KSN50N03X

30V N-Channel MOSFET

General Description

The KSN50N03X 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	6.8 at V_{GS} = 10 V	50
	10.5 at V_{GS} = 4.5 V	42

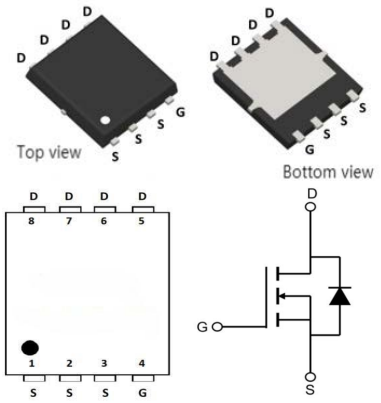
Features

- 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
- Special process technology for high ESD capability

Applications

- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible Power Supply

PDFN5*6 Pin Configuration



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℃)	50	A
	Drain Current – Continuous (T_C=100℃)	36	A
I_{DM}	Drain Current – Pulsed[1]	140	A
P_D	Power Dissipation (T_C=25℃)	60	W
	Power Dissipation (T_C=100℃)	0.8	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	---	61	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	3.5	℃/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	---	6.8	9.4	mΩ
		V_{GS}=4.5V , I_D=10A	---	10.5	14	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.0	1.5	3	V
gfs	Forward Transconductance	V_{DS}=10V , I_S=5A	---	20	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[2,3]	V_{DS}=15V , V_{GS}=10V , I_D=10A	---	32	---	nC
Q_{gs}	Gate-Source Charge[2,3]		---	5	---	
Q_{gd}	Gate-Drain Charge[2,3]		---	7	---	
$T_{d(on)}$	Turn-On Delay Time[2,3]	V_{DS}=15V, I_D=10A V_{GS}=10V,R_G=1.8Ω	---	10	---	ns
T_r	Rise Time[2,3]		---	8	---	
$T_{d(off)}$	Turn-Off Delay Time[2,3]		---	25	---	
T_f	Fall Time[2,3]		---	5	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , F=1MHz	---	1460	---	pF
C_{oss}	Output Capacitance		---	176	---	
C_{rss}	Reverse Transfer Capacitance		---	85	---	

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	---	---	50	A
I_{SM}	Pulsed Source Current		---	---	90	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	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. EAS condition：Tj=25℃, V_{DD}=15V,V_G=10V,L=0.5mH, Rg=25Ω

Typical Electrical and Thermal Characteristics (Curves)

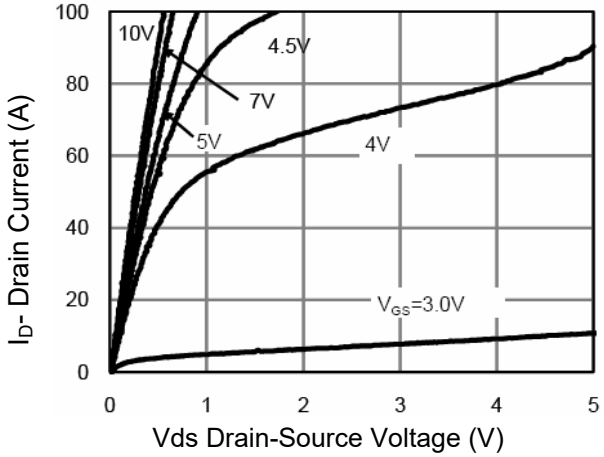


Fig.1 Output Characteristics

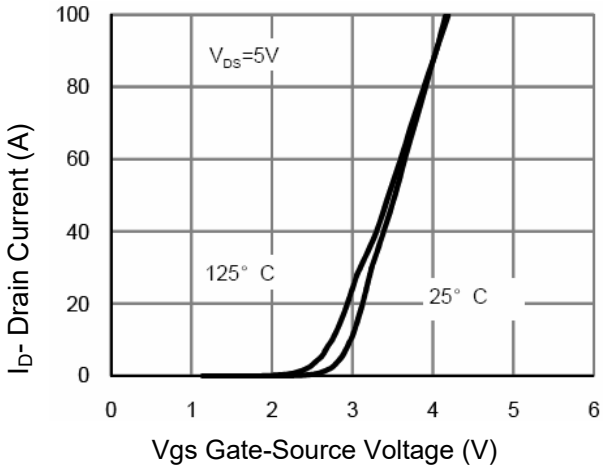


Fig. 2 Transfer Characteristics

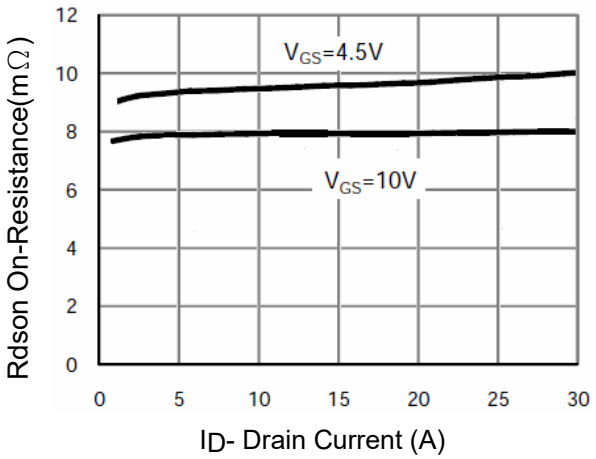


Fig. 3 Rdson- Drain Current

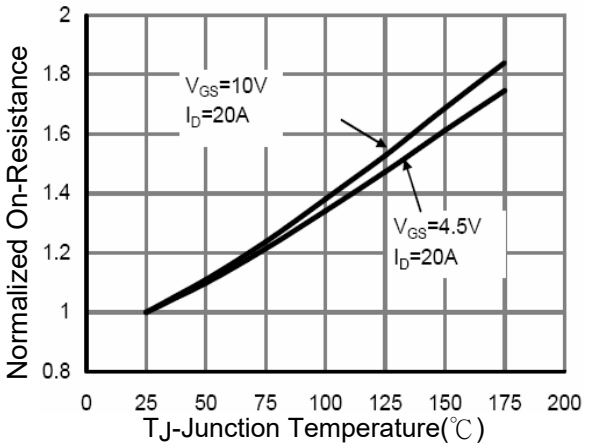


Fig. 4 Rdson-JunctionTemperature

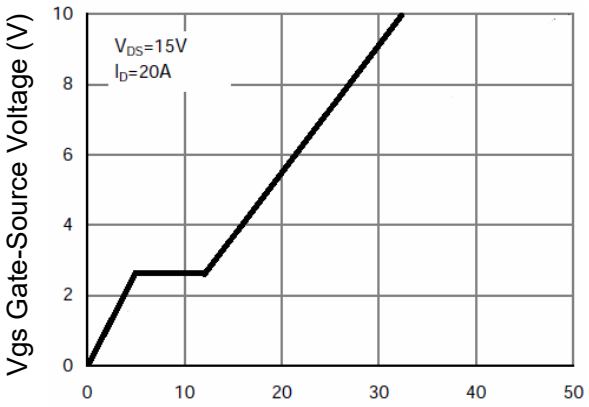


Fig. 5 Gate Charge

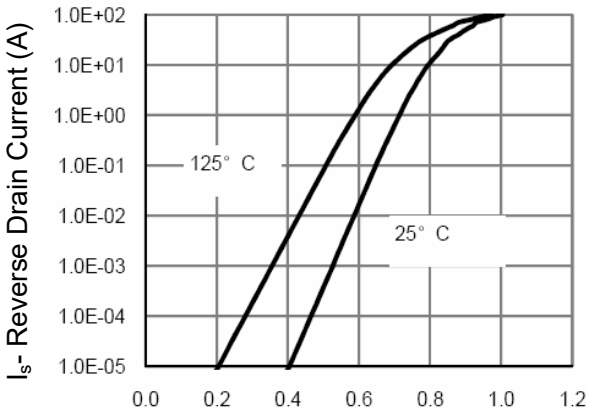
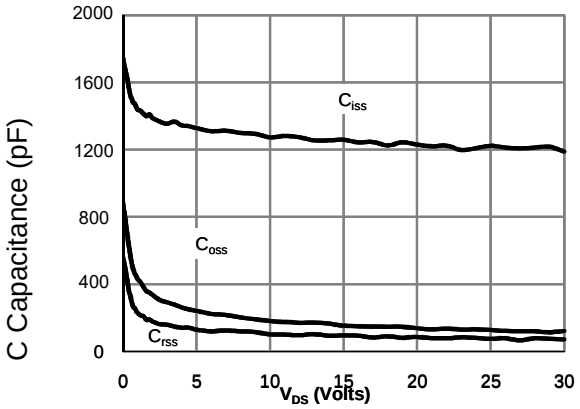
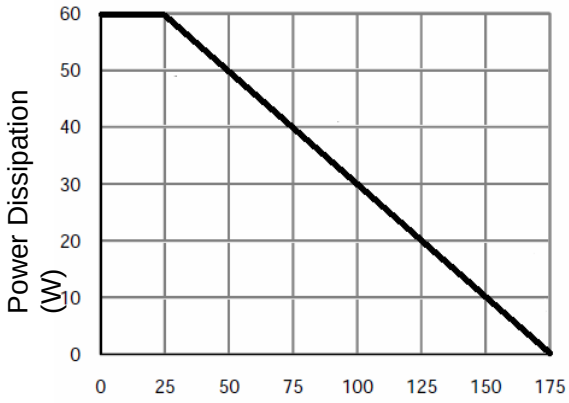


Fig. 6 Source- Drain Diode Forward



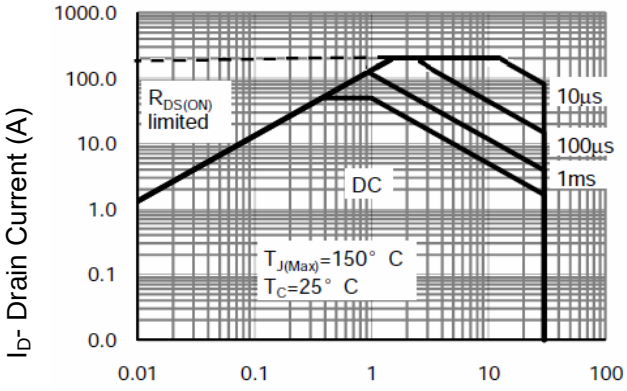
Vds Drain-Source Voltage (V)

Figu.7 Capacitance vs Vds



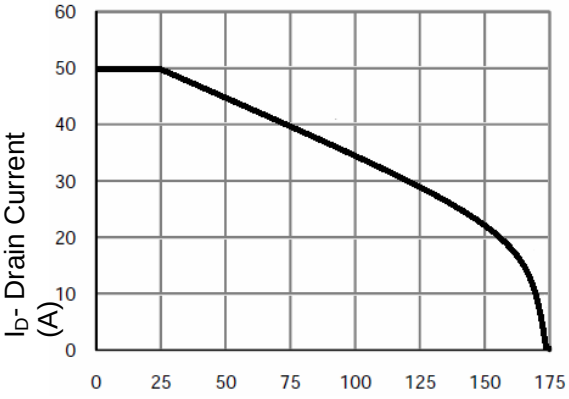
TJ-Junction Temperature(℃)

Fig. 8 Power De-rating



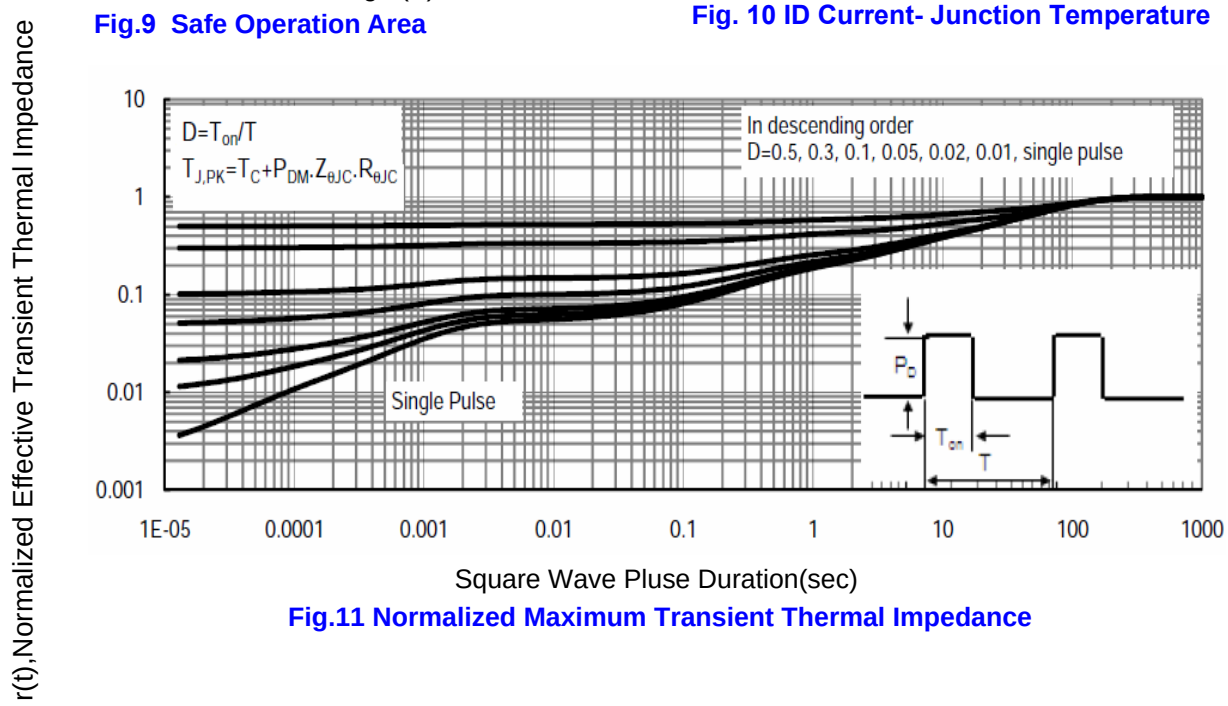
Vds Drain-Source Voltage (V)

Fig.9 Safe Operation Area



TJ-Junction Temperature(℃)

Fig. 10 ID Current- Junction Temperature



Square Wave Pluse Duration(sec)

Fig.11 Normalized Maximum Transient Thermal Impedance

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