P-Channel Enhancement Mode Power MOSFET

MTD5D0P03H8

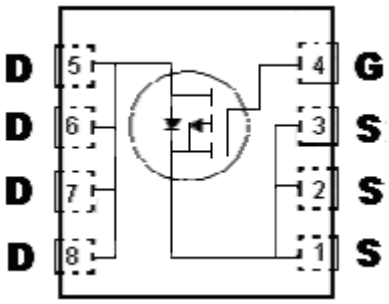
BV_{DSS}		-30V
I_D@V_{GS}=-10V, T_C=25°C		-90A
I_D@V_{GS}=-10V, T_A=25°C		-22A
$R_{DSON(TYP)}$	V_{GS}=-10V, I_D=-25A	3.9mΩ
	V_{GS}=-6V, I_D=-10A	5.6mΩ

Features

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

Symbol

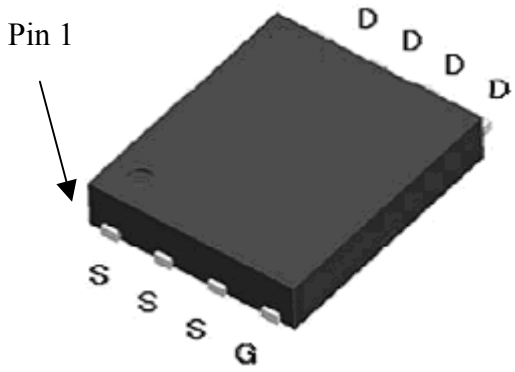
MTD5D0P03H8



G：Gate D：Drain S：Source

Outline

EDFN5×6



Ordering Information

Device	Package	Shipping
MTD5D0P03H8-0-T6-G	DFN5×6 (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	10s	Steady State	Unit
Drain-Source Voltage		V_{DS}	-30		V
Gate-Source Voltage		V_{GS}	±25		
Continuous Drain Current @ T_C=25°C, V_{GS}=-10V (Note1)		I_D	-90		A
Continuous Drain Current @ T_C=100°C, V_{GS}=-10V (Note1)			-57		
Continuous Drain Current @ T_A=25°C, V_{GS}=-10V (Note2)		I_{DSM}	-22	-14.2	
Continuous Drain Current @ T_A=70°C, V_{GS}=-10V (Note2)			-17.6	-11.4	
Pulsed Drain Current (Note3)		I_{DM}	-200 *1,2		
Single Pulse Avalanche Current @ L=0.1mH		I_{AS}	-80		
Avalanche Energy @ L=0.5mH, I_D=-30A, V_{DD}=-15V (Note4)		E_{AS}	225		mJ
Total Power Dissipation	T_C=25℃ (Note1)	P_D	83.3		W
	T_C=100℃ (Note1)		33.3		
	T_A=25°C (Note2)	P_{DSM}	5.0	2.1	
	T_A=70°C (Note2)		3.2	1.3	
Operating Junction and Storage Temperature Range		Tj, Tstg	-55~+150		°C

Thermal Data

Parameter		Symbol	Typical	Maximum	Unit
Thermal Resistance, Junction-to-case		$R_{th,j-c}$	1	1.5	°C/W
Thermal Resistance, Junction-to-ambient (Note2)	t≤10s	$R_{th,j-a}$	18	25	°C/W
	Steady State		50	60	

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 power dissipation P_{DSM} is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.

3. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C. Ratings are based on low frequency and low duty cycles to keep initial T_J=25°C.

4. 100% tested by conditions of L=0.5mH, V_{GS}=-10V, I_{AS}=-26A, V_{DD}=-15V

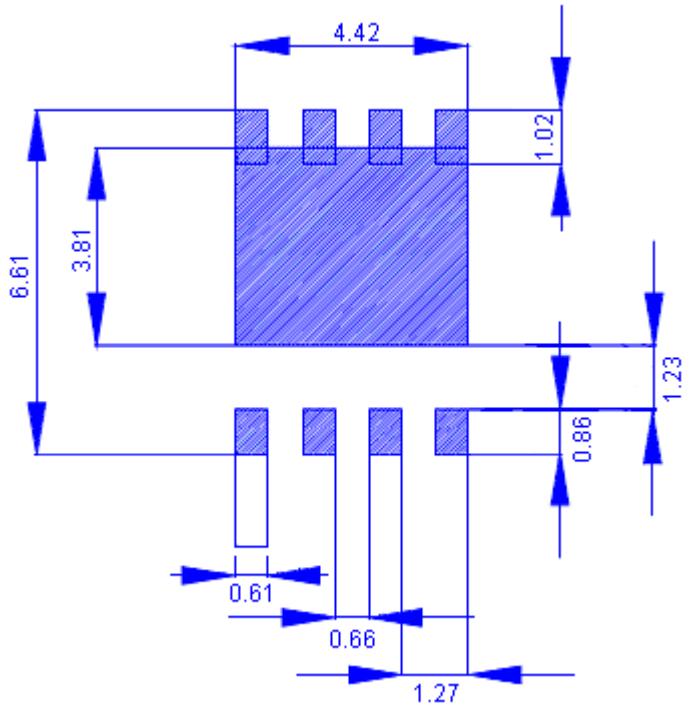
Characteristics (T_C=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	-30	-	-	V	V_{GS}=0V, I_D=-250μA
$V_{GS(th)}$	-1.5	-	-3.0	V	V_{DS} = V_{GS}, I_D=-250μA
G_{FS} *1	-	32.2	-	S	V_{DS} =-10V, I_D=-20A
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	-1	μA	V_{DS} =-24V, V_{GS} =0V
	-	-	-25		V_{DS} =-24V, V_{GS} =0, Tj=125°C
$R_{DS(ON)}$ *1	-	3.9	5.5	mΩ	V_{GS} =-10V, I_D=-25A
	-	5.6	12	mΩ	V_{GS} =-6V, I_D=-10A

Dynamic *4					
Ciss	-	5607	-	pF	V_{DS}=-15V, V_{GS}=0V, f=1MHz
Coss	-	943	-		
Crss	-	429	-		
Qg *1, 2	-	91.2	-	nC	V_{DS}=-15V, V_{GS}=-10V, I_D=-25A
Qgs *1, 2	-	23.3	-		
Qgd *1, 2	-	23.3	-		
$t_{d(ON)}$ *1, 2	-	30	-	ns	V_{DS}=-15V, I_D=-25A, V_{GS}=-10V, R_G=1Ω
tr *1, 2	-	24.2	-		
$t_{d(OFF)}$ *1, 2	-	88.2	-		
t_f *1, 2	-	26.2	-		
Rg	-	3.6	-	Ω	f=1MHz
Source-Drain Diode					
V_{SD} *1	-	-0.83	-1.2	V	I_S=-25A, V_{GS}=0V
trr	-	31.2	-	ns	I_F=-25A, dI_F/dt=100A/μs
Qrr	-	24.7	-	nC	

Note : *1.Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%
*2.Independent of operating temperature
*3.Pulse width limited by maximum junction temperature.
*4.Guaranteed by design, not subject to production testing.

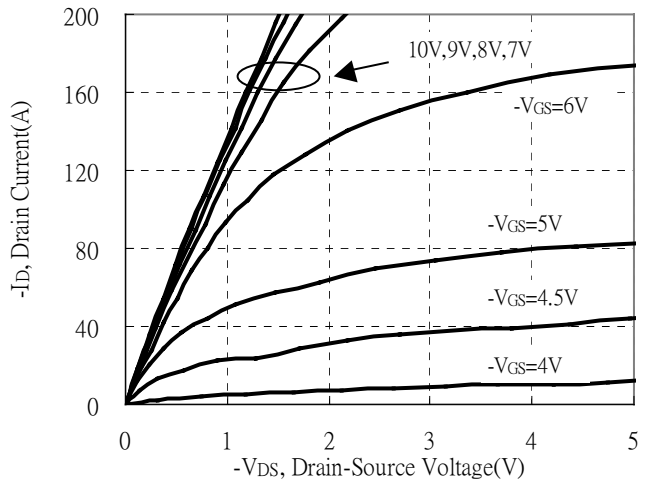
Recommended Soldering Footprint



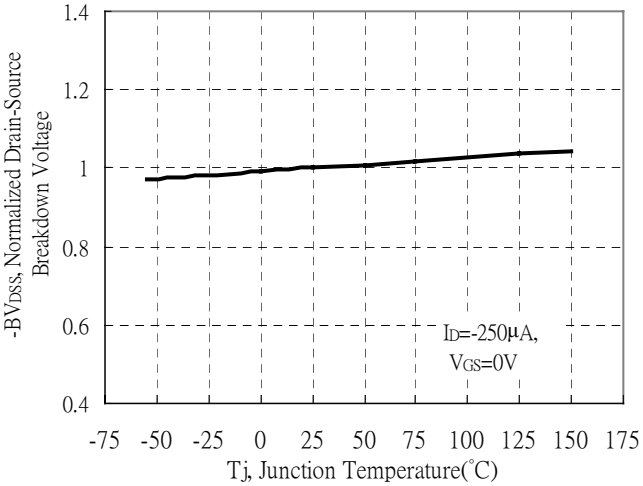
unit : mm

Typical Characteristics

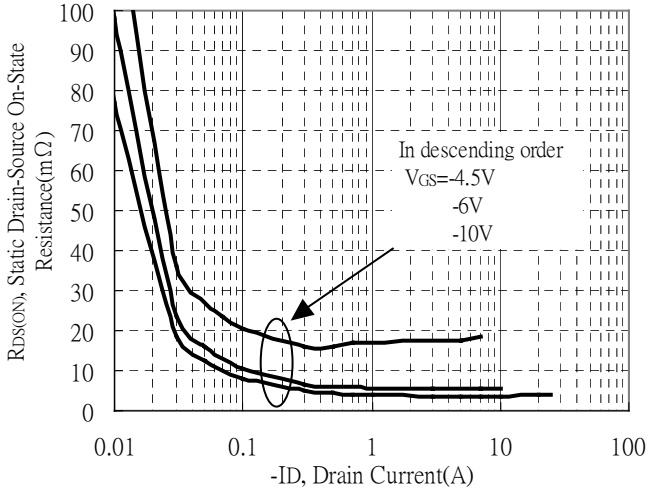
Typical Output Characteristics



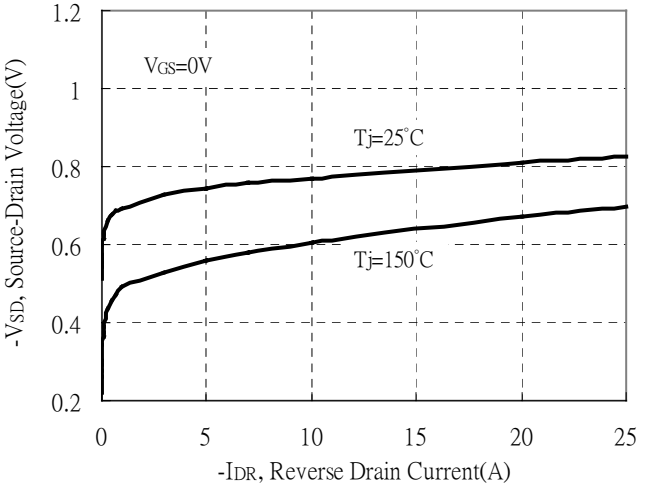
Brekdown Voltage vs Ambient Temperature



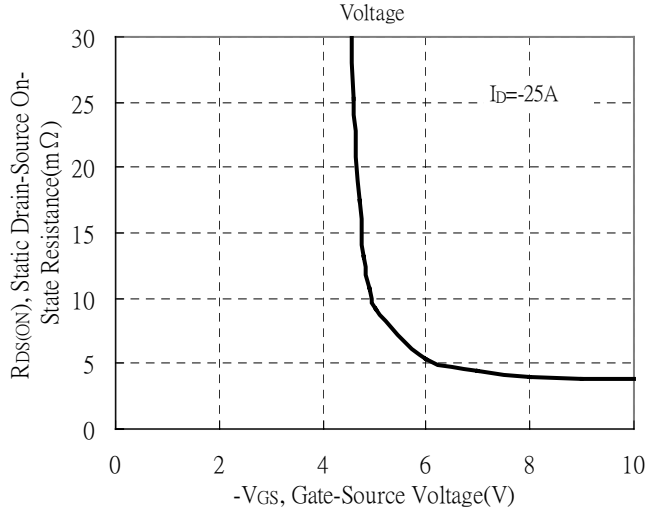
Static Drain-Source On-State resistance vs Drain Current



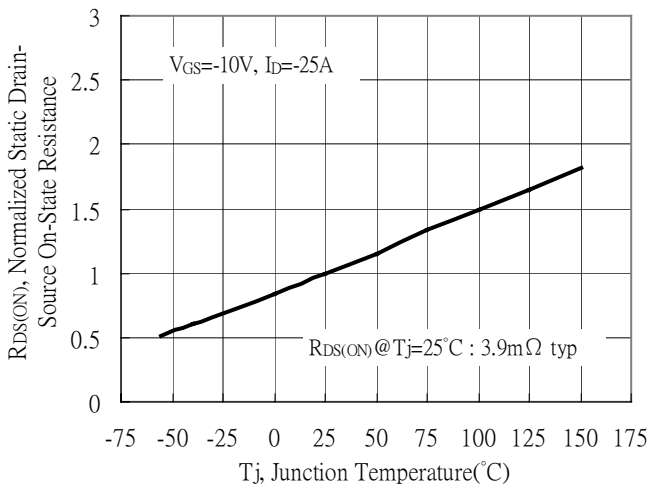
Reverse Drain Current vs Source-Drain Voltage



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

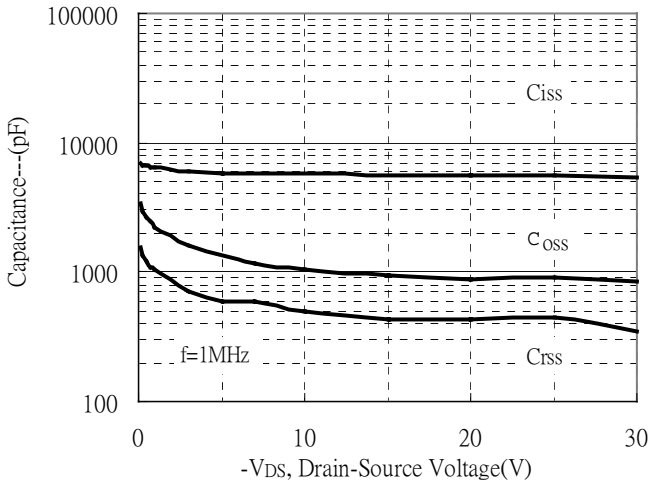


Drain-Source On-State Resistance vs Junction Tempearture

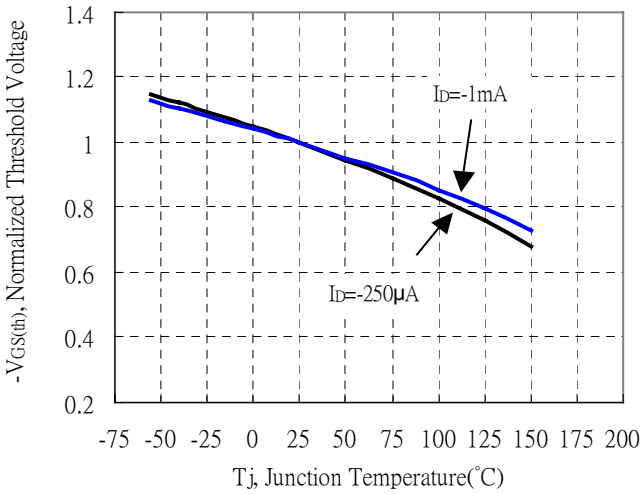


Typical Characteristics(Cont.)

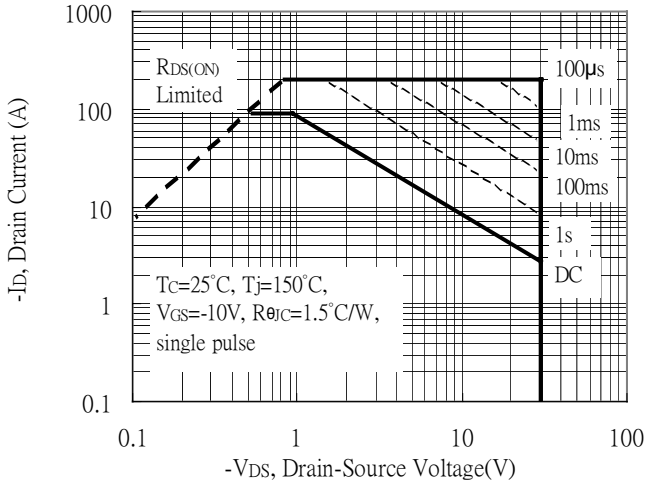
Capacitance vs Drain-to-Source Voltage



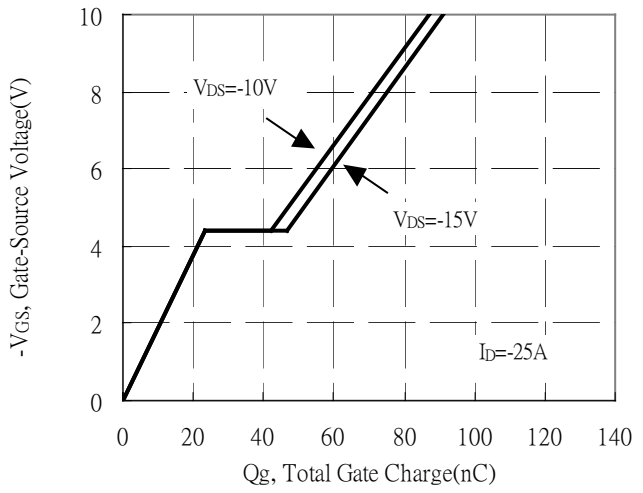
Threshold Voltage vs Junction Tempearture



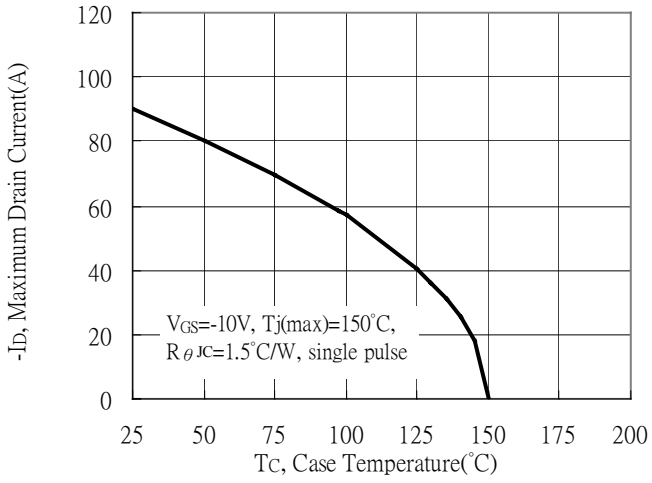
Maximum Safe Operating Area



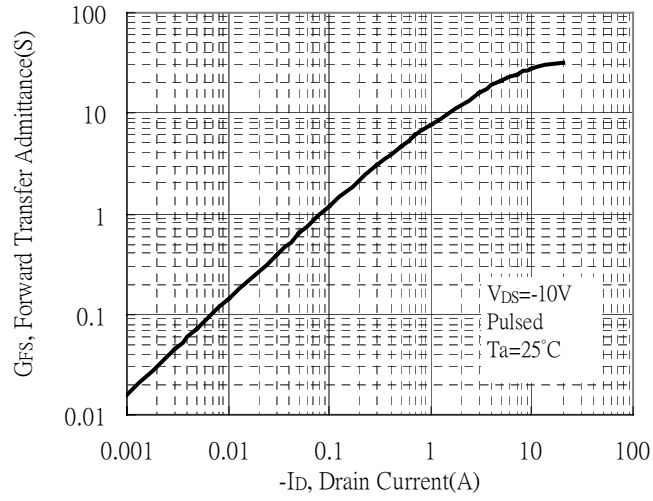
Gate Charge Characteristics



Maximum Drain Current vs Case Temperature

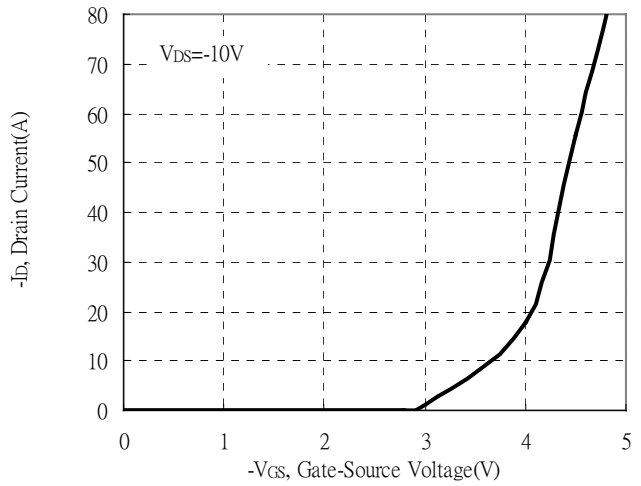


Forward Transfer Admittance vs Drain Current

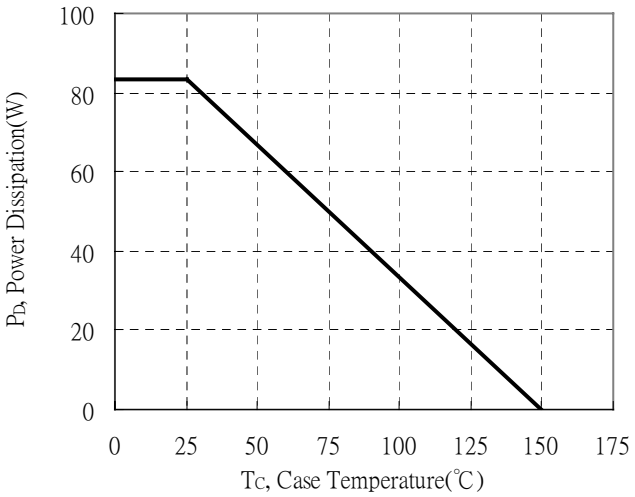


Typical Characteristics(Cont.)

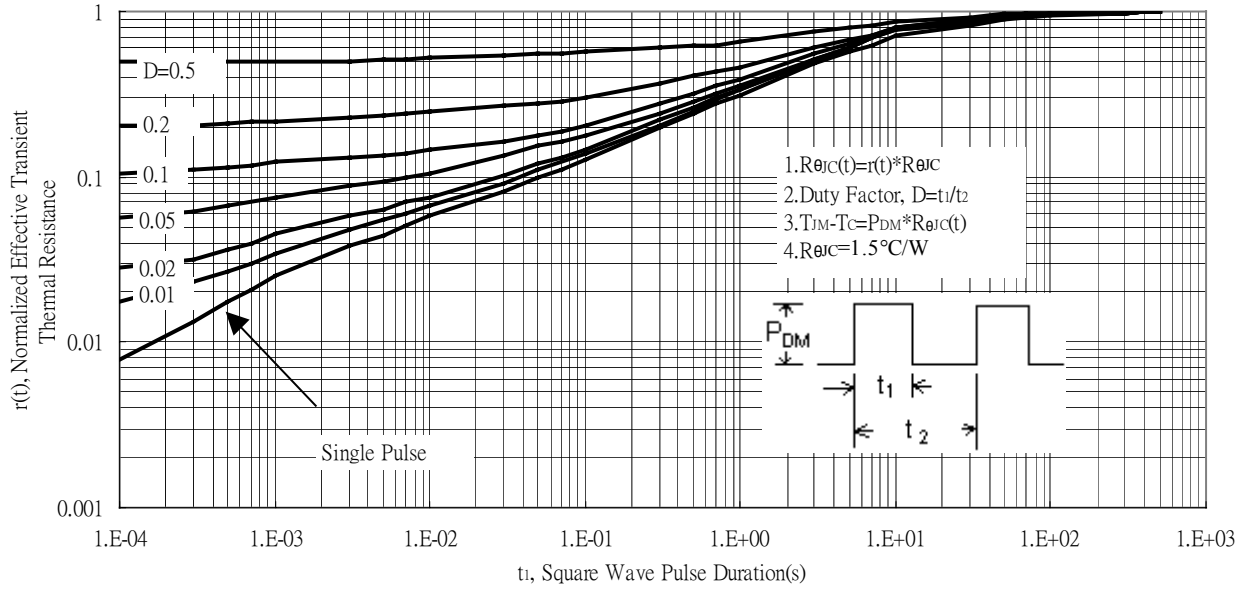
Typical Transfer Characteristics



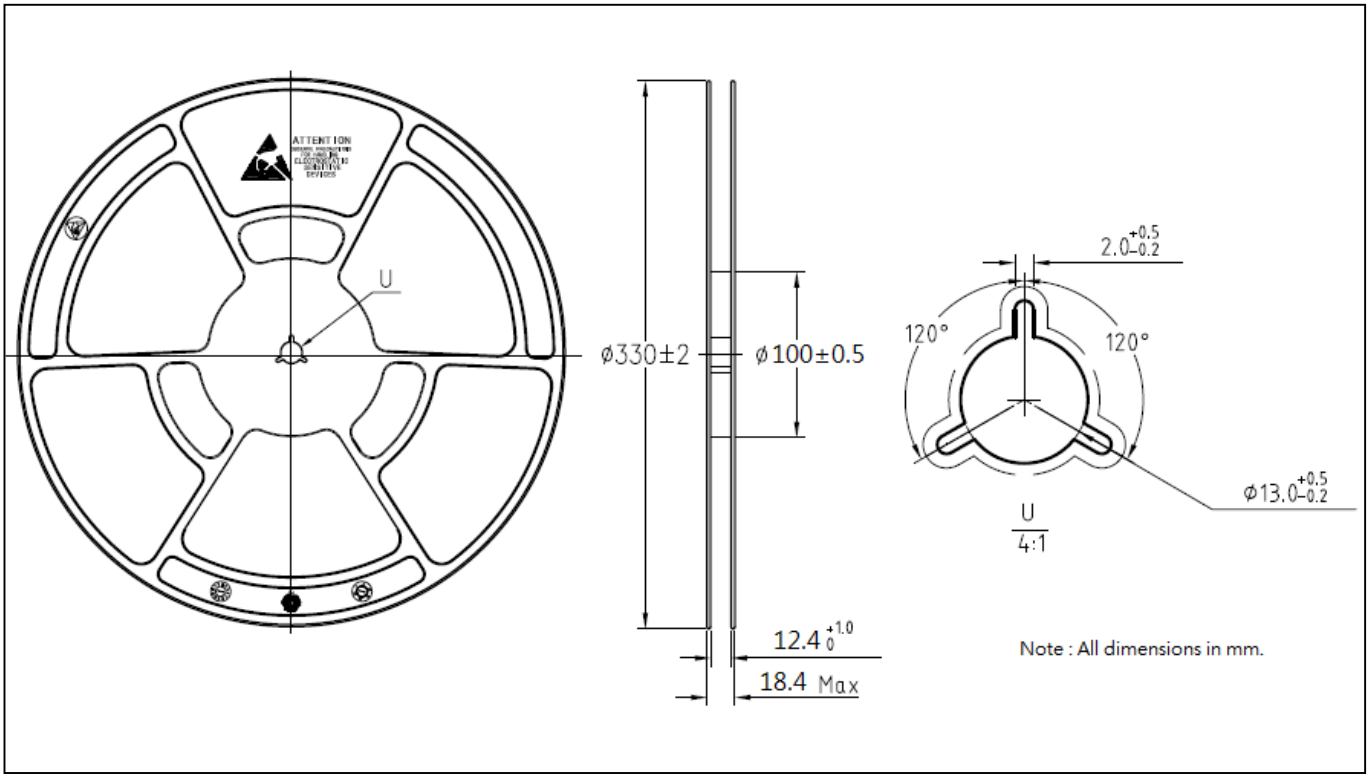
Power Derating Curve



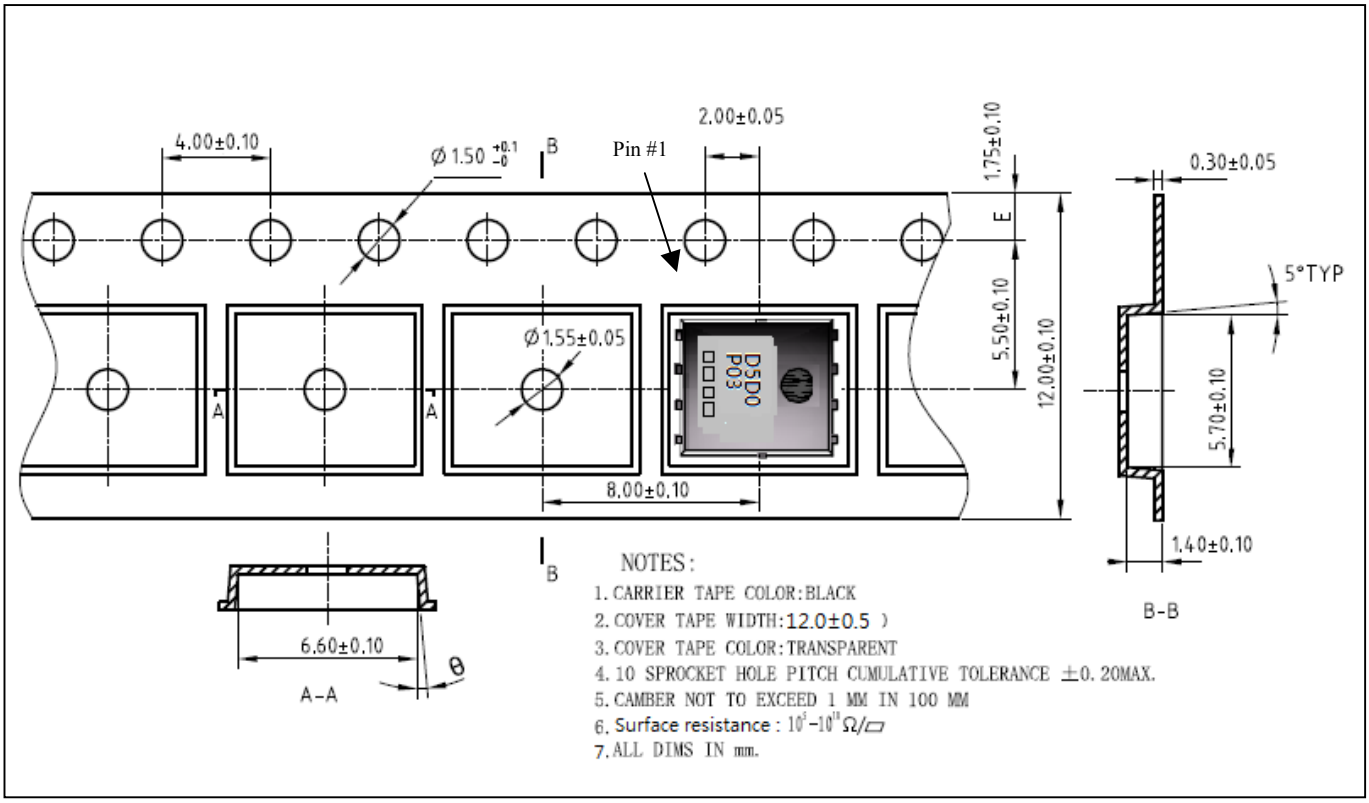
Transient Thermal Response Curves



Reel Dimension



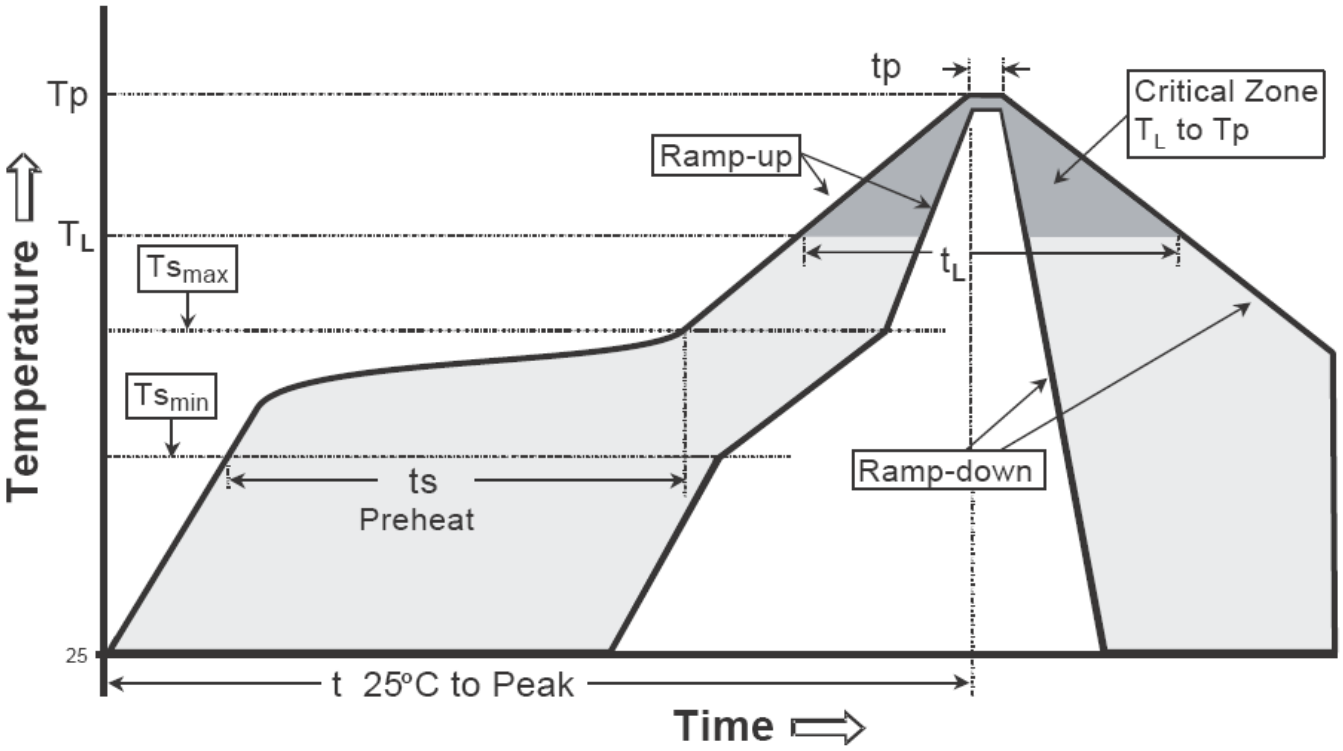
Carrier Tape Dimension



Recommended wave soldering condition

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

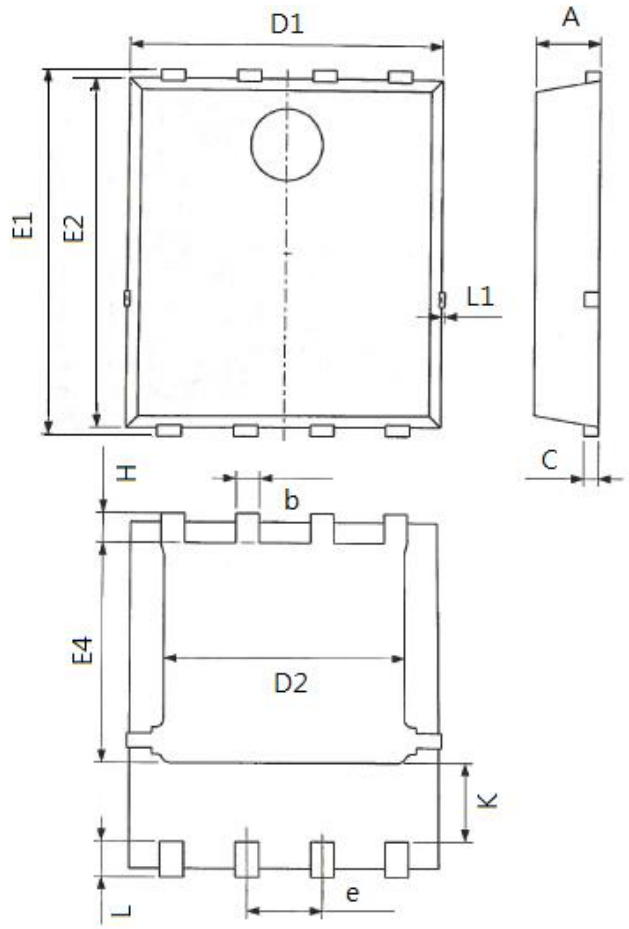
Recommended temperature profile for IR reflow



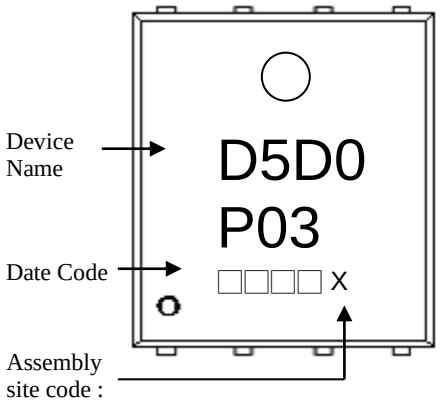
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature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



Marking :



Date Code(counting from left to right) :
1st code: year code, the last digit of Christian year
2nd code : month code, Jan→A, Feb→B, Mar→C, Apr→D
May→E, Jun→F, Jul→G, Aug→H, Sep→J,
Oct→K, Nov→L, Dec→M
3rd and 4th codes : production serial number, 01~99

8-Lead DFN5×6 Plastic Package
CYS Package Code : H8

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.900	1.200	0.0354	0.0472	E2	5.660	6.060	0.2228	0.2386
b	0.300	0.510	0.0118	0.0201	E4	3.380	3.920	0.1331	0.1543
C	0.154	0.354	0.0061	0.0139	H	0.400	0.610	0.0157	0.0240
D1	4.800	5.400	0.1890	0.2126	K	1.100	1.450	0.0453	0.0571
D2	3.670	4.250	0.1445	0.1673	L	0.300	0.710	0.0118	0.0280
e	1.270 TYP		0.0500 TYP		L1	0.000	0.120	0.0000	0.0047
E1	5.900	6.350	0.2322	0.2500					

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.