Features

- Advanced Trench MOS Technology
- Super Low Gate Charge
- Green Device Available

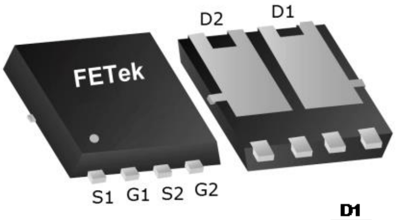
Product Summary

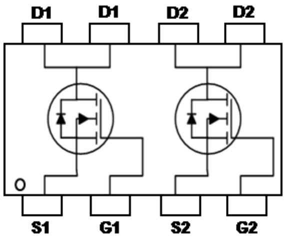
BVDSS	RDSON	ID
30V	14mΩ	30A

Applications

- Power Management in Desktop Computer
- DC/DC Converters
- Motor Control

PRPAK3X3 Pin Configuration





Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25˚C	Continuous Drain Current, V_{GS} @ 10V[1]	30	A
I_D@T_C=100˚C	Continuous Drain Current, V_{GS} @ 10V[1]	20	A
I_D@T_A=25˚C	Continuous Drain Current, V_{GS} @ 10V[1]	8.8	A
I_D@T_A=100˚C	Continuous Drain Current, V_{GS} @ 10V[1]	5.5	A
I_{DM}	Pulsed Drain Current[2]	65	A
EAS	Single Pulse Avalanche Energy[3]	24.2	mJ
I_{AS}	Avalanche Current	22	A
P_D@T_C=25˚C	Total Power Dissipation[4]	20.8	W
P_D@T_A=25˚C	Total Power Dissipation[4]	1.67	W
T_{STG}	Storage Temperature Range	-55 to 150	˚C
T_J	Operating Junction Temperature Range	-55 to 150	˚C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	75	˚C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	6	˚C/W

Electrical Characteristics (T_J=25 ˚C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	30	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=15A	---	11	14	mΩ
		V_{GS}=4.5V , I_D=10A	---	13.5	19.5	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.4	---	2.5	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=24V , V_{GS}=0V , T_J=25˚C	---	---	1	uA
		V_{DS}=24V , V_{GS}=0V , T_J=55˚C	---	---	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=15A	---	24.4	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.8	---	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=15V , V_{GS}=4.5V , I_D=12A	5.9	9.82	13.7	nC
Q_{gs}	Gate-Source Charge		1.1	2.24	3.4	
Q_{gd}	Gate-Drain Charge		2.8	5.54	8.3	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=15V , V_{GS}=10V , R_G=1.5Ω I_D=20A	---	6.4	10	ns
T_r	Rise Time		---	39	59	
$T_{d(off)}$	Turn-Off Delay Time		---	21	32	
T_f	Fall Time		---	4.7	7	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	538	896	1254	pF
C_{oss}	Output Capacitance		76	126	176	
C_{rss}	Reverse Transfer Capacitance		65	108	151	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	30	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25˚C	---	---	1	V

Note :

1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.

2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

3.The EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=22A

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

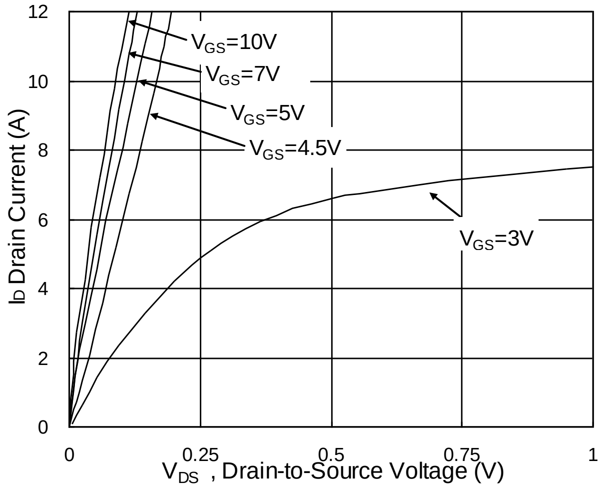


Fig.1 Typical Output Characteristics

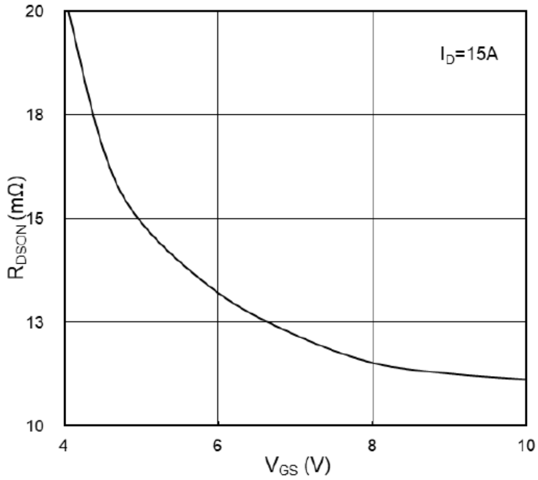


Fig.2 On-Resistance vs G-S Voltage

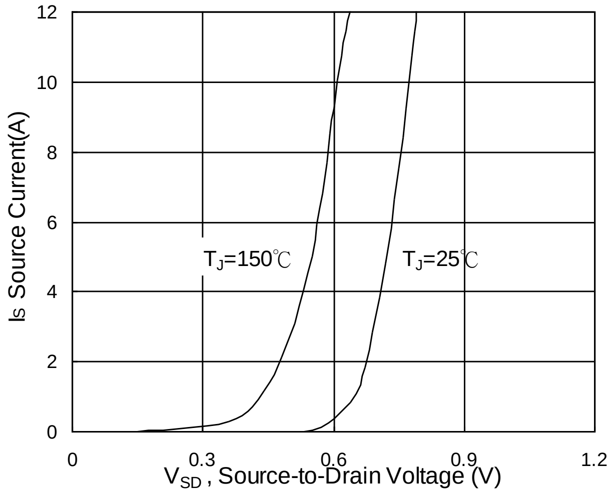


Fig.3 Source Drain Forward Characteristics

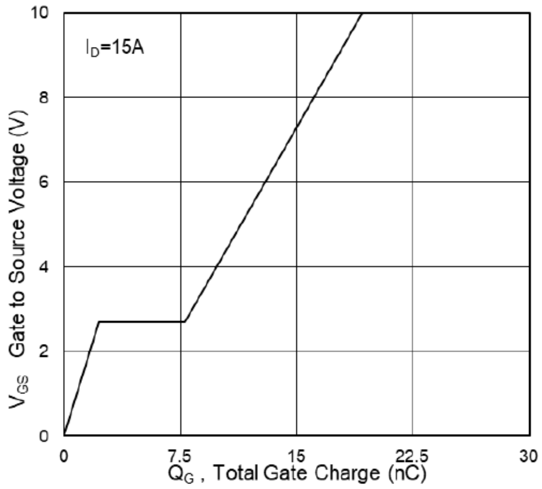


Fig.4 Gate-charge Characteristics

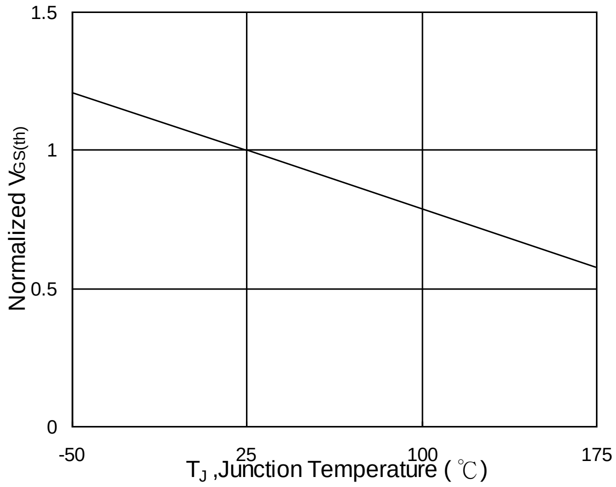


Fig.5 Normalized $V_{GS(th)}$ vs T_J

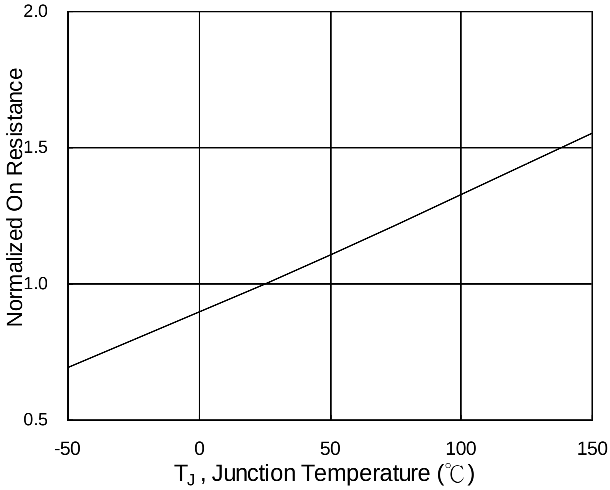


Fig.6 Normalized R_{DSON} vs T_J

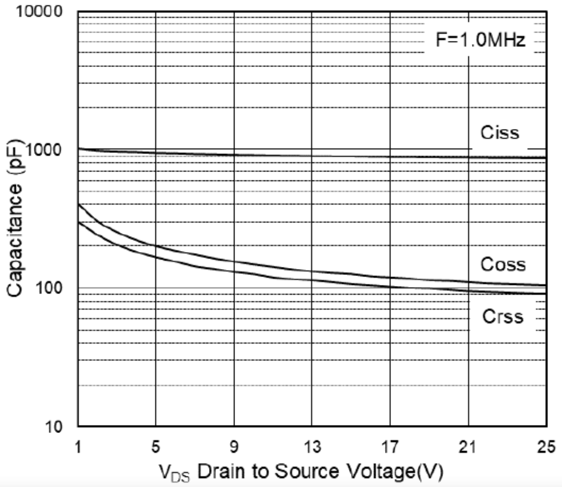


Fig.7 Capacitance

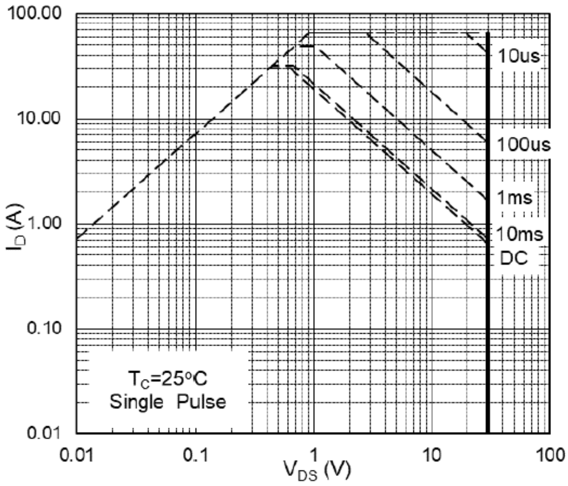


Fig.8 Safe Operating Area

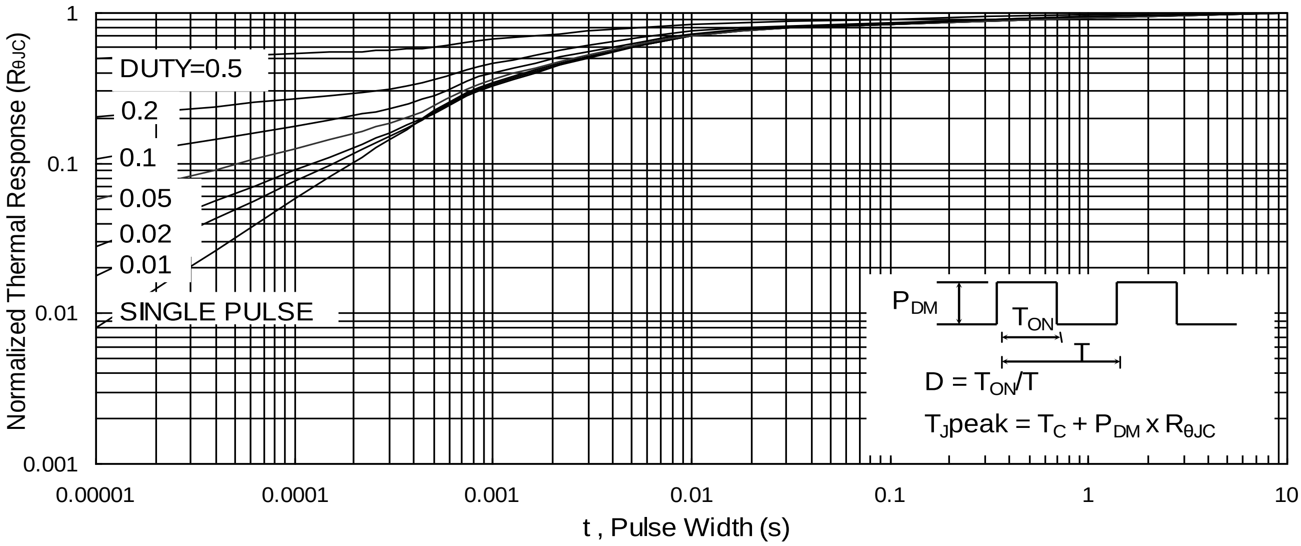


Fig.9 Normalized Maximum Transient Thermal Impedance

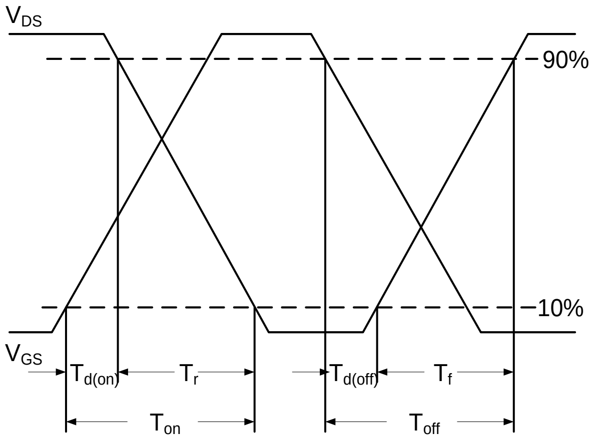


Fig.10 Switching Time Waveform

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

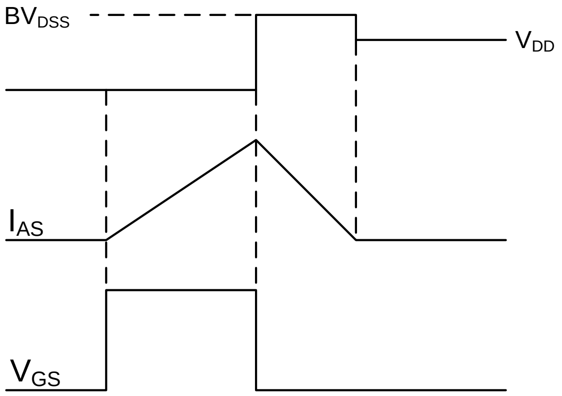
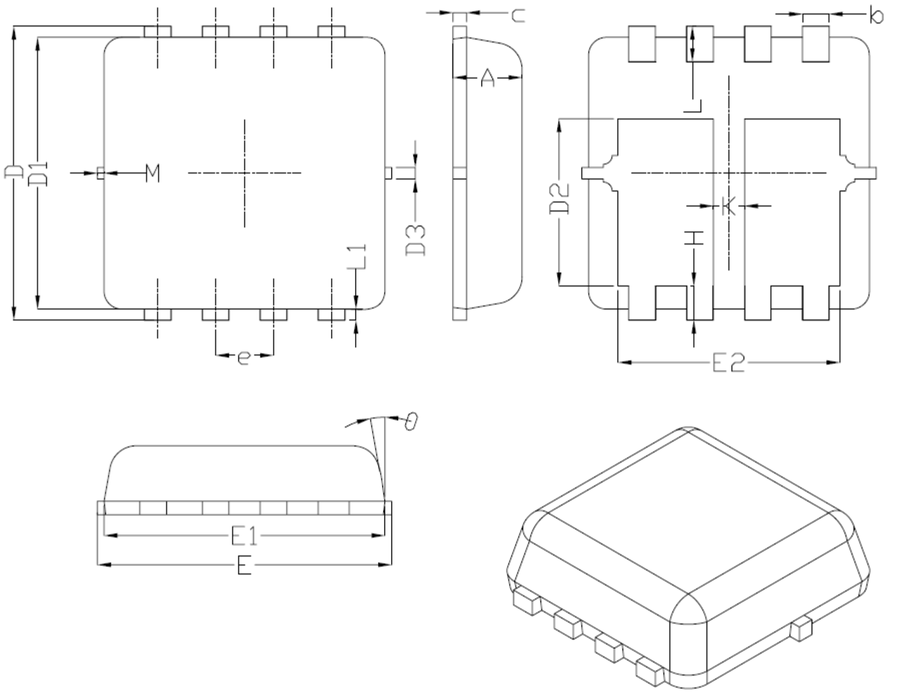


Fig.11 Unclamped Inductive Waveform

PRPAK3x3-8L_EP2 Package Outline



Symbols	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	0.70	0.85	0.027	0.031
b	0.25	0.39	0.010	0.015
c	0.10	0.25	0.004	0.010
D	3.20	3.45	0.126	0.136
D1	2.95	3.20	0.116	0.126
D2	1.60	1.98	0.063	0.080
D3	0.10	0.30	0.004	0.012
E	3.20	3.45	0.126	0.136
E1	3.00	3.25	0.118	0.128
E2	2.30	2.60	0.091	0.102
e	0.65 BSC		0.025 BSC	
H	0.30	0.50	0.011	0.026
θ	---	14°	---	14°
L	0.30	0.50	0.012	0.020
L1	0.13		0.005	
M	---	0.15	---	0.006
K	0.30	---	0.012	---

Land Pattern

(Only for Reference)