

**GENERAL FEATURES**

- $V_{DS} = -30V, I_D = -50A$
- $R_{DS(ON)} = 8.0m\Omega @ V_{GS} = -10V \text{ typ}$
- $R_{DS(ON)} = 18m\Omega @ V_{GS} = -4.5V \text{ typ}$

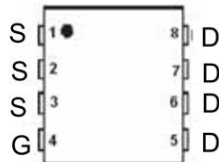
**Application**

- Load/Power Switching
- Interfacing Switching
- Logic Level Shift

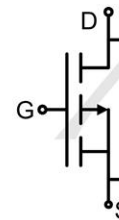
**Package and Pin Configuration**



PDFN3333 top view



**Circuit diagram**



**Marking**

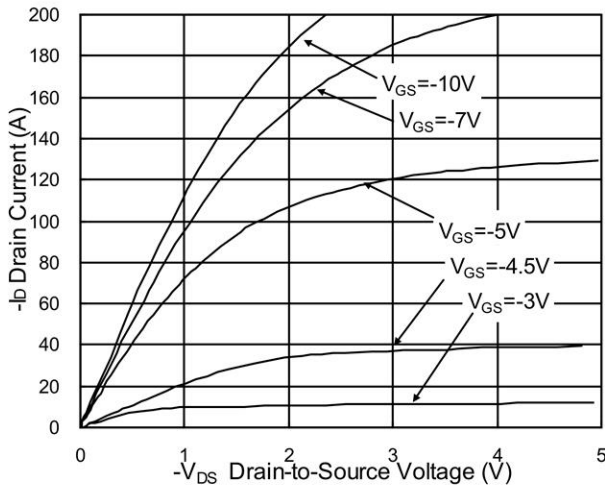


**Absolute Maximum Ratings ( $T_A = 25^\circ C$  unless otherwise noted)**

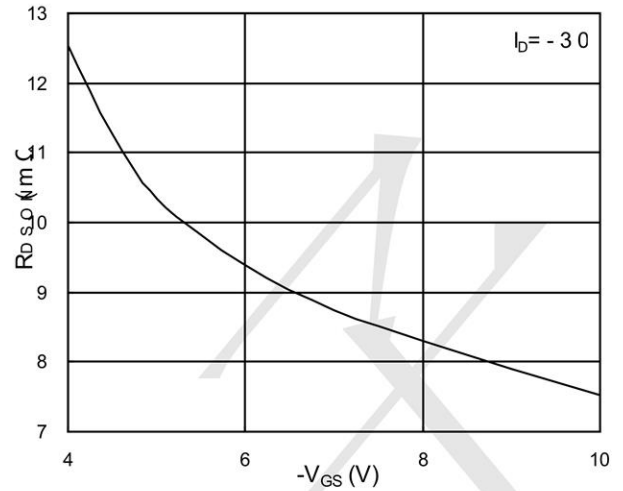
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	20	V
Drain Current-Continuous	$I_D$	-50	A
Drain Current-Continuous( $T_C = 100^\circ C$ )	$I_D(100^\circ C)$	-32	A
Pulsed Drain Current	$I_{DM}$	-200	A
Maximum Power Dissipation	$P_D$	38	W
Single pulse avalanche energy <sup>(Note 5)</sup>	$E_{AS}$	125	mJ
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	$^\circ C$

**Electrical Characteristics (T<sub>j</sub>=25°C unless otherwise noted)**

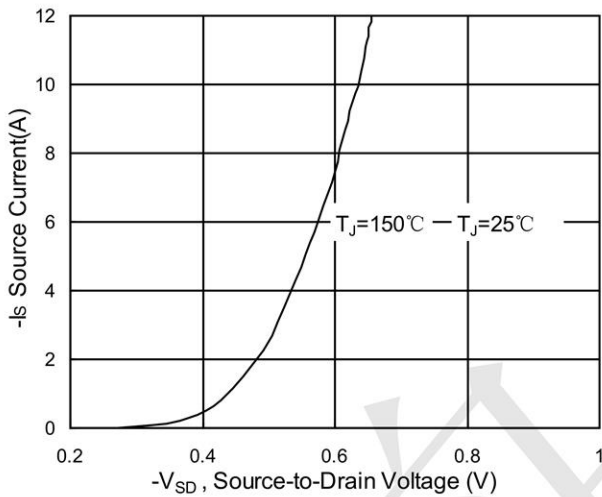
Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =-250 μA	-30	-	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V	-	-	1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = 20V, V <sub>DS</sub> =0V	-	-	100	nA
<b>On Characteristics (Note 3)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250 μA	-1.2	1.5	-2.5	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-30A	-	8.0	15	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-15A	-	18	24	mΩ
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =-5V, I <sub>D</sub> =-18A	-	25	-	S
<b>Dynamic Characteristics (Note 4)</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, F=1.0MHz	-	3448	-	PF
Output Capacitance	C <sub>oss</sub>		-	508	-	PF
Reverse Transfer Capacitance	C <sub>rss</sub>		-	421	-	PF
<b>Switching Characteristics (Note 4)</b>						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =-15V, I <sub>D</sub> =-15A, R <sub>L</sub> =1Ω	-	9.4	-	nS
Turn-on Rise Time	t <sub>r</sub>		-	10.2	-	nS
Turn-Off Delay Time	t <sub>d(off)</sub>	V <sub>GS</sub> =-10V, R <sub>G</sub> =3.3Ω	-	117	-	nS
Turn-Off Fall Time	t <sub>f</sub>		-	24	-	nS
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-15V, I <sub>D</sub> =-15A, V <sub>GS</sub> =-4.5V	-	30	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	10	-	nC
Gate-Drain Charge	Q <sub>gd</sub>		-	10.4	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =-1A	-	-	-1	V
Diode Forward Current (Note 2)	I <sub>S</sub>		-	-	-50	A



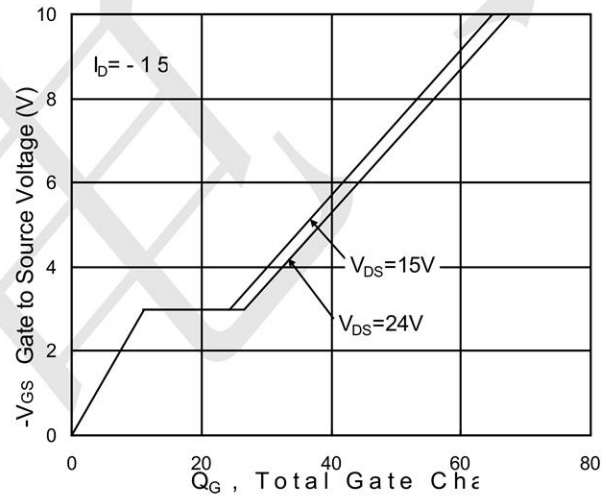
**Fig.1 Typical Output Characteristics**



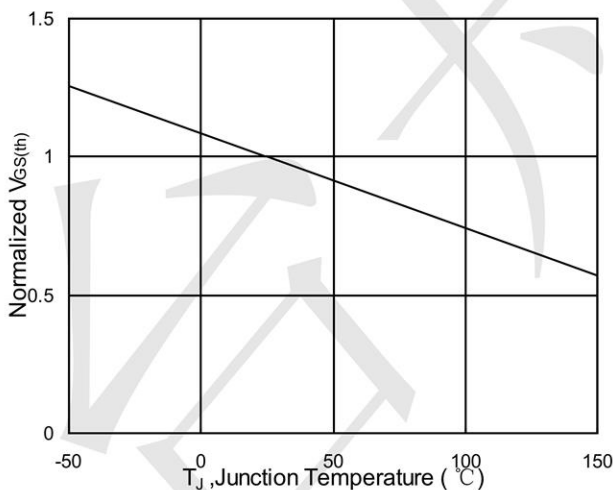
**Fig.2 On-Resistance v.s Gate-Source**



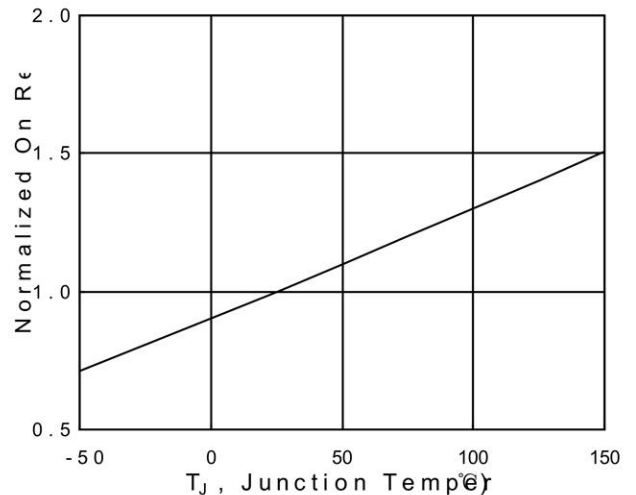
**Fig.3 Forward Characteristics Of Reverse**



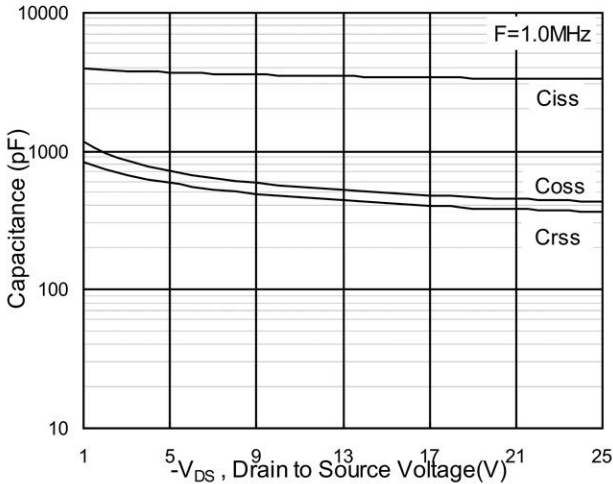
**Fig.4 Gate-Charge Characteristics**



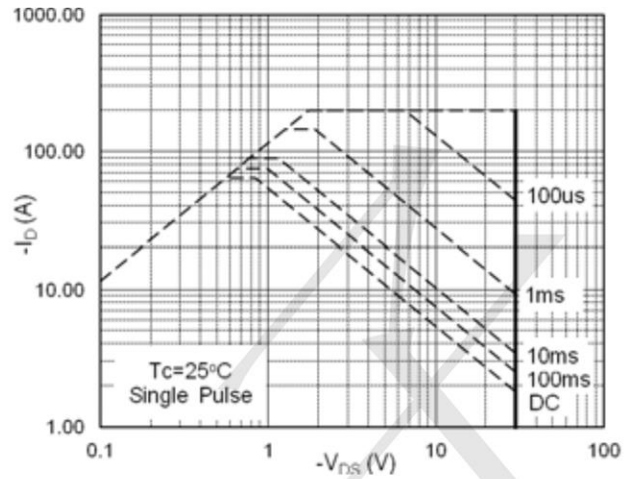
**Fig.5 Normalized V<sub>GS(th)</sub> v.s T<sub>J</sub>**



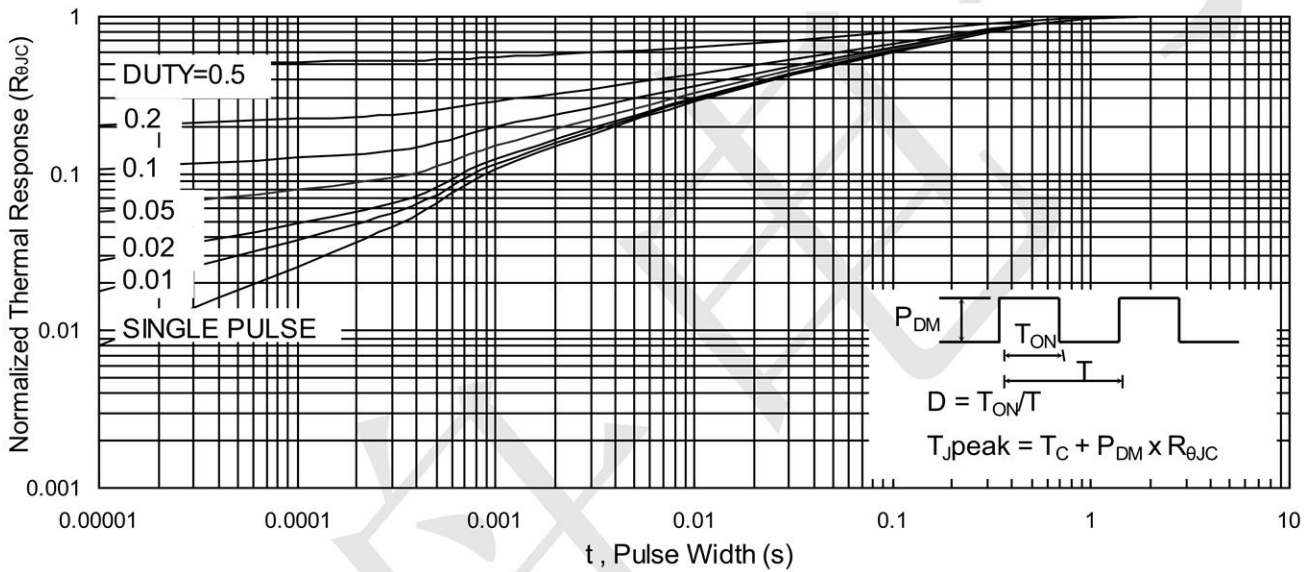
**Fig.6 Normalized R<sub>DS(on)</sub> v.s T<sub>J</sub>**



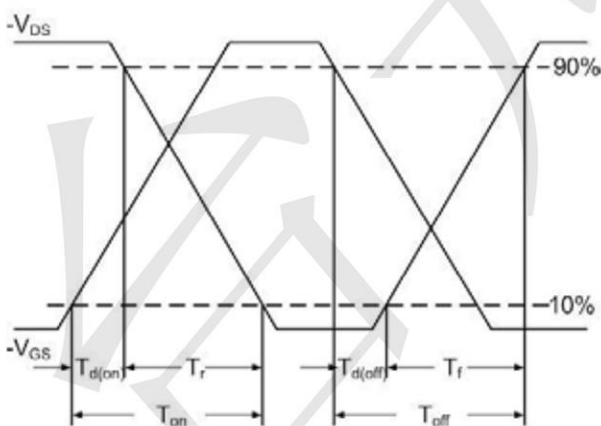
**Fig.7 Capacitance**



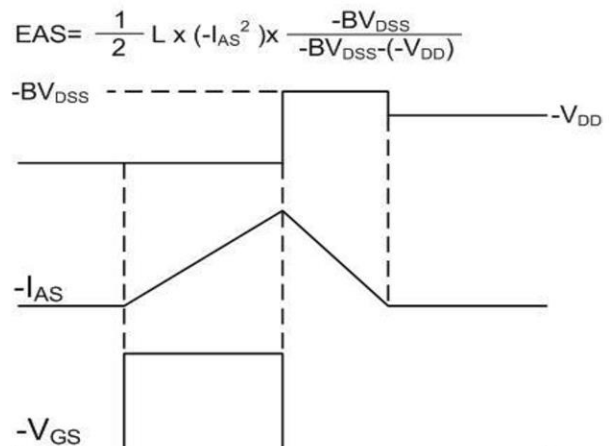
**Fig.8 Safe Operating Area**



**Fig.9 Normalized Maximum Transient Thermal Impedance**



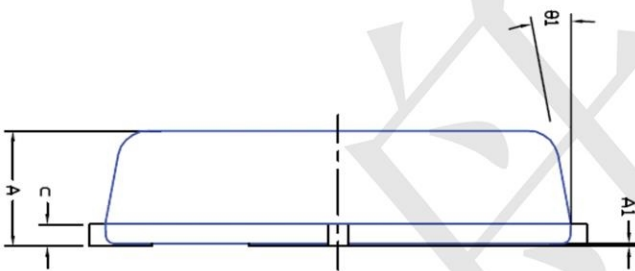
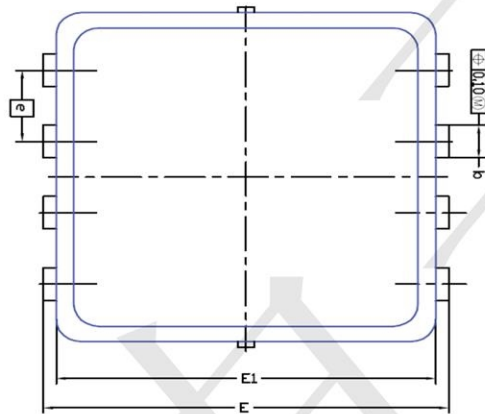
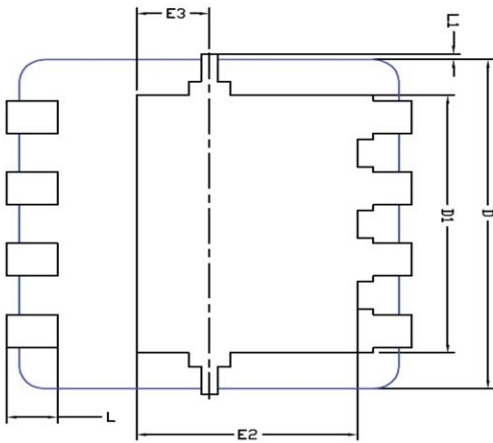
**Fig.10 Switching Time Waveform**



**Fig.11 Unclamped Inductive Switching Waveform**



PDFN3333 Package Information



DIM.	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.700	0.80	0.900	0.0276	0.0315	0.0354
A1	0.00	---	0.05	0.000	---	0.002
b	0.24	0.30	0.35	0.009	0.012	0.014
c	0.10	0.152	0.25	0.004	0.006	0.010
D	3.00 BSC			0.118 BSC		
D1	2.35 BSC			0.093 BSC		
E	3.20 BSC			0.126 BSC		
E1	3.00 BSC			0.118 BSC		
E2	1.75 BSC			0.069 BSC		
E3	0.575 BSC			0.023 BSC		
e	0.65 BSC			0.026 BSC		
L	0.30	0.40	0.50	0.0118	0.0157	0.0197
L1	0	---	0.100	0	---	0.004
θ1	0°	10°	12°	0°	10°	12°