PGQ04N070

40V/50A N-Channel Advanced Power MOSFET

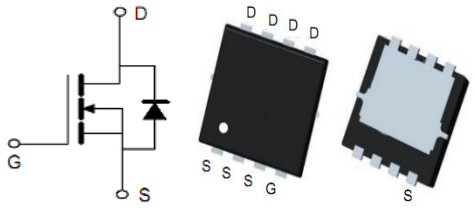
Features

- Fast switching capability
- Robust design wish better EAS performance
- Ultra-low on-resistance

BVDSS	40	V
ID	50	A
RDSON@VGS=10V	5.1	mΩ
RDSON@VGS=4.5V	7.2	mΩ

Applications

- Battery Management System
- Motor Drivers
- DC-DC Converter



PDFN3333

Order Information

Product	Package	Marking	Reel Size	Reel	Carton
PGQ04N070	PDFN3333	PGQ04N070	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	℃
T_{STG}	Storage Temperature Range		-55 to 150	℃
I_S	Diode Continuous Forward Current	TC =25°C	50	A
Mounted on Large Heat Sink				
E_{AS}	Single Pulse Avalanche Energy (Note1)		45.5	mJ
I_{DM}	Pulse Drain Current Tested (Sillicon Limit) (Note2)	TC =25°C	200	A
I_D	Continuous Drain current	TC =25°C	50	A
P_D	Maximum Power Dissipation	TC =25°C	28	W
$R_{\theta Jc}$	Thermal Resistance Junction−to−Case (Note3)		4.46	° 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(Tc=25℃)	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	1.8	2.5	V
$R_{DS(ON)}$	Drain-Source On-State Resistance (Note4)	VGS=10V, ID=20A	--	5.1	7	mΩ
		VGS=4.5V, ID=20A	--	7.2	10	mΩ
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated) (Note5)						
C_{iss}	Input Capacitance	VDS=20V, VGS=0V, F=1MHz	--	863	--	pF
C_{oss}	Output Capacitance		--	309	--	pF
C_{rss}	Reverse Transfer Capacitance		--	5.8	--	pF
Q_g	Total Gate Charge	VDS=20V, ID=20A, VGS=10V	--	14.7	--	nC
Q_{gs}	Gate-Source Charge		--	2.1	--	nC
Q_{gd}	Gate-Drain Charge		--	2.5	--	nC
R_G	Reverse Transfer Capacitance	F=1MHz	--	3.1	--	Ω
Switching Characteristics (Note5)						
$t_{d(on)}$	Turn-on Delay Time	VDS=20V, RL=1Ω, RG=1.6Ω, VGS=10V	--	5.8	--	nS
t_r	Turn-on Rise Time		--	49	--	nS
$t_{d(off)}$	Turn-off Delay Time		--	17	--	nS
t_f	Turn-off Fall Time		--	4.9	--	nS
Source- Drain Diode Characteristics@ TJ = 25°C (unless otherwise stated)						
V_{SD}	Forward on voltage	IS=20A,VGS=0V	--	--	1.2	V
t_{rr}	Reverse Recovery Time	VDD=20V ID=20A, Di/dt=100A/us	--	28.2	--	ns
Q_{rr}	Reverse Recovery Charge		--	15	--	nc

Note:

1. Limited by TJmax, starting TJ = 25° C, RG =25Ω, VDS =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 Performance Characteristics

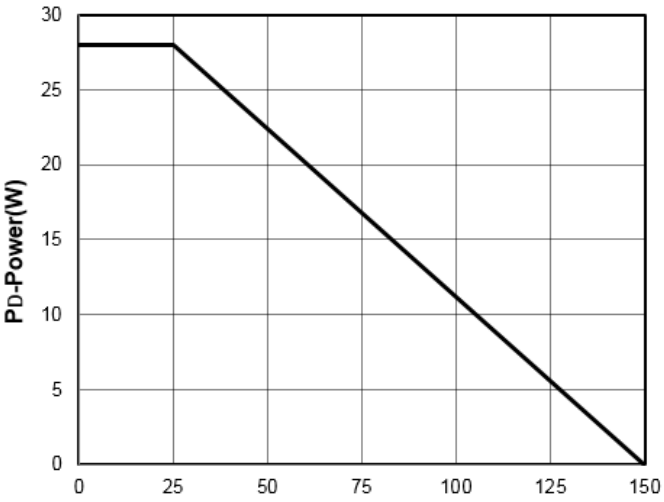


Figure1：T_J Junction Temperature（°C）

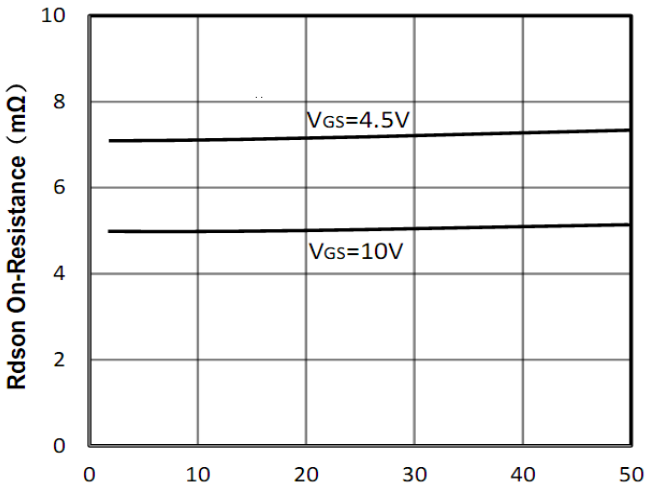


Figure2：I_D Drain Current（A）

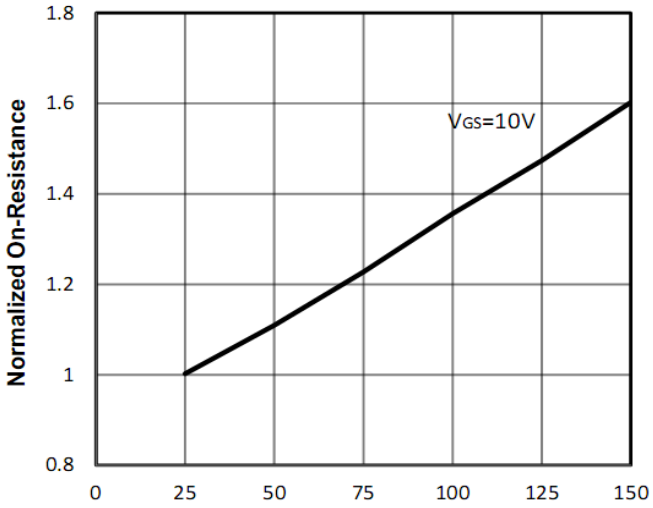


Figure3：T_J Junction Temperature（°C）

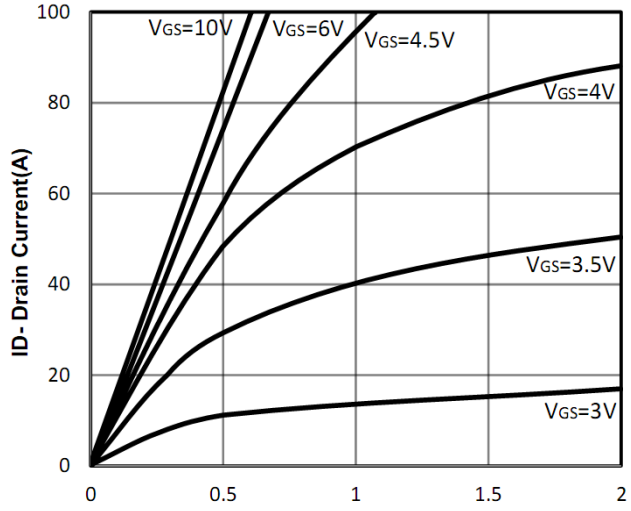


Figure4：V_{DS} Drain-Source Voltage（V）

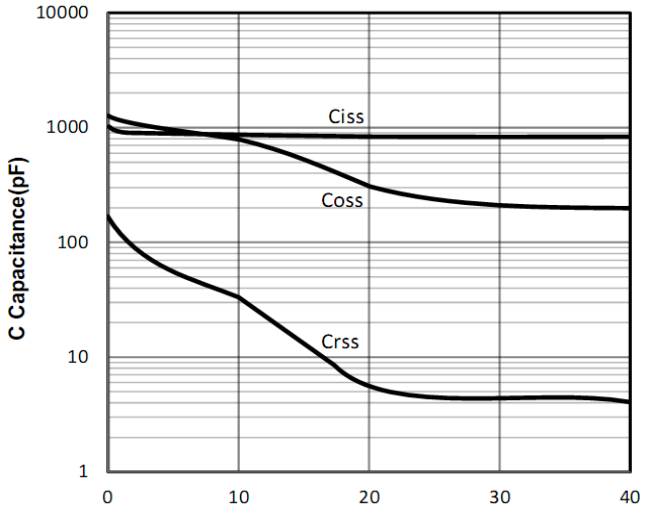


Figure5：V_{DS} Drain-Source Voltage（V）

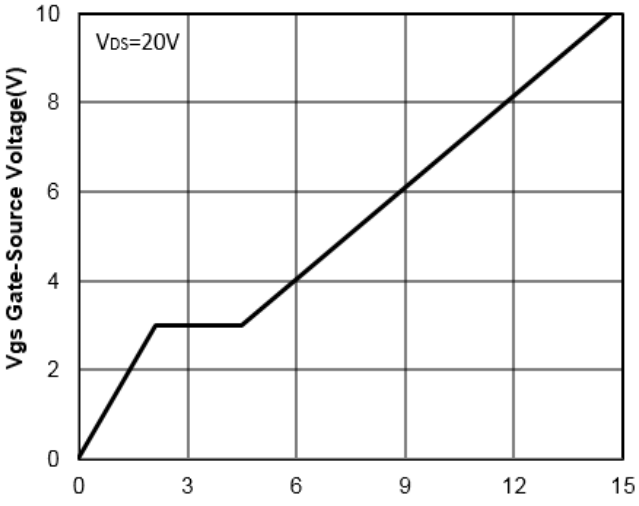


Figure6：Qg Gate Charge（nC）

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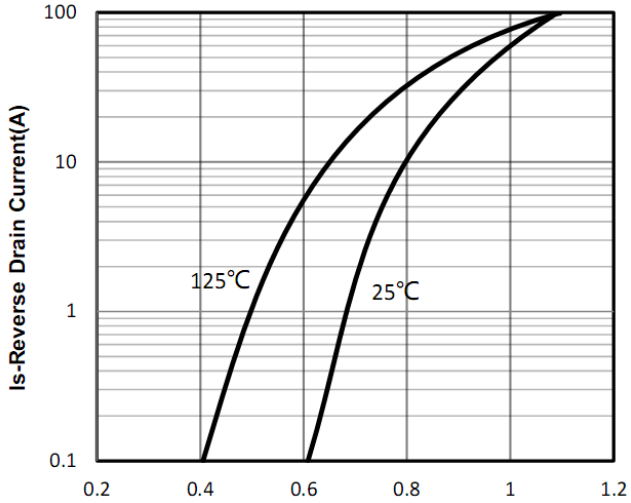


Figure7：Vsd Source-Drain Voltage（V）

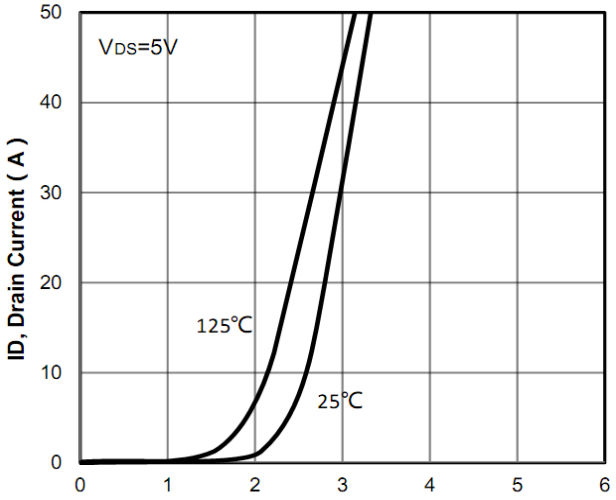


Figure8：Vgs Gate-Source Voltage（V）

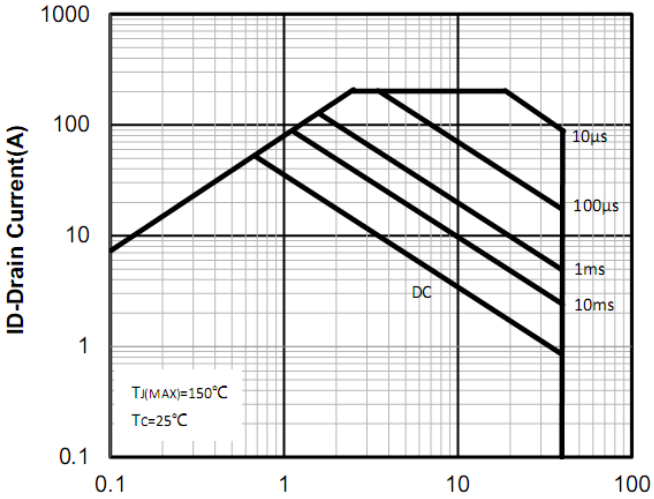


Figure9：Vsd Drain Source Voltage（V）

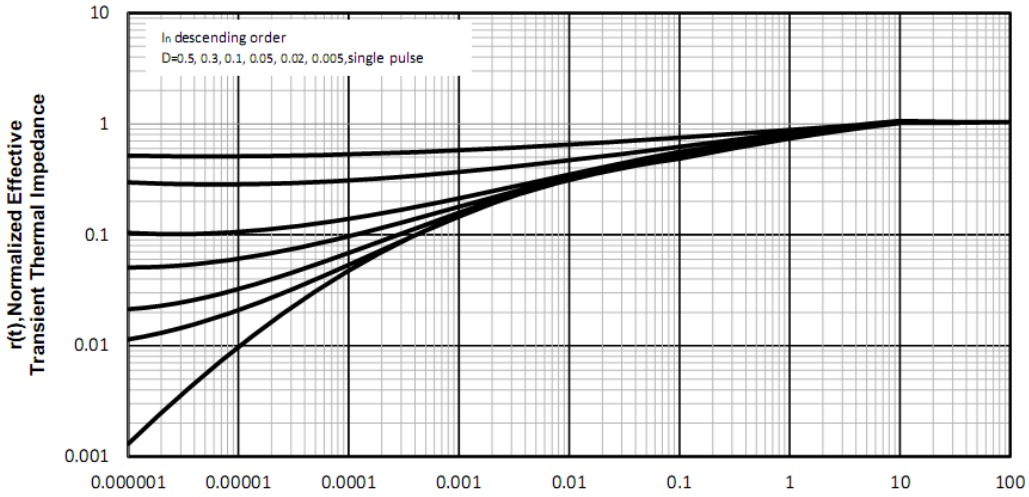


Figure10：Square Wave Pulse Duration（sec）

Test Circuit and Waveform:

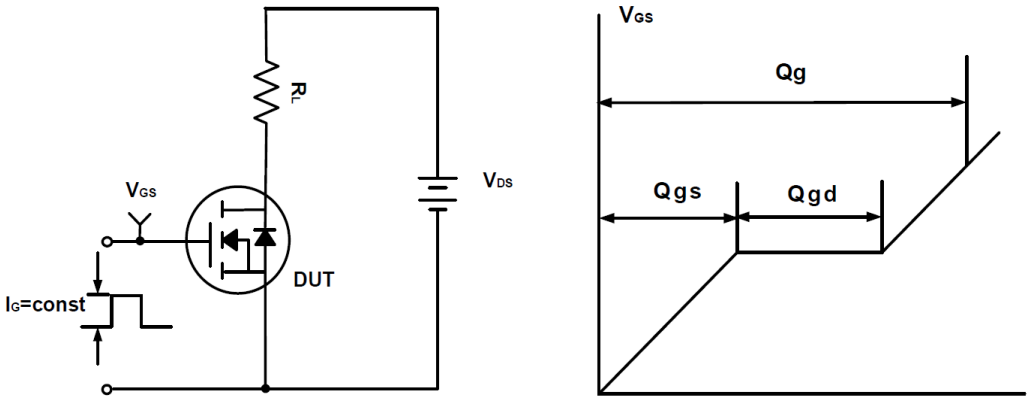


Figure A Gate Charge Test Circuit &Waveforms

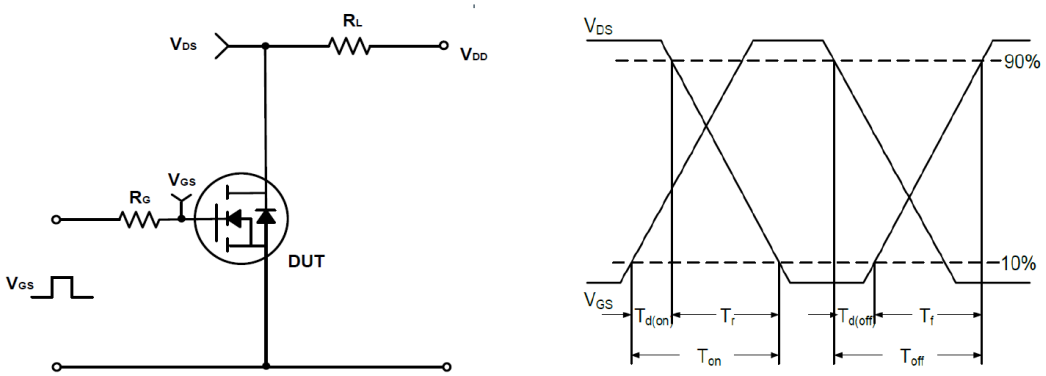


Figure B Switching Test Circuit & Waveforms

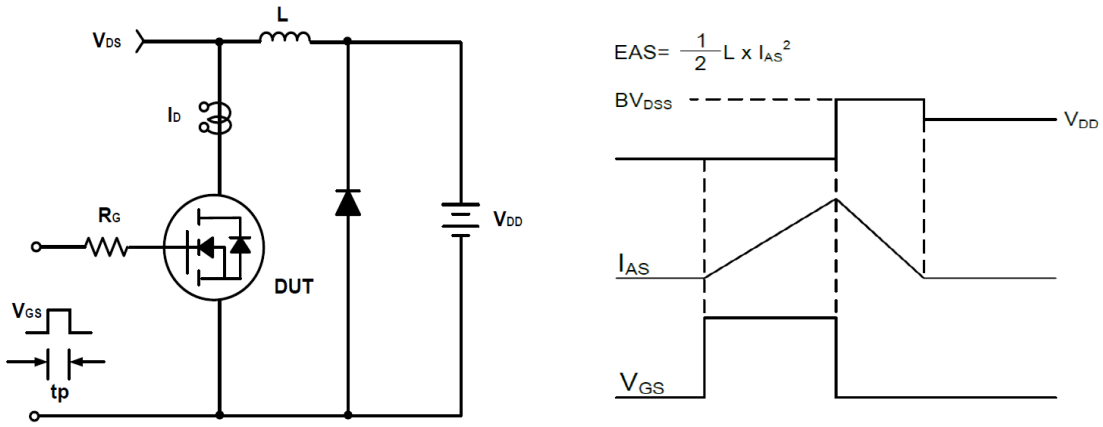
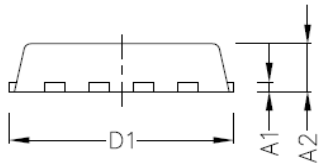


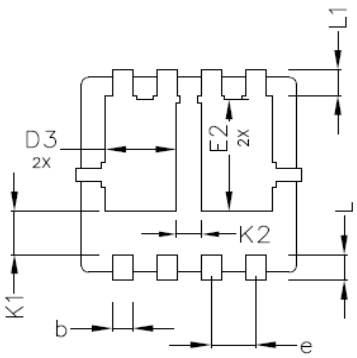
Figure C Unclamped Inductive Switching Circuit & Waveforms

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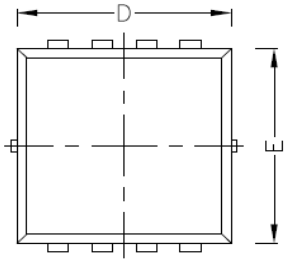
PDFN3333 Package Outline Dimensions (Units: mm)



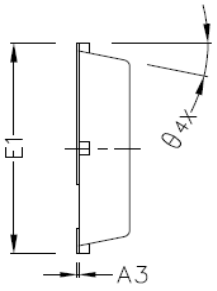
SIDE VIEW



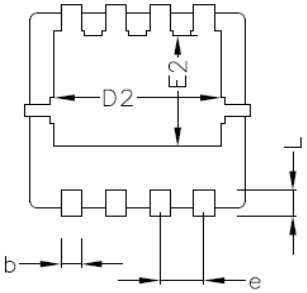
BOTTOM VIEW
OPTION 2



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	