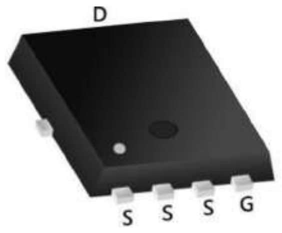
N-Ch 150V Fast Switching MOSFETs

Description:

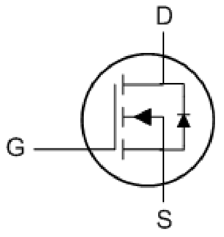
- Advanced Trench MOS Technology
- Low Gate Charge
- Low $R_{DS(ON)}$
- 100% EAS Guaranteed
- Green Device Available



PRPAK5X6 Pin Configuration

Applications:

- Load Switch
- LED Applications
- Networking Applications
- Quick Charger



Product Summary

BVDSS	RDSON	ID
150V	13mΩ	71A

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℃	Continuous Drain Current, V_{GS} @ 10V[1]	71	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	45	A
I_D@T_A=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	9.6	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ 10V[1]	7.7	A
I_{DM}	Pulsed Drain Current[2]	180	A
EAS	Single Pulse Avalanche Energy[3]	420	mJ
I_{AS}	Avalanche Current	41	A
P_D@T_C=25℃	Total Power Dissipation[4]	125	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	---	55	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	1	℃/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	150	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=20A	---	9.8	13	mΩ
		V_{GS}=4.5V , I_D=20A	---	11	15	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	1.7	2.5	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=120V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=120V , V_{GS}=0V , T_J=55℃	---	---	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.4	---	Ω
Q_g	Total Gate Charge	V_{DS}=75V , V_{GS}=4.5V , I_D=20A	---	37	---	nC
Q_{gs}	Gate-Source Charge		---	12.3	---	
Q_{gd}	Gate-Drain Charge		---	17.7	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=75V , V_{GS}=10V , R_G=6Ω, I_D=1A	---	12	---	ns
T_r	Rise Time		---	18	---	
$T_{d(off)}$	Turn-Off Delay Time		---	88	---	
T_f	Fall Time		---	142	---	
C_{iss}	Input Capacitance	V_{DS}=75V , V_{GS}=0V , f=1MHz	---	4137	---	pF
C_{oss}	Output Capacitance		---	290	---	
C_{rss}	Reverse Transfer Capacitance		---	22	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,5,6]	V_G=V_D=0V , Force Current	---	---	71	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V
t_{rr}	Reverse Recovery Time	I_F=20A , di/dt=100A/µs , T_J=25℃	---	76	---	nS
Q_{rr}	Reverse Recovery Charge		---	252	---	nC

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}=50V,V_{GS}=10V,L=0.5mH,I_{AS}=41A
4.The power dissipation is limited by 175℃ 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

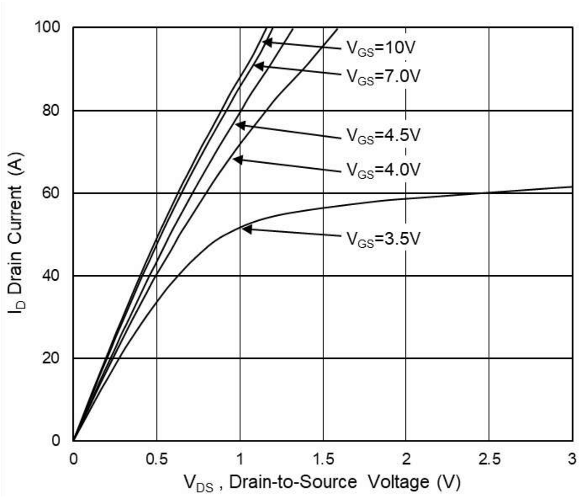


Fig.1 Typical Output Characteristics

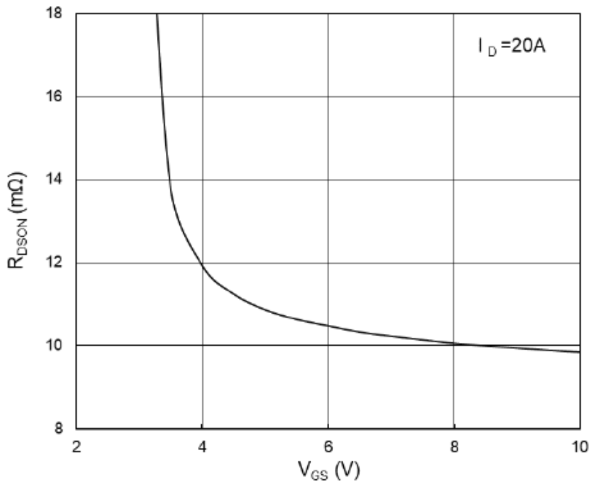


Fig.2 On-Resistance vs G-S Voltage

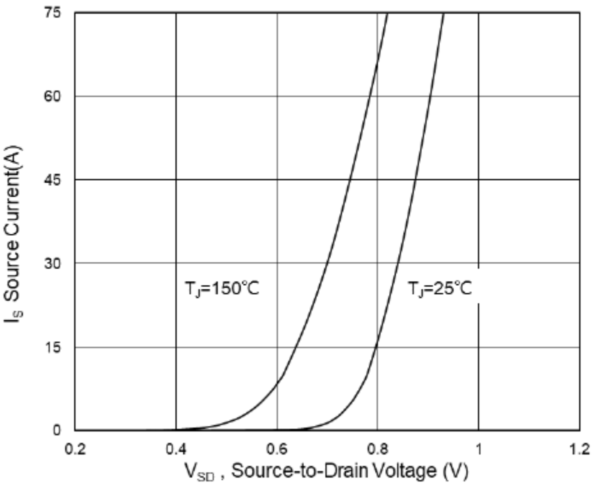


Fig.3 Source Drain Forward Characteristics

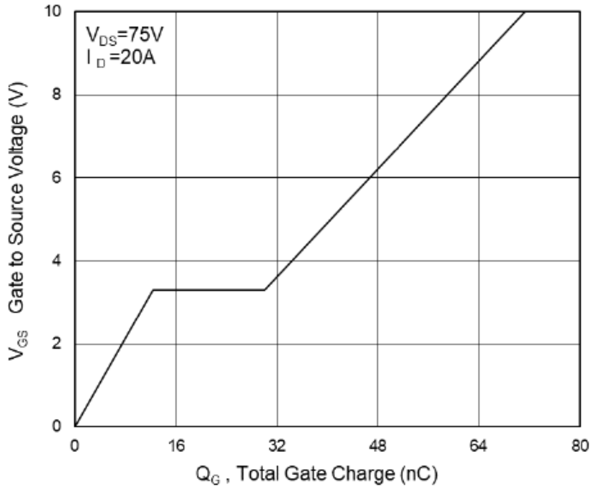


Fig.4 Gate-Charge Characteristics

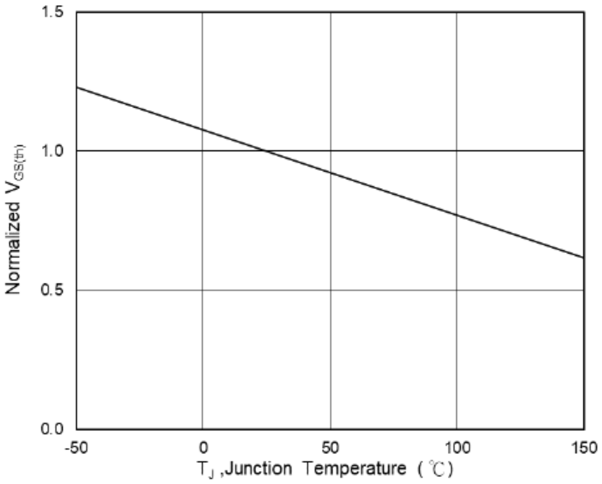


Fig.5 Normalized $V_{GS(th)}$ vs T_J

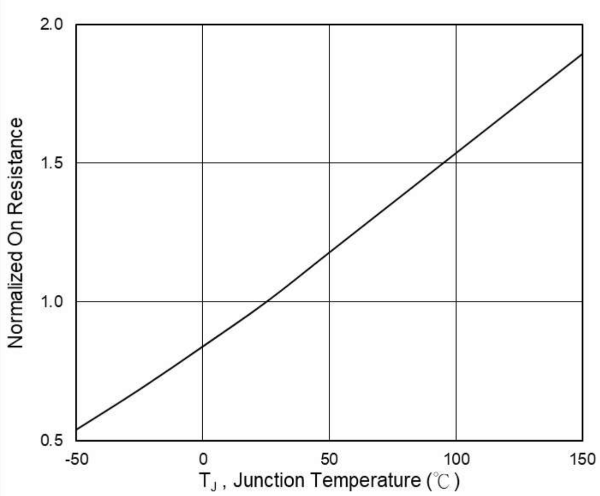


Fig.6 Normalized R_{DSON} vs T_J

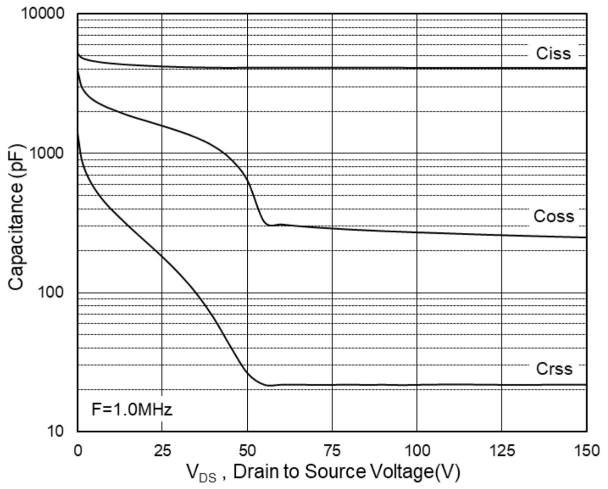


Fig.7 Capacitance

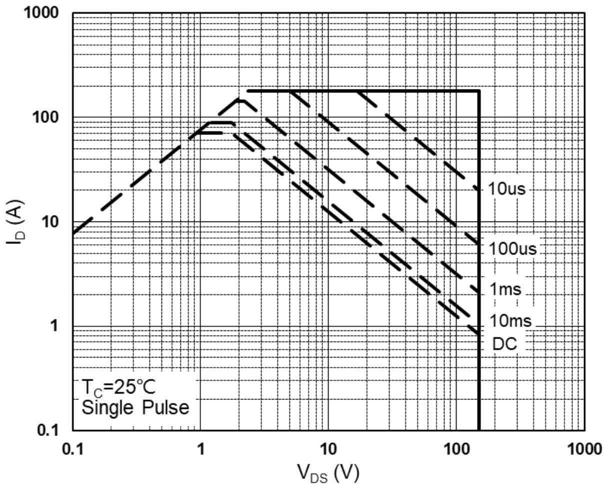


Fig.8 Safe Operating Area

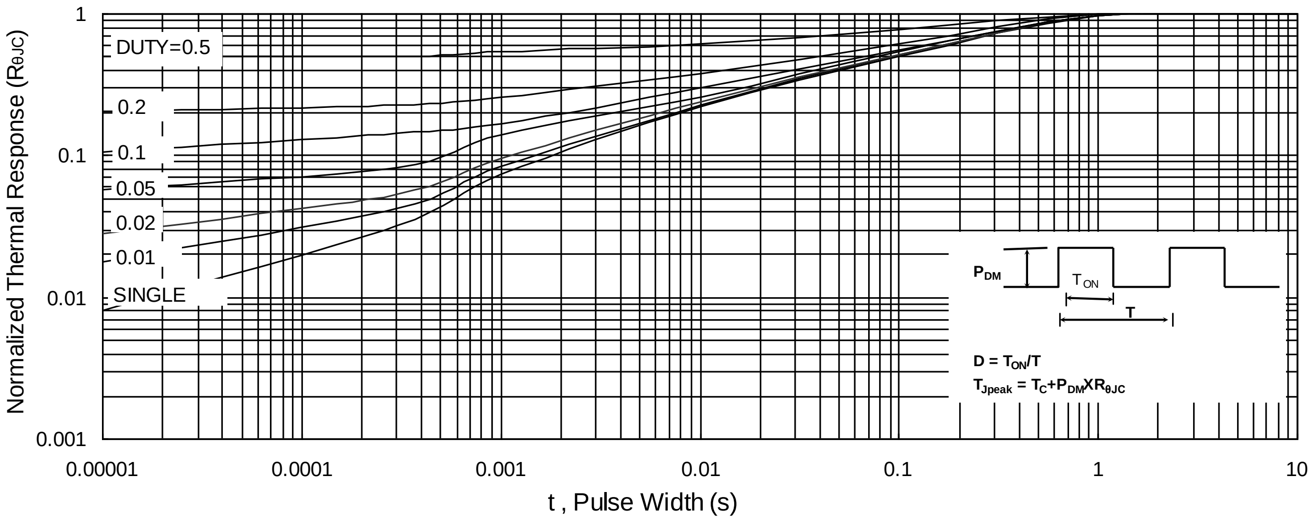


Fig.9 Normalized Maximum Transient Thermal Impedance

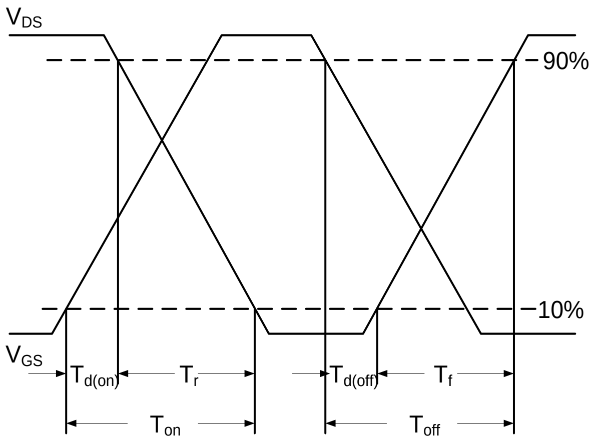
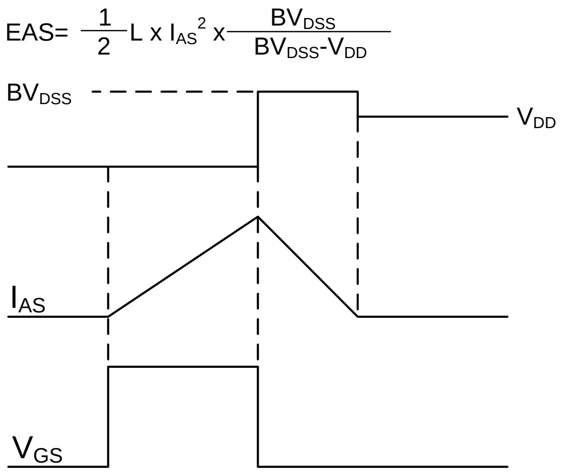


Fig.10 Switching Time Waveform



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

Fig.11 Unclamped Inductive Waveform