KSW120N12S

120V N-Channel MOSFET

General Description

The KSW120N12S uses advanced technology to provide excellent RDS(ON), low gate charge and operation with gate voltages as low as 10V.

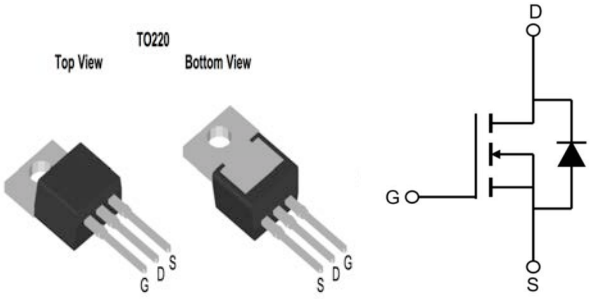
Product Summary

V_{DS} (V)	$R_{DS(on)}$ (mΩ)	I_D (A)
120	7.5 at V_{GS} = 10 V	120

Features

- Extremely low on-resistance RDS(on)
- Excellent gate charge x RDS(on) product(FOM)
- capability fast-switching applications

TO-220 Pin Configuration



Applications

- Motor control and drives
- Battery management
- Power Factor Correction (PFC)

Absolute Maximum Ratings **Tc=25℃ unless otherwise noted**

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	120	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current – Continuous (T_C=25℃)	120	A
	Drain Current – Continuous (T_C=100℃)	82	A
I_{DM}	Drain Current – Pulsed[1]	370	A
P_D	Power Dissipation (T_C=25℃)	178	W
	Power Dissipation (T_C=100℃)	2.2	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	---	0.72	℃/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	120	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=120V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=120V , V_{GS}=0V , T_J=125℃	---	---	100	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=20A	---	7.5	9.5	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	2.0	3.0	4.0	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient					
gfs	Forward Transconductance	V_{DS}=10V , I_S=20A	---	48	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[2,3]	V_{DS}=55V , V_{GS}=10V , I_D=20A	---	54	---	nC
Q_{gs}	Gate-Source Charge[2,3]		---	19	---	
Q_{gd}	Gate-Drain Charge[2,3]		---	11	---	
$T_{d(on)}$	Turn-On Delay Time[2,3]	V_{DS}=55V, I_D=20A V_{GS}=10V,R_G=10Ω	---	16	---	ns
T_r	Rise Time[2,3]		---	62	---	
$T_{d(off)}$	Turn-Off Delay Time[2,3]		---	30	---	
T_f	Fall Time[2,3]		---	55	---	
C_{iss}	Input Capacitance	V_{DS}=55V , V_{GS}=0V , F=1MHz	---	4673	---	pF
C_{oss}	Output Capacitance		---	671	---	
C_{rss}	Reverse Transfer Capacitance		---	40	---	

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	---	---	100	A
I_{SM}	Pulsed Source Current		---	---	220	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=15A , T_J=25℃	---	---	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)

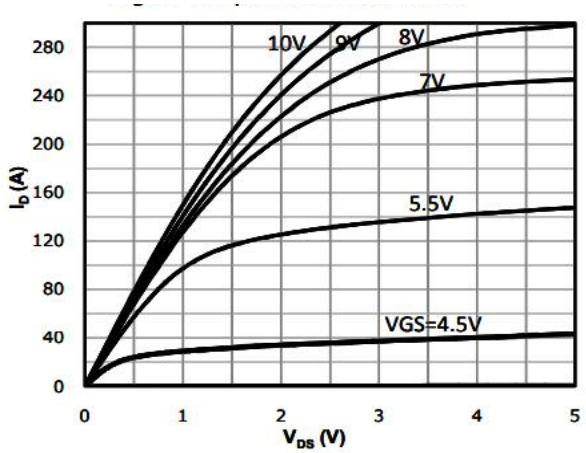


Figure 1: Output Characteristics

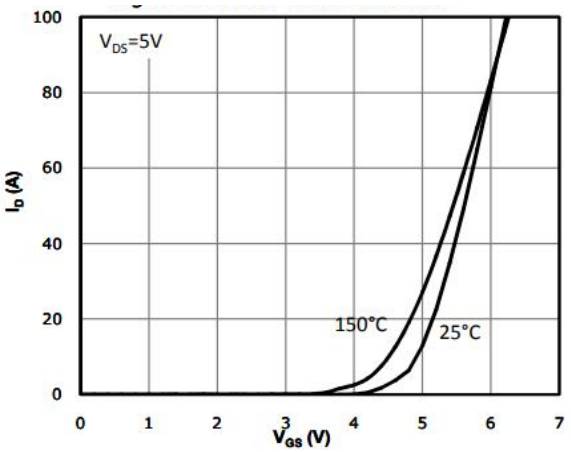


Figure 2: Transfer characteristics

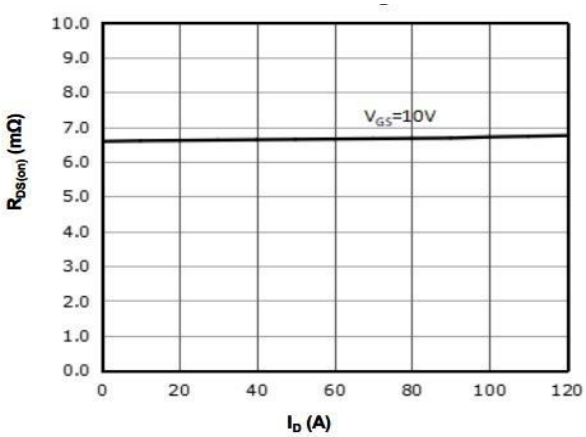


Figure 3: Rds(on)vs Drain Current andGate Voltage

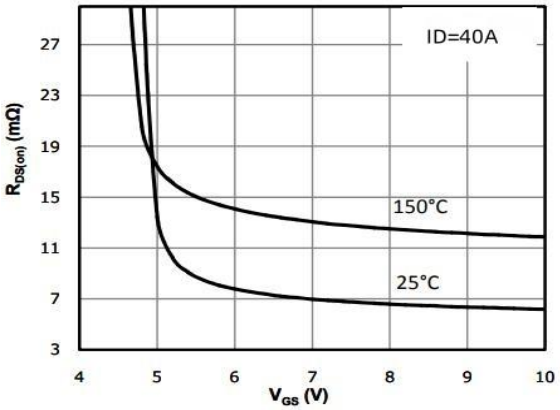


Figure 4:Rds(on) vs Gate Voltage

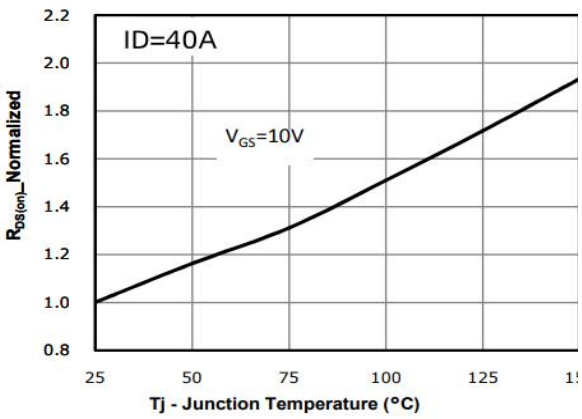


Figure 5: Rds(on)vs. Temperature

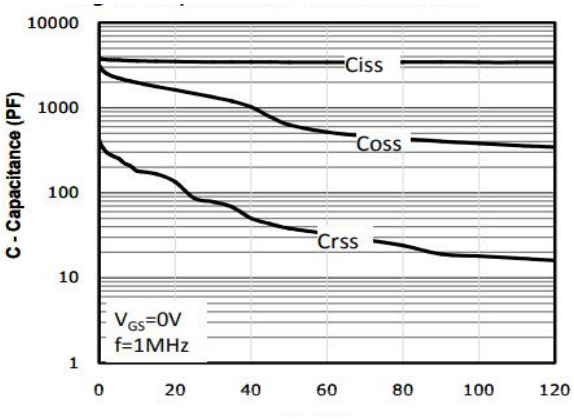


Figure 6: Capacitance Characteristics

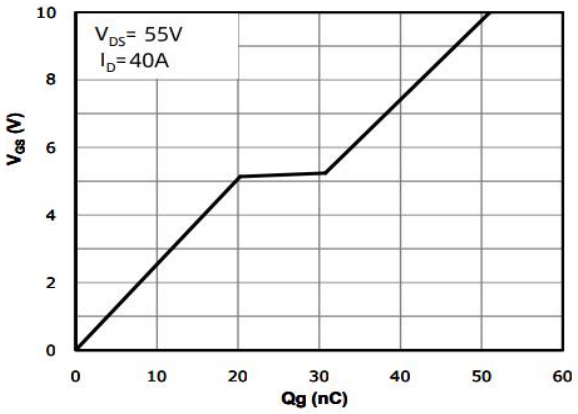


Figure 7: Gate Charge Characteristics

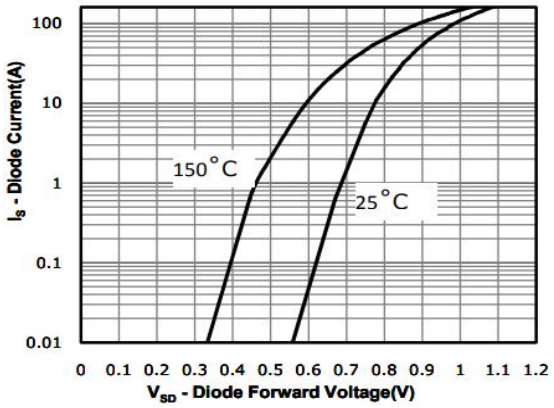


Figure 8: Body-diode ForwardCharacteristics

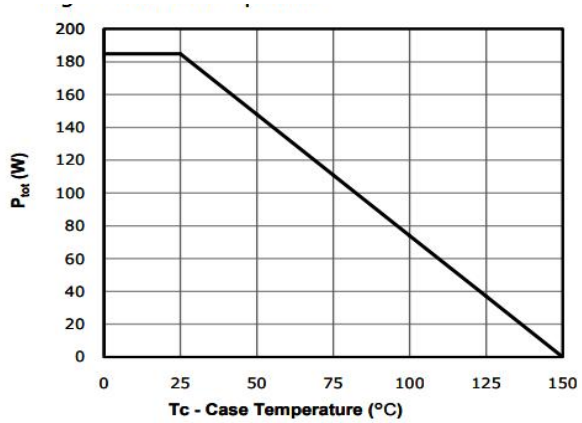


Figure 9: Power Dissipation

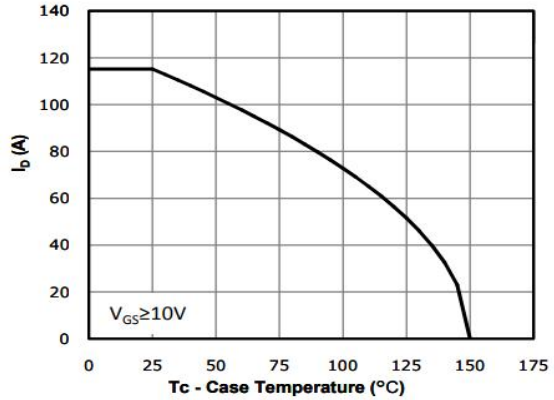


Figure 10: Drain Current Derating

Fig 11: Safe Operating Area

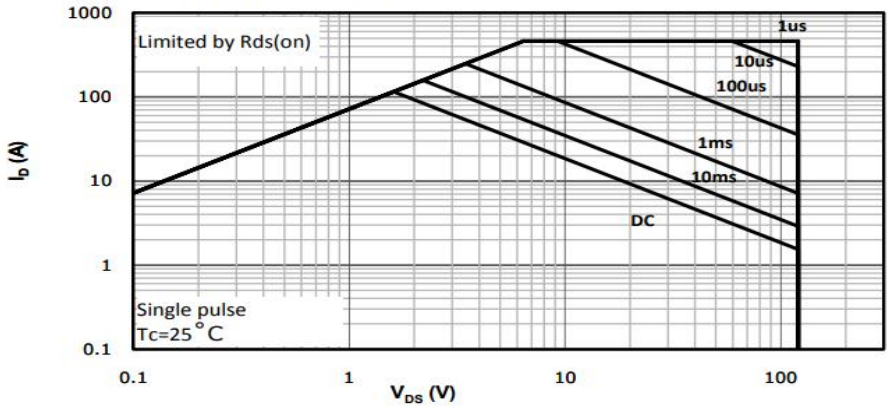


Figure 11: safe operating Area

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