N-Channel Logic Level Enhancement Mode Power MOSFET

MTB2D5N03BH8

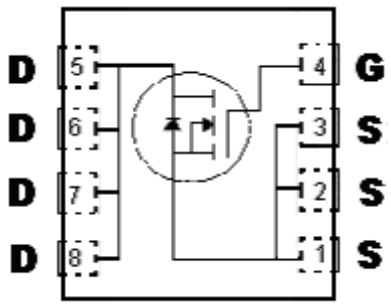
BV_{DSS}	**30V**
I_D@V_{GS}=10V, T_C=25°C	**60A**
I_D@V_{GS}=10V, T_A=25°C	**20A**
$R_{DS(ON)}$@V_{GS}=10V, I_D=30A	**2.1 mΩ (typ)**
$R_{DS(ON)}$@V_{GS}=4.5V, I_D=24A	**2.9 mΩ (typ)**

Features

- Single Drive Requirement
- Low On-resistance
- Fast Switching Characteristic
- Dynamic dv/dt rating
- Repetitive Avalanche Rated
- Pb-free lead plating and Halogen-free package

Symbol

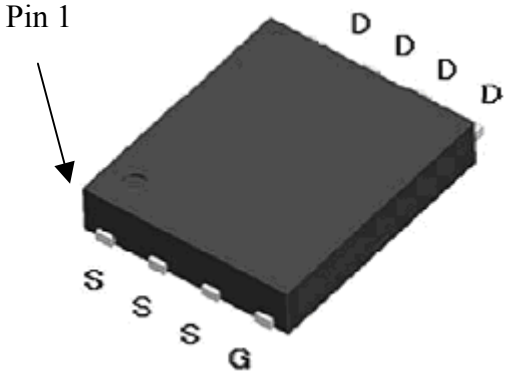
MTB2D5N03BH8



G：Gate D：Drain S：Source

Outline

DFN5x6



Ordering Information

Device	Package	Shipping
MTB2D5N03BH8-0-T6-G	DFN 5 ×6 (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}	30	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current @ T_C=25°C, V_{GS}=10V(Silicon limit)		I_D	90	A
Continuous Drain Current @ T_C=100°C, V_{GS}=10V(Silicon limit)			57	
Continuous Drain Current @ T_C=25°C, V_{GS}=10V(Package limit)			60	
Continuous Drain Current @ T_A=25°C, V_{GS}=10V		I_{DSM}	20 *3	
Continuous Drain Current @ T_A=70°C, V_{GS}=10V			16 *3	
Pulsed Drain Current		I_{DM}	200 *1	
Avalanche Current		I_{AS}	53	
Avalanche Energy @ L=0.1mH, I_D=53A, R_G=25Ω		E_{AS}	140	mJ
Total Power Dissipation	T_C=25℃	P_D	50	W
	T_C=100℃		20	
	T_A=25℃	P_{DSM}	2.5 *3	
	T_A=70℃		1.6 *3	
Operating Junction and Storage Temperature Range		Tj, Tstg	-55~+150	°C

100% UIS testing in condition of V_D=15V, L=0.1mH, V_G=10V, I_L=30A, Rated V_{DS}=30V N-CH

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	2.5	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	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.

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

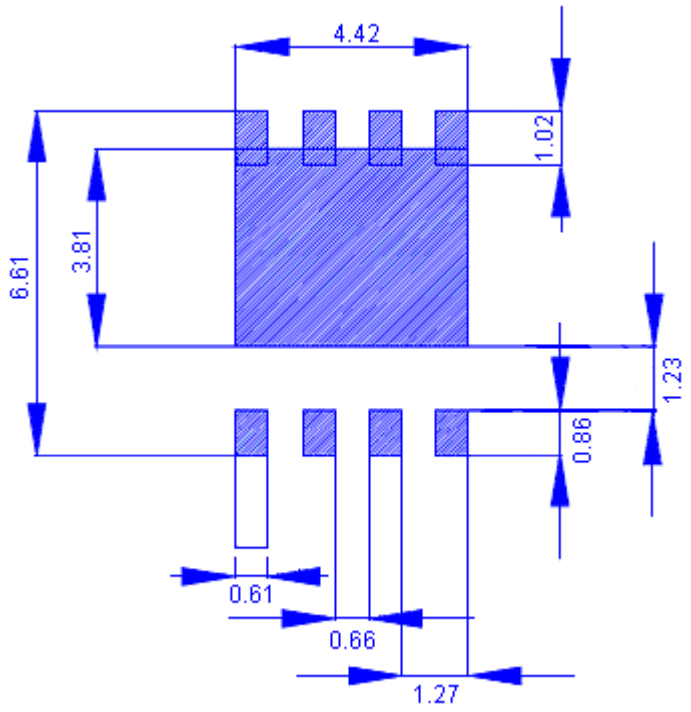
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	30	-	-	V	V_{GS}=0V, I_D=250μA
$V_{GS(th)}$	1.0	-	2.5	V	V_{DS} = V_{GS}, I_D=250μA
G_{FS} *1	-	50	-	S	V_{DS} =5V, I_D=20A
I_{GSS}	-	-	±100	nA	V_{GS}=±20V
I_{DSS}	-	-	1	μA	V_{DS} =24V, V_{GS} =0V
	-	-	25		V_{DS} =20V, V_{GS} =0V, Tj=125°C
$R_{DS(ON)}$ *1	-	2.1	2.9	mΩ	V_{GS} =10V, I_D=30A
	-	2.9	4.0	mΩ	V_{GS} =4.5V, I_D=24A
Dynamic					
Ciss	-	2743	-	pF	V_{GS}=0V, V_{DS}=15V, f=1MHz
Coss	-	495	-		
Crss	-	293	-		

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

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Qg (V_{GS}=10V) *1, 2	-	55.5	-	nC	V_{DS}=15V, V_{GS}=10V, I_D=30A
Qg (V_{GS}=4.5V) *1, 2	-	27.6	-		
Qgs *1, 2	-	9.7	-		
Qgd *1, 2	-	11.5	-		
$t_{d(ON)}$ *1, 2	-	17.6	-	ns	V_{DS}=15V, I_D=24A, V_{GS}=10V, R_{GS}=2.7Ω
tr *1, 2	-	20.2	-		
$t_{d(OFF)}$ *1, 2	-	59	-		
t_f *1, 2	-	13.6	-		
Rg	-	1.2	-	Ω	f=1MHz
Source-Drain Diode					
I_S *1	-	-	60	A	
I_{SM} *3	-	-	200		
V_{SD} *1	-	0.8	1.2	V	I_S=20A, V_{GS}=0V
trr	-	19	-	ns	I_F=24A, dI_F/dt=100A/μs
Qrr	-	10.5	-	nC	

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

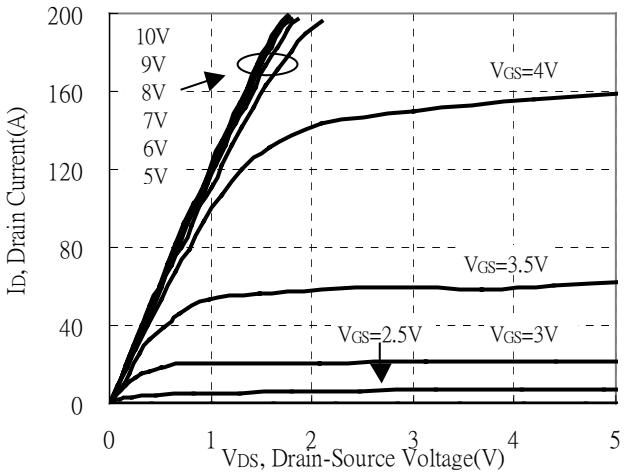
Recommended Soldering Footprint



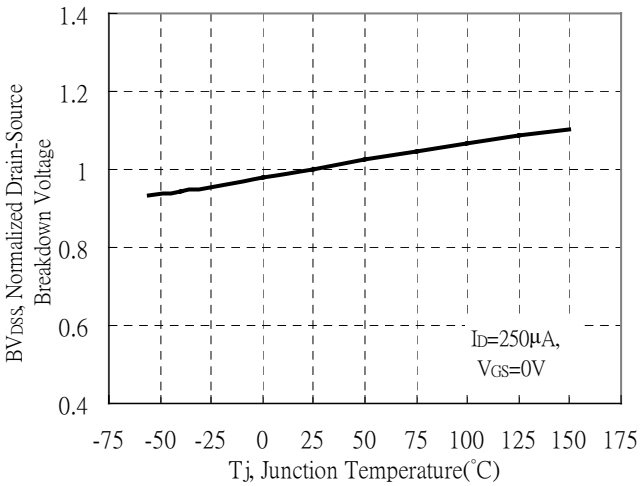
unit : mm

Typical Characteristics

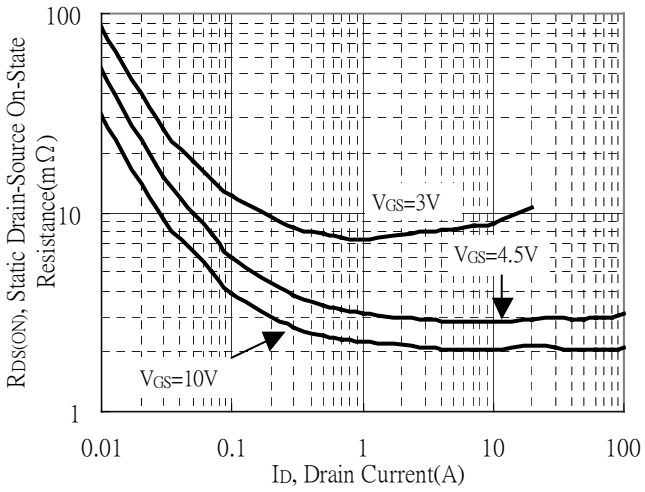
Typical Output Characteristics



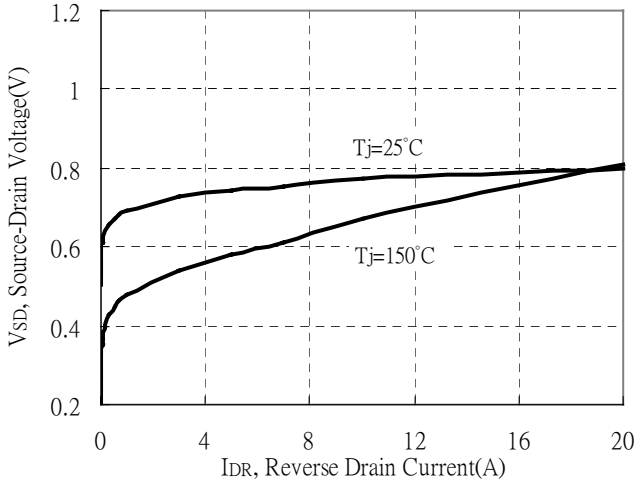
Brekdown Voltage vs Ambient Temperature



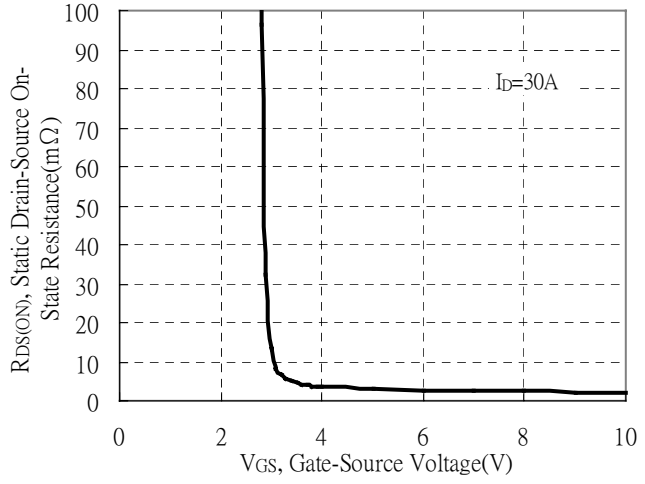
Static Drain-Source On-State resistance vs Drain Current



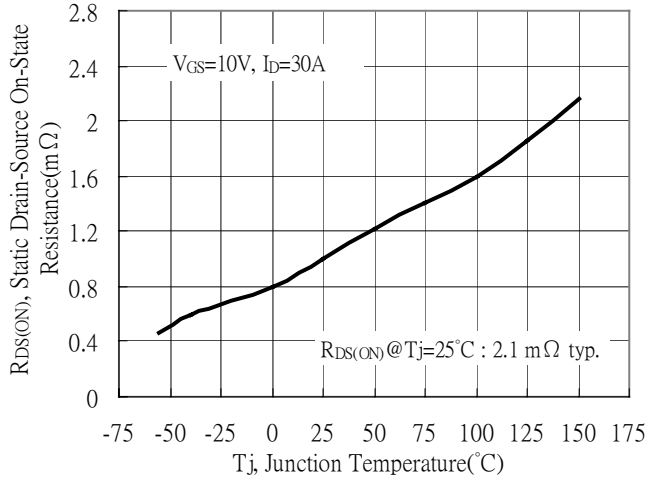
Reverse Drain Current vs Source-Drain Voltage



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

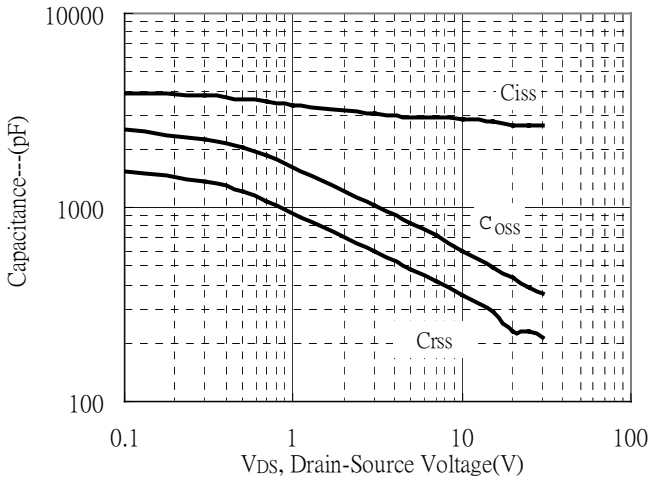


Drain-Source On-State Resistance vs Junction Tempearture

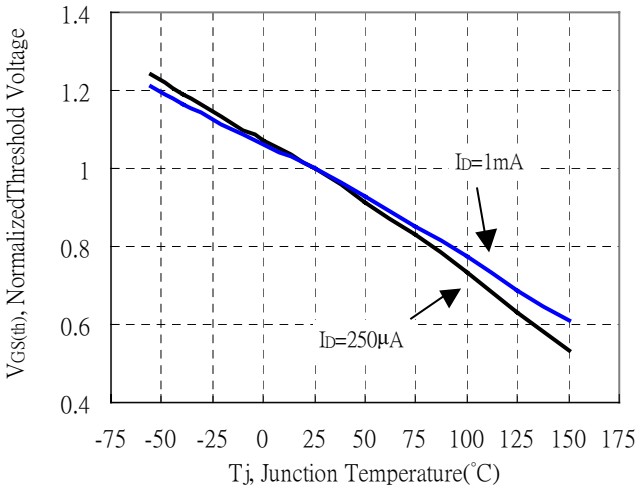


Typical Characteristics(Cont.)

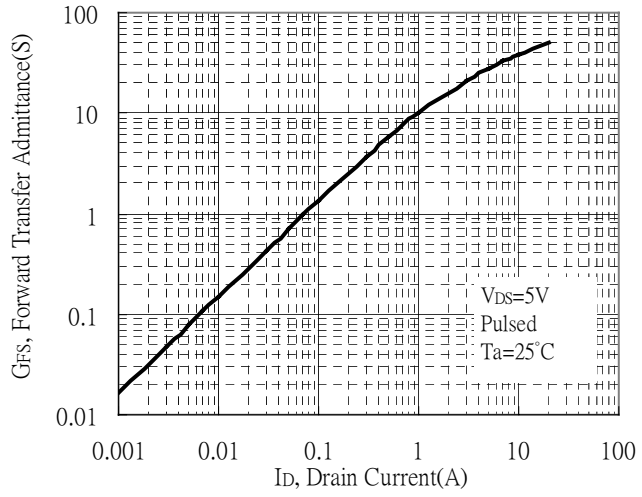
Capacitance vs Drain-to-Source Voltage



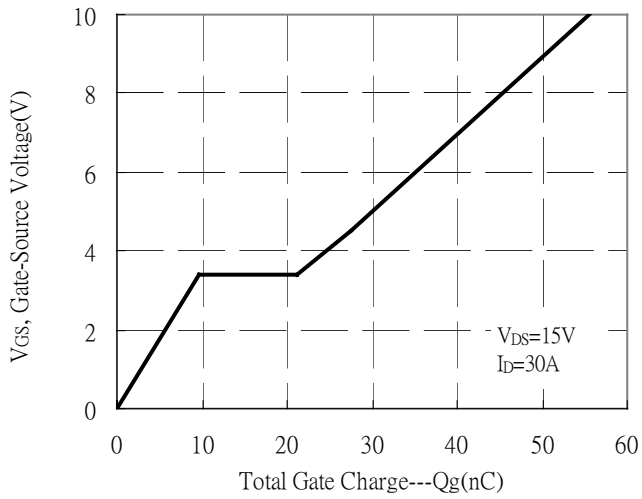
Threshold Voltage vs Junction Tempearture



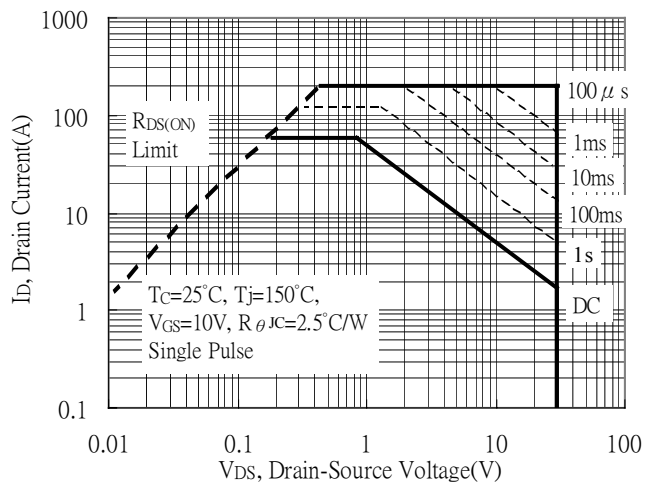
Forward Transfer Admittance vs Drain Current



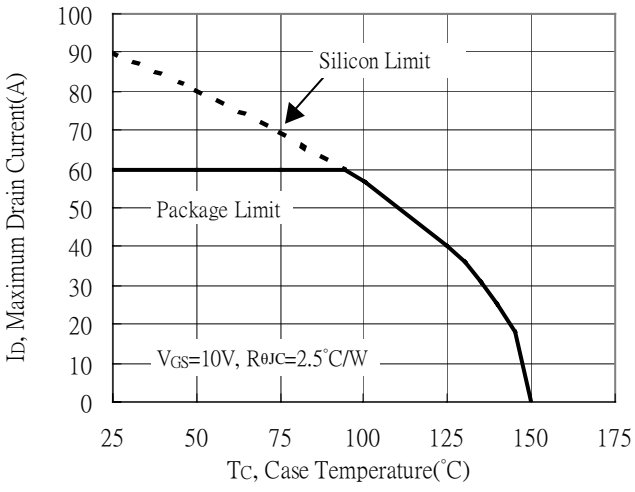
Gate Charge Characteristics



Maximum Safe Operating Area

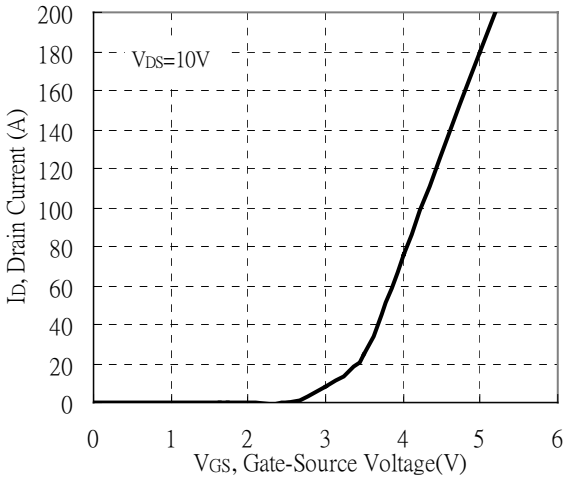


Maximum Drain Current vs Case Temperature

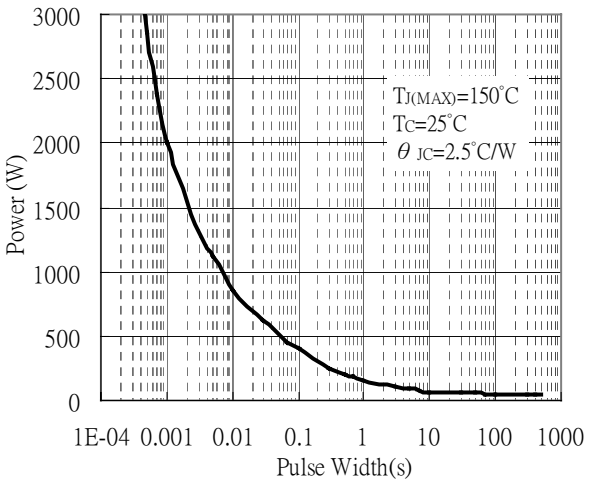


Typical Characteristics(Cont.)

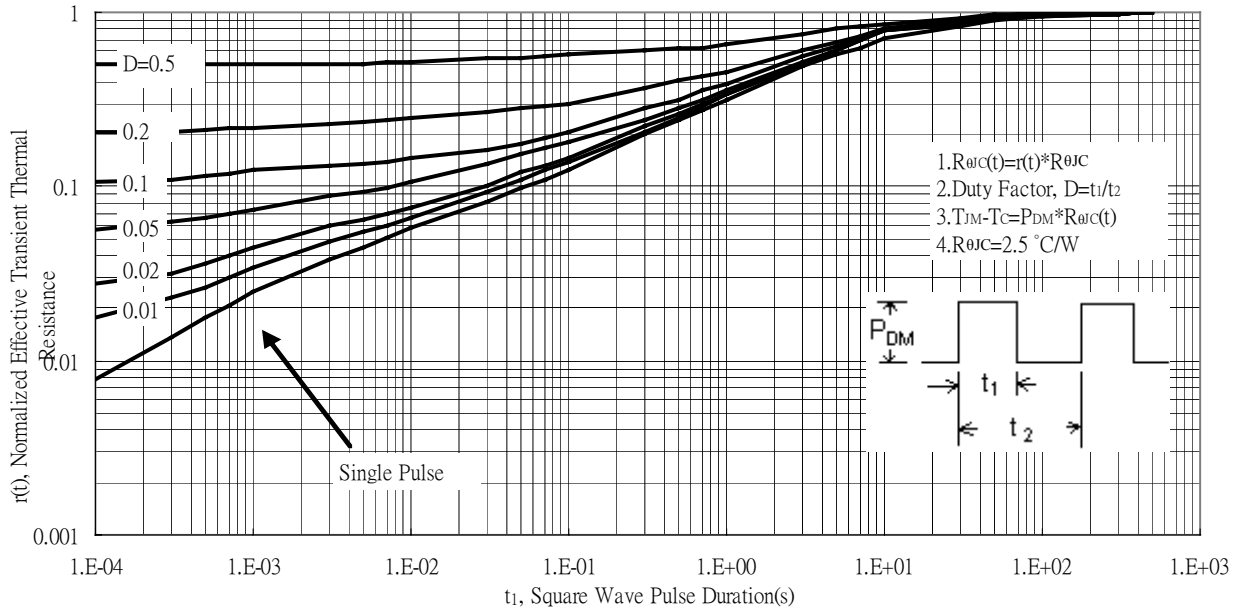
Typical Transfer Characteristics



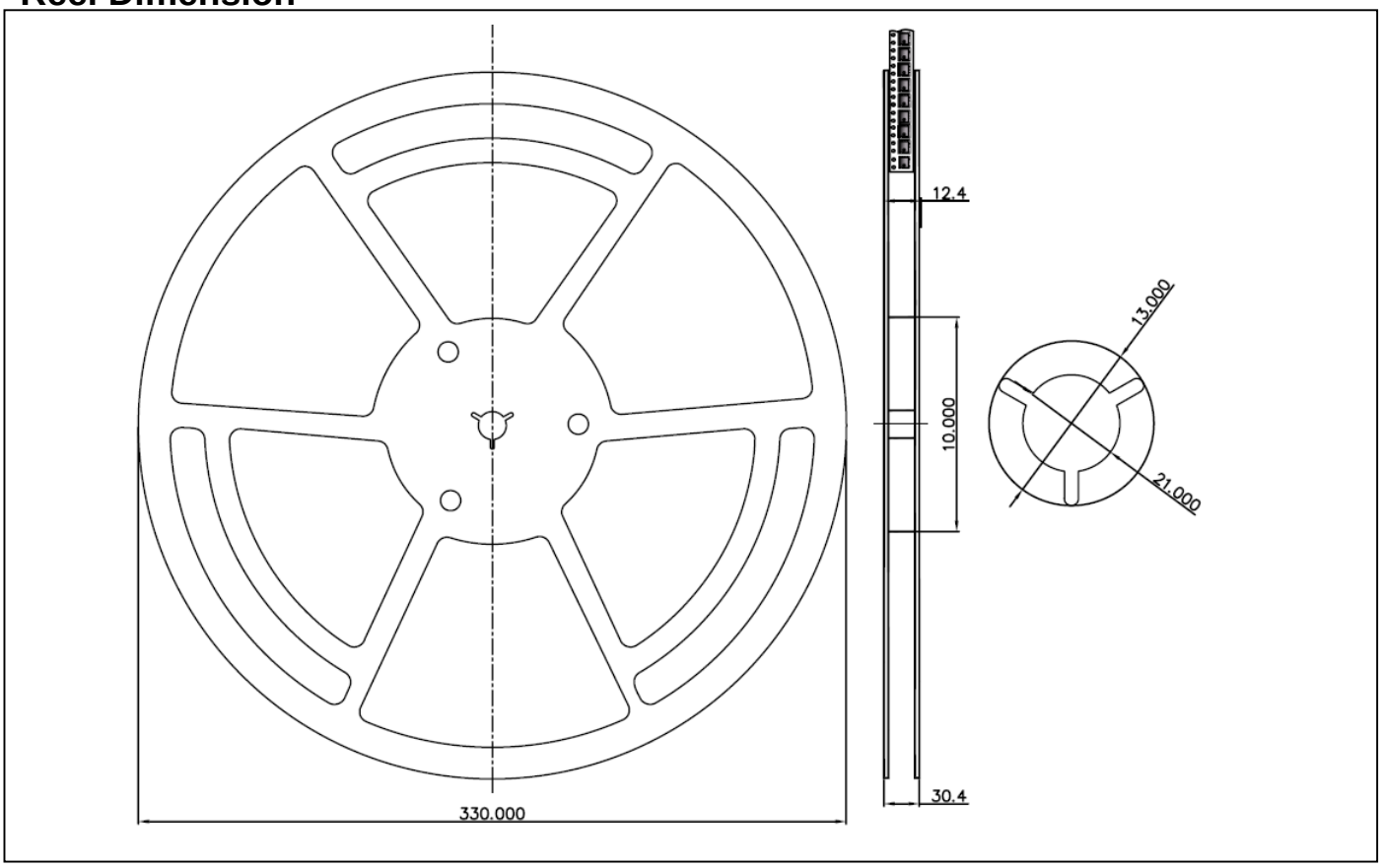
Single Pulse Maximum Power Dissipation



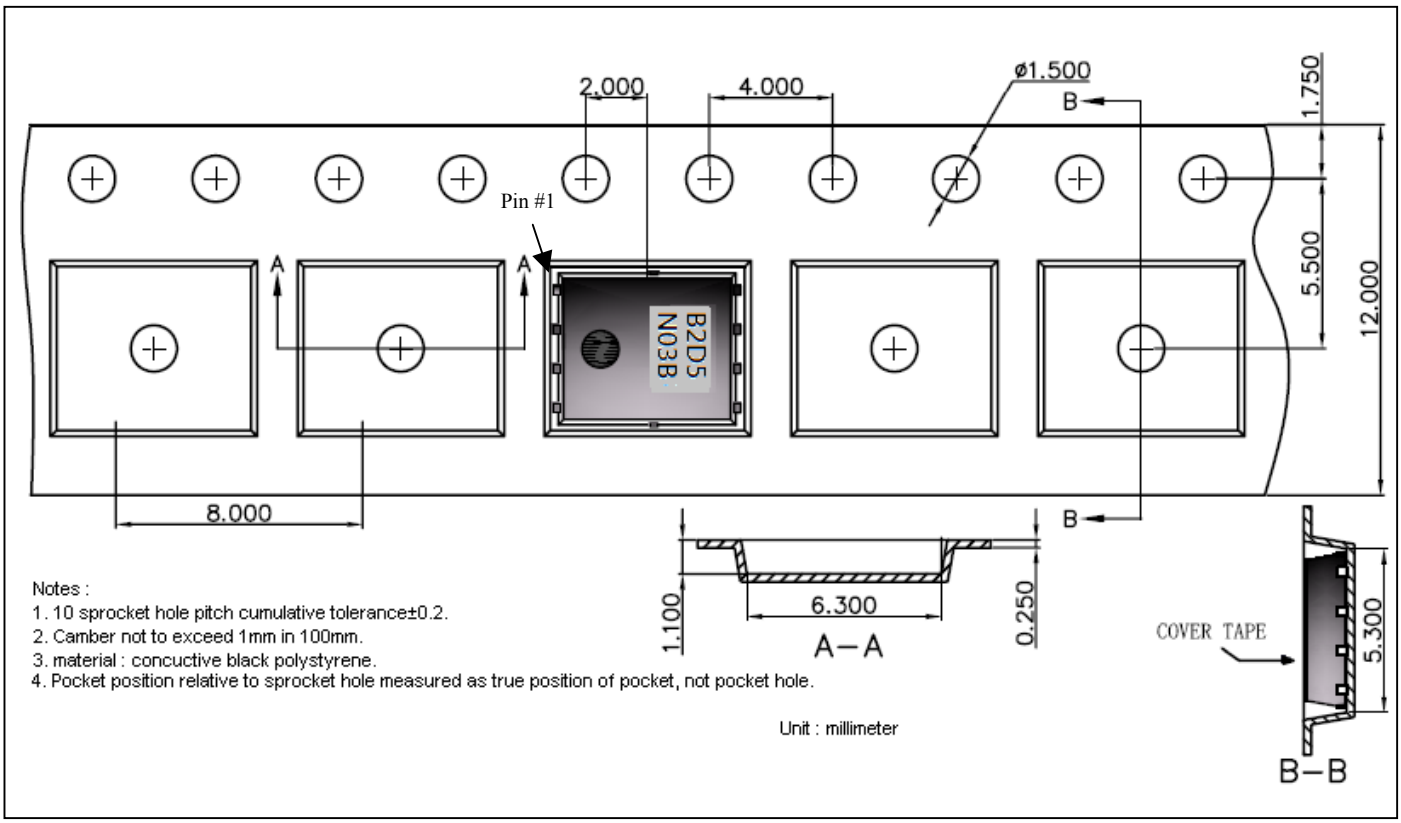
Transient Thermal Response Curves



Reel Dimension



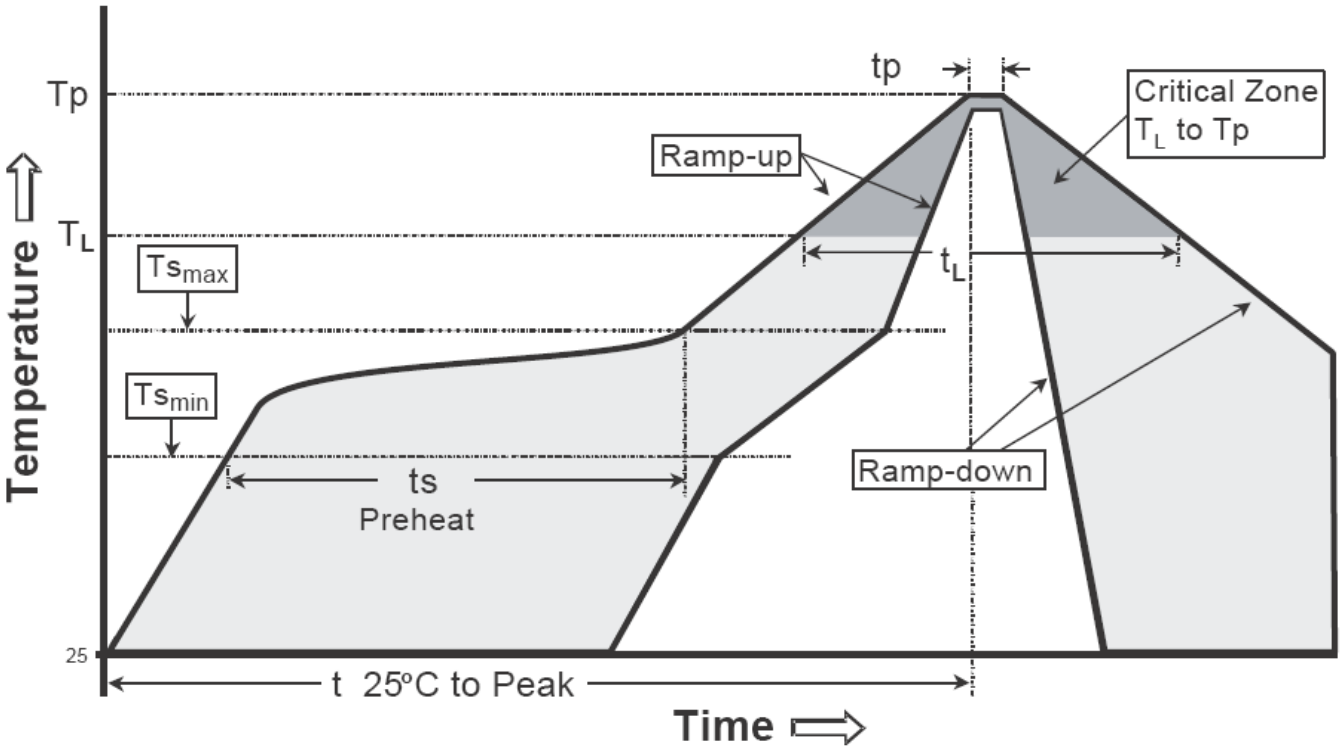
Carrier Tape Dimension



Recommended wave soldering condition

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

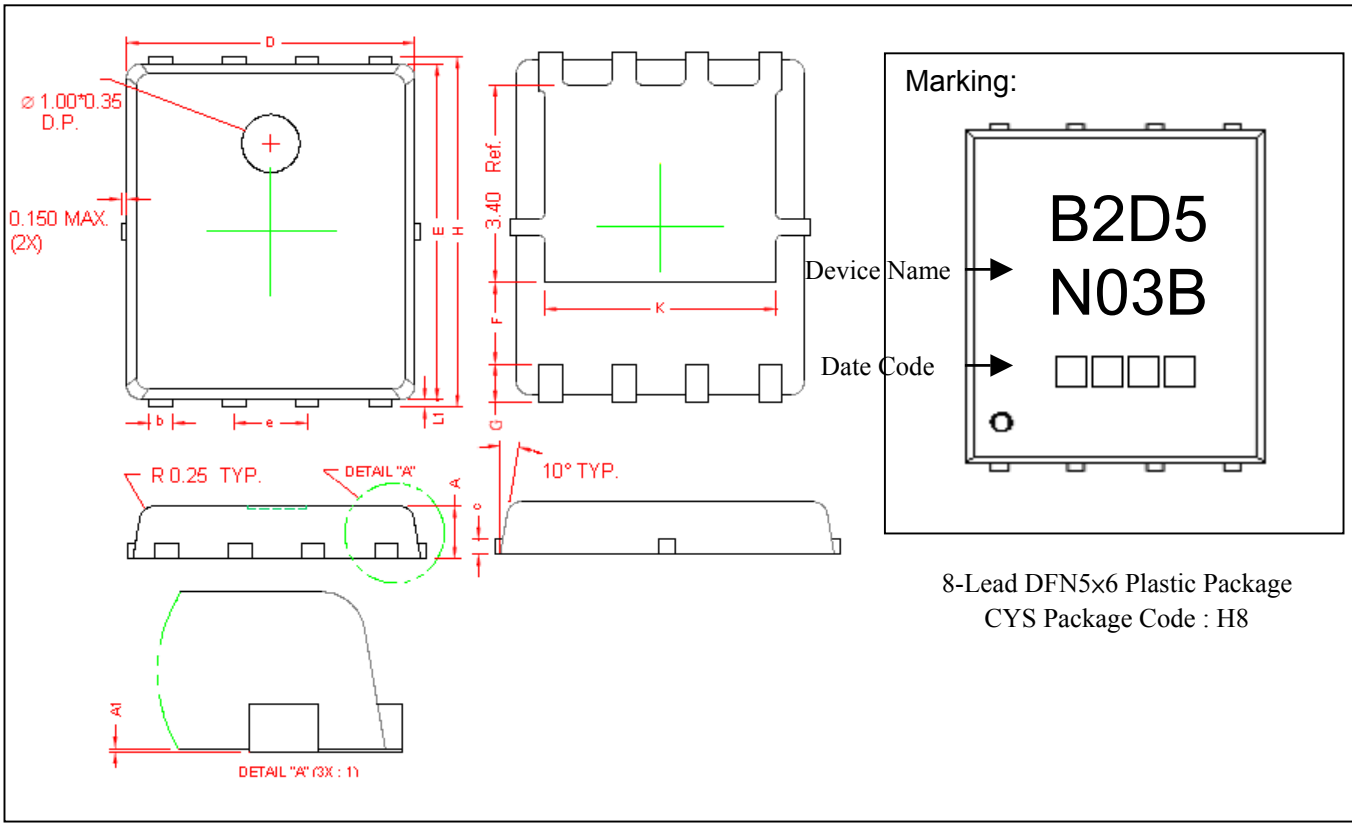
Recommended temperature profile for IR reflow



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($t_{s\ min}$ to $t_{s\ max}$)	 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.

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	0.80	1.00	0.031	0.039	E	5.70	5.90	0.224	0.232
A1	0.00	0.05	0.000	0.002	e	1.27 BSC		0.050 BSC	
b	0.35	0.49	0.014	0.019	H	5.95	6.20	0.234	0.244
c	0.254 REF		0.010 REF		L1	0.10	0.18	0.004	0.007
D	4.90	5.10	0.193	0.201	G	0.60 REF		0.024 REF	
F	1.40 REF		0.055 REF		K	4.00 REF		0.157 REF	

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.