

P-Ch 30V Fast Switching MOSFETs

Features

- ★ Advanced Trench MOS Technology
- ★ ESD Protection
- ★ 100% EAS Guaranteed
- ★ Reliable and Rugged
- ★ Green Device Available

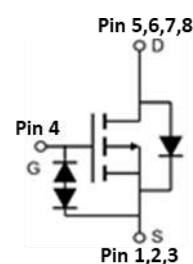
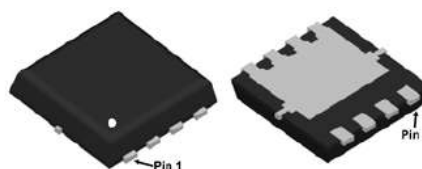
Applications

- ★ Power Management in Notebook Computer, Portable Equipment and Battery Powered Systems.

Product Summary

BVDSS	RDSON	ID
-30V	8.5mΩ	-32A

PRPAK3X3 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current ^{1,6}	-32	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current ^{1,6}	-25	A
I_{DM}	Pulsed Drain Current ²	-128	A
EAS	Single Pulse Avalanche Energy ³	125	mJ
I_{AS}	Avalanche Current	-50	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation ⁴	96	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	---	75	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	---	1.3	$^\circ\text{C/W}$

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 =-20A	---	6.8	8.5	mΩ
		V _{GS} =-4.5V, I _D =-15A	---	10.5	14	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-1.0	---	-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	---	---	±10	uA
g _{fs}	Forward Transconductance	V _{DS} =-5V, I _D =-20A	---	25	---	S
Q _g	Total Gate Charge (-4.5V)	V _{DS} =-15V, V _{GS} =-4.5V, I _D =-15A	---	30	---	nC
Q _{gs}	Gate-Source Charge		---	10	---	
Q _{gd}	Gate-Drain Charge		---	10.4	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =-15V, V _{GS} =-10V, R _G =3.3Ω I _D =-15A	---	9.4	---	ns
T _r	Rise Time		---	10.2	---	
T _{d(off)}	Turn-Off Delay Time		---	117	---	
T _f	Fall Time		---	24	---	
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1MHz	---	4319	---	pF
C _{oss}	Output Capacitance		---	439	---	
C _{rss}	Reverse Transfer Capacitance		---	299	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	---	---	-32	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =-1A, T _J =25°C	---	---	-1	V
t _{rr}	Reverse Recovery Time	I _F =-15A, di/dt=100A/μs,	---	38	---	nS
Q _{rr}	Reverse Recovery Charge	T _J =25°C	---	20	---	nC

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 ≤ 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}=-50A
4. The power dissipation is limited by 150°C junction temperature
5. The data is theoretically the same as I_D, in real applications, should be limited by total power dissipation.
6. The maximum current rating is package limited.

Typical Characteristics

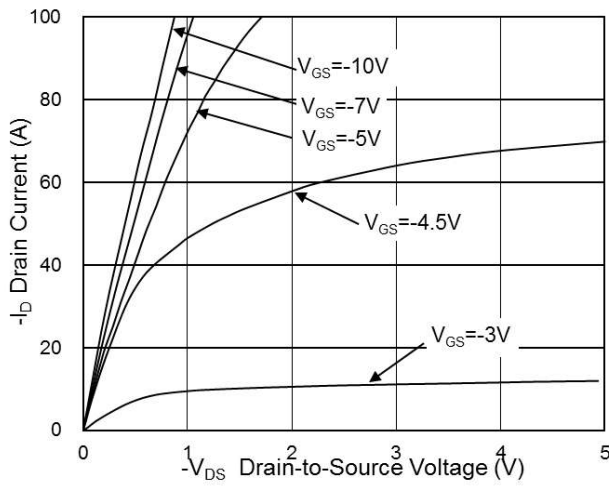


Fig.1 Typical Output Characteristics

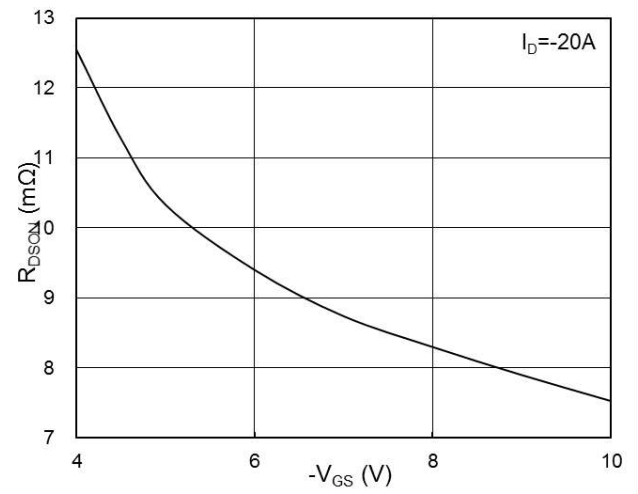


Fig.2 On-Resistance vs G-S Voltage

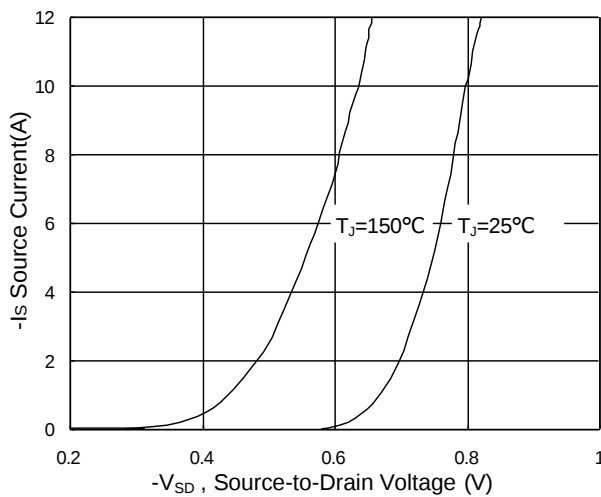


Fig.3 Source Drain Forward Characteristics

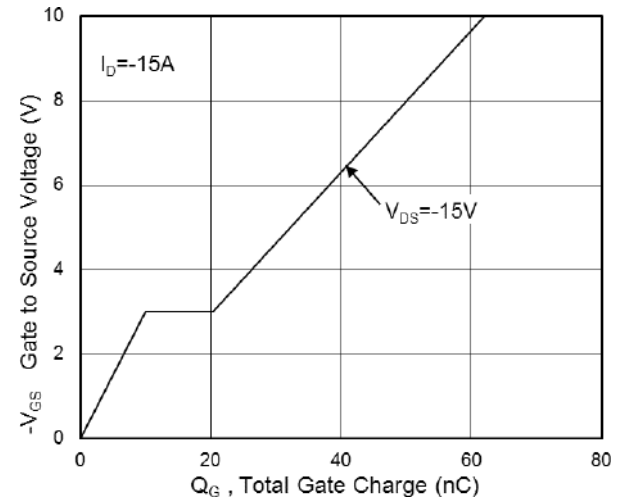


Fig.4 Gate-Charge Characteristics

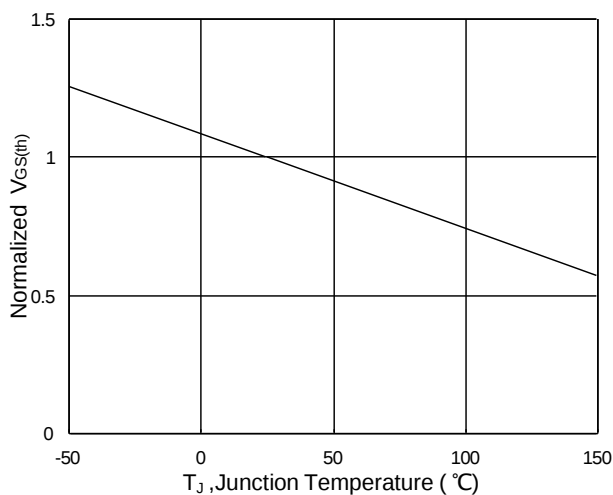


Fig.5 Normalized $V_{GS(th)}$ vs T_J

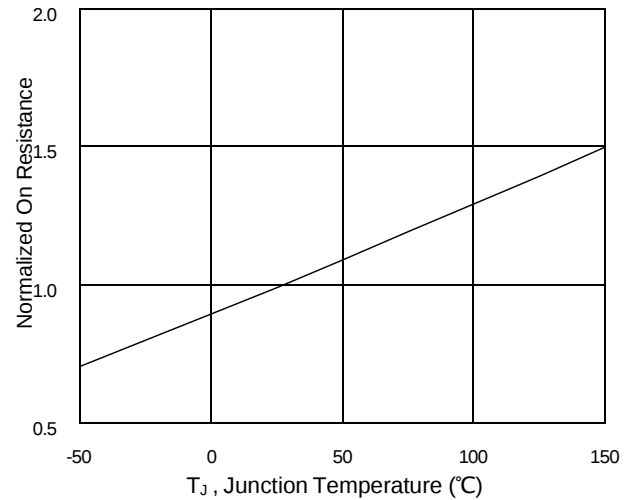


Fig.6 Normalized $R_{DS(on)}$ vs T_J

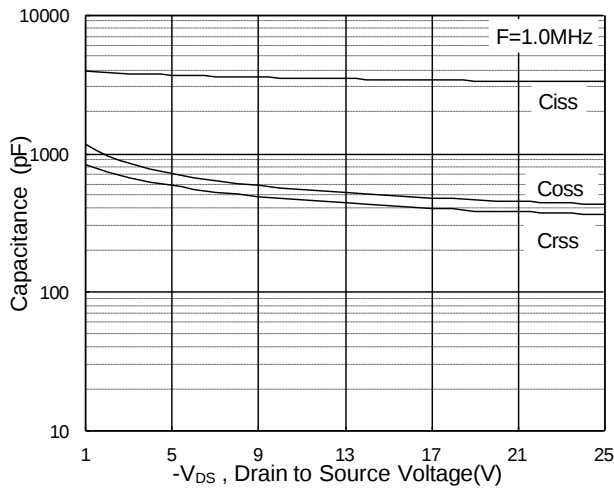


Fig.7 Capacitance

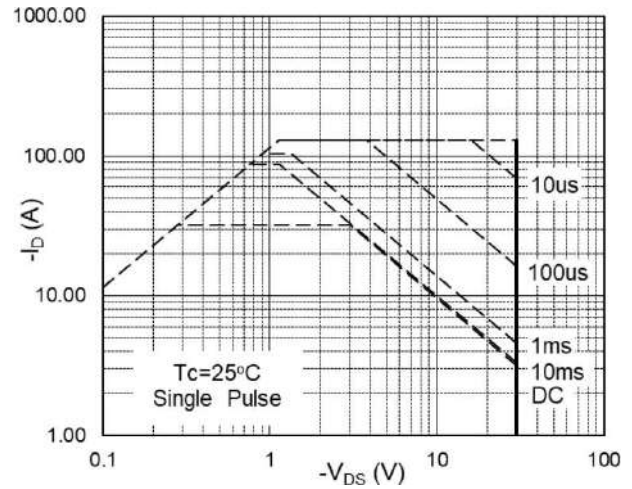


Fig.8 Safe Operating Area

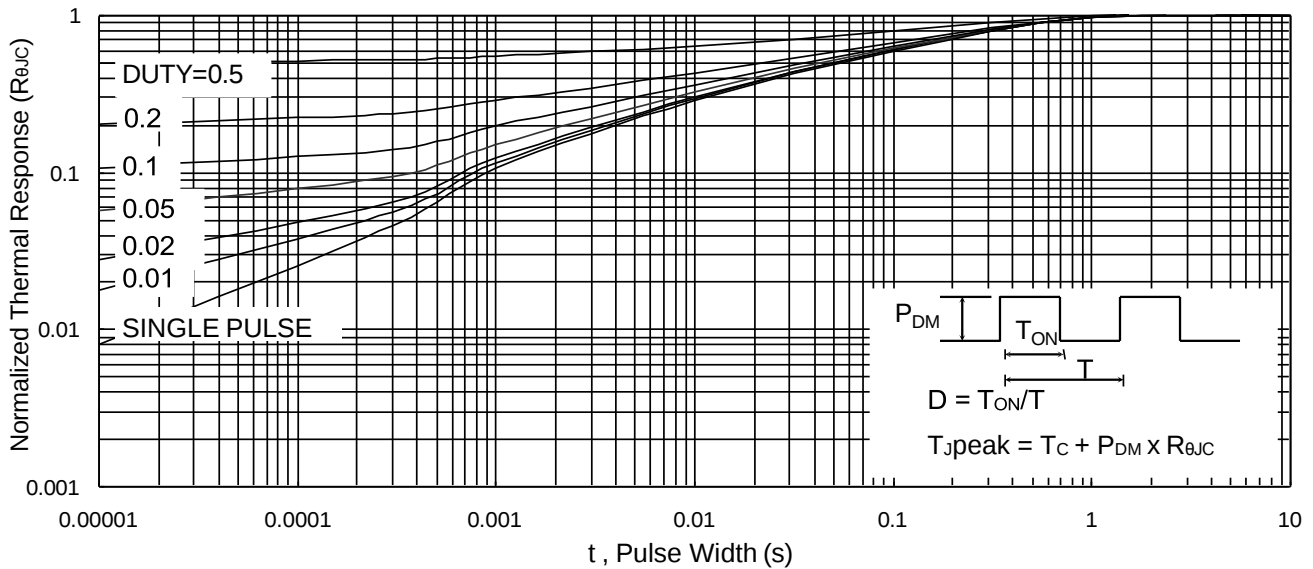


Fig.9 Normalized Maximum Transient Thermal Impedance

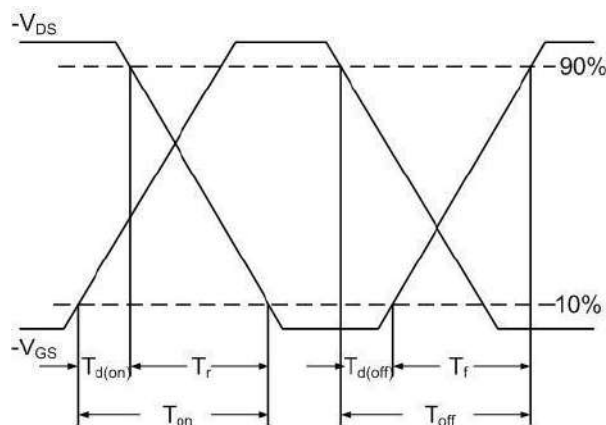


Fig.10 Switching Time Waveform

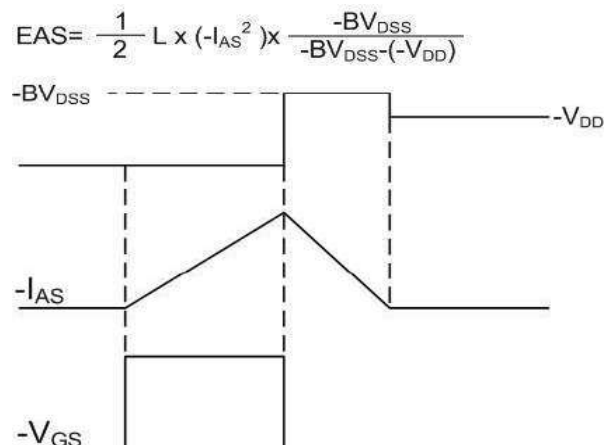


Fig.11 Unclamped Inductive Switching Waveform