N-Channel Enhancement Mode Power MOSFET

MTDB6N20H8

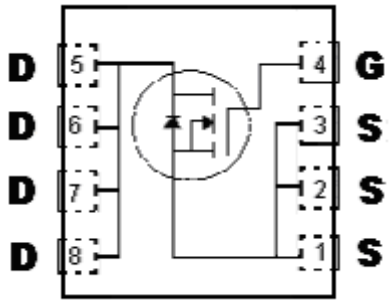
BV_{DSS}	200 V
I_D@V_{GS}=10V, T_C=25°C	8 A
I_D@V_{GS}=10V, T_A=25°C	1.8A
$R_{DSON(typ)}$@V_{GS}=10V, I_D=3A	285 mΩ
$R_{DSON(typ)}$@V_{GS}=4.5V, I_D=2A	287 mΩ

Features

- Single Drive Requirement
- Low On-resistance
- Fast Switching Characteristic
- Pb-free lead plating and Halogen-free package

Symbol

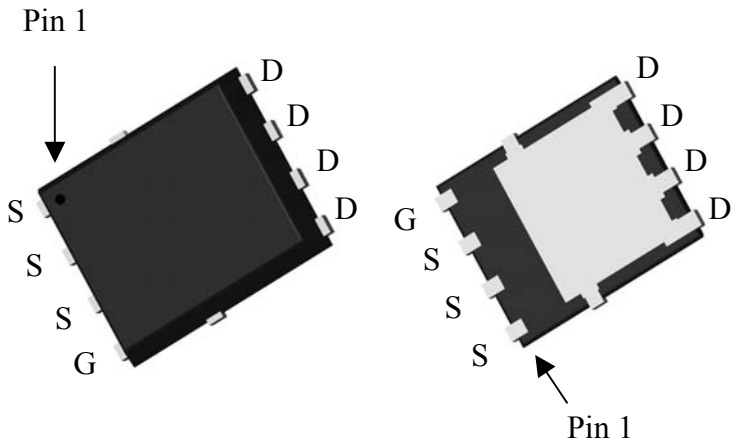
MTDB6N20H8



G：Gate D：Drain S：Source

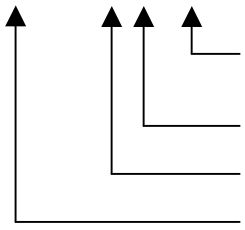
Outline

DFN5x6



Ordering Information

Device	Package	Shipping
MTDB6N20H8-0-T6-G	DFN5x6 (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel



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

Packing spec, T6 : 3000 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}	200	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current @ T_C=25°C, V_{GS}=10V		I_D	8	A
Continuous Drain Current @ T_C=100°C, V_{GS}=10V			5.1	
Continuous Drain Current @ T_A=25°C, V_{GS}=10V		I_{DSM}	1.8 *3	
Continuous Drain Current @ T_A=70°C, V_{GS}=10V			1.4 *3	
Pulsed Drain Current		I_{DM}	24 *1	
Avalanche Current		I_{AS}	4	
Avalanche Energy @ L=5mH, I_D=3A, V_{DD}=50V		E_{AS}	22.5 *4	mJ
Repetitive Avalanche Energy @ L=0.05mH		E_{AR}	5 *2	
Total Power Dissipation	T_C=25℃	P_D	50	W
	T_C=100℃		20	
	T_A=25℃	P_{DSM}	2.5	
	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	$R_{\theta JC}$	2.5	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{\theta JA}$	50 *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, 125°C/W when mounted on minimum copper pad
4. 100% tested by conditions of L=1mH, I_{AS}=3A, V_{GS}=10V, V_{DD}=50V

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

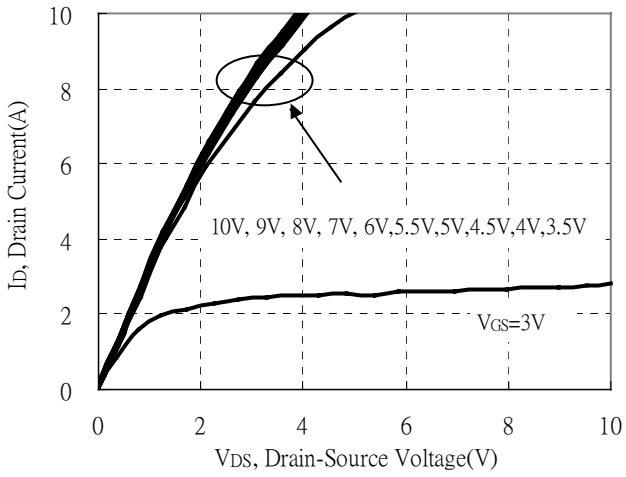
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	200	-	-	V	V_{GS}=0V, I_D=250μA
$V_{GS(th)}$	1.2	-	2.4		V_{DS} = V_{GS}, I_D=250μA
G_{FS} *1	-	6.6	-	S	V_{DS} =15V, I_D=3A
I_{GSS}	-	-	±100	nA	V_{GS}=±20V
I_{DSS}	-	-	1	μA	V_{DS} =200V, V_{GS} =0V
	-	-	10		V_{DS} =160V, V_{GS} =0V, Tj=85°C
$R_{DS(ON)}$ *1	-	285	360	mΩ	V_{GS} =10V, I_D=3A
	-	287	400		V_{GS} =4.5V, I_D=2A
Dynamic					
Ciss	-	498	-	pF	V_{GS}=0V, V_{DS}=25V, f=1MHz
Coss	-	41	-		
Crss	-	26	-		

Qg *1, 2	-	14.3	-	nC	V_{DS}=160V, V_{GS}=10V, I_D=3A
Qgs *1, 2	-	1.9	-		
Qgd *1, 2	-	4.3	-		
$t_{d(ON)}$ *1, 2	-	7.6	-	ns	V_{DS}=100V, I_D=3A, V_{GS}=10V, R_{GS}=1Ω
tr *1, 2	-	17	-		
$t_{d(OFF)}$ *1, 2	-	27.4	-		
t_f *1, 2	-	17.8	-		
Rg	-	3.9	-	Ω	f=1MHz
Source-Drain Diode					
I_S *1	-	-	8	A	
I_{SM} *3	-	-	18		
V_{SD} *1	-	0.78	1.2	V	I_S=2A, V_{GS}=0V
trr	-	51.5	-	ns	I_F=2A, dI_F/dt=100A/μs
Qrr	-	88.8	-	nC	

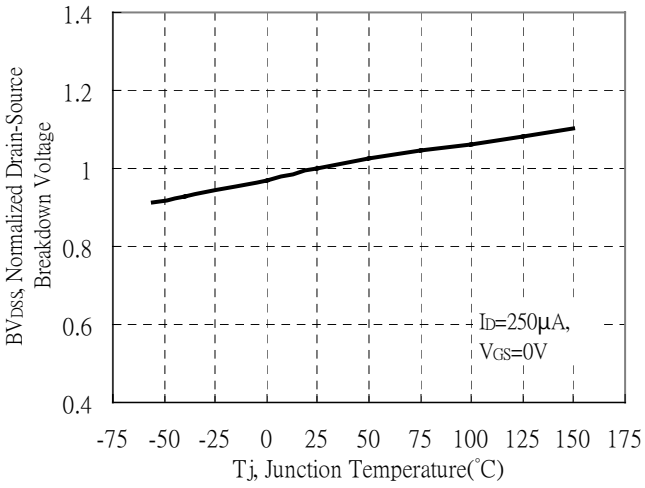
Note : *1.Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%
*2.Independent of operating temperature
*3.Pulse width limited by maximum junction temperature.

Typical Characteristics

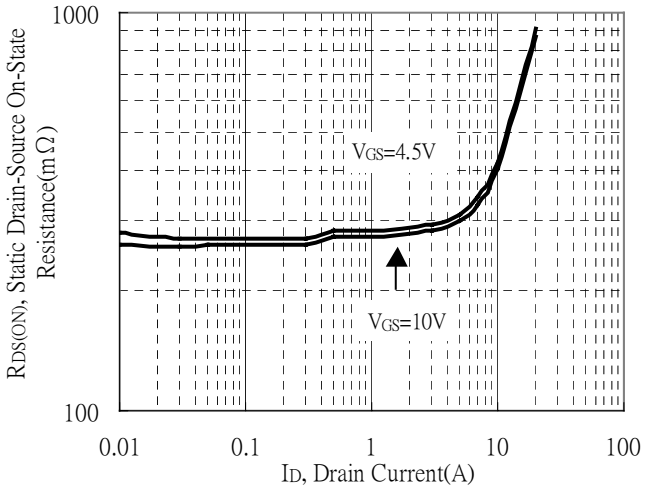
Typical Output Characteristics



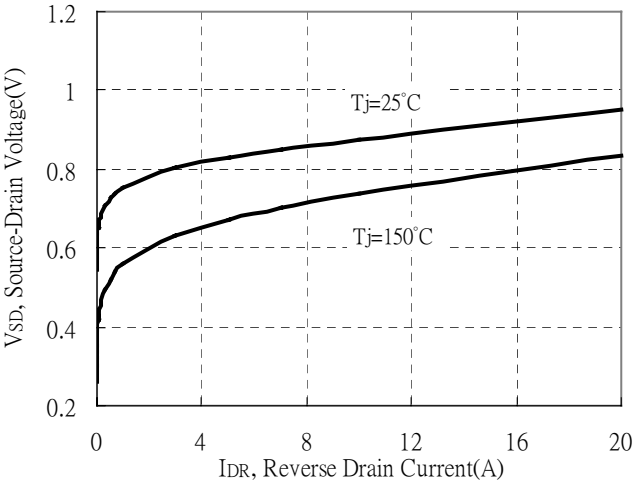
Brekdown Voltage vs Ambient Temperature



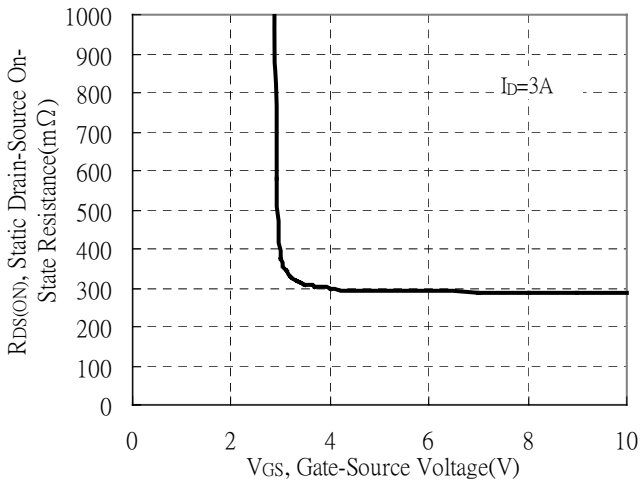
Static Drain-Source On-State resistance vs Drain Current



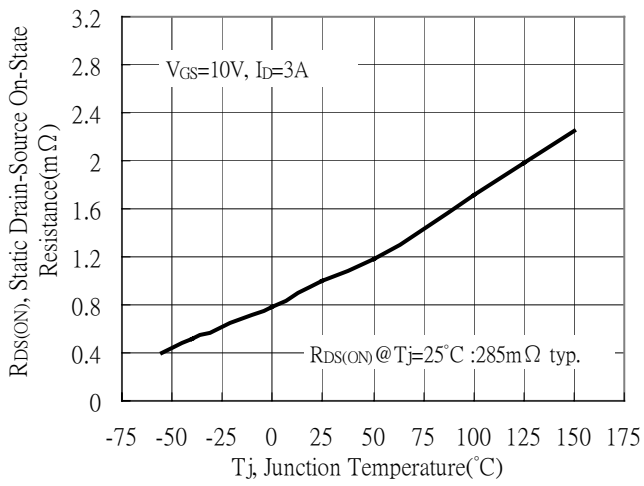
Reverse Drain Current vs Source-Drain Voltage



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

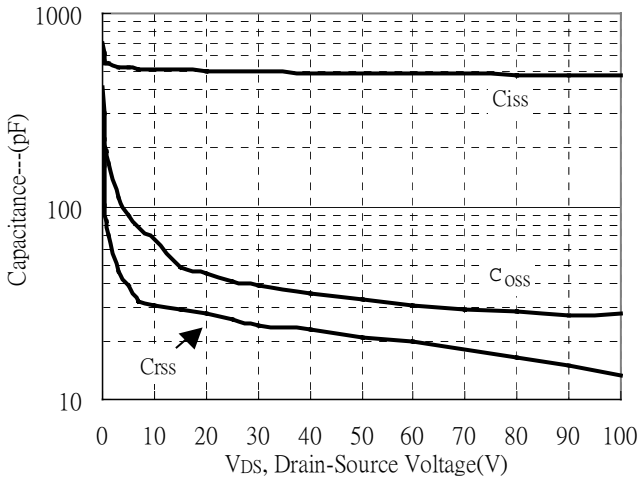


Drain-Source On-State Resistance vs Junction Tempearture

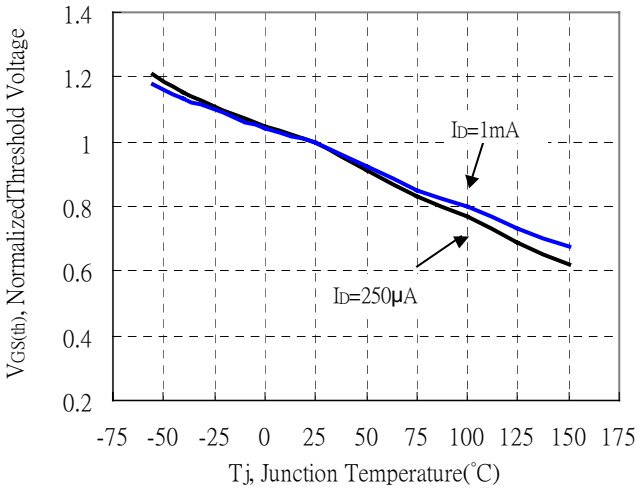


Typical Characteristics(Cont.)

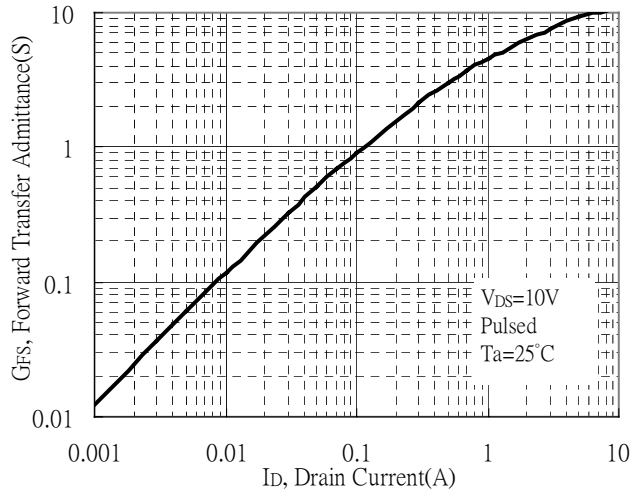
Capacitance vs Drain-to-Source Voltage



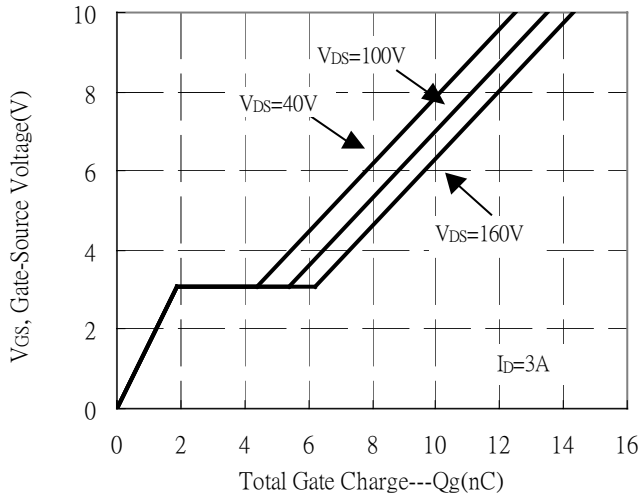
Threshold Voltage vs Junction Tempearture



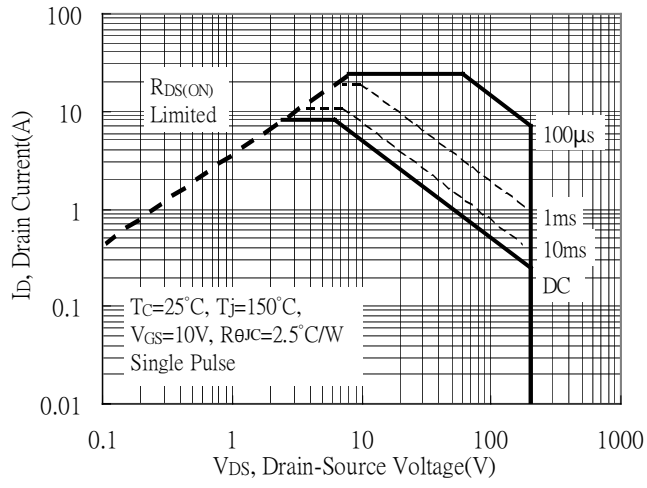
Forward Transfer Admittance vs Drain Current



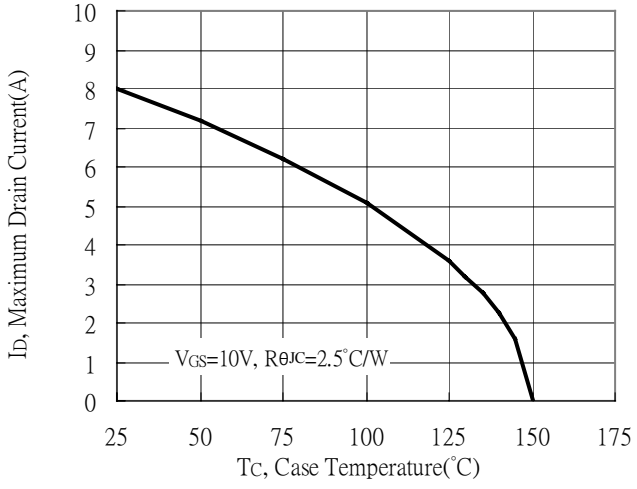
Gate Charge Characteristics



Maximum Safe Operating Area

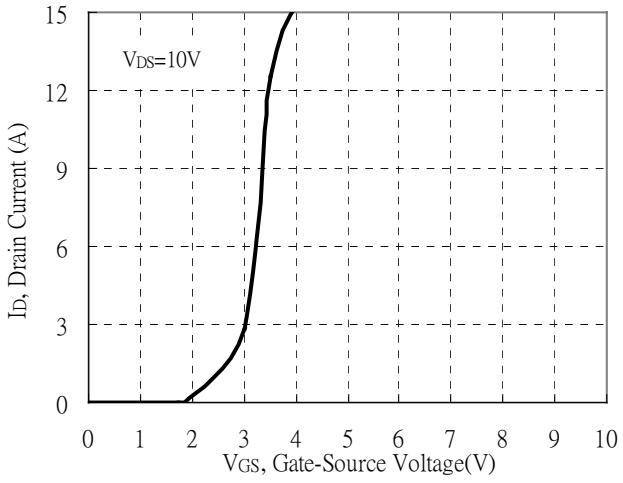


Maximum Drain Current vs Case Temperature

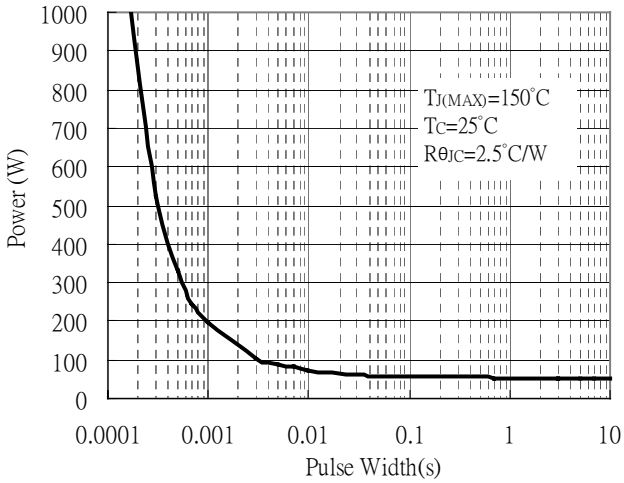


Typical Characteristics(Cont.)

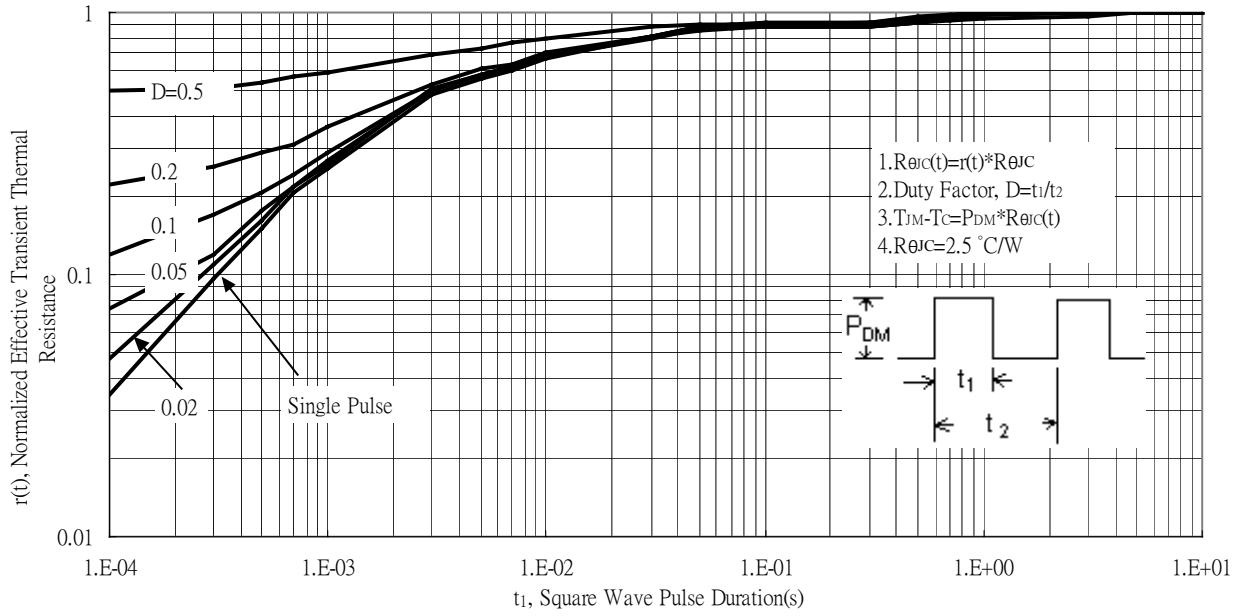
Typical Transfer Characteristics



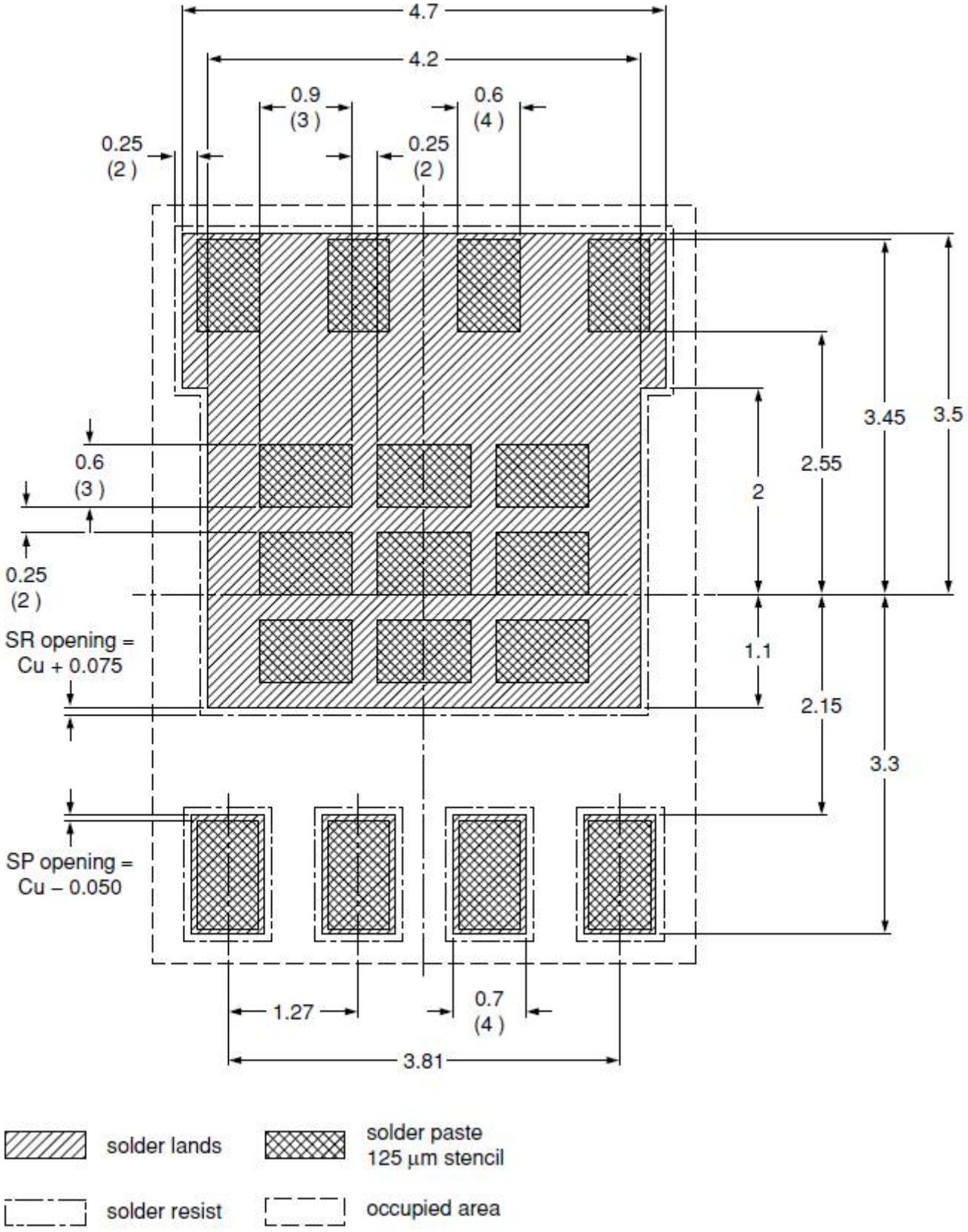
Single Pulse Maximum Power Dissipation



Transient Thermal Response Curves

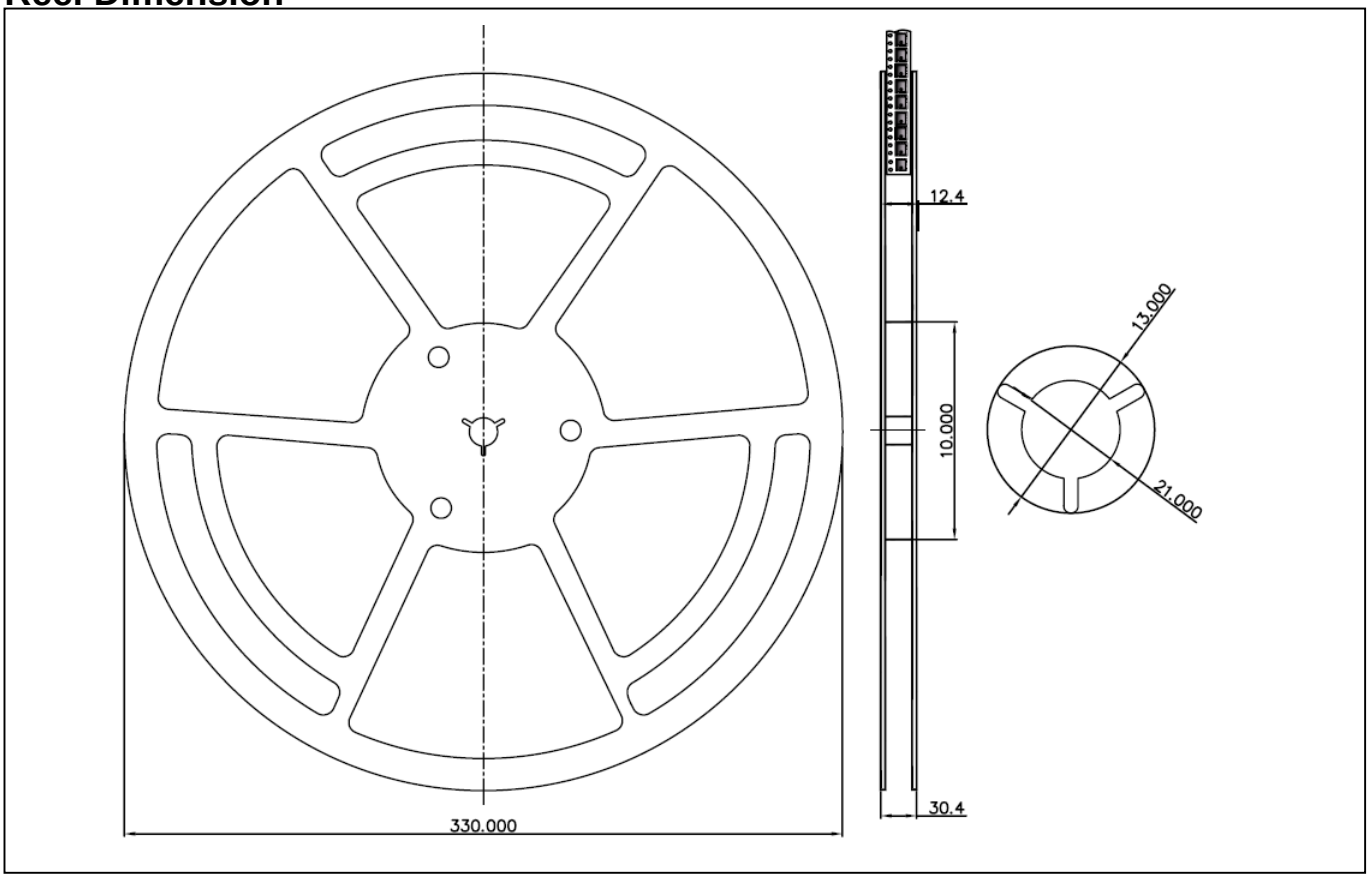


Recommended Soldering Footprint & Stencil Design

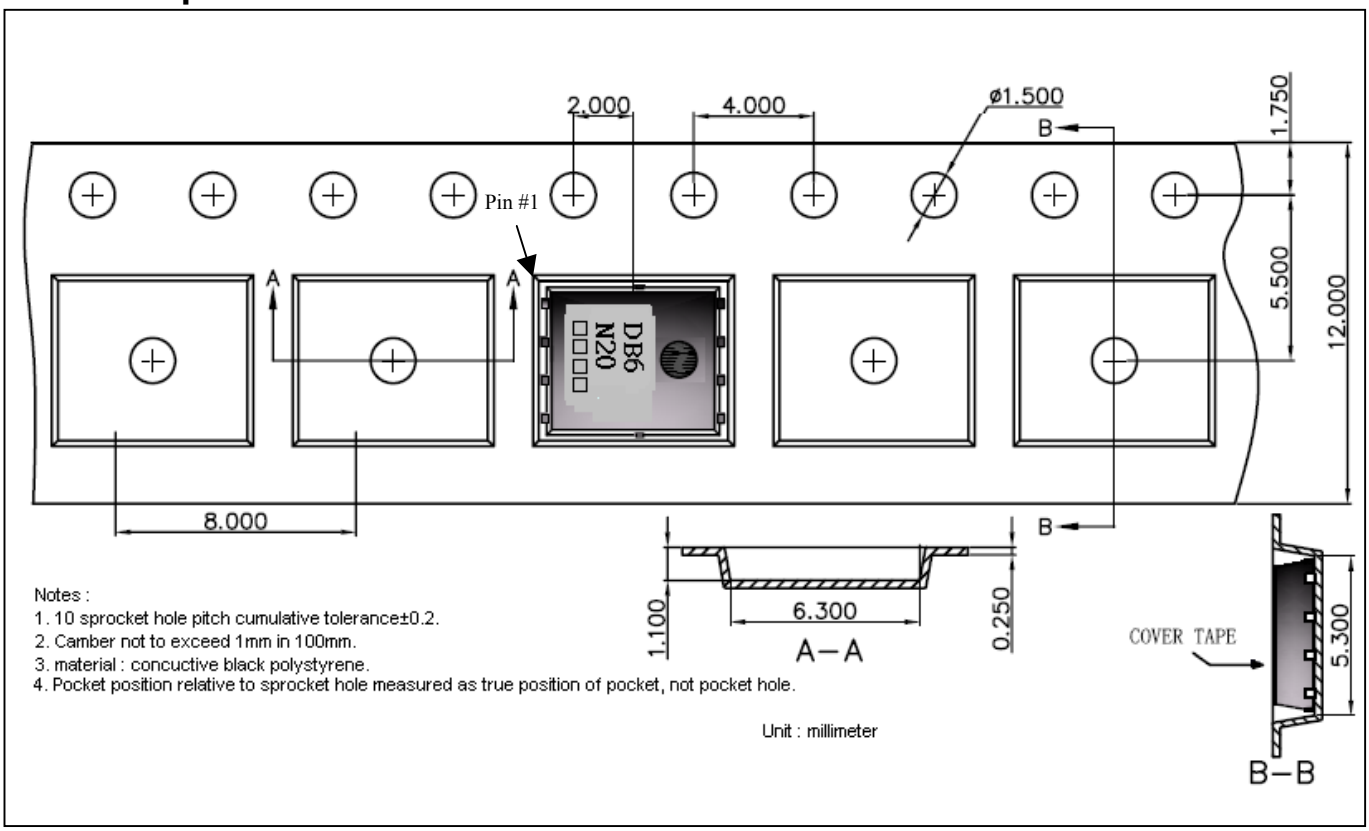


unit : mm

Reel Dimension



Carrier Tape Dimension



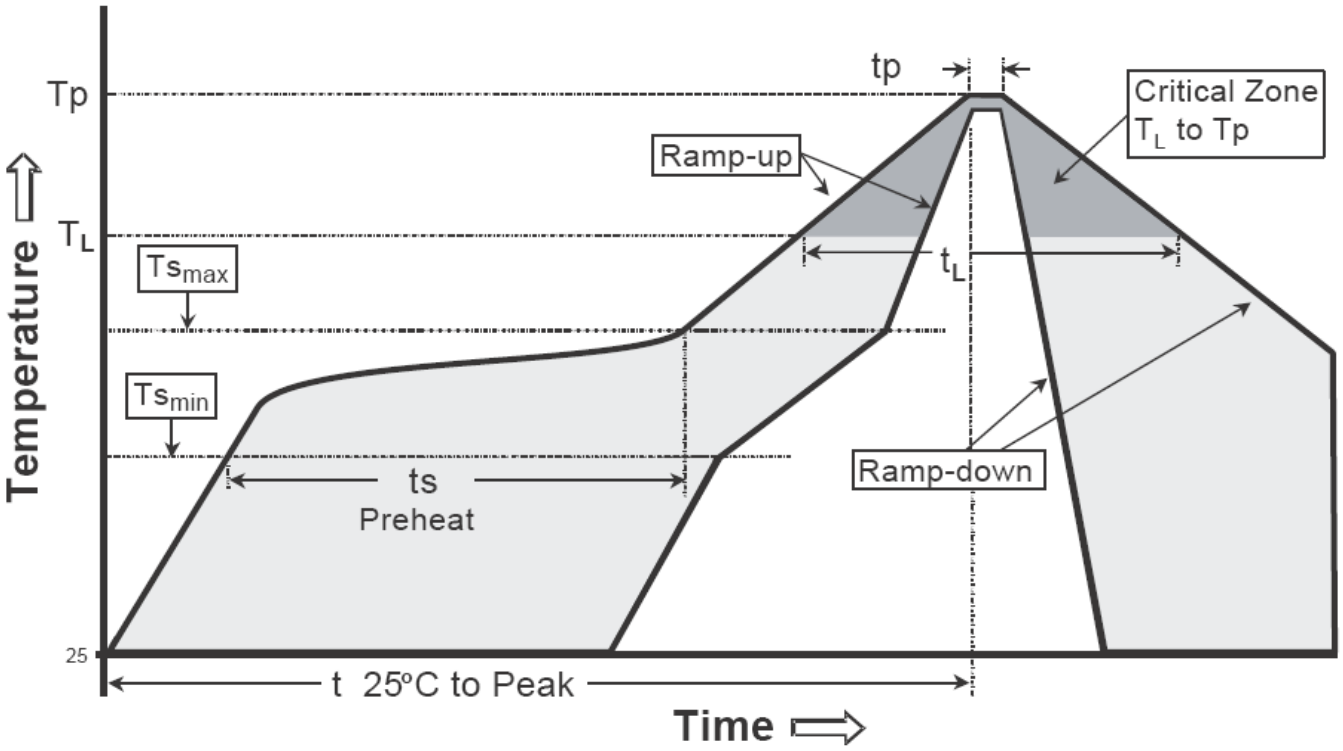
Notes :
1. 10 sprocket hole pitch cumulative tolerance±0.2.
2. Camber not to exceed 1mm in 100mm.
3. material : concuctive black polystyrene.
4. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

Unit : millimeter

Recommended wave soldering condition

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

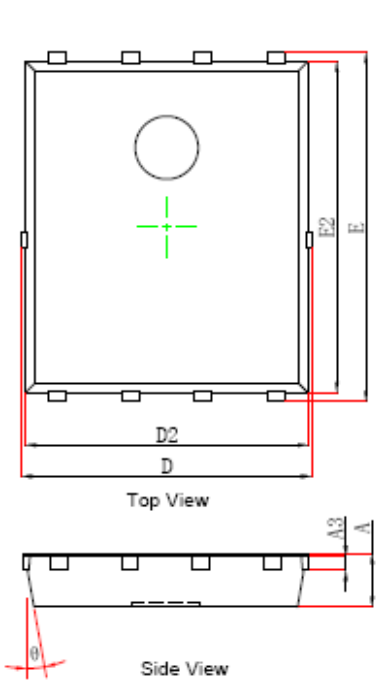
Recommended temperature profile for IR reflow

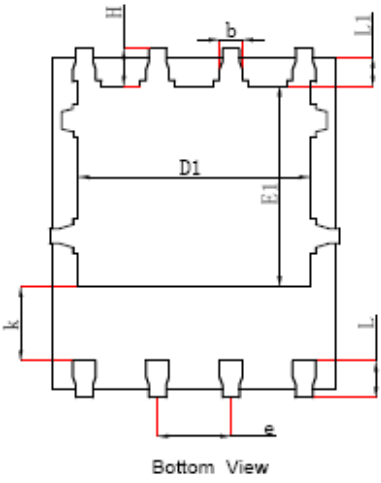


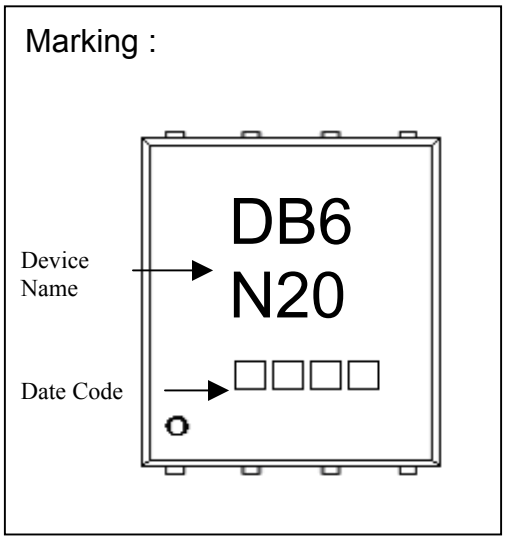
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(Ts min) −Temperature Max(Ts max) −Time(ts min to ts max)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL)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

DFN5x6 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.