KSF220N03

30V N-Channel MOSFET

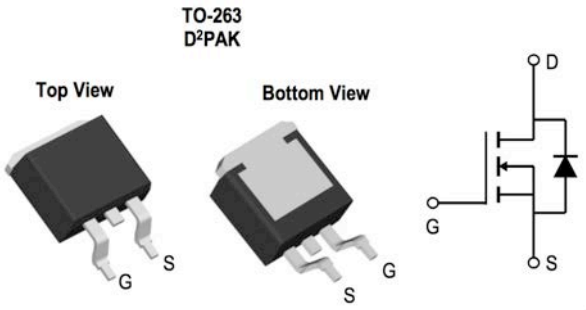
General Description

The KSF220N03 power MOSFET is produced with advanced technology of KORSUN. This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Product Summary

V_{DS} (V)	$R_{DS(on)}$ (mΩ)	I_D (A)
30	1.5 at V_{GS} = 10 V	220

TO-263 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

- Motor control and drive
- Battery management
- Uninterruptible power supply

Absolute Maximum Ratings T_C=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℃)	220	A
	Drain Current – Continuous (T_C=100℃)	140	A
I_{DM}	Drain Current – Pulsed[1]	710	A
E_{AS}	Single pulsed avalanche energy	0.5	mJ
E_{AR}	Repetitive avalanche energy	1200	mJ
P_D	Power Dissipation (T_C=25℃)	268	W
	Power Dissipation (T_C=100℃)	1.8	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	---	54	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	0.62	℃/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}=30V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=24V , V_{GS}=0V , T_J=125℃	---	---	50	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=30A	---	1.5	1.8	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} , I_D=250uA	1.0	1.5	2.0	V
gfs	Forward Transconductance	V_{DS}=5V , I_S=30A	---	120	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge	V_{DS}=15V V_{GS}=4.5V , I_D=30A	---	115	---	nC
Q_{gs}	Gate-Source Charge		---	48	---	
Q_{gd}	Gate-Drain Charge		---	26	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DS}=15V V_{GS}=4.5V, R_G=4.7Ω	---	19	---	ns
T_r	Rise Time		---	37	---	
$T_{d(off)}$	Turn-Off Delay Time		---	70	---	
T_f	Fall Time		---	20	---	
C_{iss}	Input Capacitance	V_{DS}=15V V_{GS}=0V , F=1MHz	---	5729	---	pF
C_{oss}	Output Capacitance		---	940	---	
C_{rss}	Reverse Transfer Capacitance		---	630	---	

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	---	---	220	A
I_{SM}	Pulsed Source Current		---	---	700	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=45A , 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}=30V,V_G=10V,L=0.5mH,Rg=25Ω

Typical Electrical and Thermal Characteristics (Curves)

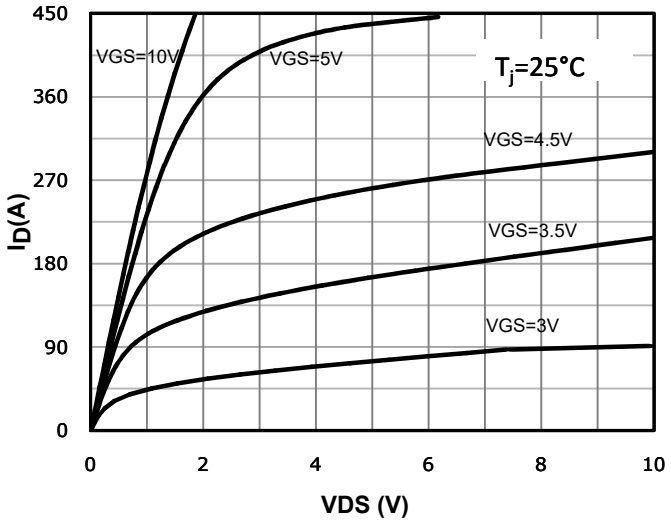


Fig1:Output Characteristics

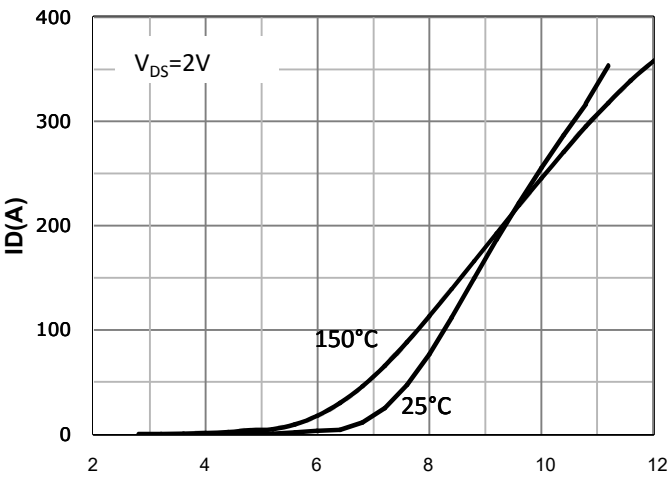


Fig2:Transfer Characteristics

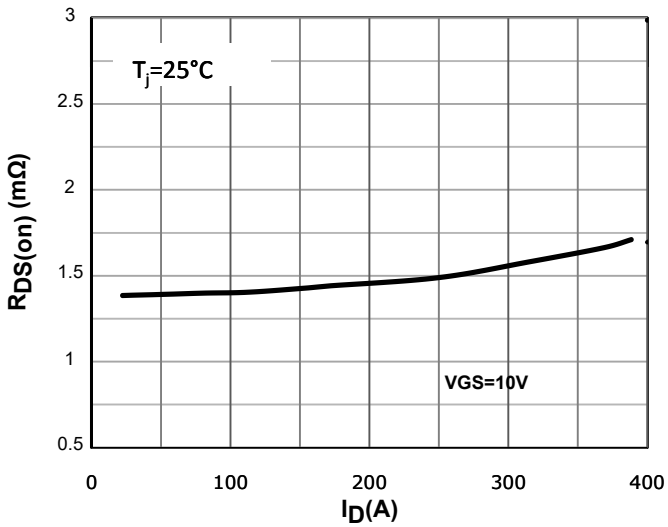


Fig3:Rdson- Drain Current

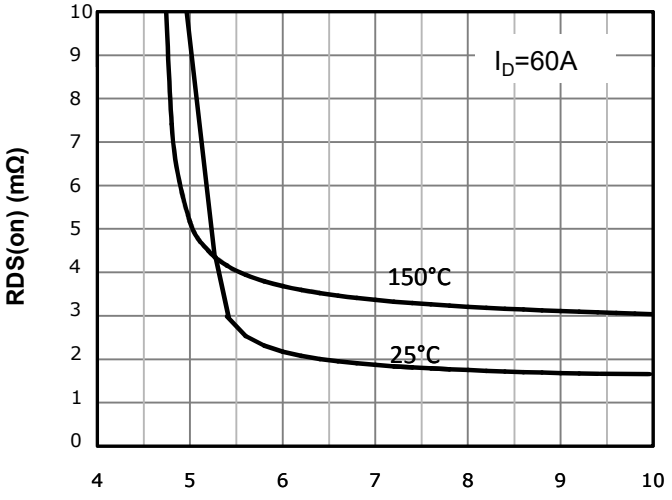


Fig4:Rds(on) vs Gate Voltage

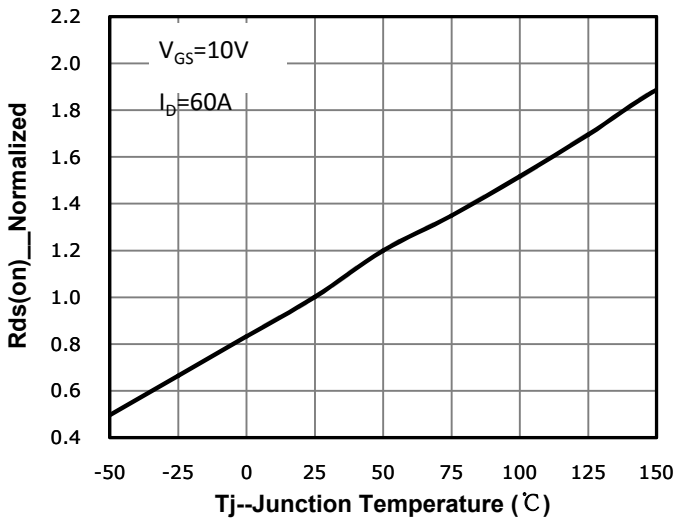


Fig5:Rds(on) vs. Temperature

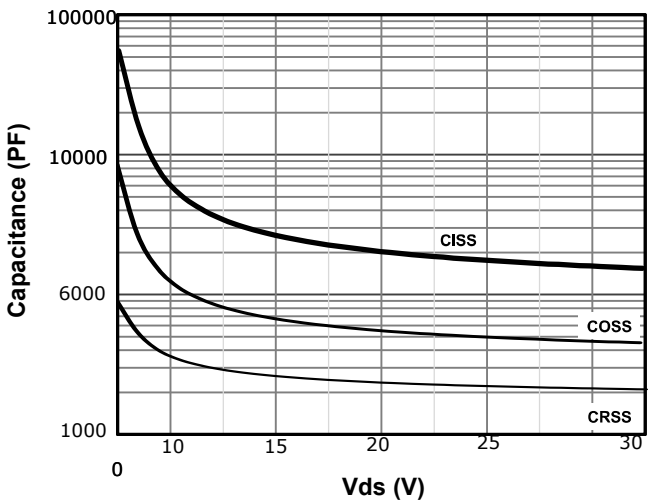


Fig6:Capacitance vs Vds

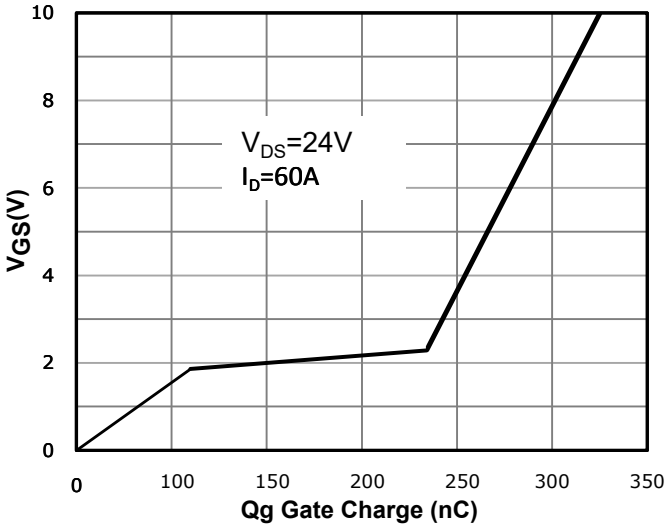


Fig7:Gate Charge

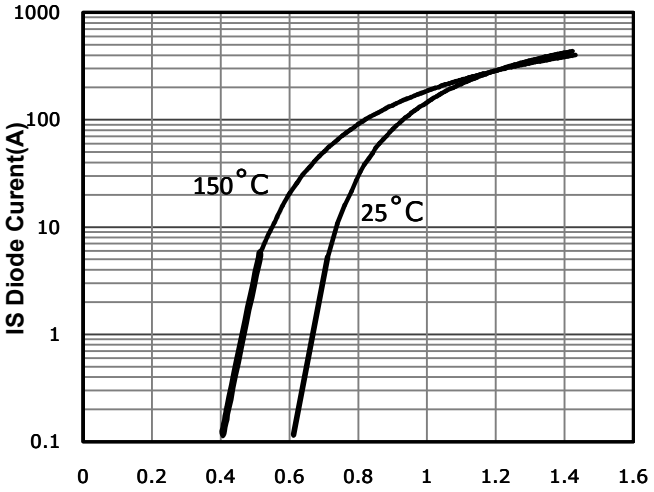


Fig8:Source- Drain Diode Forward

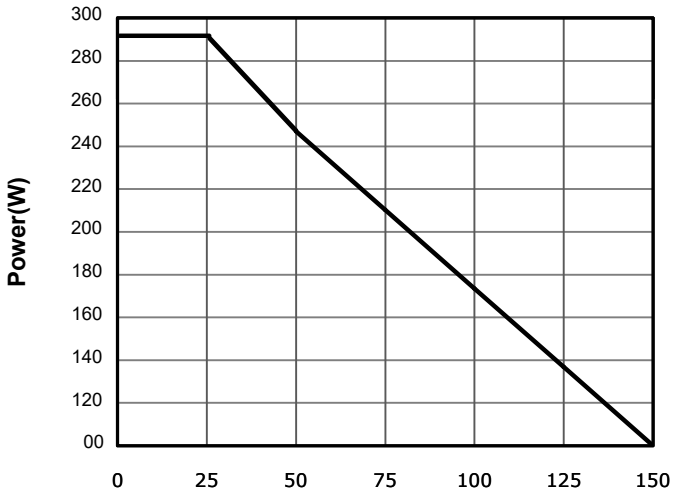


Fig9:Power Disipation

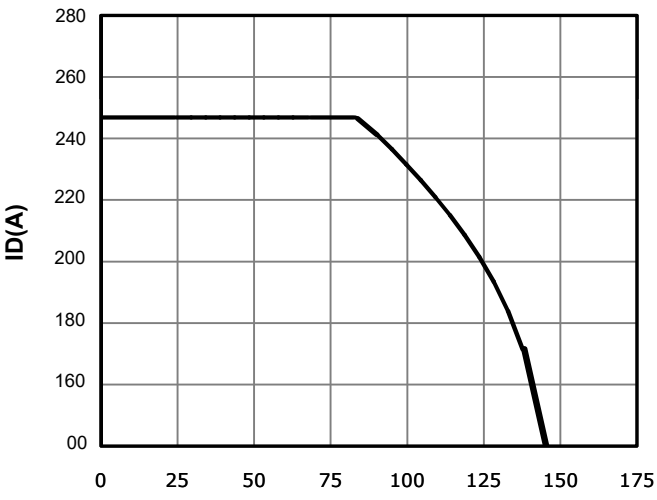


Fig10：IDCurrent- Junction Temperature

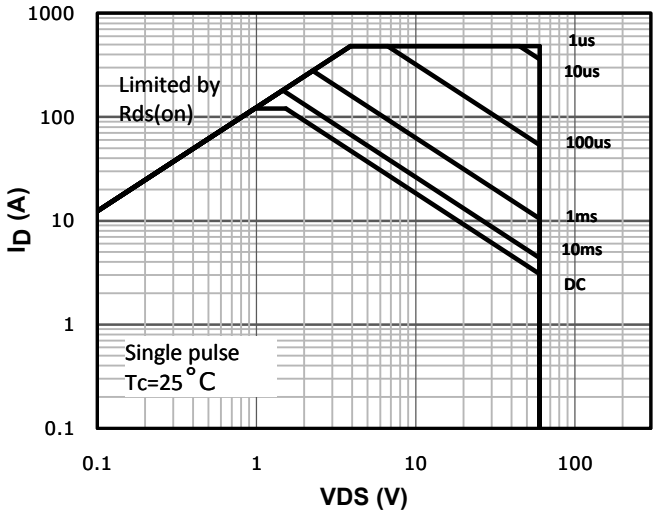


Fig11:Safe Operating Area

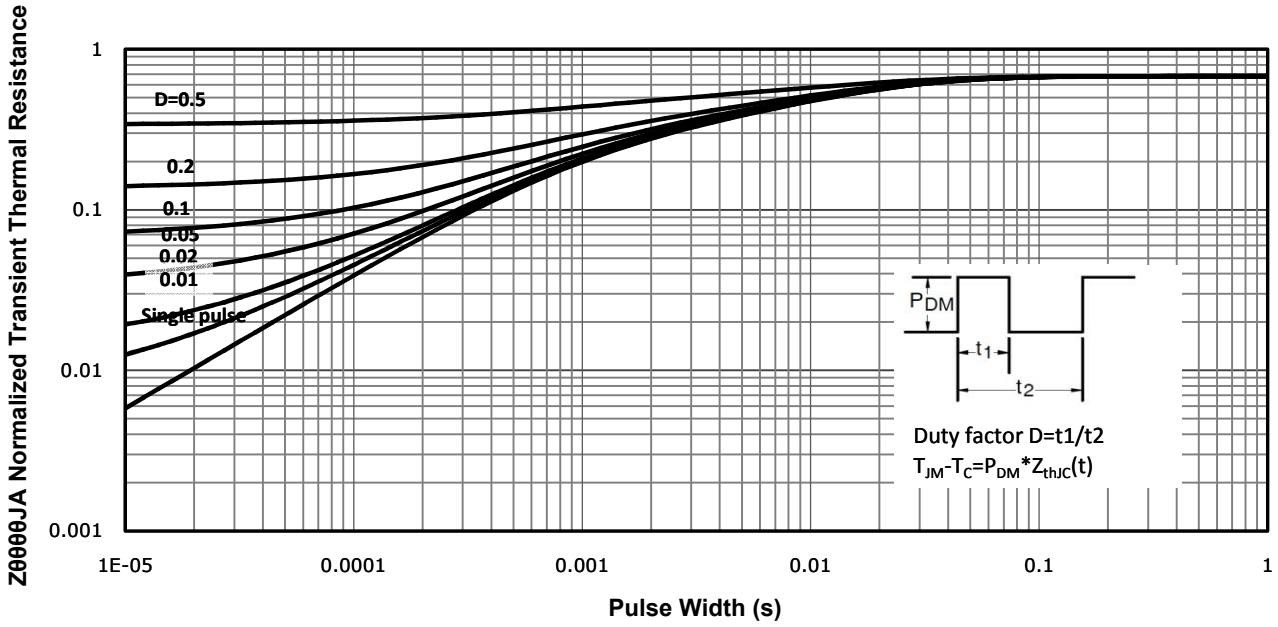


Figure 12: Normalized Maximum Transient Thermal Impedance

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