N-Channel Enhancement Mode Power MOSFET

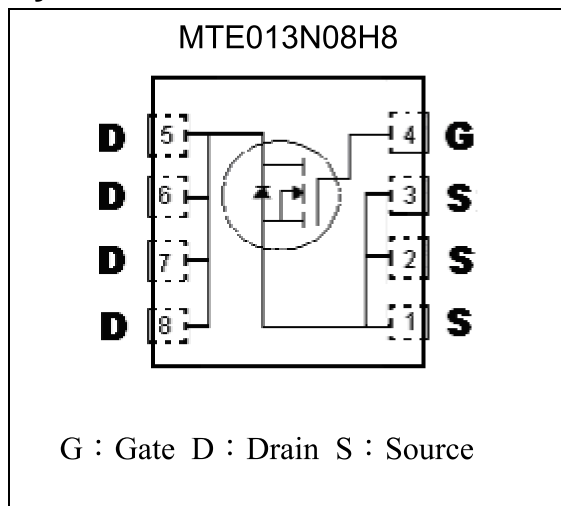
MTE013N08H8

BV_{DSS}	80V
I_D@V_{GS}=10V, T_C=25°C	40A
I_D@V_{GS}=10V, T_A=25°C	10.5A
$R_{DS(ON)}$@V_{GS}=10V, I_D=10A	9.1 mΩ(typ)

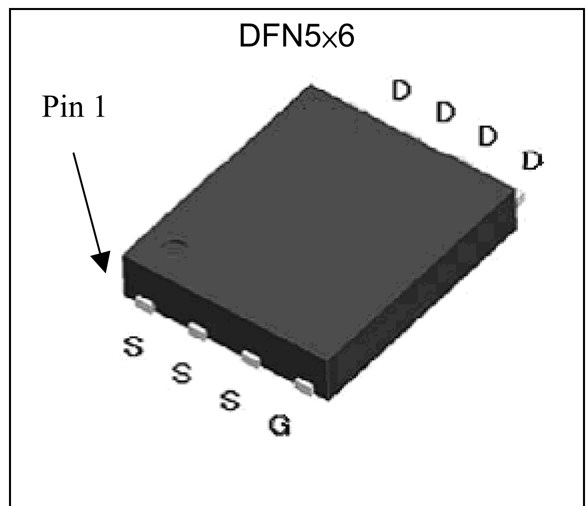
Features

- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- Pb-free lead plating and halogen-free package

Symbol

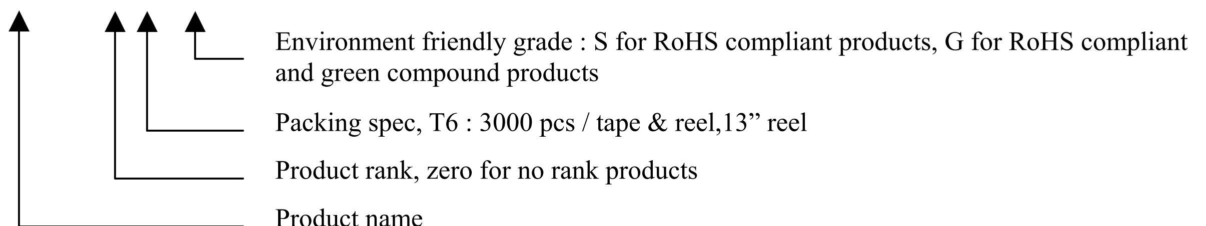


Outline



Ordering Information

Device	Package	Shipping
MTE013N08H8-0-T6-G	DFN5x6 (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel



Absolute Maximum Ratings (T_C=25°C)

Parameter		Symbol	Limits	Unit
Drain-Source Voltage (Note 1)		V_{DS}	80	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current @T_C=25°C, V_{GS}=10V(silicon limit) (Note 4)		I_D	57	A
Continuous Drain Current @T_C=25°C, V_{GS}=10V(package limit) (Note 4)			40	
Continuous Drain Current @T_C=100°C, V_{GS}=10V			36	
Continuous Drain Current @T_A=25°C, V_{GS}=10V (Note 2)		I_{DSM}	10.5	
Continuous Drain Current @T_A=70°C, V_{GS}=10V (Note 2)			8.4	
Pulsed Drain Current (Note 1)		I_{DM}	160	
Single Pulse Avalanche Current @ L=0.1mH		I_{AS}	40	
Single Pulse Avalanche Energy @ L=5mH, I_D=20 Amps, V_{DD}=30V (Note 3)		E_{AS}	1000	mJ
Repetitive Avalanche Energy		E_{AR}	6.9	
Power Dissipation	T_C=25°C	P_D	69	W
	T_C=100°C		27	
	T_A=25°C (Note 2)	P_{DSM}	2.5	
	T_A=70°C (Note 2)		1.6	
Operating Junction and Storage Temperature		Tj, Tstg	-55~+150	

*Drain current limited by maximum junction temperature

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{\theta JC}$	1.8	°C/W
Thermal Resistance, Junction-to-ambient, max (Note 2)	$R_{\theta JA}$	50	

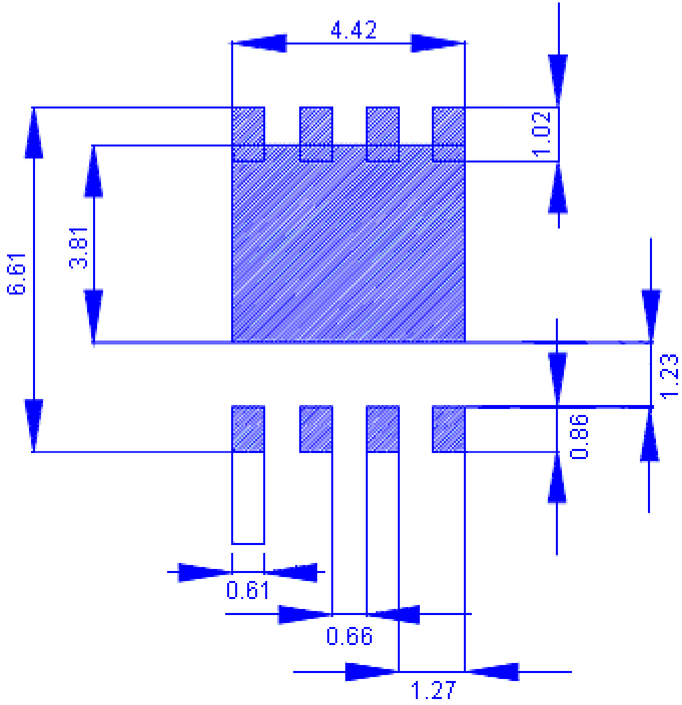
Note : 1. Pulse width limited by junction temperature.
2. Surface mounted on 1 in² copper pad of FR-4 board, 125°C/W when mounted on minimum copper pad
3. Ratings are based on low frequency and low duty cycles to keep initial T_J=25°C. 100% tested by conditions of V_{DD}=30V, I_D=20A, L=0.1mH, V_{GS}=10V.
4. Calculated continuous drain current based on maximum allowable junction temperature.
5. The static characteristics are obtained using <300μs pulses, duty cycle 0.5% maximum.
6. The $R_{\theta JA}$ is the sum of thermal resistance from junction to case $R_{\theta JC}$ and case to ambient.

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

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	80	-	-	V	V_{GS}=0V, I_D=250μA
$\Delta BV_{DSS}/\Delta Tj$	-	68	-	mV/°C	Reference to 25°C, I_D=250μA
$V_{GS(th)}$	2	-	4	V	V_{DS} = V_{GS}, I_D=250μA
*G_{FS}	-	19	-	S	V_{DS} =10V, I_D=20A
I_{GSS}	-	-	±100	nA	V_{GS}=±20V
I_{DSS}	-	-	1	μA	V_{DS} =64V, V_{GS} =0V
	-	-	5		V_{DS} =64V, V_{GS} =0V, Tj=55°C
*$R_{DS(ON)}$	-	9.1	11.5	mΩ	V_{GS} =10V, I_D=10A
Dynamic					
*Qg (V_{GS}=10V)	-	31.4	-	nC	V_{DS}=40V, V_{GS}=10V, I_D=10.5A
*Qg (V_{GS}=8V)	-	26	-		
*Qgs	-	7.3	-		
*Qgd	-	10.1	-		
*$t_{d(ON)}$	-	18.6	-	ns	V_{DS}=40V, I_D=10.5A, V_{GS}=10V, R_{GS}=6Ω
*tr	-	26.2	-		
*$t_{d(OFF)}$	-	46	-		
*t_f	-	15.8	-		
Ciss	-	1472	-	pF	V_{GS}=0V, V_{DS}=30V, f=1MHz
Coss	-	200	-		
Crss	-	105	-		
Rg	-	3.8	-	Ω	f=1MHz
Source-Drain Diode					
*I_S	-	-	40	A	
*I_{SM}	-	-	160		
*V_{SD}	-	0.74	1.1	V	I_S=2.8A, V_{GS}=0V
*trr	-	24.4	-	ns	V_{GS}=0V, I_F=10.5A, dI_F/dt=100A/μs
*Qrr	-	26.9	-	nC	

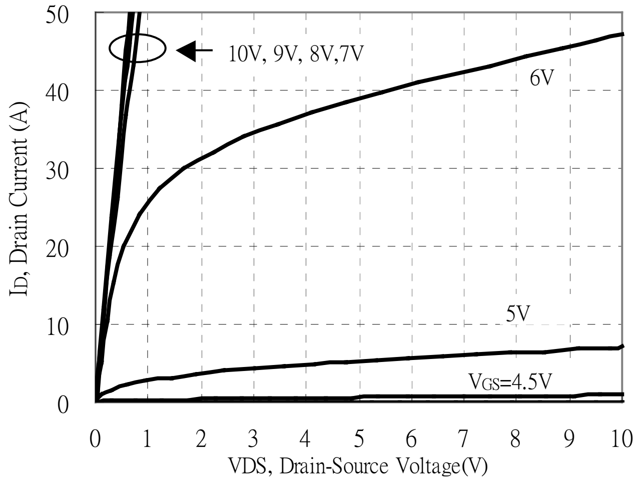
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

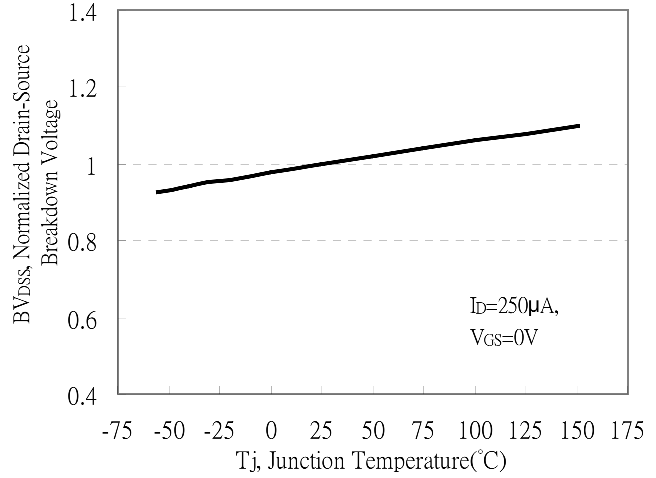
Recommended Soldering Footprint

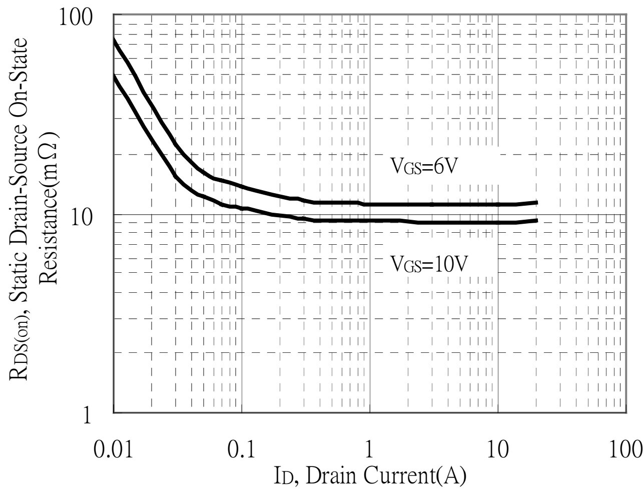


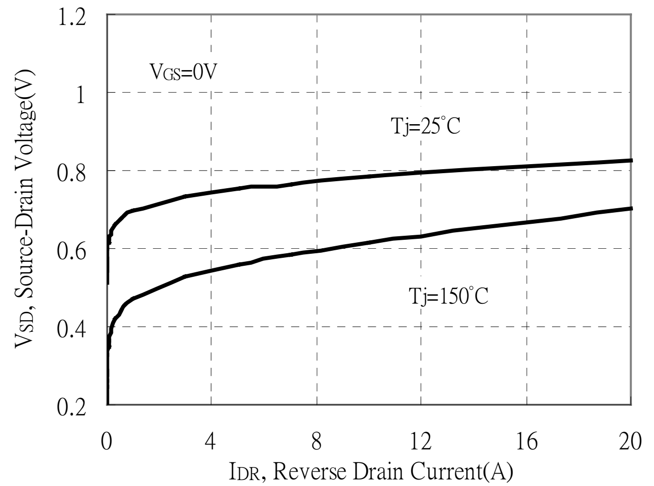
unit : mm

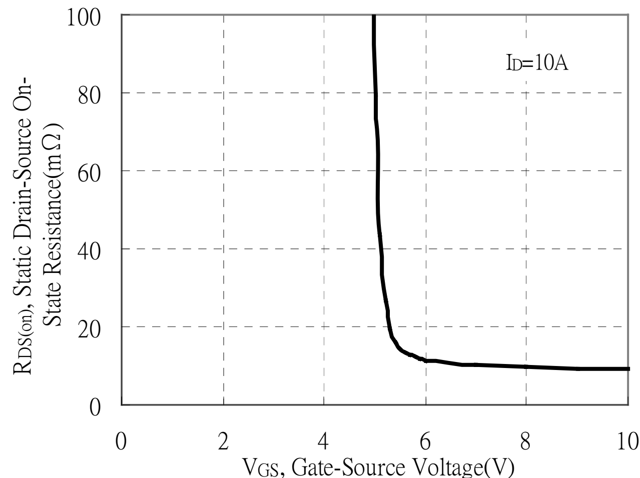
Typical Characteristics

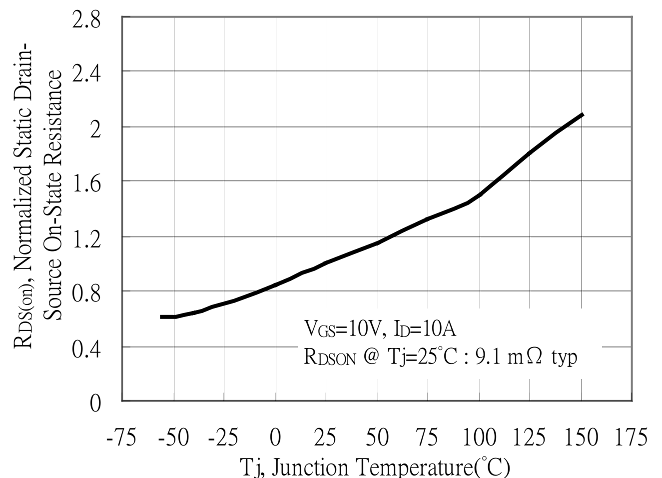












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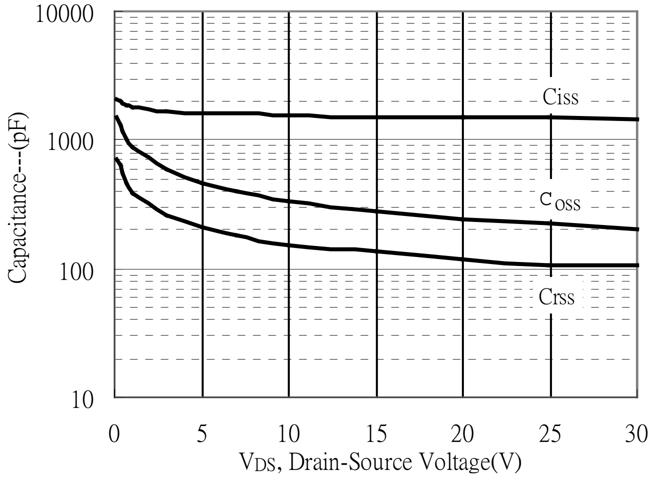
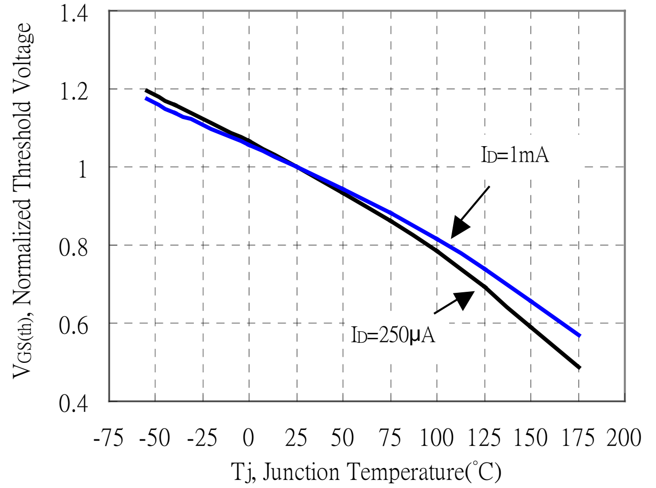
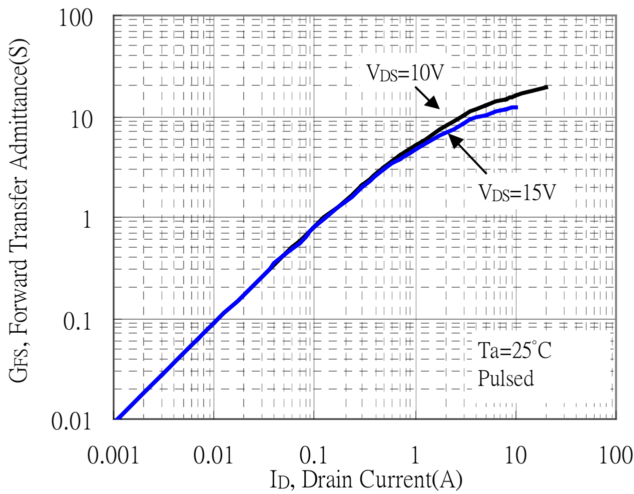
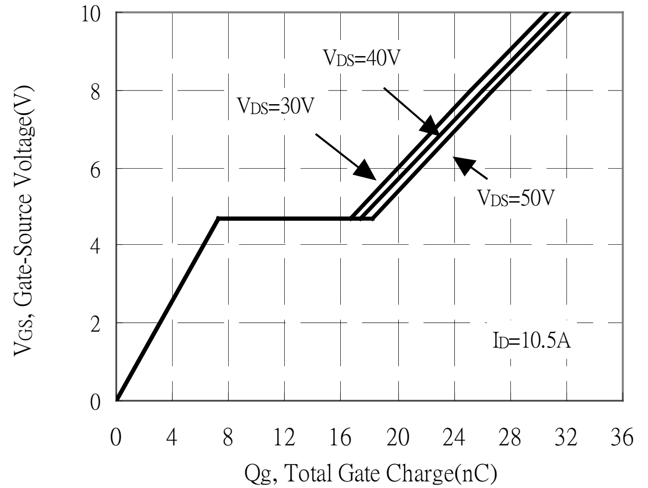
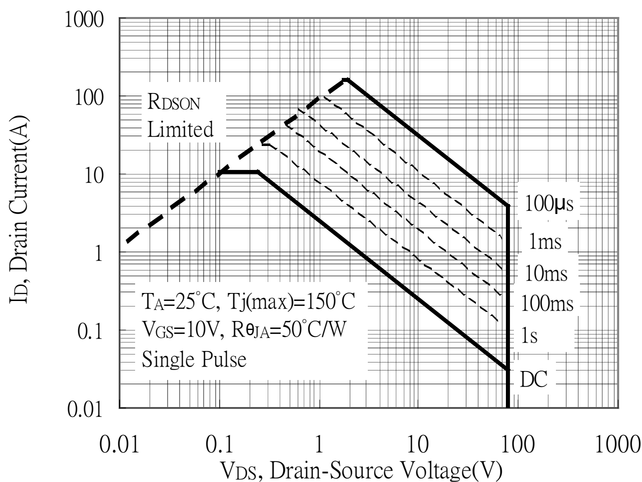
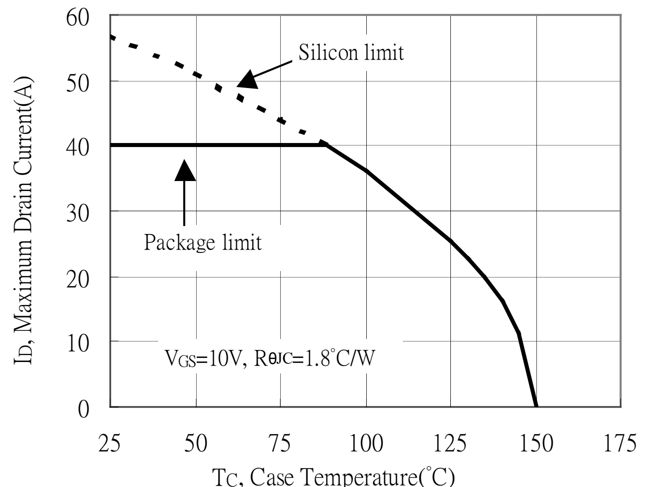




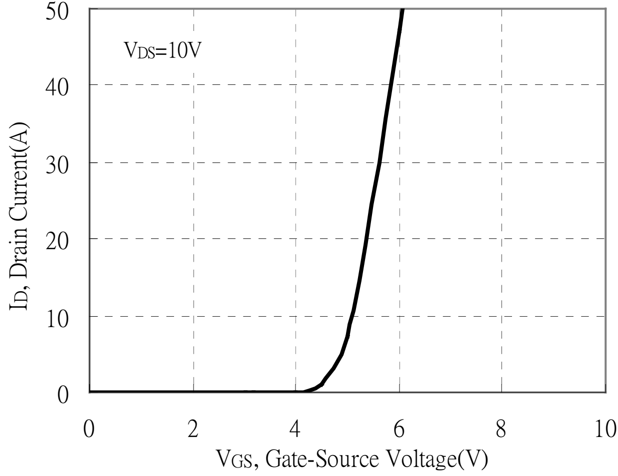


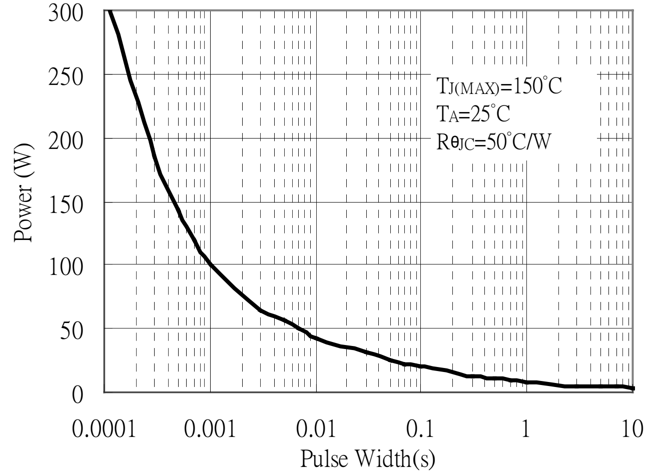


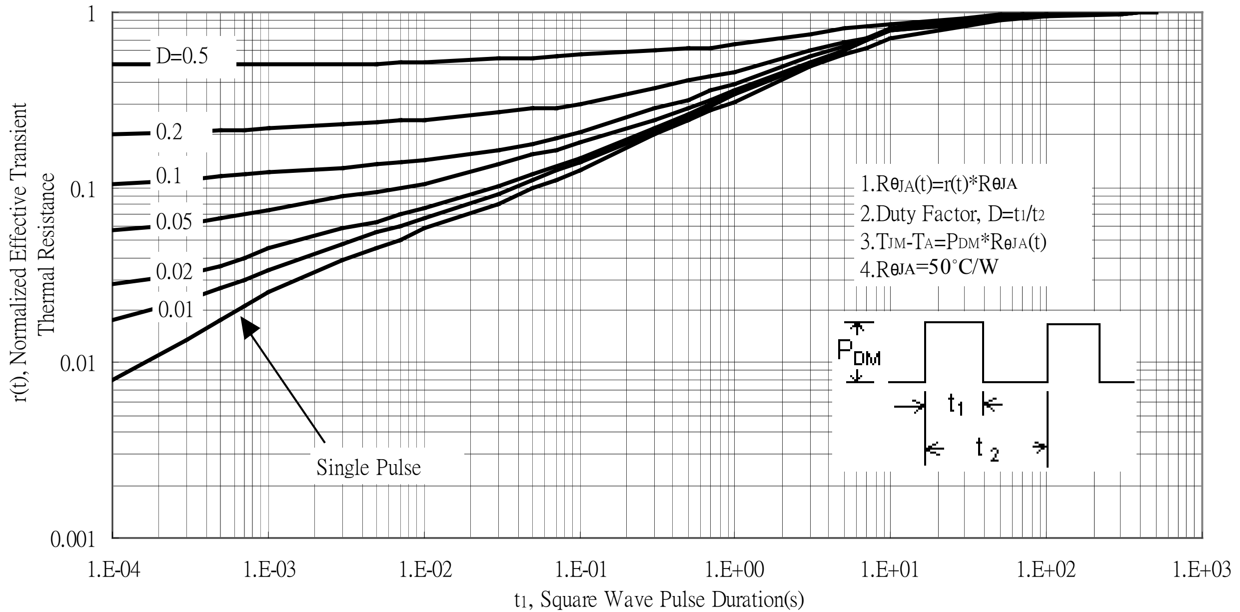




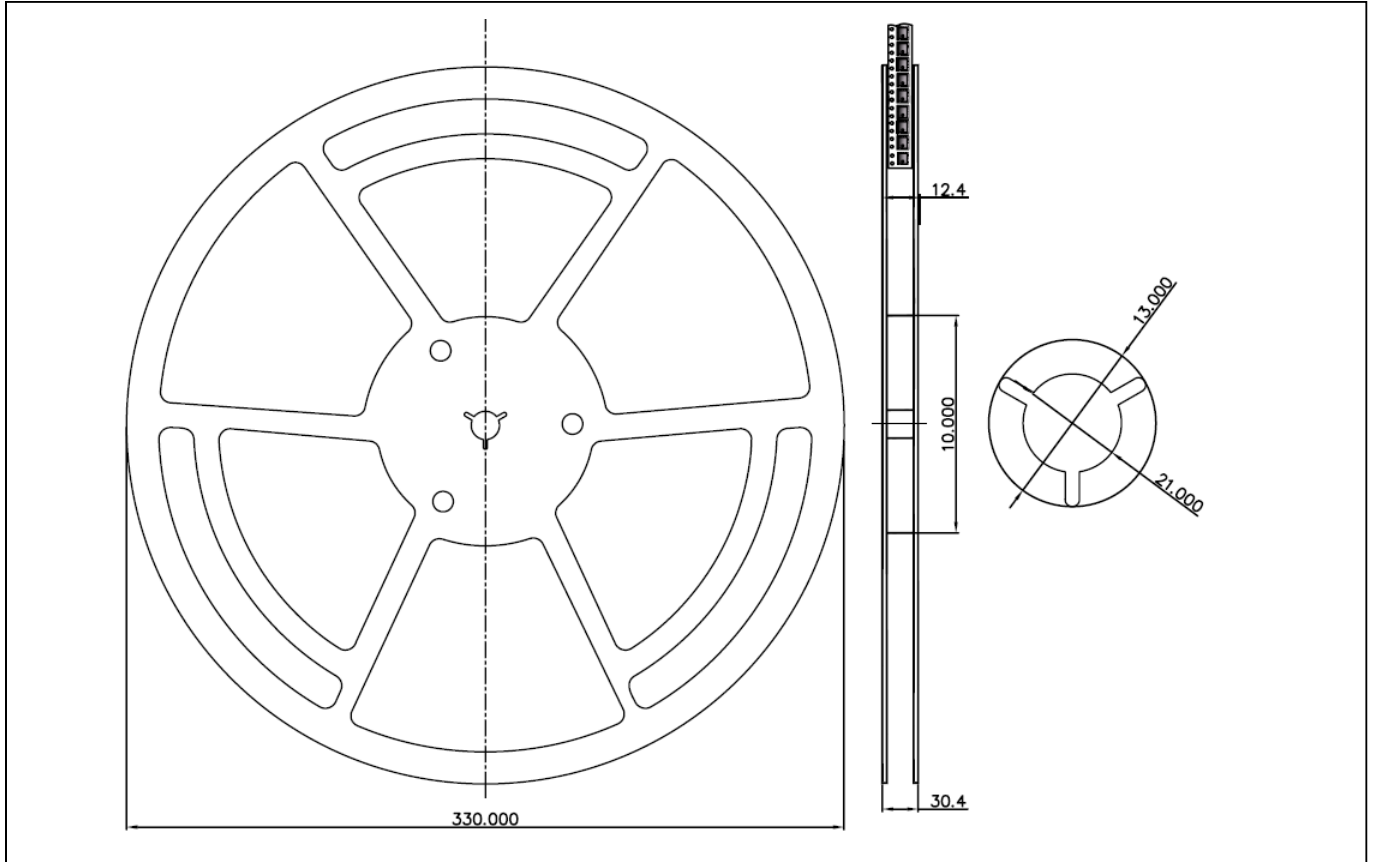
Typical Characteristics(Cont.)



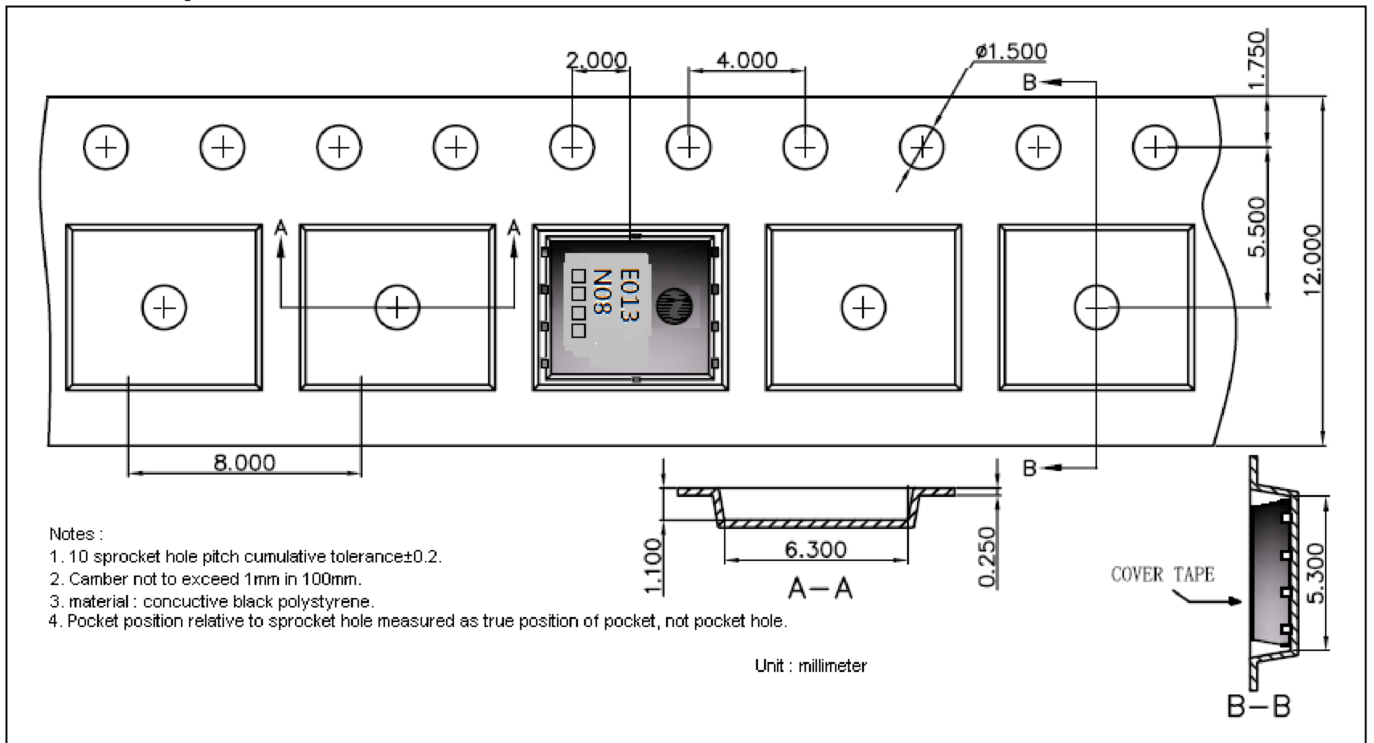




Reel Dimension



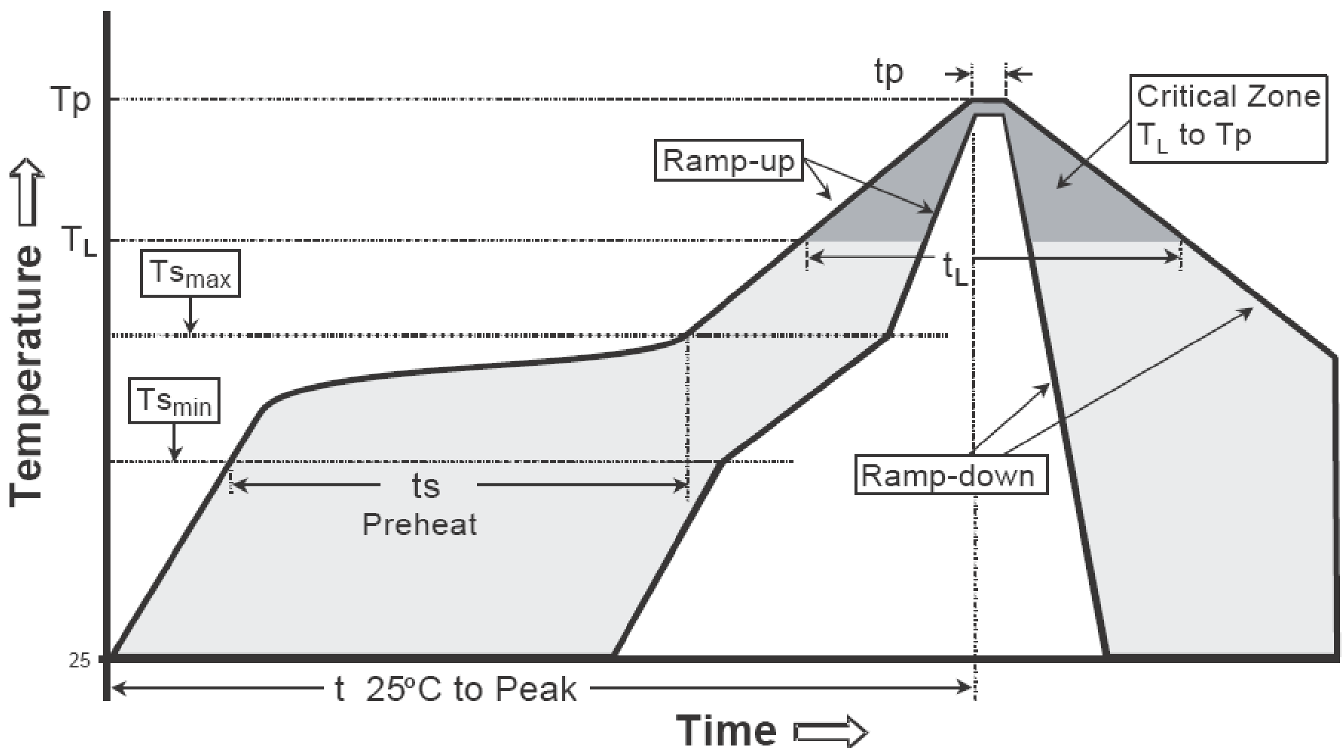
Carrier Tape Dimension



Recommended wave soldering condition

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

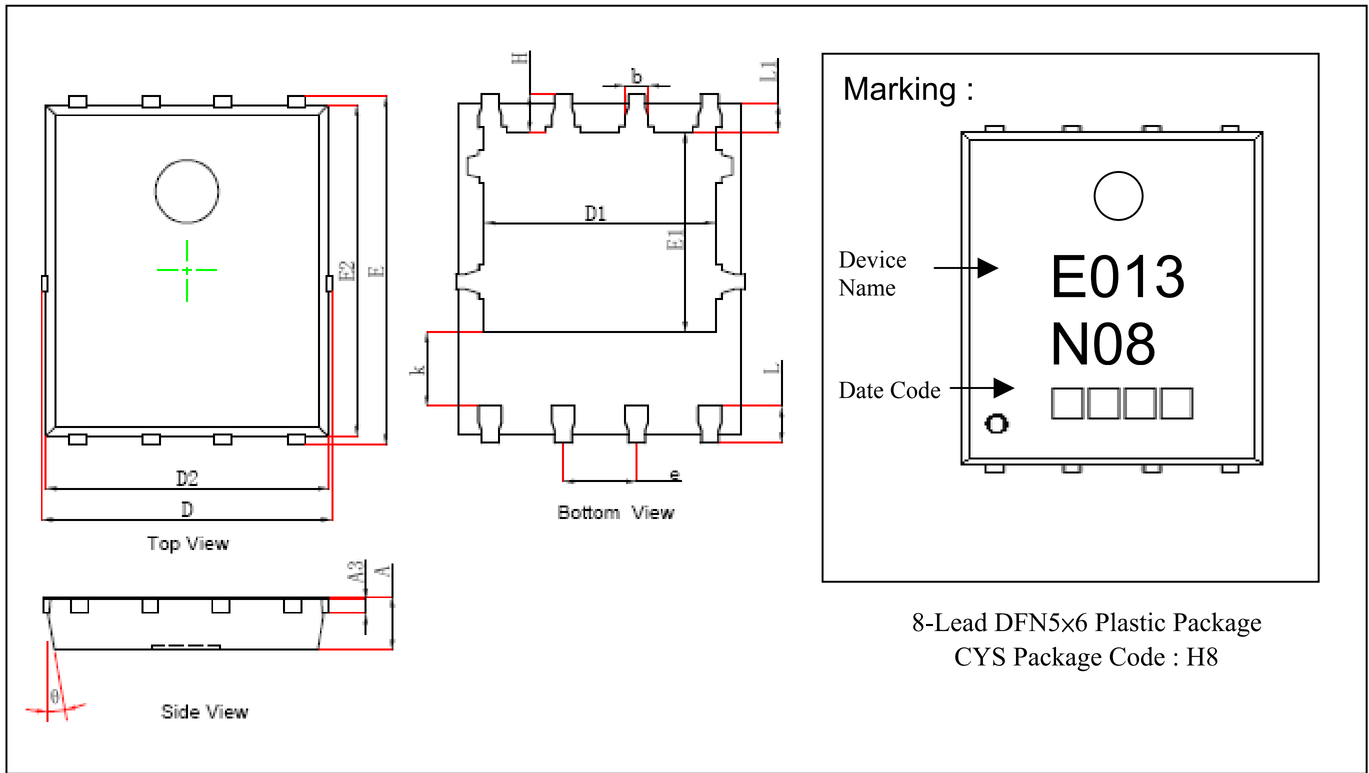
Recommended temperature profile for IR reflow



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(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 (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.

DFN5×6 Dimension



8-Lead DFN5x6 Plastic Package
CYS Package Code : H8

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039	k	1.190	1.390	0.047	0.055
A3	0.254 REF		0.010 REF		b	0.350	0.450	0.014	0.018
D	4.944	5.096	0.195	0.201	e	1.270 TYP.		0.050 TYP.	
E	5.974	6.126	0.235	0.241	L	0.559	0.711	0.022	0.028
D1	3.910	4.110	0.154	0.162	L1	0.424	0.576	0.017	0.023
E1	3.375	3.575	0.133	0.141	H	0.574	0.726	0.023	0.029
D2	4.824	4.976	0.190	0.196	θ	10°	12°	10°	12°
E2	5.674	5.826	0.223	0.229					

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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