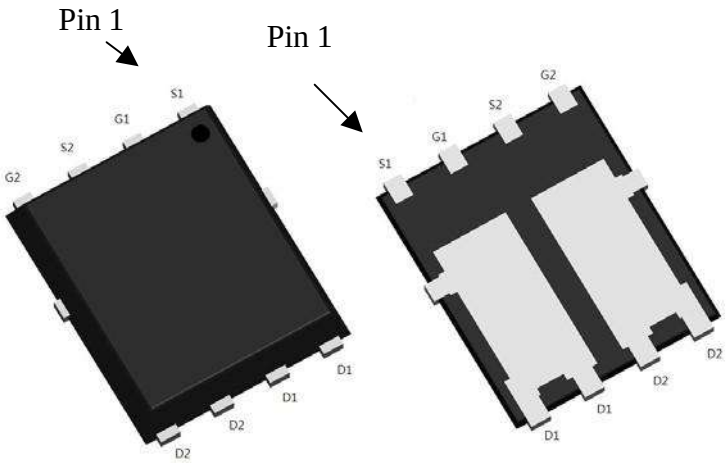
Dual N-Channel Enhancement Mode Power MOSFET

Outline

DFN5x6

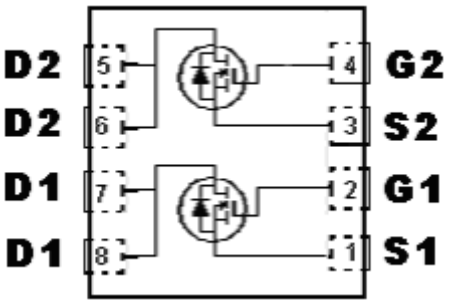


Features:

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

BV_{DSS}	**40V**
I_D@V_{GS}=10V, T_C=25˚C	**26A**
I_D@V_{GS}=10V, T_C=100˚C	**16.4A**
I_D@V_{GS}=10V, T_A=25˚C	**7.0A**
I_D@V_{GS}=10V, T_A=70˚C	**5.6A**
$R_{DS(ON)}$@V_{GS}=10V, I_D=8A	**11.3mΩ (typ)**
$R_{DS(ON)}$@V_{GS}=4.5V, I_D=4A	**14.2mΩ (typ)**

Equivalent Circuit



G：Gate D：Drain S：Source

Ordering Information

Device	Package	Shipping
KWB15A04DH8	DFN 5 ×6 (Pb-free lead plating and halogen-free package)	3000 pcs / tape & reel

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

Parameter			Symbol	Limits	Unit
Drain-Source Voltage			V_{DS}	40	V
Gate-Source Voltage			V_{GS}	±20	
Continuous Drain Current @T_C=25°C, V_{GS}=10V		(Note 1)	I_D	26	A
Continuous Drain Current @T_C=100°C, V_{GS}=10V		(Note 1)		14.4	
Continuous Drain Current @T_A=25°C, V_{GS}=10V		(Note 2)	I_{DSM}	7.0	
Continuous Drain Current @T_A=70°C, V_{GS}=10V		(Note 2)		5.6	
Pulsed Drain Current @ V_{GS}=10V		(Note 3)	I_{DM}	104	
Avalanche Current @L=0.1mH		(Note 3)	I_{AS}	20	
Single Pulse Avalanche Energy @ L=2mH, I_D=14Amps, V_{DD}=50V		(Note 5)	E_{AS}	196	mJ
Repetitive Avalanche Energy		(Note 3)	E_{AR}	2.1	
Power Dissipation	T_C=25°C	(Note 1)	P_D	21	W
	T_C=100°C	(Note 1)		8.4	
	T_A=25°C	(Note 2)	P_{DSM}	1.5	
	T_A=70°C	(Note 2)		1.0	
Operating Junction and Storage Temperature			Tj, Tstg	-55~+150	°C

*Drain current limited by maximum junction temperature

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{\theta JC}$	6	°C/W
Thermal Resistance, Junction-to-ambient, max (Note 4)	$R_{\theta JA}$	85	

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 in²FR-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.
3. Ratings are based on low frequency and low duty cycles to keep initial T_J=25°C.
4. When mounted on1 in² copper pad of FR-4 board ; 125°C/W when mounted on minimum copper pad.
5. 100% tested by conditions of L=0.1mH, I_{AS}=15A, V_{GS}=10V, V_{DD}=25V.

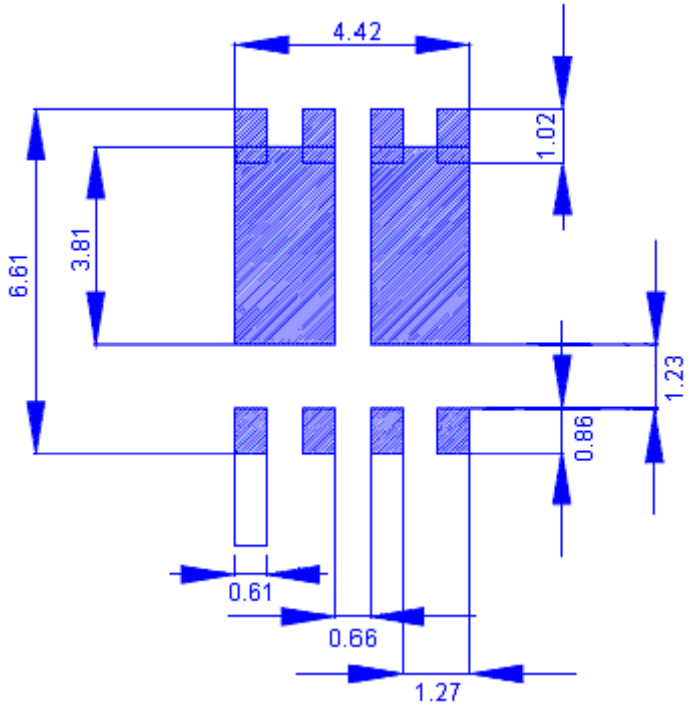
Characteristics (Tj=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	40	-	-	V	V_{GS}=0V, I_D=250μA
$\Delta BV_{DSS}/\Delta Tj$	-	0.03	-	V/°C	Reference to 25°C, I_D=250μA
$V_{GS(th)}$	1.0	-	2.5	V	V_{DS} = V_{GS}, I_D=250μA
*G_{FS}	-	10.5	-	S	V_{DS} =10V, I_D=5A
I_{GSS}	-	-	±100	nA	V_{GS}=±20V
I_{DSS}	-	-	1	μA	V_{DS} =32V, V_{GS} =0V
	-	-	25		V_{DS} =32V, V_{GS} =0V, Tj=85°C

*$R_{DS(ON)}$	-	11.3	15	mΩ	V_{GS} =10V, I_D=8A
	-	14.2	20		V_{GS} =4.5V, I_D=4A
Dynamic					
*Qg	-	14.7	22.1	nC	V_{DS}=20V, I_D=8A, V_{GS}=10V
*Qgs	-	2.5	-		
*Qgd	-	2.8	-		
*$t_{d(ON)}$	-	7.6	11.4	ns	V_{DS}=15V, I_D=8A, V_{GS}=10V, R_G=1Ω
*tr	-	16	24		
*$t_{d(OFF)}$	-	27.6	41.4		
*t_f	-	7	10.5		
Ciss	-	656	984	pF	V_{GS}=0V, V_{DS}=30V, f=1MHz
Coss	-	97	146		
Crss	-	49	74		
Rg	-	2.5	-	Ω	f=1MHz
Source-Drain Diode					
*I_S	-	-	26	A	
*I_{SM}	-	-	104		
*V_{SD}	-	0.72	1	V	I_S=1A, V_{GS}=0V
*trr	-	8.2	-	ns	V_{GS}=0V, I_F=8A, dI_F/dt=100A/μs
*Qrr	-	3.2	-	nC	

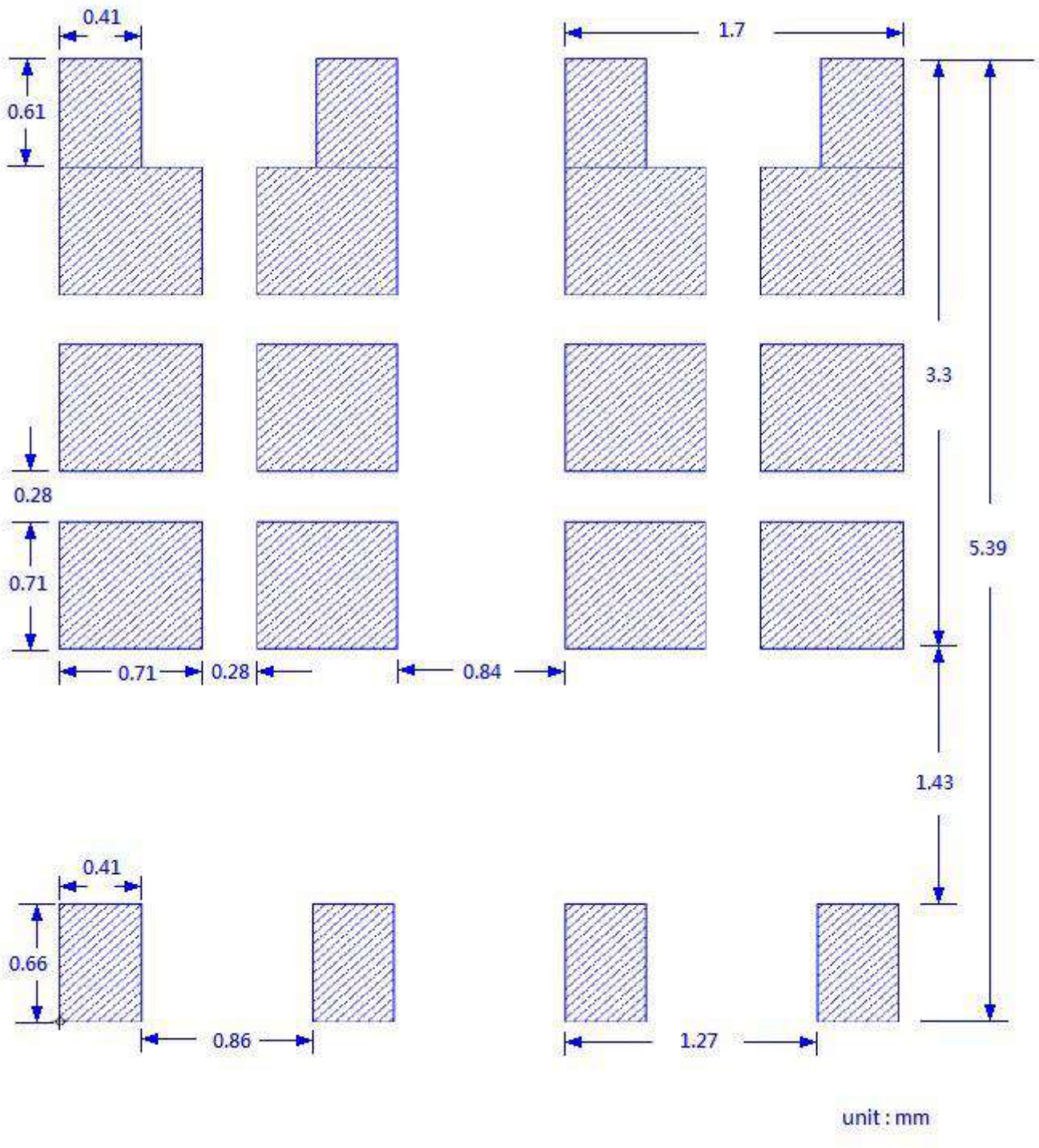
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Recommended Soldering Footprint



unit : mm

Recommended Stencil Design

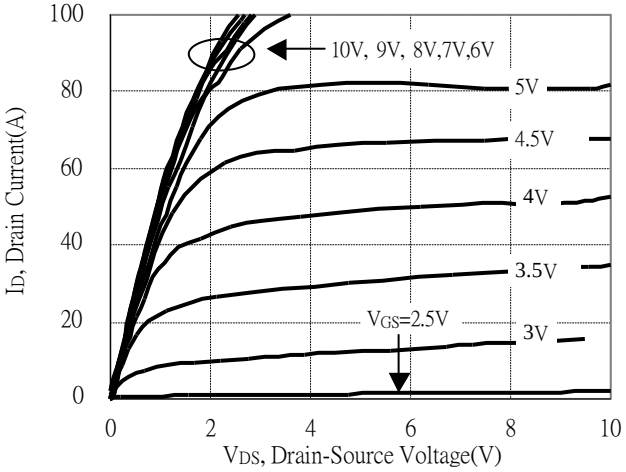


Note : 1. Stencil thickness 5 mil (0.127mm)

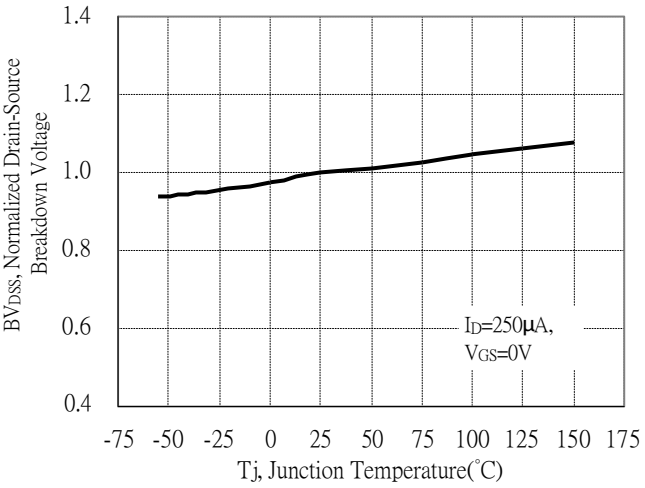
2. May need to be adjusted to specific requirements.

Typical Characteristics

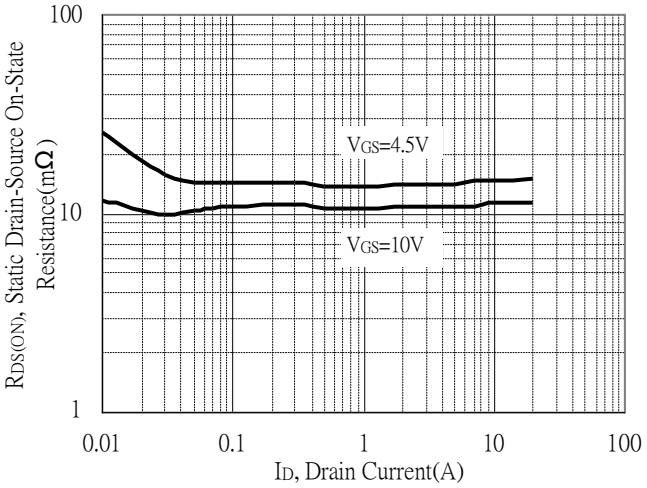
Typical Output Characteristics



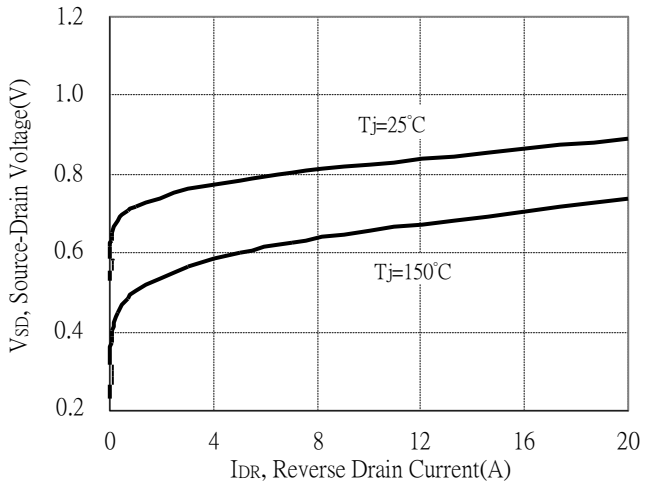
Brekdown Voltage vs Ambient Temperature



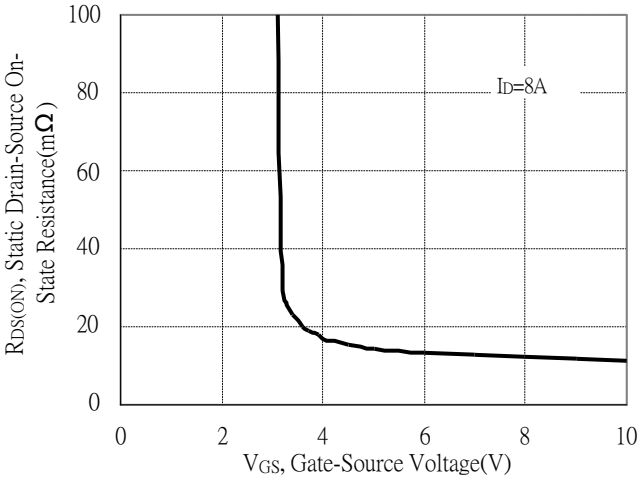
Static Drain-Source On-State resistance vs Drain Current



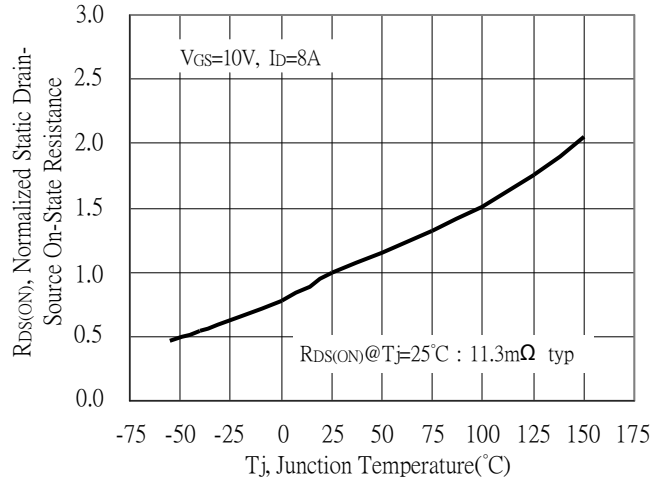
Reverse Drain Current vs Source-Drain Voltage



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

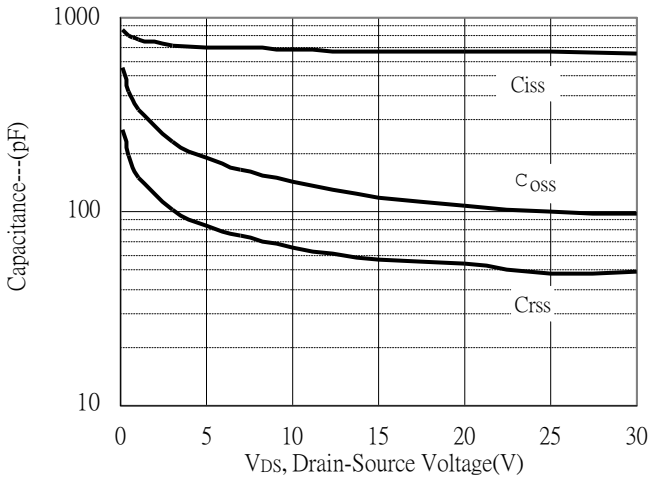


Drain-Source On-State Resistance vs Junction Tempearture

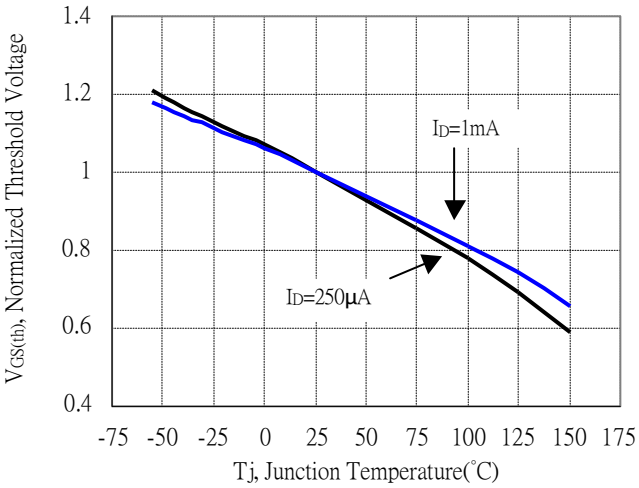


Typical Characteristics(Cont.)

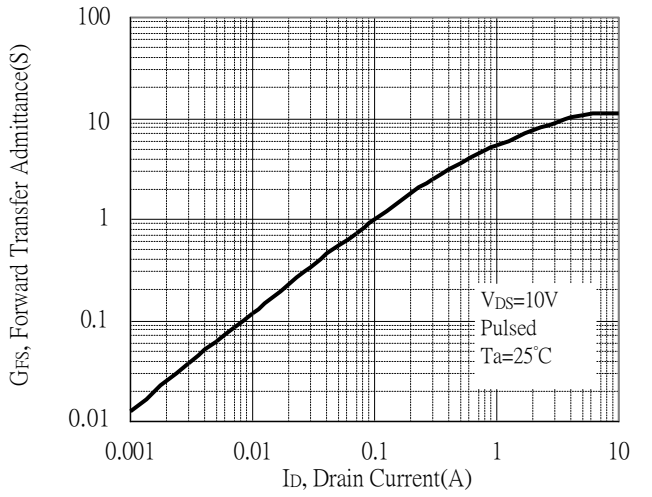
Capacitance vs Drain-to-Source Voltage



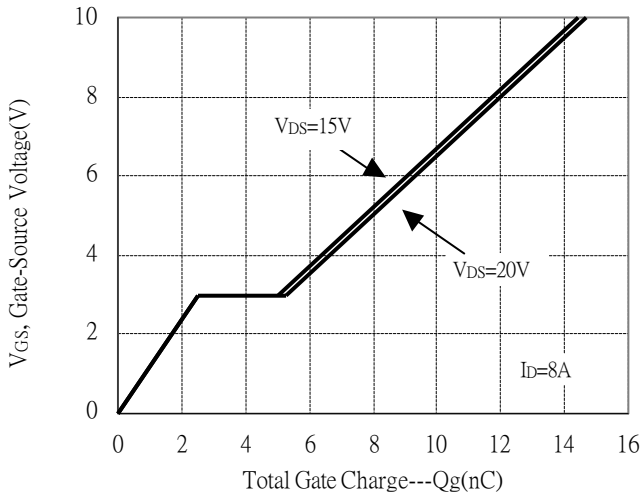
NormalizedThreshold Voltage vs Junction Tempearture



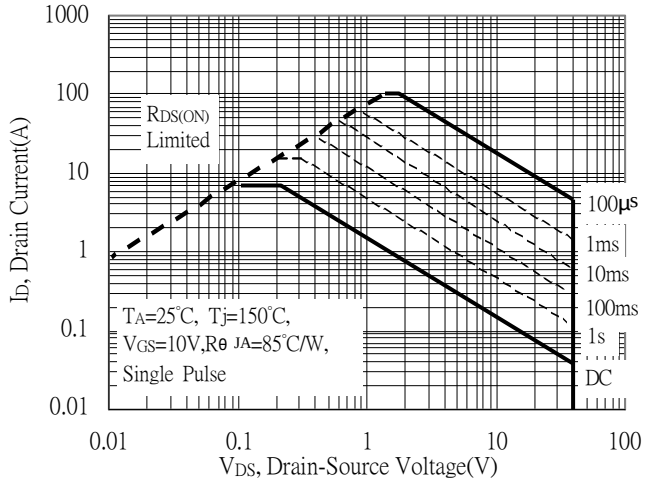
Forward Transfer Admittance vs Drain Current



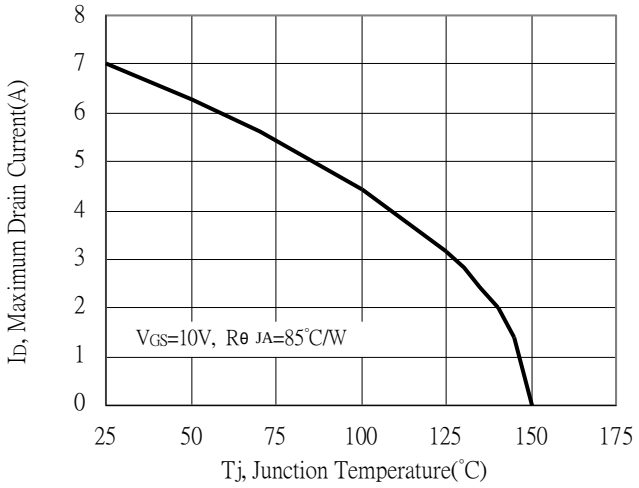
Gate Charge Characteristics



Maximum Safe Operating Area

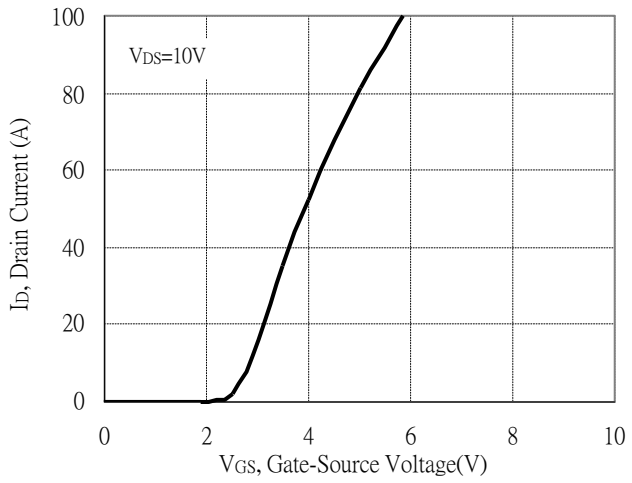


Maximum Drain Current vs Junction Temperature

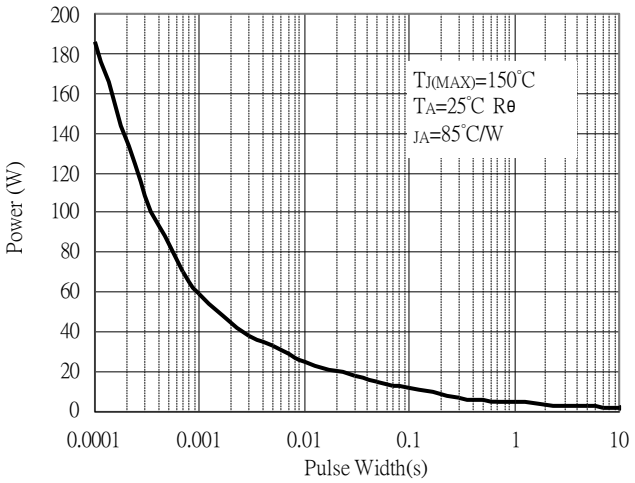


Typical Characteristics(Cont.)

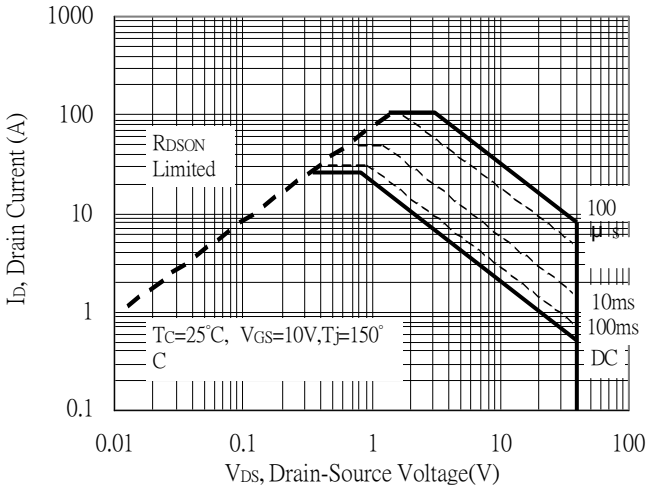
Typical Transfer Characteristics



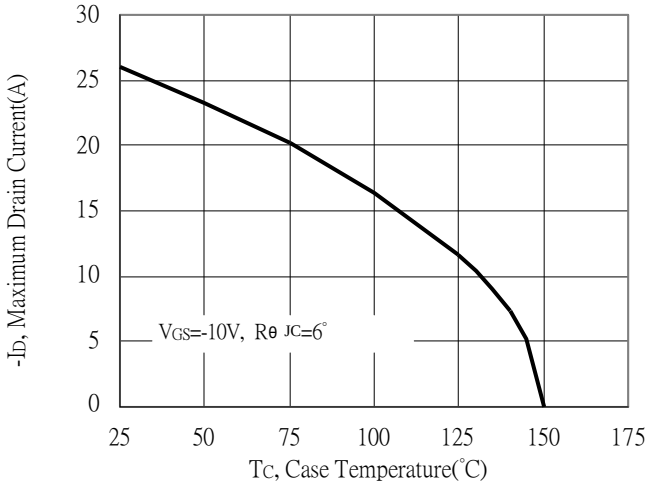
Single Pulse Maximum Power Dissipation



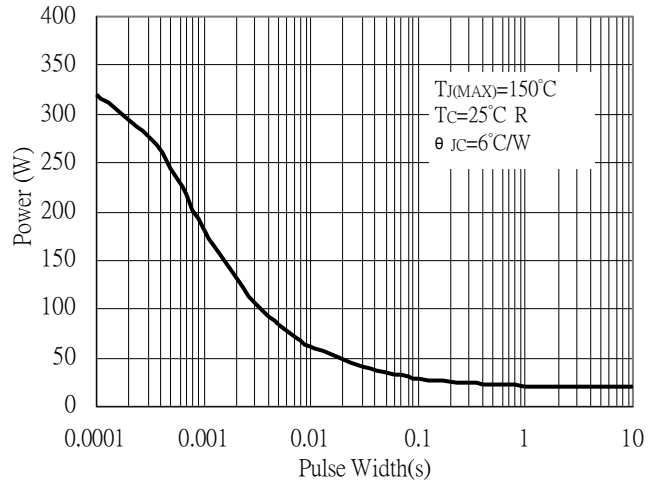
Maximum Safe Operating Area



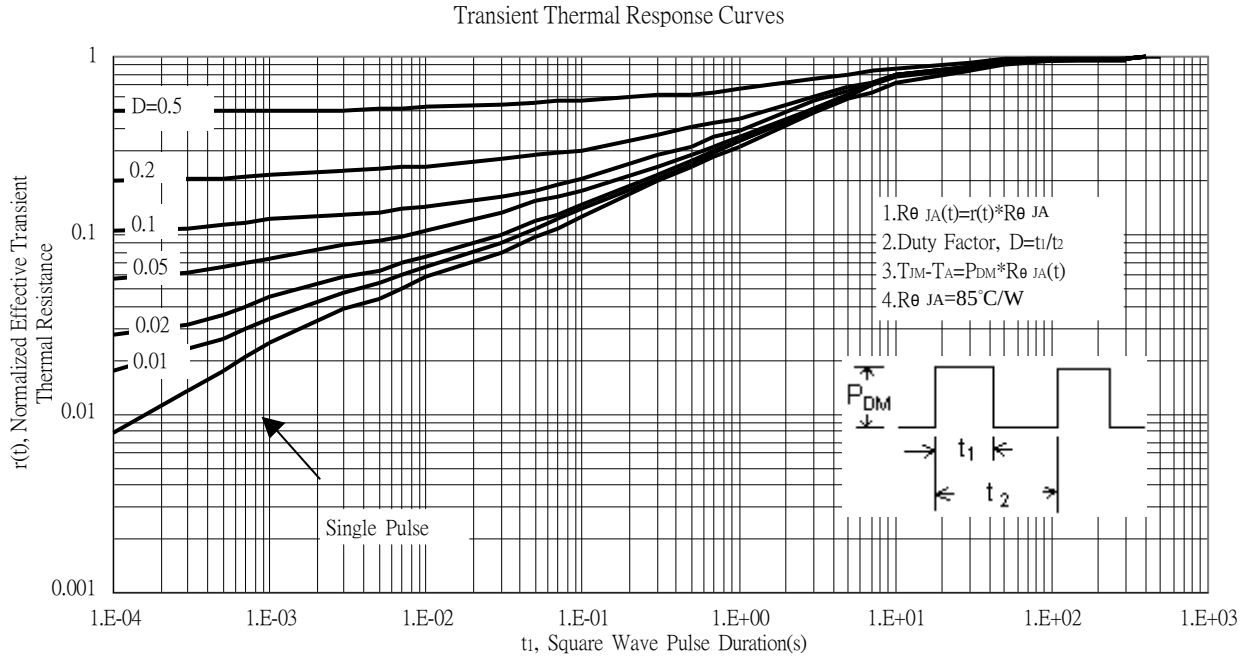
Maximum Drain Current vs Case Temperature

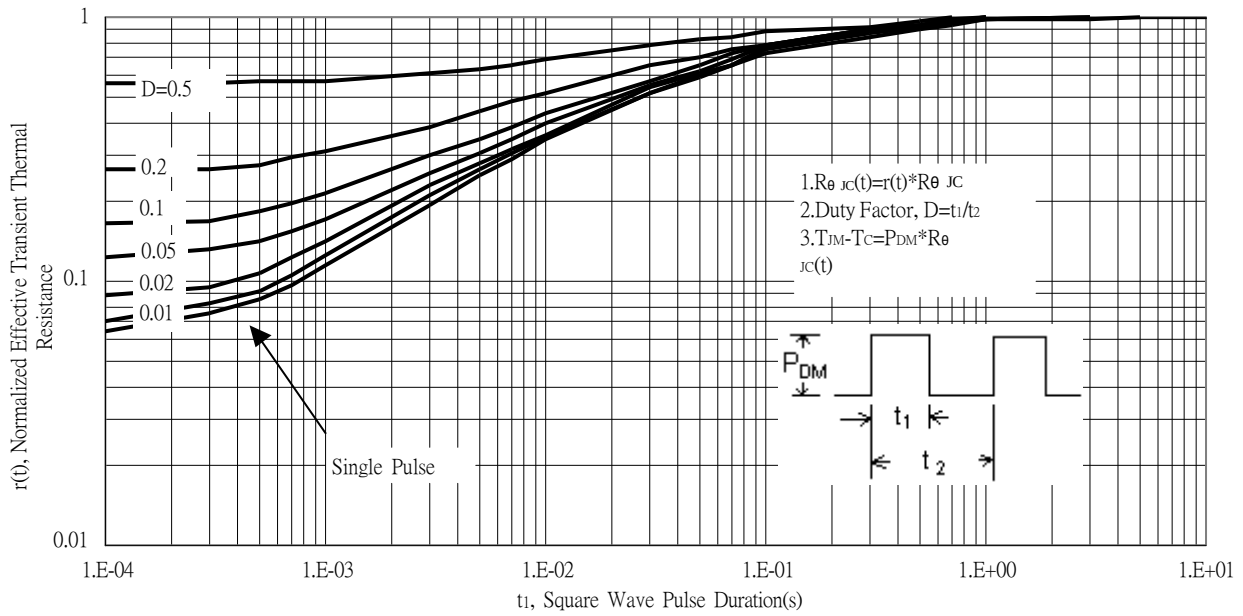


Single Pulse Maximum Power Dissipation

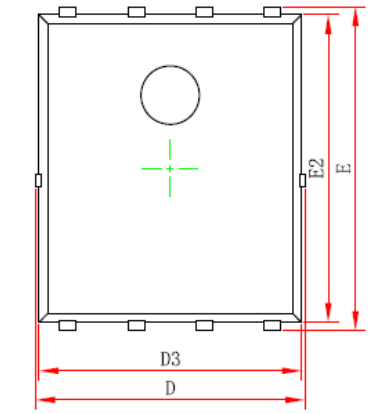


Typical Characteristics(Cont.)

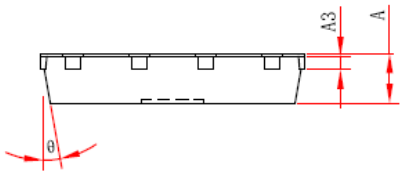




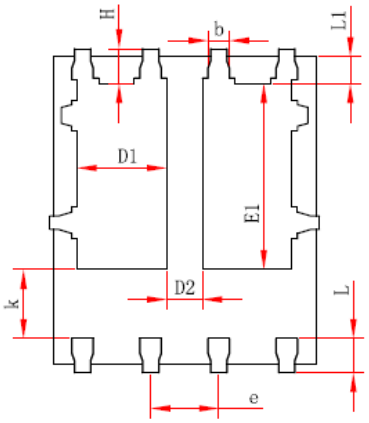
DFN5x6 Dimension



Top View

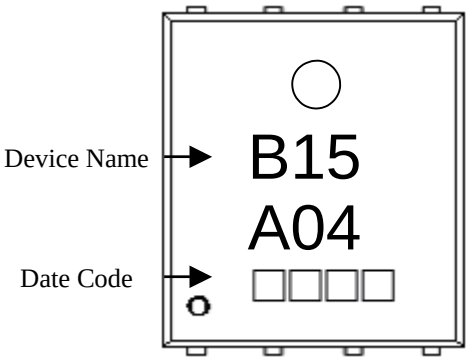


Side View



Bottom View

Marking:



8-Lead DFN5x6 Plastic 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	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°