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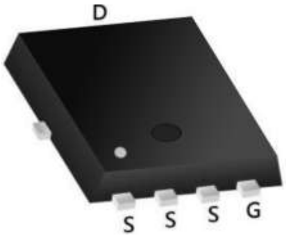
KPRBA20N15S

N-Ch 150V Fast Switching MOSFETs

Features:

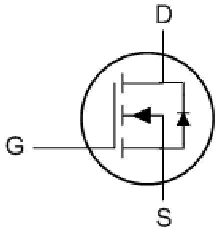
- Low $R_{DS(ON)}$
- Green Device Available
- 100% EAS Tested
- Advanced Trench MOS Technology



PRPAK5X6 Pin Configuration

Applications:

- Power Management in TV Converter.
- DC/DC Converter.



Product Summary

BVDSS	RDSON	ID
150V	56mΩ	23A

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[1]	23	A
I_D@T_C=100℃	Continuous Drain Current[1]	16	A
I_D@T_A=25℃	Continuous Drain Current[1]	4.5	A
I_D@T_A=70℃	Continuous Drain Current[1]	3.8	A
I_{DM}	Pulsed Drain Current[2]	60	A
P_D@T_C=25℃	Total Power Dissipation[3]	72.6	W
P_D@T_A=25℃	Total Power Dissipation[3]	2.7	W
T_{STG}	Storage Temperature Range	-55 to 175	℃
T_J	Operating Junction Temperature Range	-55 to 175	℃

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]	---	2.0	℃/W

Electrical Characteristics (T_J=25 ℃, 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=10A	---	47	56	mΩ
	Static Drain-Source On-Resistance[2]	V_{GS}=4.5V , I_D=10A	---	53	68	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	---	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
gfs	Forward Transconductance	V_{DS}=5V , I_D=10A	---	25	---	S
Q_g	Total Gate Charge	V_{DS}=75V , V_{GS}=10V , I_D=10A	---	19	---	nC
Q_{gs}	Gate-Source Charge		---	4.5	---	
Q_{gd}	Gate-Drain Charge		---	2.6	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=75V , V_{GS}=10V , R_G=3.3Ω I_D=10A	---	18	---	ns
T_r	Rise Time		---	5.8	---	
$T_{d(off)}$	Turn-Off Delay Time		---	26.5	---	
T_f	Fall Time		---	4.5	---	
C_{iss}	Input Capacitance	V_{DS}=25V , V_{GS}=0V , f=1MHz	---	1090	---	pF
C_{oss}	Output Capacitance		---	93	---	
C_{rss}	Reverse Transfer Capacitance		---	6	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	20	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=10A , dI/dt=100A/µs , T_J=25℃	---	45	---	nS
Q_{rr}	Reverse Recovery Charge		---	138	---	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 power dissipation is limited by 150℃ junction temperature
4.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

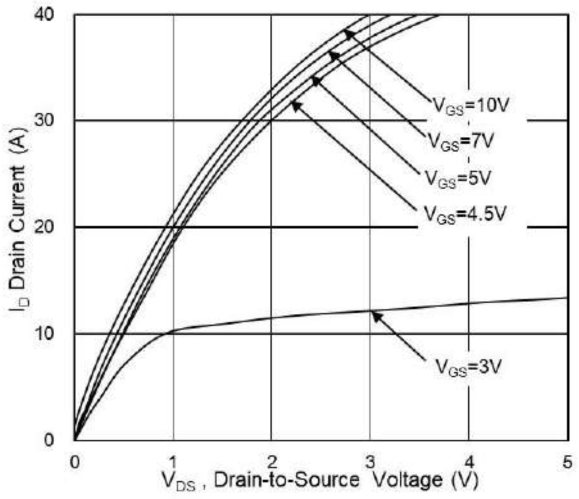


Fig.1 Typical Output Characteristics

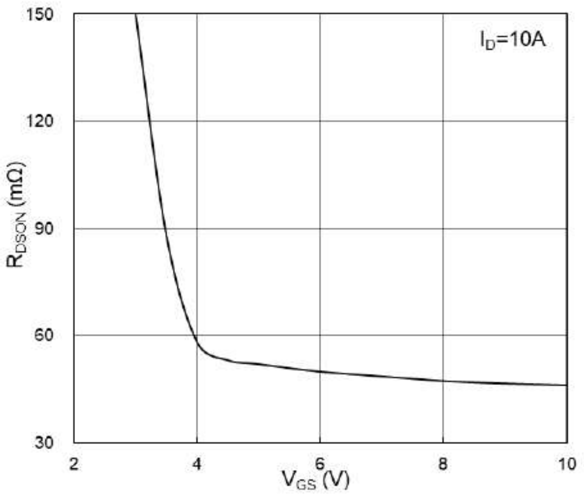


Fig.2 On-Resistance vs G-S Voltage

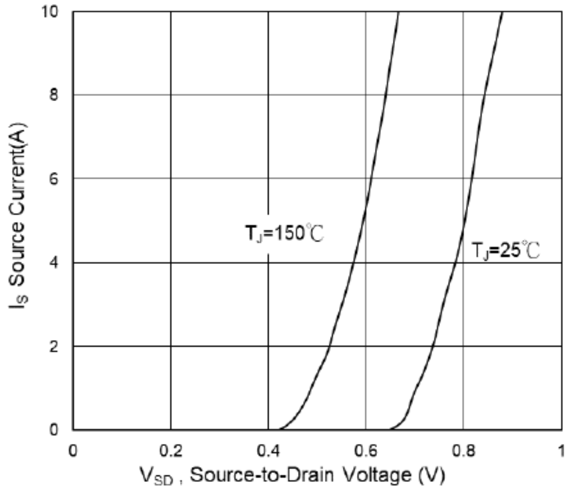


Fig.3 Source Drain Forward Characteristics

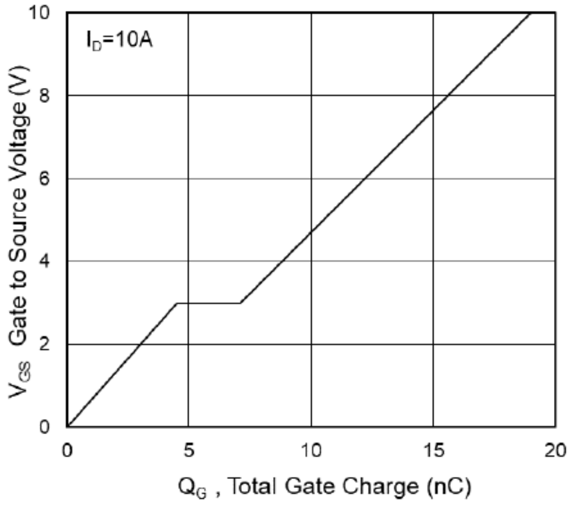


Fig.4 Gate-Charge Characteristics

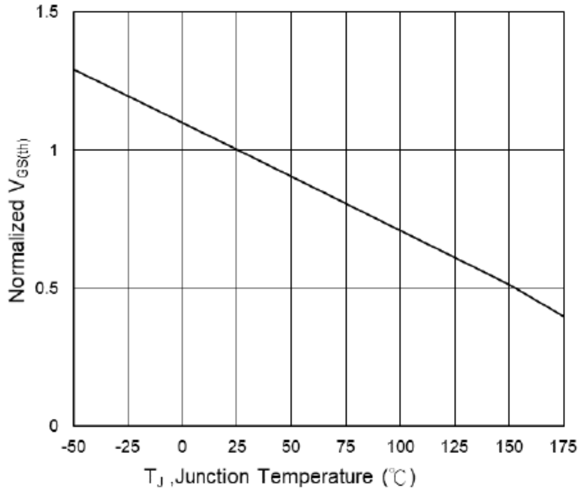


Fig.5 Normalized $V_{GS(th)}$ vs T_J

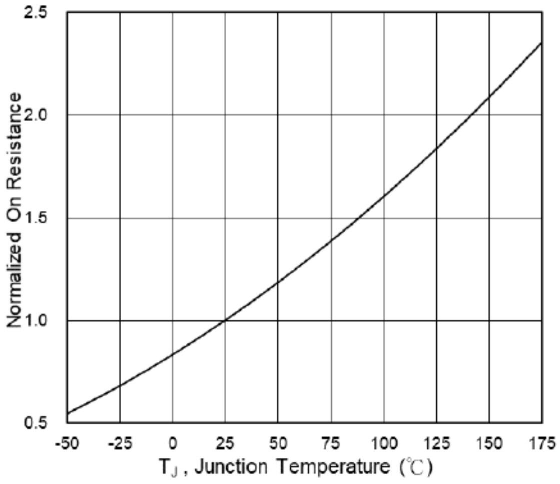


Fig.6 Normalized R_{DSON} vs T_J

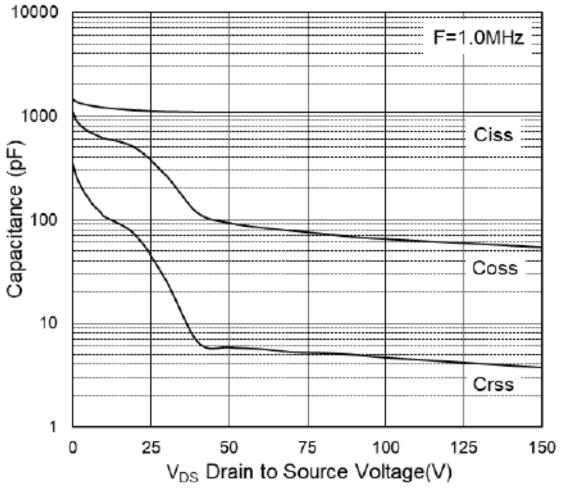


Fig.7 Capacitance

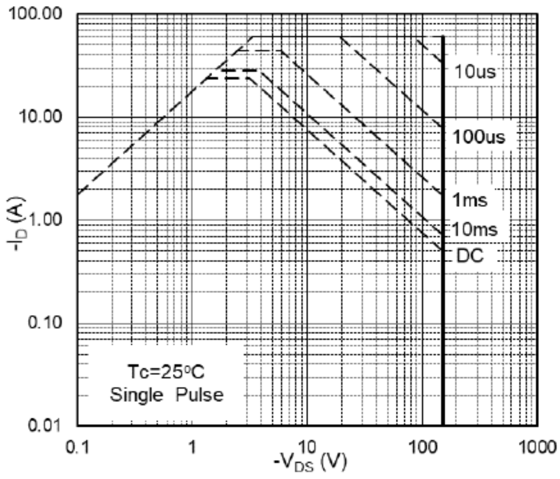


Fig.8 Safe Operating Area

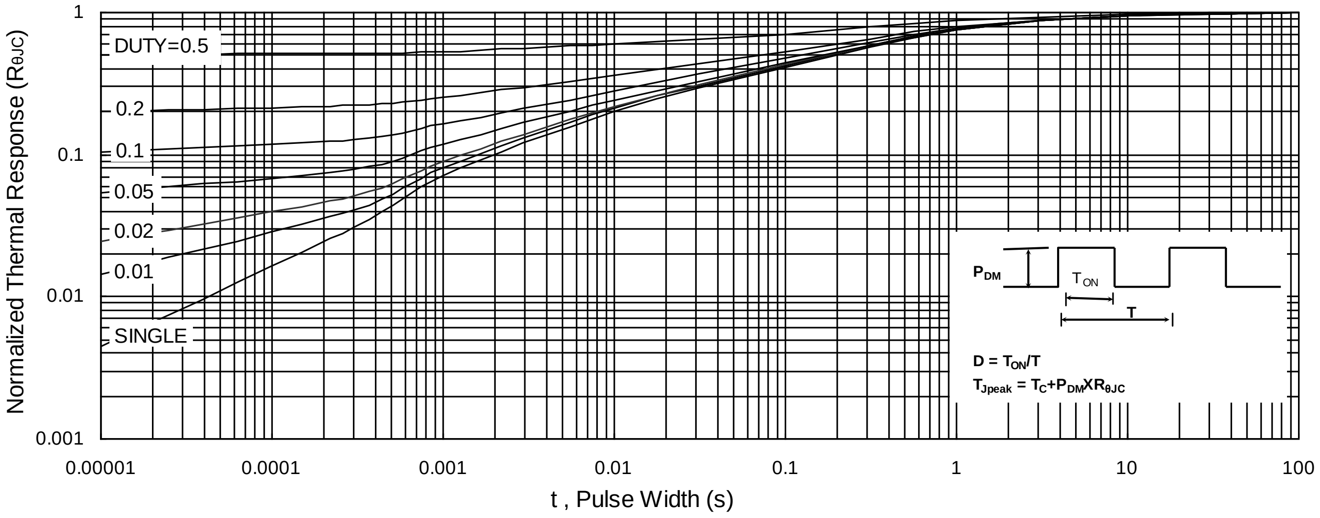


Fig.9 Normalized Maximum Transient Thermal Impedance

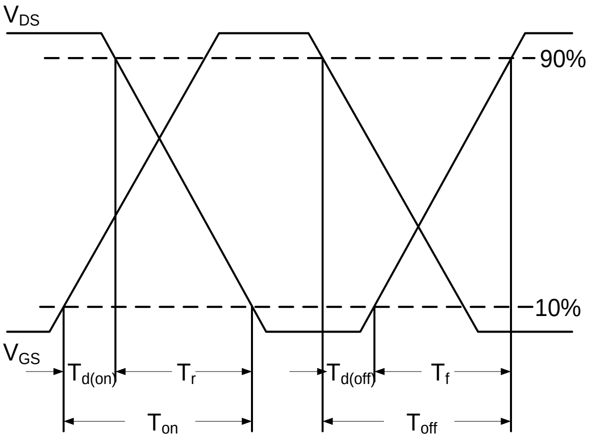


Fig.10 Switching Time Waveform

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

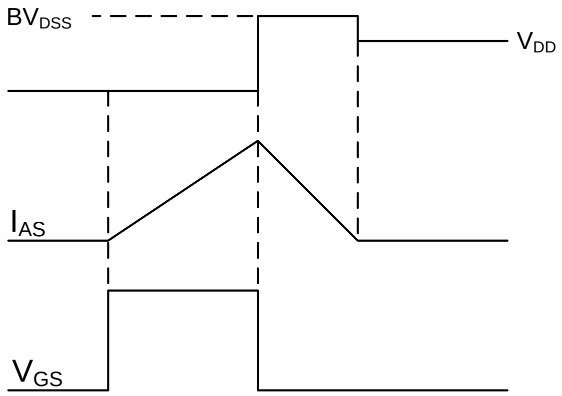


Fig.11 Unclamped Inductive Switching Waveform