P-Ch 40V Fast Switching MOSFETs

Features

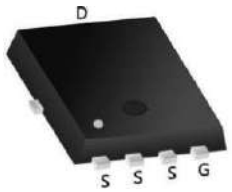
★ Super Low Gate Charge
★ 100% EAS Guaranteed
★ Green Device Available
★ Excellent CdV/dt effect decline
★ Advanced high cell density Trench technology

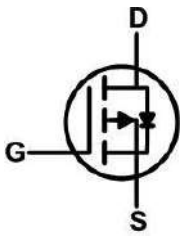
Description

The KPRA4119 is the high cell density trenched P-Ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

The KPRA4119 meet the RoHS and Green Product requirement, 100% EAS guaranteed with full function reliability approved.

PRPAK5X6 Pin Configuration





Product Summary

BVDSS	RDSON	ID
-40V	3.8mΩ	-115A

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ -10V[1]	-115	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ -10V[1]	-73	A
I_{DM}	Pulsed Drain Current[2]	-580	A
EAS	Single Pulse Avalanche Energy[3]	1250	mJ
I_{AS}	Avalanche Current	-70.7	A
P_D@T_C=25℃	Total Power Dissipation[4]	83.3	W
P_D@T_C=100℃	Total Power Dissipation[4]	33.3	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]	---	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	---	1.5	℃/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=-250μA	-40	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=-10V , I_D=-30A	---	3.1	3.8	mΩ
		V_{GS}=-4.5V , I_D=-20A	---	4.0	5.6	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250μA	-1.0		-2.5	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-40V , V_{GS}=0V , T_J=25℃	---	---	-1	μA
		V_{DS}=-40V , V_{GS}=0V , T_J=125℃	---	---	-100	
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	---	1.7	---	Ω
Q_g	Total Gate Charge	V_{DS}=-20V , V_{GS}=-10V , I_D=-20A	---	137	---	nC
Q_{gs}	Gate-Source Charge		---	25	---	
Q_{gd}	Gate-Drain Charge		---	30	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=-20V , V_{GS}=-10V , R_G=3Ω, I_D=-10A	---	18	---	ns
T_r	Rise Time		---	3.6	---	
$T_{d(off)}$	Turn-Off Delay Time		---	21	---	
T_f	Fall Time		---	39	---	
C_{iss}	Input Capacitance	V_{DS}=-20V , V_{GS}=0V , f=1MHz	---	6759	---	pF
C_{oss}	Output Capacitance		---	653	---	
C_{rss}	Reverse Transfer Capacitance		---	448	---	

Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	-115	A
V_{SD}	Diode Forward Voltage [2]	I_S = -20 A , V_{GS}=0V , T_J=25℃	---	---	-1.2	V
t_{rr}	Reverse Recovery Time	I_F = -20 A , dI/dt = 100A/μs, T_J=25℃	---	52	---	nS
Q_{rr}	Reverse Recovery Charge		---	128	---	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}=-40V,V_{GS}=-10V,L=0.5mH,I_{AS}=-70.7A.
4. The power dissipation is limited by 150℃ 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

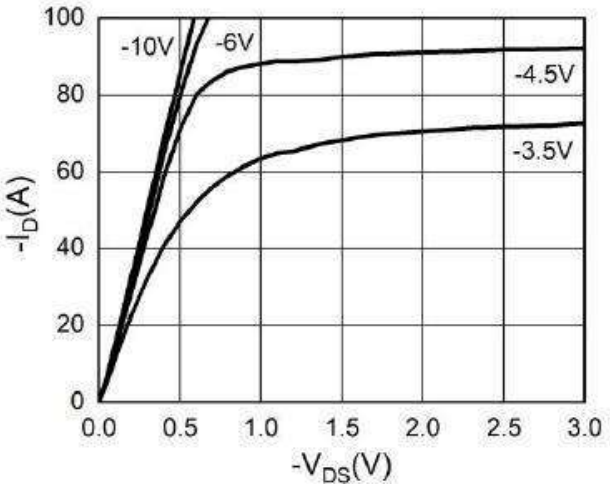


Fig.1 Typical Output Characteristics

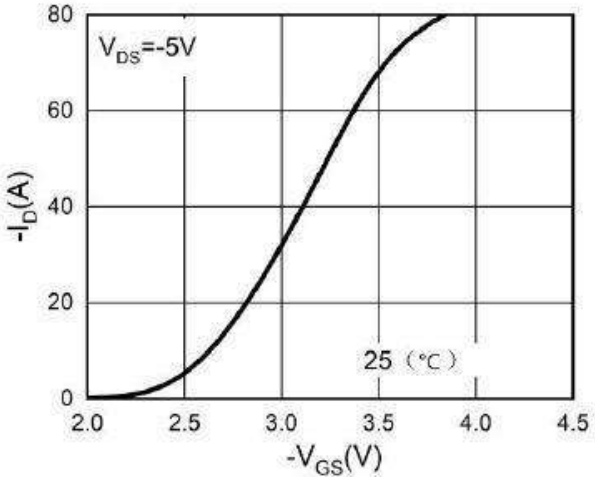


Fig.2 Transfer Characteristics

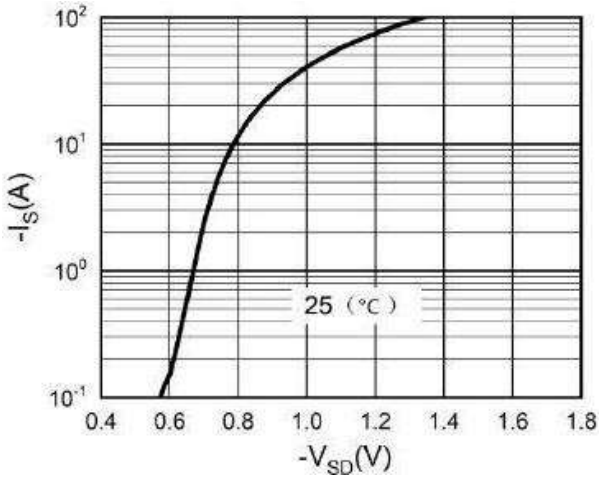


Fig.3 Forward Characteristics Of Reverse

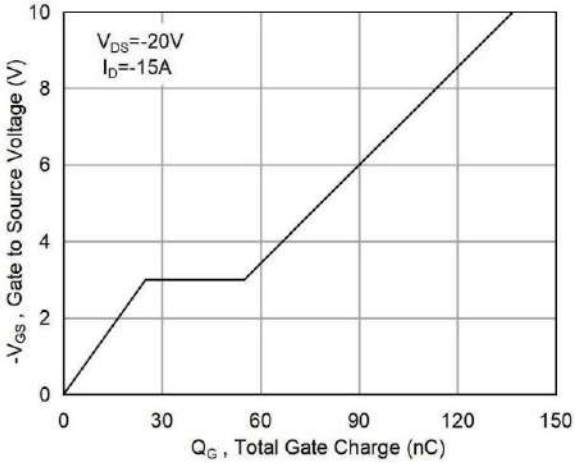


Fig.4 Gate-Charge Characteristics

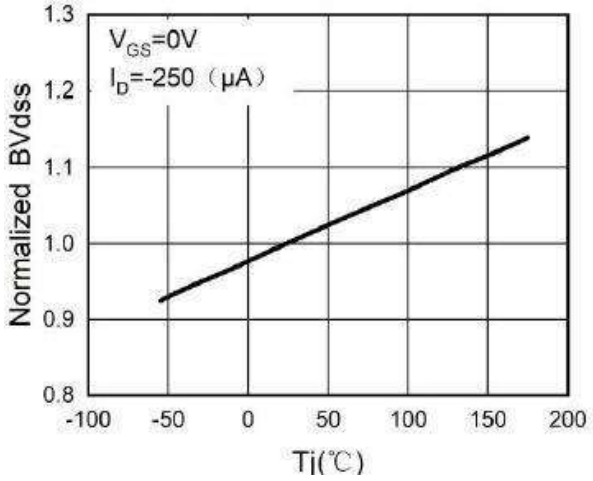


Fig.5 Normalized BV_{DSS} v.s T_J

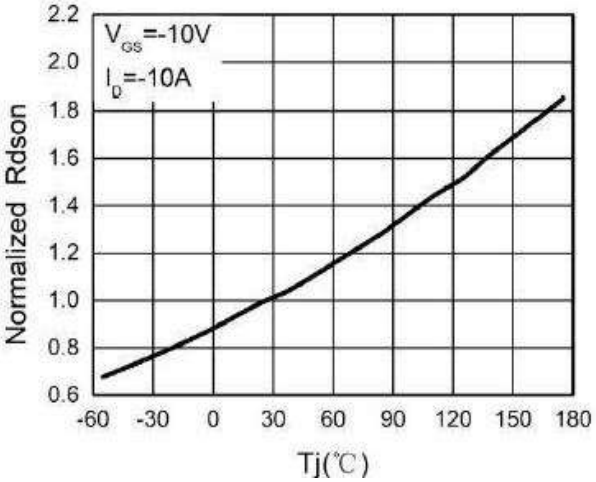


Fig.6 Normalized R_{DSON} v.s T_J

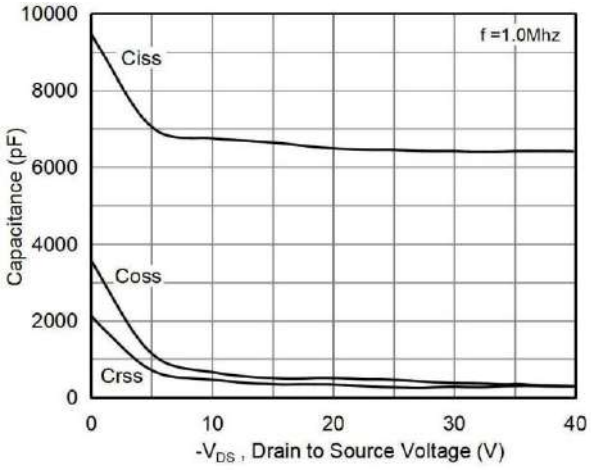


Fig.7 Capacitance

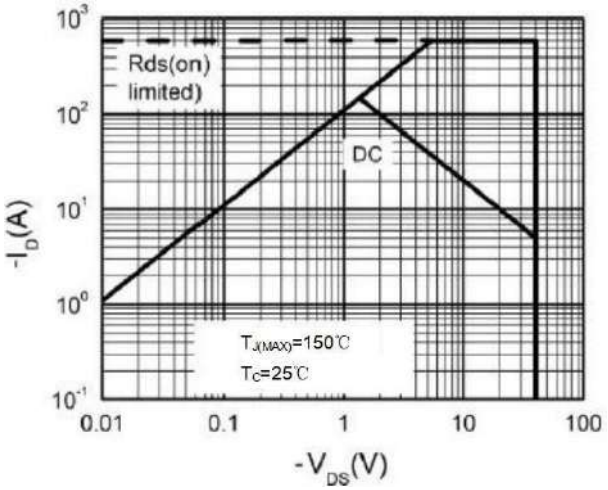


Fig.8 Safe Operating Area

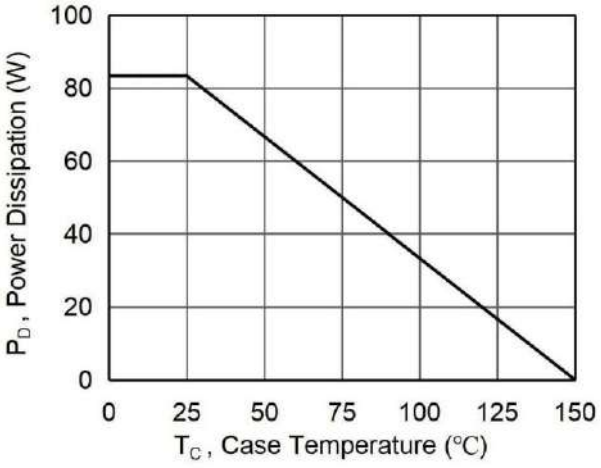


Fig.9 Power Dissipation

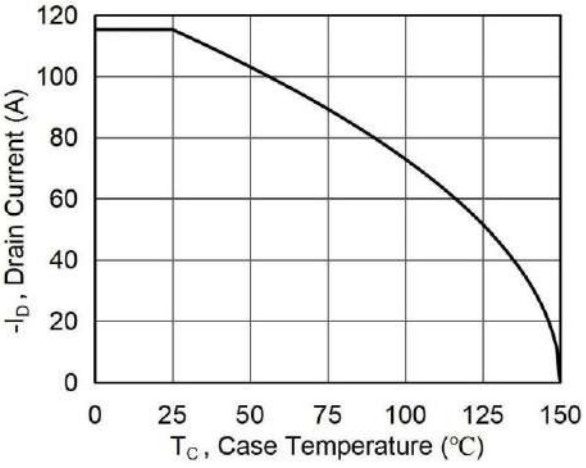


Fig.10 Drain Current

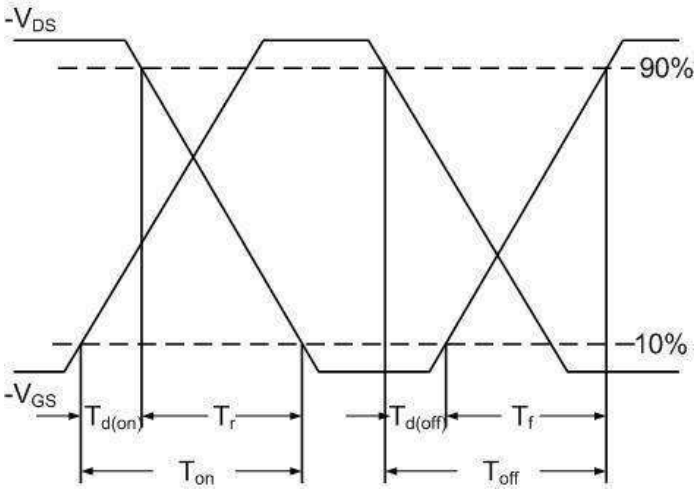


Fig.11 Switching Time Waveform

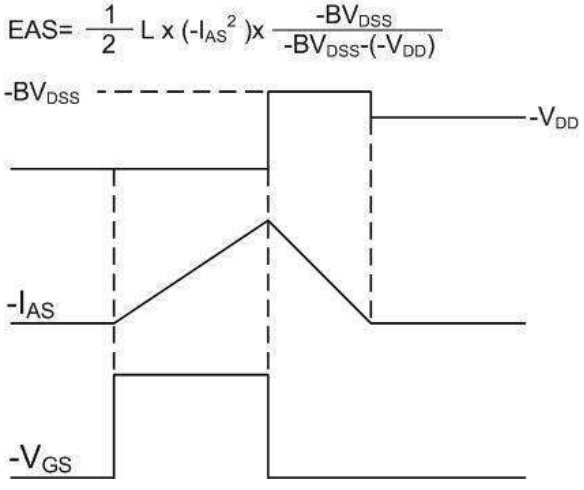


Fig.12 Unclamped Inductive Waveform