

APG032N04G

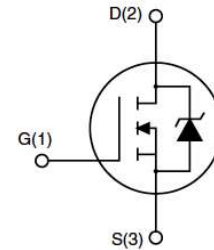
N-Channel Enhancement Mosfet

AIPOWER

DATA SHEET

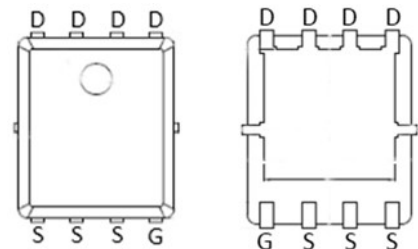
Feature

- 40V,100A
 $R_{DS(ON)} < 3.2m\Omega @ V_{GS}=10V$ (TYP:2.7m Ω)
 $R_{DS(ON)} < 4.6m\Omega @ V_{GS}=4.5V$ (TYP:3.8m 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)
G032N04	APG032N04G	PDFN5X6	13 inch	-	5000

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_a=25^{\circ}C$)	I_D	100	A
Continuous Drain Current ($T_a=100^{\circ}C$)	I_D	62	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	420	A
Single Pulsed Avalanche Energy ⁽²⁾	E_{AS}	100	mJ
Power Dissipation	P_D	62.5	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	2	$^{\circ}C/W$
Junction Temperature	T_J	150	$^{\circ}C$
Storage Temperature	T_{STG}	-55~ +150	$^{\circ}C$

MOSFET ELECTRICAL CHARACTERISTICS($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	40	-	-	V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 40V, V_{GS} = 0V$	-	-	1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 100	nA
Gate threshold voltage ⁽³⁾	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.2	1.7	2.2	V
Drain-source on-resistance ⁽³⁾	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 30A$	-	2.7	3.2	m Ω
		$V_{GS} = 4.5V, I_D = 20A$	-	3.8	4.6	
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	$t_{d(on)}$	$V_{DD} = 20V, I_D = 20A,$ $V_{GS} = 10V, R_G = 6\Omega$	-	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 Charge	Q_{rr}	$I_F = 20A, di/dt = 100A/\mu s$	-	20	-	nC
Reverse Recovery Time	T_{rr}	$I_F = 20A, di/dt = 100A/\mu s$	-	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		-	-	70	A

Notes:

1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition: $T_J = 25^{\circ}\text{C}, V_{DD} = 20V, R_G = 25\Omega, L = 0.5\text{Mh}, I_{AS} = 20A$
3. Pulse Test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
4. Surface Mounted on FR4 Board, $t \leq 10\text{ sec}$

■ Test circuits and waveforms

Figure A: Gate Charge Test Circuit & Waveforms

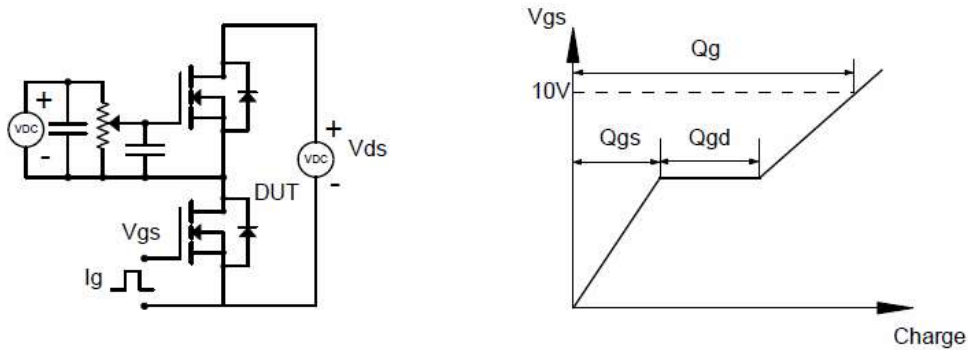


Figure B: Resistive Switching Test Circuit & Waveforms

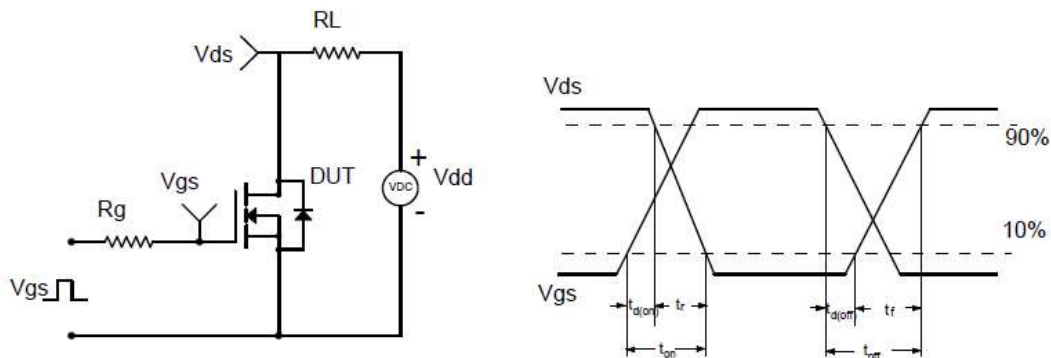


Figure C: Unclamped Inductive Switching (UIS) Test

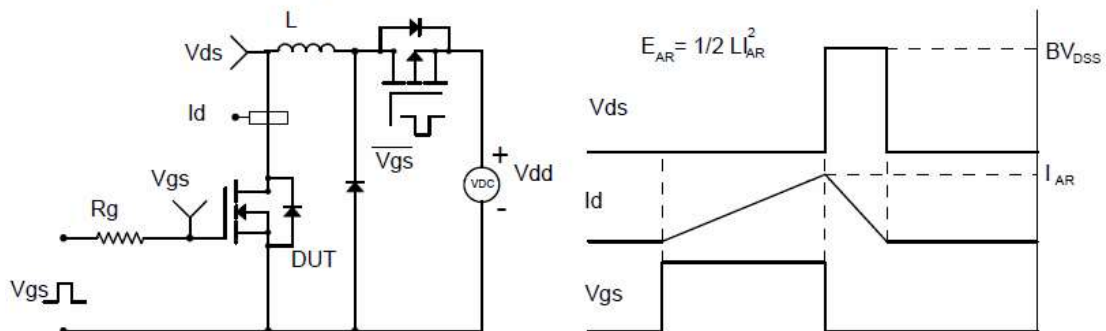
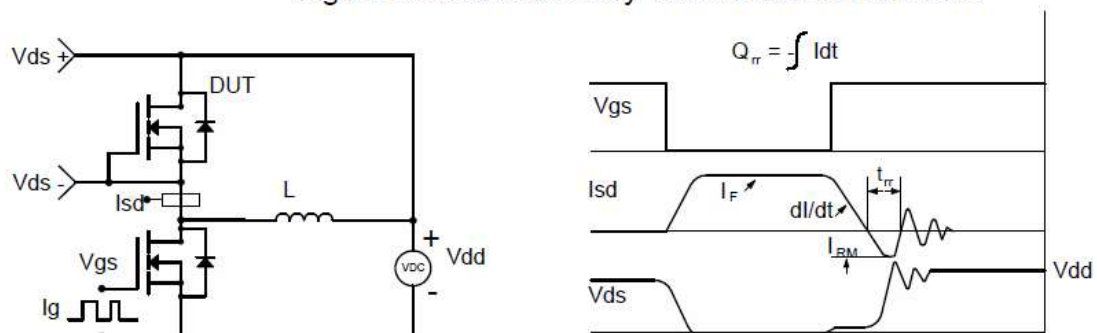


Figure D: Diode Recovery Test Circuit & Waveforms



Electrical Characteristics Diagrams

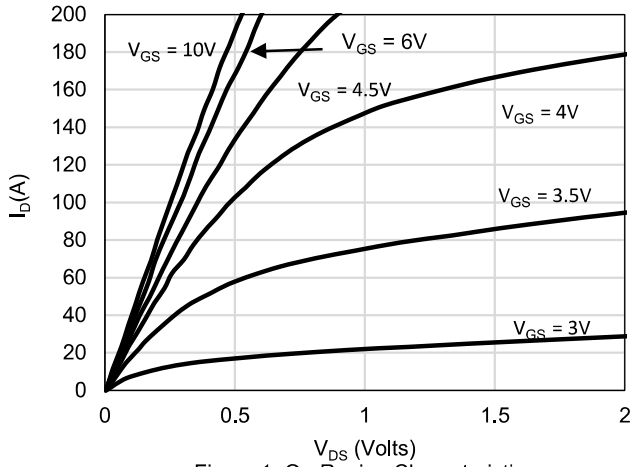


Figure 1: On-Region Characteristics

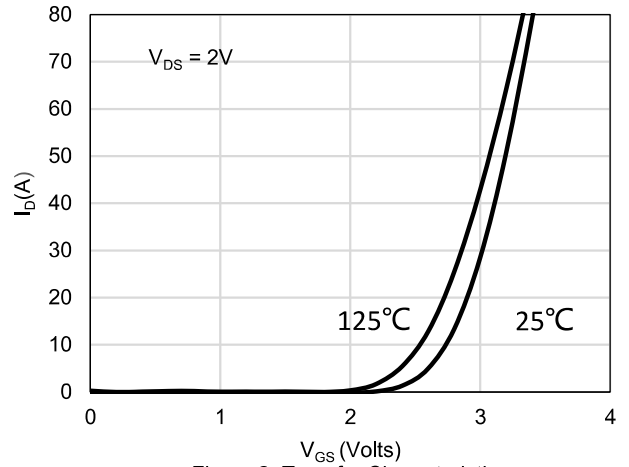


Figure 2: Transfer Characteristics

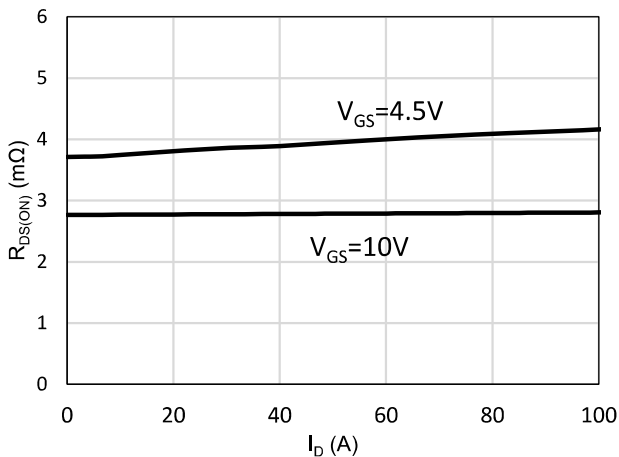


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

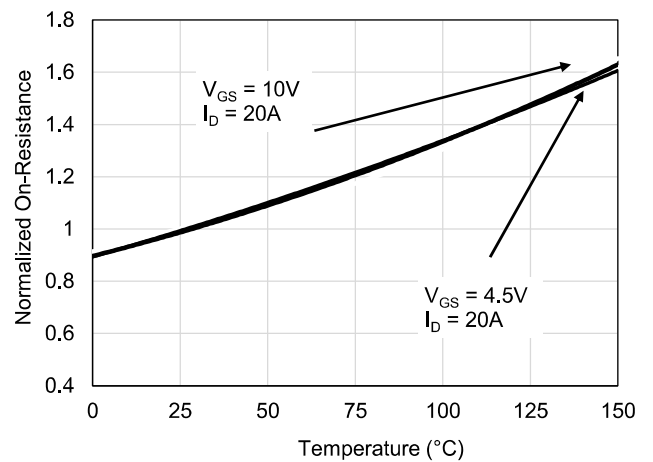


Figure 4: On-Resistance vs. Junction Temperature

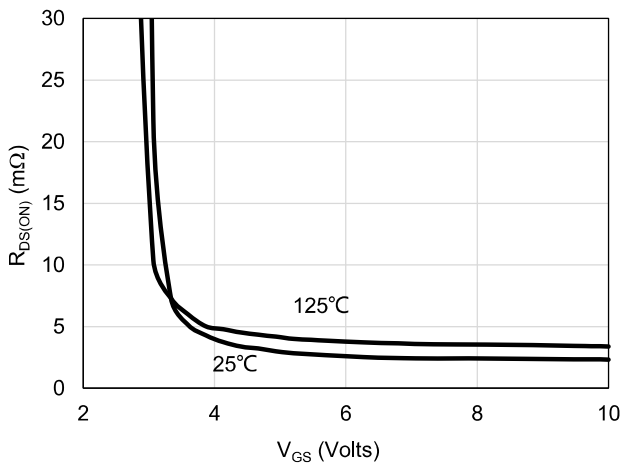


Figure 5: On-Resistance vs. Gate-Source Voltage

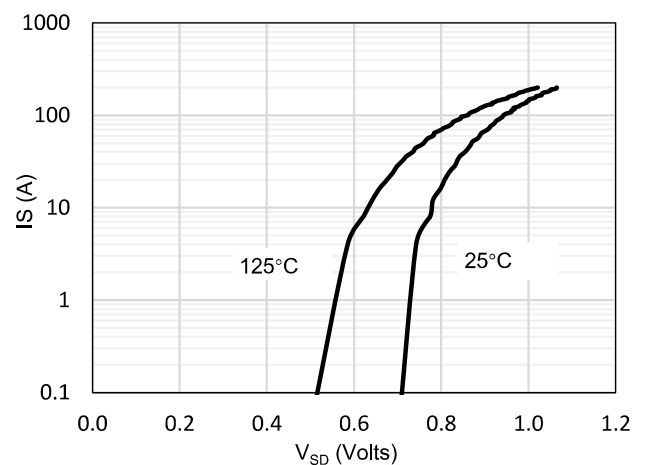


Figure 6: Body-Diode Characteristics

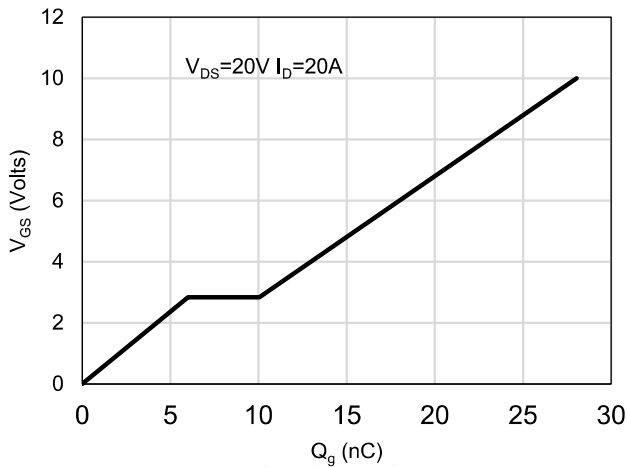


Figure 7: Gate-Charge Characteristics

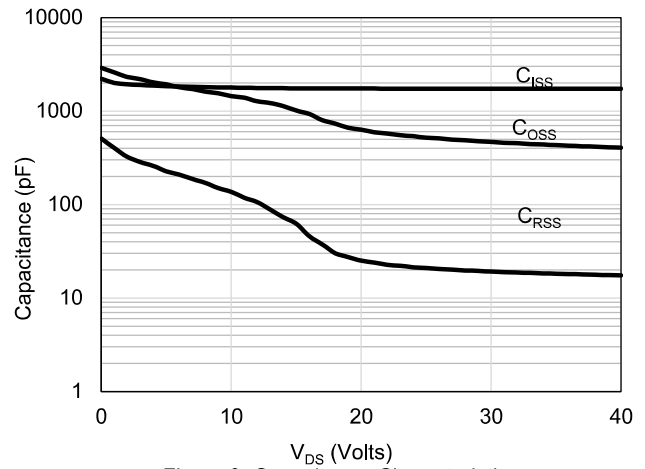


Figure 8: Capacitance Characteristics

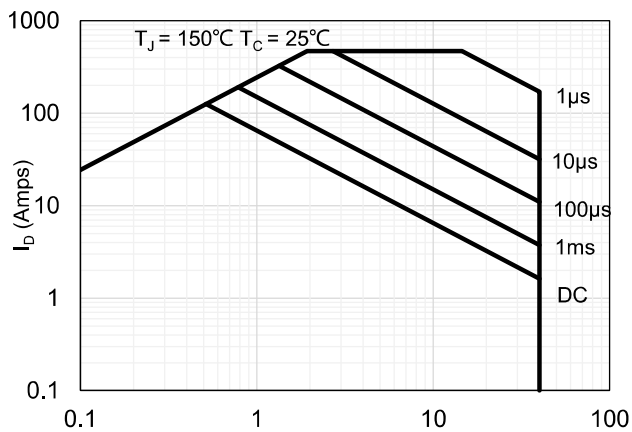


Figure 9: Maximum Forward Biased Safe Operating Area

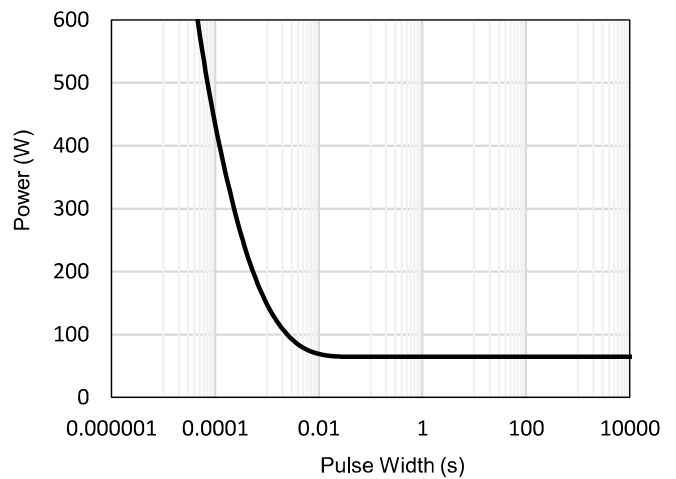


Figure 10: Single Pulse Power Rating Junction-to-Case

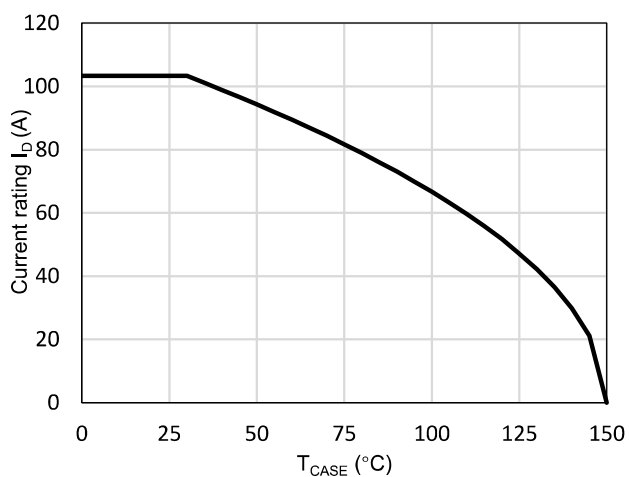


Figure 11: Current De-rating

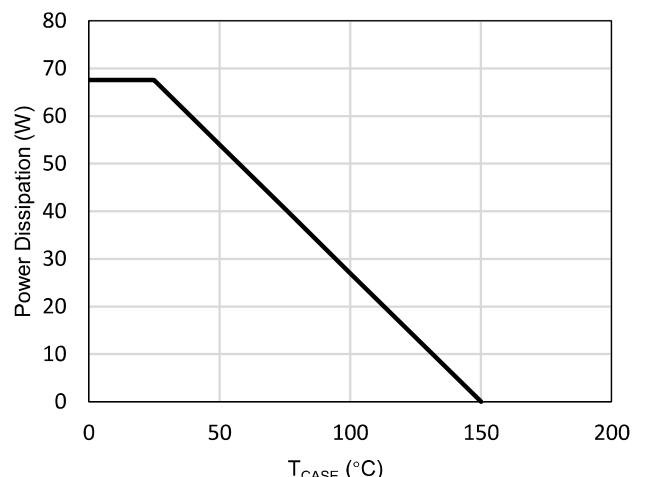


Figure 12: Power De-rating

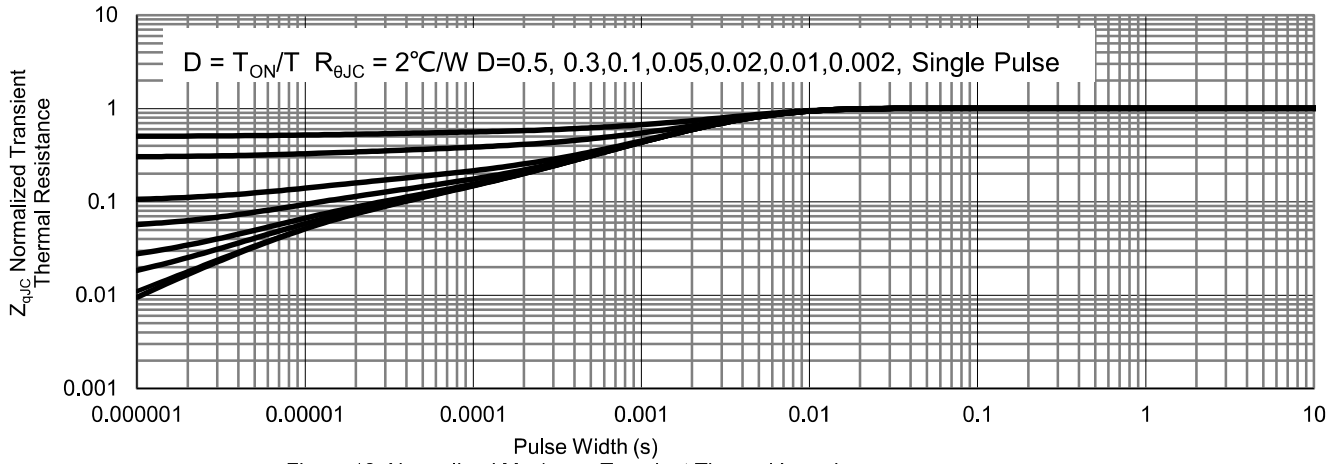
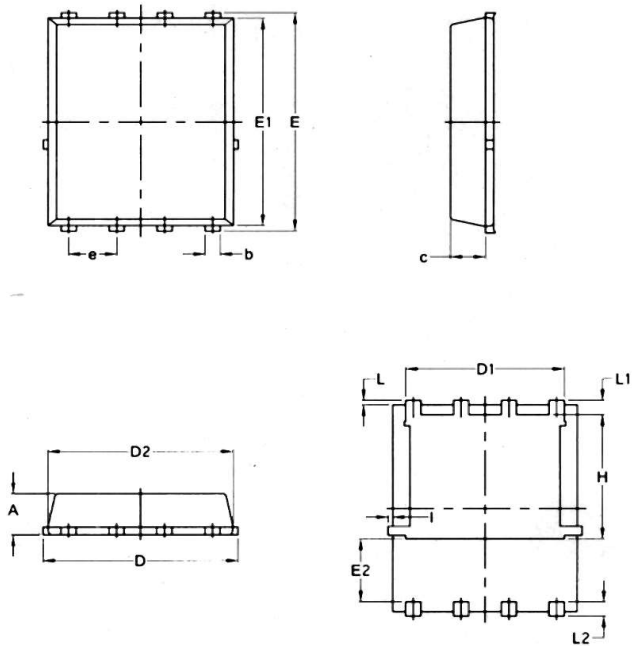


Figure 13: Normalized Maximum Transient Thermal Impedance

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

PDFN5*6-8L Package Information