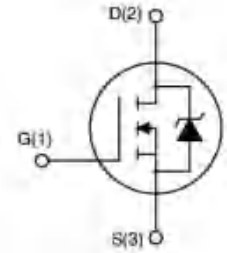


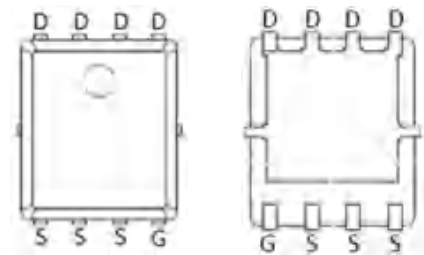
Feature

- 40V,120A
 $R_{DS(ON)} < 2.4m\Omega @ V_{GS}=10V$ (TYP:2.0m Ω)
 $R_{DS(ON)} < 3.6m\Omega @ V_{GS}=4.5V$ (TYP:3.0m Ω)
- 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)
G024N04	APG024N04G	PDFN5X6	13 inch	-	5000

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_a=25^\circ\text{C}$)	I_D	120	A
Continuous Drain Current ($T_a=100^\circ\text{C}$)	I_D	74	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	468	A
Single Pulsed Avalanche Energy ⁽²⁾	E_{AS}	144	mJ
Power Dissipation	P_D	62.5	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	2	$^\circ\text{C}/\text{W}$
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55~ +150	$^\circ\text{C}$

MOSFET ELECTRICAL CHARACTERISTICS(T_a=25°C 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	1.2	1.7	2.2	V
Drain-source on-resistance ⁽³⁾	R _{DS(on)}	V _{GS} =10V, I _D =30A	-	2.0	2.4	mΩ
		V _{GS} =4.5V, I _D =20A	-	3.0	3.6	
Gate Resistance	R _g	V _{DS} =V _{GS} =0V, f =1MHz	-	3.8	-	Ω
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V, f =1MHz	-	1827	-	pF
Output Capacitance	C _{oss}		-	623	-	
Reverse Transfer Capacitance	C _{rss}		-	22	-	
Switching characteristics						
Turn-on delay time	t _{d(on)}	V _{DD} =20V, I _D =20A, V _{GS} =10V, R _G =6Ω	-	6.2	-	ns
Turn-on rise time	t _r		-	27.4	-	
Turn-off delay time	t _{d(off)}		-	39.8	-	
Turn-off fall time	t _f		-	16.6	-	
Total Gate Charge	Q _g	V _{DS} =20V, I _D =20A, V _{GS} =10V	-	28.3	-	nC
Gate-Source Charge	Q _{gs}		-	6.17	-	
Gate-Drain Charge	Q _{gd}		-	4.55	-	
Reverse Recovery Chrage	Q _{rr}	I _F =20A, di/dt=100A/us		20		nC
Reverse Recovery Time	T _{rr}	I _F =20A, di/dt=100A/us		36		ns
Source-Drain Diode characteristics						
Diode Forward voltage ⁽³⁾	V _{SD}	V _{GS} =0V, I _S =50A	-	-	1.2	V
Diode Forward current ⁽⁴⁾	I _S		-	-	80	A

Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition: T_J=25°C, V_{DD}=20V, R_G=25 Ω, L=0.5Mh, I_{AS}=24A
3. Pulse Test: pulse width≤300μs, duty cycle≤2%
4. Surface Mounted on FR4 Board, t≤10 sec

■ Test circuits and waveforms

Figure A: Gate Charge Test Circuit & Waveforms

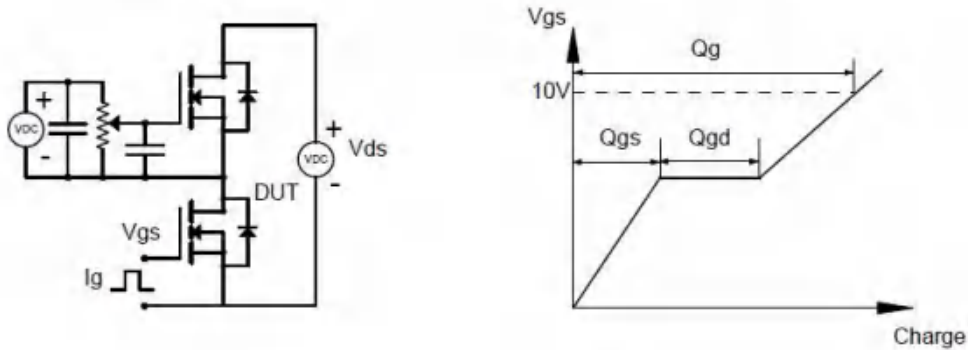


Figure B: Resistive Switching Test Circuit & Waveforms

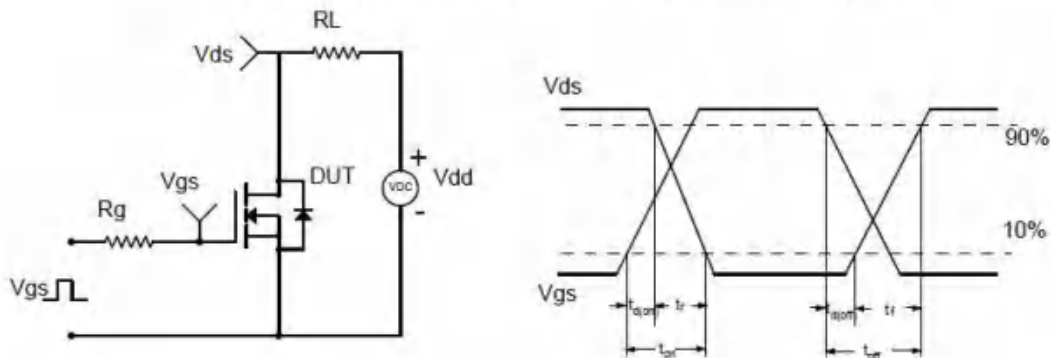


Figure C: Unclamped Inductive Switching (UIS) Test

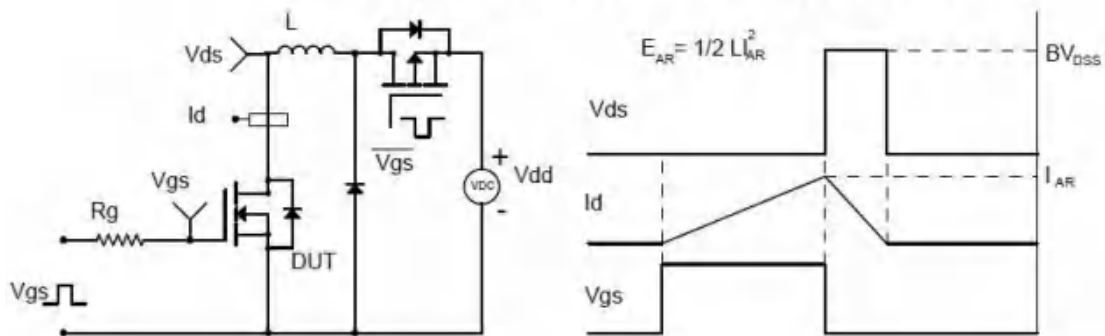
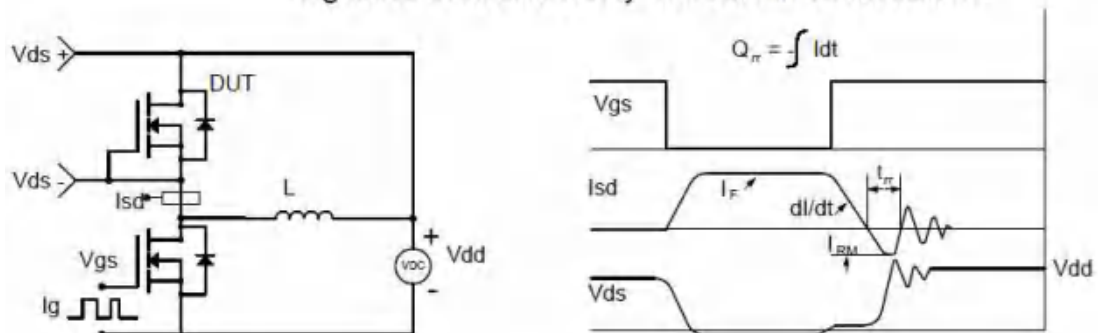


Figure D: Diode Recovery Test Circuit & Waveforms



Electrical Characteristics Diagrams

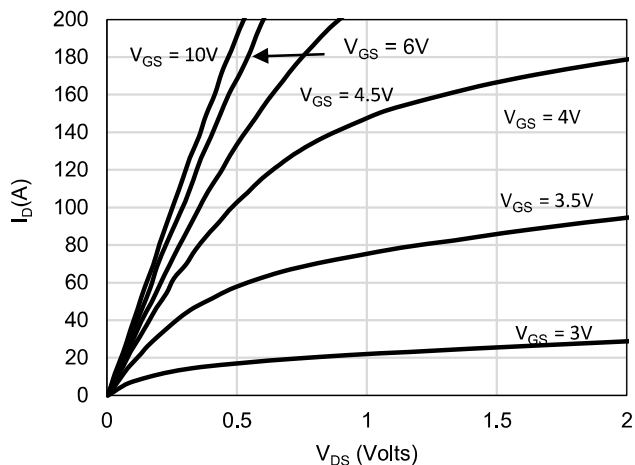


Figure 1: On-Region Characteristics

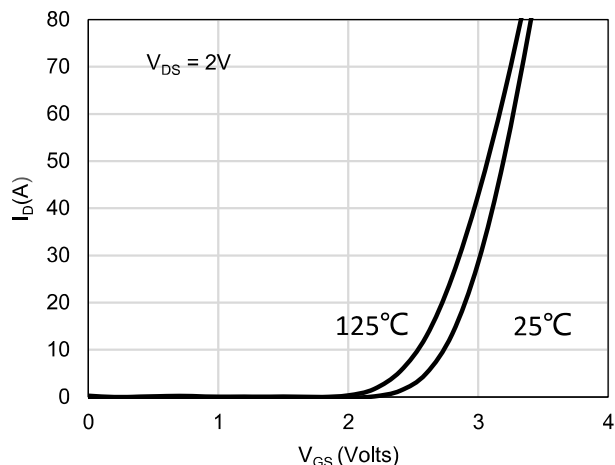


Figure 2: Transfer Characteristics

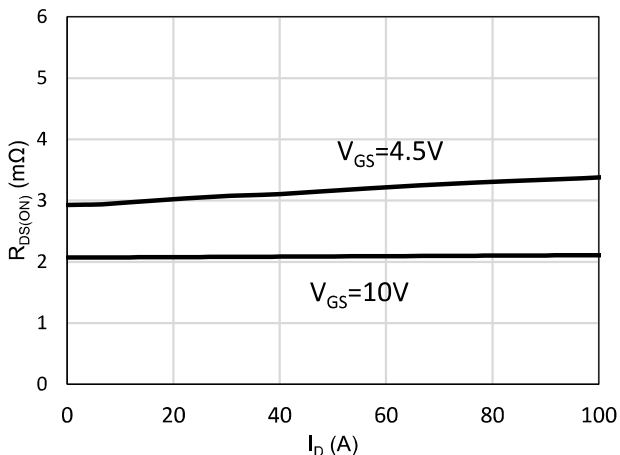


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

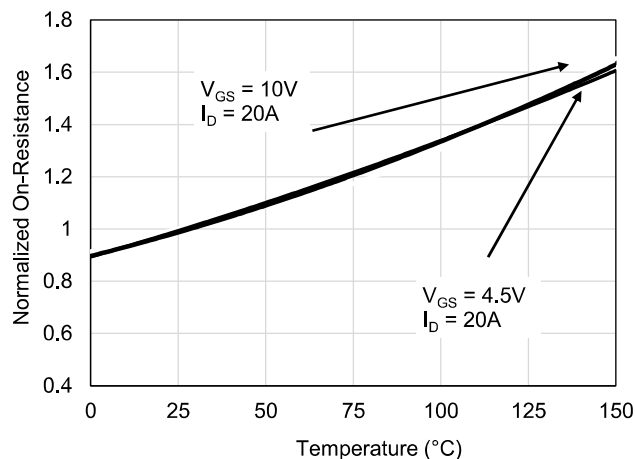


Figure 4: On-Resistance vs. Junction Temperature

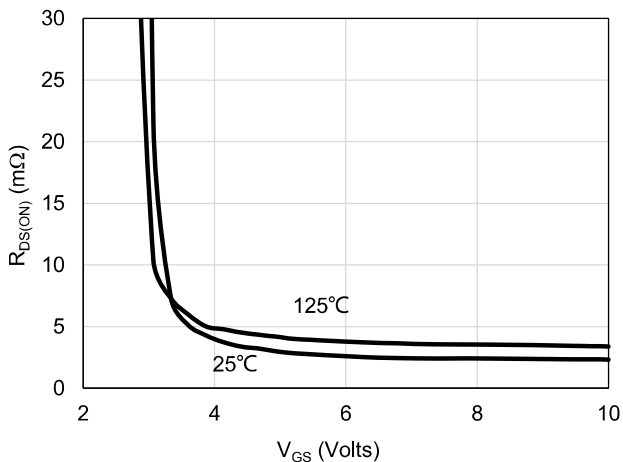


Figure 5: On-Resistance vs. Gate-Source Voltage

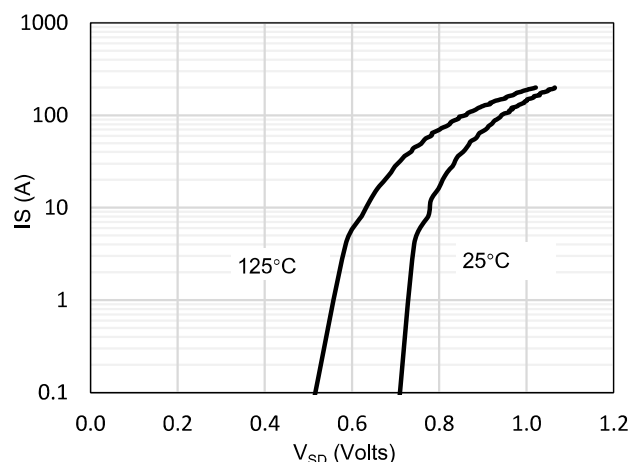


Figure 6: Body-Diode Characteristics

APG024N04G

N-Channel Enhancement Mosfet

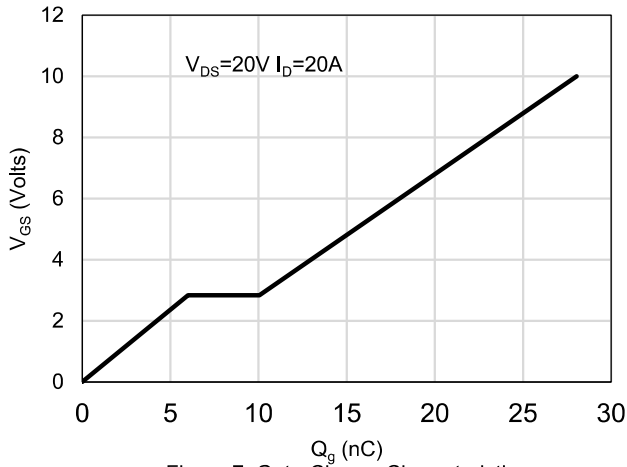


Figure 7: Gate-Charge Characteristics

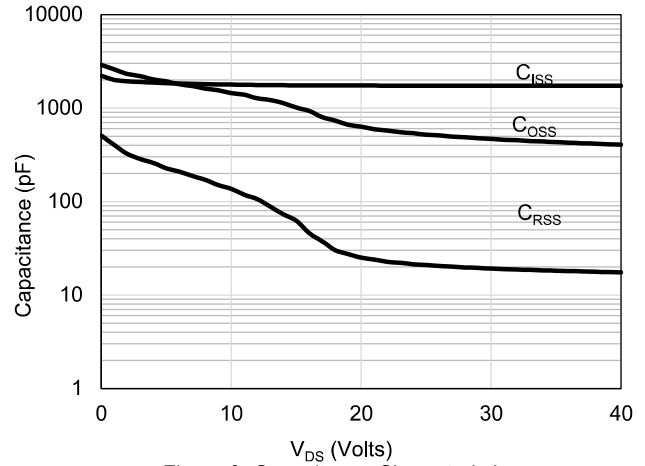


Figure 8: Capacitance Characteristics

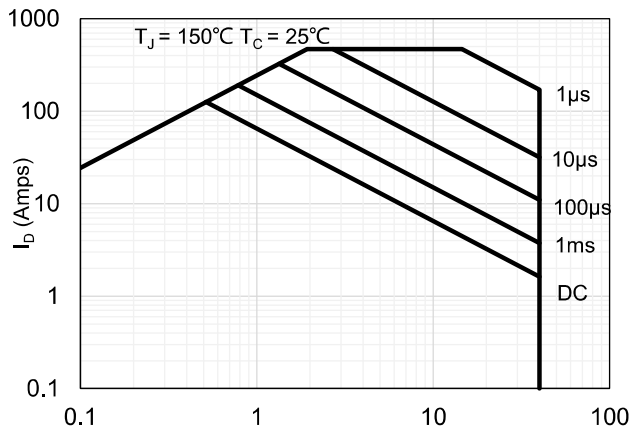


Figure 9: Maximum Forward Biased Safe Operating Area

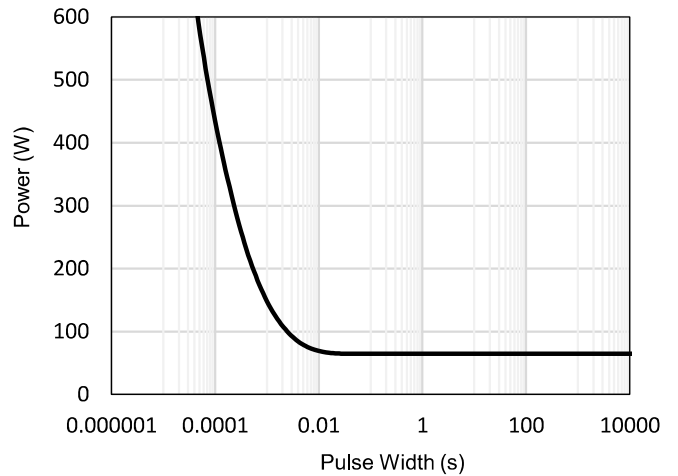


Figure 10: Single Pulse Power Rating Junction-to-Case

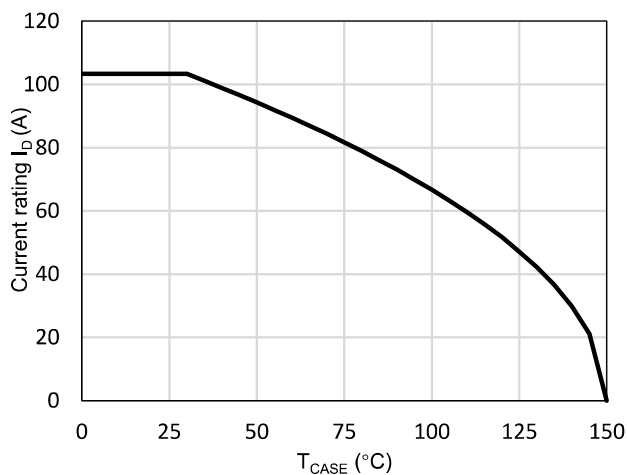


Figure 11: Current De-rating

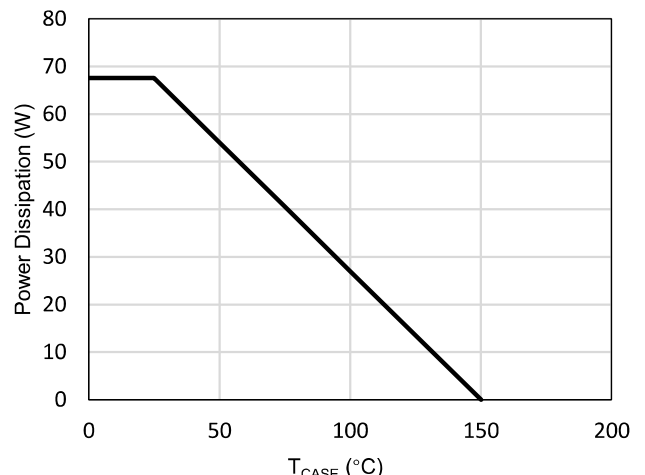


Figure 12: Power De-rating

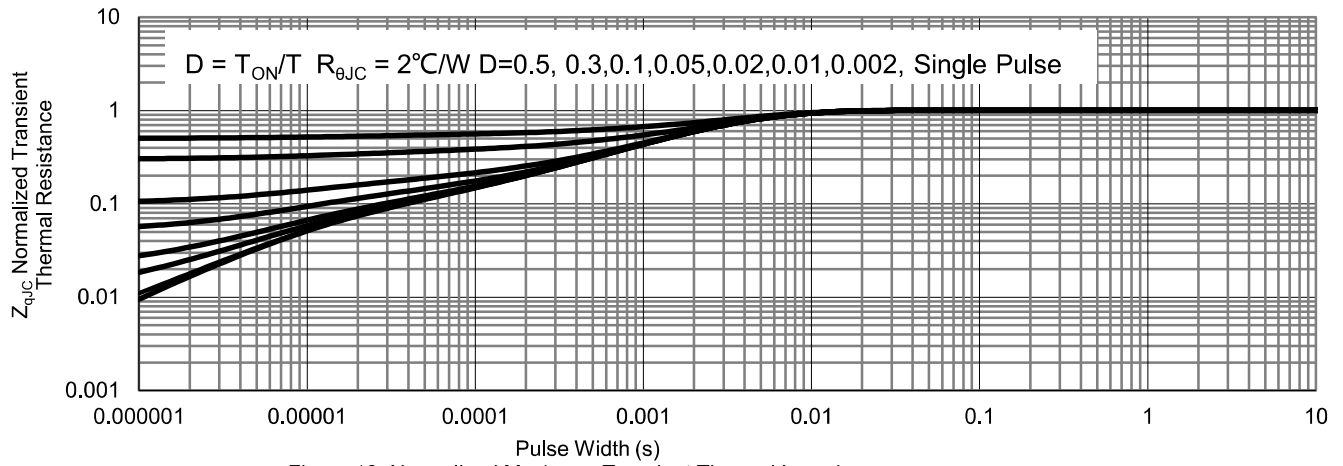
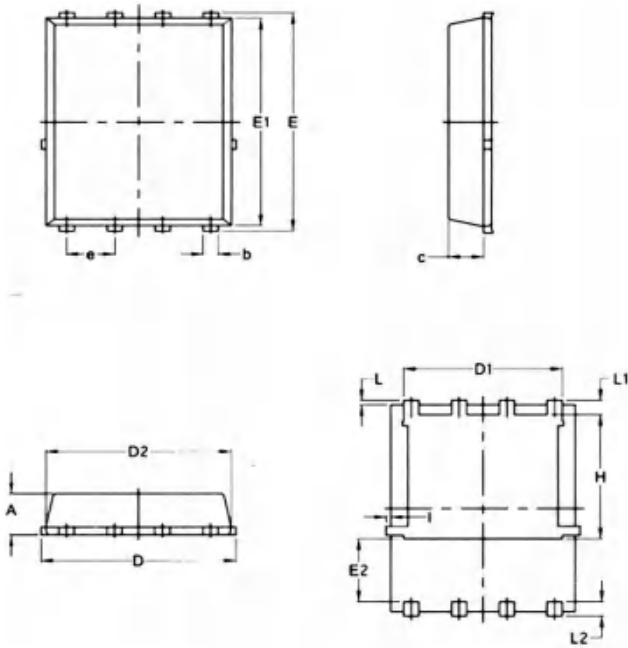


Figure 13: Normalized Maximum Transient Thermal Impedance

PDFN5X6 Package Information



PDFN5X6

SYMBOL	COMMON			
	MM		INCH	
	MIN.	MAX.	MIN.	MAX.
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.970	0.0324	0.0382
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	—	0.0630	—
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	—	0.18	—	0.0070