PTN40N120

40V/120A N-Channel Advanced Power MOSFET

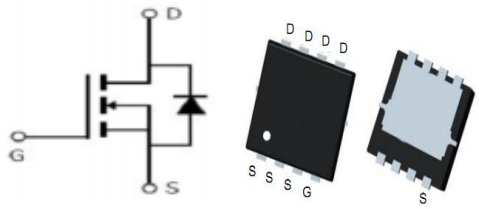
Features

- Lead free and Green Device Available
- Low Rds-on to Minimize Conductive Loss
- High avalanche Current
- 100% Avalanche Tested

BVDSS	40	V
ID	120	A
RDSON@VGS=10V	2.4	mΩ
RDSON@VGS=4.5V	3.5	mΩ

Applications

- Power Supply
- DC-DC Converters
- Load Switch



PDFN5X6-8L

Order Information

Product	Package	Marking	Reel Size	Reel	Carton
PTN40N120	PDFN5X6-8L	PTN40N120	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	120	A
Mounted on Large Heat Sink				
E_{AS}	Single Pulse Avalanche Energy (Note1)		270	mJ
I_{DM}	Pulse Drain Current Tested (Sillicon Limit) (Note2)	TC =25°C	400	A
I_D	Continuous Drain current	TC =25°C	120	A
P_D	Maximum Power Dissipation	TC =25°C	60	W
$R_{\theta Jc}$	Thermal Resistance Junction−to−Case (Note3)		2.08	°C/W

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Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ TJ = 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	1.8	2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance (Note4)	VGS=10V, ID=30A	--	2.4	3.3	mΩ
		VGS=4.5V, ID=20A	--	3.5	4.5	mΩ
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated) (Note5)						
C_{iss}	Input Capacitance	VDS=20V, VGS=0V, F=1MHz	--	6310	--	pF
C_{oss}	Output Capacitance		--	723	--	pF
C_{rss}	Reverse Transfer Capacitance		--	540	--	pF
Q_g	Total Gate Charge	VDS=20V, ID=30A, VGS=10V	--	130	--	nC
Q_{gs}	Gate-Source Charge		--	22	--	nC
Q_{gd}	Gate-Drain Charge		--	29	--	nC
Switching Characteristics (Note5)						
$t_{d(on)}$	Turn-on Delay Time	VDD=20V, ID=30A, VGS=10V, RG=3Ω, RL=1 Ω	--	17.2	--	nS
t_r	Turn-on Rise Time		--	40	--	nS
$t_{d(off)}$	Turn-off Delay Time		--	120	--	nS
t_f	Turn-off Fall Time		--	35	--	nS
Source- Drain Diode Characteristics@ TJ = 25°C (unless otherwise stated)						
V_{SD}	Forward on voltage	IS=30A,VGS=0V	--	--	1.2	V
t_{rr}	Reverse Recovery Time	IF=30A, Di/dt=100A/us	--	23.6	--	ns
Q_{rr}	Reverse Recovery Charge		--	13	--	nc

Note:

1. Limited by TJmax, starting TJ = 25° C, RG = 25Ω, VD =20V, VGS =10V. Part not recommended for use above this value.
2. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. Surface Mounted on FR4 Board, t ≤ 10 sec.
4. Pulse Test: pulse width ≤ 300 us, duty cycle ≤ 2%.
5. Guranteed by design, not subject to production testing.

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Typical Characteristics

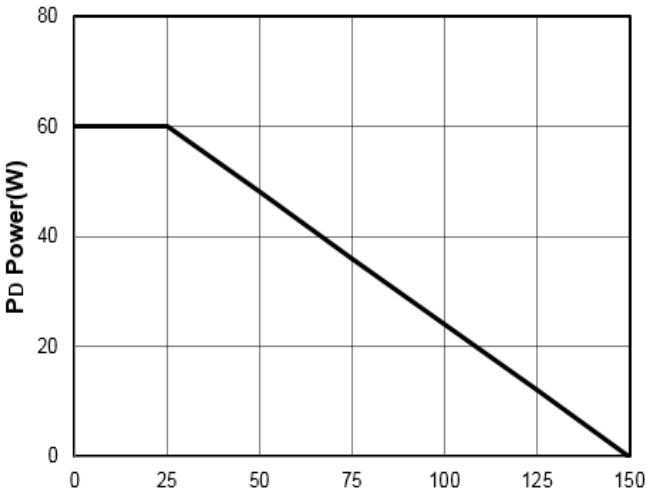

Figure1：T_J Junction Temperature（°C）

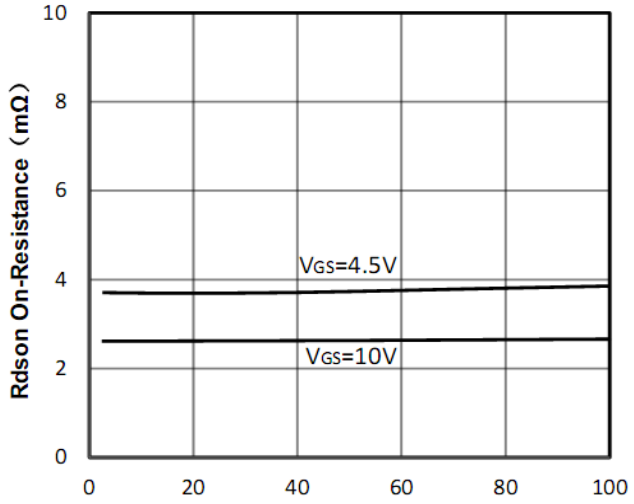

Figure2：I_D Drain Current（A）

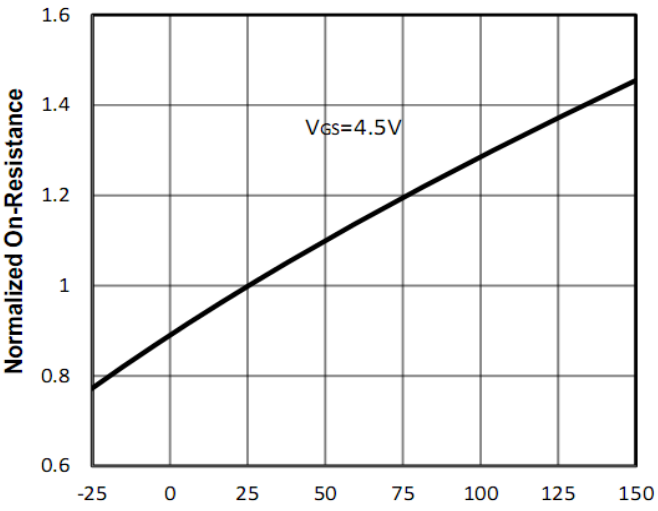

Figure3：T_J Junction Temperature（°C）

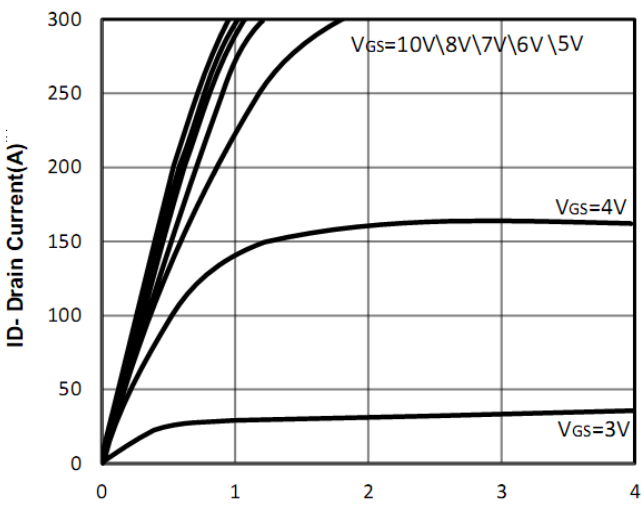

Figure4：V_{DS} Drain-Source Voltage（A）

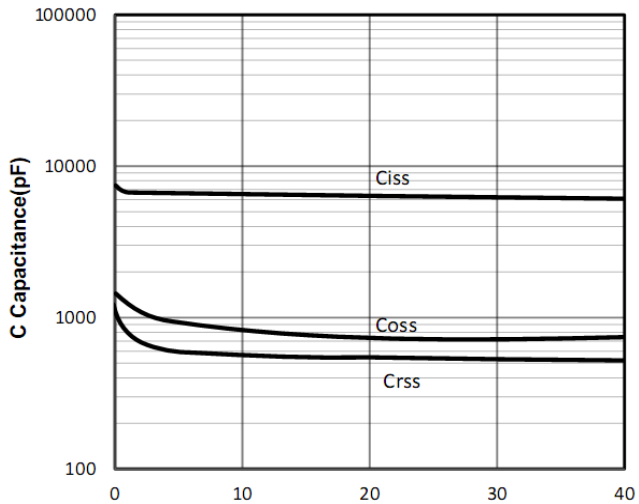

Figure5：V_{DS} Drain-Source Voltage（V）

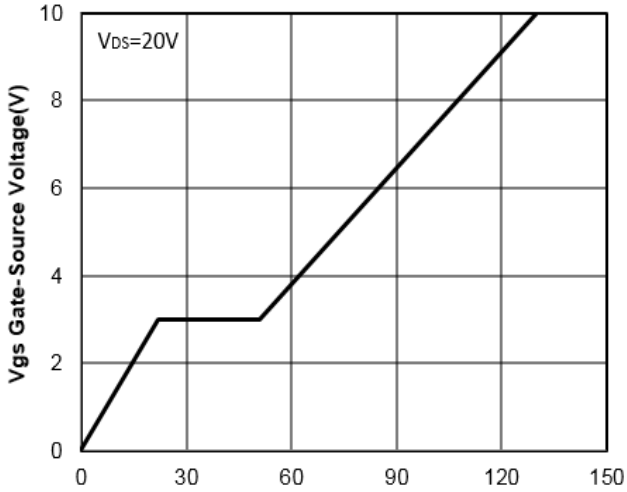

Figure6：Qg Gate Charge（nC）

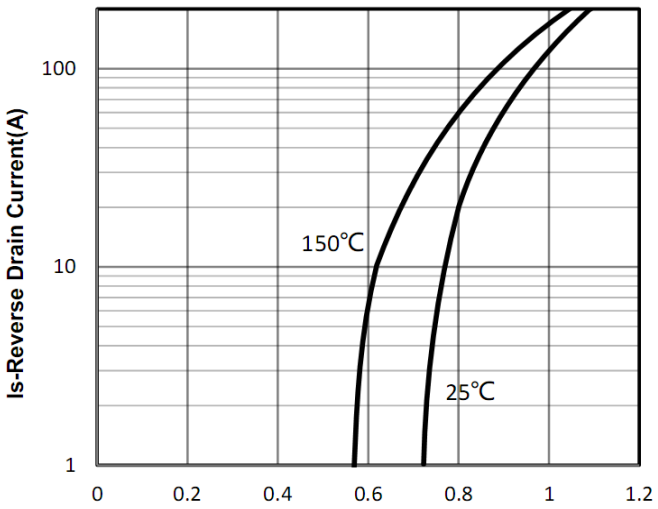

Figure7：Vsd Source-Drain Voltage（V）

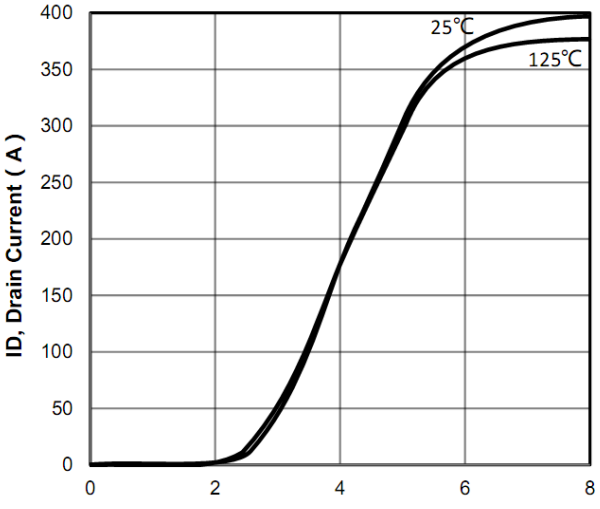

Figure8：Vgs Gate-Source Voltage（V）

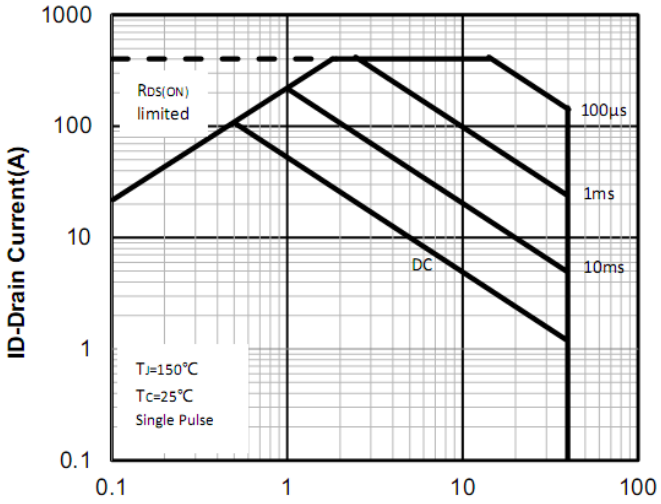

Figure9：VDS Drain -Source Voltage（V）

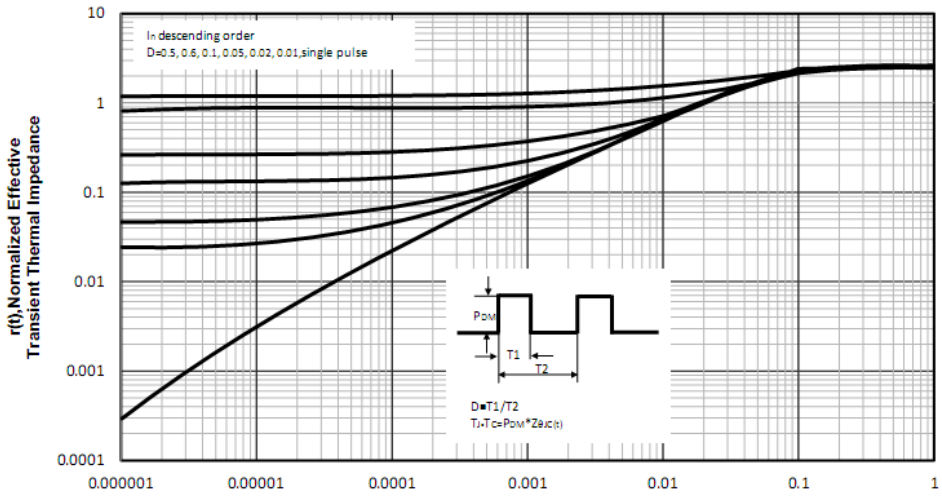

Figure10：Square Wave Pulse Duration（sec）

Test Circuit and Waveform:

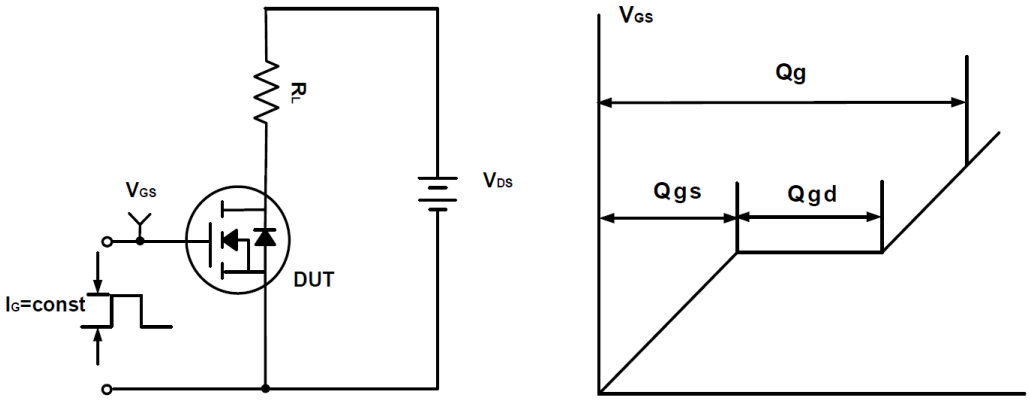

Figure A Gate Charge Test Circuit &Waveforms

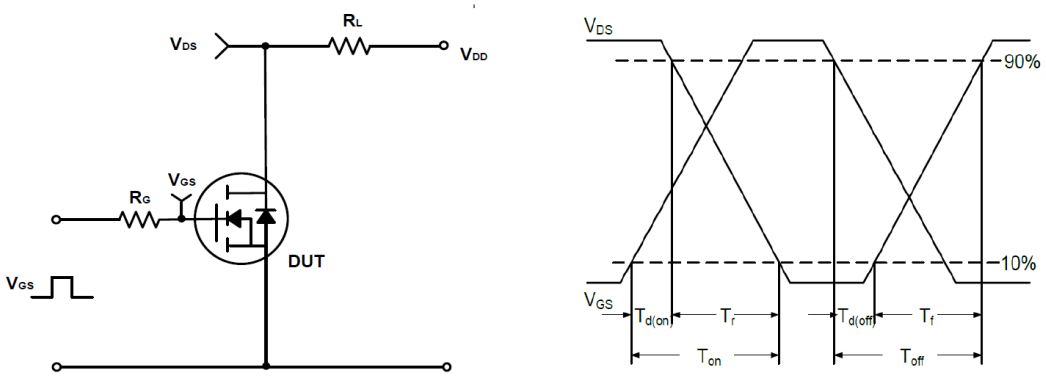

Figure B Switching Test Circuit & Waveforms

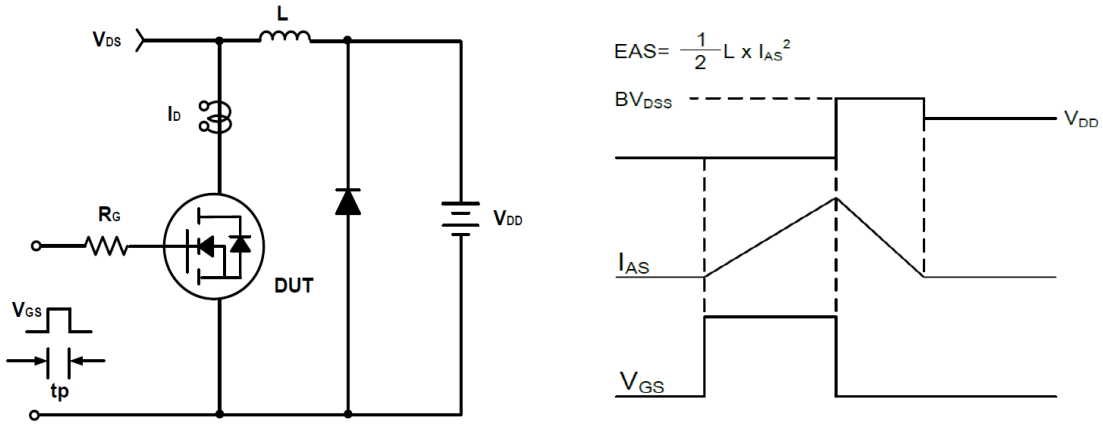

Figure C Unclamped Inductive Switching Circuit & Waveforms

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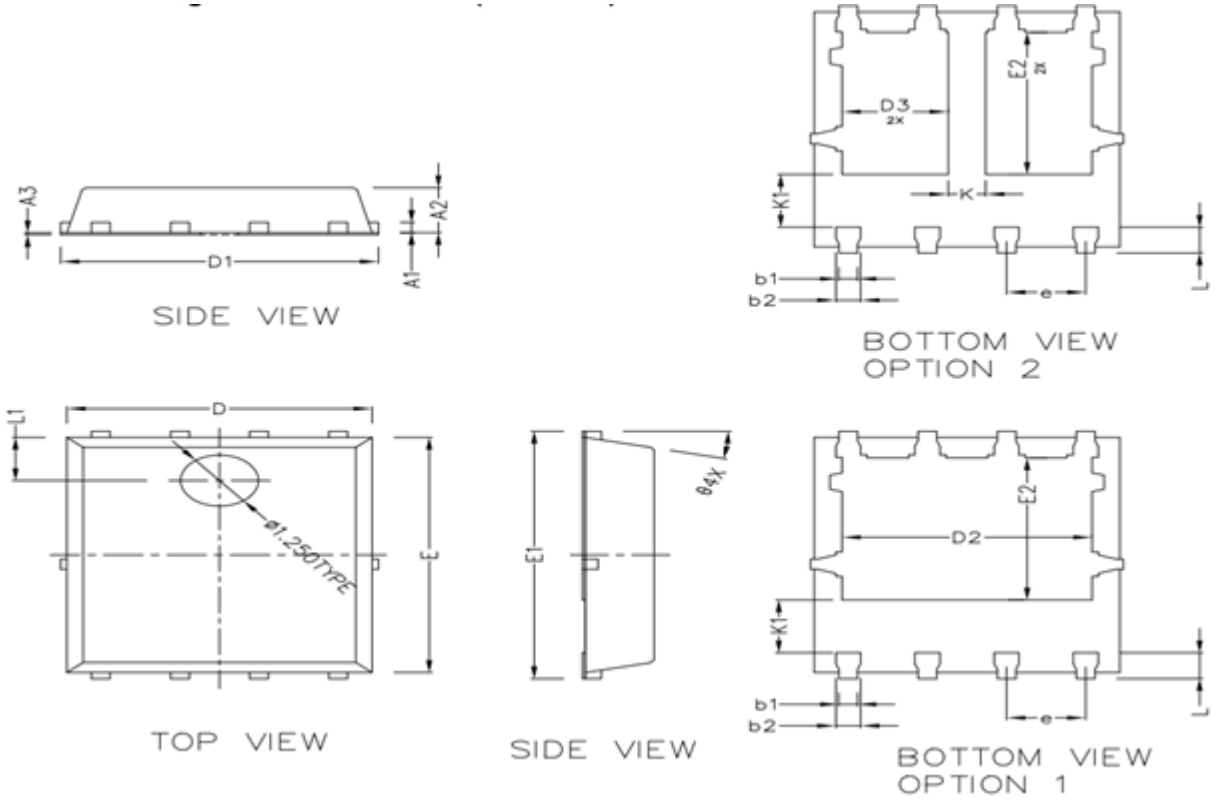
PDFN5X6-8L Package Outline Dimensions (Units: mm)



COMMON DIMENSIONS (UNITS OF MEASURE IS mm)			
	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	0.530	0.630	0.730
L1		1.00REF	
θ		13° TYPE	
K		0.600 REF	
K1		1.235 REF	