



N And P- Channel Enhancement Mode Power MOSSFET

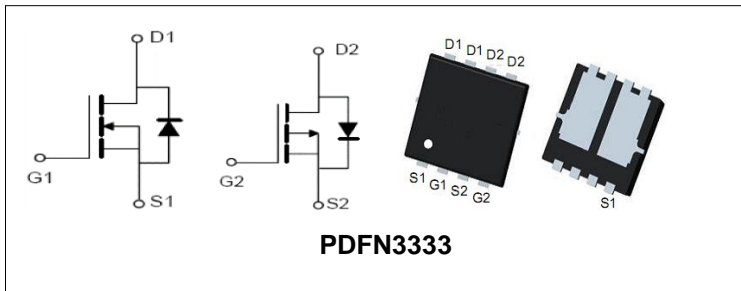
Features

- Improved dv/dt Capability, High Ruggedness
- Maximum Junction Temperature Range (150°C)

Applications

- DC Fan
- Brushless motor
- Optimized for Power Management Applications for Portable Products, such as H-bridge, Inverters Car Charger and Others

N-Channel		
BVDSS	30	V
ID	15	A
RDSON@VGS=10V	16	mΩ
RDSON@VGS=4.5V	21	mΩ



P-Channel		
BVDSS	-30	V
ID	-11	A
RDSON@VGS=-10V	26	mΩ
RDSON@VGS=-5V	37	mΩ

Order Information

Product	Package	Marking	Reel Size	Reel	Carton
PTQ15C03	PDFN3333	PTQ15C03	13inch	5000PCS	50000PCS

Absolute Maximum Ratings

Symbol	Parameter	N-Channel	P-Channel	Unit	
Common Ratings (TC=25°C Unless Otherwise Noted)					
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	30	-30	V	
V_{GS}	Gate-Source Voltage	±20	±20	V	
T_J	Maximum Junction Temperature	150		°C	
T_{STG}	Storage Temperature Range	-50 to 150		°C	
I_S	Diode Continuous Forward Current	TC =25°C	15	-11	A
Mounted on Large Heat Sink					
I_{DM}	Pulse Drain Current Tested (Silicon Limit) (Note1)	TC =25°C	60	-44	A
I_D	Continuous Drain current	TC=25°C	15	-11	A
P_D	Maximum Power Dissipation	TC =25°C	15		W
$R_{θJC}$	Thermal Resistance Junction-to-Case (Note2)	8.3		°C/W	



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N-Channel Electrical Characteristics

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	30	--	--	V
I _{DSS}	Zero Gate Voltage Drain current	VDS=30V,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	1.5	2.5	V
R _{DS(ON)}	Drain-Source On-State Resistance (Note3)	VGS=10V, ID=10A	--	16	22	mΩ
		VGS=4.5V, ID=6A	--	21	31	mΩ
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated) (Note4)						
C _{iss}	Input Capacitance	VDS= 15V, VGS=0V, F=1MHz	--	584	--	pF
C _{oss}	Output Capacitance		--	112	--	pF
C _{rss}	Reverse Transfer Capacitance		--	96	--	pF
Q _g	Total Gate Charge	VDS= 15V, ID= 10A, VGS= 10V	--	15	--	nC
Q _{gs}	Gate-Source Charge		--	4.7	--	nC
Q _{gd}	Gate-Drain Charge		--	3.6	--	nC
Switching Characteristics (Note4)						
t _{d(on)}	Turn-on Delay Time	VDD= 30V, ID=10A, VGEN=10V, RG=3Ω	--	5	--	nS
t _r	Turn-on Rise Time		--	8	--	nS
t _{d(off)}	Turn-off Delay Time		--	21	--	nS
t _f	Turn-off Fall Time		--	7	--	nS
Source- Drain Diode Characteristics @ T_J = 25°C (unless otherwise stated)						
V _{SD}	Forward on voltage	IS=15A,VGS=0V	--	0.82	1.2	V



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P-Channel Electrical Characteristics

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	-30	--	--	V
I _{DSS}	Zero Gate Voltage Drain current	VDS=-30V,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	-1.0	-1.5	-2.5	V
R _{DS(ON)}	Drain-Source On-State Resistance (Note3)	VGS=-10V, ID=-8A	--	26	34	mΩ
		VGS=-5V, ID=-5A	--	37	46	mΩ
Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated) (Note4)						
C _{iss}	Input Capacitance	VDS= -15V, VGS=0V, F=1MHz	--	1200	--	pF
C _{oss}	Output Capacitance		--	155	--	pF
C _{rss}	Reverse Transfer Capacitance		--	139	--	pF
Q _g	Total Gate Charge	VDS= -15V, ID= -8A, VGS= -10V	--	52	--	nC
Q _{gs}	Gate-Source Charge		--	9.8	--	nC
Q _{gd}	Gate-Drain Charge		--	8.3	--	nC
Switching Characteristics (Note4)						
t _{d(on)}	Turn-on Delay Time	VDD=- 15V, ID=-1A, VGS=-10V, RG=6Ω	--	13	--	nS
t _r	Turn-on Rise Time		--	15	--	nS
t _{d(off)}	Turn-off Delay Time		--	198	--	nS
t _f	Turn-off Fall Time		--	98	--	nS
Source- Drain Diode Characteristics @ T_J = 25°C (unless otherwise stated)						
V _{SD}	Forward on voltage	IS=-11A,VGS=0V	--	-0.8	-1.2	V

Note:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec
3. Pulse Test: pulse width ≤ 300 us, duty cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.



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Typical Characteristics (N-Channel)

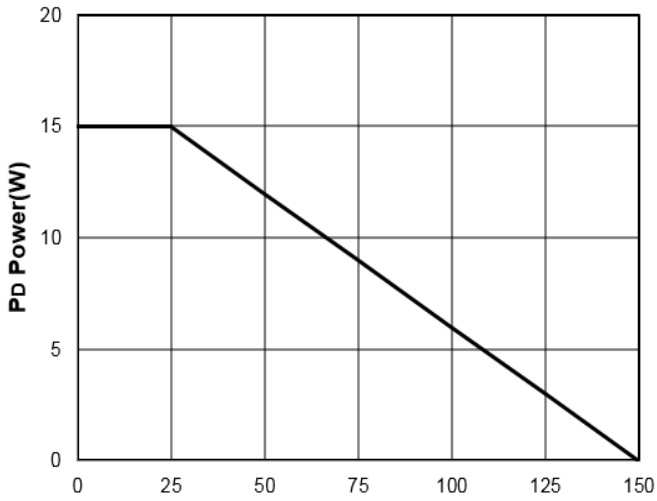


Figure1: T_j Junction Temperature (°C)

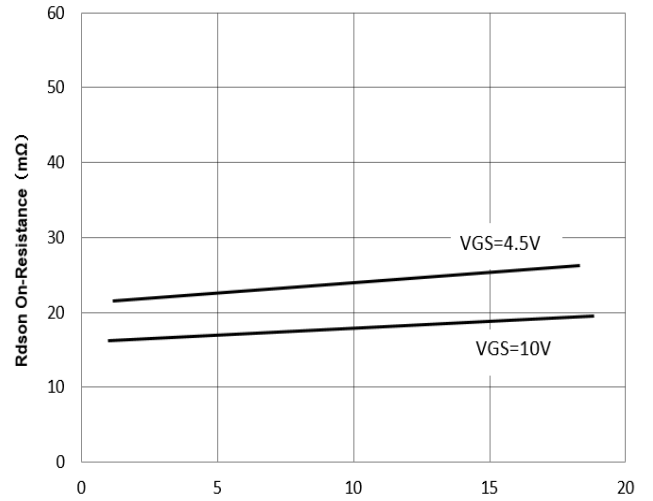


Figure2: I_d Drain Current (A)

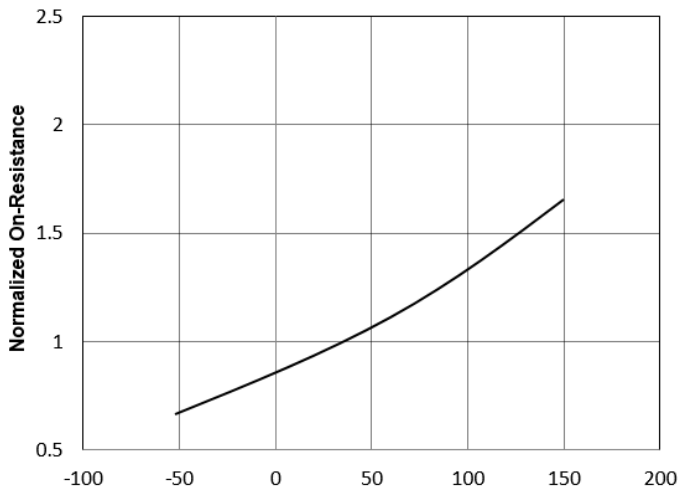


Figure3: T_j Junction Temperature (°C)

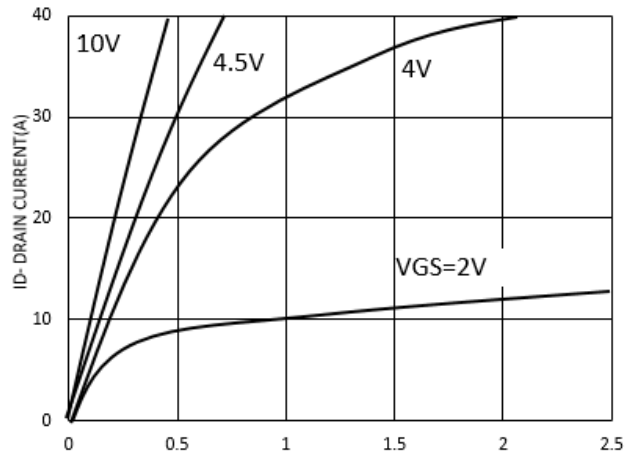


Figure4: V_{ds} Drain-Source Voltage (V)

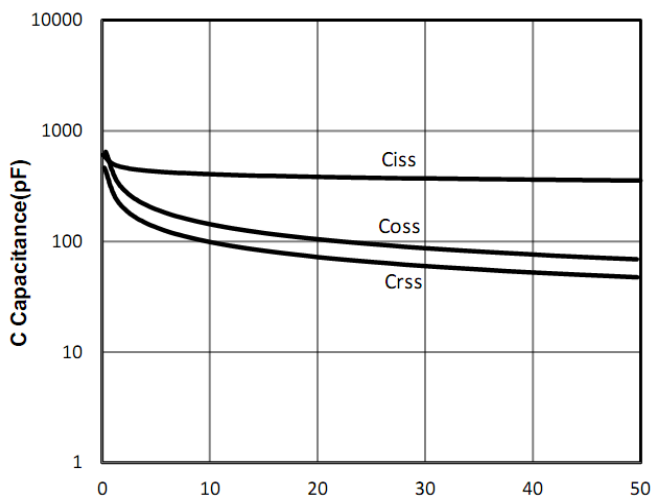


Figure5: V_{ds} Drain-Source Voltage (V)

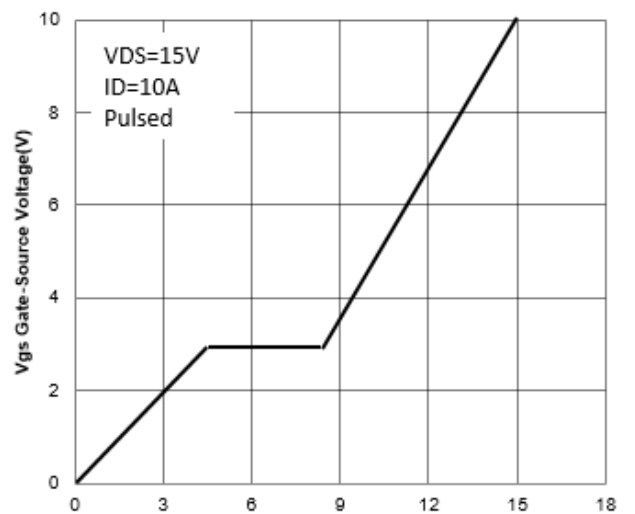


Figure6: Q_g Gate Charge (nC)



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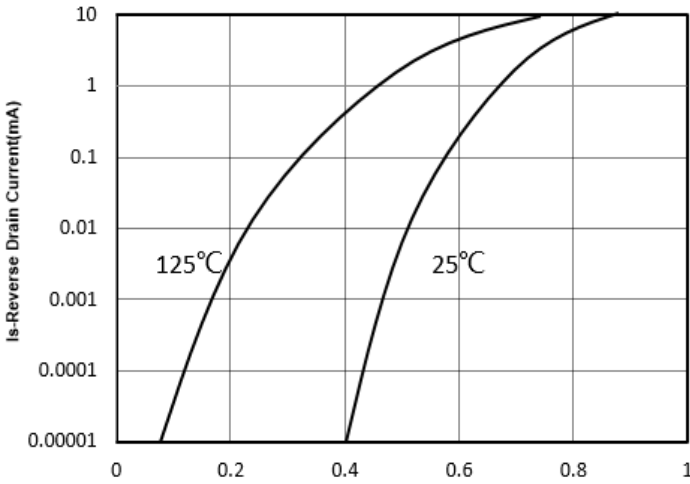


Figure7: Vsd Source-Drain Voltage (V)

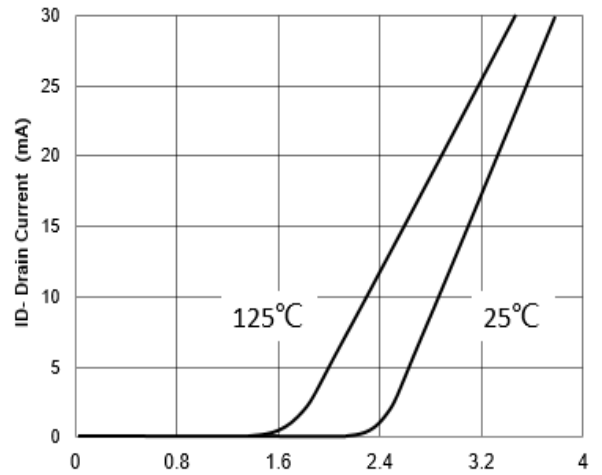


Figure8: Vgs Gate-Source Voltage (V)

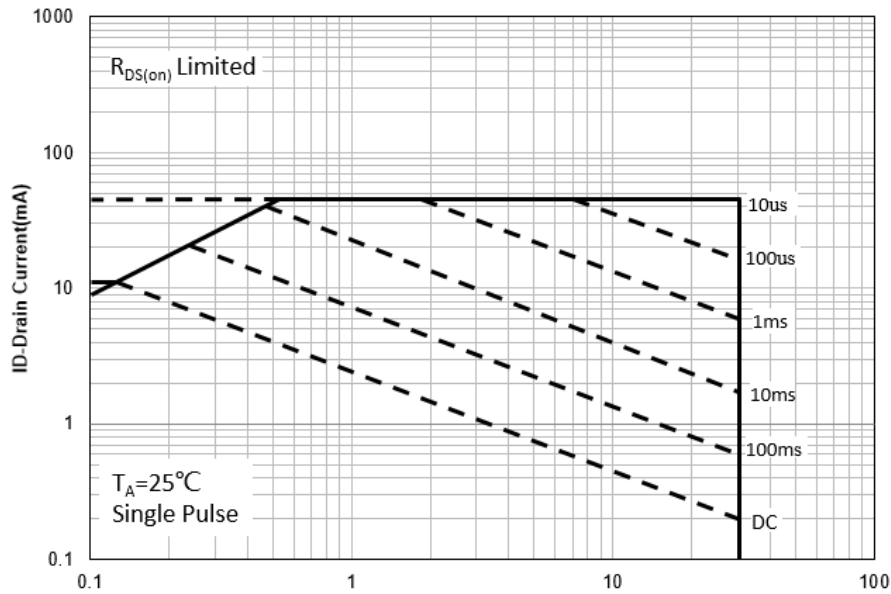


Figure9: Vds Drain -Source Voltage (V)

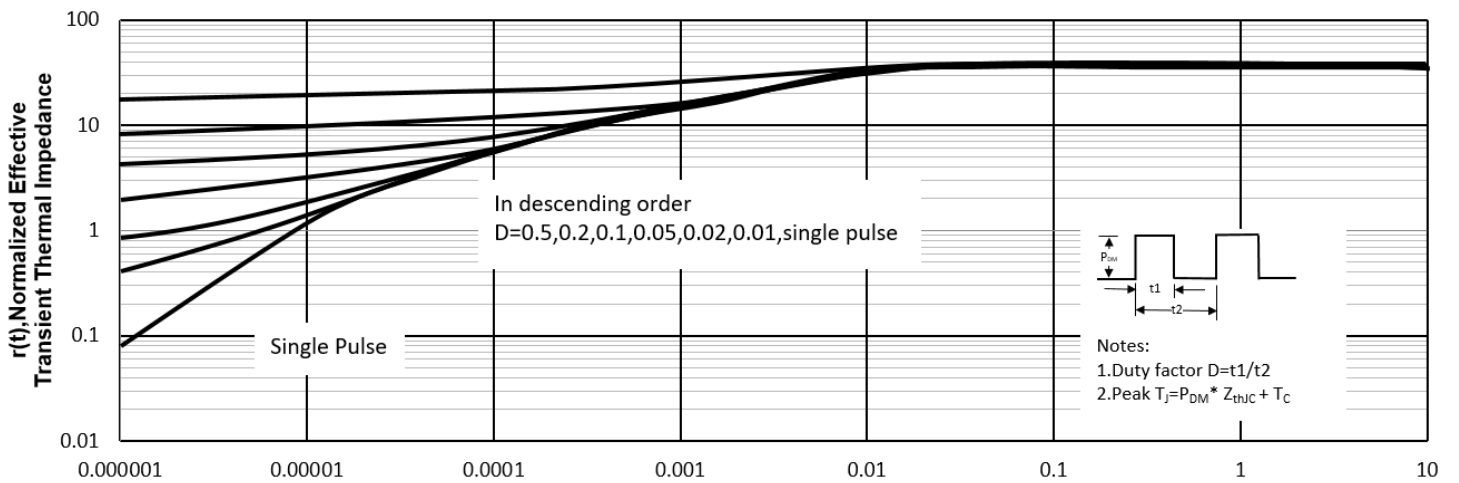
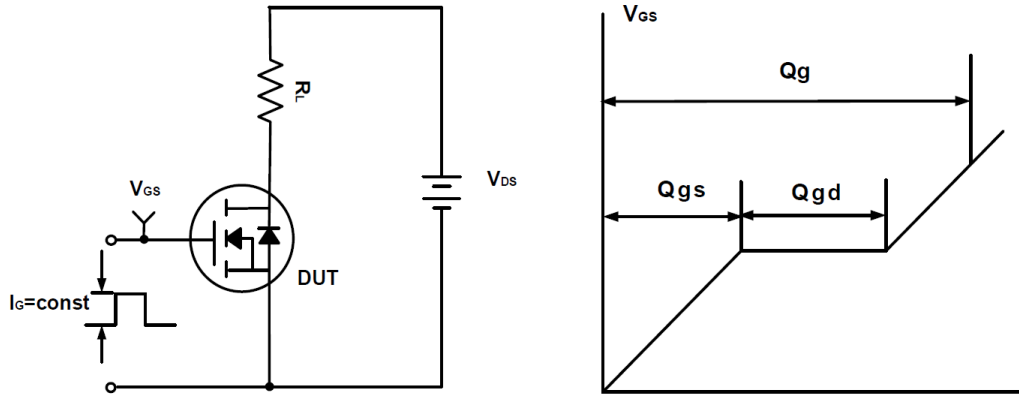
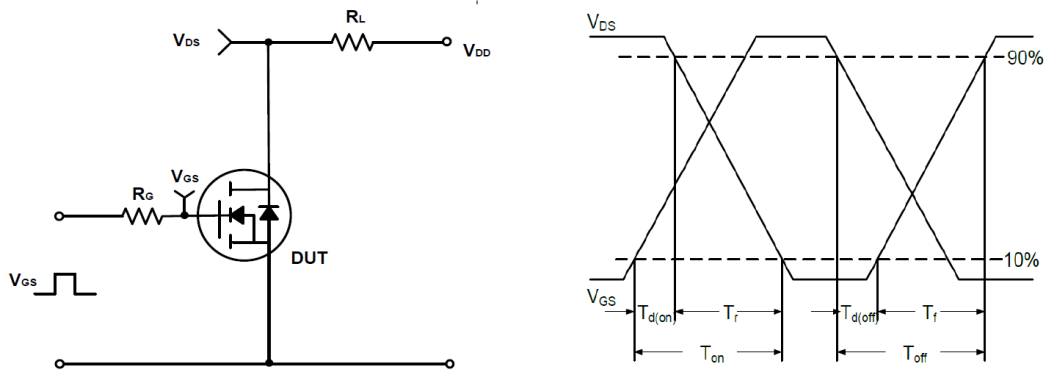
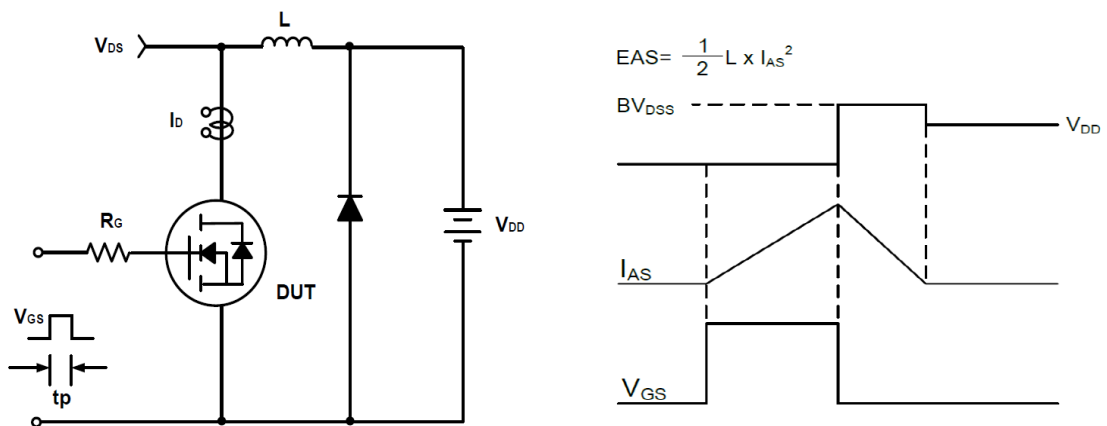


Figure10: Square Wave Pulse Duration (sec)

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Test Circuit and Waveform(N-Channel):

Figure A Gate Charge Test Circuit & Waveforms

Figure B Switching Test Circuit & Waveforms

Figure C Unclamped Inductive Switching Circuit & Waveforms



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Typical Characteristics(P-Channel)

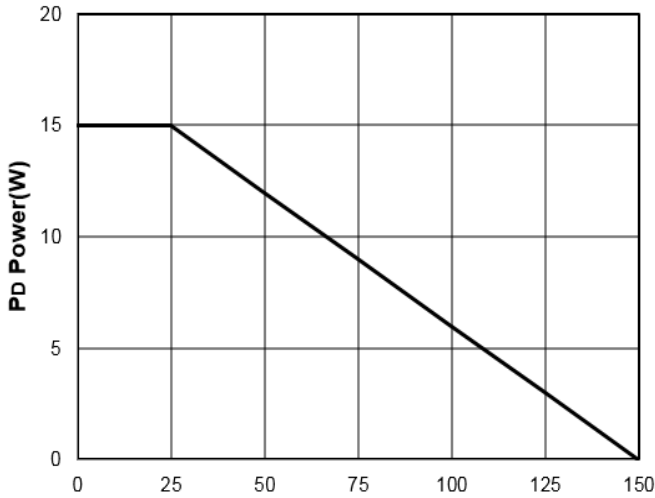


Figure11: Tj Junction Temperature (°C)

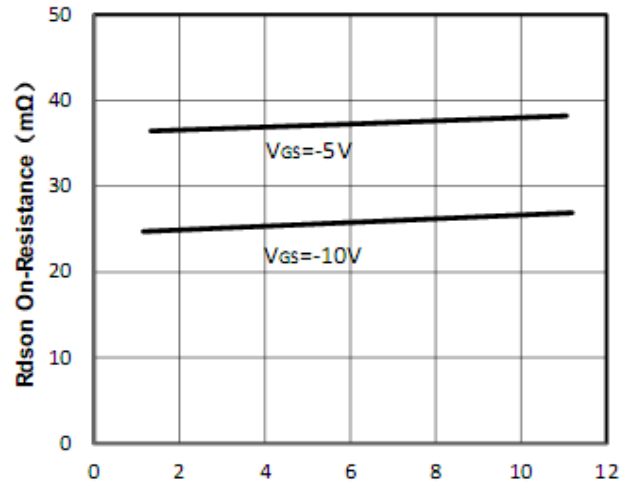


Figure12: -Id Drain Current (A)

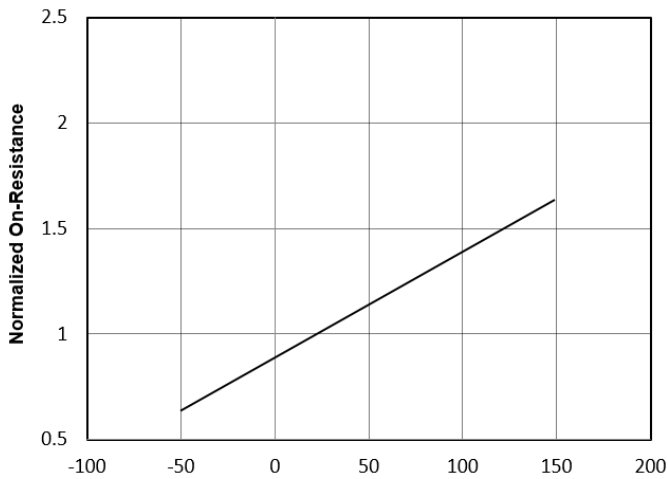


Figure13: Tj Junction Temperature (°C)

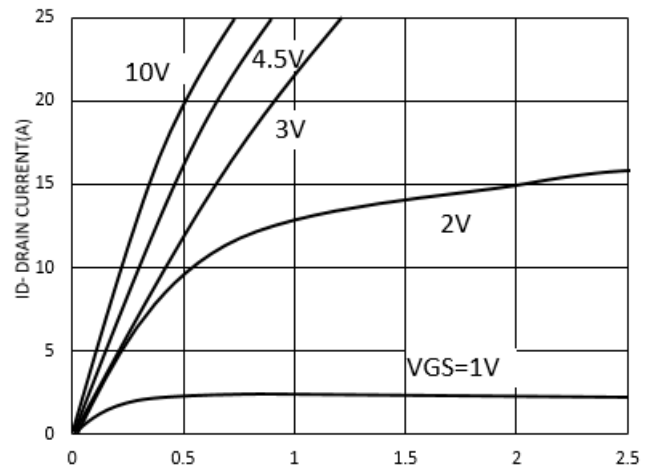


Figure14: -Vds Drain-Source Voltage (V)

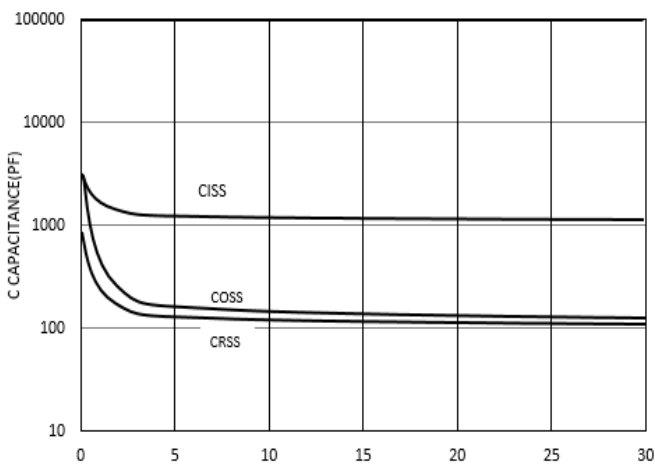


Figure15: -Vds Drain-Source Voltage (V)

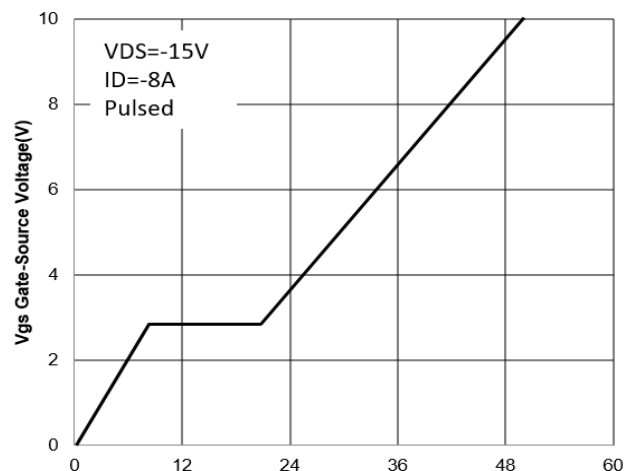


Figure16: Qg Gate Charge (nC)



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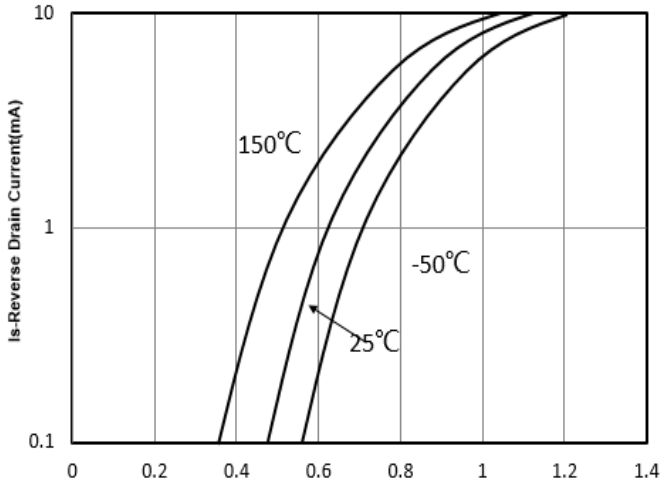


Figure17: Vsd Source-Drain Voltage (V)

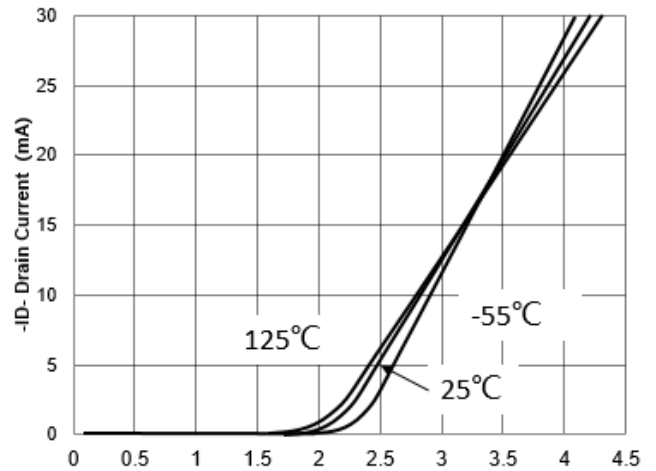


Figure18: -Vgs Gate-Source Voltage (V)

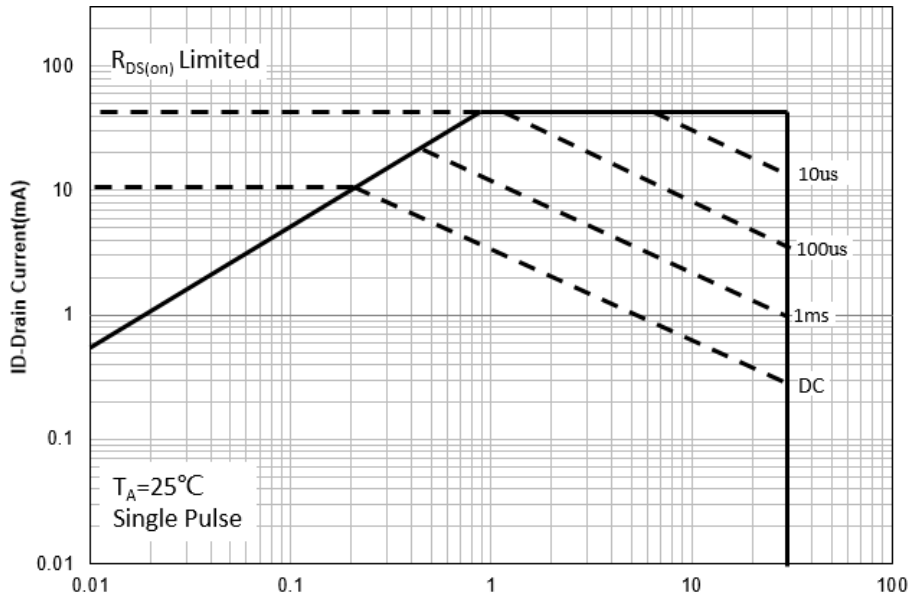


Figure19: -Vds Drain -Source Voltage (V)

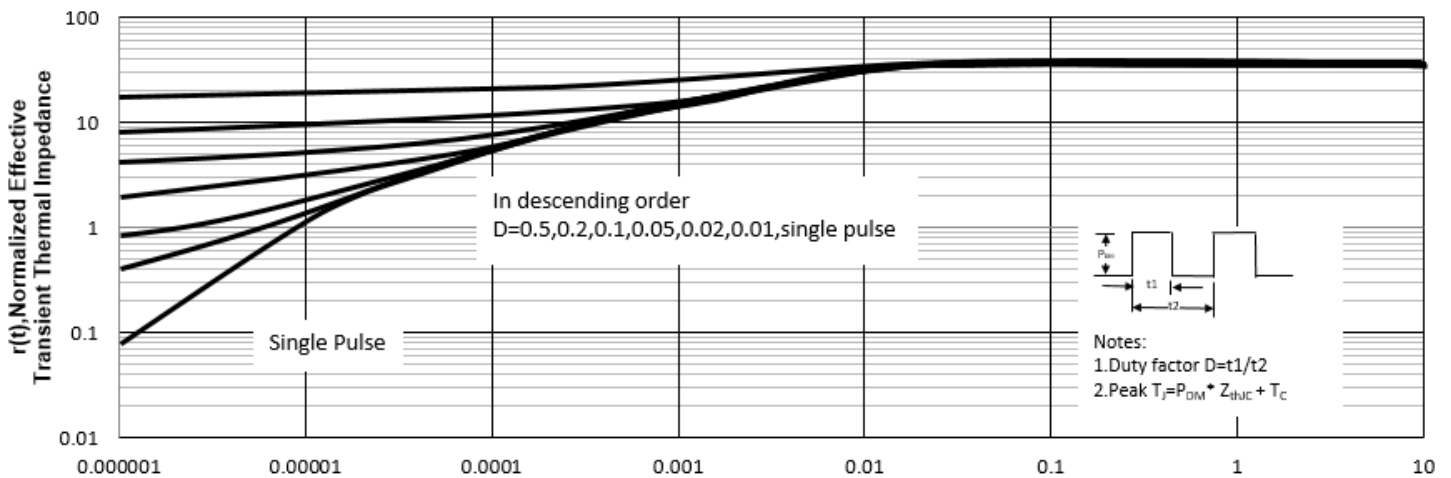


Figure20: Square Wave Pulse Duration (sec)

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Test Circuit and Waveform(P-Channel):

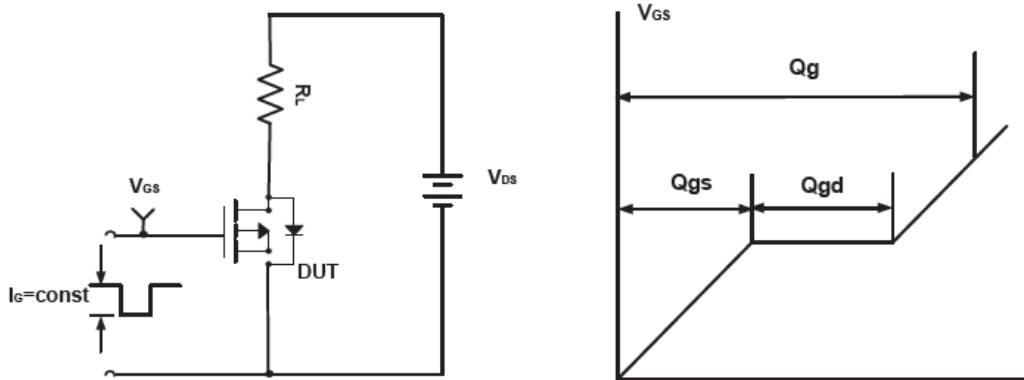
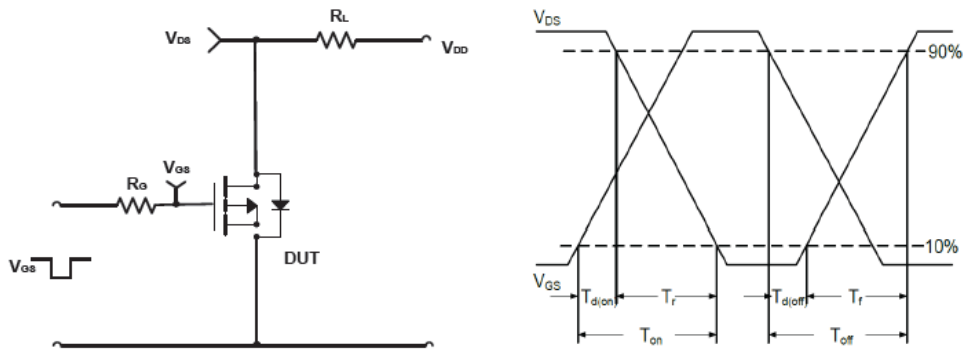


Figure D Gate Charge Test Circuit & Waveforms



FigureE Switching Test Circuit & Waveforms

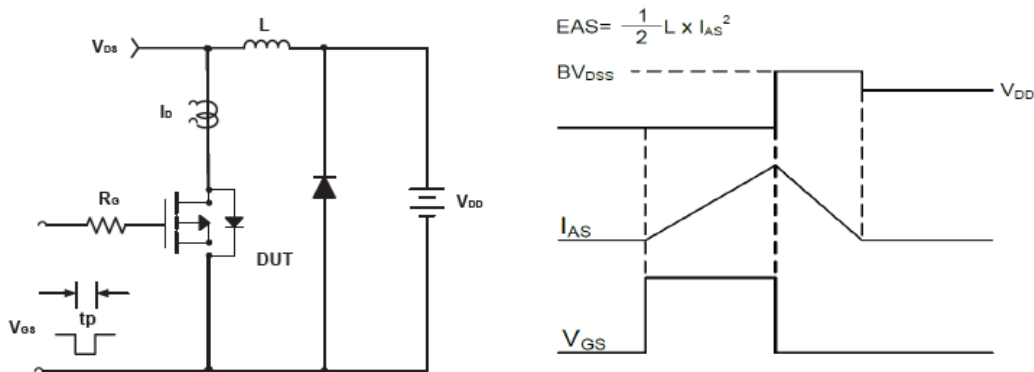
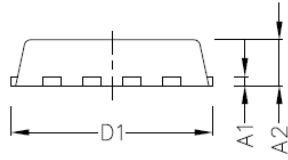
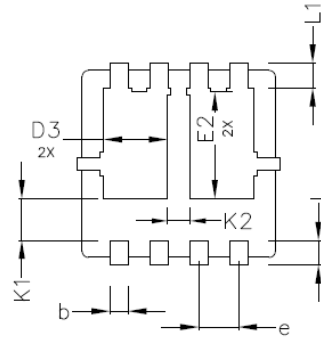
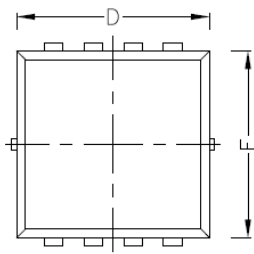


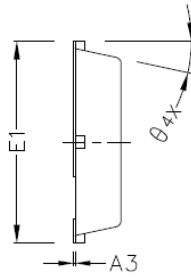
Figure F Unclamped Inductive Switching Circuit & Waveforms

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PDFN3333 Package Outline Dimensions (Units: mm)


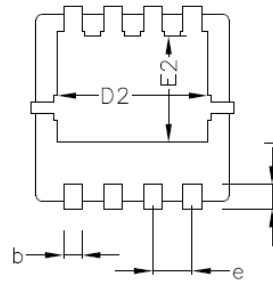
SIDE VIEW


 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		