N- and P-Channel Enhancement Mode MOSFET

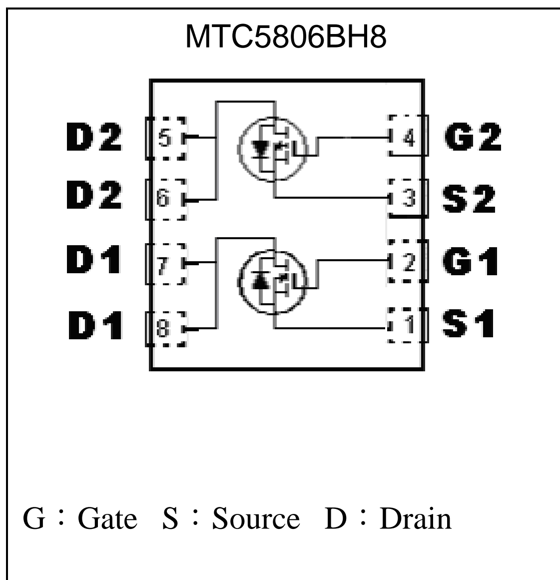
MTC5806BH8

	N-CH	P-CH
BV_{DSS}	60V	-60V
I_D@V_{GS}=10V(-10V), T_A=25°C	5.2A	-4.0A
I_D@V_{GS}=10V(-10V), T_C=25°C	23.6A	-18.2A
$R_{DSON(typ)}$@V_{GS}=10V(-10V)	33mΩ	82mΩ
$R_{DSON(typ)}$@V_{GS}=4.5V(-4.5V)	36mΩ	92mΩ

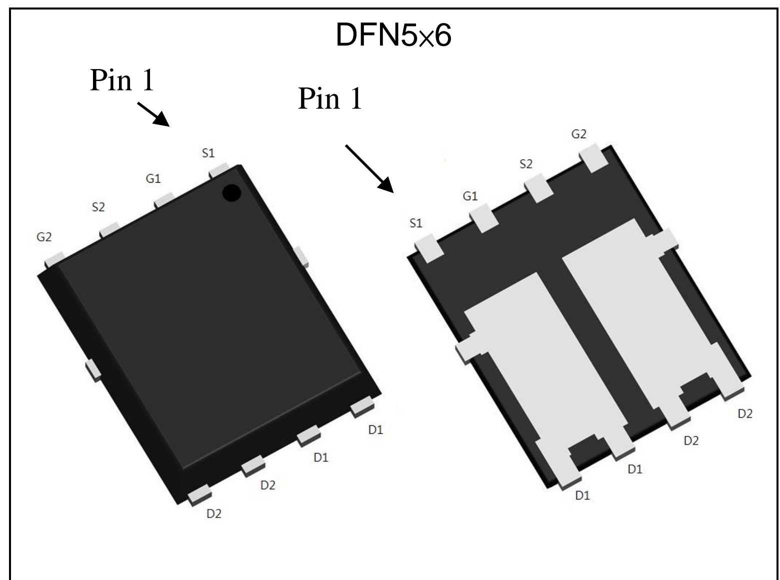
Features

- Simple drive requirement
- Low on-resistance
- Fast switching speed
- Pb-free lead plating and halogen-free package

Equivalent Circuit

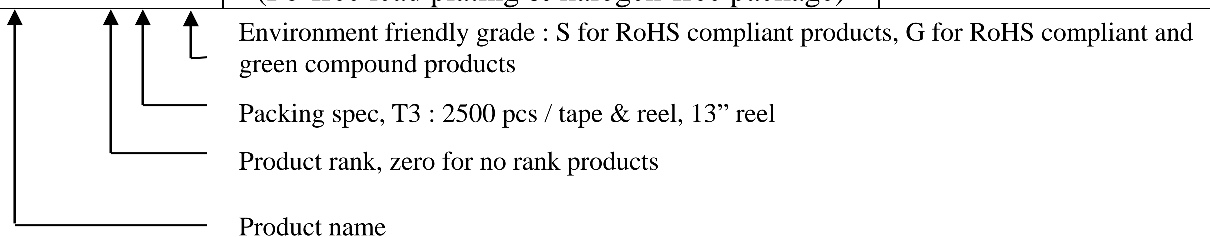


Outline



Ordering Information

Device	Package	Shipping
MTC5806BH8-0-T6-G	DFN 5 x6 (Pb-free lead plating & halogen-free package)	3000 pcs / Tape & Reel



Absolute Maximum Ratings (Tc=25°C, unless otherwise noted)

Parameter		Symbol	Limits		Unit
			N-channel	P-channel	
Drain-Source Breakdown Voltage		BV_{DSS}	60	-60	V
Gate-Source Voltage		V_{GS}	±20	±20	V
Continuous Drain Current	T_A=25 °C, V_{GS}=10V (-10V)	I_{DSM}	5.2	-4.0	A
	T_A=70 °C, V_{GS}=10V (-10V)		4.2	-3.2	
	T_C=25 °C, V_{GS}=10V (-10V)	I_D	23.6	-18.2	
	T_C=100 °C, V_{GS}=10V (-10V)		15.0	-11.5	
Pulsed Drain Current (Note 1 & 2)		I_{DM}	35	-27	
Single Pulse Avalanche Current @ L=0.1mH		I_{AS}	20	-20	
Single Pulse Avalanche Energy (Note 4)		E_{AS}	32	32	mJ
Power Dissipation	T_A=25 °C	P_{DSM}	2.0 (Note 3)		W
	T_A=70 °C		1.3 (Note 3)		
	T_C=25 °C	P_D	41.7		
	T_C=100 °C		16.7		
Operating Junction and Storage Temperature Range		Tj; Tstg	-55~+150		°C

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{\theta JC}$	3	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{\theta JA}$	62 (Note 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. For N-channel, L=1mH, V_{DD}=25V, V_{GS}=10V, I_{AS}=8A; for P-channel, L=1mH, V_{DD}=-25V, V_{GS}=-10V, I_{AS}=-8A

N-Channel Electrical Characteristics (Tc=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	60	-	-	V	V_{GS}=0V, I_D=250μA
$V_{GS(th)}$	1.0	-	2.5	V	V_{DS}=V_{GS}, I_D=250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	1	μA	V_{DS}=48V, V_{GS}=0V
	-	-	25		V_{DS}=48V, V_{GS}=0, Tj=125°C
*$R_{DS(ON)}$	-	33	46	mΩ	I_D=8A, V_{GS}=10V
	-	36	54		I_D=4A, V_{GS}=4.5V
*G_{FS}	-	6.1	-	S	V_{DS}=10V, I_D=5A
Dynamic					
Ciss	-	756	1134	pF	V_{DS}=30V, V_{GS}=0V, f=1MHz
Coss	-	50	-		
Crss	-	44	-		

*td(ON)	-	10.6	-	ns	VDS=30V, ID=1A, VGS=10V, RG=6Ω
*tr	-	9.6	-		
*td(OFF)	-	45.4	-		
*tf	-	7.2	-		
*Qg	-	18.4	27.6	nC	VDS=48V, ID=4.5A, VGS=10V
*Qgs	-	2.6	-		
*Qgd	-	4.2	-		
Rg	-	3.3	-	Ω	f=1MHz
Body Diode					
*IS	-	-	5.2	A	
*ISM	-	-	20		
*VSD	-	0.75	1	V	VGS=0V, IS=1A
*trr	-	13.1	-	ns	IF=1.3A, dIF/dt=100A/µs
*Qrr	-	8.1	-	nC	

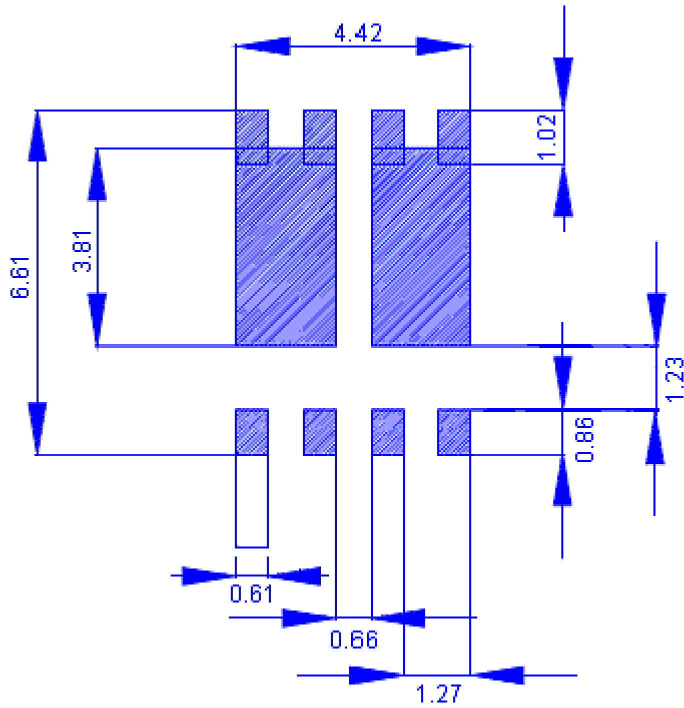
*Pulse Test : Pulse Width ≤300µs, Duty Cycle≤2%

P-Channel Electrical Characteristics (Tc=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BVDSS	-60	-	-	V	VGS=0V, ID=-250µA
VGS(th)	-1.0	-	-2.5		VDS=VGS, ID=-250µA
IGSS	-	-	±100	nA	VGS=±20V, VDS=0V
IDSS	-	-	-1	µA	VDS=-48V, VGS=0V
	-	-	-25		VDS=-48V, VGS=0V, Tj=125°C
*RDS(ON)	-	80	104	mΩ	ID=-4A, VGS=-10V
	-	92	120		ID=-2A, VGS=-4.5V
*GFS	-	5.6	-	S	VDS=-10V, ID=-4A
Dynamic					
Ciss	-	1057	1586	pF	VDS=-30V, VGS=0V, f=1MHz
Coss	-	51	-		
Crss	-	42	-		
*td(ON)	-	11.2	-	ns	VDS=-30V, ID=-1A, VGS=-10V, RG=6Ω
*tr	-	20.6	-		
*td(OFF)	-	84.4	-		
*tf	-	52.2	-		
*Qg	-	20.2	30.3	nC	VDS=-48V, ID=-3.5A, VGS=-10V
*Qgs	-	3.5	-		
*Qgd	-	3.9	-		
Rg	-	19.5	-	Ω	f=1MHz
Body Diode					
*IS	-	-	-4	A	
*ISM	-	-	-20		
*VSD	-	-0.77	-1	V	VGS=0V, IS=-1A
*trr	-	13.4	-	ns	IF=-1.3A, dIF/dt=100A/µs
*Qrr	-	8.9	-	nC	

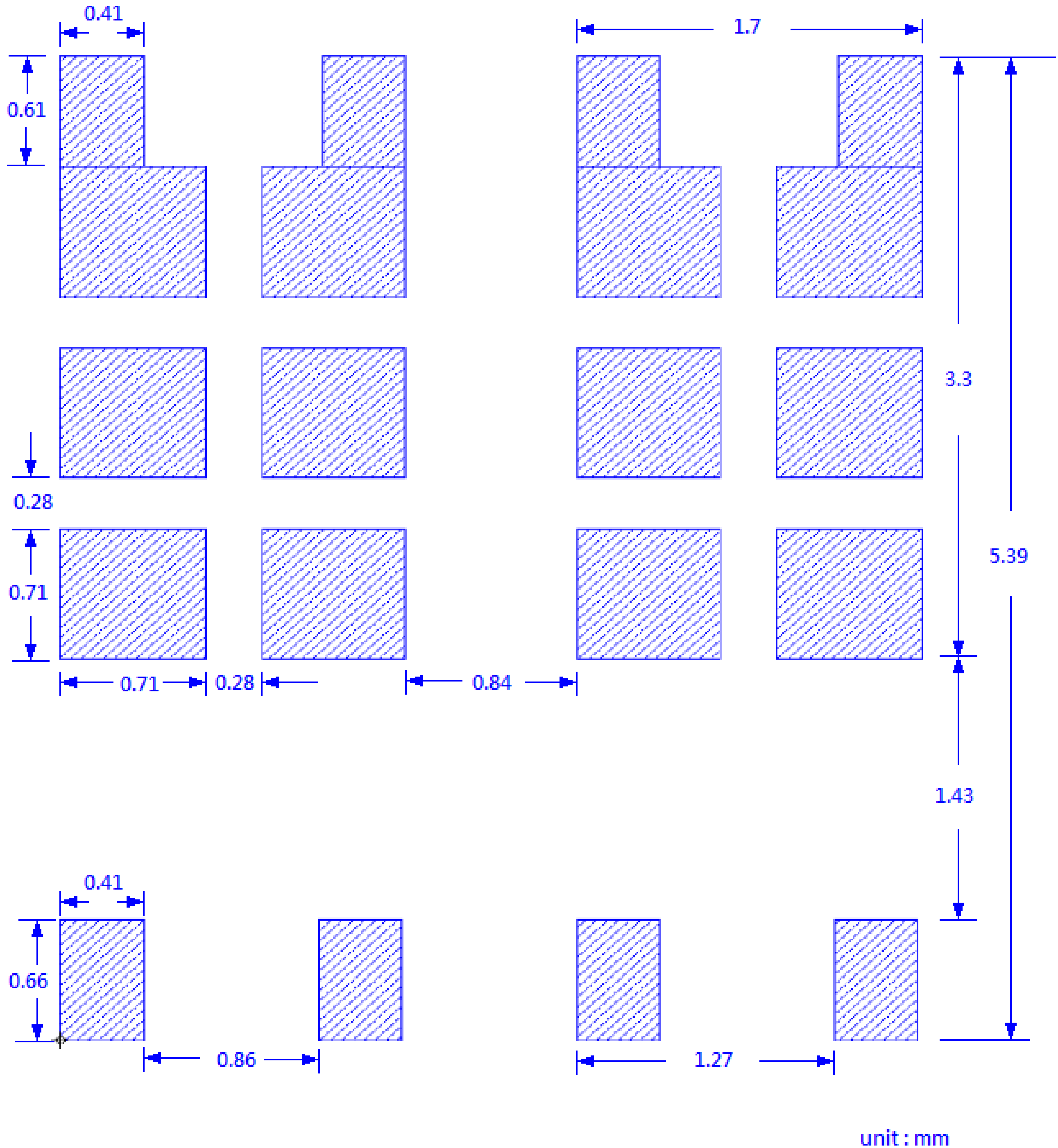
*Pulse Test : Pulse Width ≤300µs, Duty Cycle≤2%

Recommended Soldering Footprint



unit : mm

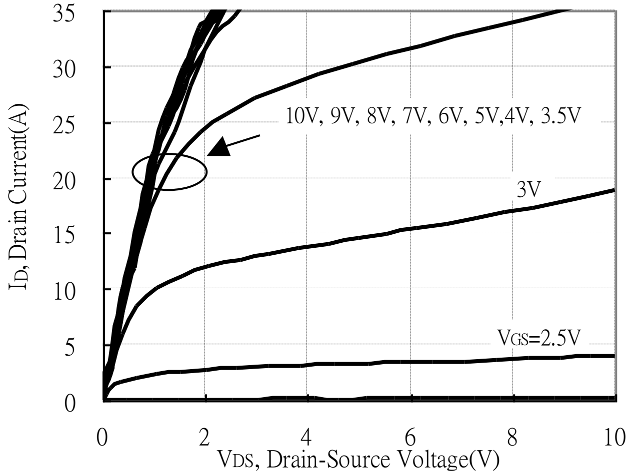
Recommended Stencil Design

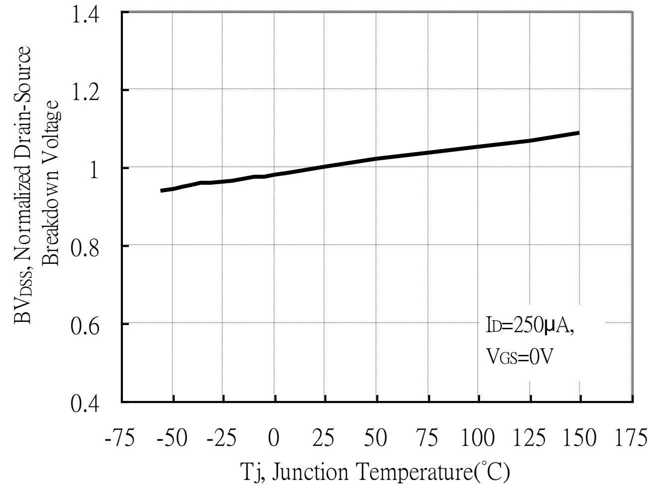


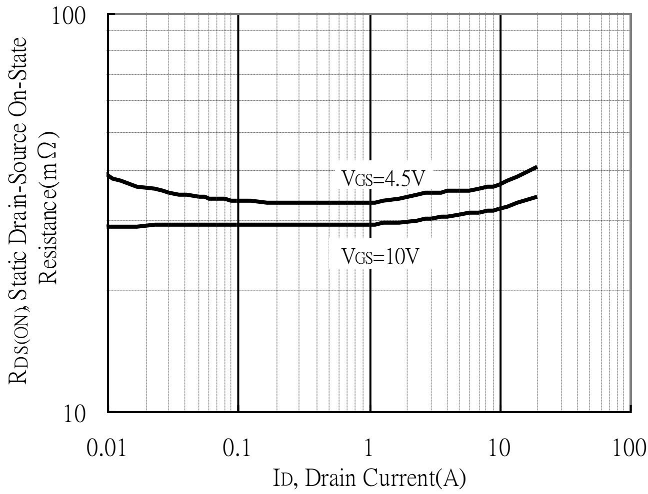
Note : 1. Stencil thickness 5 mil (0.127mm)

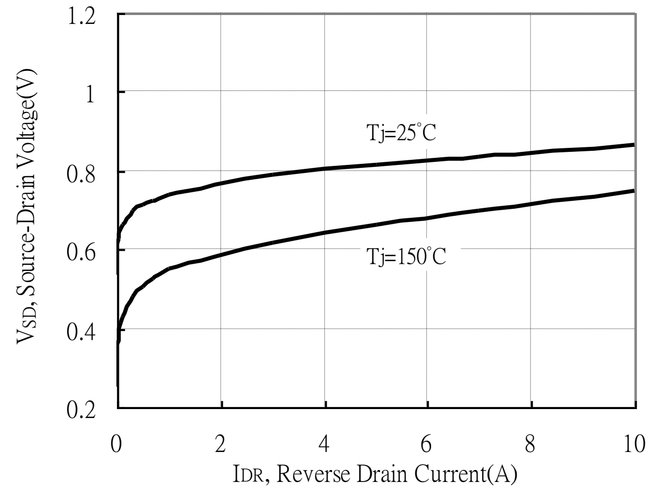
2. May need to be adjusted to specific requirements.

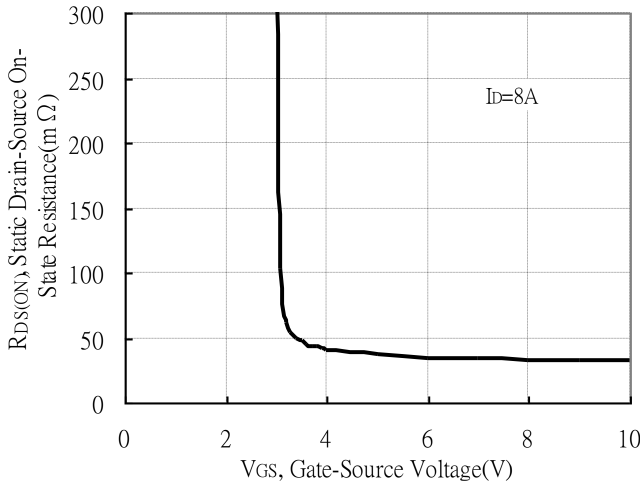
Typical Characteristics : Q1(N-channel)

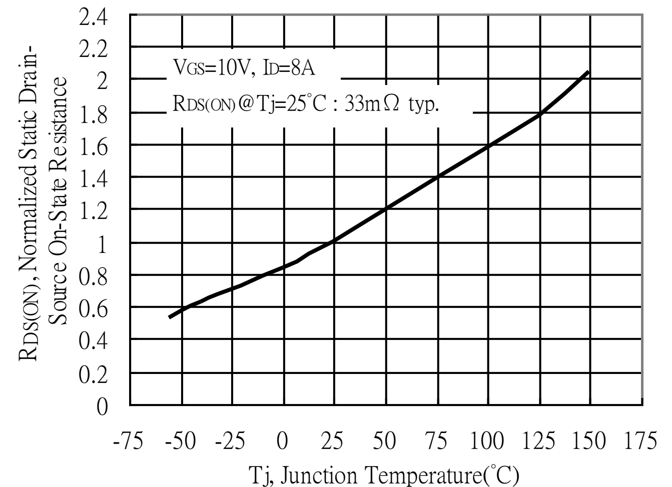




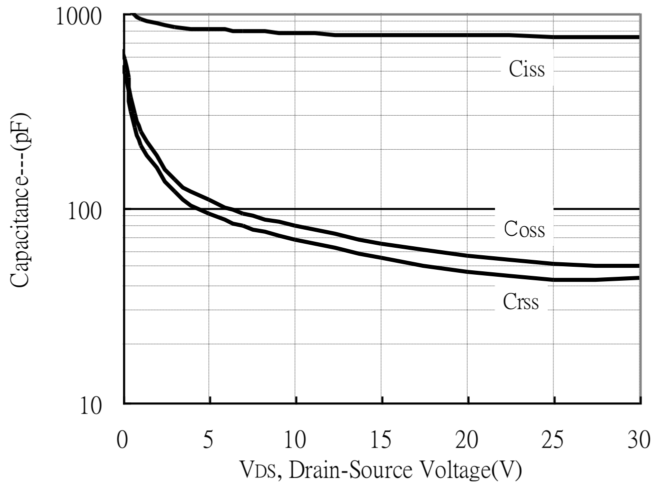


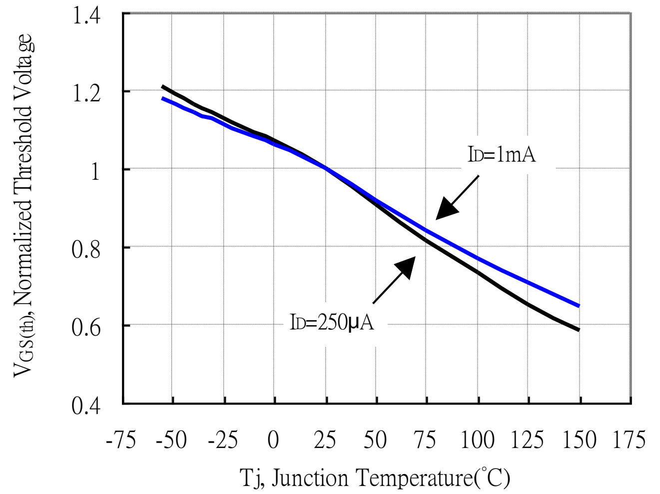


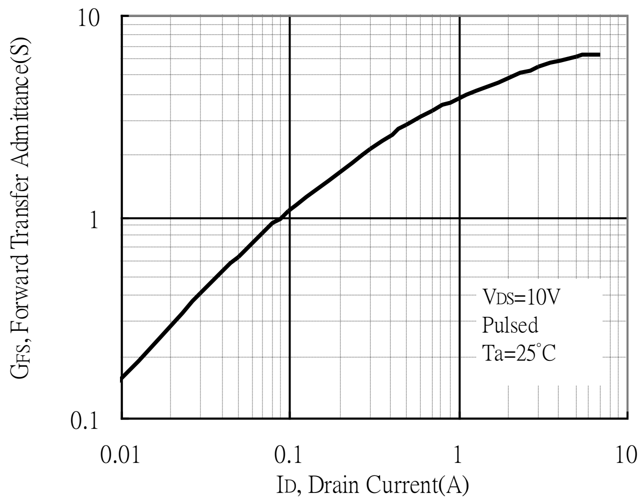


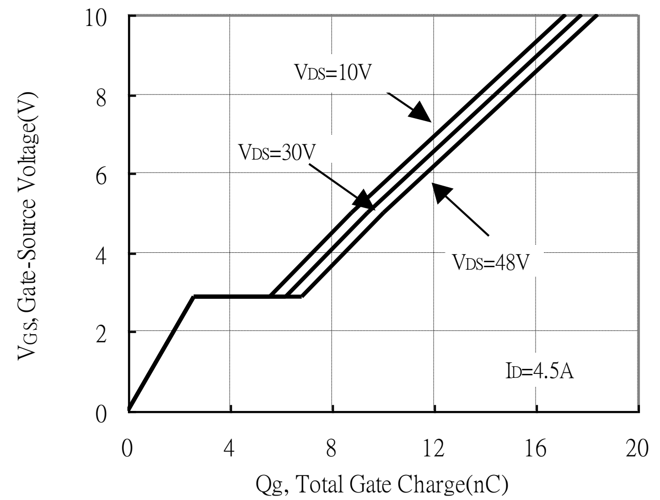


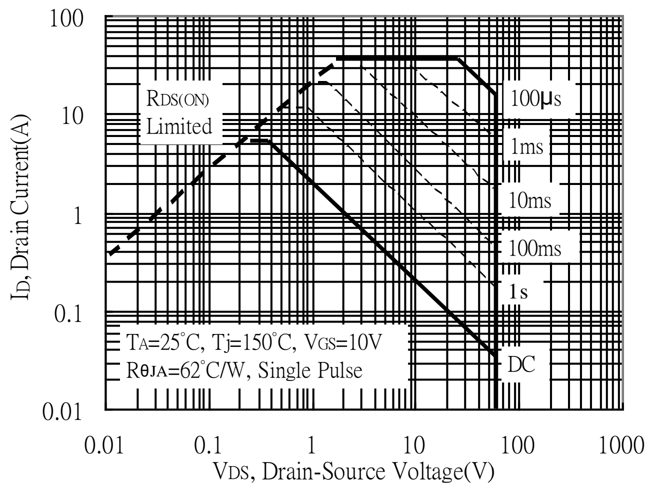
Typical Characteristics(Cont.) : Q1(N-channel)

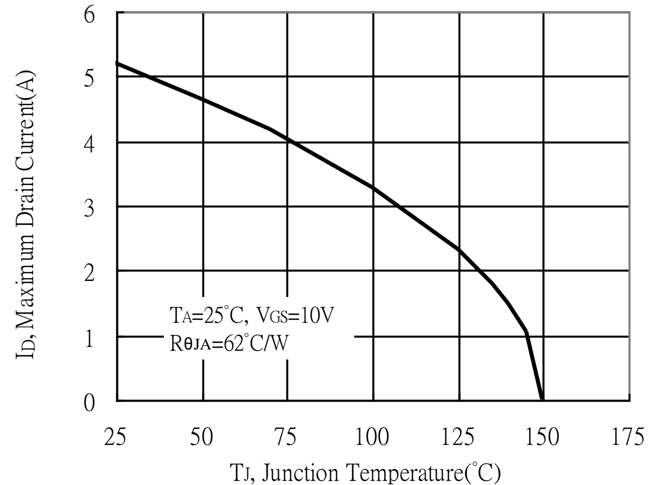




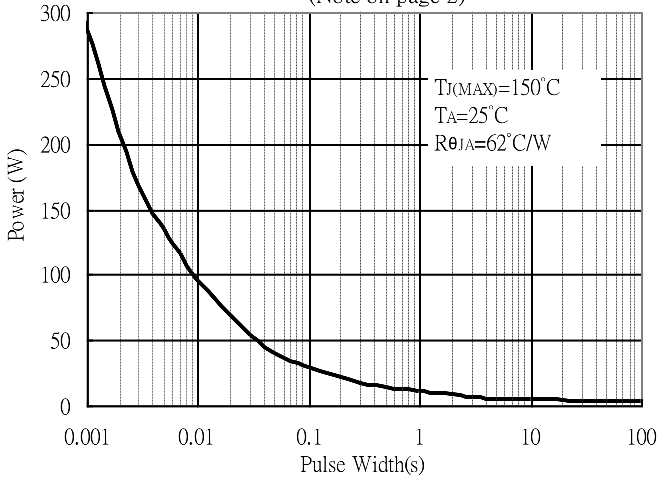


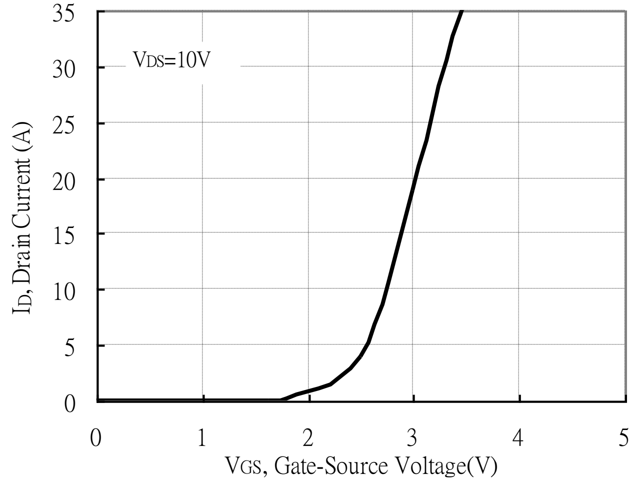


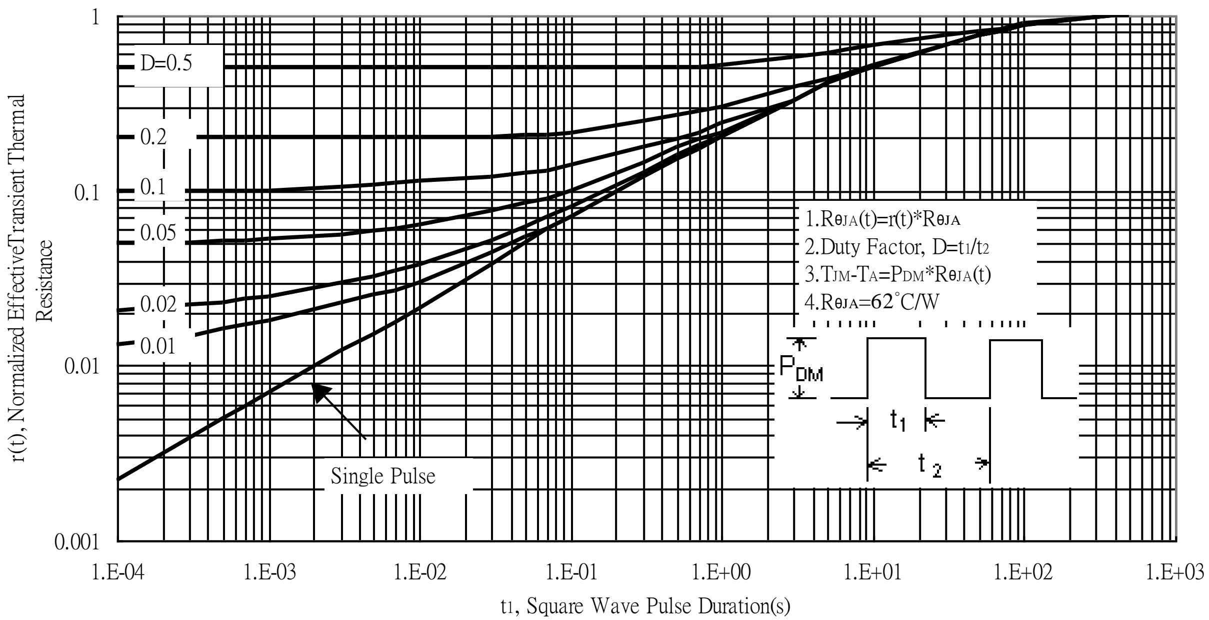




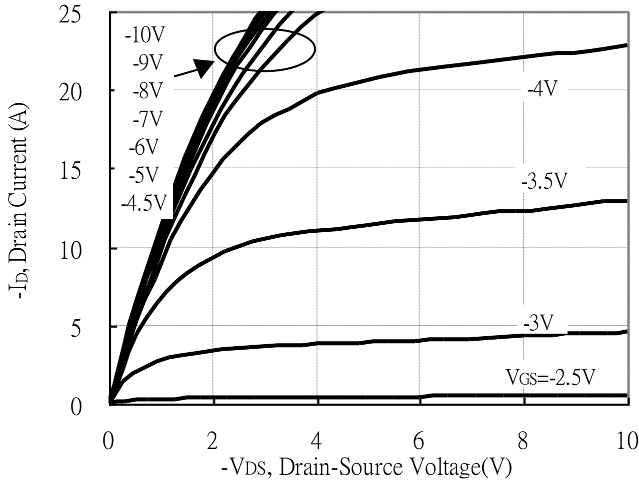
Typical Characteristics(Cont.) : Q1(N-channel)

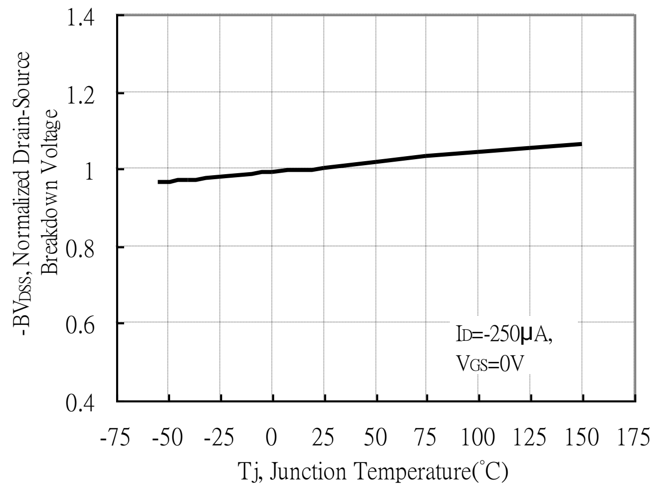


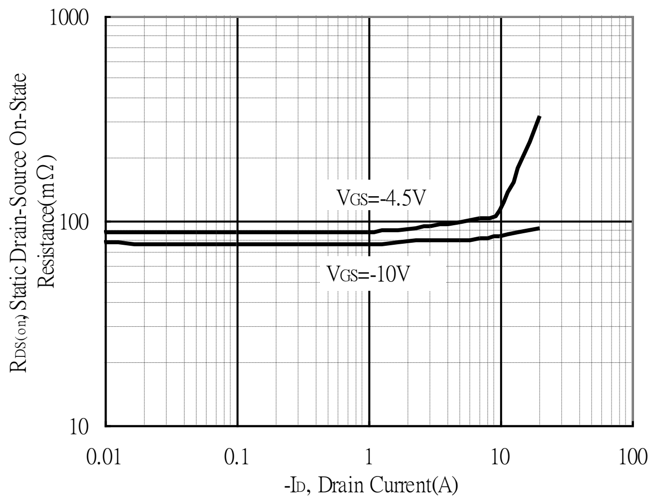


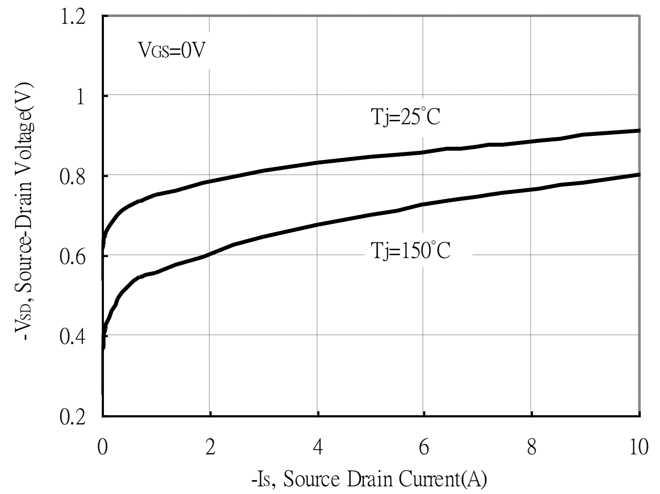


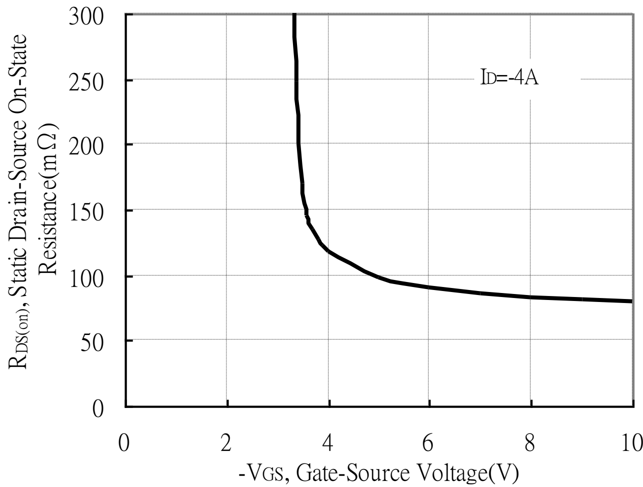
Typical Characteristics : Q2(P-channel)

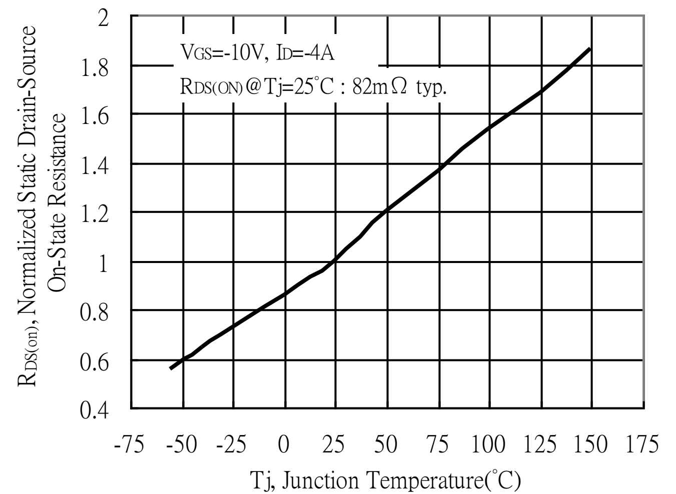












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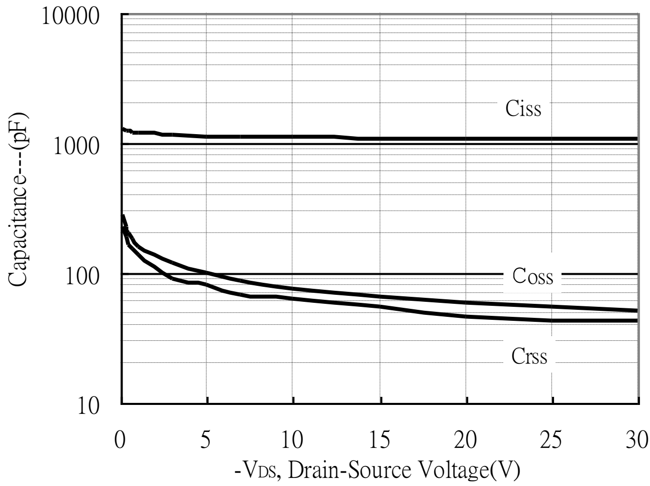
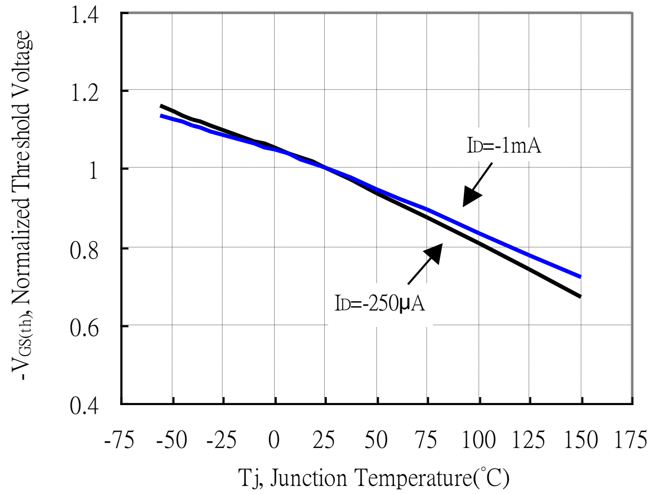
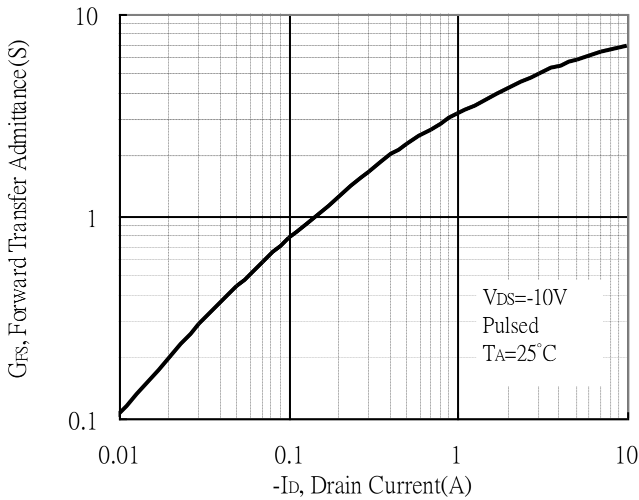
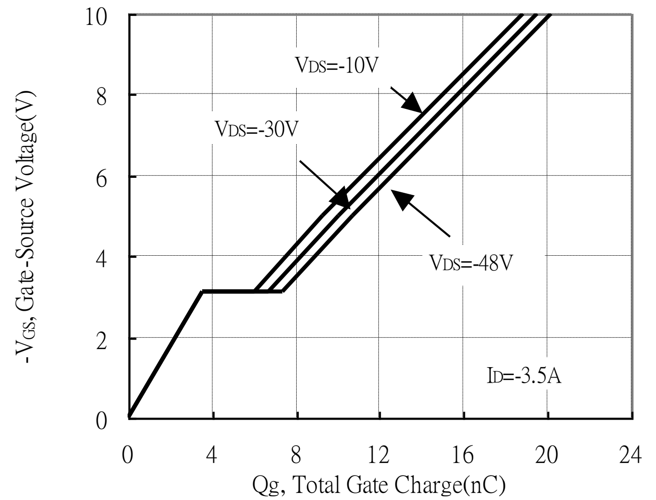
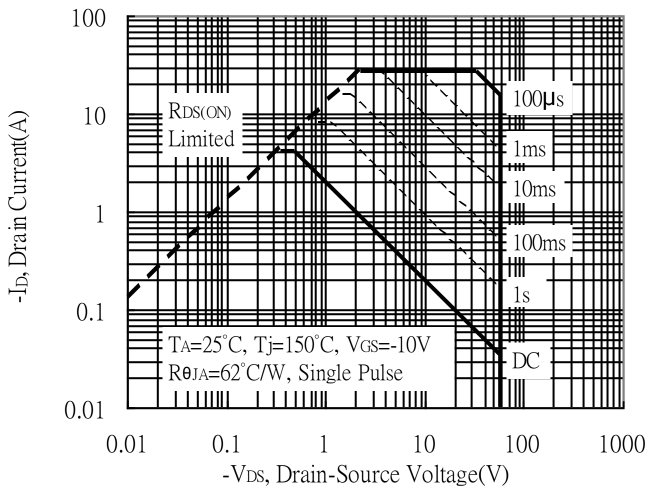
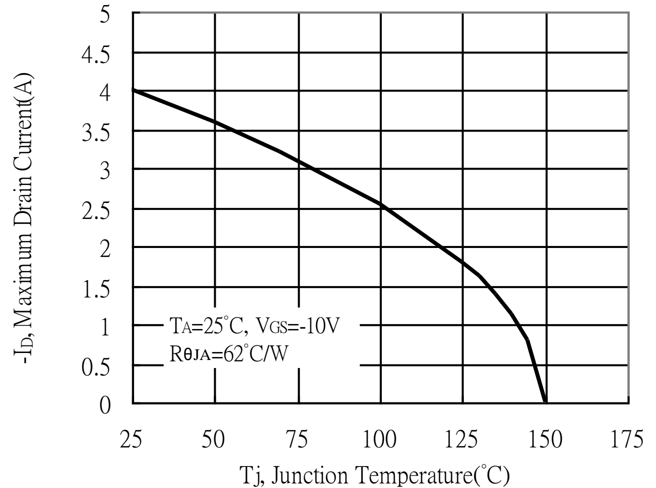




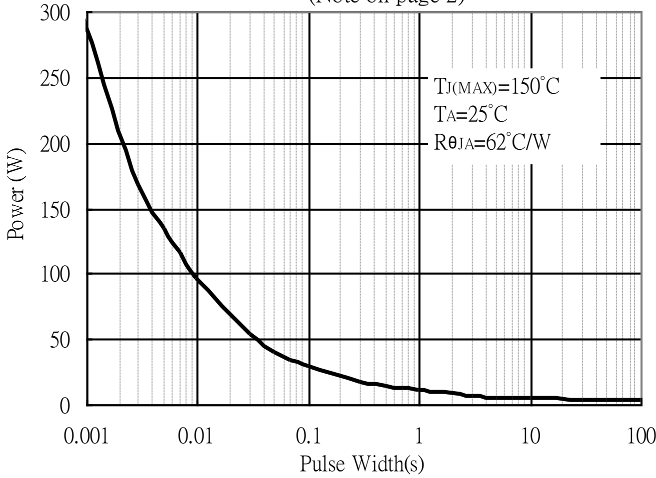


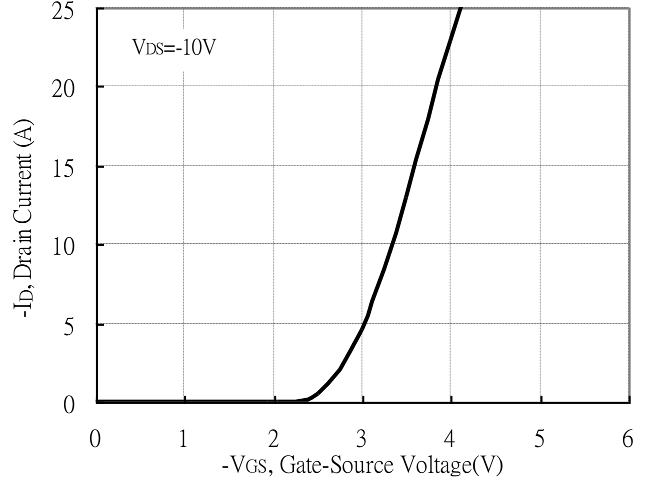


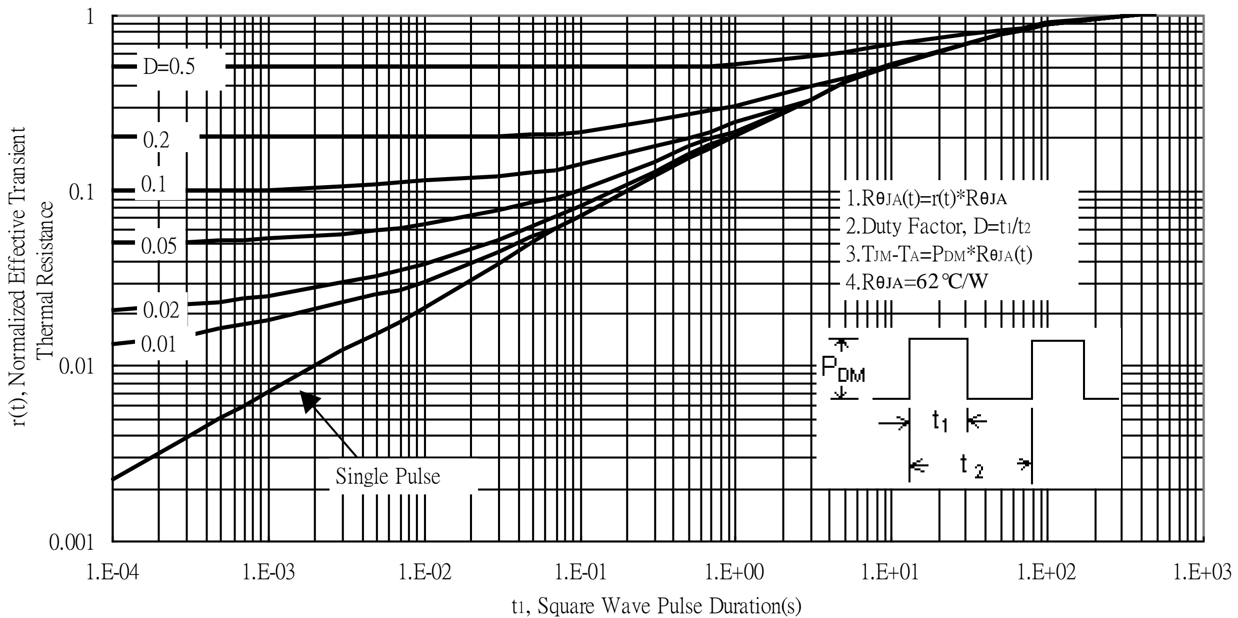




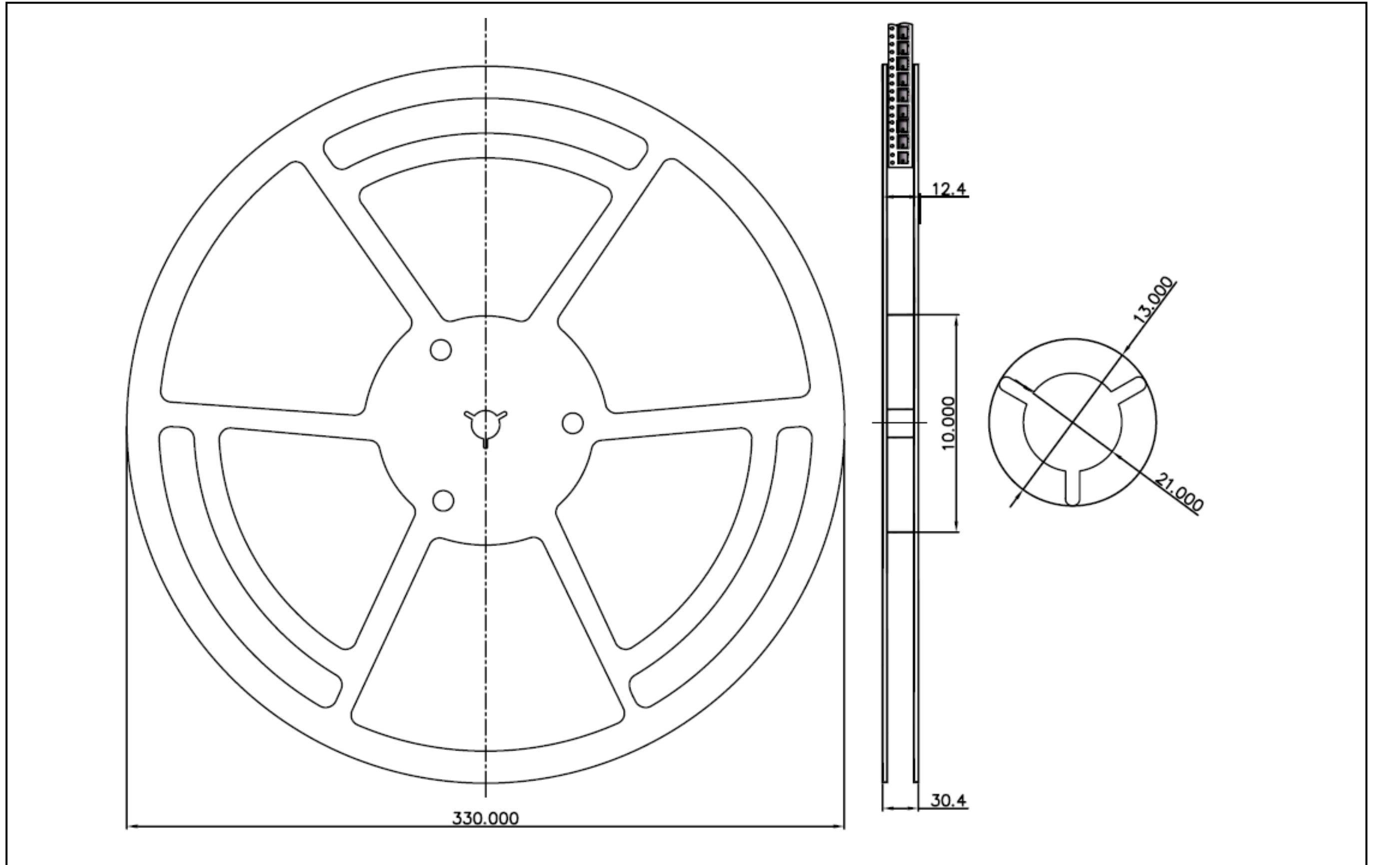
Typical Characteristics(Cont.) : Q2(P-channel)



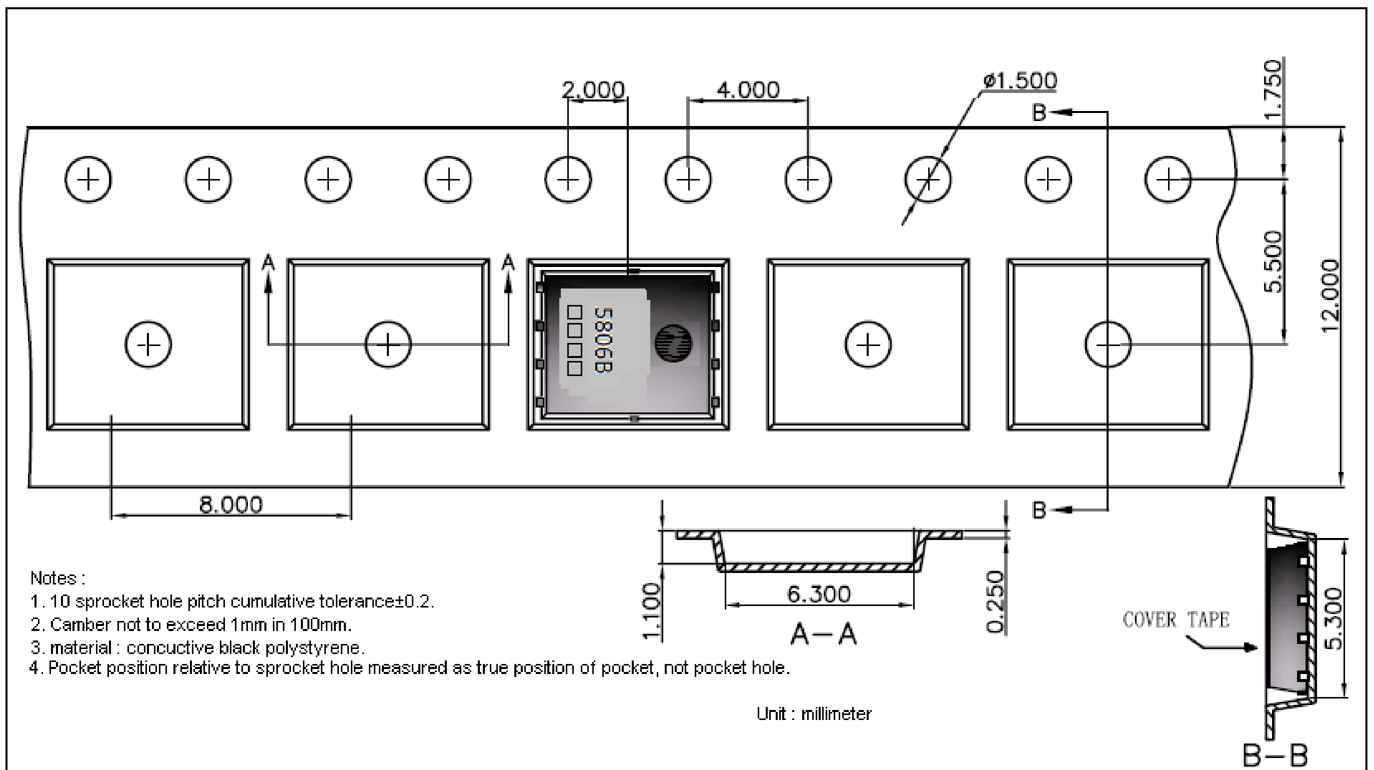




Reel Dimension



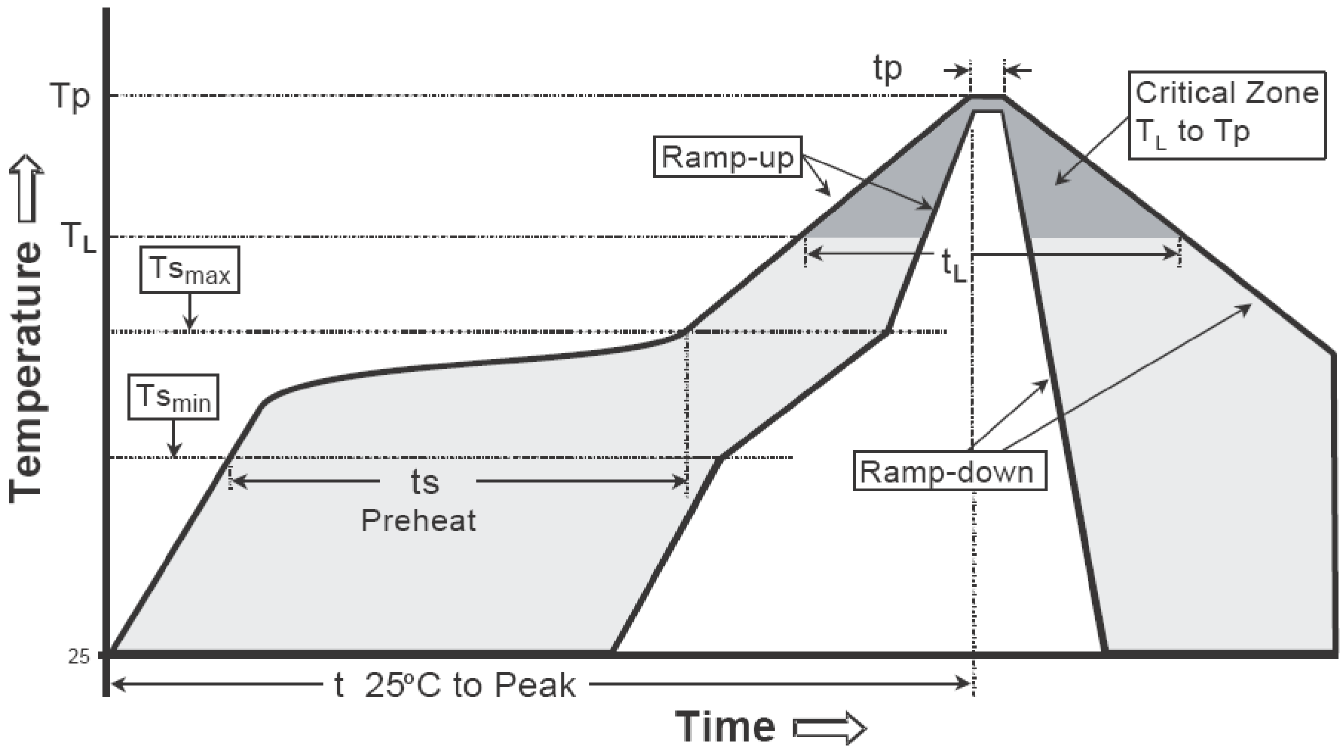
Carrier Tape Dimension



Recommended wave soldering condition

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

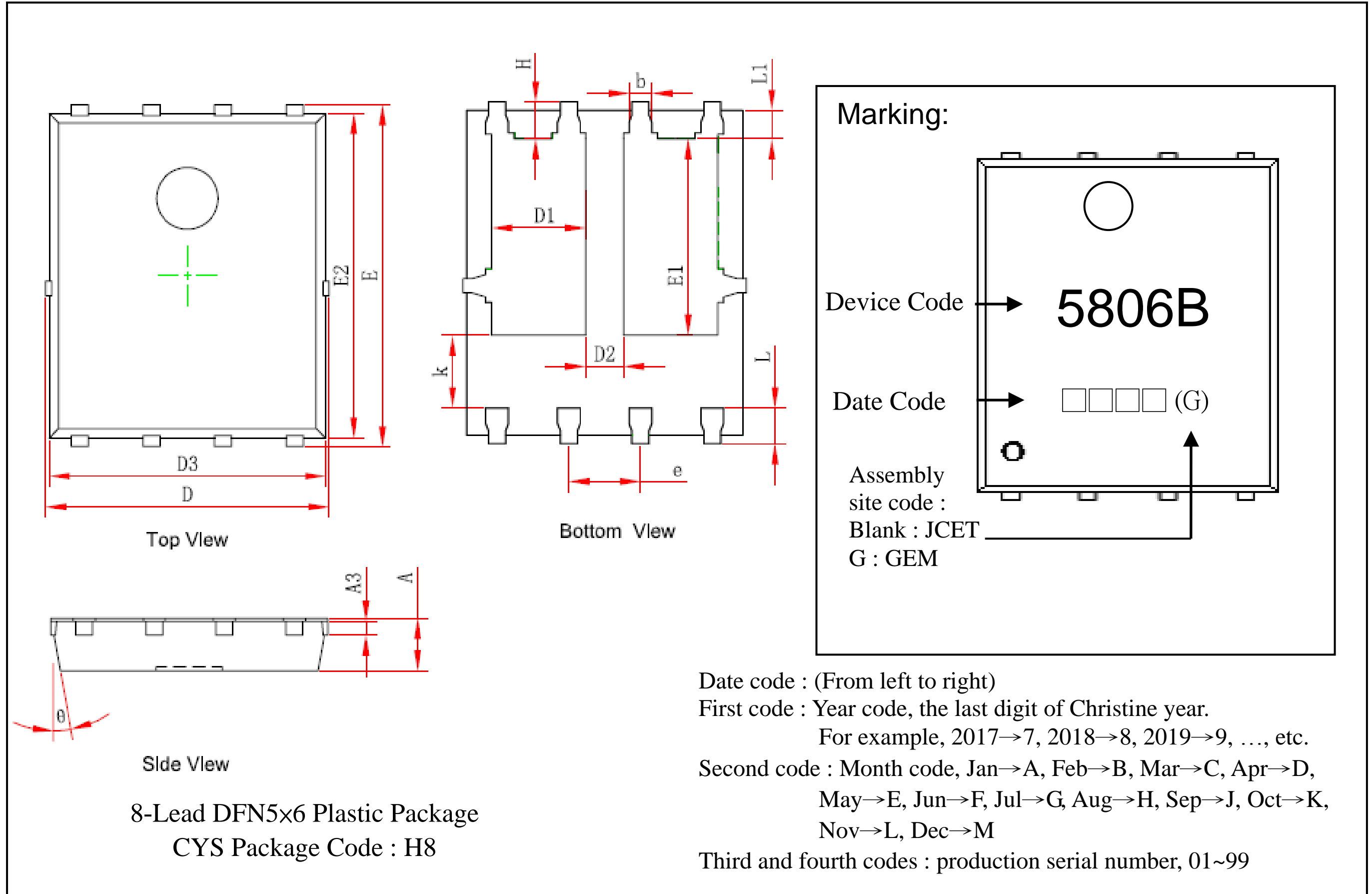
Recommended temperature profile for IR reflow



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 (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 :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.

DFN5×6 Dimension



8-Lead DFN5x6 Plastic Package
CYS Package Code : H8

Date code : (From left to right)
First code : Year code, the last digit of Christine year.
For example, 2017→7, 2018→8, 2019→9, …, etc.
Second 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
Third and fourth codes : production serial number, 01~99

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039	E2	5.674	5.826	0.223	0.229
A3	0.254 REF		0.010 REF		k	1.190	1.390	0.047	0.055
D	4.944	5.096	0.195	0.201	b	0.350	0.450	0.014	0.018
E	5.974	6.126	0.235	0.241	e	1.270 TYP		0.050 TYP	
D1	1.470	1.870	0.058	0.074	L	0.559	0.711	0.022	0.028
D2	0.470	0.870	0.019	0.034	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
D3	4.824	4.976	0.190	0.196	θ	10°	12°	10°	12°

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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