FH3080G

N-Channel Trench Power MOSFET

Description

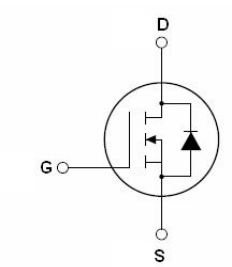
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on state resistance, provide superior switching performance, and with stand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

General Features

- V_{DSS}=30V , ID=75A
  $R_{DS(ON)}$ =4.3mΩ (Typ) @V_{GS}=10V
  $R_{DS(ON)}$ =7.2mΩ (Typ) @V_{GS}=4.5V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green device available

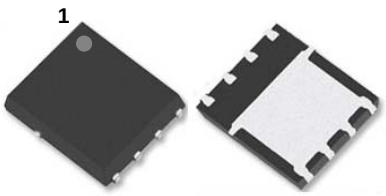
Applications

- Motor Drives
- UPS
- DC-DC Converter



Schematic diagram

Marking and pin Assignment



PDFN5X6-8L top and bottom view

Symbol	Parameter	Value	Units
V_{DS}	Drain-Source Voltage	30	V
I_D	Drain Current - Continuous (TC= 25°C)	75	A
	- Continuous (TC= 100°C)	47*	A
I_{DM}	Drain Current - Pulsed (Note 1)	220*	A
V_{GS}	Gate-Source Voltage	± 20	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	95	mJ
P_D	Power Dissipation (TC = 25°C)	46	W
	- Derate above 25°C		
T_j , T_{stg}	Operating and Storage Temperature Range	-55 to +150	°C

* Drain current limited by maximum junction temperature

Thermal Characteristics

Symbol	Parameter	Value	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	2.741	°C/W

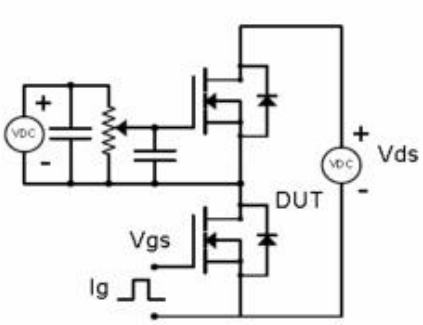
Electrical Characteristics T_C = 25°C unless otherwise noted

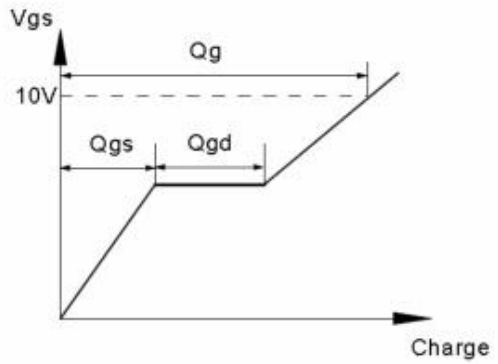
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 μA	30			V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 29.5 V, V_{GS} = 0 V			1	μA
I_{GSSF}	Gate Leakage Current, Forward	V_{GS} = 20 V, V_{DS} = 0 V			100	nA
I_{GSSR}	Gate Leakage Current, Reverse	V_{GS} = -20 V, V_{DS} = 0 V			-100	nA
On Characteristics						
$V_{GS(TH)}$	Gate Threshold voltage	V_{DS} = V_{GS}, I_D = 250 uA	1.0	1.5	2.0	V
$R_{DS(On)}$	Drain-Source on-state resistance	V_{GS} = 10 V, I_D = 30 A		4.3	6.5	mΩ
		V_{GS} = 4.5 V, I_D = 20 A		7.2	10	mΩ
Dynamic Characteristics						
C_{iss}	Input capacitance	VDS=15V, VGS=0V, F=1.0Mhz		1560		pF
C_{oss}	Output capacitance			246		pF
C_{rss}	Reverse transfer capacitance			225		pF
Switching Characteristics						
$t_{d(on)}$	Turn On Delay Time	VDD=20V, ID=54A, VGS=10V, RG=4.7Ohm (Note 3, 4)		3.2		ns
t_r	Rising Time			19.6		ns
$t_{d(off)}$	Turn Off Delay Time			29.2		ns
t_f	Fall Time			18.8		ns
Q_g	Total Gate Charge	VDD=15V, ID=30A, VGS=10V (Note 3, 4)		33.7		nC
Q_{gs}	Gate-Source Charge			4.5		nC
Q_{gd}	Gate-Drain Charge			7.4		nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current				50	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current				200	A
V_{SD}	Diode Forward Voltage	V_{GS}= 0 V, I_S = 30 A			1.2	V
t_{rr}	Body Diode Revese Recovery Time	Vds=32V,Ids=20A, di/dt=100A/us		13		ns
Q_{rr}	Body Diode Revese Recovery Charge			6		nC

Notes:
1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. L = 0.5 mH, V_{DD} = 20V, R_G = 25 Ω, Starting T_j = 25°C
3. I_{SD} ≤ 100A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_j =25°C
4. Pulse Test : Pulse width ≤ 300us, Duty cycle ≤ 2%
5. Essentially independent of operating temperature

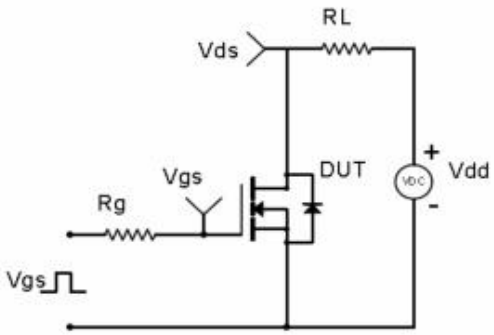
Test Circuit & Waveform

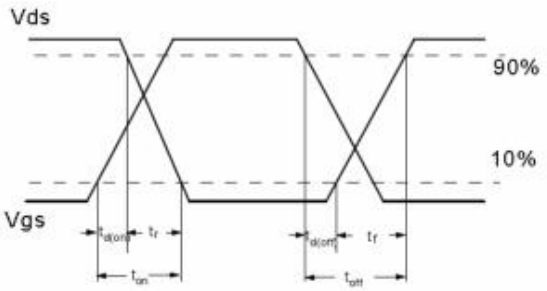
Gate Charge Test Circuit & Waveform



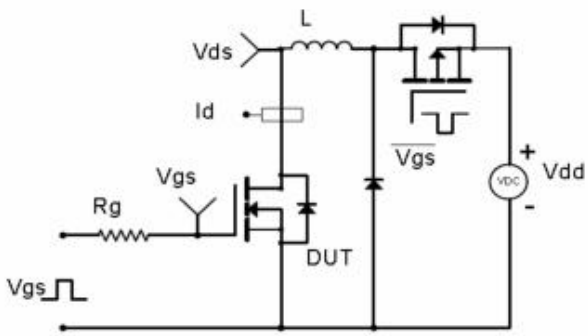


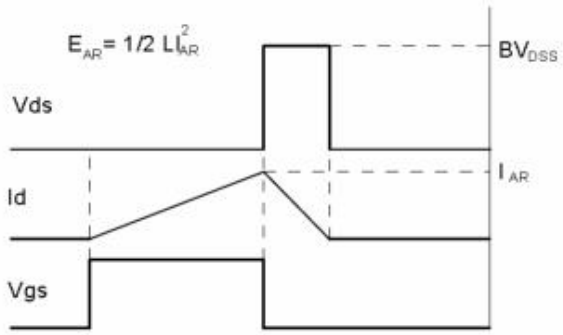
Resistive Switching Test Circuit & Waveforms



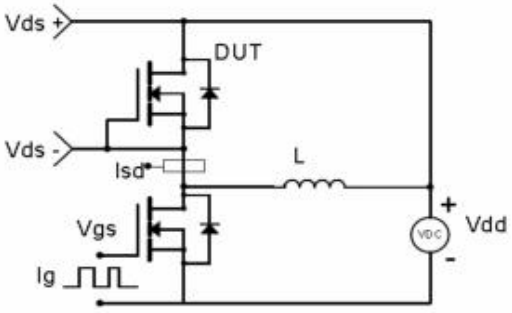


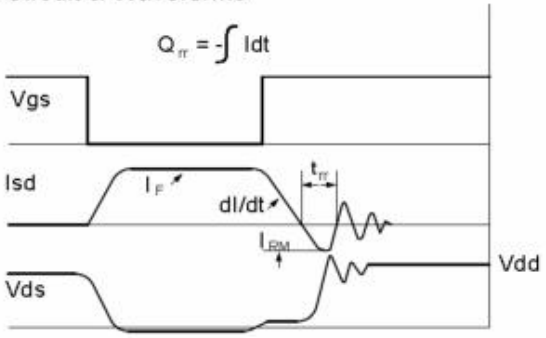
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms





Diode Recovery Test Circuit & Waveforms





Typical Performance Characteristics

Fig.1 Power Dissipation Derating Curve

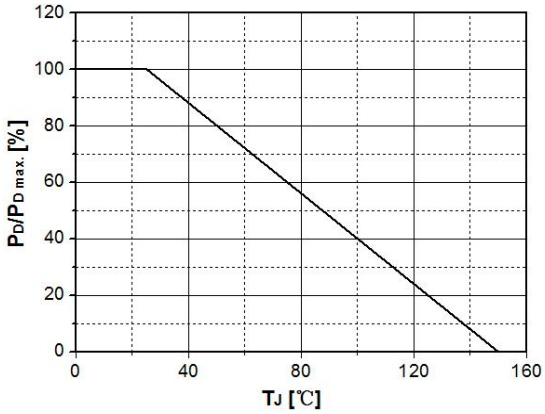


Fig.2 Avalanche Energy Derating Curve vs. Junction Temperature

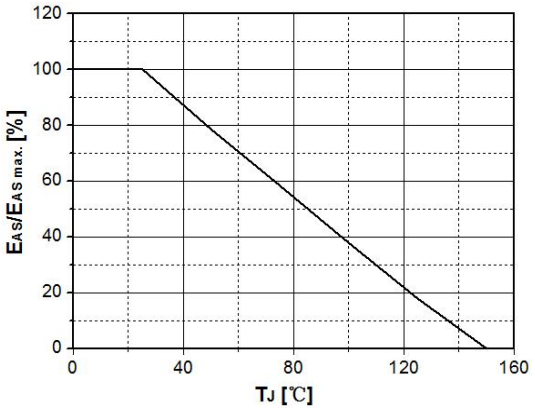


Fig.3 Typical Output Characteristics

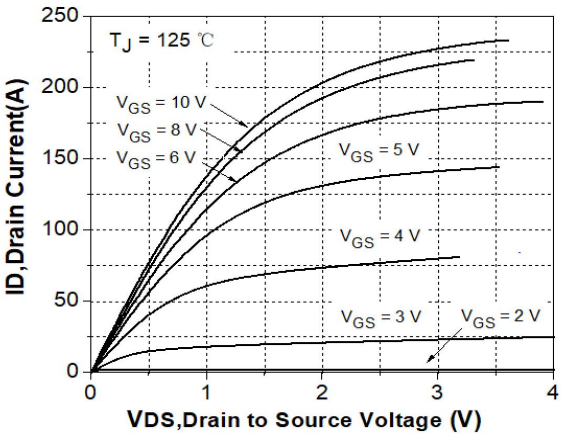


Fig. 4 Transconductance vs. Drain Current

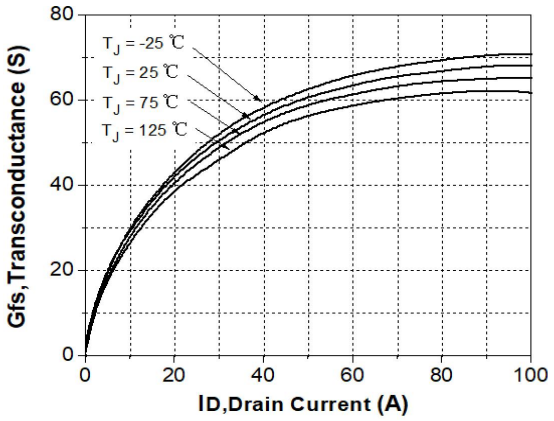


Fig.5 Typical Transfer Characteristics

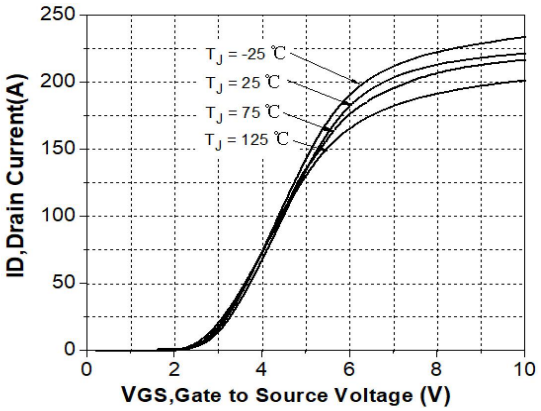


Fig. 6 State Resistance vs. Drain Current @-25℃

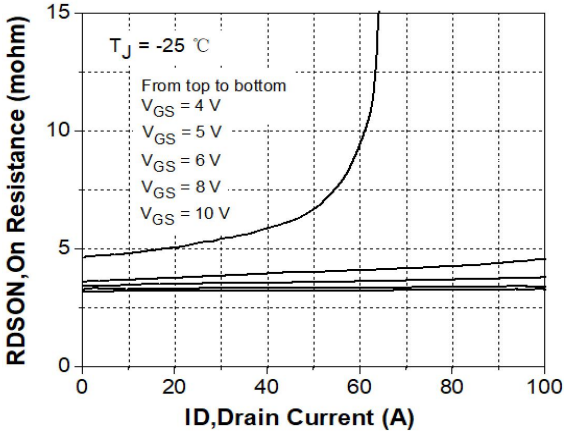


Fig.7 State Resistance vs. Drain Current @25℃

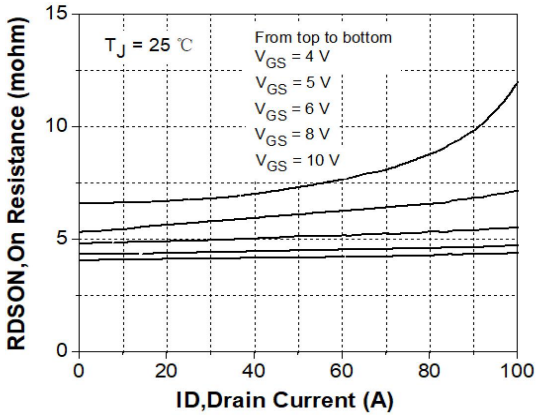


Fig. 8 State Resistance vs. Drain Current @125℃

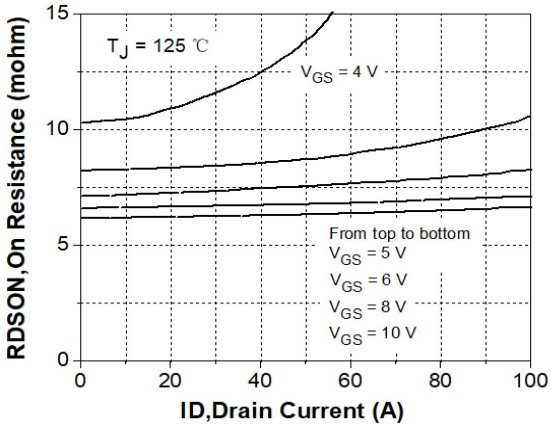


Fig.9 Typical Capacitance vs. Drain Source Voltage

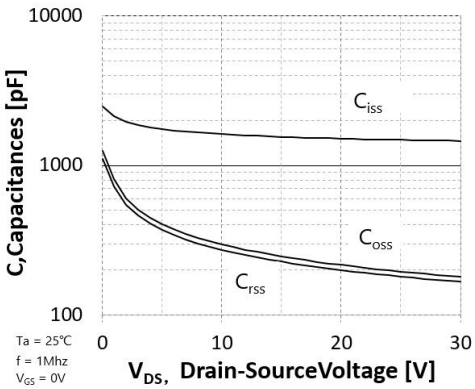


Fig.10 Dynamic Input Characteristics

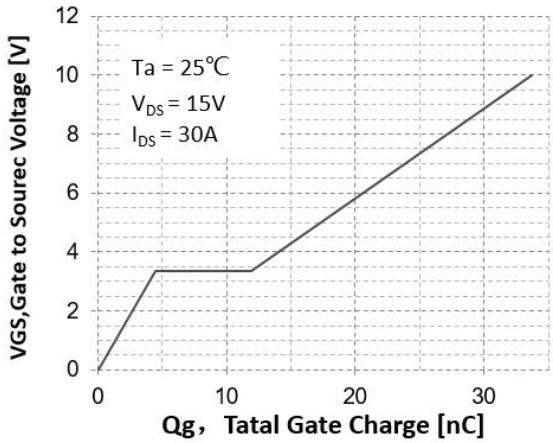


Fig.11 Breakdown Voltage vs. Junction Temperature

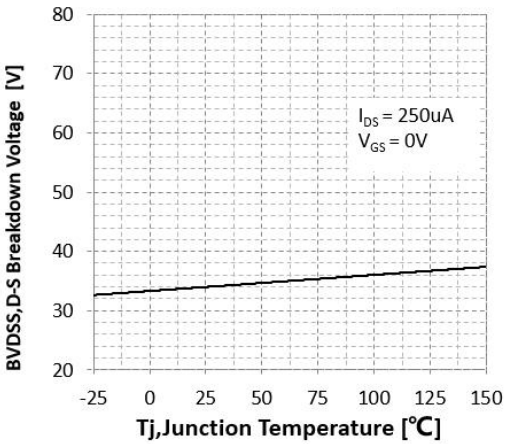


Fig. 12 Gate Threshold Voltage vs. Junction Temperature

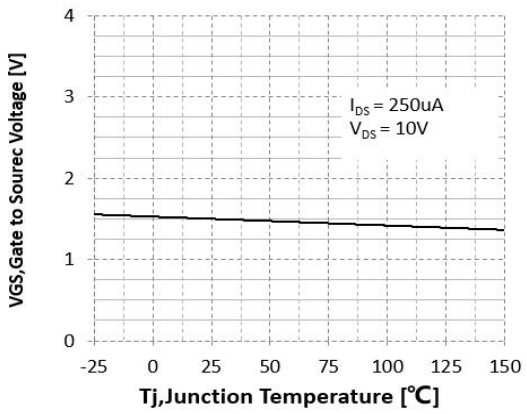


Fig.13 On-Resistance Variation vs. Junction Temperature

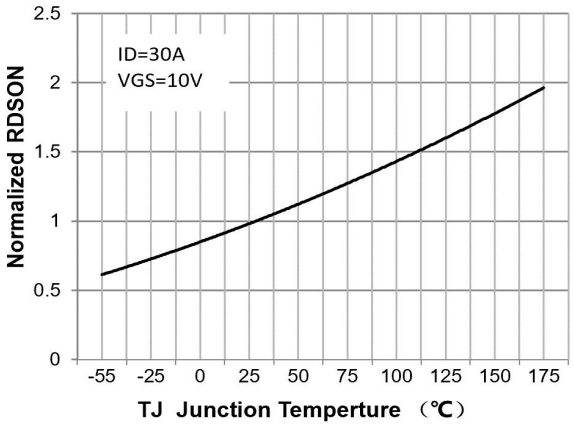


Fig.14 Maximum Drain Current vs. Case Temperature

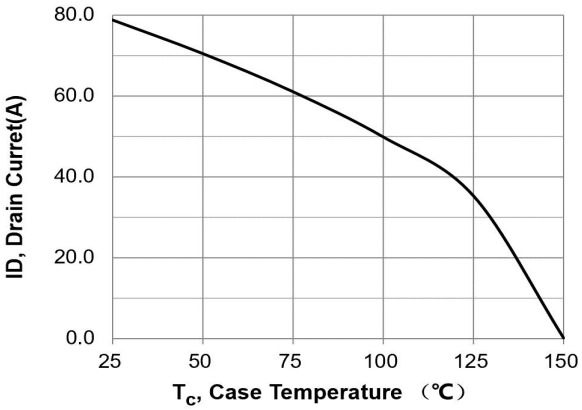


Fig.15 Body Diode Forward Voltage Vs Reverse Drain Current

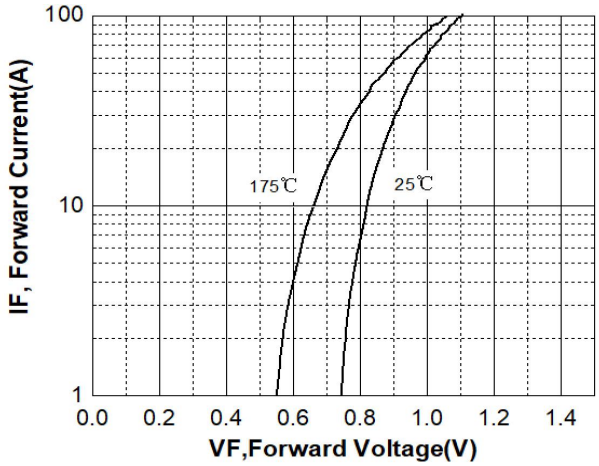


Fig.16 Safe Operating Area

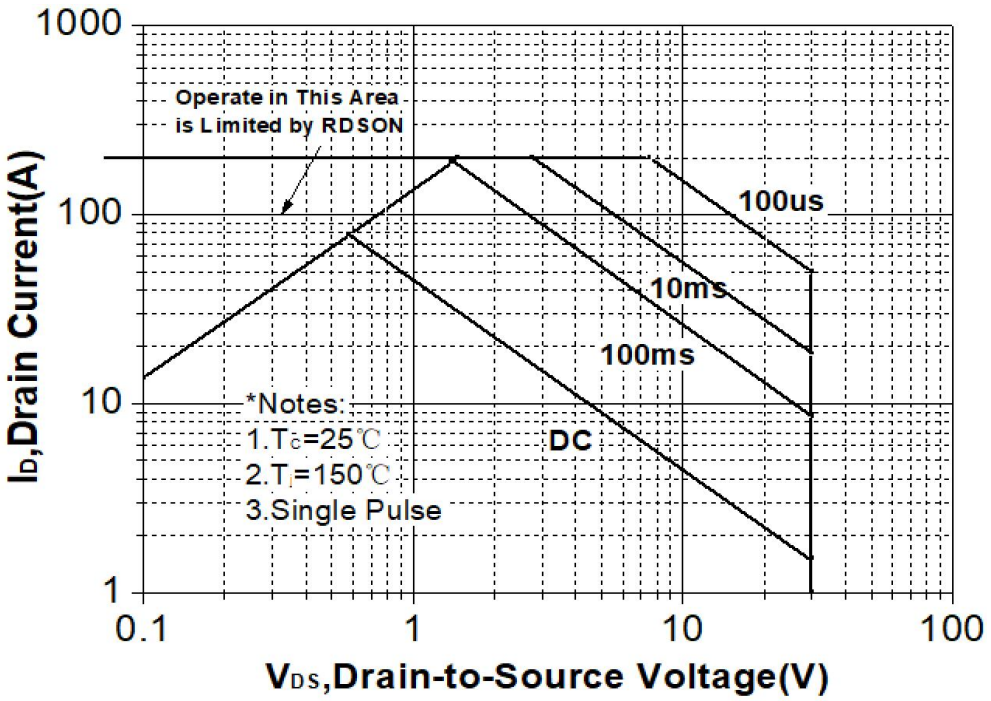
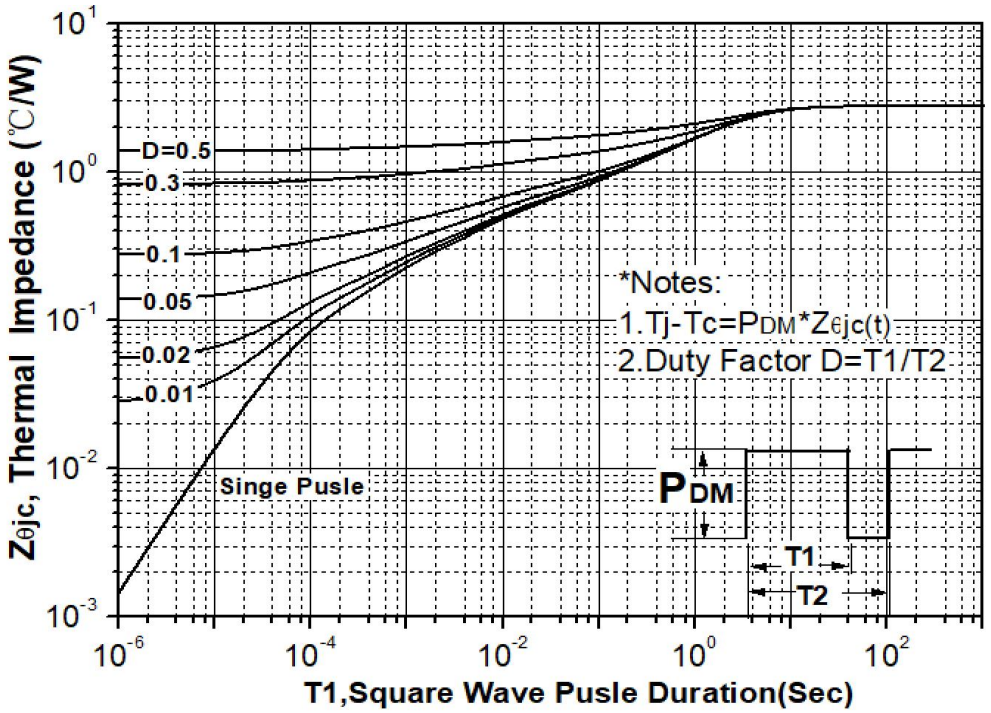
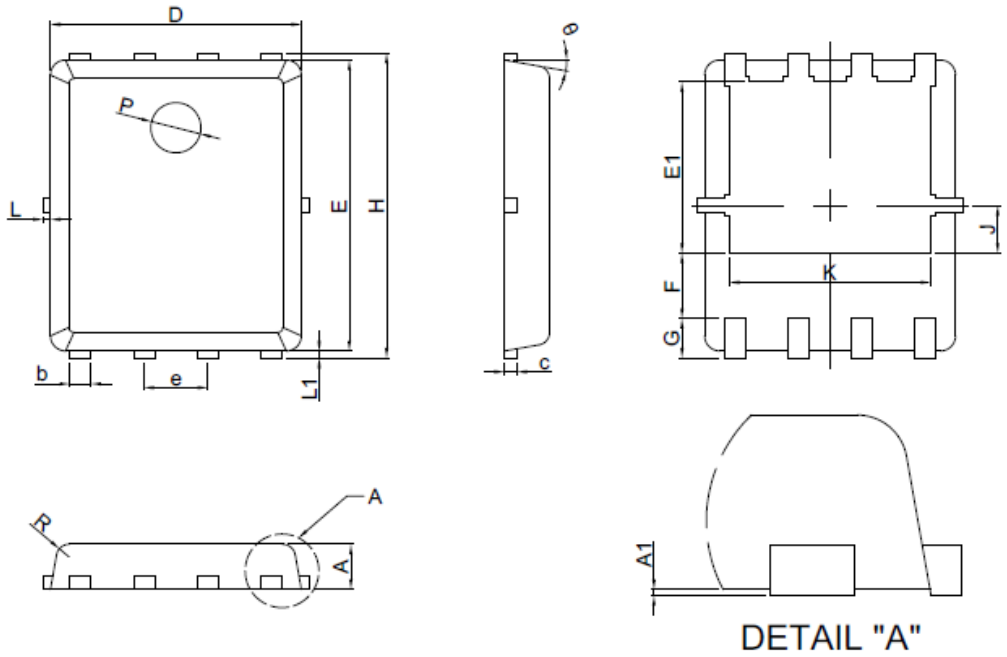


Fig. 17 Transient Thermal Response Curve



Package Information：PDFN5x6-8L



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	0.80	1.00
A1	0.00	0.05
b	0.35	0.49
c	0.254REF	
D	4.80	5.20
F	1.40REF	
E	5.60	5.90
e	1.27BSC	
H	5.80	6.20
L1	0.10	0.18
G	0.60REF	
K	4.00REF	
L	-	0.15
J	0.95BSC	
P	1.00REF	
E1	3.40REF	
θ	6°	14°
R	0.25REF	