



-40V/-40A P-Channel Advanced Power MOSFET

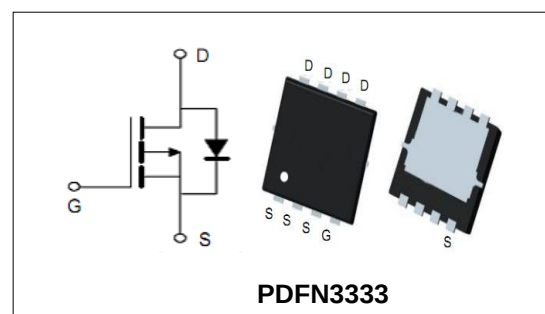
Features

- Improved dv/dt Capability, High Ruggedness.
- Maximum Junction Temperature Range (150°C)
- 100% Avalanche Tested

BVDSS	-40	V
ID	-40	A
RDSON@VGS=-10V	10.4	mΩ
RDSON@VGS=-4.5V	13.5	mΩ

Applications

- Battery and loading switching



Order Information

Product	Package	Marking	Reel Size	Reel	Carton
PTQ40P40	PDFN3333	PTQ40P40	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	-40	A
Mounted on Large Heat Sink				
E _{AS}	Single Pulse Avalanche Energy (Note1)		156	mJ
I _{DM}	Pulse Drain Current Tested (Silicon Limit) (Note2)	TC =25°C	-160	A
I _D	Continuous Drain current	TC =25°C	-40	A
P _D	Maximum Power Dissipation	TC =25°C	31	W
R _{θJC}	Thermal Resistance Junction-to-Case (Note3)		4.03	°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	--	-2.1	V
R _{DS(ON)}	Drain-Source On-State Resistance (Note4)	VGS=-10V, ID=-12A	--	10.4	14	mΩ
		VGS=-4.5V, ID=-10A	--	13.5	18	mΩ
Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated) (Note5)						
C _{iss}	Input Capacitance	VDS= -20V, VGS=0V, F=1MHz	--	3230	--	pF
C _{oss}	Output Capacitance		--	262	--	pF
C _{rss}	Reverse Transfer Capacitance		--	3.8	--	pF
Q _g	Total Gate Charge	VDS= -20V, ID= -20A, VGS= -10V	--	67.4	--	nC
Q _{gs}	Gate-Source Charge		--	11.1	--	nC
Q _{gd}	Gate-Drain Charge		--	12.4	--	nC
Switching Characteristics (Note5)						
t _{d(on)}	Turn-on Delay Time	VDD=-20V, ID=-20A, RG=2.5Ω, VGS=-10V	--	11.4	--	nS
t _r	Turn-on Rise Time		--	27.8	--	nS
t _{d(off)}	Turn-off Delay Time		--	92.4	--	nS
t _f	Turn-off Fall Time		--	20.6	--	nS
Source- Drain Diode Characteristics@ TJ = 25°C (unless otherwise stated)						
V _{SD}	Forward on voltage (Note4)	IS=-20A,VGS=0V	--	--	-1.2	V

Note:

- Limited by TJmax, starting TJ = 25° C, RG = 25Ω, VD = -15V, VGS = -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.



Typical Characteristics

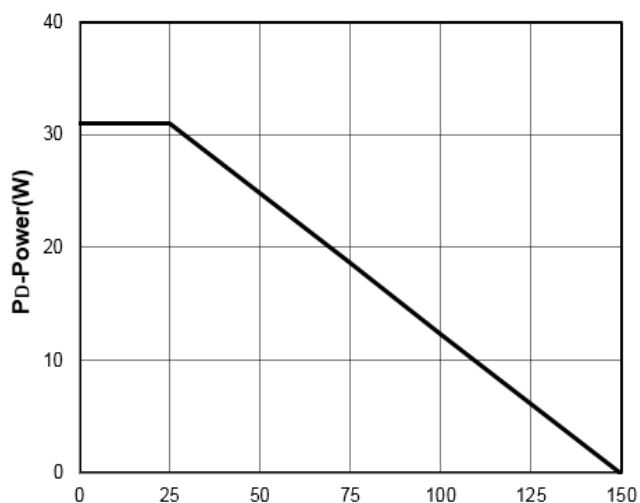


Figure1: T_j Junction Temperature (°C)

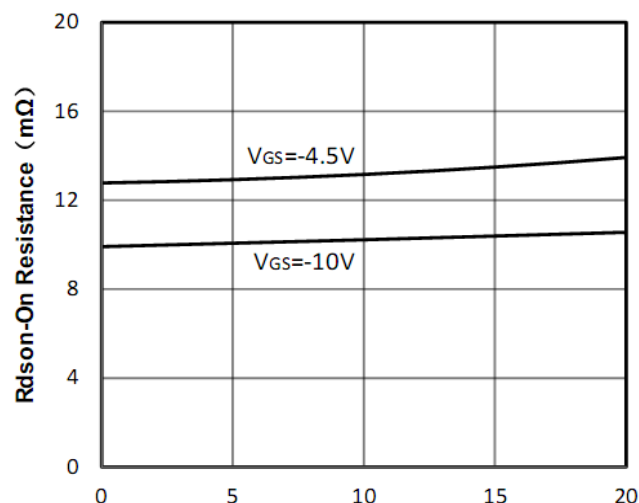


Figure2: -I_d Drain Current (A)

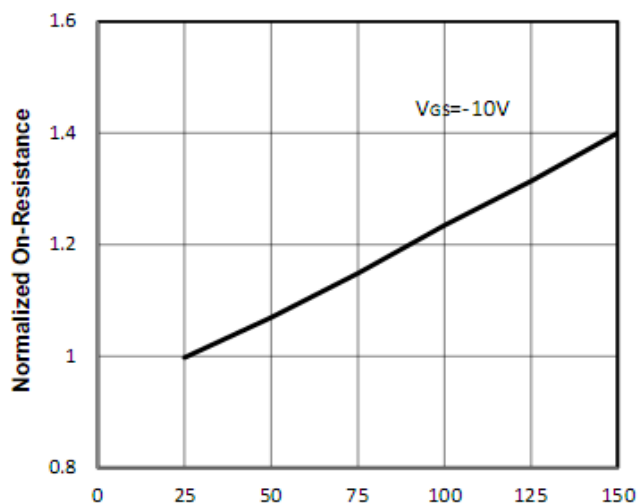


Figure3: T_j Junction Temperature (°C)

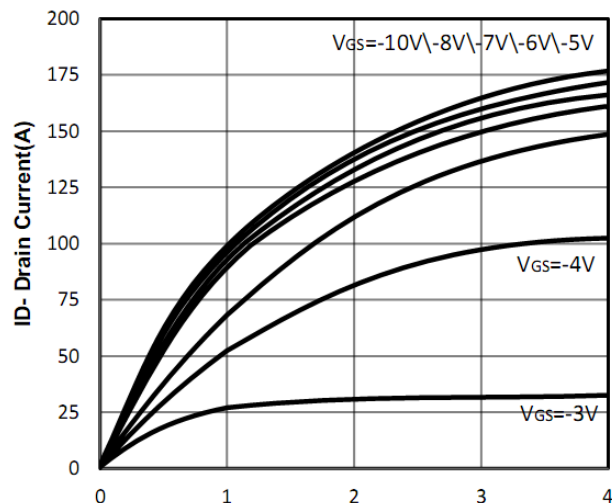


Figure4: -V_{ds} Drain-Source Voltage (V)

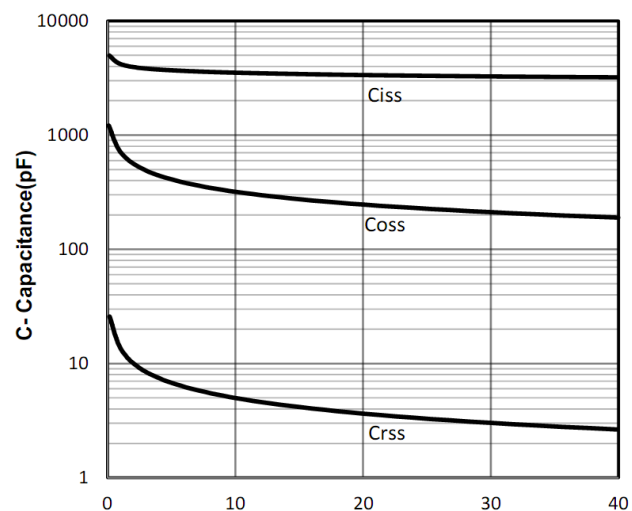


Figure5: -V_{ds} Drain-Source Voltage (V)

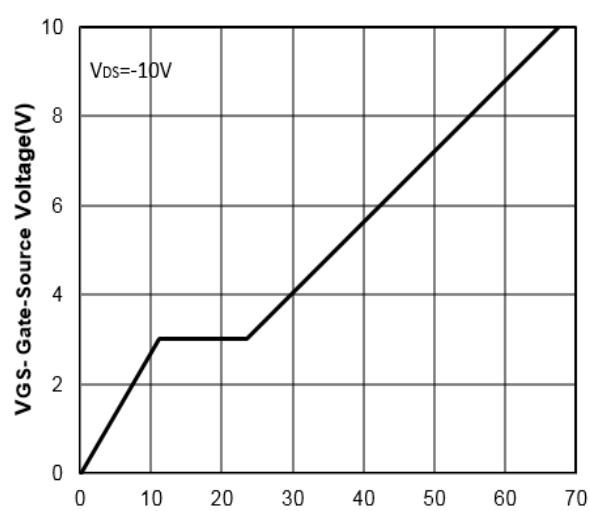


Figure6: Q_g Gate Charge (nC)



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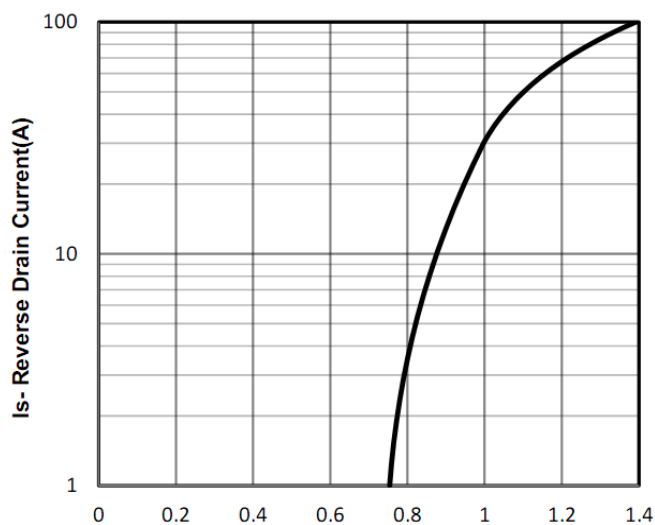


Figure7: -Vsd Source-Drain Voltage (V)

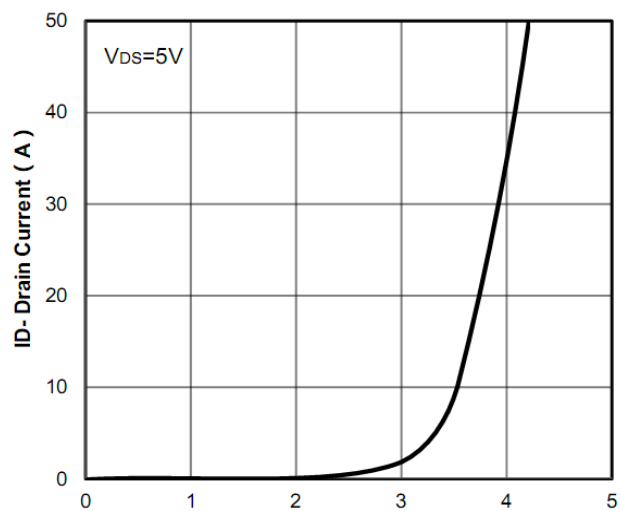


Figure8: -Vgs Gate-Source Voltage (V)

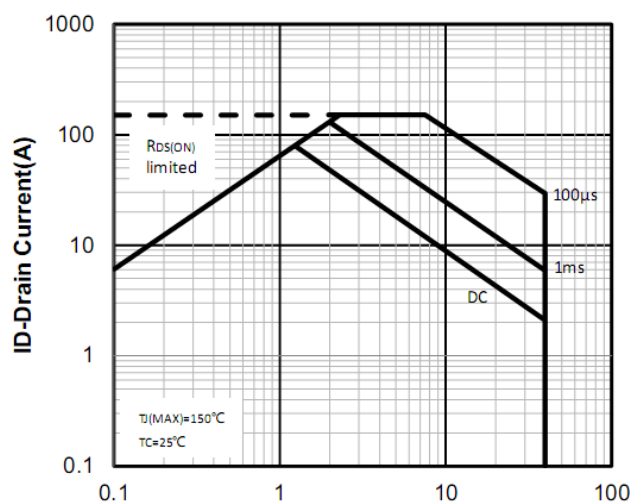


Figure9: -Vds Drain -Source Voltage (V)

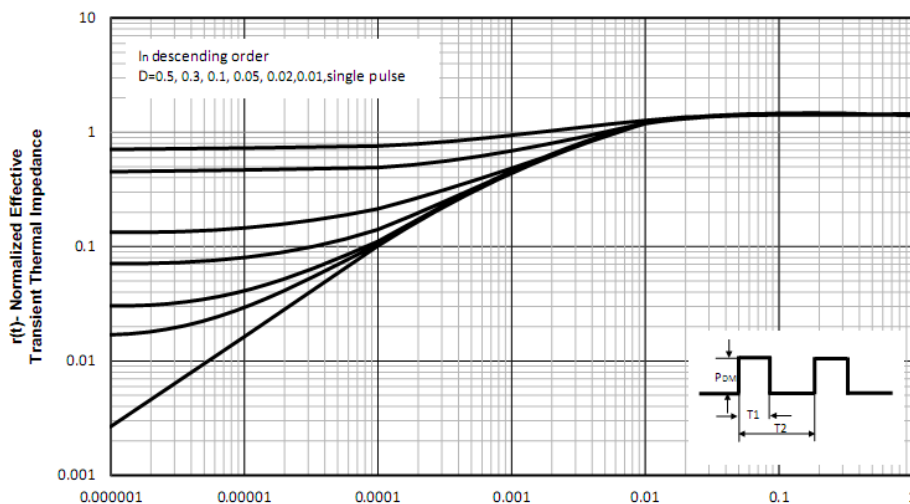


Figure10: Square Wave Pulse Duration (sec)



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Test Circuit and Waveform:

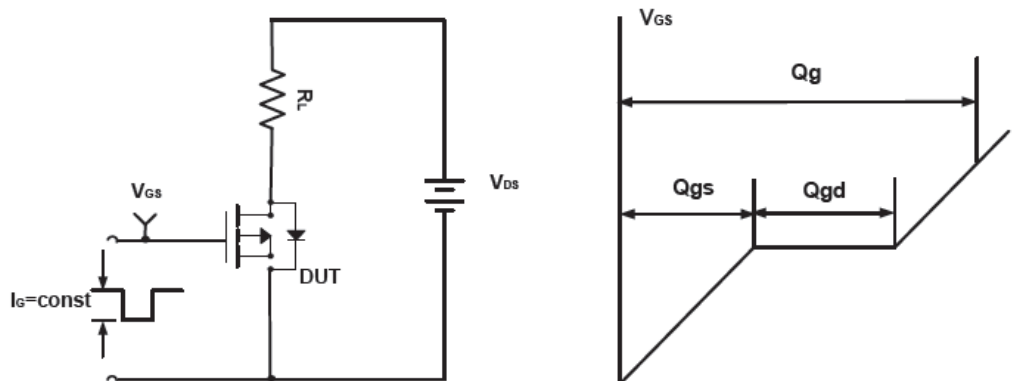


Figure A Gate Charge Test Circuit & Waveforms

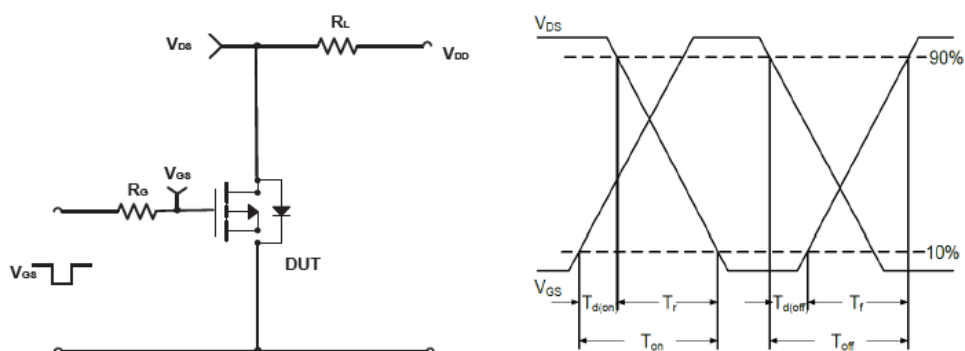


Figure B Switching Test Circuit & Waveforms

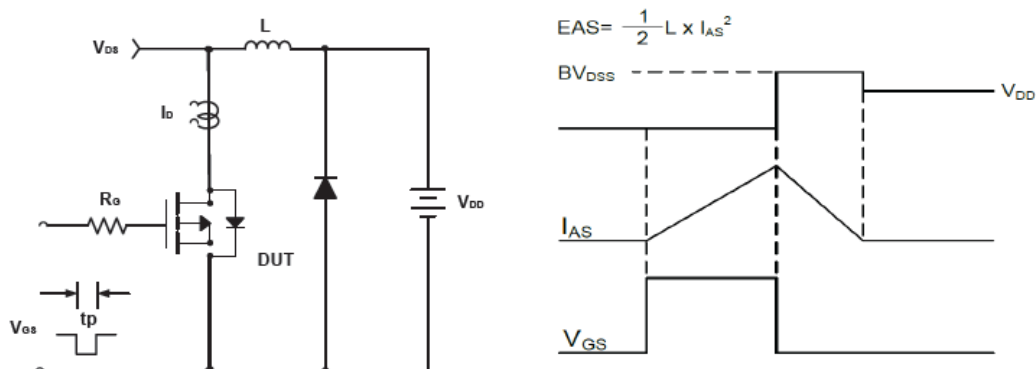
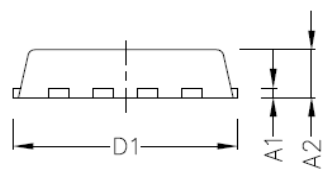
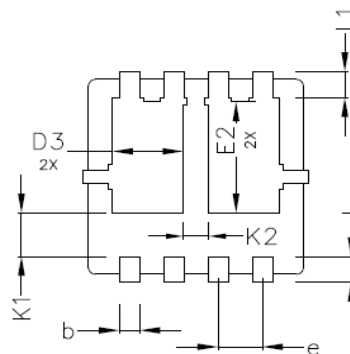
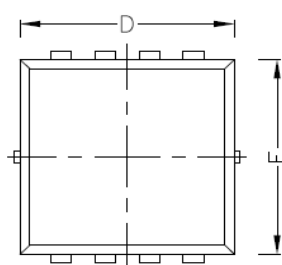


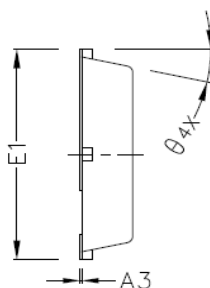
Figure C Unclamped Inductive Switching Circuit & Waveforms

**PDFN3333 Package Outline Dimensions (Units: mm)**

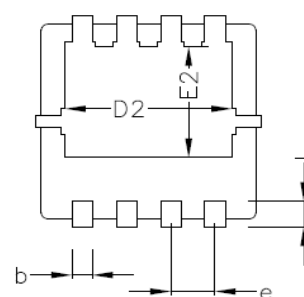
SIDE VIEW

BOTTOM VIEW
OPTION 2

TOP VIEW



SIDE VIEW

BOTTOM VIEW
OPTION 1

COMMON DIMENSIONS (UNITS OF MEASURE IS mm)			
	MIN	NORMAL	MAX
A1	0.152 BSC		
A2	0.650	0.750	0.850
A3	0.005	—	0.020
b	0.250	0.300	0.350
D	3.050	3.150	3.250
D1	3.200	3.300	3.400
D2	2.350	2.450	2.550
D3	0.935	1.035	1.135
E1	3.150	3.300	3.450
E	2.950	3.050	3.150
E2	1.635	1.735	1.835
e	0.650 TYPE		
L	0.300	0.400	0.500
θ	12° TYPE		
K1	0.680 REF		
K2	0.380 REF		
L1	0.410 REF		