

P-Ch 150V Fast Switching MOSFETs

Features

- Advanced Trench MOS Technology
- 100% EAS Guaranteed
- Green Device Available

Product Summary

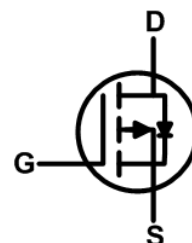
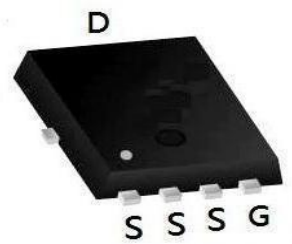


BVDSS	RDSON	ID
-150V	650mΩ	-2.2A

Applications

- Load Switch.
- Power Management.
- LED Backlighting.
- Networking Application.

PDFN3333-8 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-150	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current, $-V_{GS}$ @ $-10V^1$	-2.2	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current, $-V_{GS}$ @ $-10V^1$	-1.5	A
I_{DM}	Pulsed Drain Current ²	-8	A
EAS	Single Pulse Avalanche Energy ³	12.5	mJ
I_{AS}	Avalanche Current	5	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation ⁴	7.8	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	---	62	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	16	$^\circ\text{C/W}$

Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=-250\mu A$	-150	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=-10V$, $I_D=-1A$	---	650	780	m Ω
		$V_{GS}=-6V$, $I_D=-0.5A$	---	700	980	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=-250\mu A$	-2.0	-3.0	-4.0	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-120V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=-120V$, $V_{GS}=0V$, $T_J=85^\circ\text{C}$	---	---	30	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1\text{MHz}$	5	12	20	Ω
Q_g	Total Gate Charge	$V_{DS}=-75V$, $V_{GS}=-10V$, $I_D=-1A$	6.5	10.8	15.2	nC
Q_{gs}	Gate-Source Charge		1.6	3.1	4.7	
Q_{gd}	Gate-Drain Charge		1.1	2.2	3.3	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-30V$, $V_{GS}=-10V$, $R_G=6\Omega$, $I_D=-1A$	---	21	32	ns
T_r	Rise Time		---	16	24	
$T_{d(off)}$	Turn-Off Delay Time		---	40	60	
T_f	Fall Time		---	18	27	
C_{iss}	Input Capacitance	$V_{DS}=-75V$, $V_{GS}=0V$, $f=1\text{MHz}$	424	706	988	pF
C_{oss}	Output Capacitance		12	23	35	
C_{rss}	Reverse Transfer Capacitance		7	13	20	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,5}	$V_G=V_D=0V$, Force Current	---	---	-2.2	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=-1A$, $T_J=25^\circ\text{C}$	---	---	-1.2	V

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is $V_{DD}=-50V$, $V_{GS}=-10V$, $L=1mH$, $I_{AS}=-5A$
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

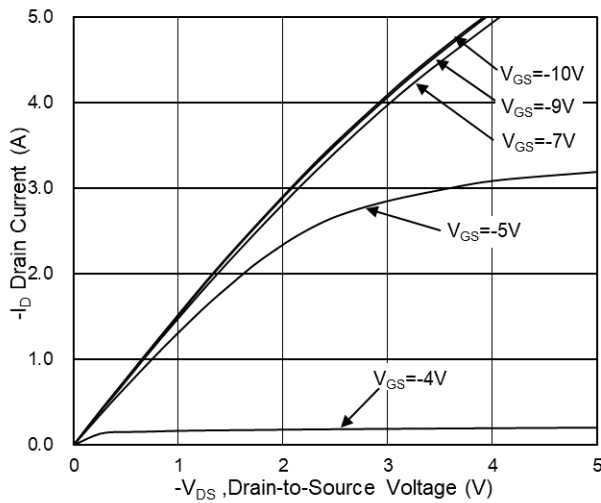


Fig.1 Typical Output Characteristics

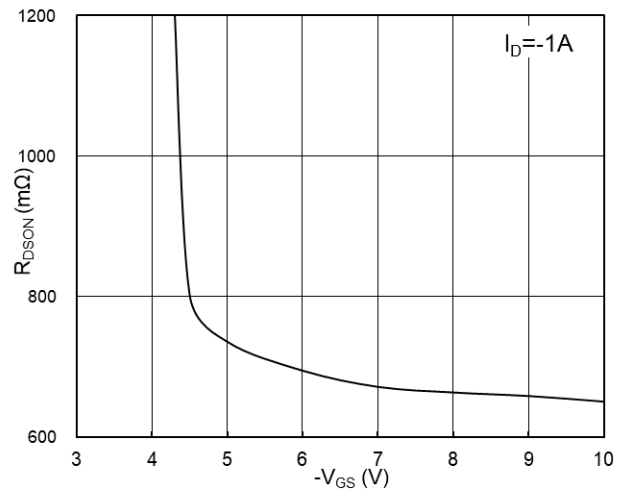


Fig.2 On-Resistance vs G-S Voltage

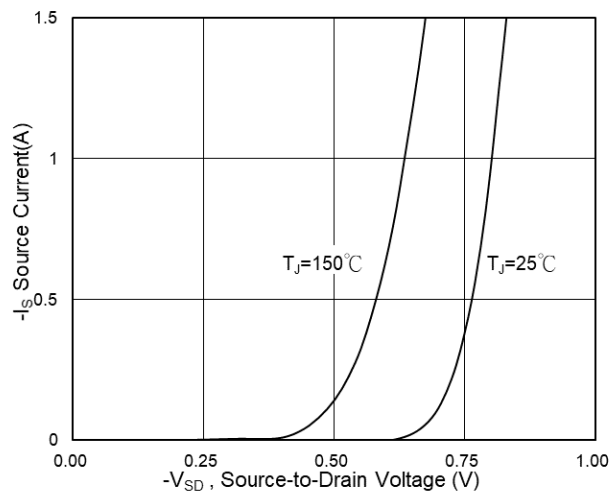


Fig.3 Source Drain Forward Characteristics

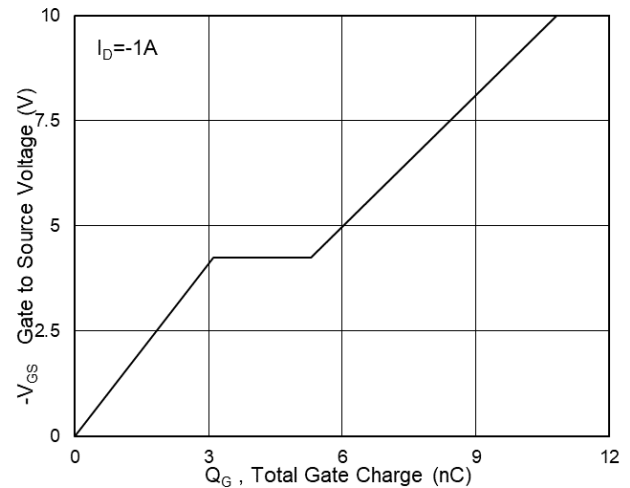


Fig.4 Gate-Charge Characteristics

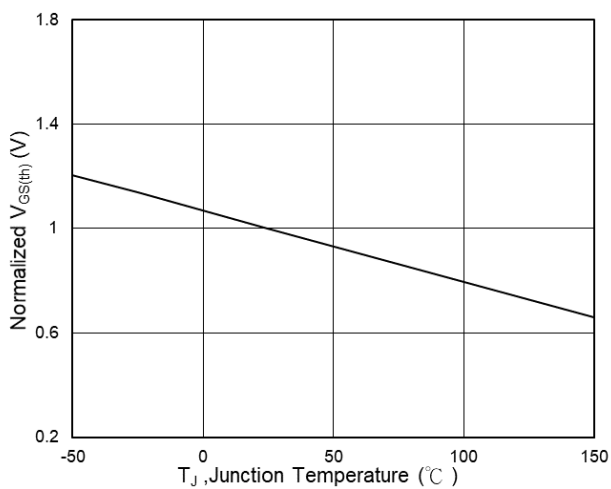


Fig.5 Normalized $V_{GS(th)}$ vs T_J

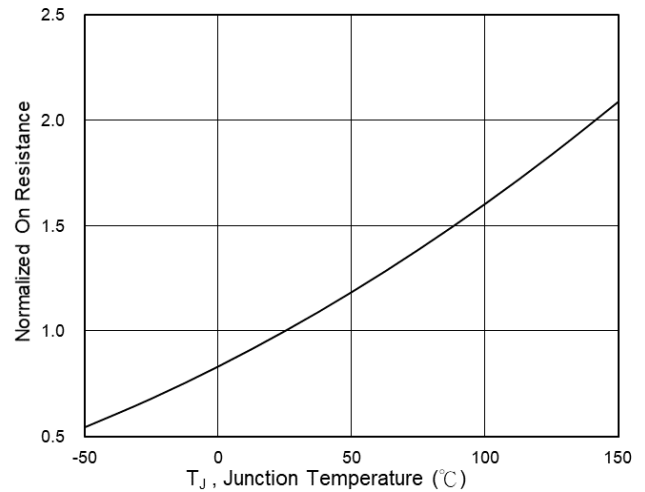


Fig.6 Normalized $R_{DS(on)}$ vs T_J



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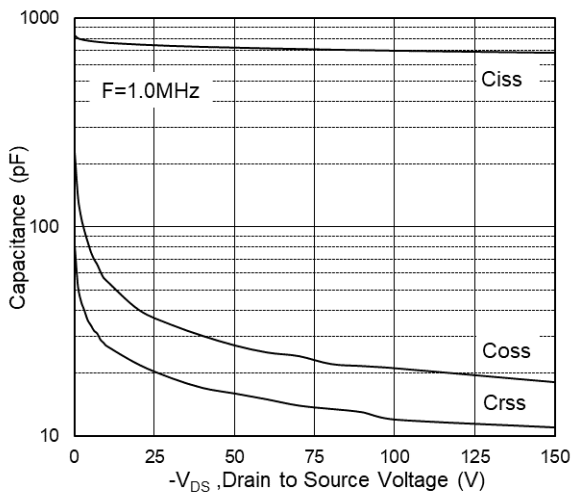


Fig.7 Capacitance

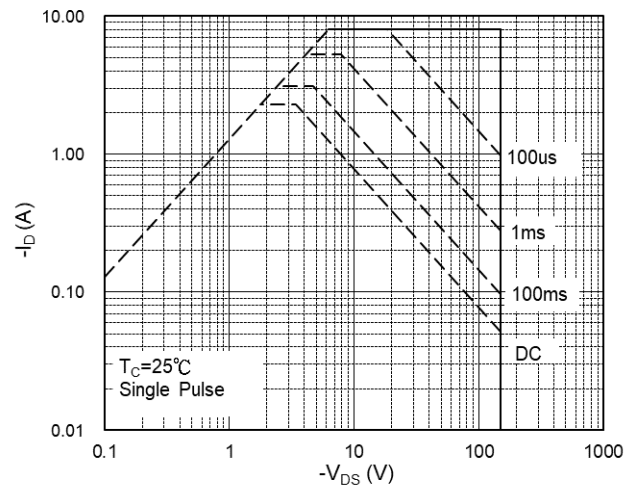


Fig.8 Safe Operating Area

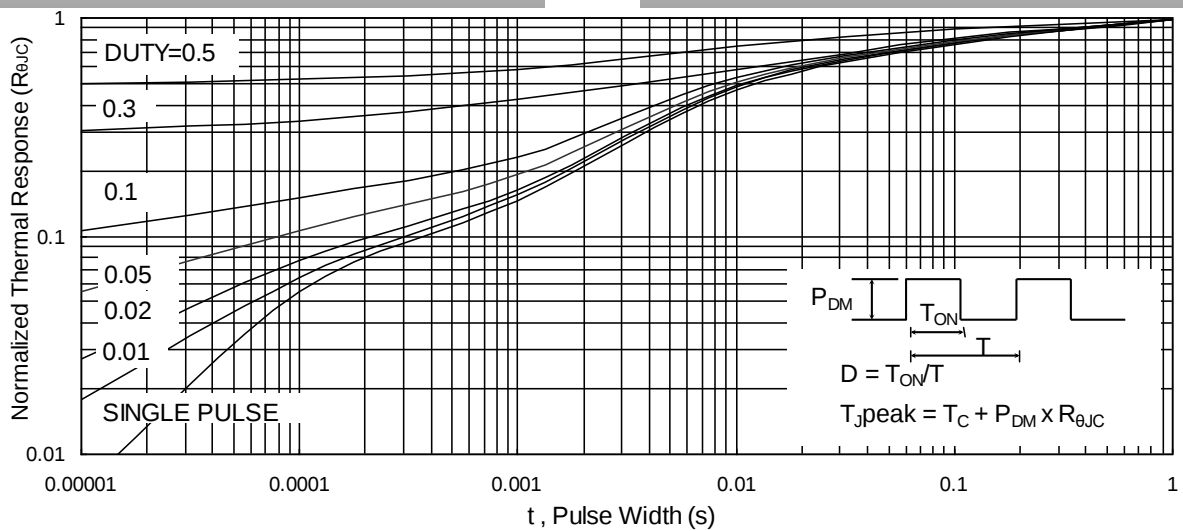


Fig.9 Normalized Maximum Transient Thermal Impedance

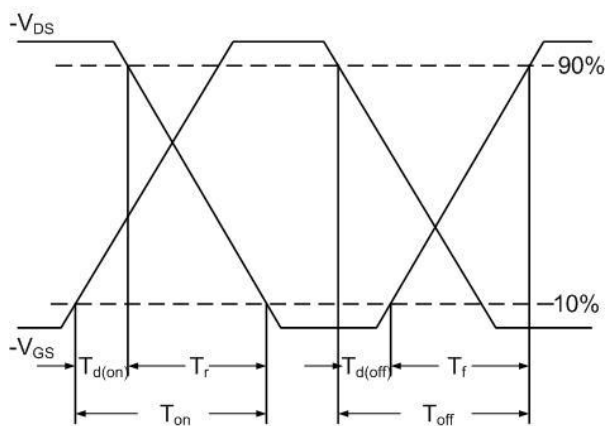


Fig.10 Switching Time Waveform

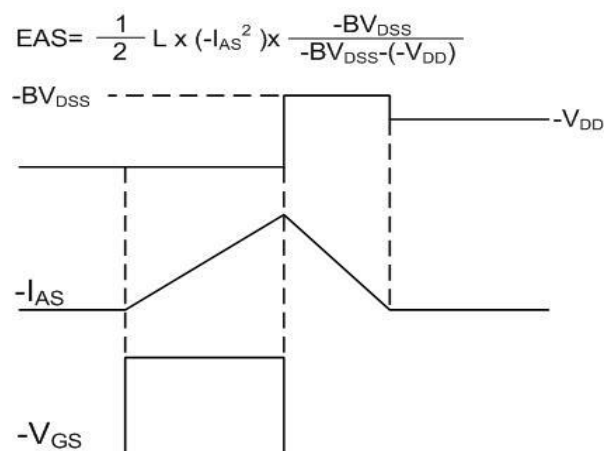
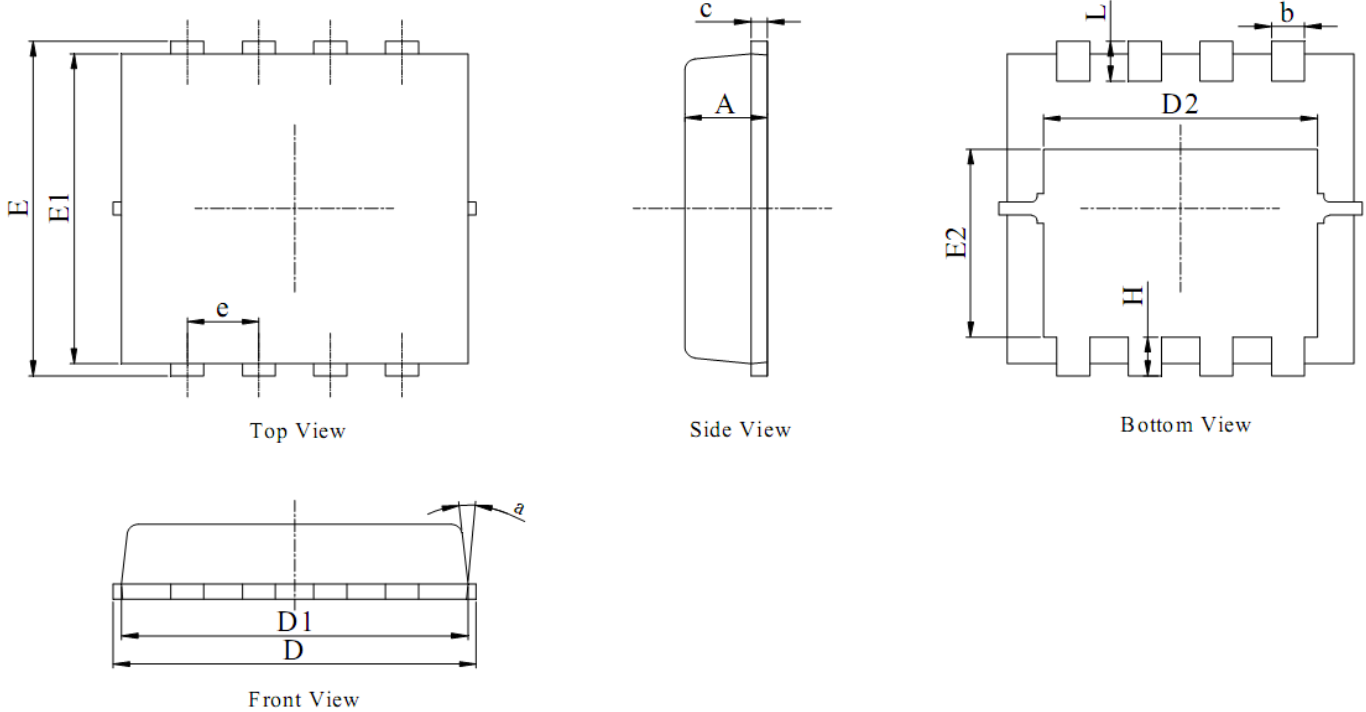


Fig.11 Unclamped Inductive Waveform

$$EAS = \frac{1}{2} L \times (-I_{AS}^2) \times \frac{-BV_{DSS}}{-BV_{DSS} - (-V_{DD})}$$

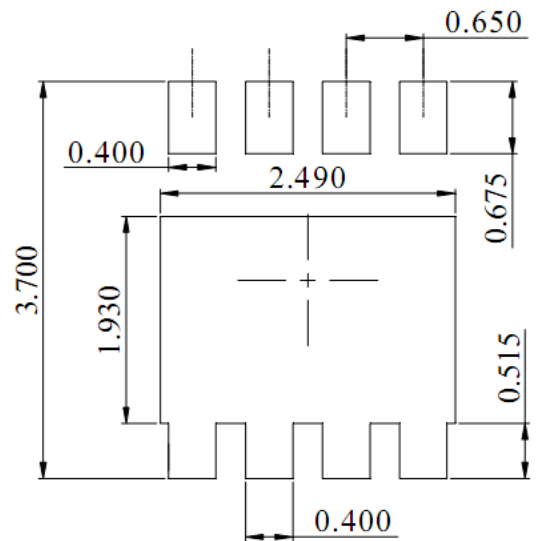
Package Mechanical Data-PDFN3333-8L-Single



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M,1994.
2. ALL DIMENSIONS IN MILLIMETER (ANGLE IN DEGREE).
3. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.20	0.25
D	3.00	3.15	3.25
D1	2.95	3.05	3.15
D2	2.39	2.49	2.59
E	3.20	3.30	3.40
E1	2.95	3.05	3.15
E2	1.70	1.80	1.90
e	0.65 BSC		
H	0.30	0.40	0.50
L	0.25	0.40	0.50
a	---	---	15°



DIMENSIONS:MILLIMETERS