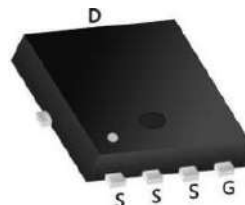


N-Ch 60V Fast Switching MOSFETs

Features:

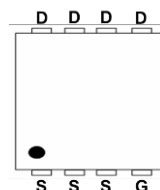
- Advanced Trench MOS Technology
- Low Gate Charge
- LOW $R_{DS(ON)}$
- 100% EAS Guaranteed
- Green Device Available



PRPAK5X6 Pin Configuration

Application:

- Motor Control.
- DC/DC Converter.
- Synchronous rectifier applications.



Product Summary

BVDSS	RDS(ON)	ID
60V	5.2mΩ	80A

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current ^{1,6}	80	A
$I_D@T_C=100^\circ\text{C}$		51	A
I_{DM}	Pulsed Drain Current ²	300	A
EAS	Single Pulse Avalanche Energy ³	92.5	mJ
I_{AS}	Avalanche Current	43	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation ⁴	54.3	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 ($t \leq 10\text{S}$)	---	25	$^\circ\text{C/W}$
	Thermal Resistance Junction-ambient ¹ (Steady State)	---	55	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-case ¹	---	2.3	$^\circ\text{C/W}$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=20A$	---	4.4	5.2	$m\Omega$
		$V_{GS}=4.5V, I_D=10A$	---	6.4	7.8	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.65	2.3	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=48V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=48V, V_{GS}=0V, T_J=55^\circ\text{C}$	---	---	5	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
R_g	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	---	1.3	---	Ω
Q_g	Total Gate Charge (10V)	$V_{DS}=30V, V_{GS}=10V, I_D=20A$	---	33.4	---	nC
Q_g	Total Gate Charge (4.5V)		---	17.8	---	
Q_{gs}	Gate-Source Charge		---	5.8	---	
Q_{gd}	Gate-Drain Charge		---	7.9	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=30V, V_{GS}=10V, R_G=3.3\Omega, I_D=20A$	---	7.5	---	ns
T_r	Rise Time		---	6	---	
$T_{d(off)}$	Turn-Off Delay Time		---	29	---	
T_f	Fall Time		---	7.5	---	
C_{iss}	Input Capacitance	$V_{DS}=30V, V_{GS}=0V, f=1\text{MHz}$	---	1625	---	pF
C_{oss}	Output Capacitance		---	438	---	
C_{rss}	Reverse Transfer Capacitance		---	25	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,5,6}	$V_G=V_D=0V$, Force Current	---	---	60	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1.2	V
t_{rr}	Reverse Recovery Time	$I_F=20A, dI/dt=400A/\mu s, T_J=25^\circ\text{C}$	---	23	---	nS
Q_{rr}	Reverse Recovery Charge		---	60	---	nC

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
2. Single pulse width limited by junction temperature $T_{J(MAX)}=150^\circ\text{C}$.
- 3.The EAS data shows Max. rating . The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=43A$
- 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.
- 6.The maximum current rating is package limited.

Typical Characteristics

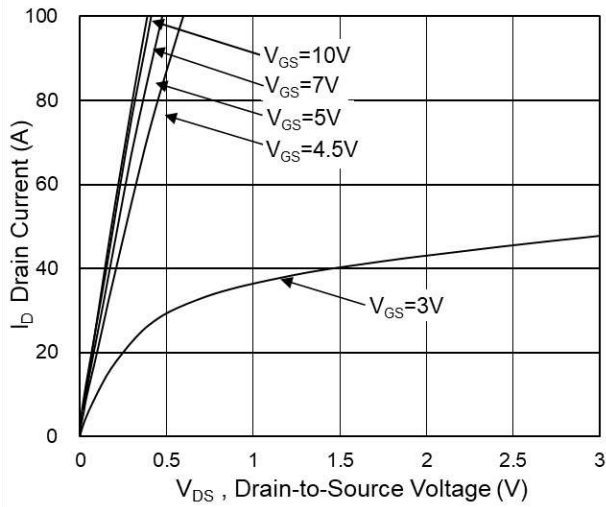


Fig.1 Typical Output Characteristics

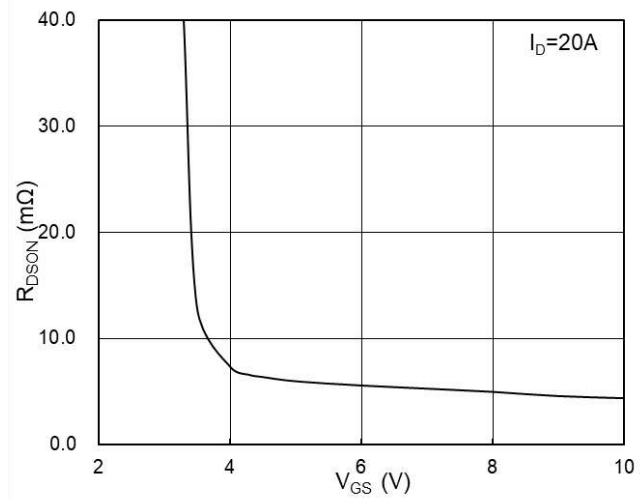


Fig.2 On-Resistance vs G-S Voltage

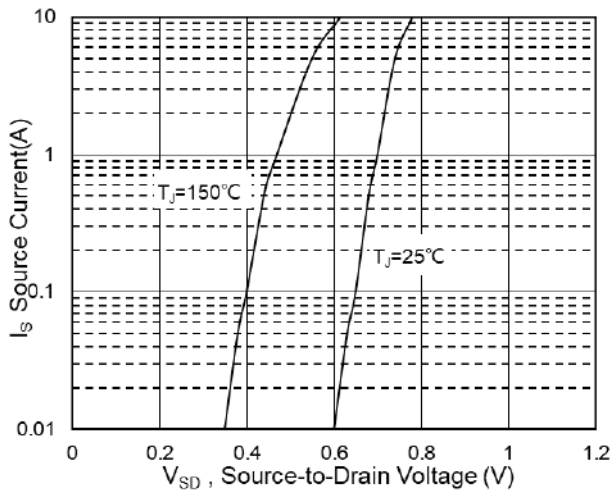


Fig.3 Source Drain Forward Characteristics

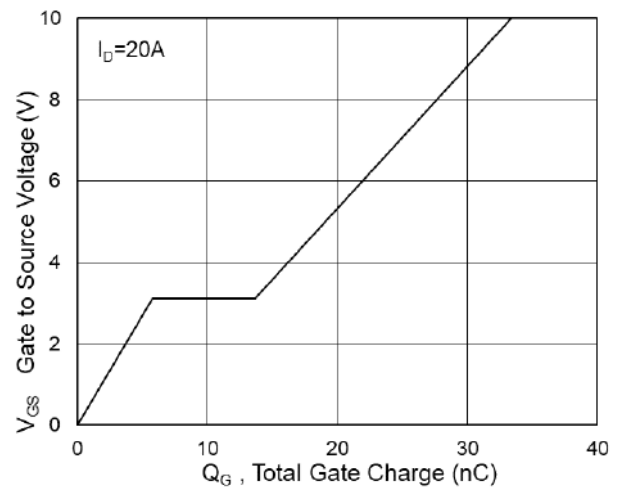


Fig.4 Gate-Charge Characteristics

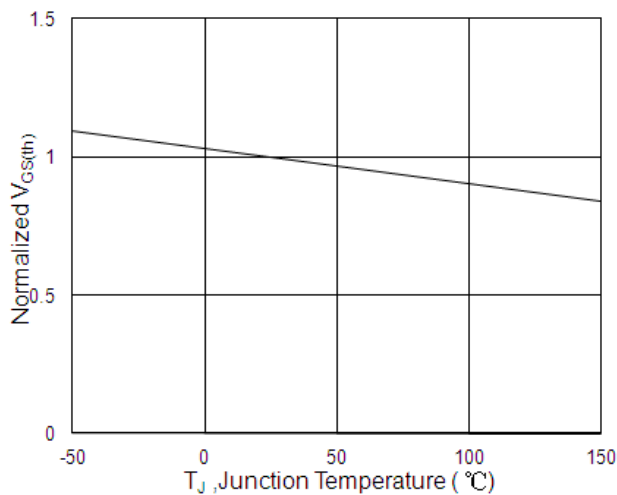


Fig.5 Normalized $V_{GS(th)}$ vs T_J

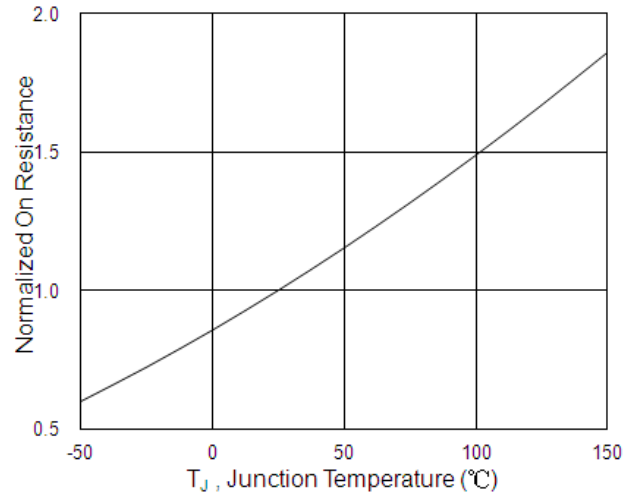


Fig.6 Normalized $R_{DS(on)}$ vs T_J

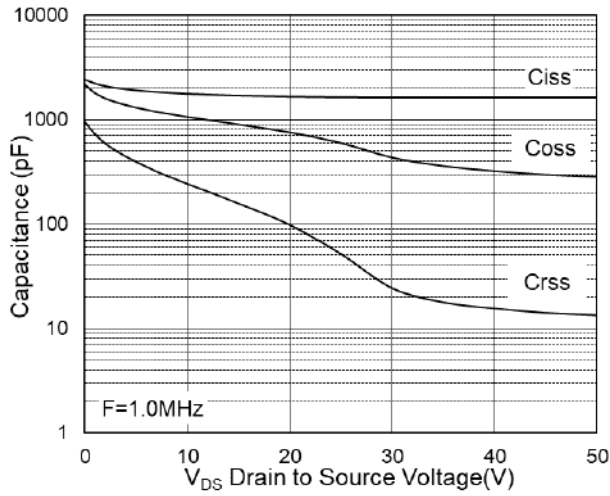


Fig.7 Capacitance

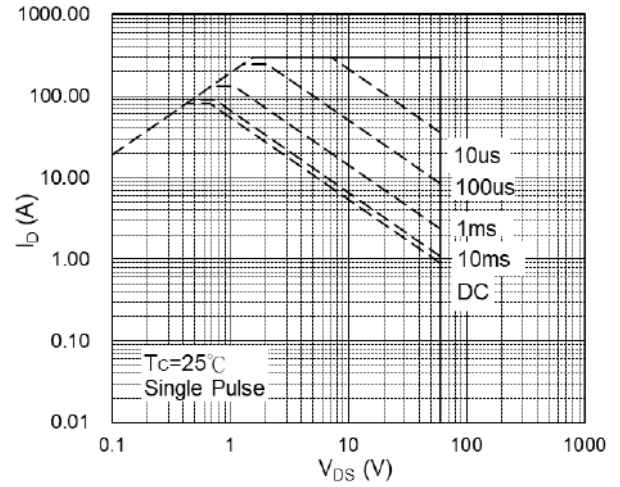


Fig.8 Safe Operating Area

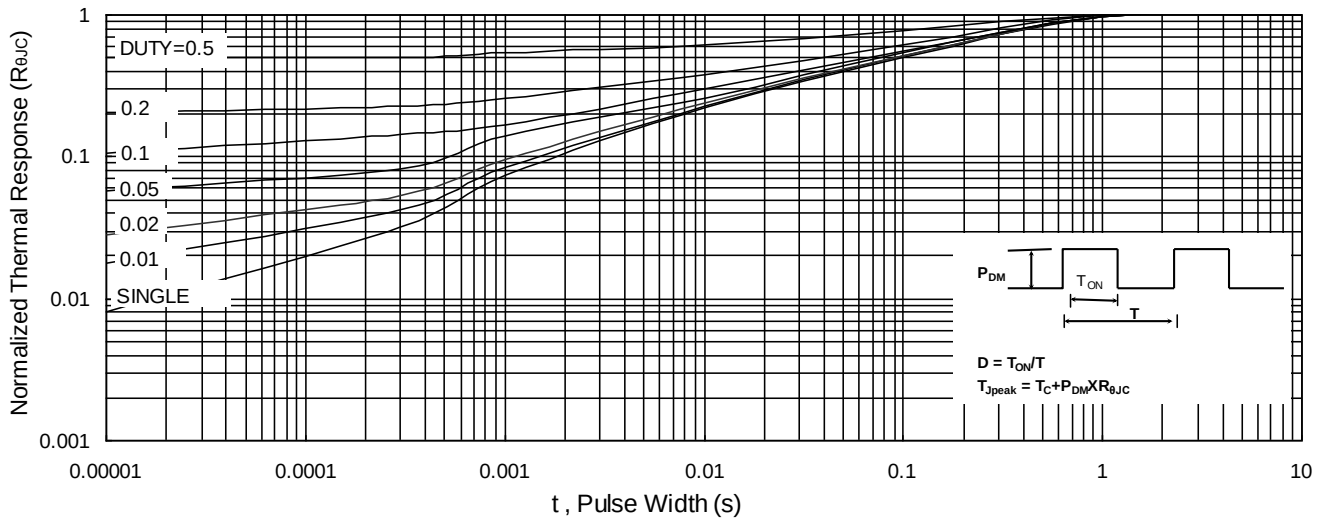


Fig.9 Normalized Maximum Transient Thermal Impedance

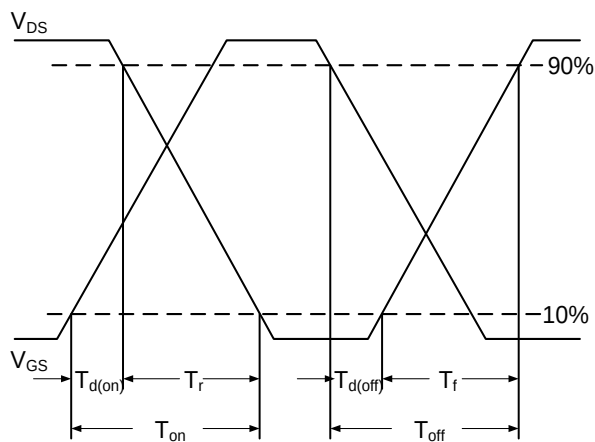


Fig.10 Switching Time Waveform

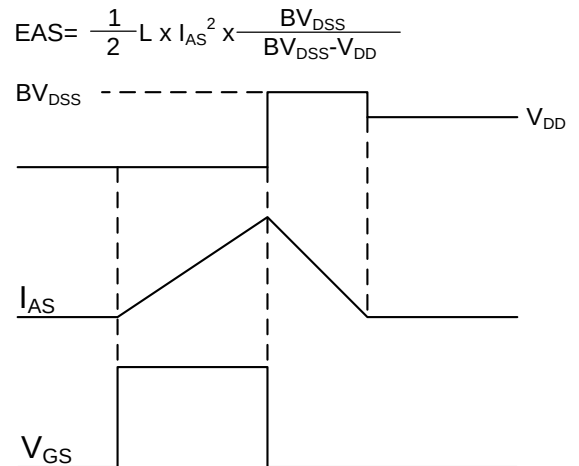


Fig.11 Unclamped Inductive Switching Waveform