KSN20P02Q

-20V 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.

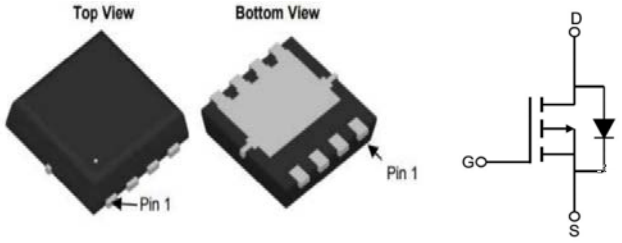
Product Summary

V_{DS} (V)	$R_{DS(on)}$ (mΩ)	I_D (A)
-20	15 at V_{GS} = 4.5V	-20
	21 at V_{GS} = 2.5V	-18

Features

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

PDFN3x3 Pin Configuration



Applications

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

100% UIS TESTED!
100% ΔVds TESTED!

Absolute Maximum Ratings T_C=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℃)	-20	A
	Drain Current – Continuous (T_C=100℃)	-12	A
I_{DM}	Drain Current – Pulsed[1]	-28	A
P_D	Power Dissipation (T_C=25℃)	5	W
	Power Dissipation – Derate above 25℃	0.40	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	---	62.5	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	3.72	℃/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	-20	---	---	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}=-20V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=-20V , V_{GS}=0V , T_J=125℃	---	---	10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±12V , V_{DS}=0V	---	---	±100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-4.5V , I_D=-7A	---	15	20	mΩ
		V_{GS}=-2.5V , I_D=-5A	---	21	32	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	-0.4	-0.7	-1	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-1.5	---	mV/℃
gfs	Forward Transconductance	V_{DS}=-5V , I_S=-10A	---	18	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[2,3]	V_{DS}=-10V , V_{GS}=-4.5V , I_D=--3A	---	15.3		nC
Q_{gs}	Gate-Source Charge[2,3]		---	2.2		
Q_{gd}	Gate-Drain Charge[2,3]		---	4.4		
$T_{d(on)}$	Turn-On Delay Time[2,3]	V_{DS}=-10V , V_{GS}=-4.5V , R_G=2.5 Ω I_D=-7A	---	10		ns
T_r	Rise Time[2,3]		---	31		
$T_{d(off)}$	Turn-Off Delay Time[2,3]		---	28		
T_f	Fall Time[2,3]		---	8		
C_{iss}	Input Capacitance	V_{DS}=-10V , V_{GS}=0V , F=1MHz	---	2000		pF
C_{oss}	Output Capacitance		---	242		
C_{rss}	Reverse Transfer Capacitance		---	231		

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	---	---	-20	A
I_{SM}	Pulsed Source Current		---	---	-28	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=-7A , T_J=25℃	---	-0.8	-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.

Typical Electrical and Thermal Characteristics (Curves)

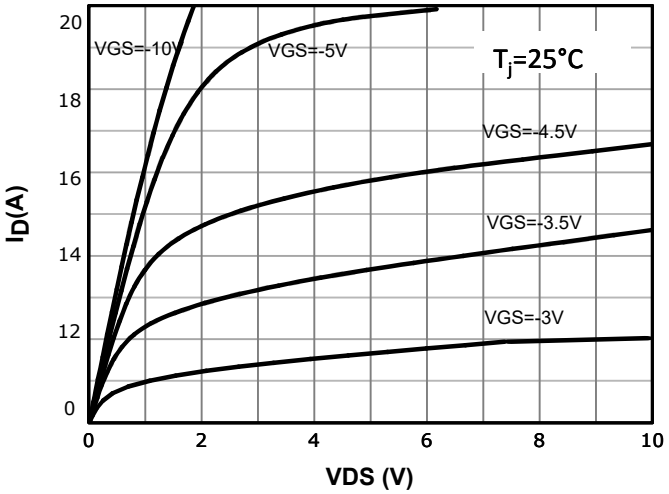


Fig1:Output Characteristics

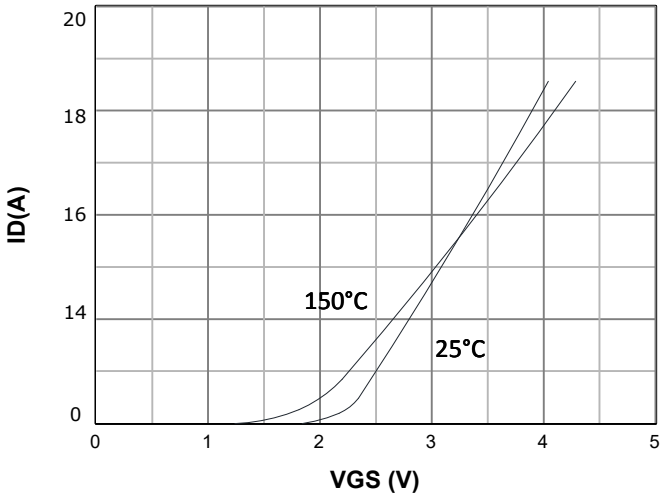


Fig2:Transfer Characteristics

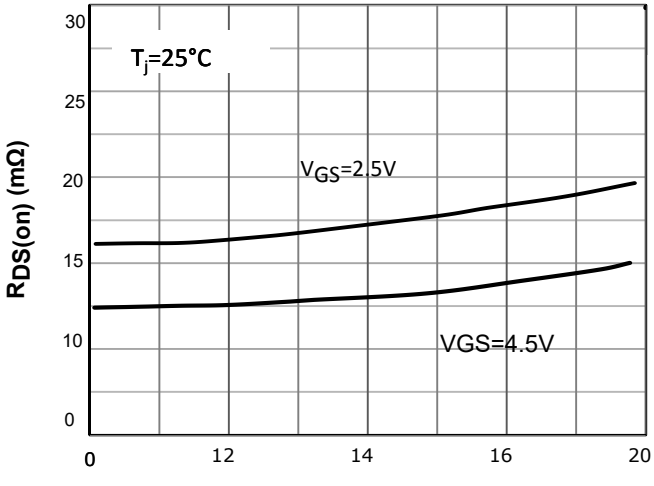


Fig3:Rdson- Drain Current

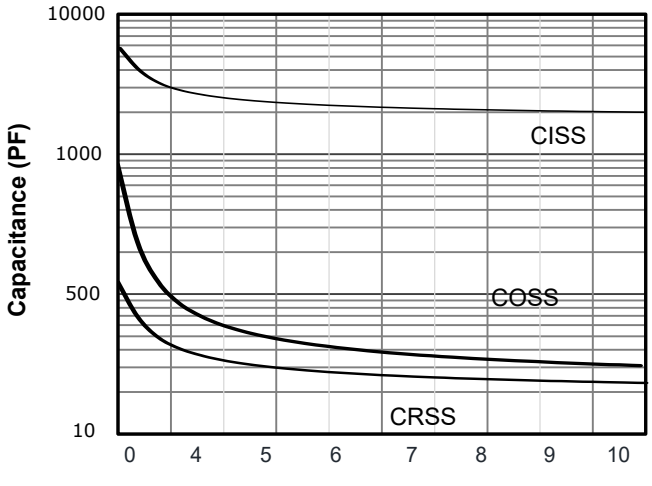


Fig4:Capacitance vs Vds

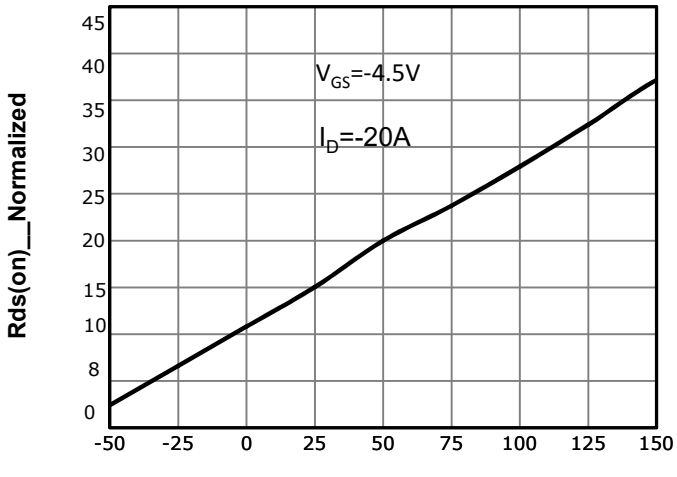


Fig5:Rds(on) vs. Temperature

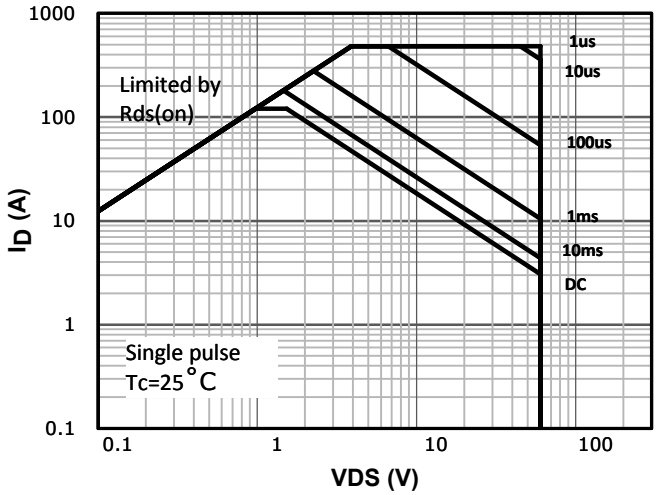


Fig6:Safe Operating Area

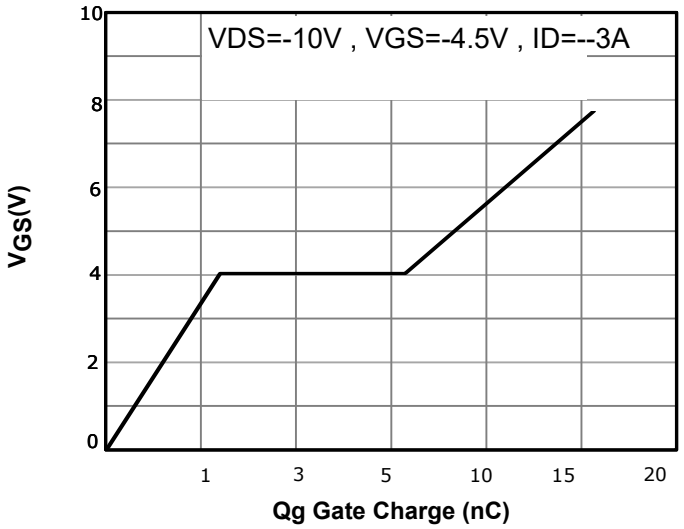


Fig7:Gate Charge

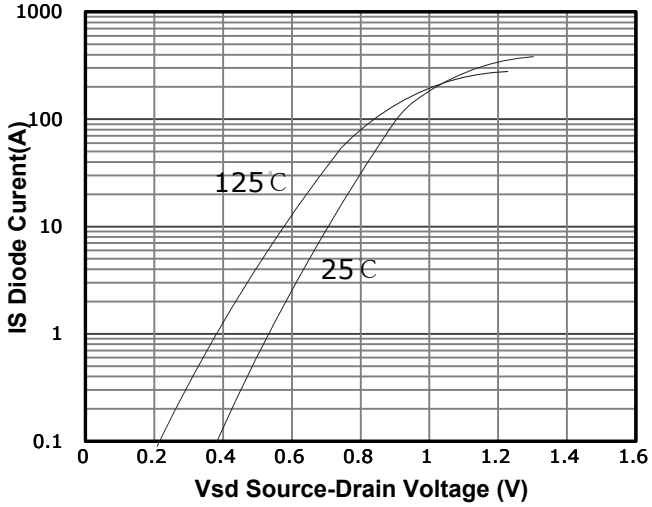


Fig8:Source- Drain Diode Forwrd

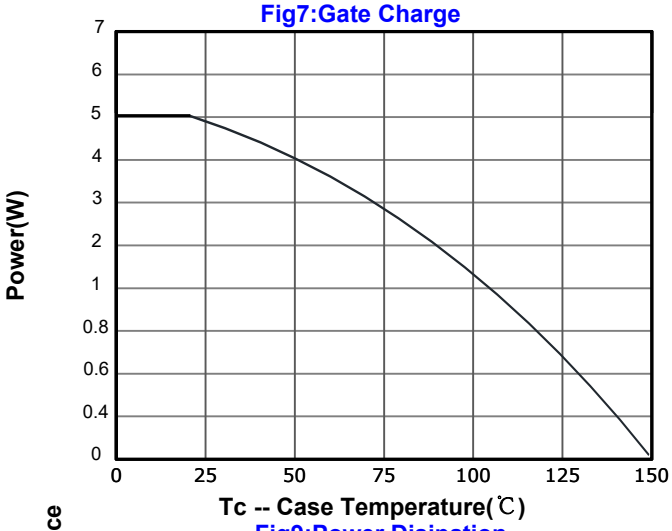


Fig9:Power Disipation

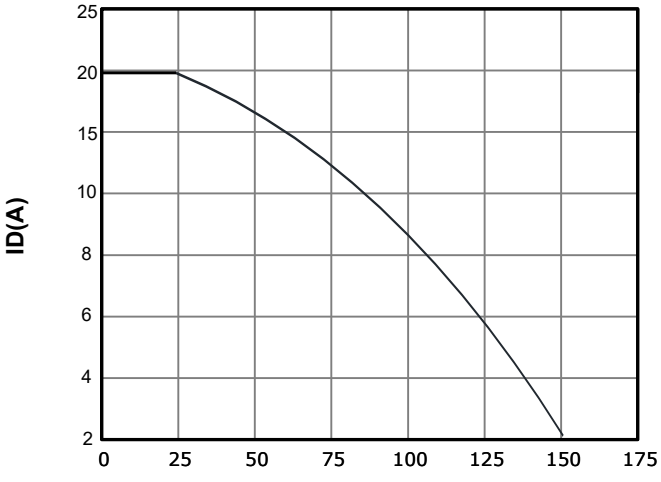


Fig10：IDCurrent- Junction Temperature

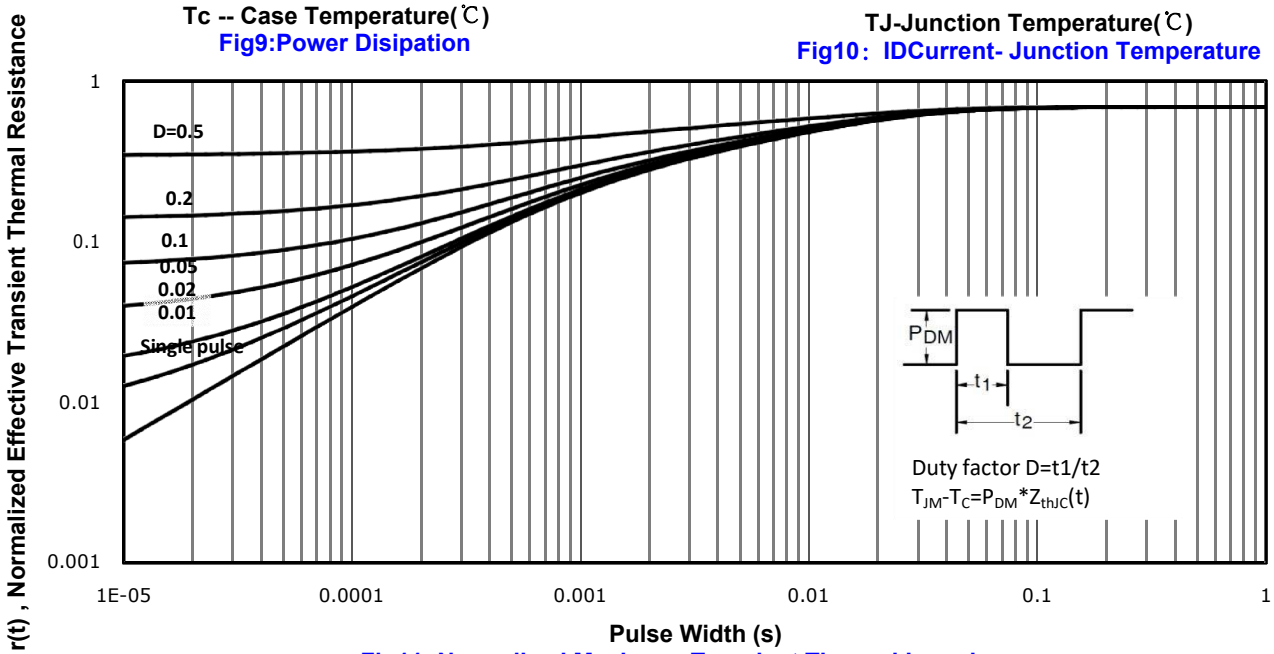


Fig11: Normalized Maximum Transient Thermal Impedance

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