KSN20P30Q

-20V P-Channel MOSFET

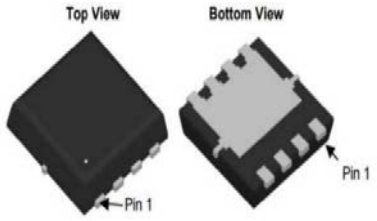
General Description

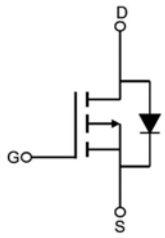
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

Product Summary

V_{DS} (V)	$R_{DS(on)}$ (mΩ)	I_D (A)
-20	6.6 at V_{GS} =-4.5V	-50
	8 at V_{GS} = -2.5V	-45

PDFN3X3 Pin Configuration





Features

- -20V, - 50A, R_{DS}(ON) =6.6mΩ@V_{GS} =-4.5V
- Improved dv/dt capability
- Fast switching
- Green Device Available

Applications

- Notebook
- Load Switch
- Networking
- Hand-Held Instruments

Absolute Maximum Ratings Tc=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D	Drain Current – Continuous (T_C=25℃)	-50	A
	Drain Current – Continuous (T_C=100℃)	-33	A
I_{DM}	Drain Current – Pulsed[1]	-140	A
P_D	Power Dissipation (T_C=25℃)	32	W
	Power Dissipation – Derate above 25℃	0.33	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	---	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	3	℃/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	-18	-20	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=-1mA	---	-0.008	---	V/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-20V , V_{GS}=0V , T_J=25℃	---	---	-1	uA
		V_{DS}=-20V , V_{GS}=0V , T_J=125℃	---	---	-30	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±12V , V_{DS}=0V	---	---	±400	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-4.5V , I_D=-15A	---	6.6	8.5	mΩ
		V_{GS}=-2.5V , I_D=-15A	---	8	12	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-0.4	-0.65	-1.0	V
$\triangle V_{GS}$	$V_{GS(th)}$ Temperature Coefficient		---	-3.44	---	mV/℃
gfs	Forward Transconductance	V_{DS}=-10V , I_S=-3A	---	20	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[2,3]	V_{DS}=-10V , V_{GS}=-4.5V , I_D=-15A	---	56	---	nC
Q_{gs}	Gate-Source Charge[2,3]		---	8	---	
Q_{gd}	Gate-Drain Charge[2,3]		---	15	---	
$T_{d(on)}$	Turn-On Delay Time[2,3]	V_{DD}=-10V , V_{GS}=-4.5V , R_G=2.7 Ω I_D=-15A	---	11	---	nS
T_r	Rise Time[2,3]		---	110	---	
$T_{d(off)}$	Turn-Off Delay Time[2,3]		---	155	---	
T_f	Fall Time[2,3]		---	160	---	
C_{iss}	Input Capacitance	V_{DS}=-10V , V_{GS}=0V , F=1MHz	---	4600	---	pF
C_{oss}	Output Capacitance		---	470	---	
C_{rss}	Reverse Transfer Capacitance		---	430	---	
Rg	Gate resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz	---	2.6	---	Ω

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	---	---	-36	A
I_{SM}	Pulsed Source Current		---	---	-75	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1	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.

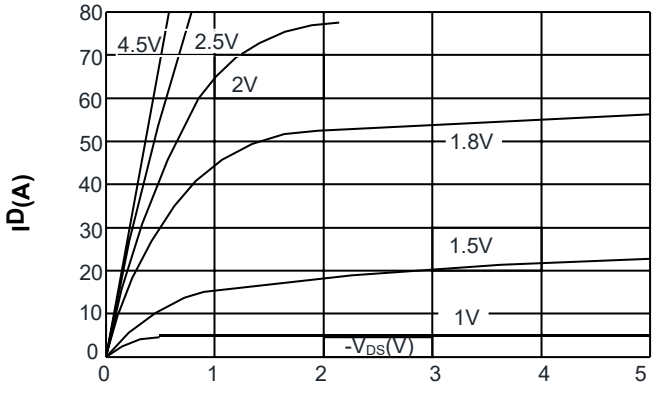


Fig1:Output Characteristics

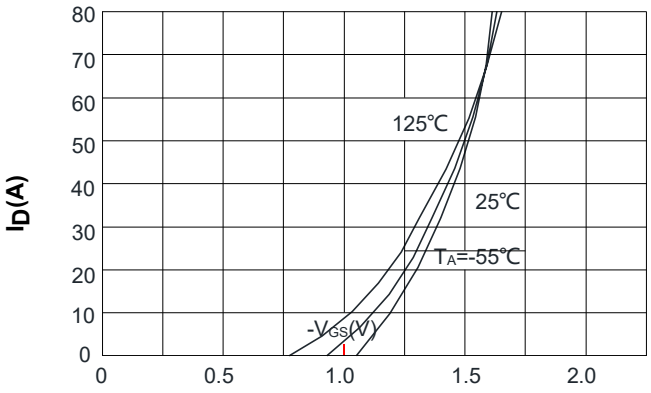


Fig2:Transfer Characteristics

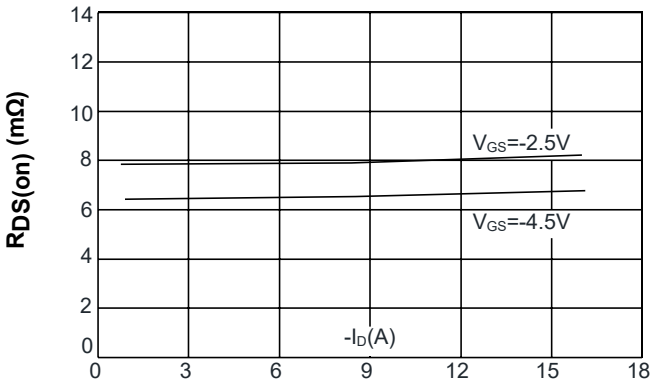


Fig3:Rdson- Drain Current

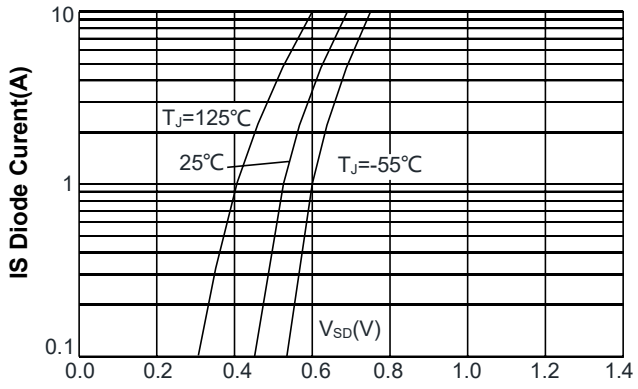


Fig4:Source- Drain Diode Forwrd

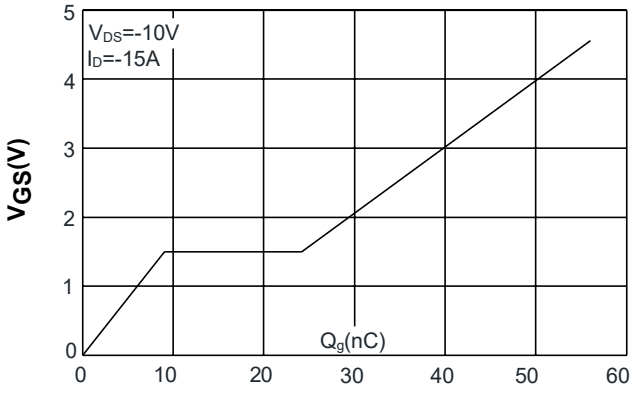


Fig5:Gate Charge

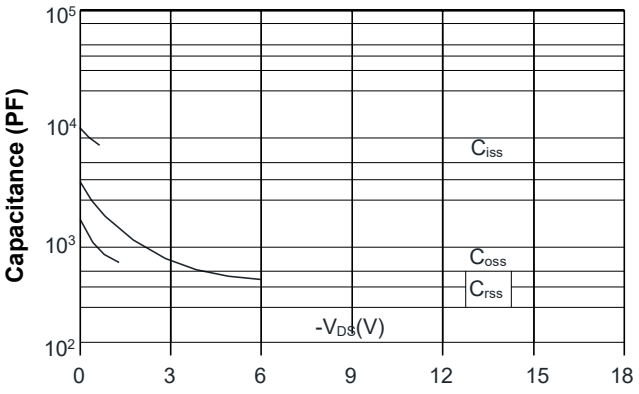


Fig6:Capacitance vs Vds

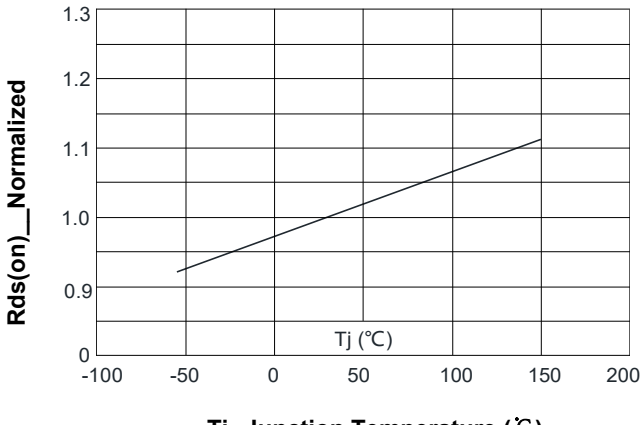


Fig7:Rds(on) vs. Temperature

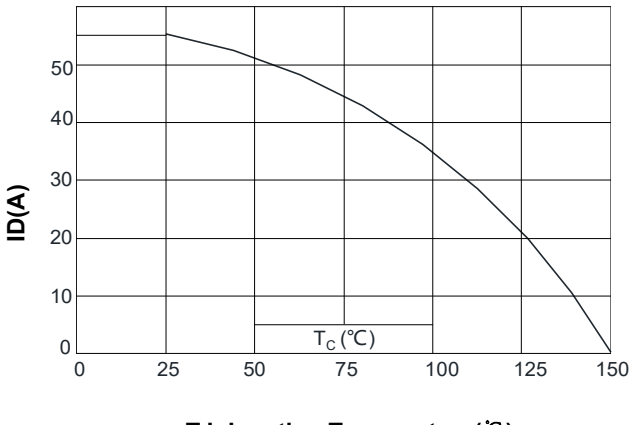


Fig8：ID Current- Junction Temperature

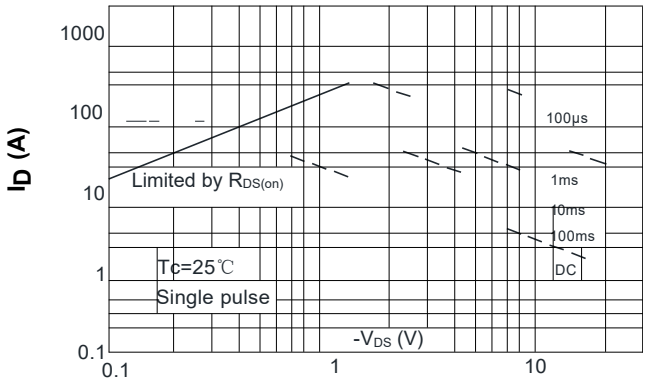


Fig9:Safe Operating Area

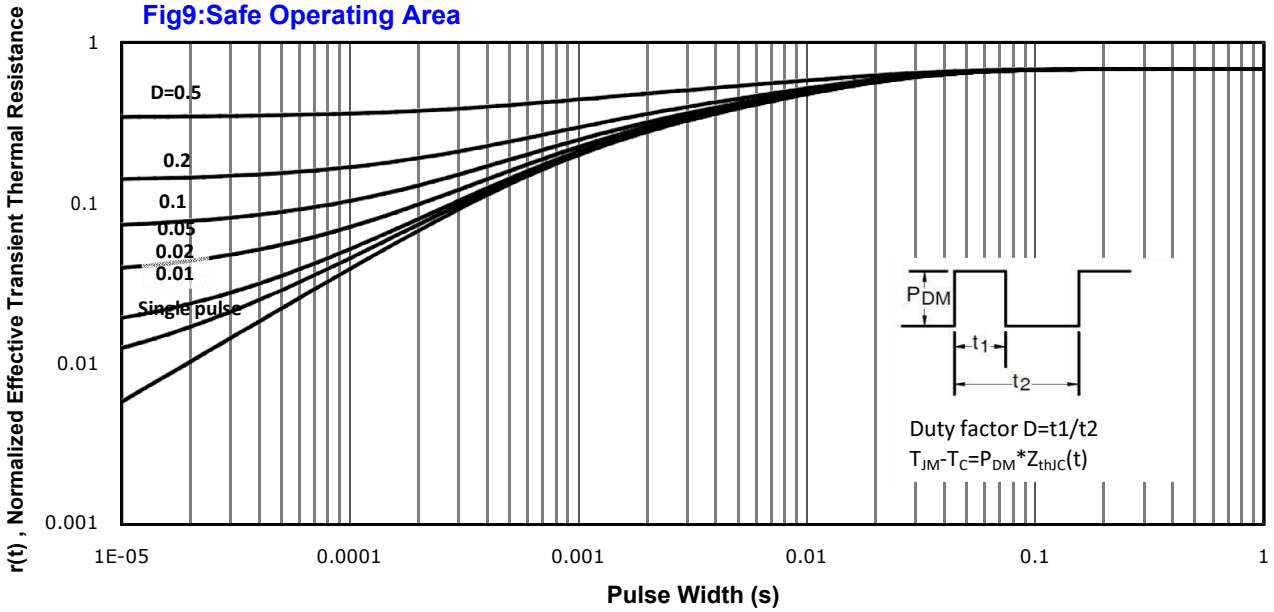


Fig10: Normalized Maximum Transient Thermal Impedance

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