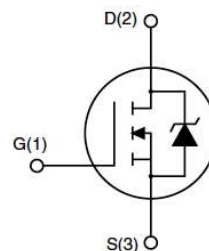


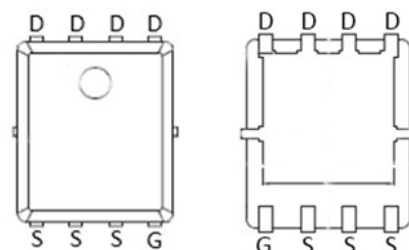
## Feature

- 40V,50A  
 $R_{DS(ON)} < 6.8m\Omega @ V_{GS}=10V$  (TYP:5.7m $\Omega$ )  
 $R_{DS(ON)} < 10m\Omega @ V_{GS}=4.5V$  (TYP:8.5m $\Omega$ )
- Split Gate Trench Technology
- Lead free product is acquired
- Excellent  $R_{DS(ON)}$  and Low Gate Charge



## Application

- PWM applications
- Load Switch
- Power management



PDFN5X6

## Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
G068N04G	APG068N04G	PDFN5X6	13 inch	-	5000

## ABSOLUTE MAXIMUM RATINGS ( $T_J=25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $T_c = 25^{\circ}C$ )	$I_D$	50	A
Continuous Drain Current ( $T_c = 100^{\circ}C$ )	$I_D$	32	A
Pulsed Drain Current <sup>(1)</sup>	$I_{DM}$	200	A
Single Pulsed Avalanche Energy <sup>(2)</sup>	$E_{AS}$	56	mJ
Power Dissipation	$P_D$	41.6	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	3.0	$^{\circ}C/W$
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	80	$^{\circ}C/W$
Junction Temperature	$T_J$	150	$^{\circ}C$
Storage Temperature	$T_{STG}$	-55~ +150	$^{\circ}C$

**MOSFET ELECTRICAL CHARACTERISTICS(T<sub>J</sub>=25°C unless otherwise noted)**

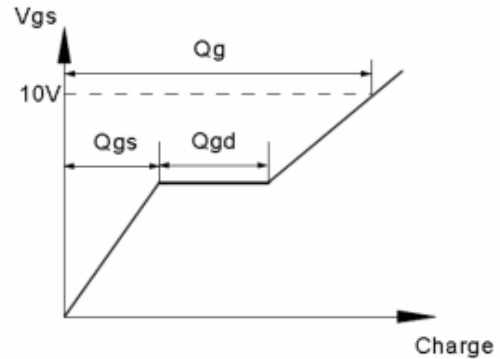
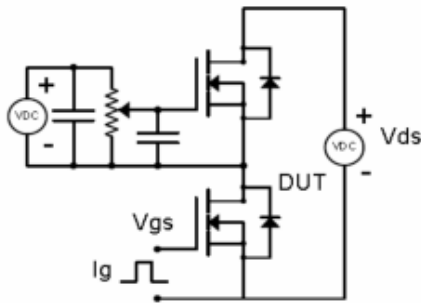
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA	40	-	-	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =40V, V <sub>GS</sub> = 0V	-	-	1	μA
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	-	-	±100	nA
Gate threshold voltage <sup>(3)</sup>	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.0	1.6	2.0	V
Drain-source on-resistance <sup>(3)</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	-	5.7	6.8	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =15A	-	8.5	10	
Gate Resistance	R <sub>g</sub>	V <sub>DS</sub> =V <sub>GS</sub> =0V, f =1MHz	-	3.6	-	Ω
<b>Dynamic characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V, f =1MHz	-	840	-	pF
Output Capacitance	C <sub>oss</sub>		-	254	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	5	-	
<b>Switching characteristics</b>						
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> =20V, I <sub>D</sub> =20A, V <sub>GS</sub> =10V, R <sub>G</sub> =10Ω	-	4	-	ns
Turn-on rise time	t <sub>r</sub>		-	11	-	
Turn-off delay time	t <sub>d(off)</sub>		-	25	-	
Turn-off fall time	t <sub>f</sub>		-	23	-	
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =20V, I <sub>D</sub> =20A, V <sub>GS</sub> =4.5V	-	13.1	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	2.2	-	
Gate-Drain Charge	Q <sub>gd</sub>		-	2.6	-	
Reverse Recovery Chrage	Q <sub>rr</sub>	I <sub>F</sub> =20A, di/dt=100A/us		5.8		nC
Reverse Recovery Time	T <sub>rr</sub>	I <sub>F</sub> =20A, di/dt=100A/us		18		ns
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage <sup>(3)</sup>	V <sub>DS</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =20A	-	-	1.2	V
Diode Forward current <sup>(4)</sup>	I <sub>S</sub>		-	-	50	A

**Notes:**

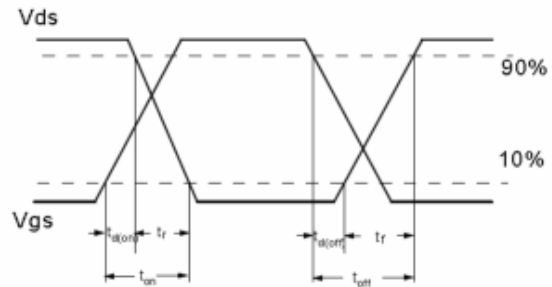
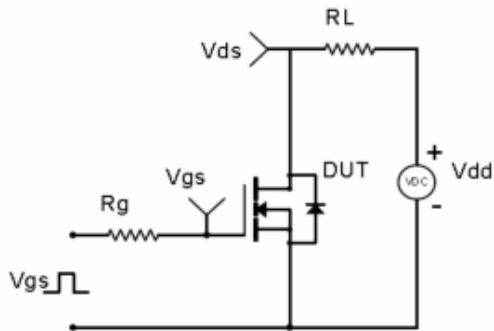
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition: T<sub>J</sub>=25°C, V<sub>DD</sub>=20V, R<sub>G</sub>=25 Ω, L=0.5mH
3. Pulse Test: pulse width≤300μs, duty cycle≤2%
4. Surface Mounted on FR4 Board, t≤10 sec

**Test Circuit & Waveform**

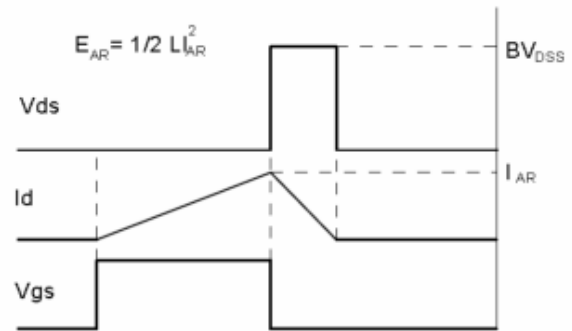
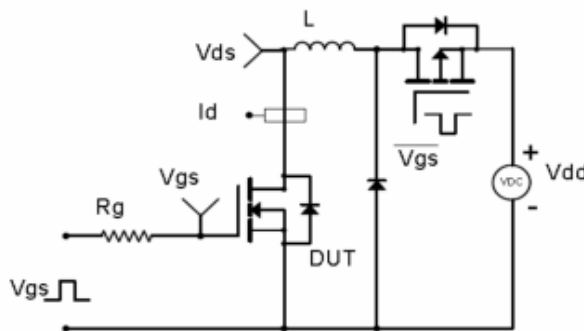
Gate Charge Test Circuit & Waveform



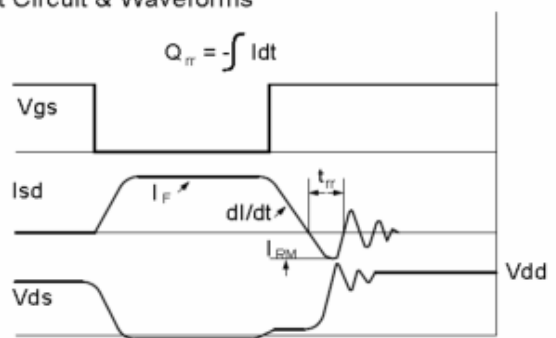
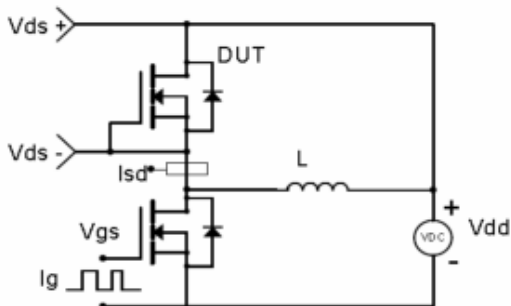
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



**Electrical Characteristics Diagrams**

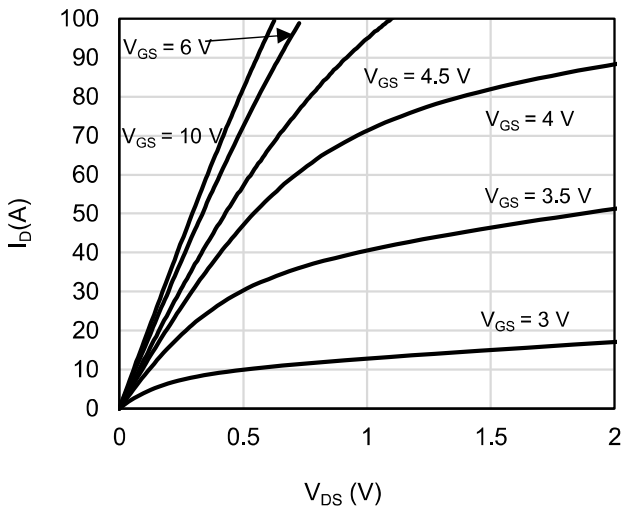


Figure 1: On-Region Characteristics

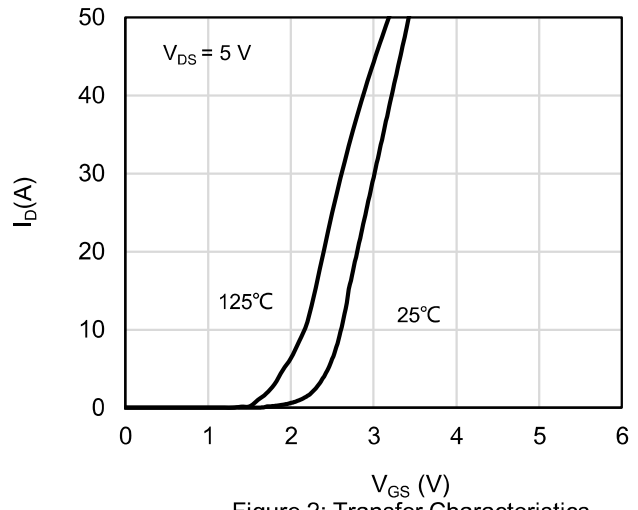


Figure 2: Transfer Characteristics

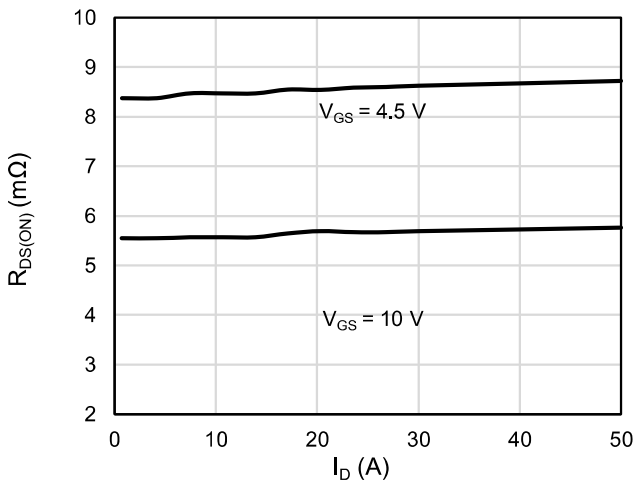


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

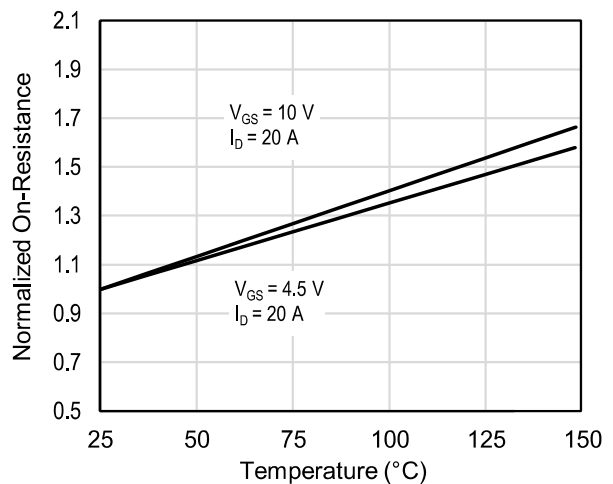


Figure 4: On-Resistance vs. Junction Temperature

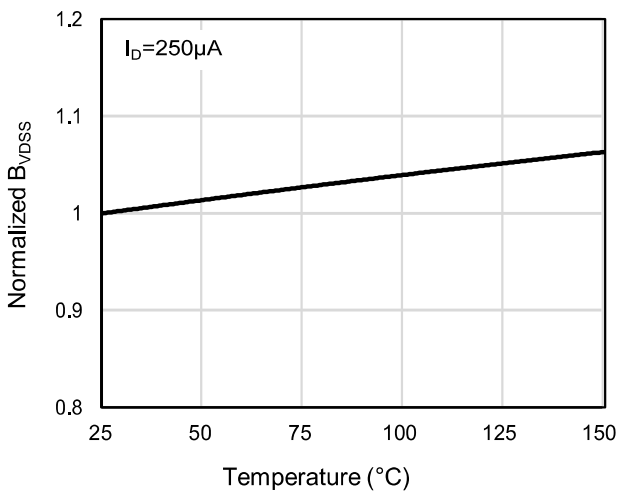


Figure 5: Breakdown Voltage vs. Junction Temperature

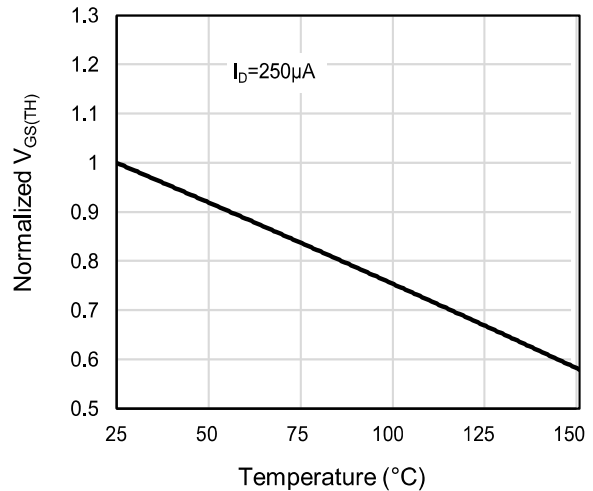


Figure 6: Threshold Voltage vs. Junction Temperature

**Electrical Characteristics Diagrams**

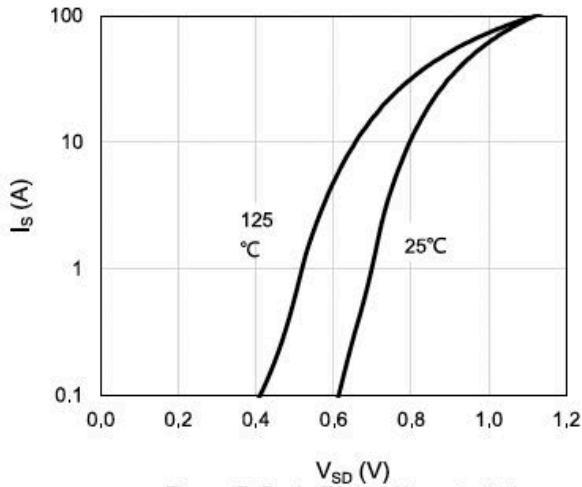


Figure 7: Body-Diode Characteristics

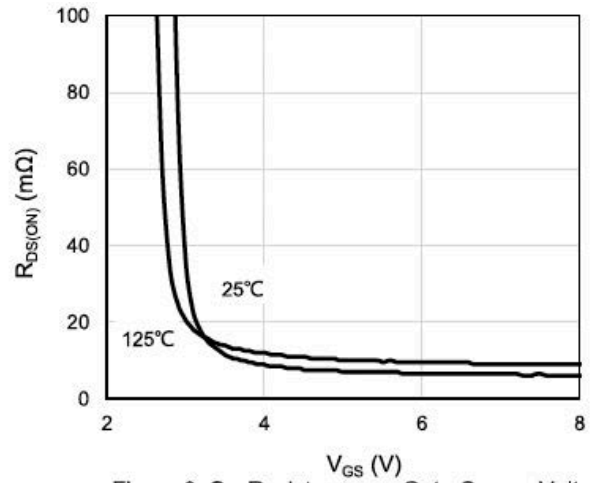


Figure 8: On-Resistance vs. Gate-Source Voltage

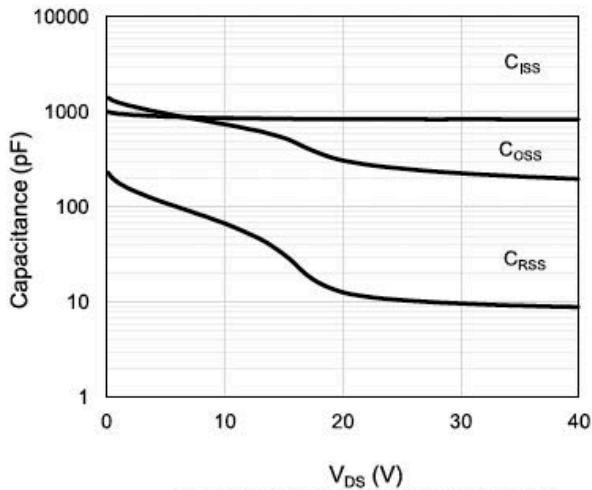


Figure 9: Capacitance Characteristics

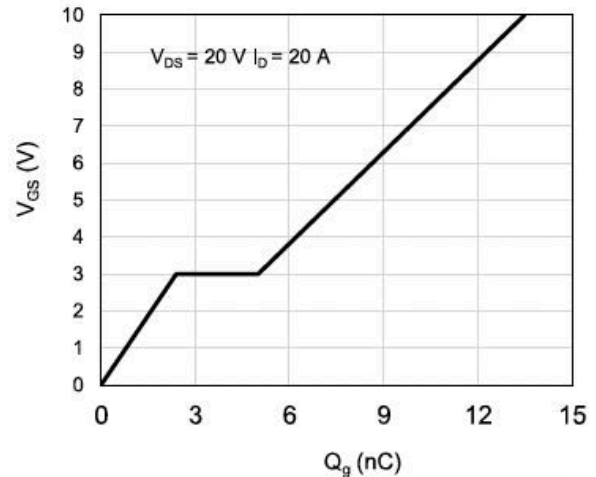


Figure 10: Gate-Charge Characteristics

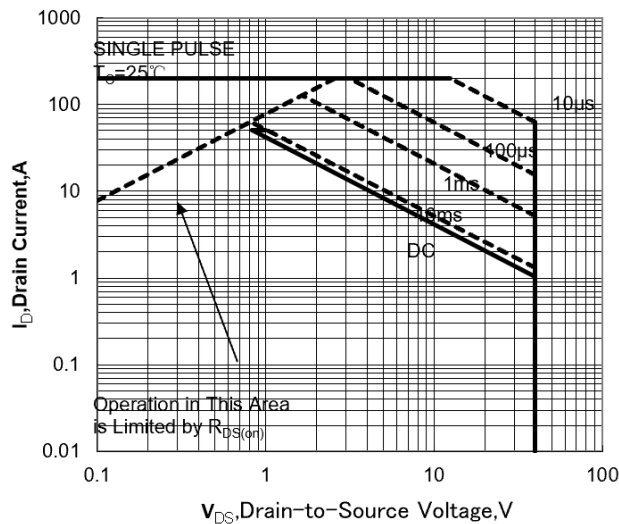


Figure 11: Maximum Safe Operating Area

**Electrical Characteristics Diagrams**

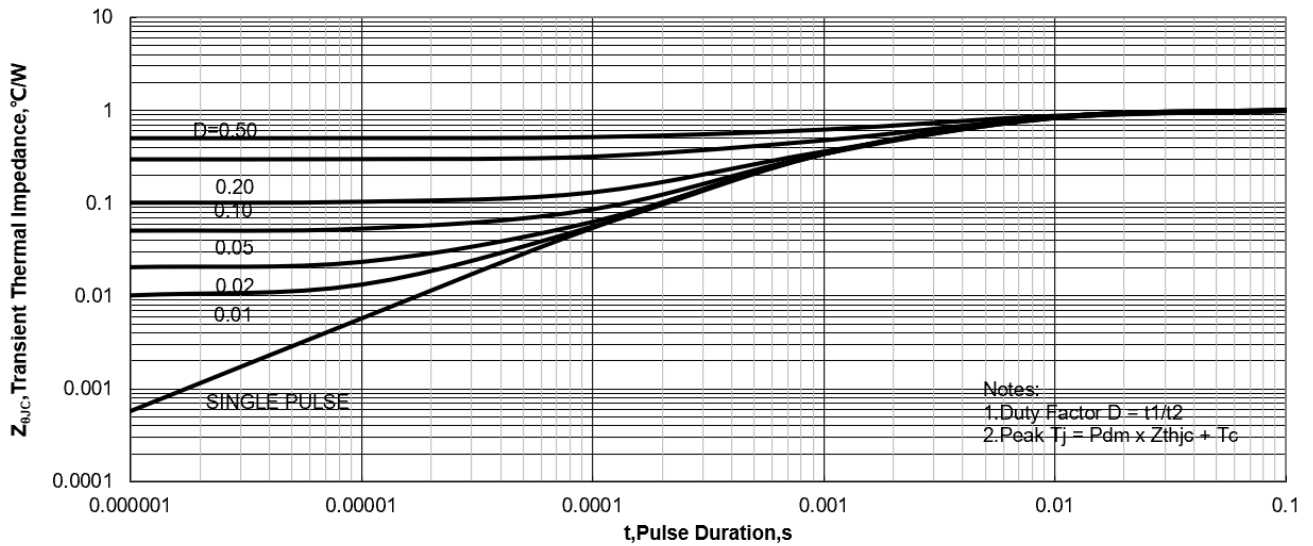
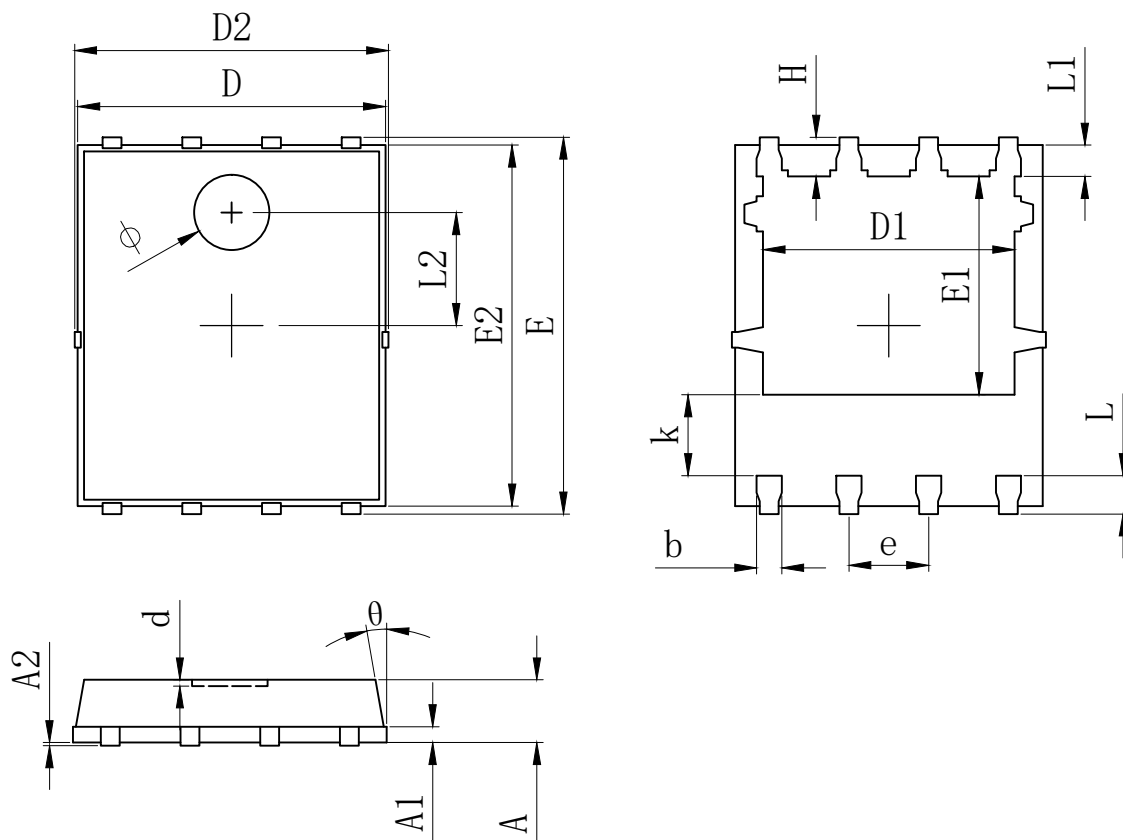


Figure.12: Maximum Effective Transient Thermal Impedance, Junction-to-Case

**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
$\theta$	8°	10°	12°
$\Phi$	1.100	1.200	1.300
d			0.100

## Revision History

Revision	Release	Remark
V1.0	2023/06/16	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.