



20V/25A Dual N-Channel Power MOSFET

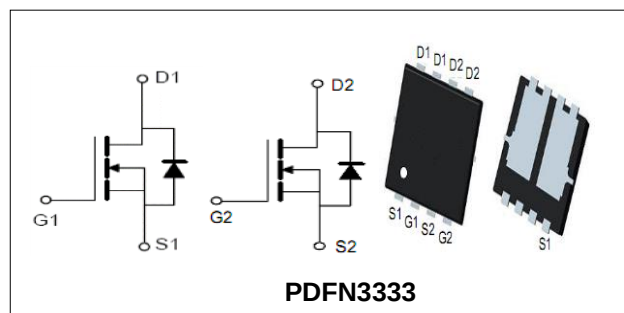
Features

- Low on-resistance and low conduction losses
- 100% Avalanche Tested

V_{DS}	20	V
I_D	25	A
$R_{DS(on), Typ} @ V_{GS}=4.5V$	5.8	m Ω
$R_{DS(on), Typ} @ V_{GS}=2.5V$	6.9	m Ω

Applications

- DC/DC Converter
- Motor Control and Drives
- Battery Management



PDFN3333

Order Information

Product	Package	Marking	Reel Size	Reel	Carton
PTQ2025D	PDFN3333	PTQ2025D	13inch	5000PCS	50000PCS

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T _c =25°C Unless Otherwise Noted)				
V _{(BR)DSS}	Drain-Source Breakdown Voltage		20	V
V _{GS}	Gate-Source Voltage		±12	V
T _j	Maximum Junction Temperature		150	°C
T _{stg}	Storage Temperature Range		-55 to 150	°C
I _S	Diode Continuous Forward Current	T _C =25°C	25	A
Mounted on Large Heat Sink				
E _{AS}	Single Pulse Avalanche Energy (Note1)		85	mJ
I _{DM}	Pulse Drain Current Tested (Note2)	T _C =25°C	100	A
I _D	Continuous Drain Current	T _C =25°C	25	A
P _D	Maximum Power Dissipation	T _C =25°C	21	W
R _{θJC}	Thermal Resistance Junction-to-Case		6	°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	V _{GS} =0V, I _D =250μA	20	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =20V, V _{GS} =0V	--	--	1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} =±12V, V _{DS} =0V	--	--	±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	0.5	--	0.9	V
R _{DS(on)}	Drain-Source On-State Resistance (Note3)	V _{GS} =4.5V, I _D =20A	--	5.8	7.5	mΩ
		V _{GS} =2.5V, I _D =15A	--	6.9	9	mΩ
Dynamic Electrical Characteristics @ T _j = 25°C (unless otherwise stated) (Note4)						
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, f=1MHz	--	1890	--	pF
C _{oss}	Output Capacitance		--	280	--	pF
C _{rss}	Reverse Transfer Capacitance		--	274	--	pF
Q _g	Total Gate Charge	V _{DS} =10V, I _D =20A, V _{GS} =4.5V,	--	24	--	nC
Q _{gs}	Gate-Source Charge		--	3.1	--	nC
Q _{gd}	Gate-Drain Charge		--	7.2	--	nC
R _G	Reverse Transfer Capacitance	f=1MHz	--	2.3	--	Ω
Switching Characteristics (Note4)						
t _{d(on)}	Turn-on Delay Time	V _{DS} =10V, I _D =20A, R _G =3Ω, V _{GS} =4.5V,	--	6	--	ns
t _r	Turn-on Rise Time		--	16	--	ns
t _{d(off)}	Turn-off Delay Time		--	28	--	ns
t _f	Turn-off Fall Time		--	16	--	ns
Source- Drain Diode Characteristics@ T _j = 25°C (unless otherwise stated)						
V _{SD}	Forward on Voltage	I _S =20A,V _{GS} =0V,	--	--	1.2	V

Note:

- Limited by T_{jmax} , starting $T_j = 25^\circ\text{C}$, $R_\theta = 25\Omega$, $V_o = 10V$, $V_{GS} = 10V$. Part not recommended for use above this value.
- Repetitive Rating: Pulse width limited by maximum junction temperature.
- Pulse Test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.



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Typical Characteristics

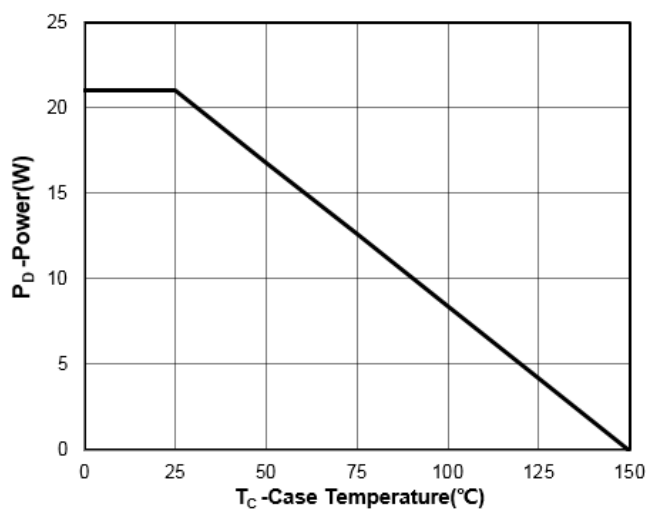


Figure1: Power De-rating

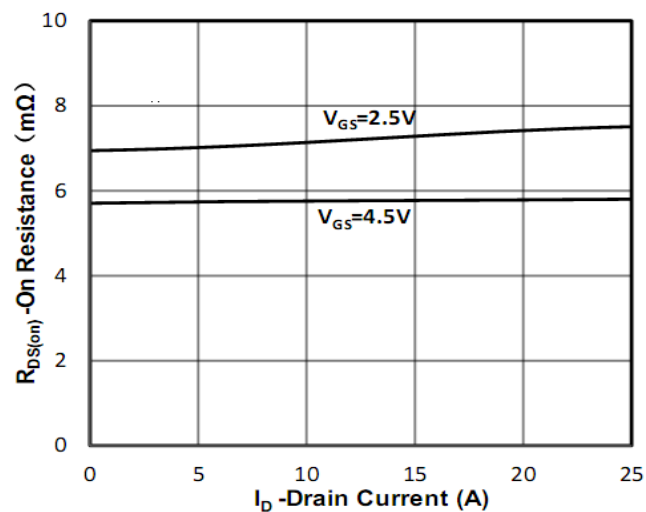
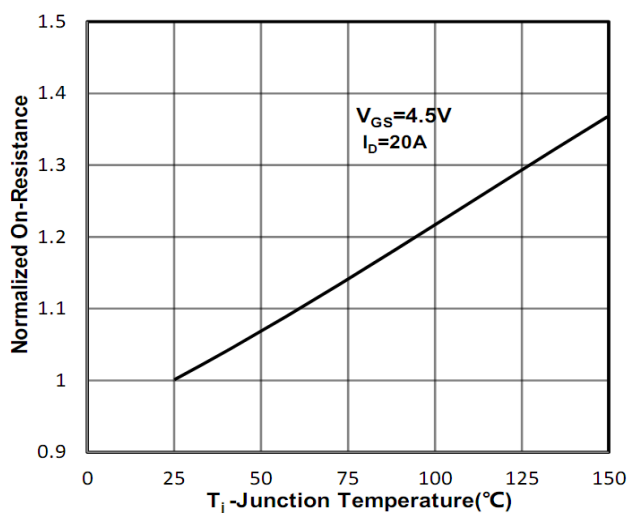
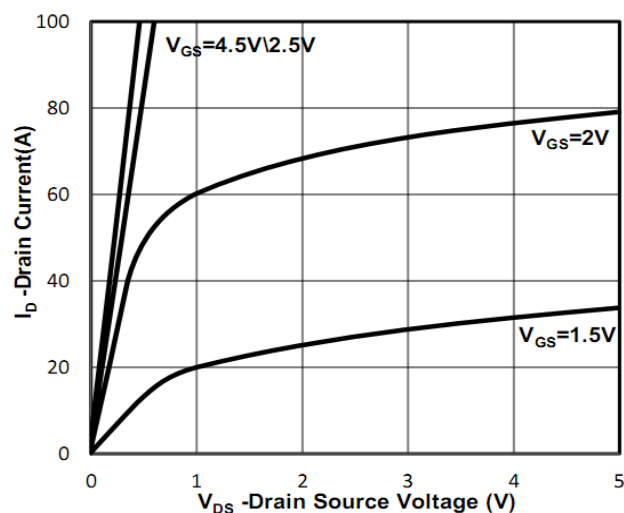
Figure2: $R_{DS(on)}$ -Drain CurrentFigure3: $R_{DS(on)}$ -Junction Temperature

Figure4: Output Characteristics

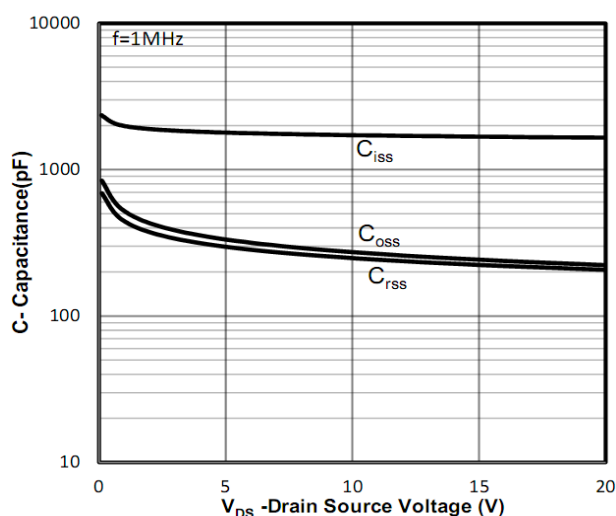
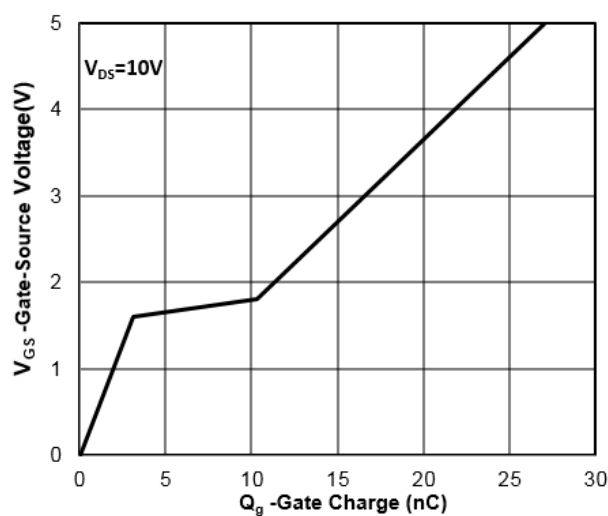
Figure5: Capacitance - V_{DS} 

Figure6: Gate Charge



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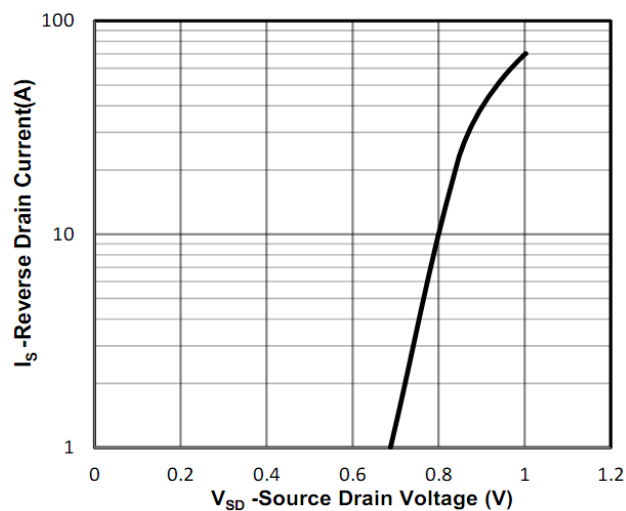


Figure7: Source-Drain Diode Forward

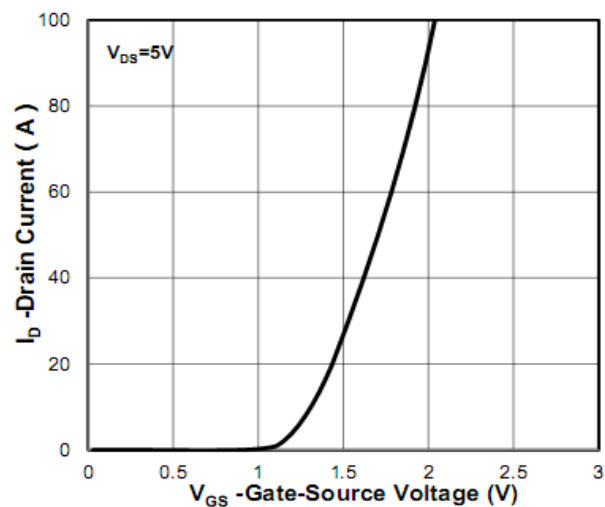


Figure8: Transfer Characteristics

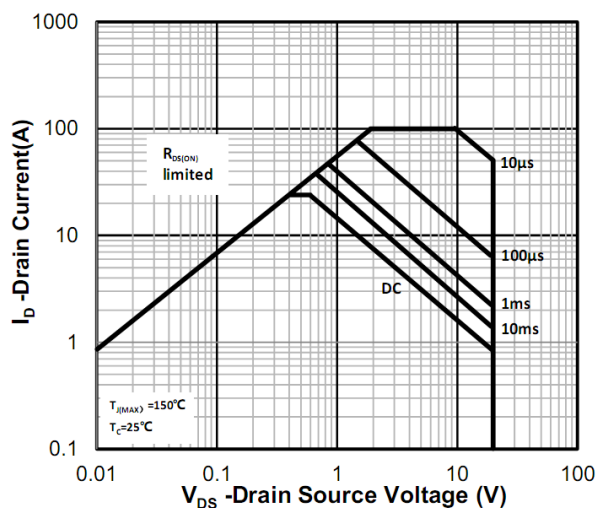


Figure9: Safe Operation Area

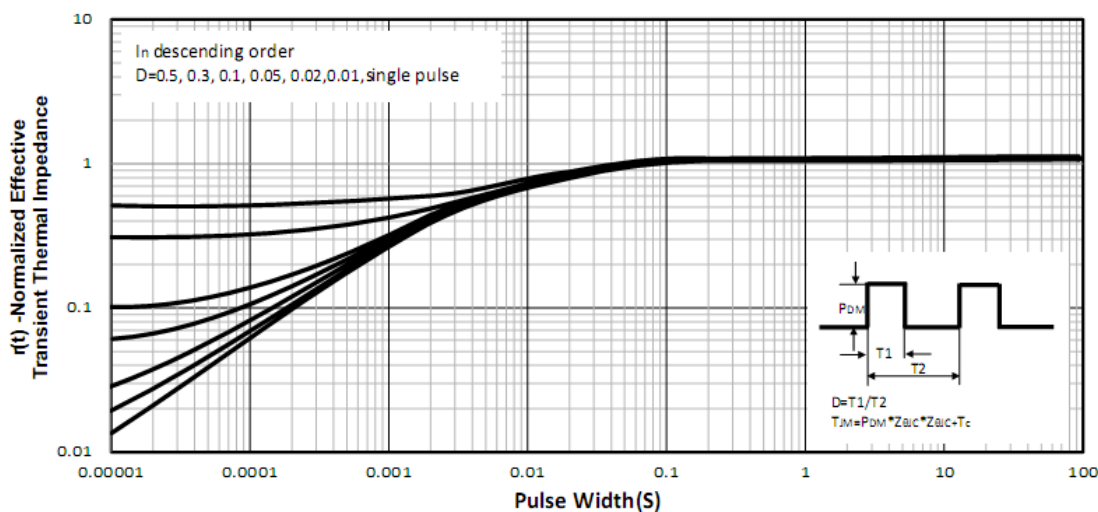


Figure10: Normalized Maximum Transient Thermal Impedance



Test Circuit and Waveform:

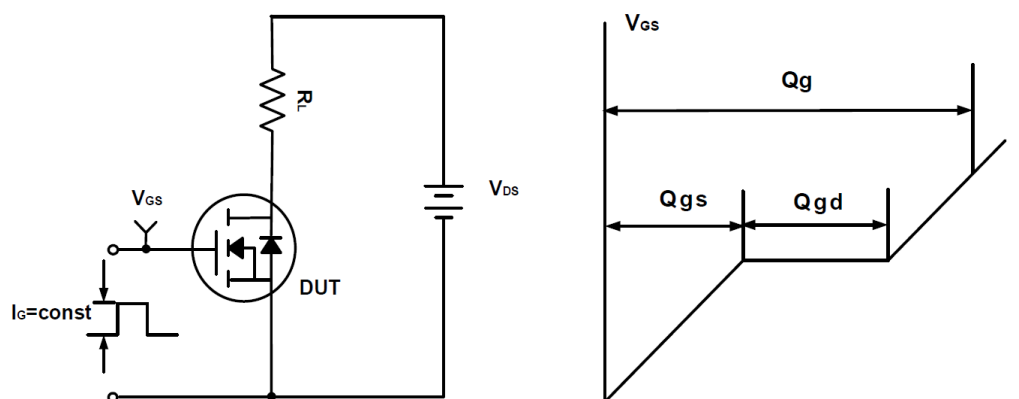


Figure A Gate Charge Test Circuit & Waveforms

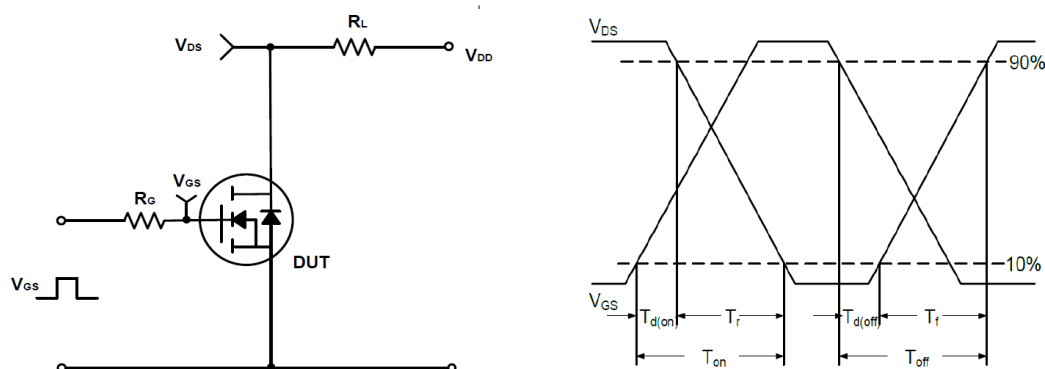


Figure B Switching Test Circuit & Waveforms

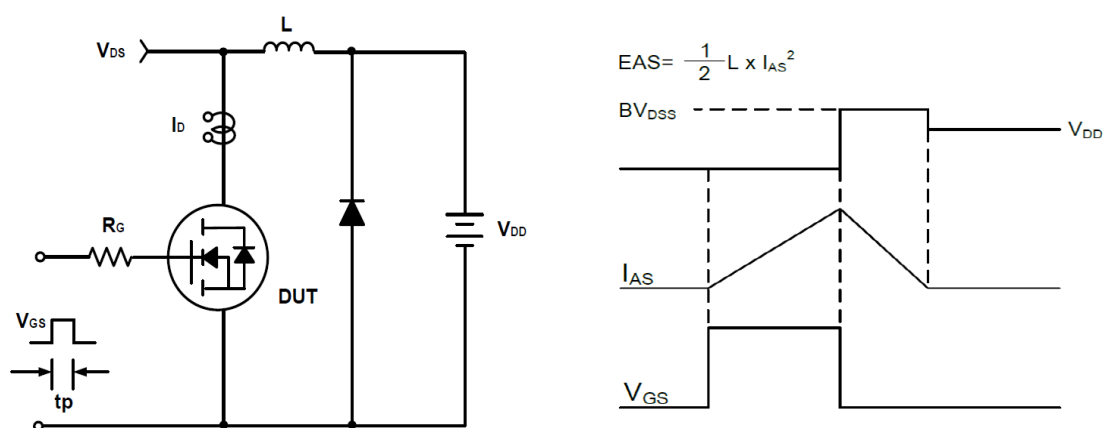
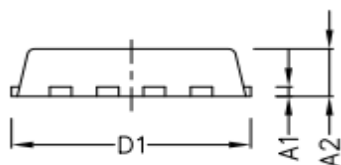
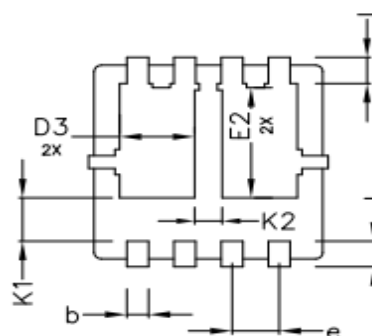
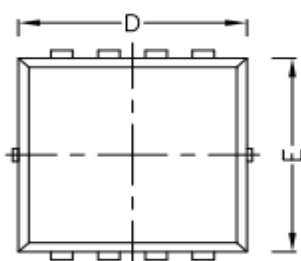


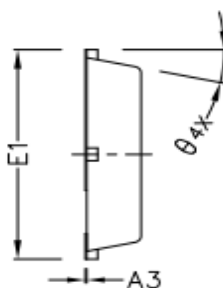
Figure C Unclamped Inductive Switching Circuit & Waveforms

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

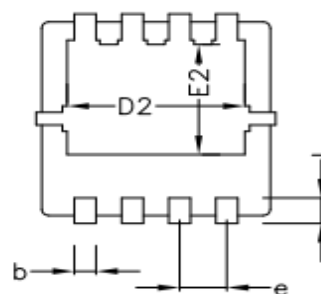
SIDE VIEW

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		