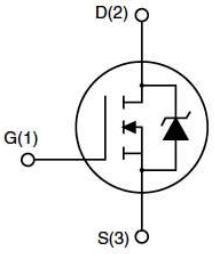
Feature

- 40V,160A
  $R_{DS(ON)}$ <1.3mΩ@V_{GS}=10V (TYP:1.1mΩ)
  $R_{DS(ON)}$ <1.8mΩ@V_{GS}=4.5V (TYP:1.6mΩ)
- Split Gate 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)
G013N04G	APG013N04G	PDFN5X6	13 inch	-	5000

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current (T_C=25℃)	I_D	160	A
Continuous Drain Current (T_C=100℃)	I_D	100	A
Pulsed Drain Currenr (1)	I_{DM}	480	A
Singel Pulsed Avalanche Energy (2)	E_{AS}	473	mJ
Power Dissipation	P_D	65	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	1.9	℃/W
Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	-55~ +150	℃

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

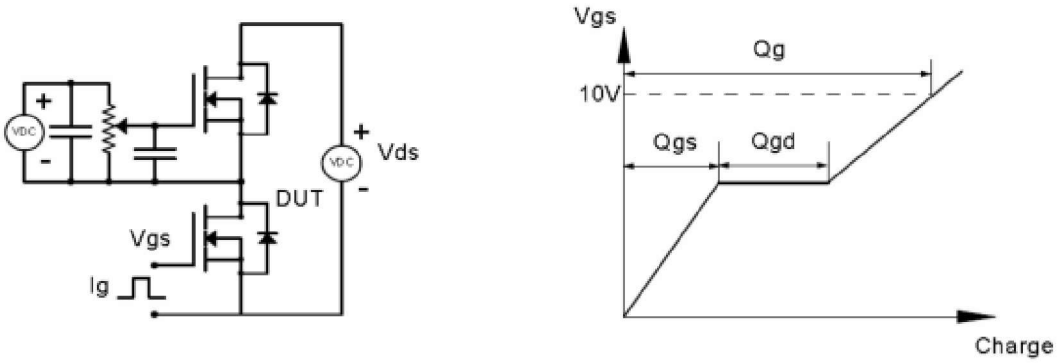
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =250μA	40	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS} =40V, V_{GS} = 0V	-	-	1	μA
Gate-body leakage current	I_{GSS}	V_{GS} =±20V, V_{DS} = 0V	-	-	±100	nA
Gate threshold voltage(3)	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	1.0	1.6	2.0	V
Drain-source on-resistance(3)	$R_{DS(on)}$	V_{GS} =10V, I_D =25A	-	1.1	1.3	mΩ
		V_{GS} =4.5V, I_D =25A	-	1.6	1.8	
Forward Threshold Voltage	g_{fs}	V_{DS} =2V, I_D =25A	90	-	-	S
Gate Resistance	R_g	V_{DS} =V_{GS} =0V, f =1MHz	-	2	-	Ω
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =25V, V_{GS} =0V, f =1MHz	-	3876	-	pF
Output Capacitance	C_{oss}		-	1169	-	
Reverse Transfer Capacitance	C_{rss}		-	29	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DD}=20V, I_D=25A, V_{GS}=10V, R_G=4.7Ω	-	12	-	ns
Turn-on rise time	t_r		-	30	-	
Turn-off delay time	$t_{d(off)}$		-	79	-	
Turn-off fall time	t_f		-	38	-	
Total Gate Charge	Qg	VDS=20V, ID=55A, VGS=4.5V	-	30	-	nC
Gate-Source Charge	Qgs		-	10	-	
Gate-Drain Charge	Qgd		-	12	-	
Reverse Recovery Chrage	Qrr	I_F=50A,di/dt=100A/us		47		nC
Reverse Recovery Time	Trr	I_F=50A,di/dt=100A/us		50		ns
Source-Drain Diode characteristics						
Diode Forward voltage(3)	V_{DS}	V_{GS} =0V, I_S=50A	-	-	1.2	V
Diode Forward current(4)	I_S		-	-	160	A

Notes:

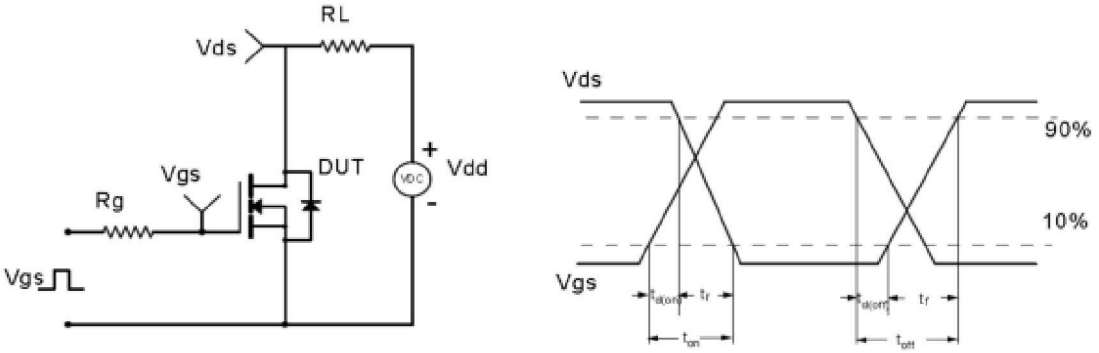
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition:T_J=25℃,V_{DD}=15V,R_G=25Ω,L=0.5mH
3. Pulse Test: pulse width≤300μs, duty cycle≤2%
4. Surface Mounted on FR4 Board,t≤10 sec

Test Circuit & Waveform

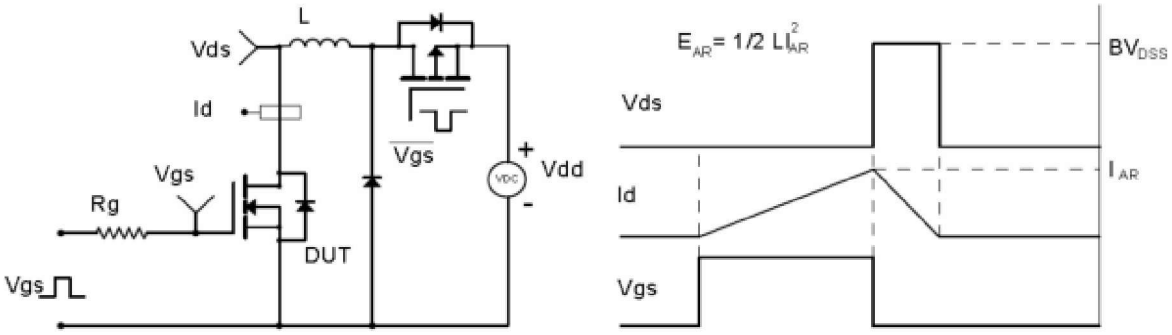
Gate Charge Test Circuit & Waveform



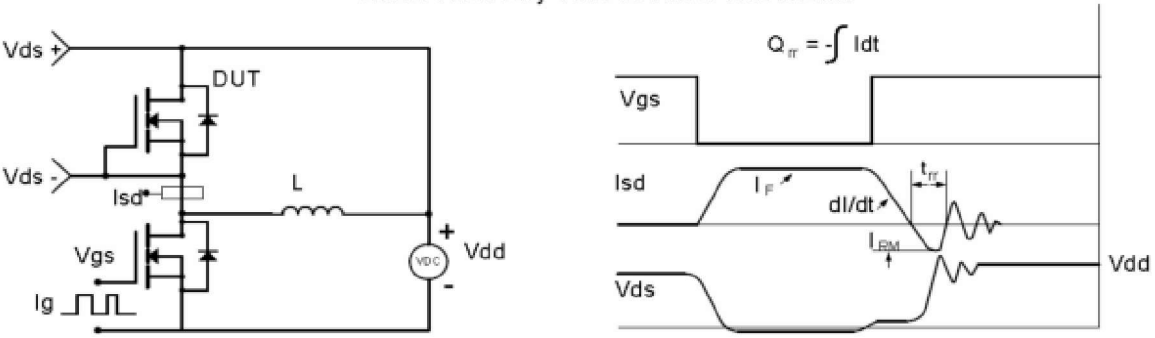
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Typical Performance Characteristics

Fig.1 Power Dissipation Derating Curve

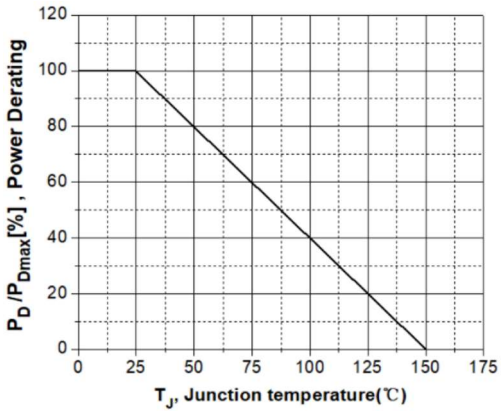


Fig.2 Avalanche Energy Derating Curve vs. Junction Temperature

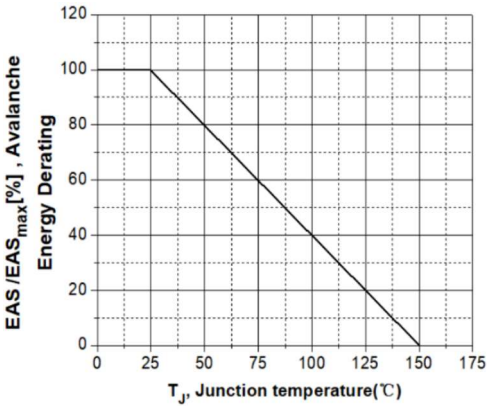


Fig.3 Typical Output Characteristics

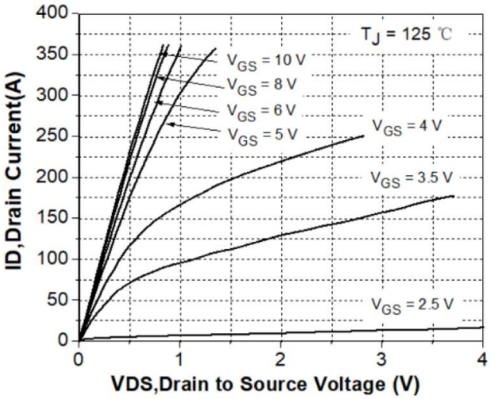


Fig. 4 Transconductance vs. Drain Current

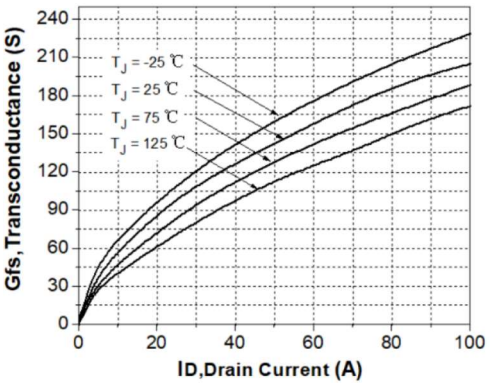


Fig.5 Typical Transfer Characteristics

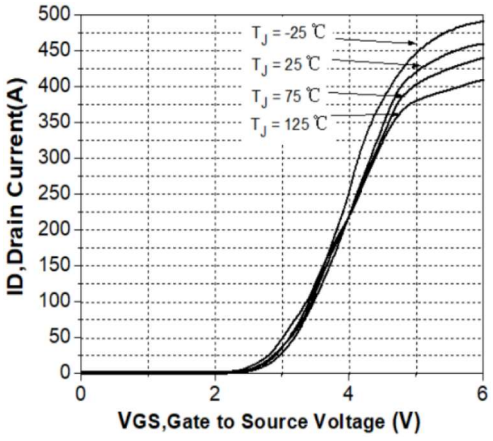


Fig. 6 State Resistance vs. Drain Current @-25℃

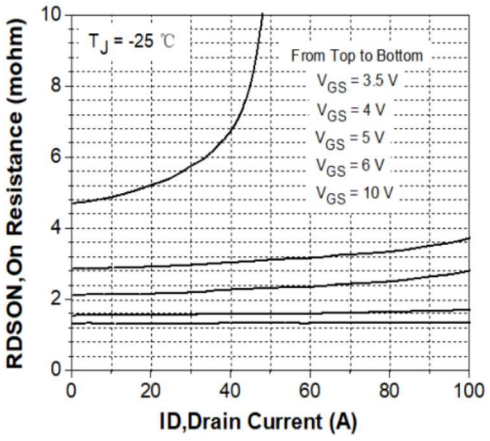


Fig.7 State Resistance vs. Drain Current @25℃

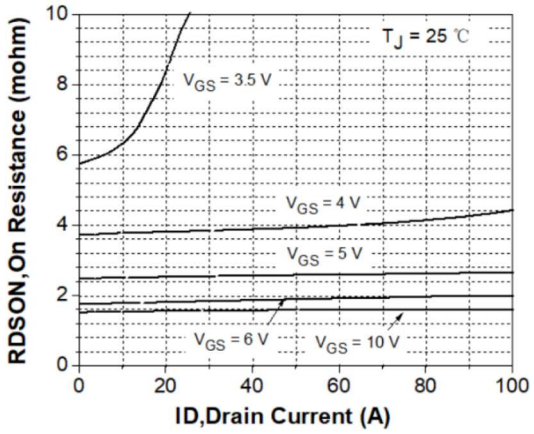


Fig. 8 State Resistance vs. Drain Current @125℃

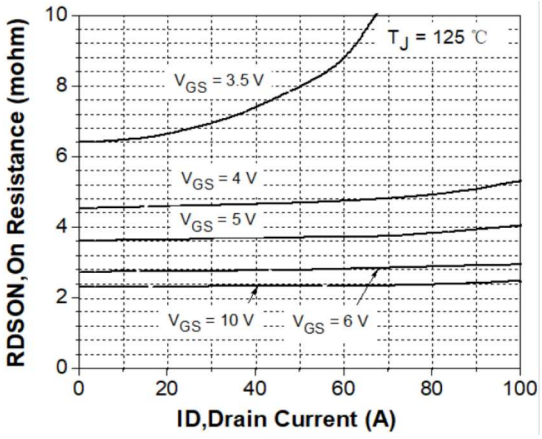


Fig.9 Typical Capacitance vs. Drain Source Voltage

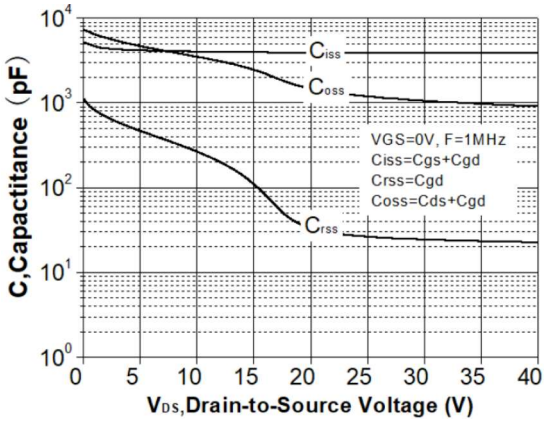


Fig.10 Dynamic Input Characteristics

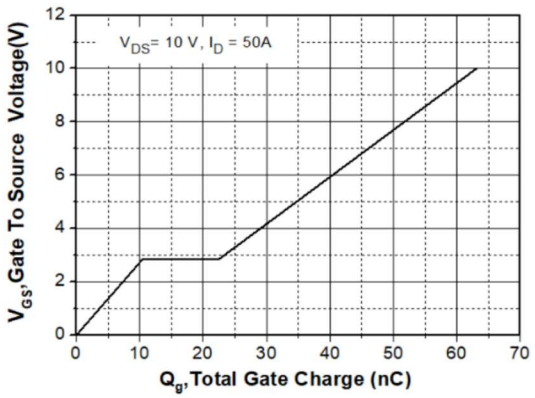


Fig.11 Breakdown Voltage vs. Junction Temperature

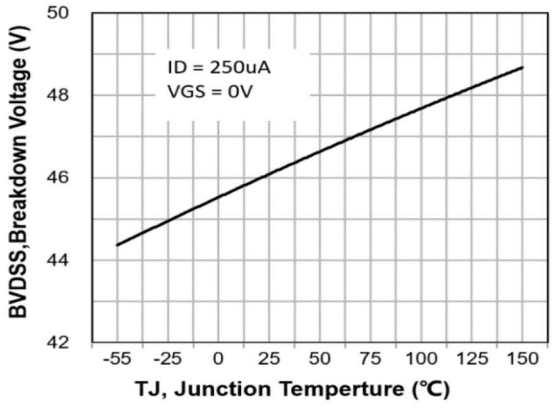


Fig. 12 Gate Threshold Voltage vs. Junction Temperature

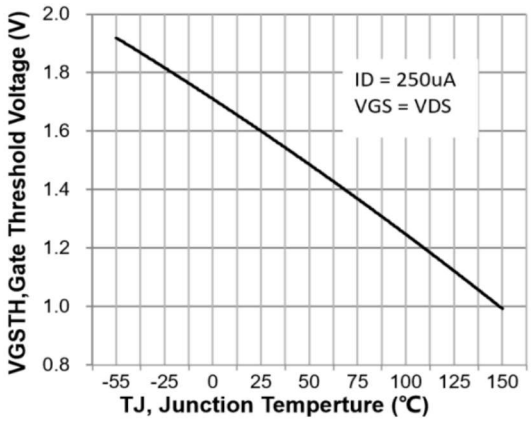


Fig.13 On-Resistance Variation vs. Junction

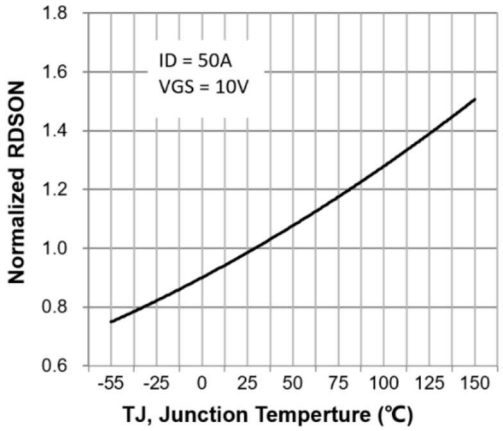


Fig.14 Maximum Drain Current vs.Case Temperature

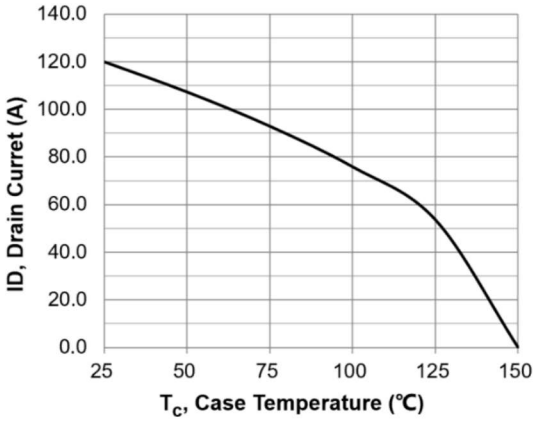


Fig.15 Body Diode Forward Voltage
vs. Reverse Drain Current

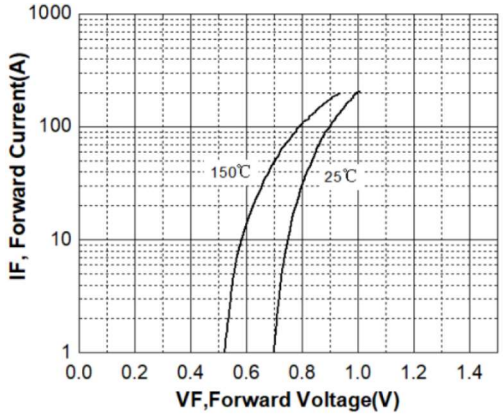


Fig.16 Safe Operating Area

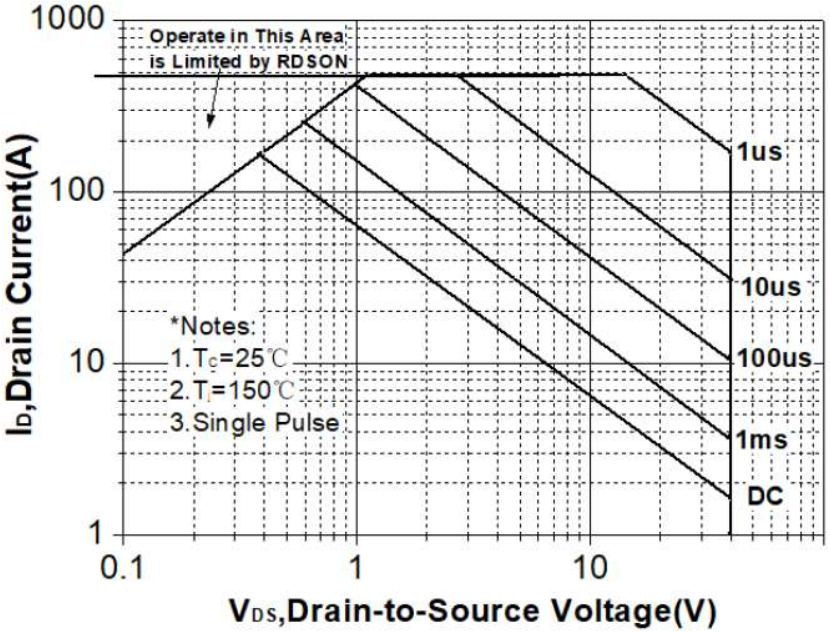
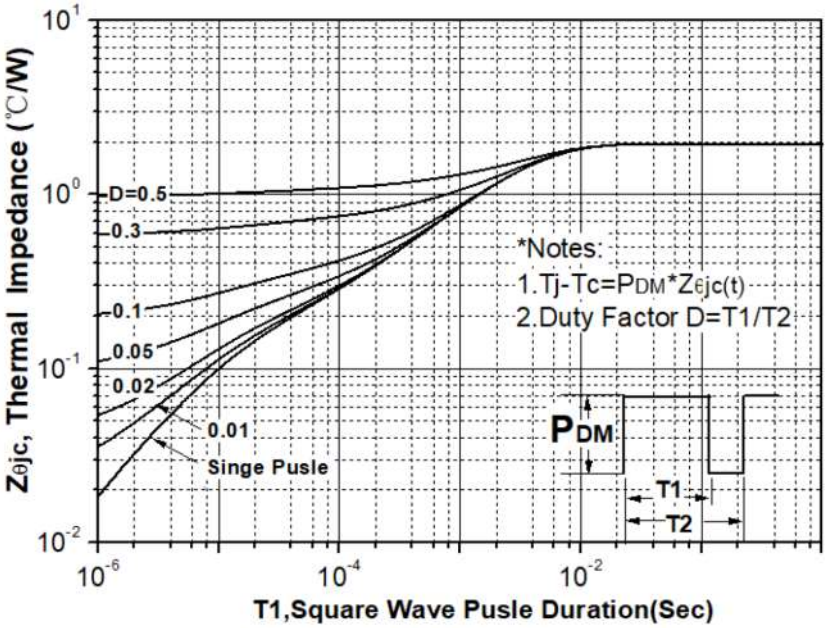
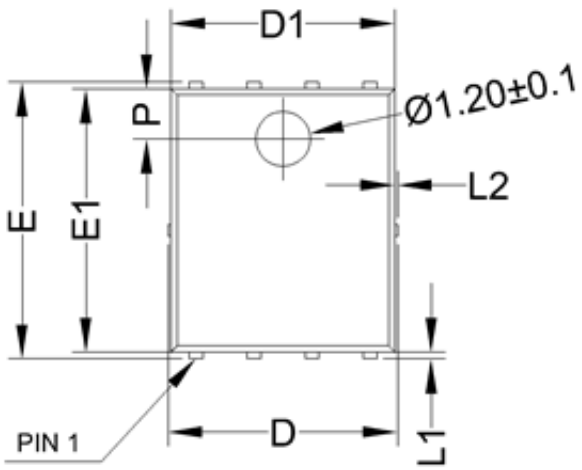


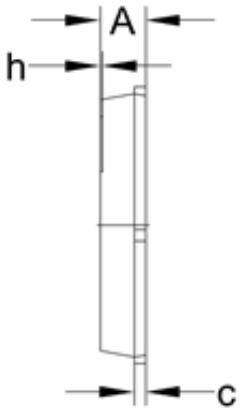
Fig. 17 Transient Thermal Response Curve



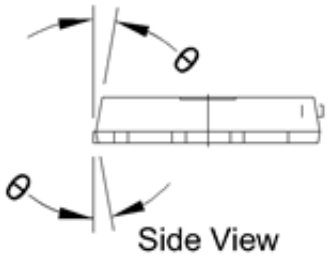
PDFN5X6 Package Information



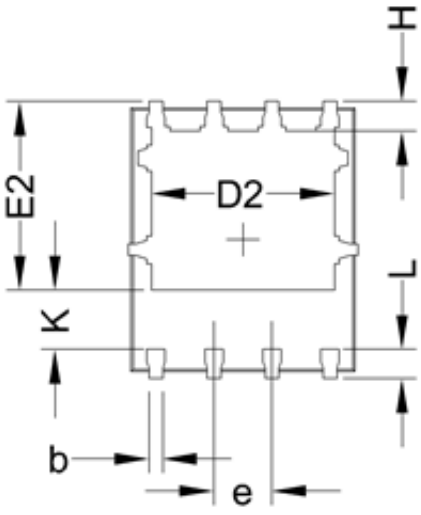
Top View



Side View



Side View



Bottom View

	MIN	NOM	MAX
A	0.90	1.00	1.10
b	0.20	0.30	0.40
c	0.21	0.25	0.34
D	–	–	5.10
D1	4.80	4.90	5.00
D2	3.91	4.01	4.11
e		1.27 BSC	
E	5.90	6.00	6.10
E1	5.65	5.75	5.85
E2	3.375	3.475	3.575
H	0.55	0.65	0.75
h	–	–	0.10
K	1.20	–	–
L	0.55	0.65	0.75
L1	0.05	0.15	0.25
L2	–	–	0.12
Θ	8°	10°	12°
P	1.00	1.10	1.20

Unit in mm

Revision History

Revision	Release	Remark
V1.0	2023/10/07	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.