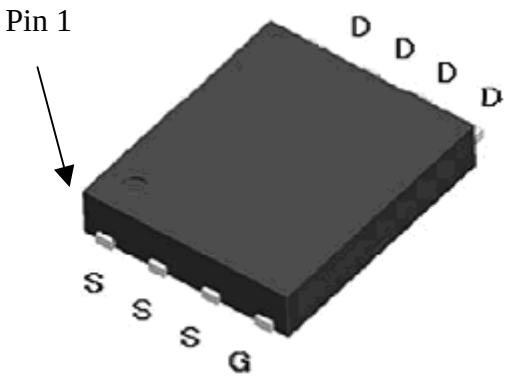
N-Channel Enhancement Mode Power MOSFET

Features:

- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- ESD protected gate
- Pb-free lead plating and Halogen-free package

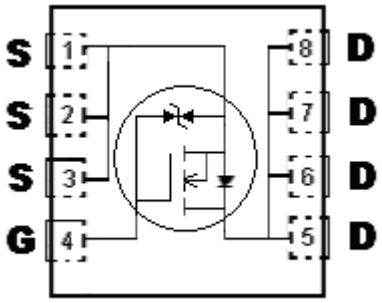
Outline

DFN5x6



Symbol

KWB020N06KH8



G：Gate D：Drain S：Source

BV_{DSS}	**60V**
I_D@V_{GS}=10V, T_C=25˚C	**42A**
I_D@V_{GS}=10V, T_A=25˚C	**7.8A**
$R_{DS(ON)}$@V_{GS}=10V, I_D=8A	**12.2mΩ(typ)**
$R_{DS(ON)}$@V_{GS}=4.5V, I_D=6A	**15.6mΩ(typ)**
$R_{DS(ON)}$@V_{GS}=4V, I_D=4A	**17.6mΩ(typ)**

Ordering Information

Device	Package	Shipping
KWB020N06KH8	DFN 5 x6 (Pb-free lead plating and halogen-free package)	3000 pcs / tape & reel

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

Parameter		Symbol	Limits	Unit
Drain-Source Voltage (Note 1)		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current @T_C=25°C, V_{GS}=10V (Note 5)		I_D	42	A
Continuous Drain Current @T_C=100°C, V_{GS}=10V (Note 5)			29.7	
Continuous Drain Current @T_A=25°C, V_{GS}=10V (Note 2)		I_{DSM}	7.8	
Continuous Drain Current @T_A=70°C, V_{GS}=10V (Note 2)			6.2	
Pulsed Drain Current @ V_{GS}=10V (Note 3)		I_{DM}	168	
Avalanche Current (Note 3)		I_{AS}	8	
Single Pulse Avalanche Energy @ L=2mH, I_D=8A, V_{DD}=15V (Note 4)		E_{AS}	64	mJ
Repetitive Avalanche Energy (Note 3)		E_{AR}	7	
Power Dissipation	T_C=25°C (Note 1)	P_D	71	W
	T_C=100°C (Note 1)		35.5	
	T_A=25°C (Note 2)	P_{DSM}	2.0	
	T_A=70°C (Note 2)		1.3	
Operating Junction and Storage Temperature		Tj, Tstg	-55~+175	°C

*Drain current limited by maximum junction temperature

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{\theta JC}$	2.1	°C/W
Thermal Resistance, Junction-to-ambient, max (Note 2)	$R_{\theta JA}$	62	

Note : 1.The power dissipation P_D is based on $T_{J(MAX)}$=175°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 value in any given application depends on the user's specific board design. The power dissipation P_{DSM} is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C, and the maximum temperature of 175 °C may be used if the PCB allows it.

3. Pulse width limited by junction temperature $T_{J(MAX)}$=175°C.

4. Ratings are based on low frequency and low duty cycles to keep initial T_J=25°C. 100% tested by conditions of V_{DD}=15V, I_D=6A, L=1mH, V_{GS}=10V.

5. Calculated continuous drain current based on maximum allowable junction temperature.

6. The static characteristics are obtained using <300μs pulses, duty cycle 0.5% maximum.

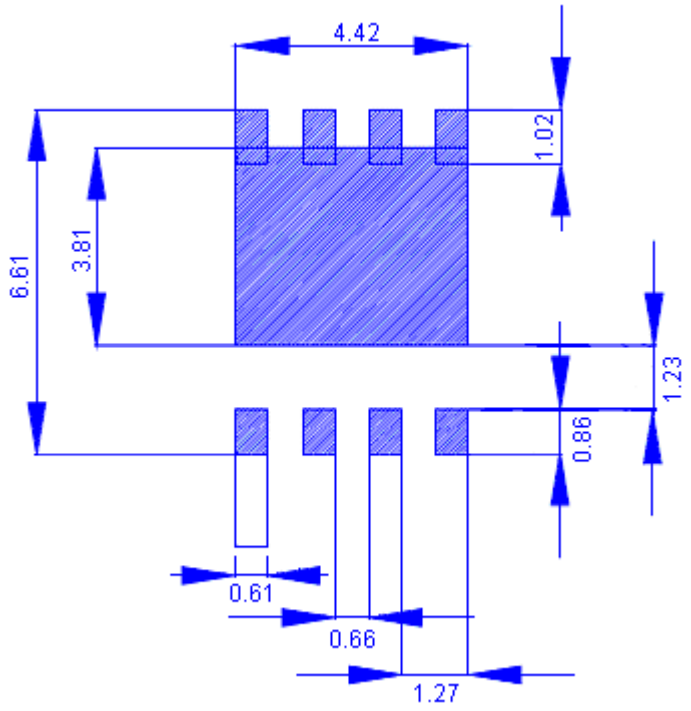
7. The $R_{\theta JA}$ is the sum of thermal resistance from junction to case $R_{\theta JC}$ and case to ambient.

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

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	60	-	-	V	V_{GS}=0V, I_D=250μA
$\Delta BV_{DSS}/\Delta Tj$	-	0.06	-	V/°C	Reference to 25°C, I_D=250μA
$V_{GS(th)}$	1	-	2.5	V	V_{DS} = V_{GS}, I_D=250μA
*G_{FS}	-	14.9	-	S	V_{DS} =10V, I_D=10A
I_{GSS}	-	-	±10	μA	V_{GS}=±16V
I_{DSS}	-	-	1		V_{DS} =60V, V_{GS} =0V
	-	-	5		V_{DS} =48V, V_{GS} =0V, Tj=55°C
*$R_{DS(ON)}$	-	12.2	17	mΩ	V_{GS} =10V, I_D=8A
	-	15.6	21		V_{GS} =4.5V, I_D=6A
	-	17.6	31		V_{GS} =4V, I_D=4A
Dynamic					
*Qg	-	17	-	nC	V_{DS}=30V, I_D=8A, V_{GS}=10V
*Qgs	-	1.4	-		
*Qgd	-	6.2	-		
*$t_{d(ON)}$	-	8.2	-	ns	V_{DS}=30V, I_D=8A, V_{GS}=10V, R_G=6Ω
*tr	-	18.8	-		
*$t_{d(OFF)}$	-	34.4	-		
*t_f	-	11	-		
Ciss	-	736	-	pF	V_{GS}=0V, V_{DS}=20V, f=1MHz
Coss	-	140	-		
Crss	-	70	-		
Source-Drain Diode					
*I_S	-	-	42	A	
*I_{SM}	-	-	168		
*V_{SD}	-	0.8	1.2	V	I_S=8A, V_{GS}=0V
*trr	-	14	-	ns	V_{GS}=0V, I_F=8A, dI_F/dt=100A/μs
*Qrr	-	8.6	-	nC	

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

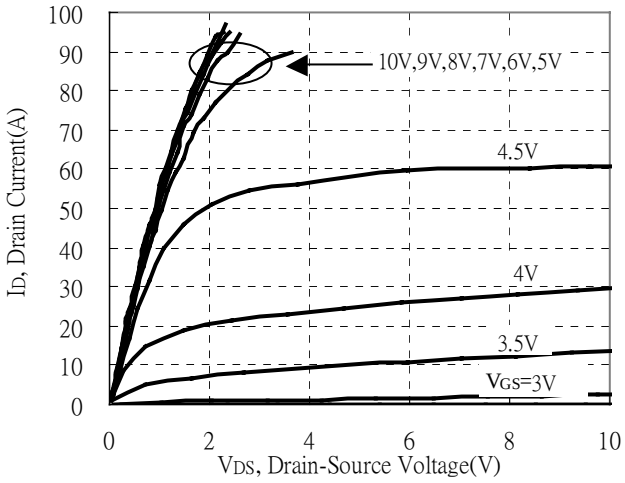
Recommended Soldering Footprint



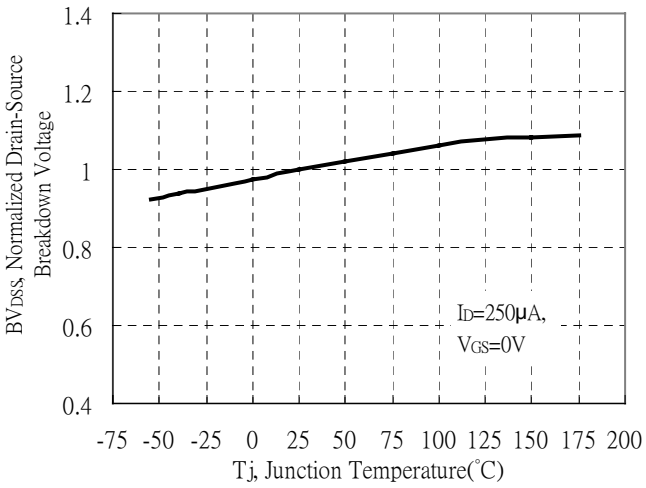
unit : mm

Typical Characteristics

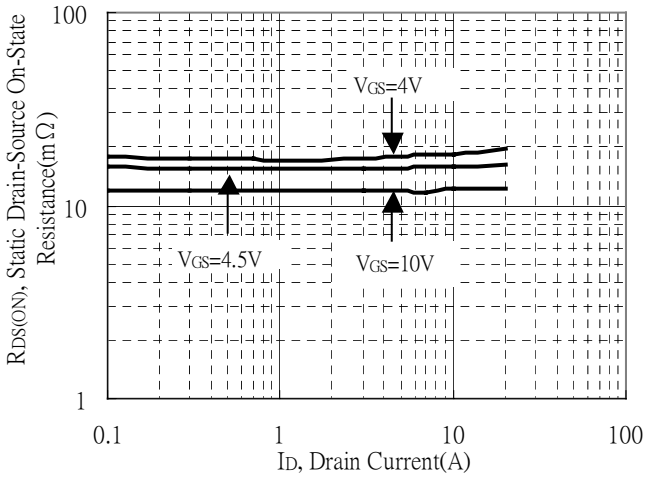
Typical Output Characteristics



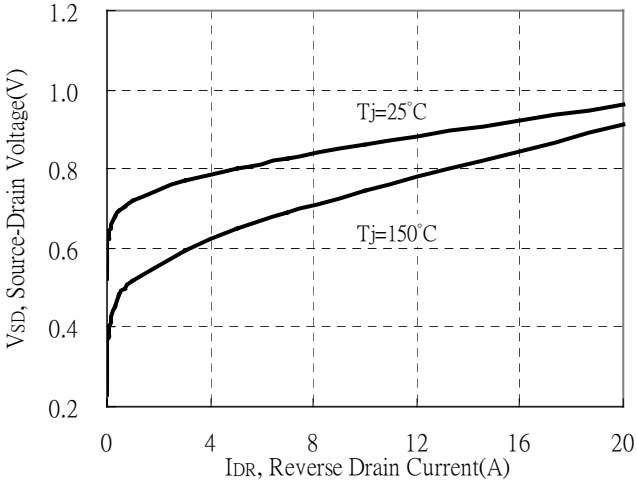
Brekdown Voltage vs Ambient Temperature



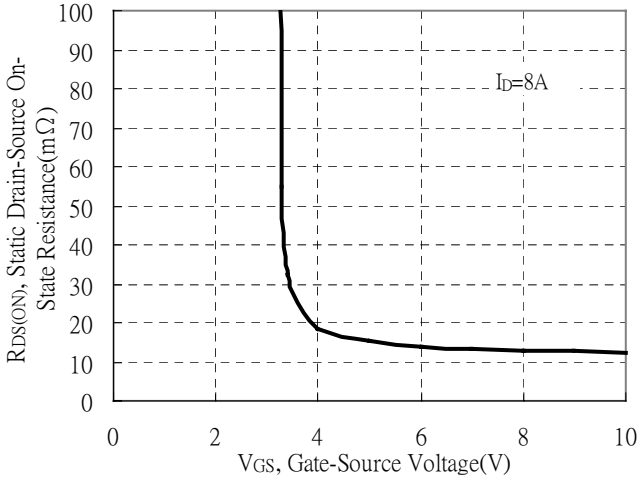
Static Drain-Source On-State resistance vs Drain Current



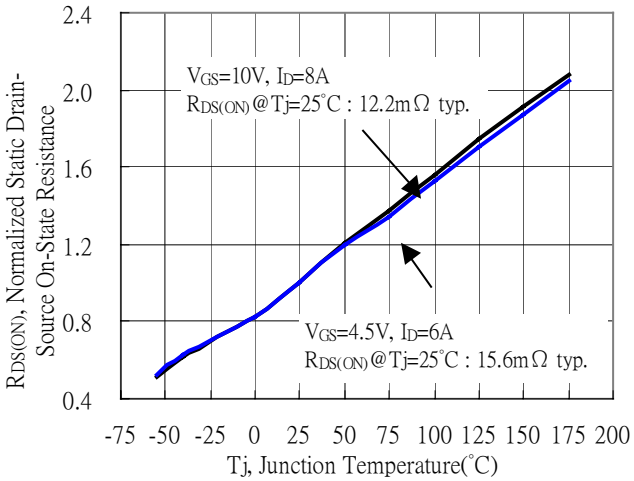
Reverse Drain Current vs Source-Drain Voltage



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

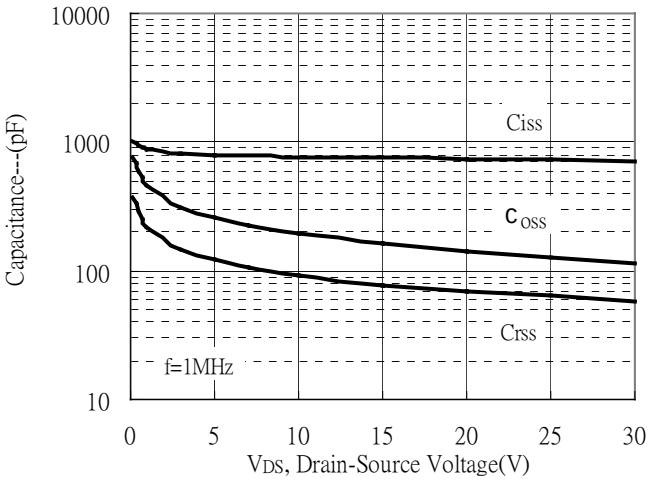


Drain-Source On-State Resistance vs Junction Tempearture

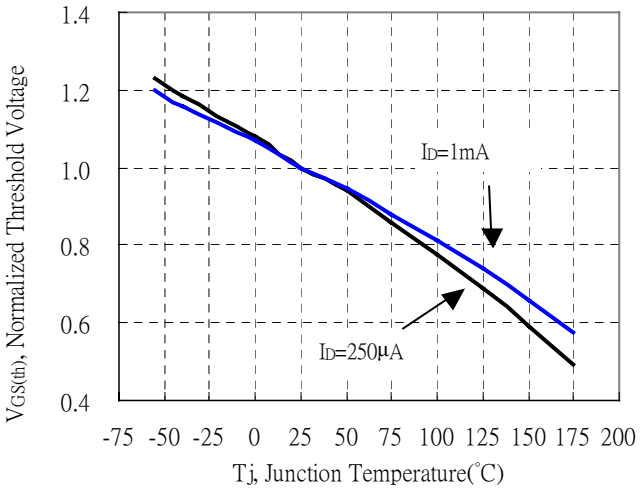


Typical Characteristics(Cont.)

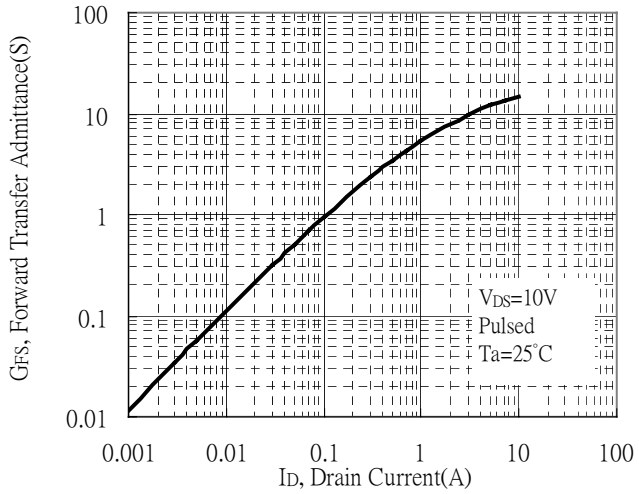
Capacitance vs Drain-to-Source Voltage



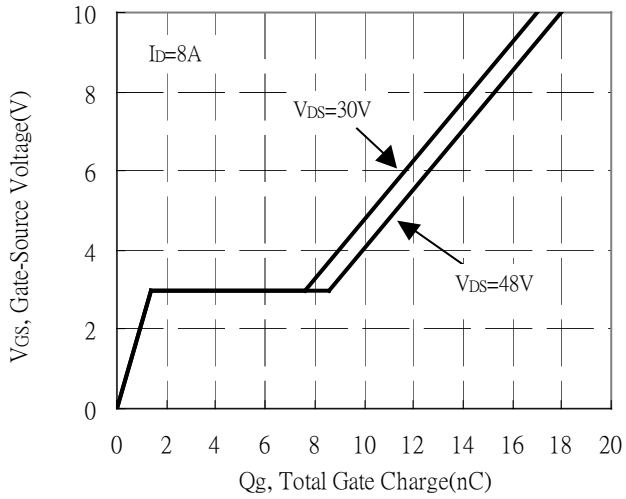
Threshold Voltage vs Junction Tempearture



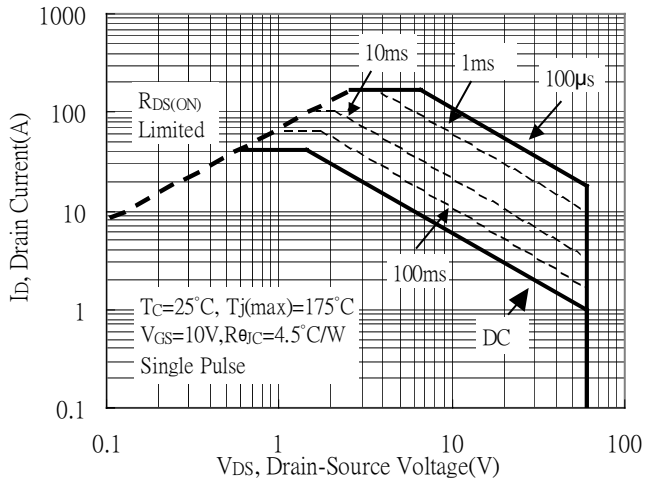
Forward Transfer Admittance vs Drain Current



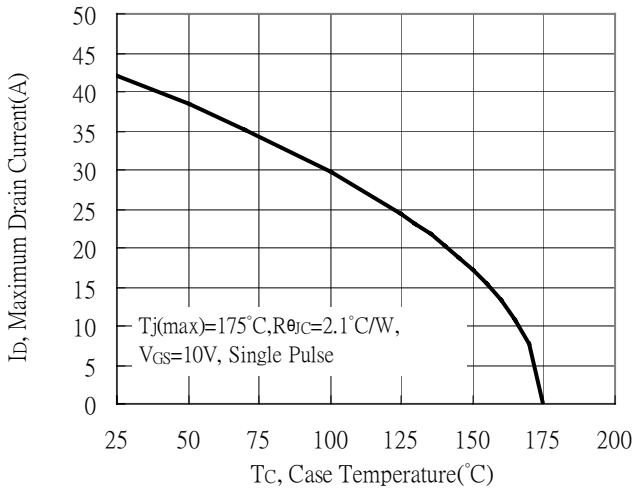
Gate Charge Characteristics



Maximum Safe Operating Area

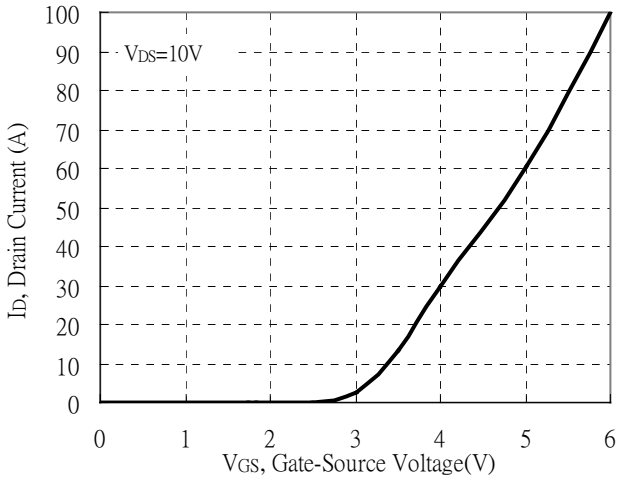


Maximum Drain Current vs Case Temperature

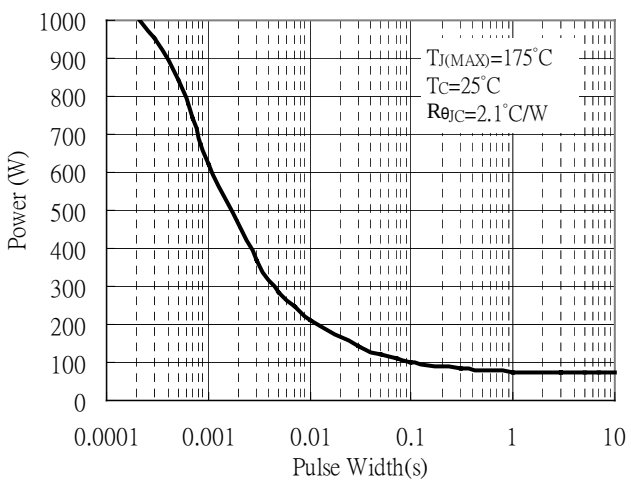


Typical Characteristics(Cont.)

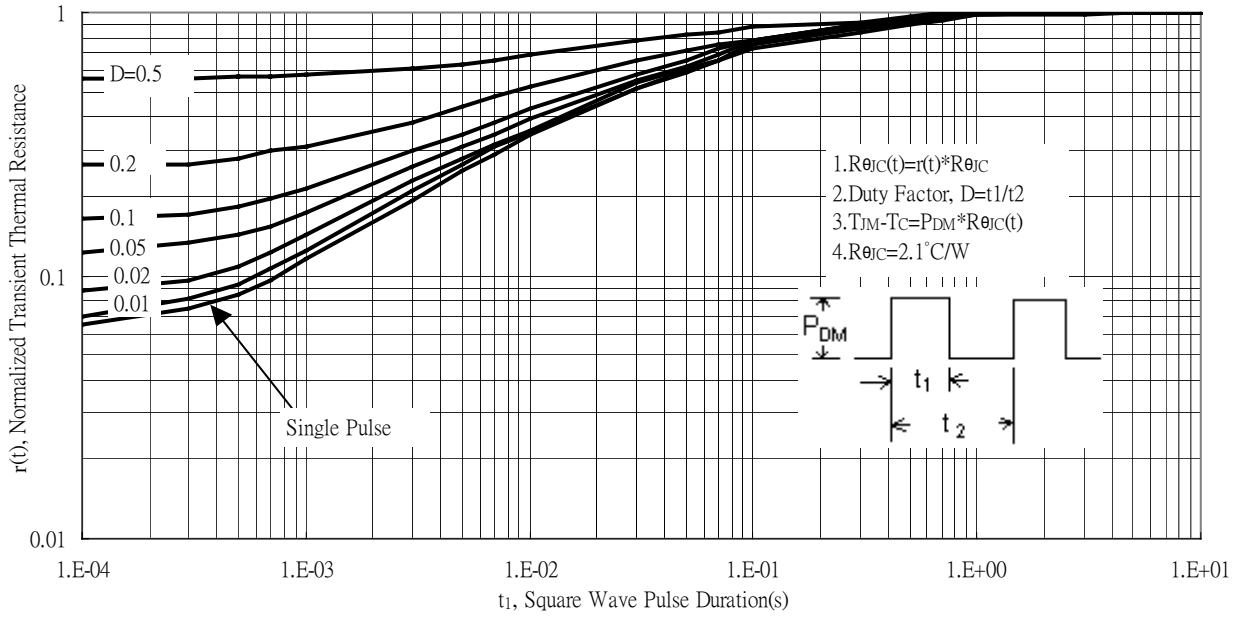
Typical Transfer Characteristics



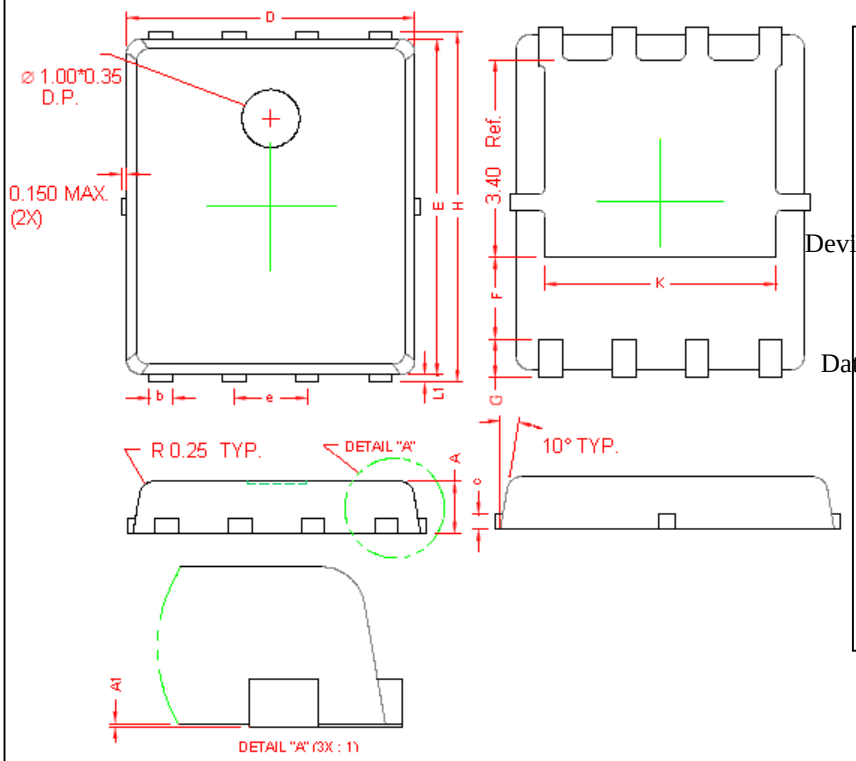
Single Pulse Power Rating, Junction to Case



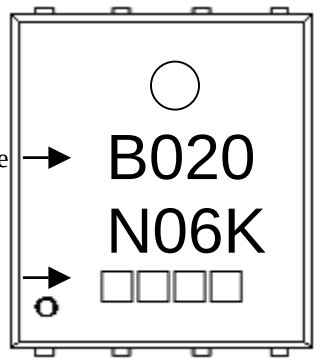
Transient Thermal Response Curves



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 : prodcution serial number, 01~99

8-Lead DFN5x6 Plastic 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	