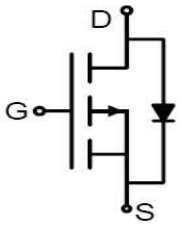
AP60P20G

P-Channel Enhancement Mosfet

DATA SHEET

Feature

- -20V,-60A
  $R_{DS(ON)}$ <7.0mΩ @V_{GS}=-4.5V TYP=5.2 mΩ
  $R_{DS(ON)}$ <9.0mΩ @V_{GS}=-2.5V TYP=6.6 mΩ
  Advanced Trench Technology
- Lead free product is acquired
- Excellent $R_{DS(ON)}$ and Low Gate Charge



Schematic Diagram

Application

- PWM applications
- Load Switch
- Power management



Marking and pin assignment

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
60P20G	AP60P20G	PDFN5X6	13 inch	-	5000

ABSOLUTE MAXIMUM RATINGS (T_J=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	±12	V
Continuous Drain Current (T_c =25℃)	I_D	-60	A
Continuous Drain Current (T_c =100℃)	I_D	-42	A
Pulsed Drain Current (1)	I_{DM}	-240	A
Single Pulsed Avalanche Energy (4)	E_{AS}	110	mJ
Power Dissipation	P_D	100	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	1.25	℃/W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	48	℃/W
Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	-55~ +150	℃

MOSFET ELECTRICAL CHARACTERISTICS(T_J=25℃ unless otherwise noted)

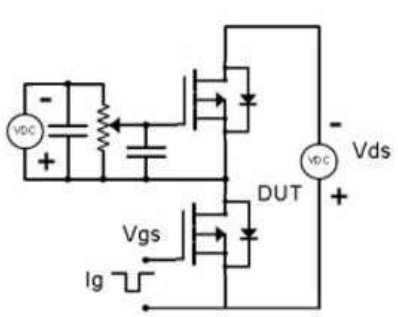
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =-250μA	-20	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS} =-20V, V_{GS} = 0V	-	-	1	μA
Gate-body leakage current	I_{GSS}	V_{GS} =±12V, V_{DS} = 0V	-	-	±100	nA
Gate threshold voltage(3)	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =-250μA	-0.5	-0.7	-1.0	V
Drain-source on-resistance(3)	$R_{DS(on)}$	V_{GS} =-4.5V, I_D =-30A	-	5.2	7.0	mΩ
		V_{GS} =-2.5V, I_D =-20A	-	6.6	9.0	
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =-10V, V_{GS} =0V, f =1MHz	-	5230	-	pF
Output Capacitance	C_{oss}		-	640	-	
Reverse Transfer Capacitance	C_{rss}		-	650	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DD}=-10V, I_D=-15A, R_L=0.5Ω V_{GS}=-4.5V, R_G=2.7Ω	-	9	-	ns
Turn-on rise time	t_r		-	53	-	
Turn-off delay time	$t_{d(off)}$		-	225	-	
Turn-off fall time	t_f		-	33	-	
Total Gate Charge	Qg	VDS=-10V, ID=-15A, VGS=-4.5V	-	68	-	nC
Gate-Source Charge	Qgs		-	8.5	-	
Gate-Drain Charge	Qgd		-	19	-	
Source-Drain Diode characteristics						
Diode Forward voltage(2)	V_{DS}	V_{GS} =0V, I_S=-20A	-	-	-1.2	V
Diode Forward current(3)	I_S		-	-	-60	A

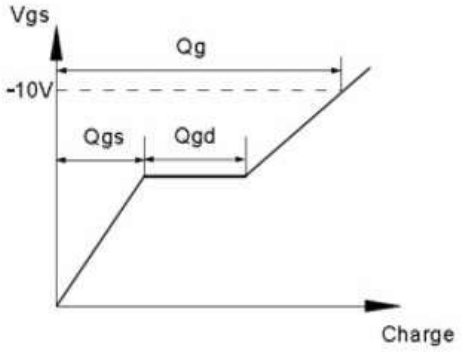
Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. Pulse Test: pulse width≤300μs, duty cycle≤2%
3. Surface Mounted on FR4 Board,t≤10 sec
4. EAS Condition:T_J=25℃,V_{DD}=-10V,R_G=25Ω,L=0.5mH

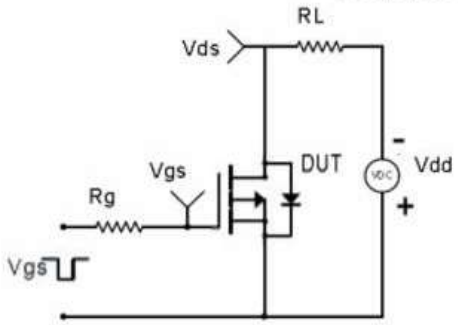
Test Circuit & Waveform

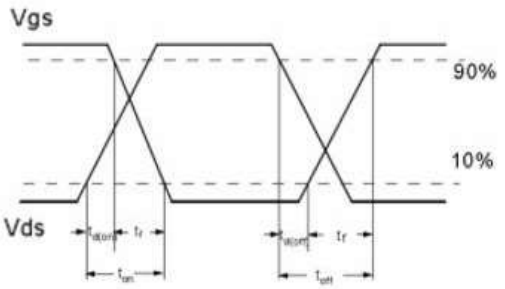
Gate Charge Test Circuit & Waveform



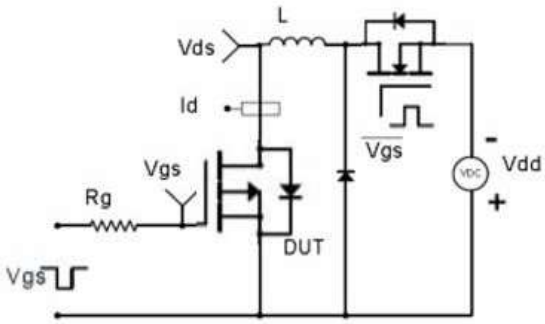


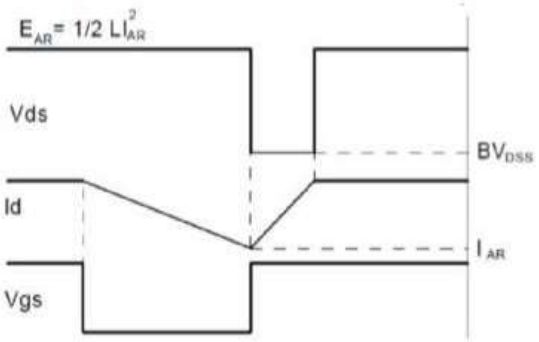
Resistive Switching Test Circuit & Waveforms



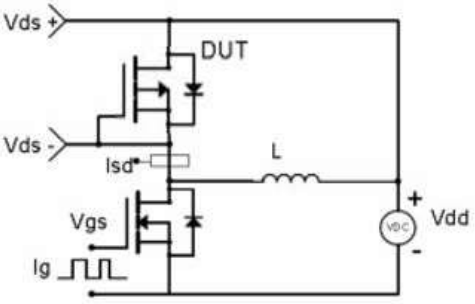


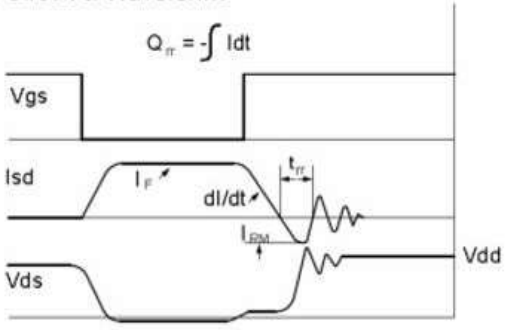
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms





Diode Recovery Test Circuit & Waveforms





Typical Performance Characteristics

Fig.1 Power Dissipation Derating Curve

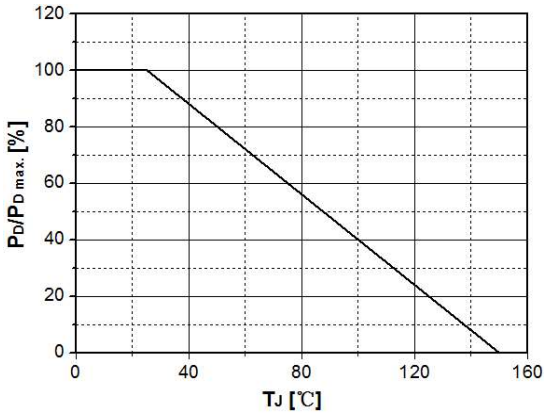


Fig.2 Avalanche Energy Derating Curve vs. Junction Temperature

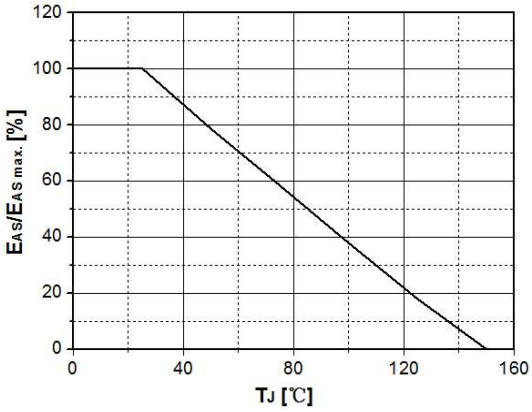


Fig.3 Typical Output Characteristics

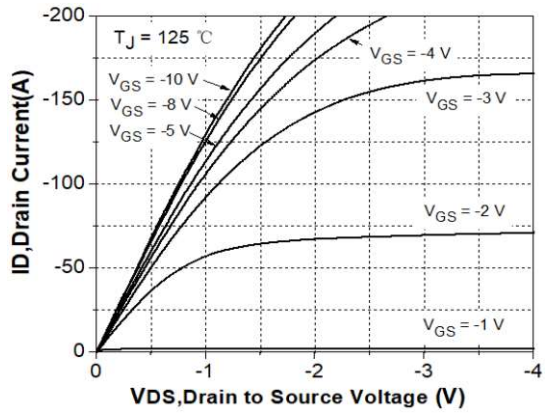


Fig. 4 Transconductance vs. Drain Current

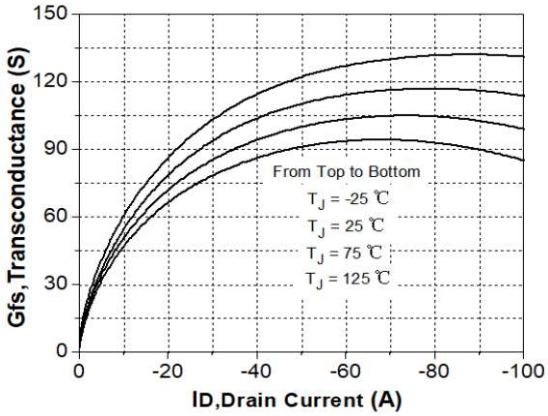


Fig.5 Typical Transfer Characteristics

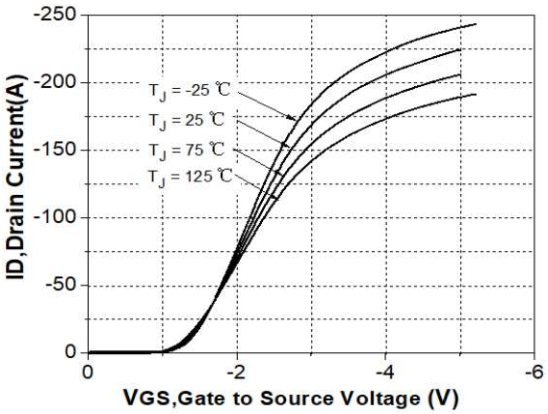


Fig. 6 State Resistance vs. Drain Current @-25℃

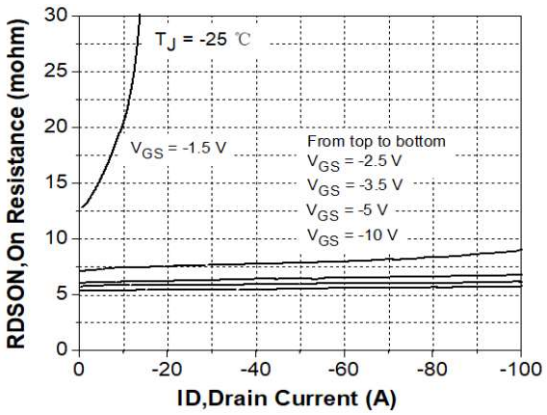


Fig.7 State Resistance vs. Drain Current @25℃

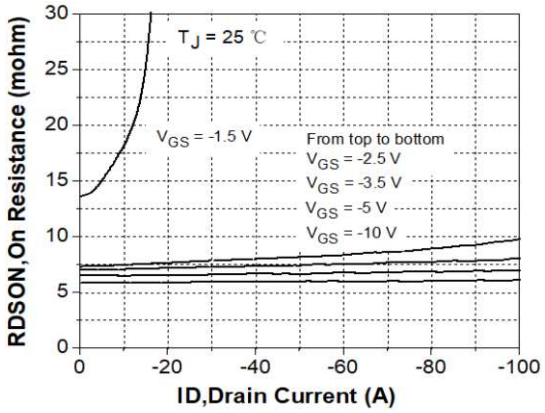


Fig. 8 State Resistance vs. Drain Current @125℃

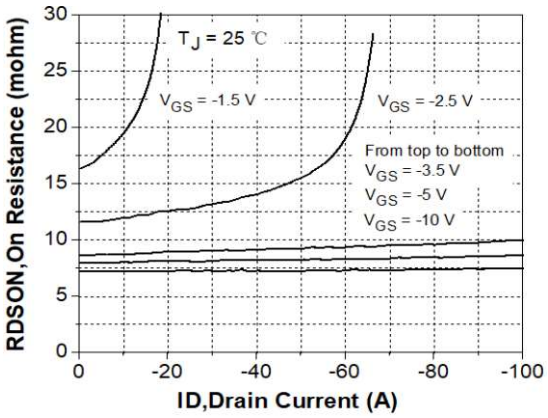


Fig.9 Typical Capacitance vs. Drain Source Voltage

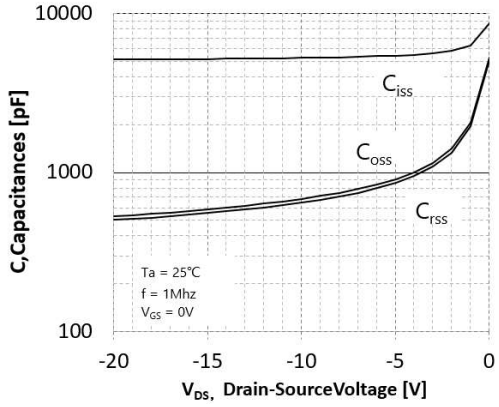


Fig.10 Dynamic Input Characteristics

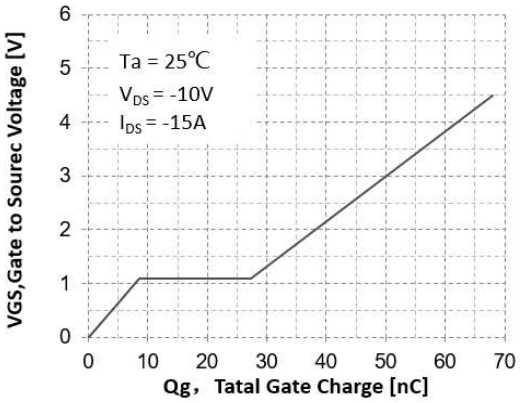


Fig.11 Breakdown Voltage vs. Junction Temperature

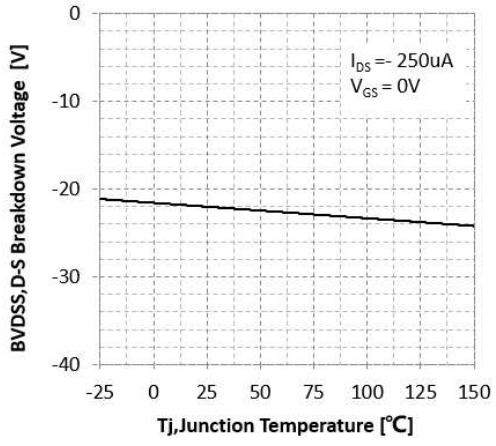


Fig. 12 Gate Threshold Voltage vs. Junction Temperature

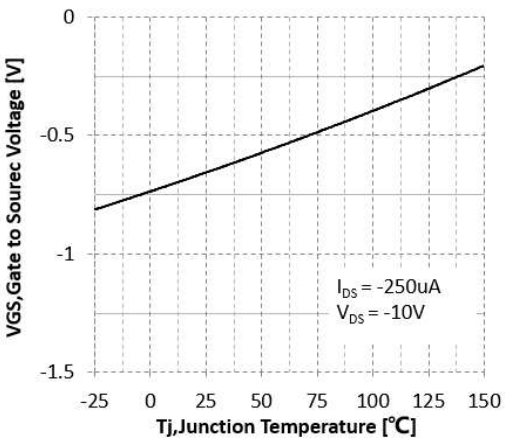


Fig.13 On-Resistance Variation vs. Junction Temperature

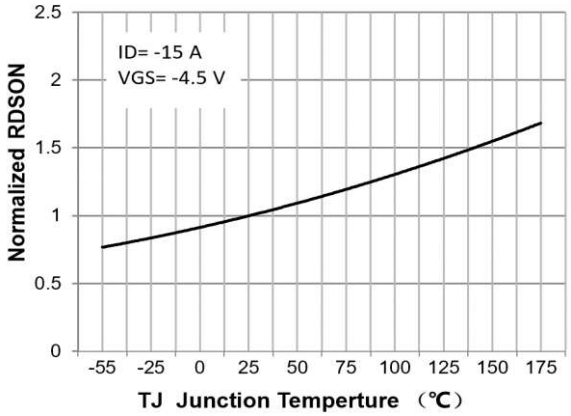


Fig.14 Maximum Drain Current vs. Case Temperature

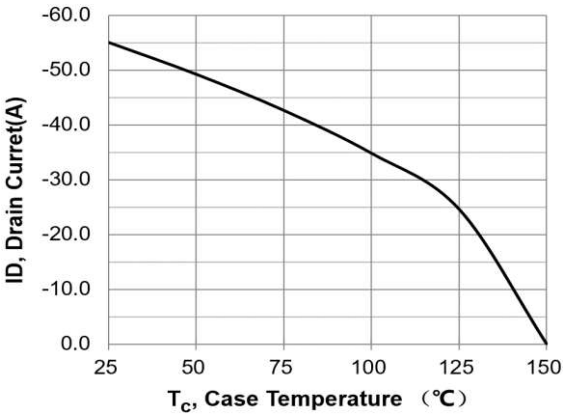


Fig.15 Body Diode Forward Voltage Vs Reverse Drain Current

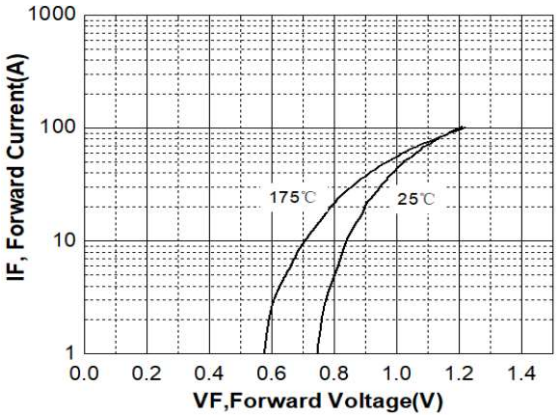


Fig.16 Safe Operating Area

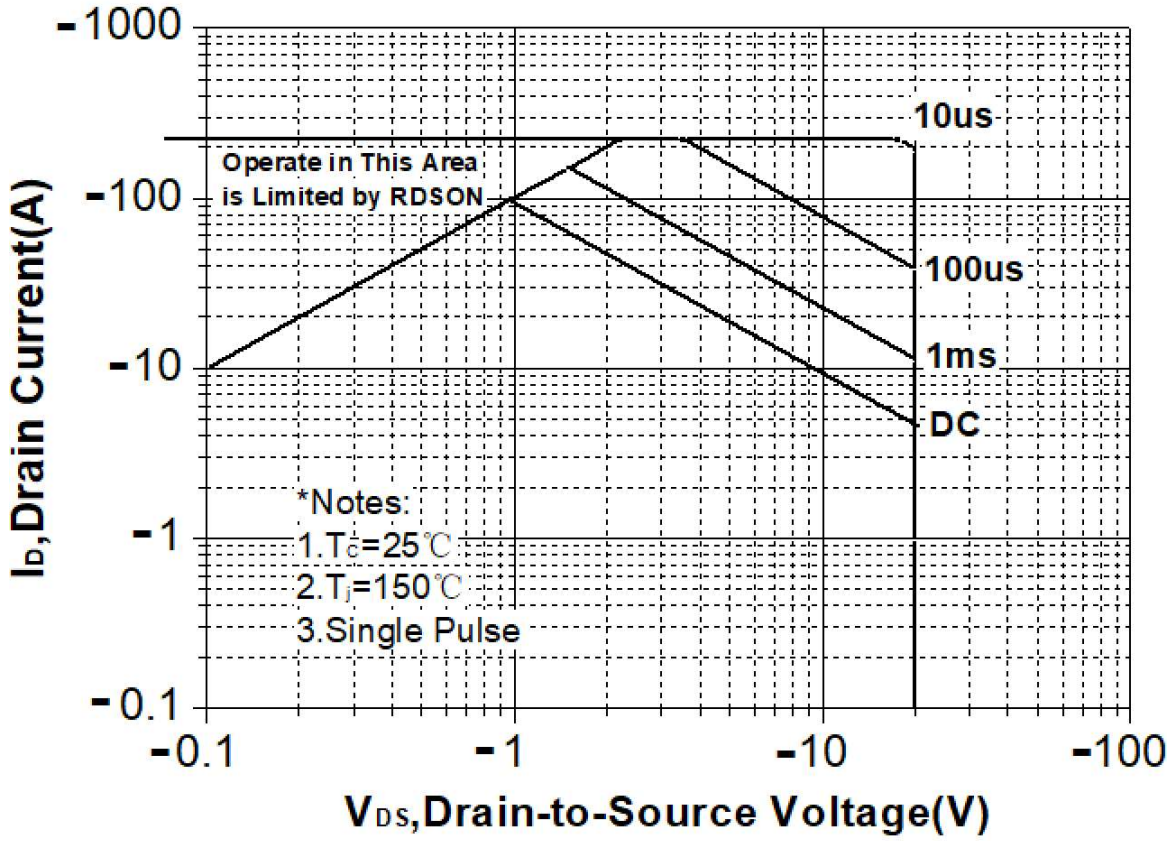
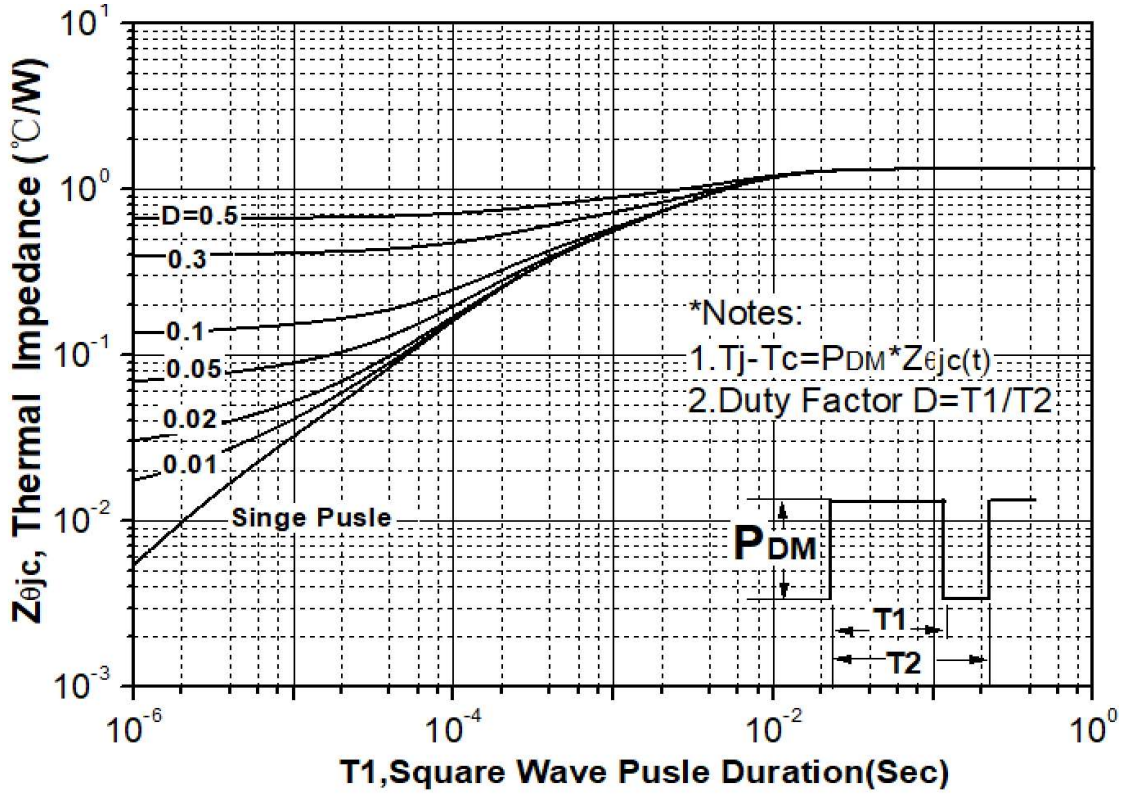
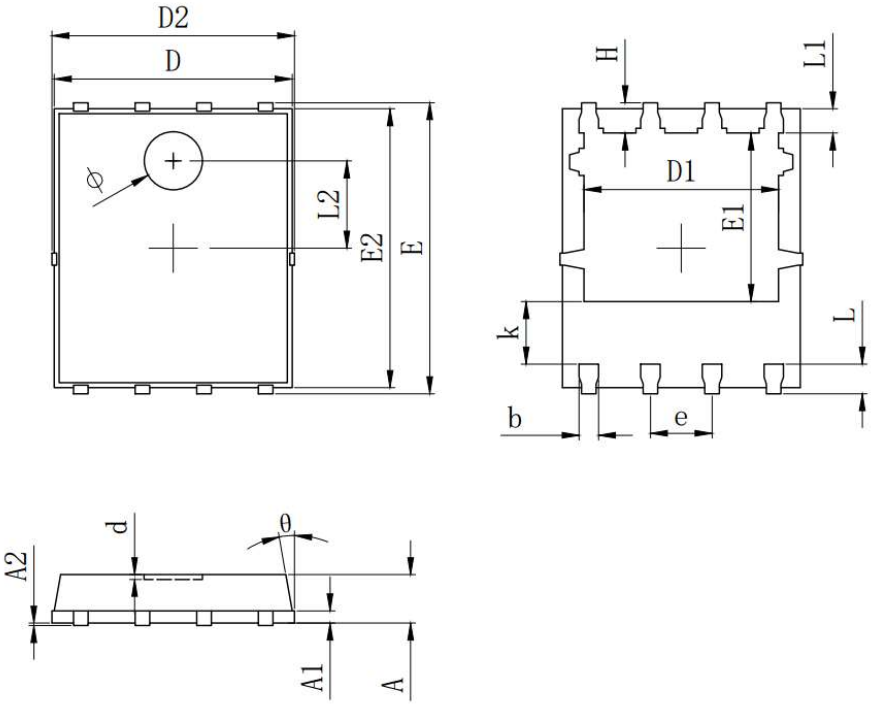


Fig. 17 Transient Thermal Response Curve



PDFN5X6 Package Information



SYMBOL	MILLIMETER		
	MIN	Typ.	MAX
A	0.900	1.000	1.100
A1	0.254 REF.		
A2	0~0.05		
D	4.824	4.900	4.976
D1	3.910	4.010	4.110
D2	4.924	5.000	5.076
E	5.924	6.000	6.076
E1	3.375	3.475	3.575
E2	5.674	5.750	5.826
b	0.350	0.400	0.450
e	1.270 TYP.		
L	0.534	0.610	0.686
L1	0.424	0.500	0.576
L2	1.800 REF.		
k	1.190	1.290	1.390
H	0.549	0.625	0.701
θ	8°	10°	12°
Φ	1.100	1.200	1.300
d			0.100

Revision History

Revision	Release	Remark
V1.0	2023/03/21	Initial Release

Disclaimer

The information given in this document describes the independent performance of the product,but similar performance is not guaranteed under other working conditions,and cannot be guaranteed when installed with other products or equipment.To achieve the required performance of the product in actual scenarios,the customer should conduct a complete application test to assess the functionality of the product.

Allpower assumes no responsibility for equipment failures result from using products at values that exceed the ratings,operating conditions,or other parameters listed in the product specifications.

The product described in this specification is not applicable for aerospace or other applications which requires high reliability.Customers using or selling these products for use in medical,life-saving,or life-sustaining applications do so at their own risk and agree to fully indemnify.

Due to product or technical improvements,the information described or contained herein may be changed without prior notice.