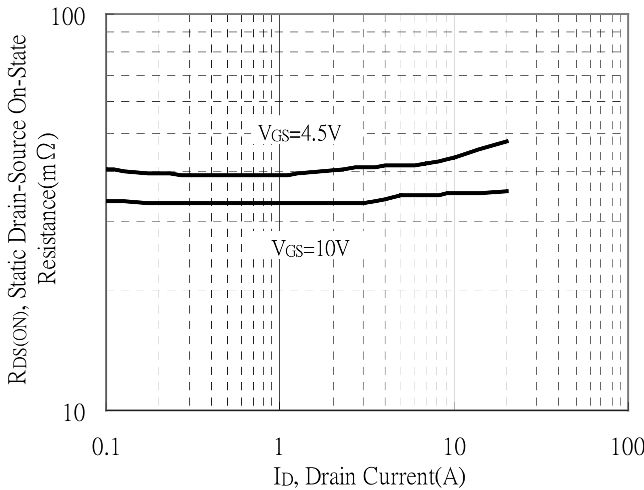
Recommended Soldering Footprint

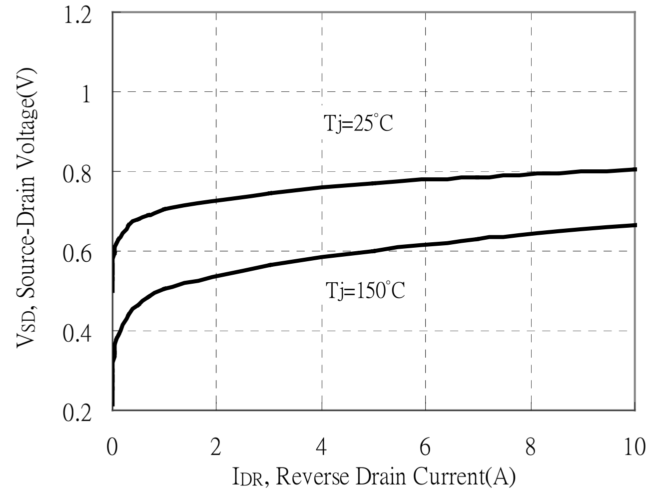


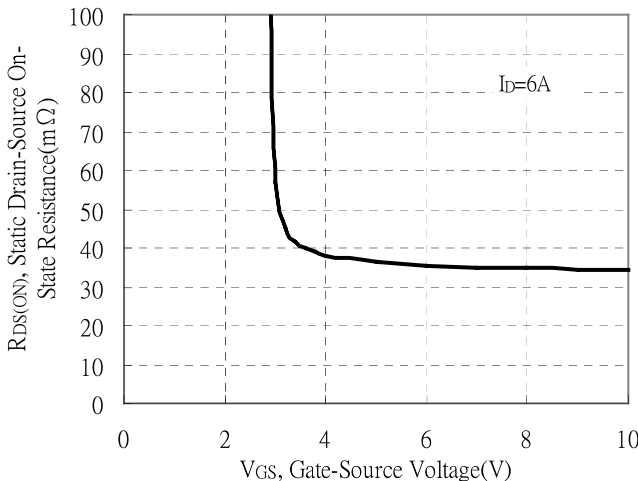
Typical Characteristics

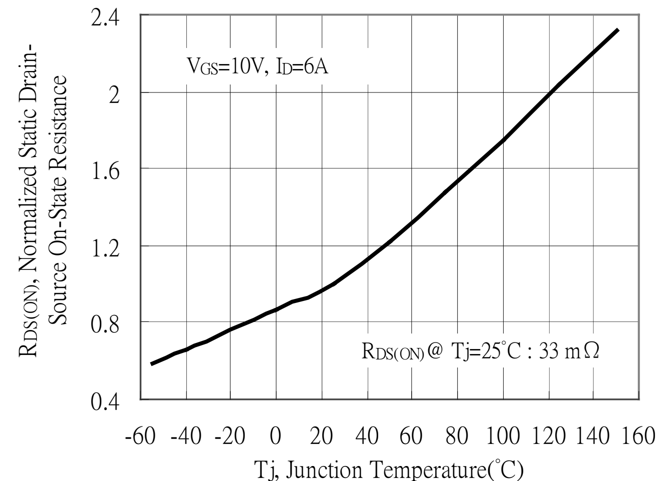




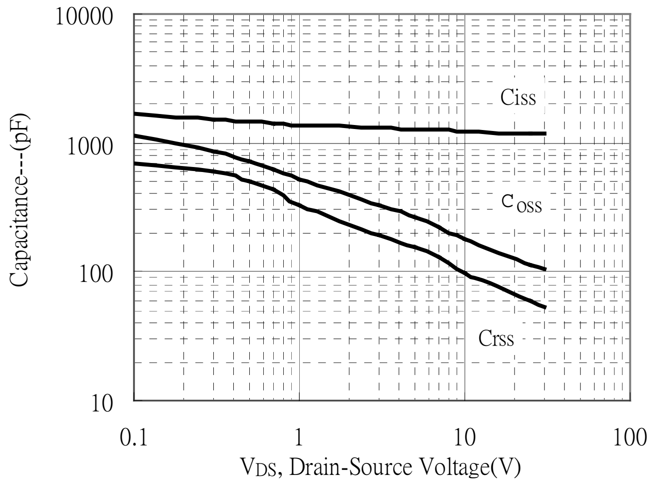


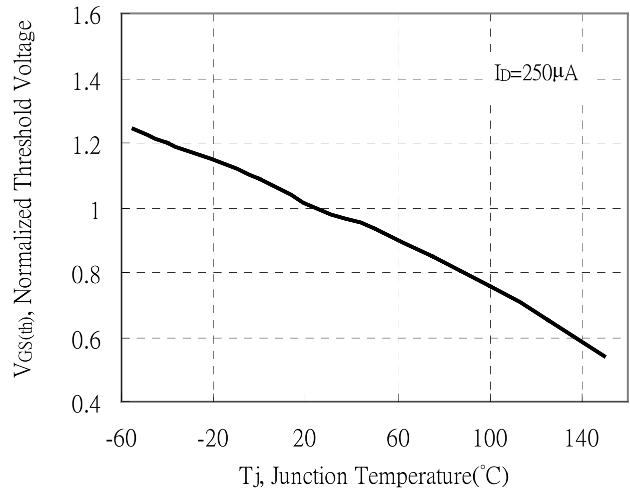


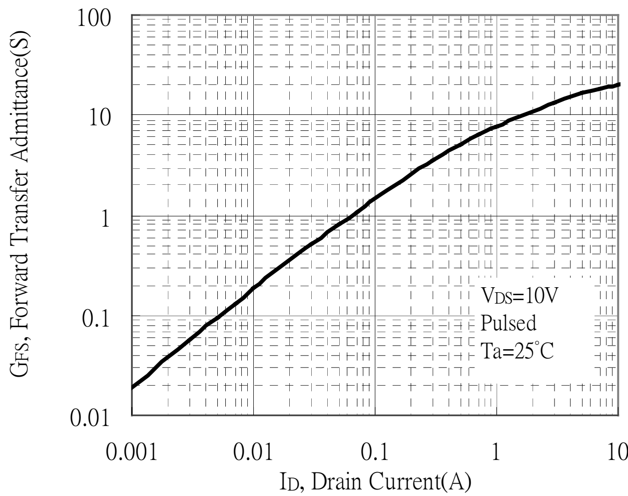


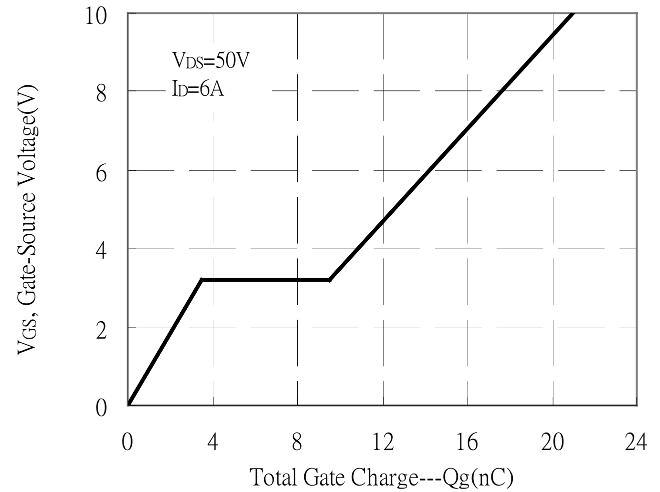


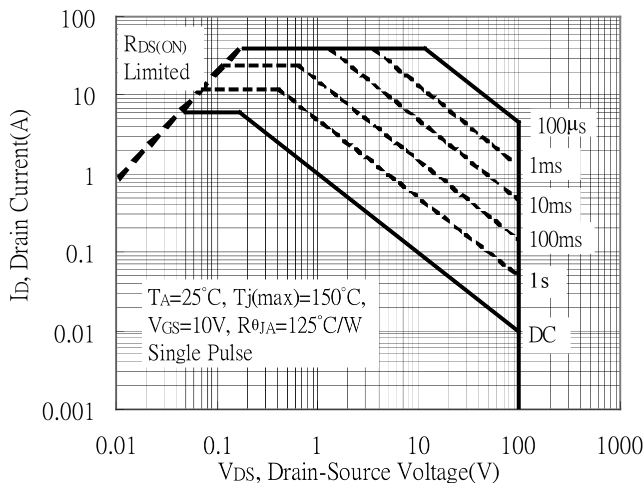
Typical Characteristics(Cont.)

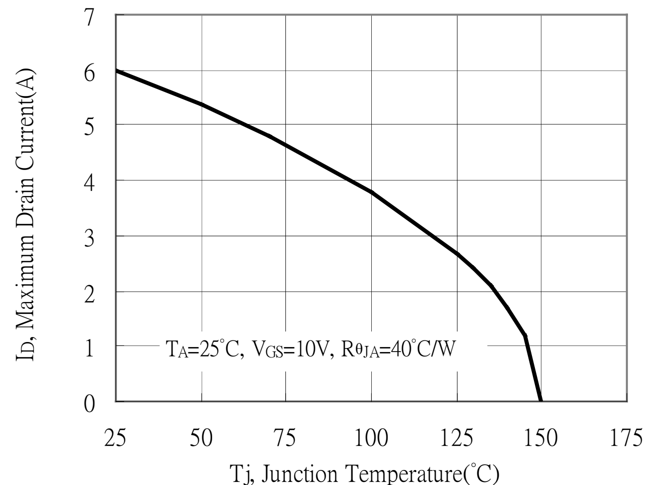




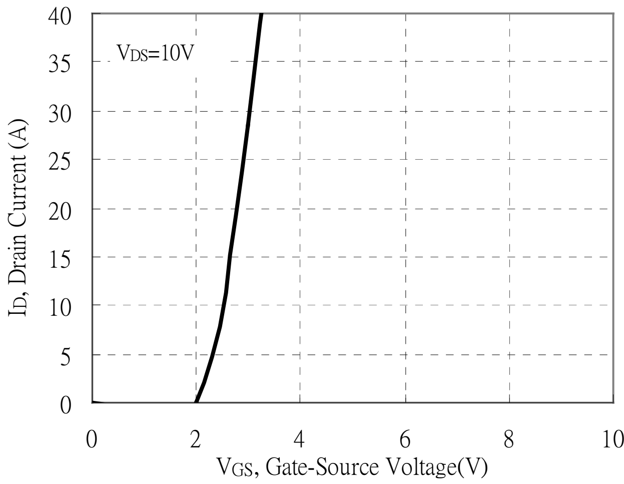


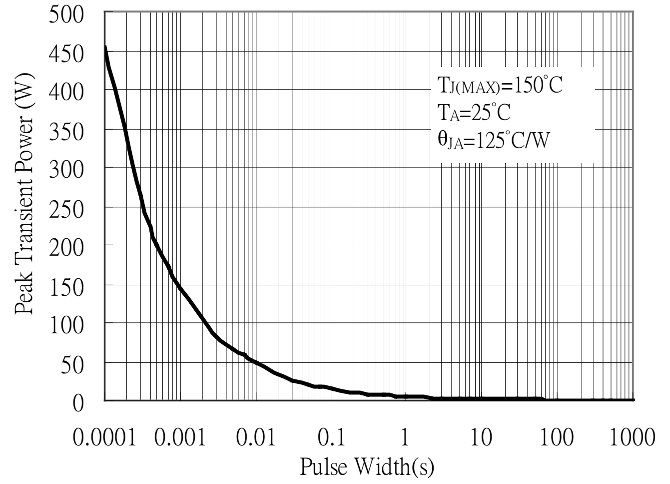


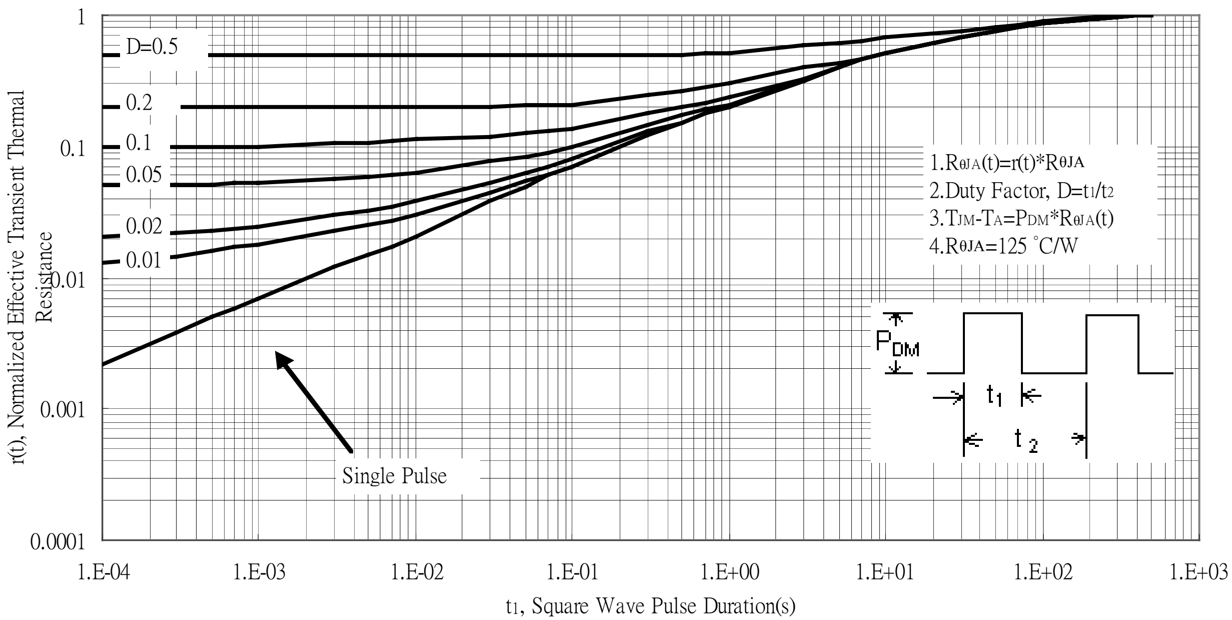




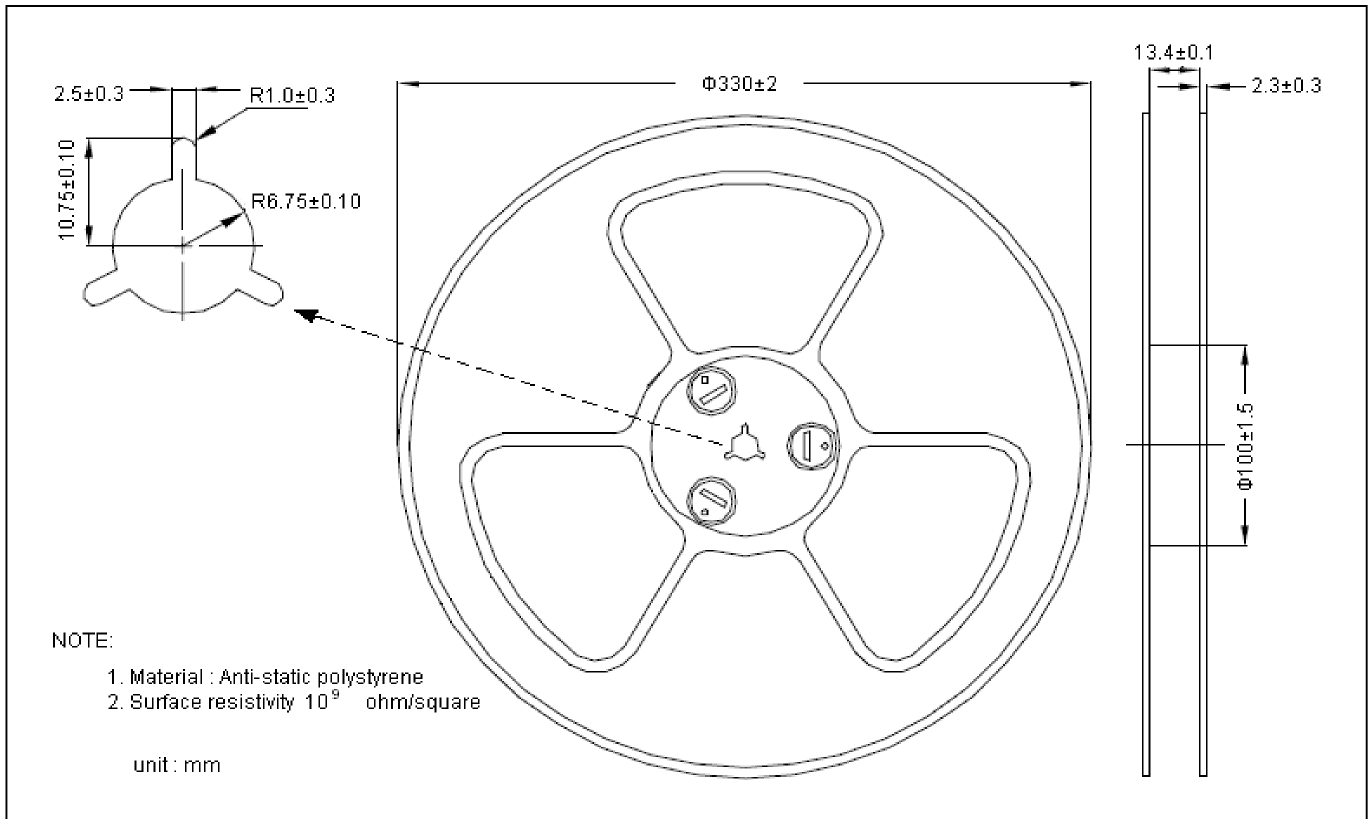
Typical Characteristics(Cont.)



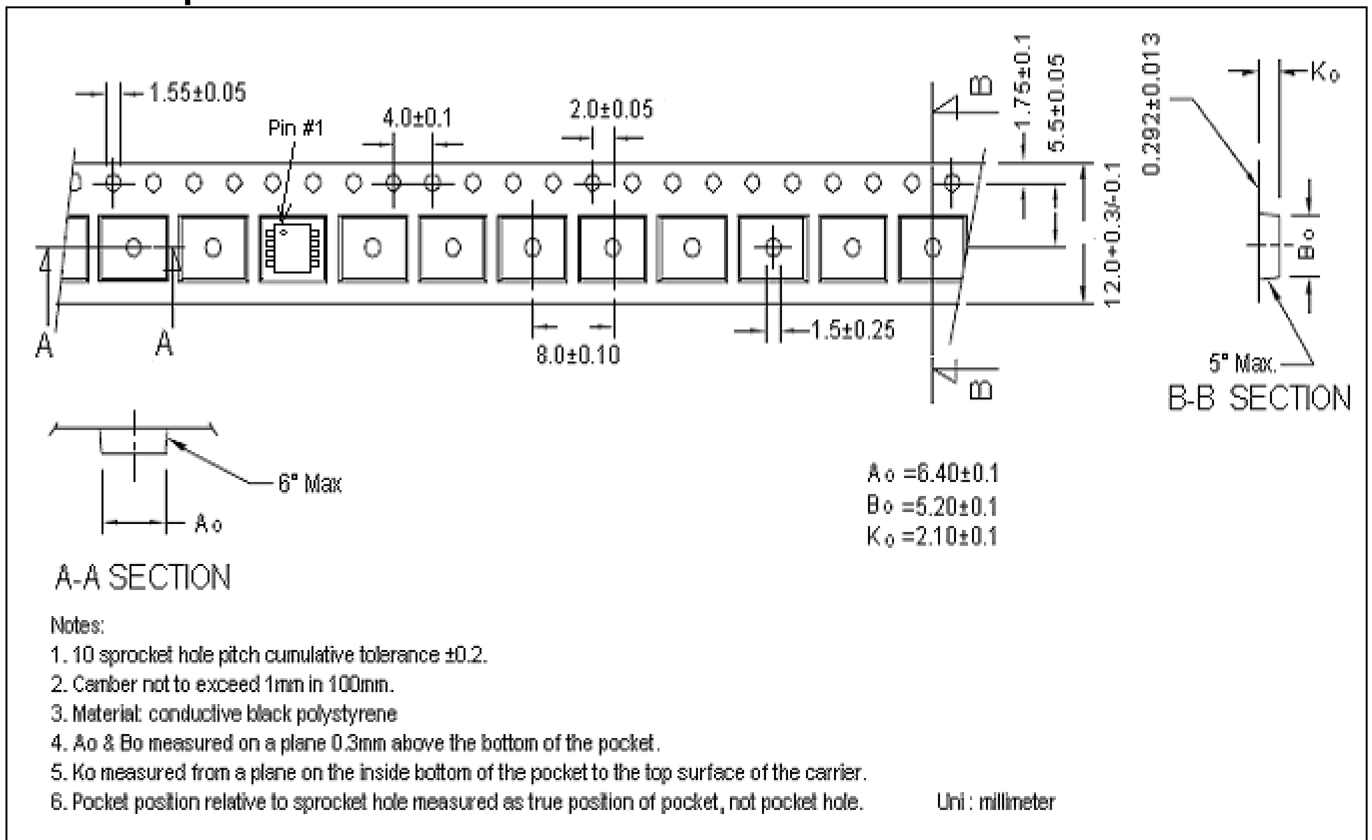




Reel Dimension



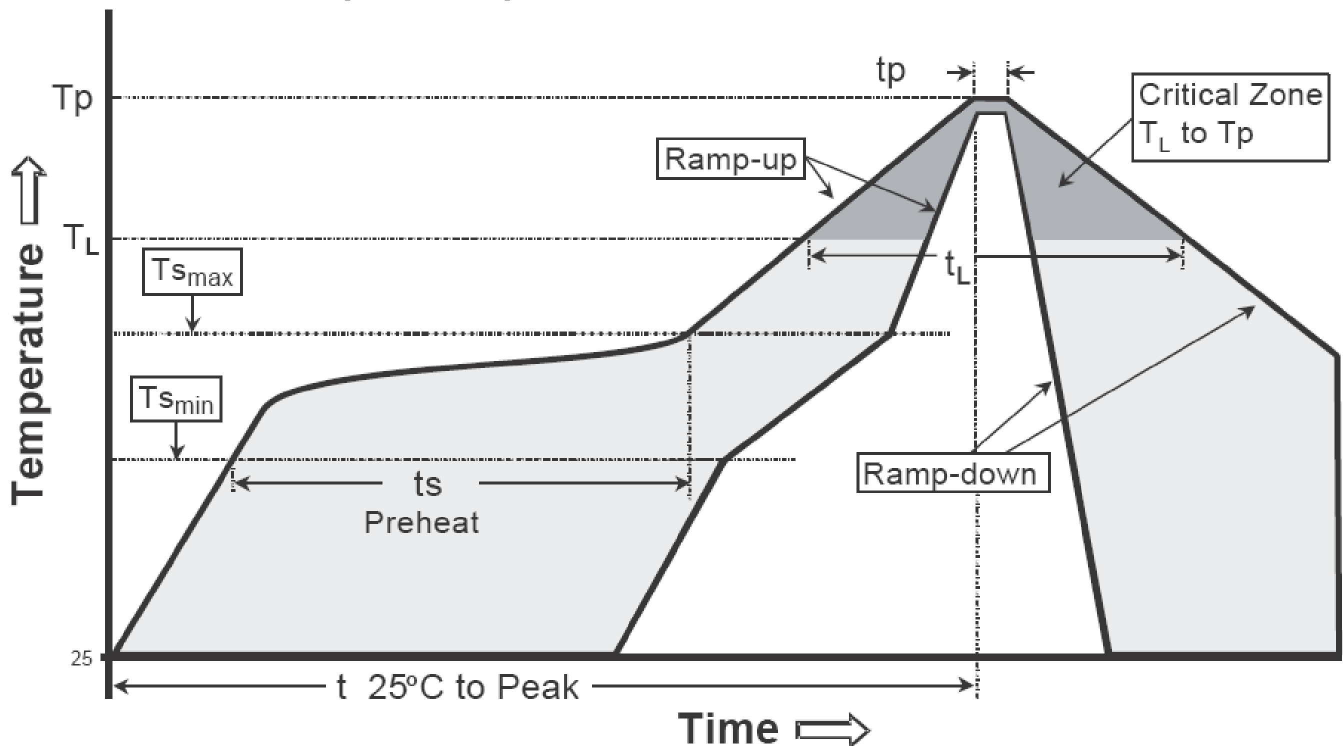
Carrier Tape Dimension



Recommended wave soldering condition

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

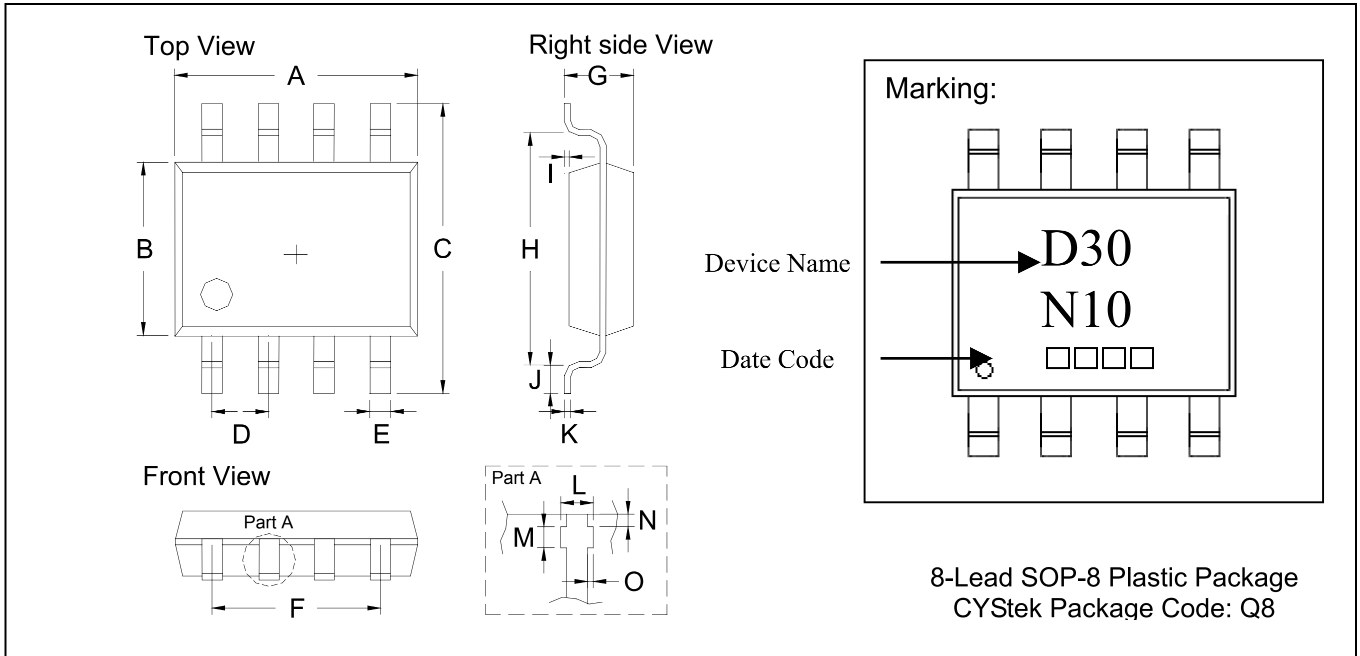
Recommended temperature profile for IR reflow



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(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 :1. All temperatures refer to topside of the package, measured on the package body surface.
2.For devices mounted on FR-4 PCB of 1.6mm or equivalent grade PCB. If other grade PCB is used, care should be taken to match the coefficients of thermal expansion between components and PCB. If they are not matched well, the solder joints may crack or the bodies of the parts may crack or shatter as the assembly cools.

SOP-8 Dimension



*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1850	0.2007	4.70	5.10	I	0.0031	0.0110	0.08	0.28
B	0.1457	0.1614	3.70	4.10	J	0.0157	0.0323	0.40	0.83
C	0.2283	0.2441	5.80	6.20	K	0.0074	0.0102	0.19	0.26
D	0.0500*		1.27*		L	0.0145	0.0204	0.37	0.52
E	0.0130	0.0201	0.33	0.51	M	0.0118	0.0197	0.30	0.50
F	0.1472	0.1527	3.74	3.88	N	0.0031	0.0051	0.08	0.13
G	0.0472	0.0638	1.20	1.62	O	0.0000	0.0059	0.00	0.15
H	0.1889	0.2007	4.80	5.10					

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.

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