



40V/320A N-Channel Power MOSFET

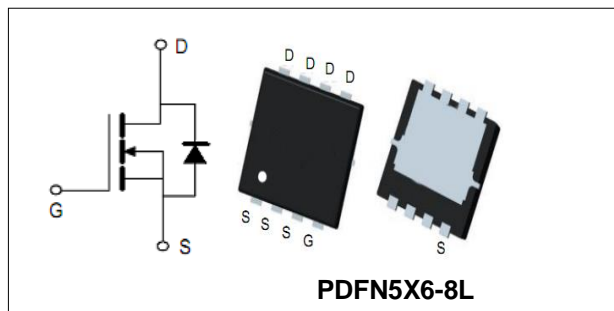
Features

- New technology for high voltage device.
- Low on-resistance and low conduction losses
- Ultra Low Gate Charge cause lower driving requirements
- 100% Avalanche Tested

Applications

- DC/DC Converter
- Motor control and drives
- Battery management

BVDSS	40	V
ID	320	A
RDSON@VGS=10V	0.99	mΩ
RDSON@VGS=4.5V	1.5	mΩ



Order Information

Product	Package	Marking	Reel Size	Reel	Carton
PGN04N012H	PDFN5X6-8L	PGN04N012H	13inch	5000PCS	50000PCS

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit	
Common Ratings (TC=25°C Unless Otherwise Noted)				
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	40	V	
V_{GS}	Gate-Source Voltage	±20	V	
T_J	Maximum Junction Temperature	150	°C	
T_{STG}	Storage Temperature Range	-55 to 150	°C	
I_S	Diode Continuous Forward Current	TC =25°C	280	A
Mounted on Large Heat Sink				
E_{AS}	Single Pulse Avalanche Energy (Note1)	363	mJ	
I_{DM}	Pulse Drain Current Tested (Silicon Limit) (Note2)	TC =25°C	1200	A
I_D	Continuous Drain current	TC =25°C	320	A
P_D	Maximum Power Dissipation	TC =25°C	160	W
$R_{θJc}$	Thermal Resistance Junction-to-Case (Note3)	0.78	°C/W	

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Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ T_J = 25°C (unless otherwise stated)						
V _{(BR)DSS}	Drain- Source Breakdown Voltage	VGS=0V ID=250μA	40	--	--	V
I _{DSS}	Zero Gate Voltage Drain current	VDS=40V,VGS=0V	--	--	1	μA
I _{GSS}	Gate-Body Leakage Current	VGS=±20V,VDS=0V	--	--	±100	nA
V _{GS(TH)}	Gate Threshold Voltage	VDS=VGS,ID=250μA	1.2	1.7	2.5	V
R _{DS(ON)}	Drain-Source On-State Resistance (Note4)	VGS=10V, ID=75A	--	0.99	1.2	mΩ
		VGS=4.5V, ID=20A	--	1.5	2	mΩ
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated) (Note5)						
C _{iss}	Input Capacitance	VDS=25V, VGS=0V, F=300kHz	--	6280	--	pF
C _{oss}	Output Capacitance		--	1610	--	pF
C _{rss}	Reverse Transfer Capacitance		--	70	--	pF
Q _g	Total Gate Charge	VDS=20V, ID=50A, VGS=10V	--	98	--	nC
Q _{gs}	Gate-Source Charge		--	32	--	nC
Q _{gd}	Gate-Drain Charge		--	20	--	nC
Switching Characteristics (Note5)						
t _{d(on)}	Turn-on Delay Time	VDS=20V, ID=50A RG=1.6Ω, VGS=10V	--	16	--	nS
t _r	Turn-on Rise Time		--	8.6	--	nS
t _{d(off)}	Turn-off Delay Time		--	62	--	nS
t _f	Turn-off Fall Time		--	11	--	nS
Source- Drain Diode Characteristics @ T_J = 25°C (unless otherwise stated)						
V _{SD}	Forward on voltage	ISD=75A,VGS=0V	--	--	1.2	V

Note:

- Limited by T_{Jmax}, starting T_J = 25° C, R_G = 25Ω, V_D = 30V, V_{GS} = 10V. Part not recommended for use above this value.
- Repetitive Rating: Pulse width limited by maximum junction temperature.
- Surface Mounted on FR4 Board, t ≤ 10 sec.
- Pulse Test: pulse width ≤ 300 us, duty cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.



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Typical Characteristics

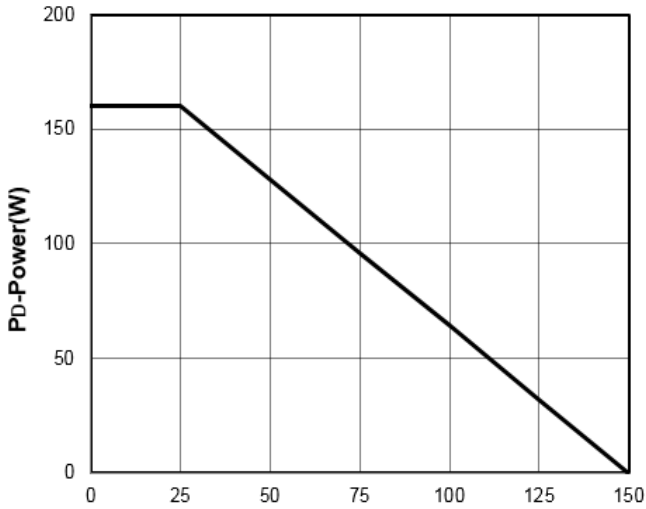


Figure1: T_J- Junction Temperature (°C)

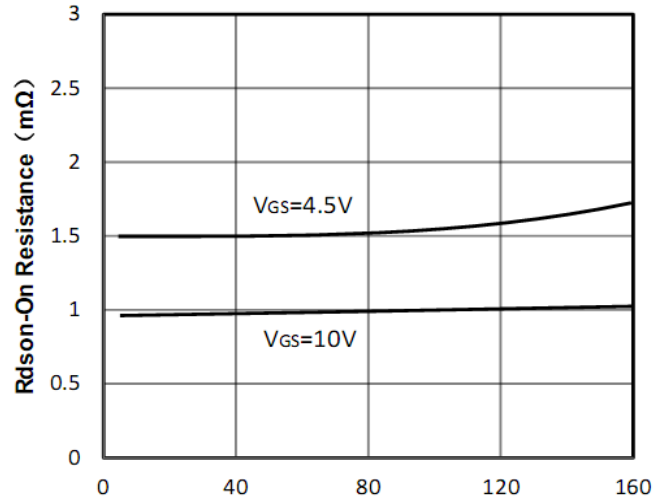


Figure2: I_D- Drain Current (A)

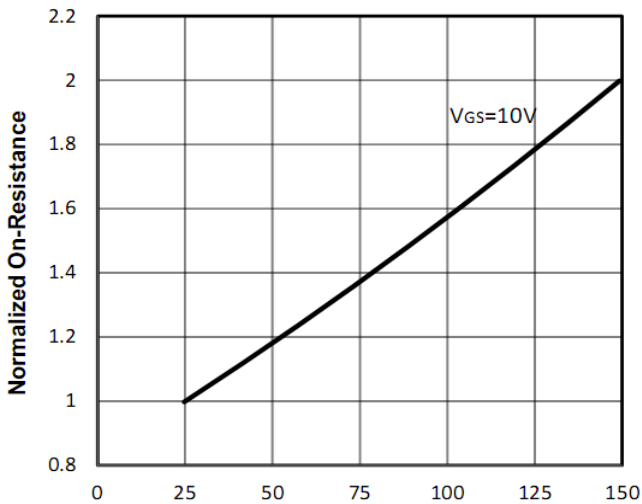


Figure3: T_J- Junction Temperature (°C)

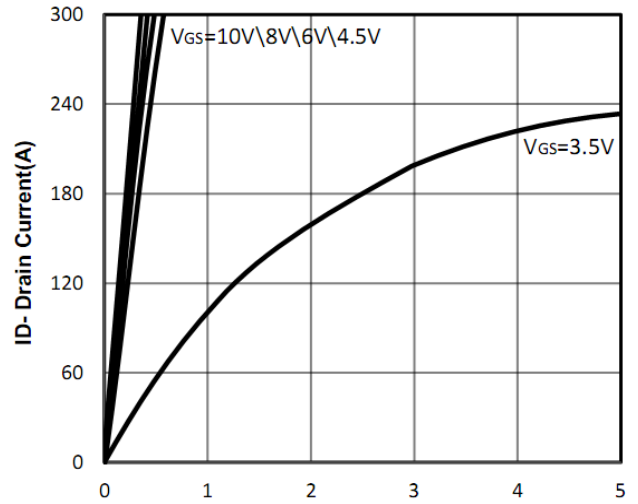


Figure4: V_{DS}- Drain Source Voltage (V)

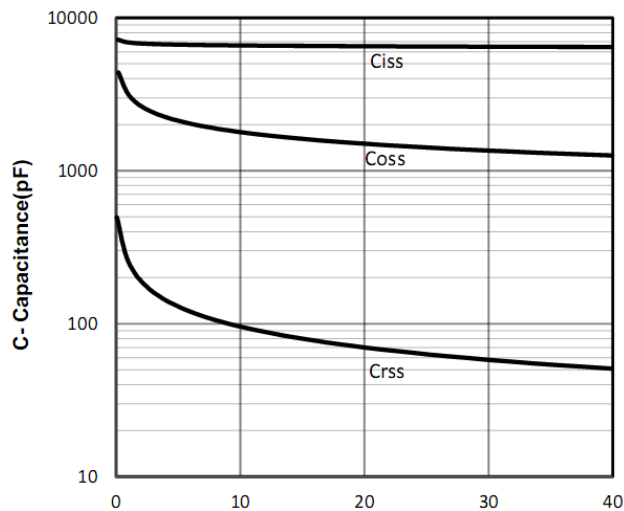


Figure5: V_{DS}- Drain Source Voltage (V)

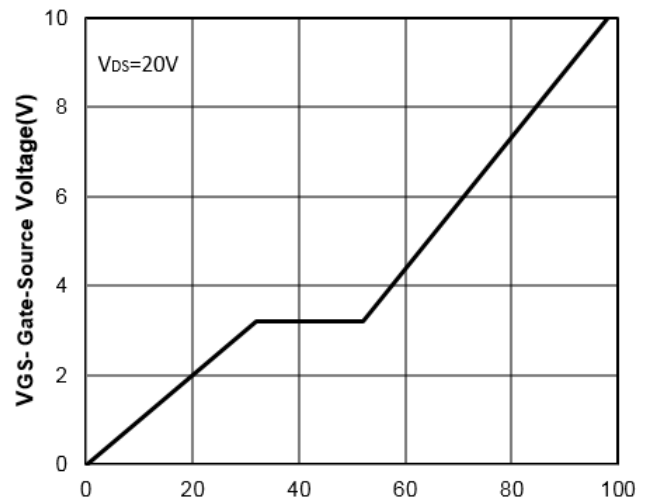


Figure6: Q_g- Gate Charge (nC)



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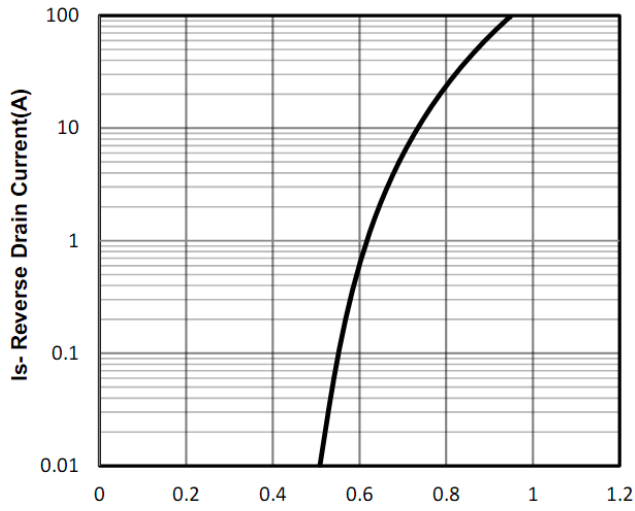


Figure7: Vsd- Source Drain Voltage (V)

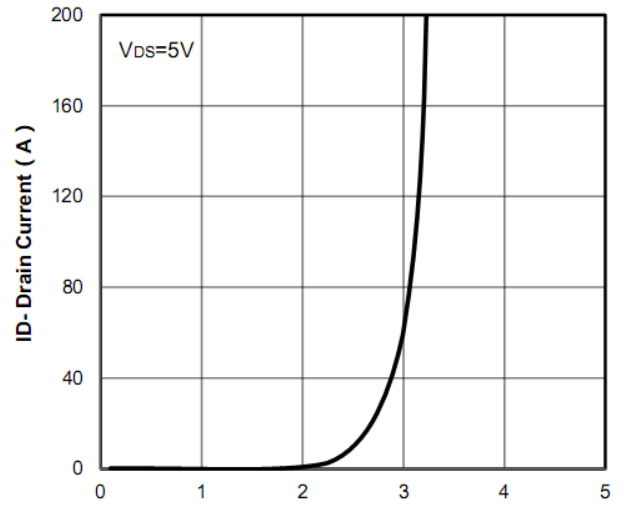


Figure8: Vgs- Gate Source Voltage (V)

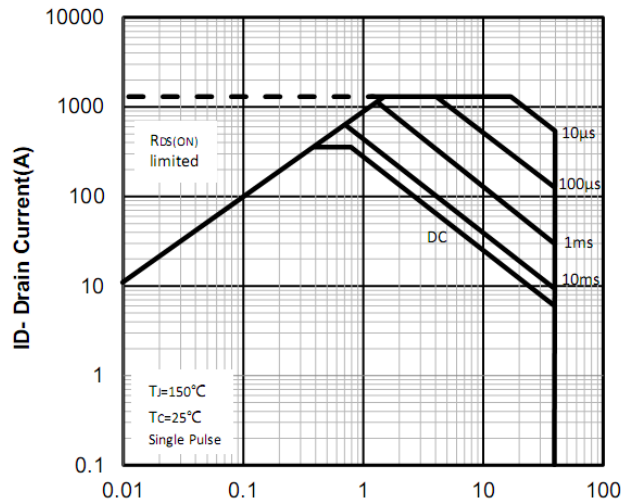


Figure9: Vds- Drain Source Voltage (V)

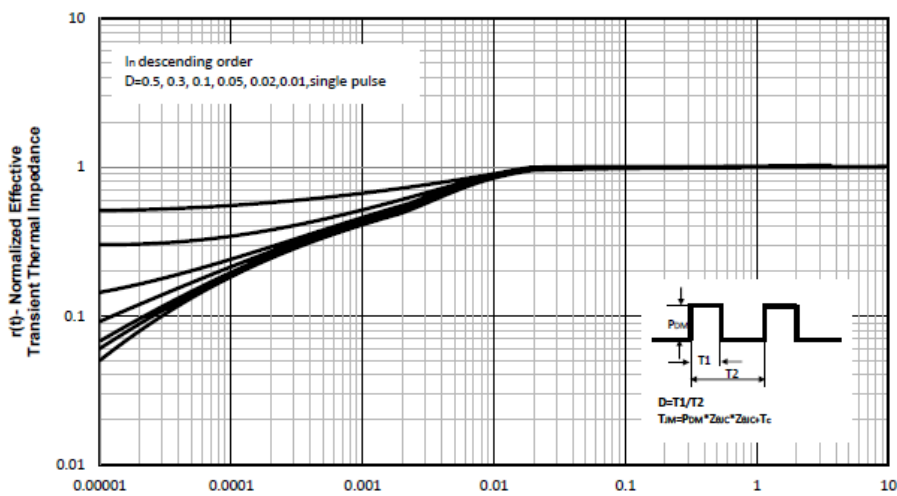


Figure10: Square Wave Pulse Duration (sec)

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Test Circuit and Waveform:

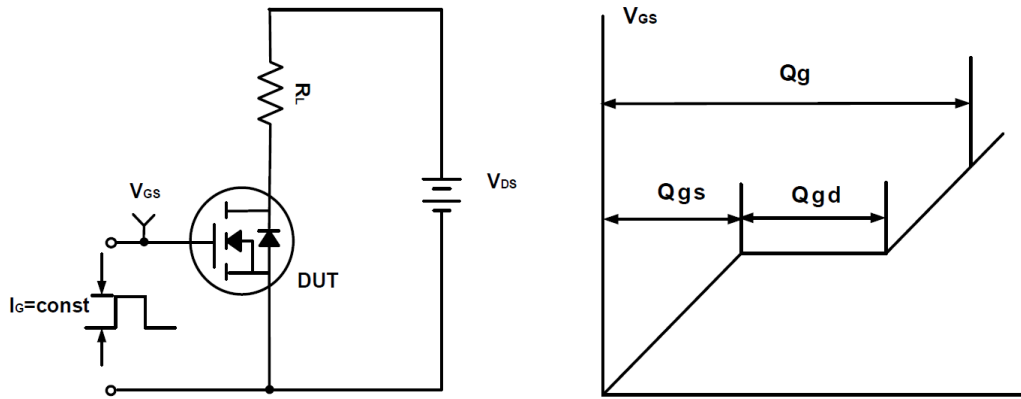


Figure A Gate Charge Test Circuit & Waveforms

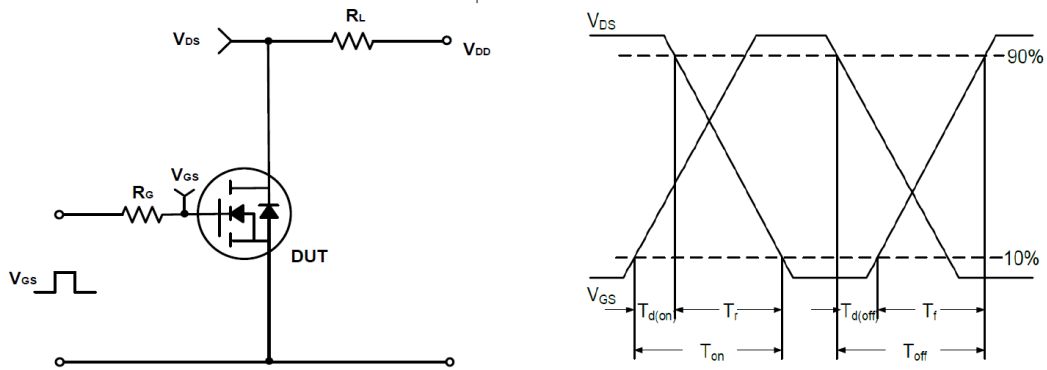


Figure B Switching Test Circuit & Waveforms

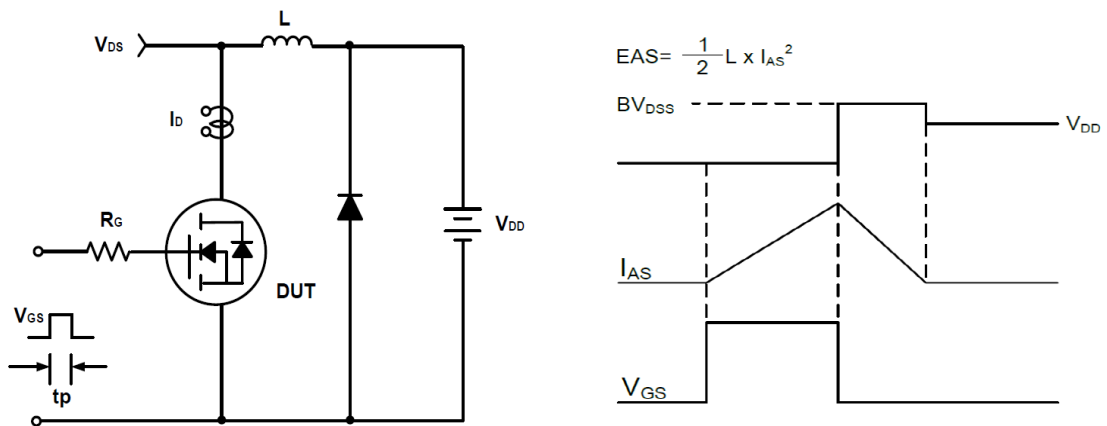
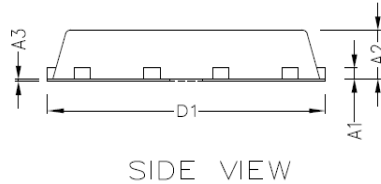


Figure C Unclamped Inductive Switching Circuit & Waveforms

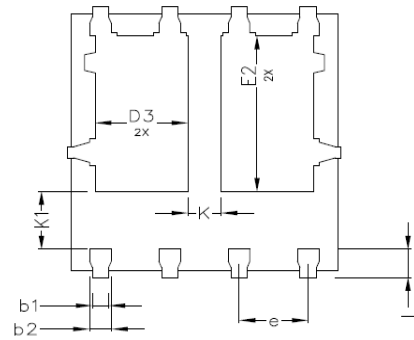


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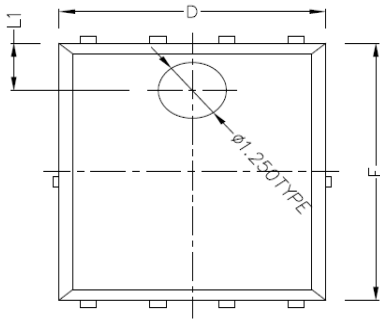
PDFN5X6-8L Package Outline Dimensions (Units: mm)



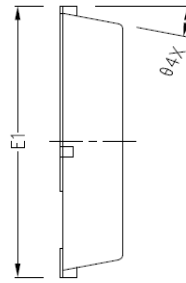
SIDE VIEW



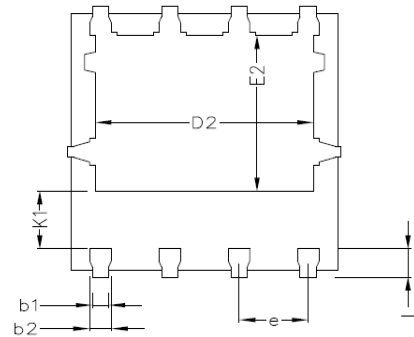
BOTTOM VIEW
OPTION 2



TOP VIEW



SIDE VIEW



BOTTOM VIEW
OPTION 1

COMMON DIMENSIONS (UNITS OF MEASURE IS)			
	MIN	NORMAL	MAX
A1	0.254 BSC		
A2	1.000	1.100	1.200
A3	0.005	-	0.020
b1	0.250	0.300	0.350
b2	0.350	0.400	0.450
D	4.800	4.900	5.000
D1	5.000	5.100	5.200
D2	3.910	4.010	4.110
D3	1.605	1.705	1.805
E	5.650	5.750	5.850
E1	5.950	6.050	6.150
E2	3.375	3.475	3.575
e	1.270 TYPE		
L	0.630	0.630	0.730
L1	1.00REF		
ø	1.3 TYPE		
K	0.600 REF		
K1	1.235 REF		