KSN50P03Q

-30V P-Channel MOSFET

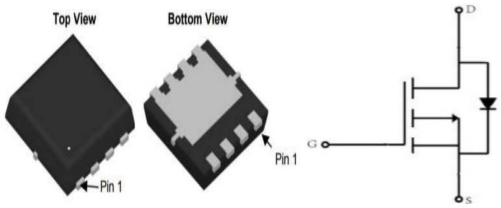
General Description

The KSN50P03Q series are from Advanced Power innovated design and silicon process technology to achieve the lowest possible onresistance and fast switching performance. It provides the designer with an extreme efficient device for use in a wide range of power applications.

Product Summary

V_{DS} (V)	$R_{DS(on)}$ (mΩ)	I_D (A)
-30	9 at V_{GS} = 10 V	-40
	17 at V_{GS} = 4.5 V	-20

PDFN3x3 Pin Configuration



Features

- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation

Applications

- High side switch for full bridge converter
- DC/DC converter for LCD display

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℃)	-40	A
	Drain Current – Continuous (T_C=100℃)	-20	A
I_{DM}	Drain Current – Pulsed[1]	-70	A
P_D	Power Dissipation (T_C=25℃)	41	W
	Power Dissipation (T_C=100℃)	1	W/℃
T_{STG}	Storage Temperature Range	-50 to 150	℃
T_J	Operating Junction Temperature Range	-50 to 150	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	61	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	1.5	℃/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
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-25V , V_{GS}=0V , T_J=25℃	---	---	-1	uA
		V_{DS}=-25V , 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	---	9	11	mΩ
		V_{GS}=-4.5V , I_D=-10A	---	17	20	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.0	1.8	3	V
gfs	Forward Transconductance	V_{DS}=-5V , I_S=-10A	---	25	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge	V_{DS}=-15V , V_{GS}=-10V , I_D=-15A	---	32	---	nC
Q_{gs}	Gate-Source Charge		---	4.2	---	
Q_{gd}	Gate-Drain Charge		---	10	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DS}=-30V, R_L=3Ω V_{GS}=-10V,R_G=2.5Ω	---	9	---	ns
T_r	Rise Time		---	10	---	
$T_{d(off)}$	Turn-Off Delay Time		---	50	---	
T_f	Fall Time		---	20	---	
C_{iss}	Input Capacitance	V_{DS}=-15V , V_{GS}=0V , F=1MHz	---	1350	---	pF
C_{oss}	Output Capacitance		---	250	---	
C_{rss}	Reverse Transfer Capacitance		---	210	---	

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	---	---	-30	A
I_{SM}	Pulsed Source Current		---	---	-55	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1.0	V

Note :

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. E_{AS} condition: Tj=25℃,V_{DD}=-15V,V_G=-10V,L=0.5mH,Rg=25Ω,I_{AS}=-26A

Typical Electrical and Thermal Characteristics (Curves)

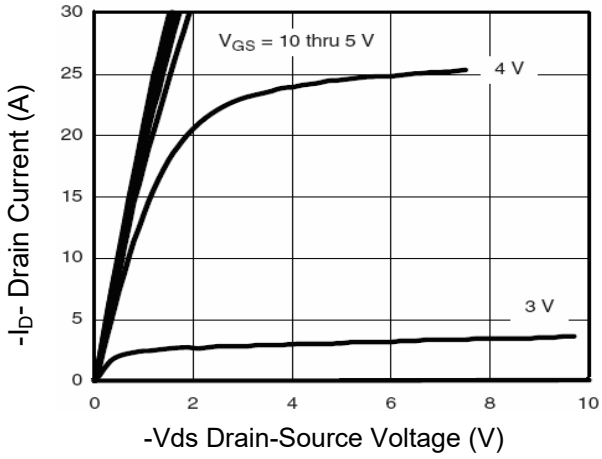


Fig.1 Output Characteristics

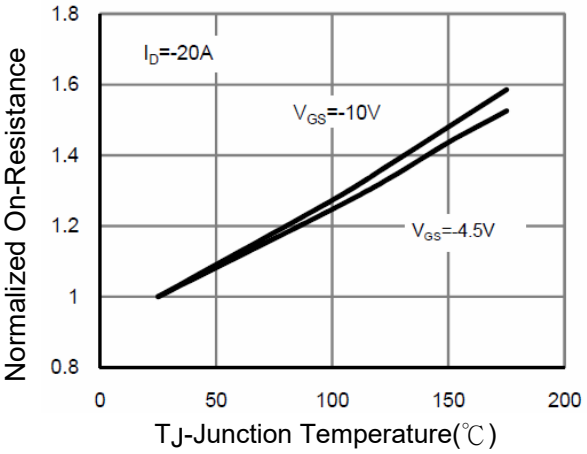


Fig. 4 Rdson-JunctionTemperature

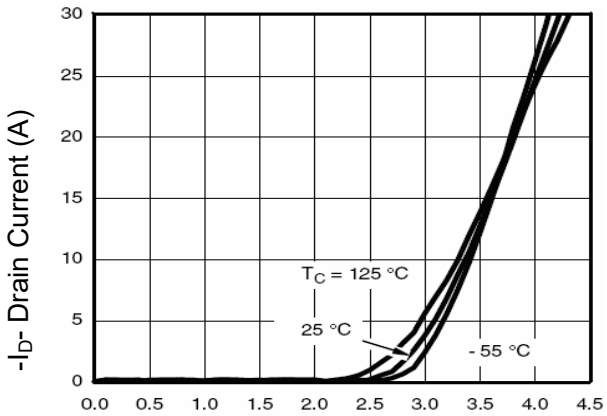


Fig. 2 Transfer Characteristics

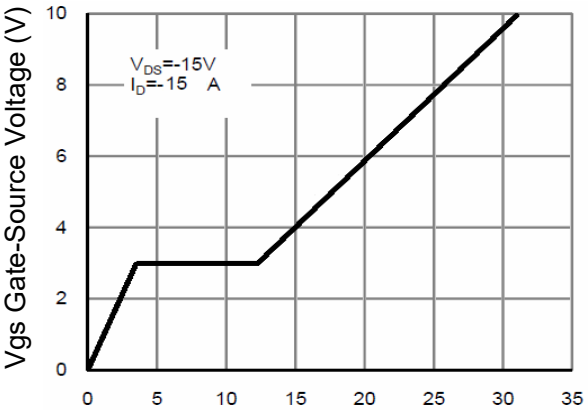


Fig. 5 Gate Charge

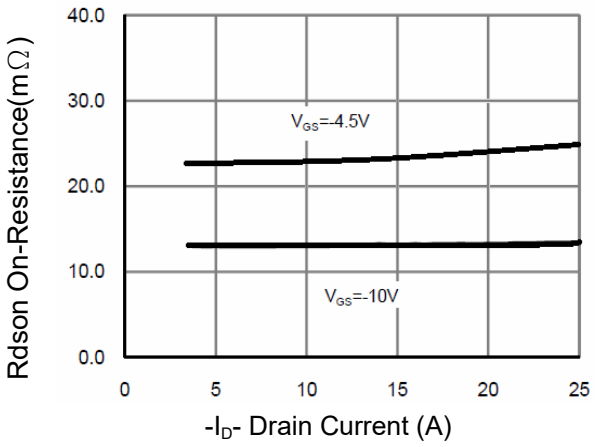


Fig. 3 Rdson- Drain Current

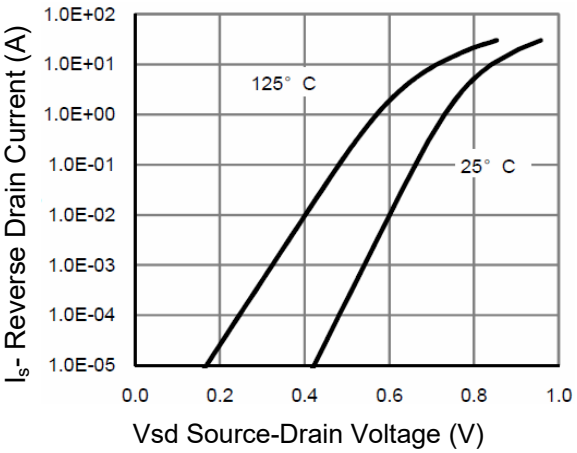
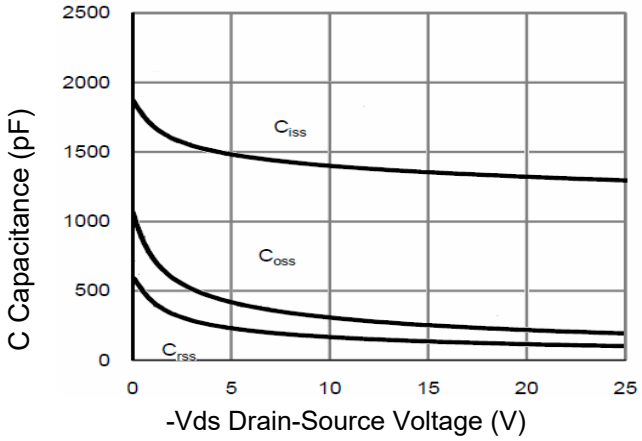


Fig. 6 Source- Drain Diode Forward



Figu.7 Capacitance vs Vds

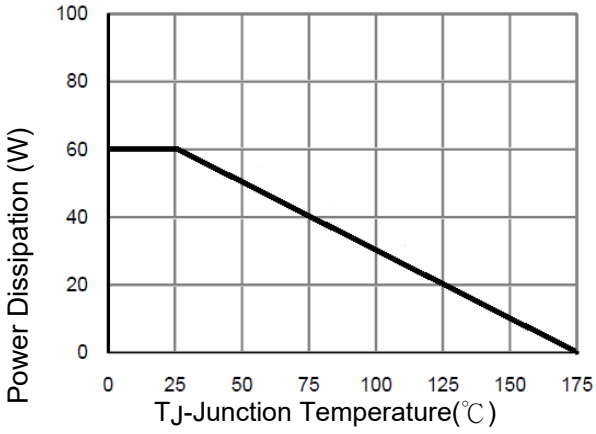


Fig. 8 Power De-rating

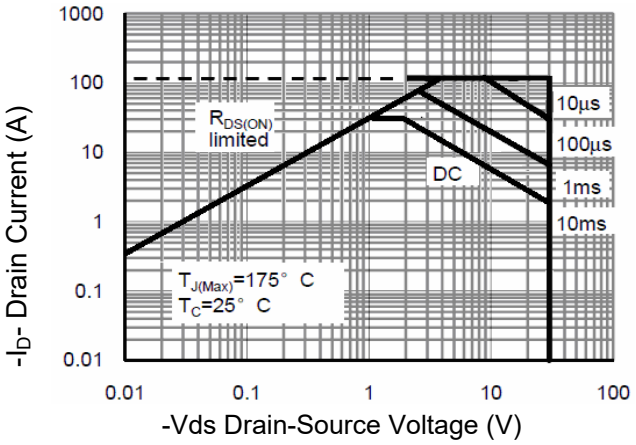


Fig.9 Safe Operation Area

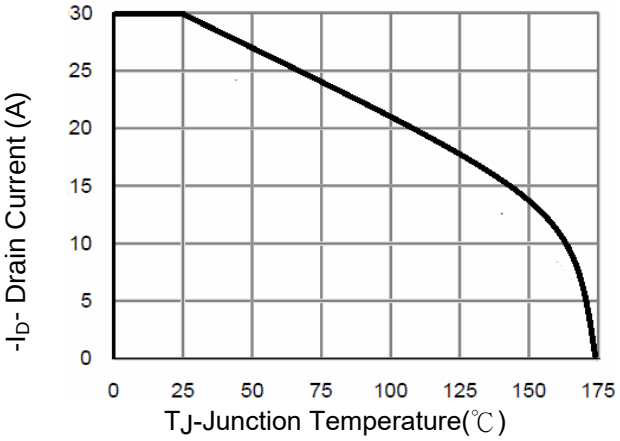


Fig. 10 ID Current Derating

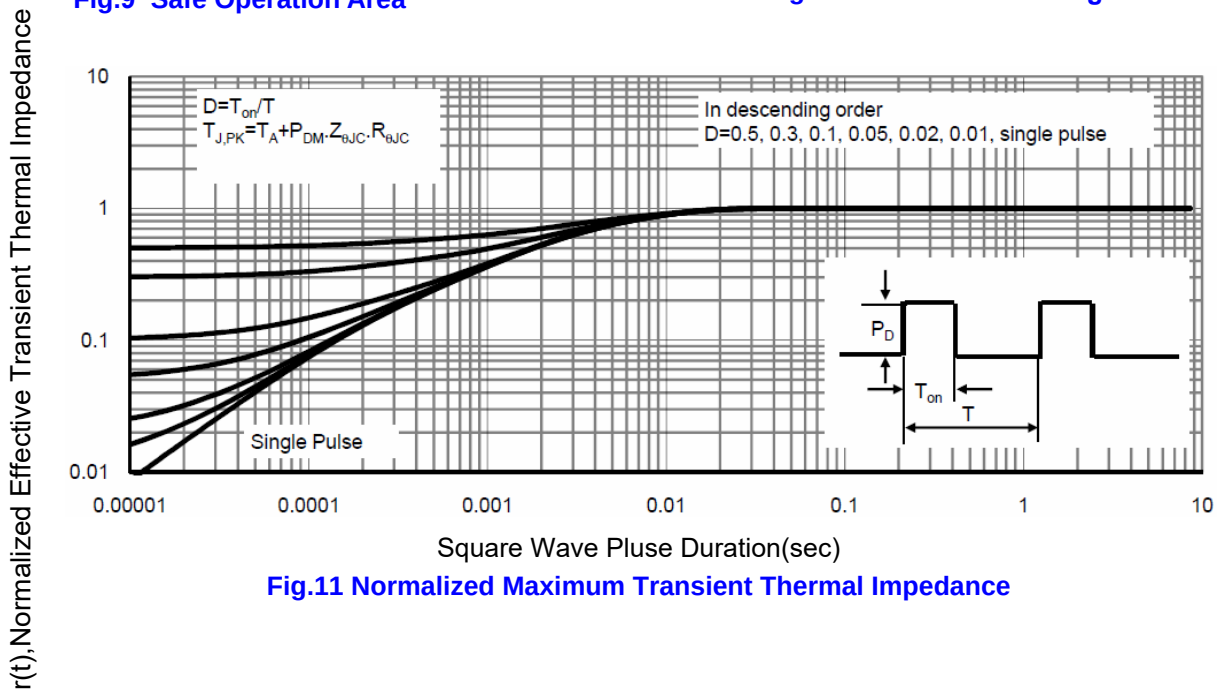


Fig.11 Normalized Maximum Transient Thermal Impedance

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