KSN3419Q

-30V P-Channel MOSFET

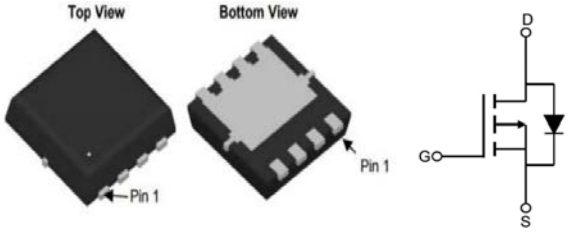
General Description

These P-Channel enhancement mode power field effect transistors are using advanced trench technology to provide excellent R_{DS}(ON), low gate charge . This device is suitable for use as a load switch or in PWM applications.

Product Summary

V_{DS} (V)	$R_{DS(on)}$ (mΩ)	I_D (A)
-30	10.5 at V_{GS} = 10 V	-38
	17 at V_{GS} = 4.5 V	-27

PDFN3x3 Pin Configuration



Features

- Improved dv/dt capability
- Green Device Available
- Suit for 1.8V Gate Drive Applications

Applications

- Load Switch
- PWM applications
- SMPS 2nd SR
- Li-Battery Protection

100% UIS TESTED!
100% ΔVds TESTED!

Absolute Maximum Ratings **Tc=25℃ unless otherwise noted**

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current – Continuous (T_C=25℃)	-38	A
	Drain Current – Continuous (T_C=100℃)	-13	A
I_{DM}	Drain Current – Pulsed[1]	-80	A
P_D	Power Dissipation (T_C=25℃)	35	W
	Power Dissipation – Derate above 25℃	0.46	W/℃
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	46	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	3.57	℃/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	-30	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.01	---	V/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-30V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=-30V , V_{GS}=0V , T_J=125℃	---	---	10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-10V , I_D=-15A	---	10.5	13.7	mΩ
		V_{GS}=-4.5V , I_D=-10A	---	17	22	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	-1	-1.56	-2	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-1.5	---	mV/℃
gfs	Forward Transconductance	V_{DS}=-5V , I_S=-12A	---	20	---	S

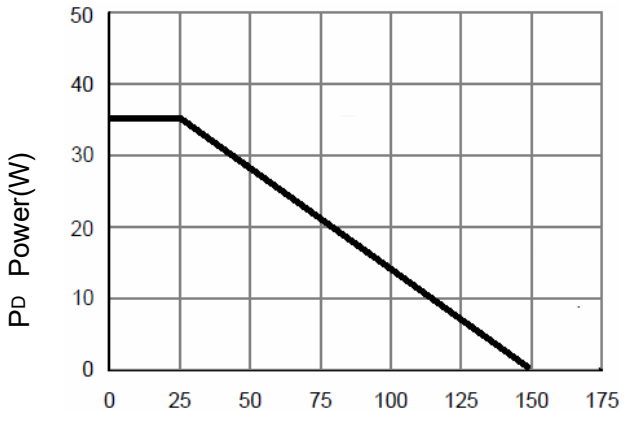
Dynamic and switching Characteristics

Q_g	Total Gate Charge[2,3]	V_{DS}=-15V , V_{GS}=-10V , I_D=-10A	---	29.8	45	nC
Q_{gs}	Gate-Source Charge[2,3]		---	2.5	6	
Q_{gd}	Gate-Drain Charge[2,3]		---	9	14	
$T_{d(on)}$	Turn-On Delay Time[2,3]	V_{DS}=-15V , V_{GS}=-10V , R_G=1.2 Ω I_D=-10A	---	11.5	20	ns
T_r	Rise Time[2,3]		---	9	13	
$T_{d(off)}$	Turn-Off Delay Time[2,3]		---	16	27	
T_f	Fall Time[2,3]		---	11	16	
C_{iss}	Input Capacitance	V_{DS}=-25V , V_{GS}=0V , F=1MHz	---	1920	2790	pF
C_{oss}	Output Capacitance		---	280	410	
C_{rss}	Reverse Transfer Capacitance		---	180	270	

Drain-Source Diode Characteristics and Maximum Ratings

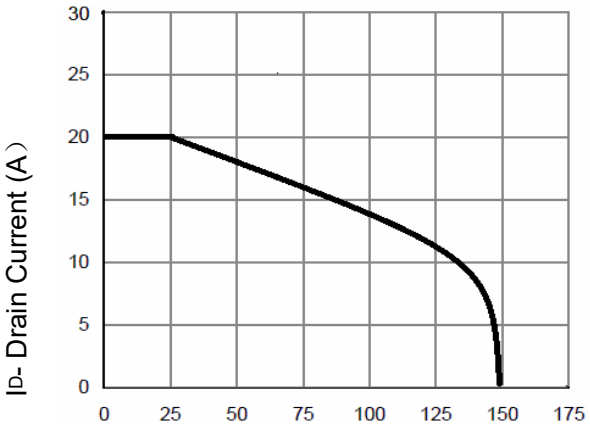
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	-35	A
I_{SM}	Pulsed Source Current		---	---	-56	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1.2	V

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
3. Essentially independent of operating temperature.



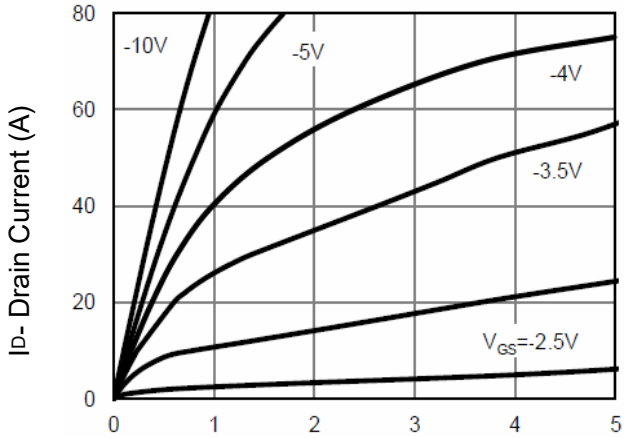
T_C , Case Temperature (℃)

Fig.1 Continuous Drain Current vs. T_C



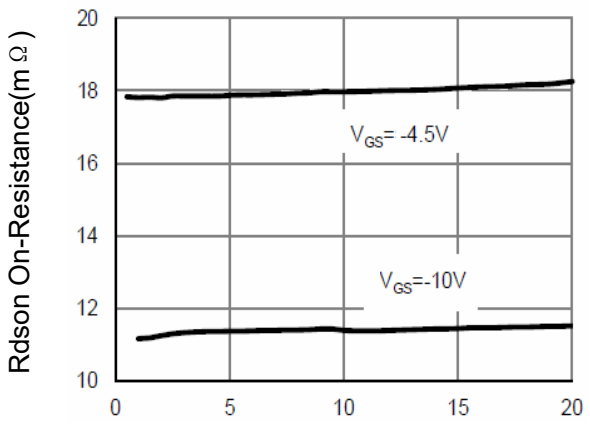
T_J , Junction Temperature (℃)

Fig.2 Normalized RDSON vs. T_J



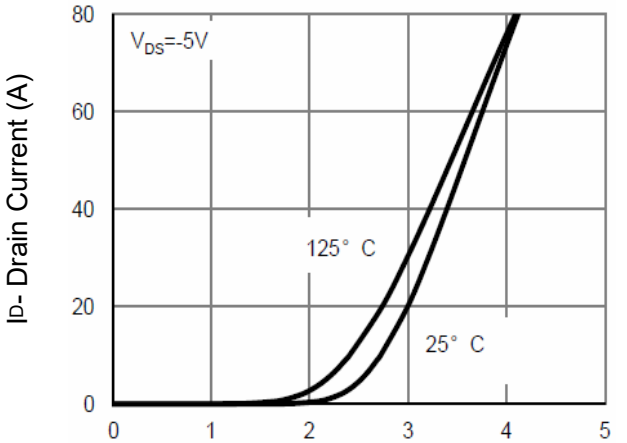
Vds Drain-Source Voltage (V)

Fig.3 Normalized V_{th} vs. T_J



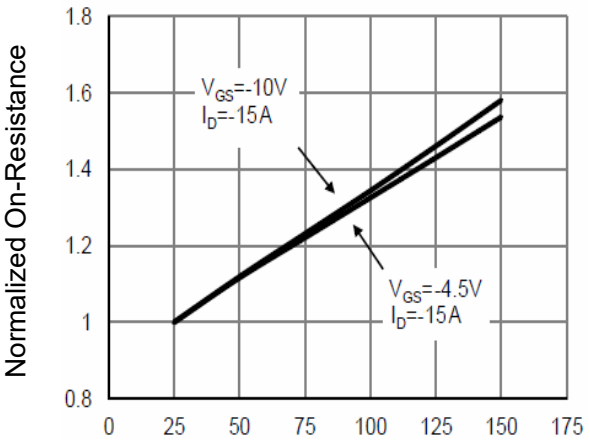
I_D- Drain Current (A)

Fig.4 Gate Charge Waveform



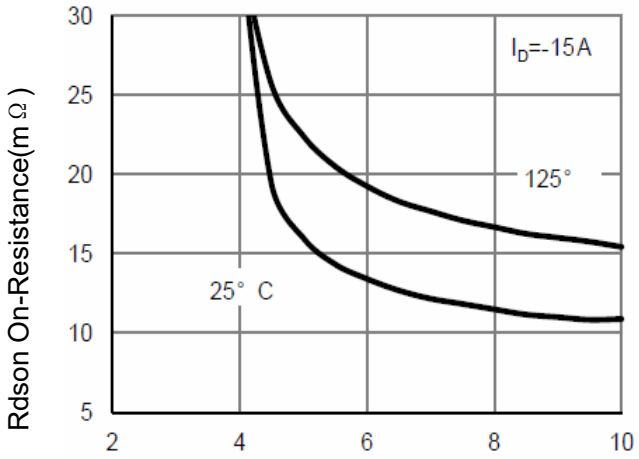
Vgs Gate-Source Voltage (V)

Fig.5 Normalized Transient Response



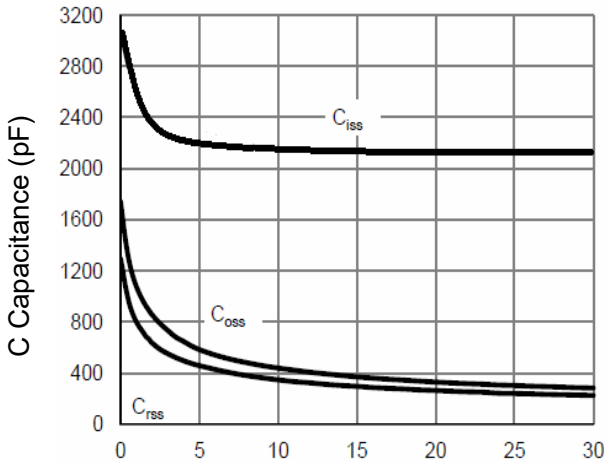
TJ-Junction Temperature(℃)

Fig.6 Maximum Safe Operation Area



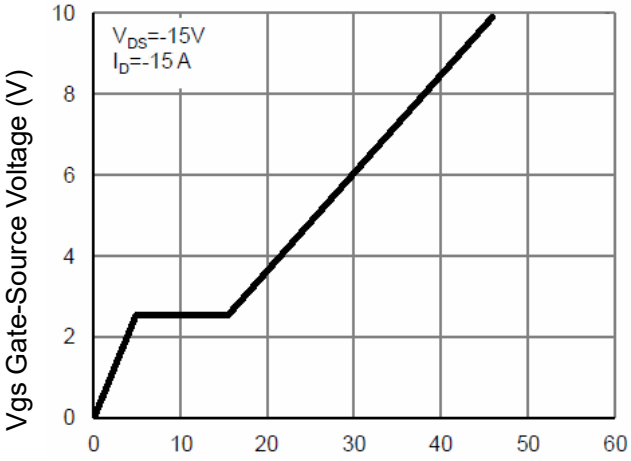
Vgs Gate-Source Voltage (V)

Fig.7 Switching Time Waveform



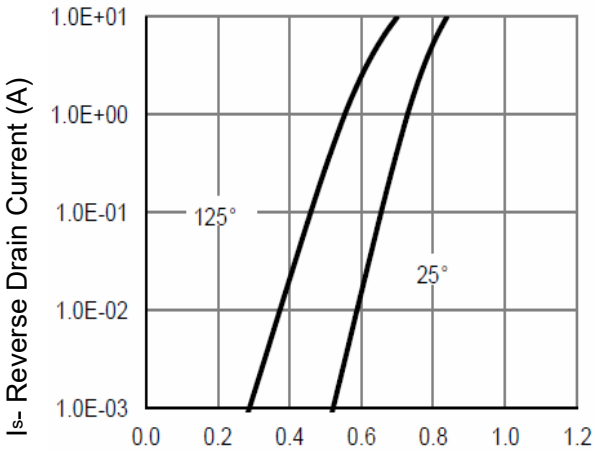
Vds Drain-Source Voltage (V)

Fig.8 EAS Waveform



Qg Gate Charge (nC)

Figure 9 Gate Charge



Vsd Source-Drain Voltage (V)

Figure 10 Source- Drain Diode Forward

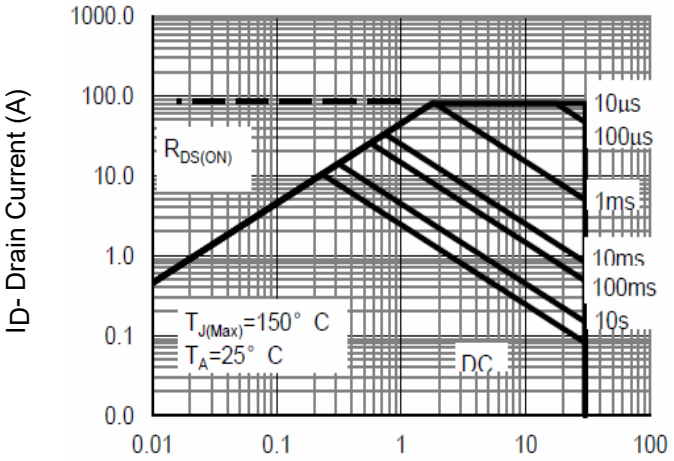


Fig.10 Switching Time Waveform

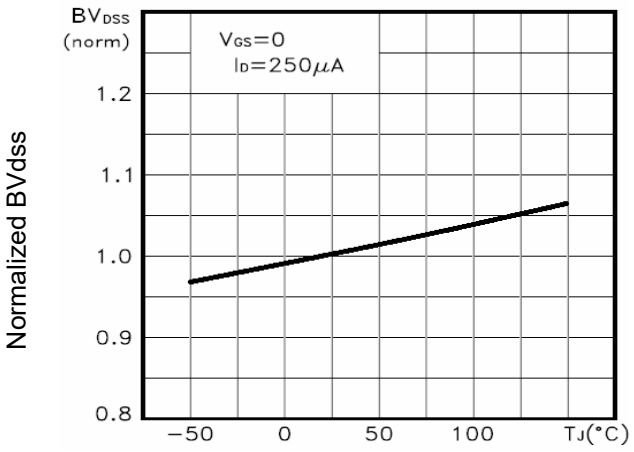


Figure 11 BVDSS vs Junction Temperature

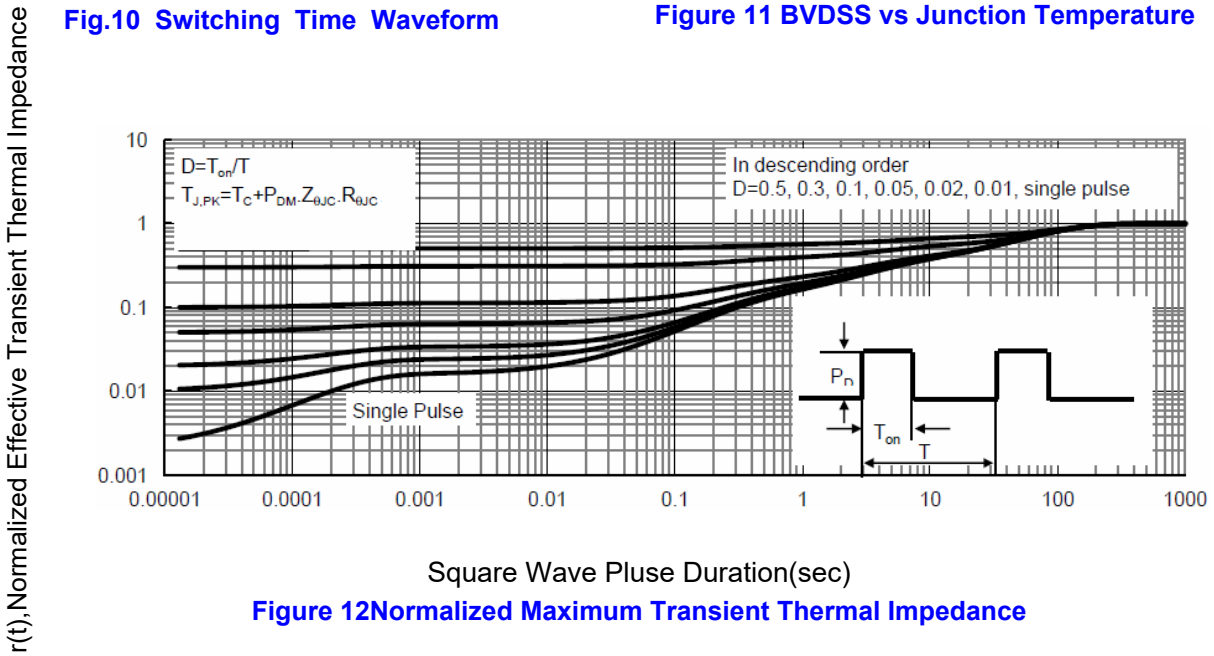


Figure 12Normalized Maximum Transient Thermal Impedance

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