KSW20N50

500V N-Channel MOSFET

General Description

The KSW20N50 uses advanced technology to provide excellent R_{DS}(ON), low gate charge and operation with gate voltages as low as 10V.

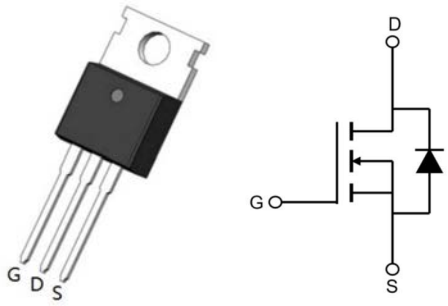
Product Summary

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
500	0.256 at V_{GS} = 10 V	20

Features

- Low gate charge
- Fast Switching Speed
- High input resistance

TO-220 Pin Configuration



Applications

- Electronic Transformer
- LED Driver
- UPS

Absolute Maximum Ratings Tc=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	500	V
V_{GS}	Gate-Source Voltage	±25	V
I_D	Drain Current – Continuous (T_C=25℃)	20	A
	Drain Current – Continuous (T_C=100℃)	8	A
I_{DM}	Drain Current – Pulsed[1]	78	A
P_D	Power Dissipation (T_C=25℃)	75	W
	Power Dissipation (T_C=100℃)	0.5	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	---	1.6	℃/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	500	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=500V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=400V , V_{GS}=0V , T_J=125℃	---	---	10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±25V , V_{DS}=0V	---	---	±100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=8.0A	---	0.256	0.32	Ω
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	3.0	4.0	5.0	V
gfs	Forward Transconductance	V_{DS}=15V , I_S=5A	---	30	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge	V_{DS}=400V , V_{GS}=10V , I_D=10A	---	112	---	nC
Q_{gs}	Gate-Source Charge		---	25	---	
Q_{gd}	Gate-Drain Charge		---	53	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DS}=250V,R_L=3.3Ω V_{GS}=10V,R_G=10Ω	---	33	---	ns
T_r	Rise Time		---	42	---	
$T_{d(off)}$	Turn-Off Delay Time		---	26	---	
T_f	Fall Time		---	30	---	
C_{iss}	Input Capacitance	V_{DS}=25V , V_{GS}=0V , F=1MHz	---	3240	---	pF
C_{oss}	Output Capacitance		---	449	---	
C_{rss}	Reverse Transfer Capacitance		---	25	---	

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	---	---	18	A
I_{SM}	Pulsed Source Current		---	---	68	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

Typical Electrical and Thermal Characteristics (Curves)

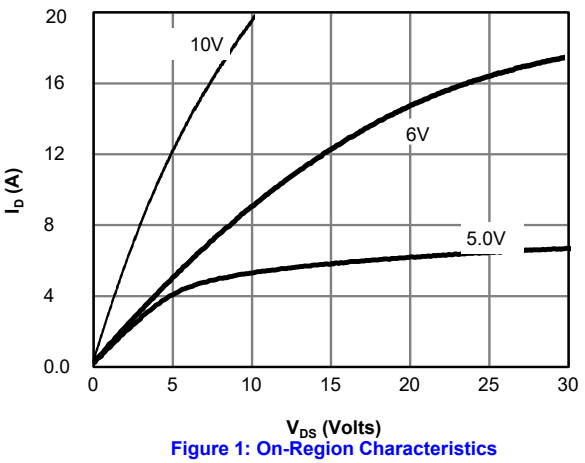


Figure 1: On-Region Characteristics

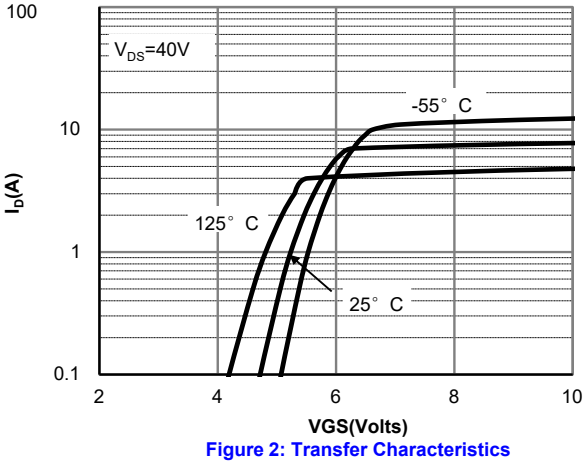


Figure 2: Transfer Characteristics

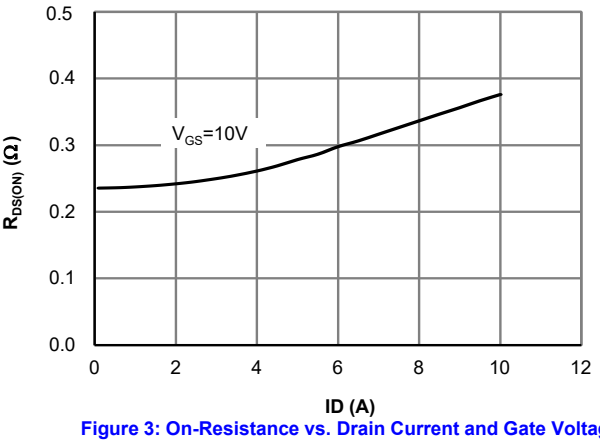


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

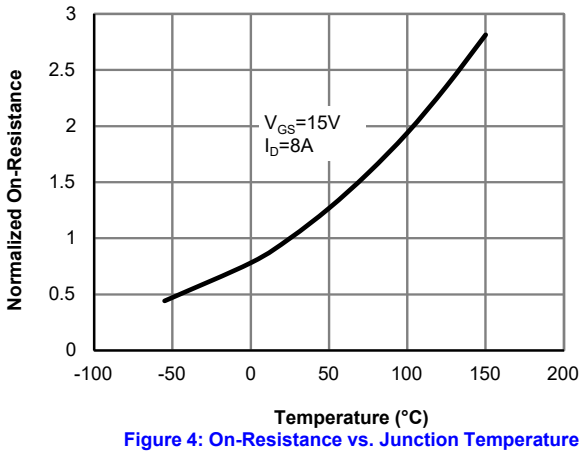


Figure 4: On-Resistance vs. Junction Temperature

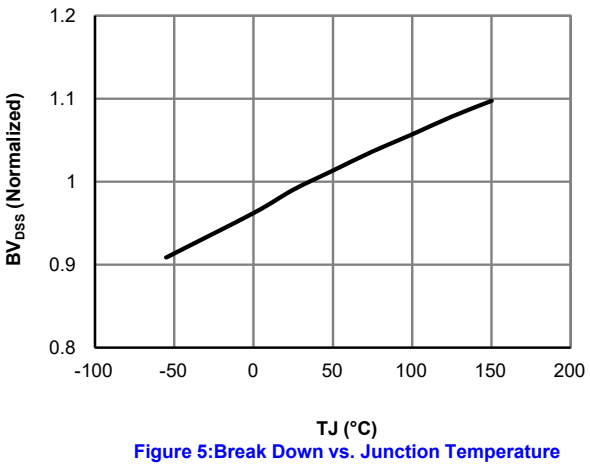


Figure 5:Break Down vs. Junction Temperature

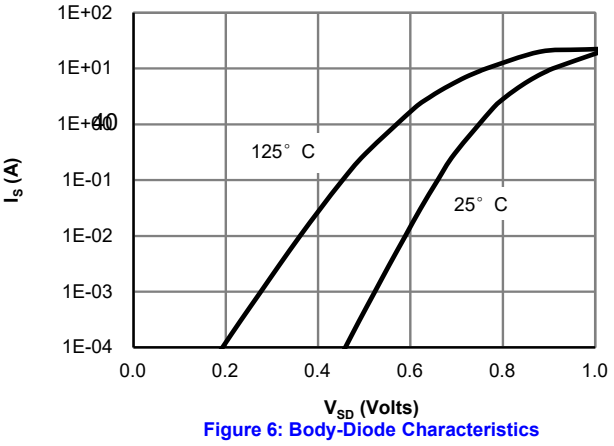


Figure 6: Body-Diode Characteristics

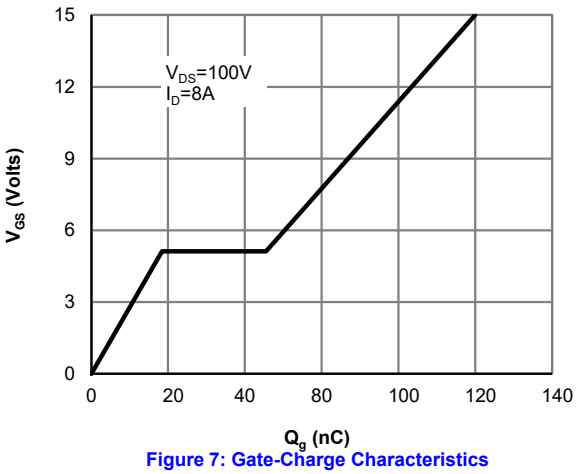


Figure 7: Gate-Charge Characteristics

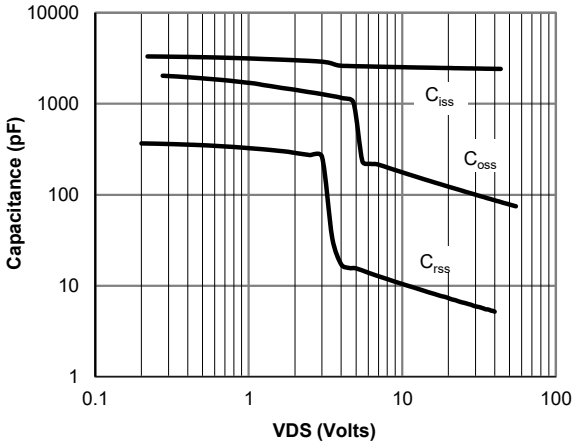


Figure 8: Capacitance Characteristics

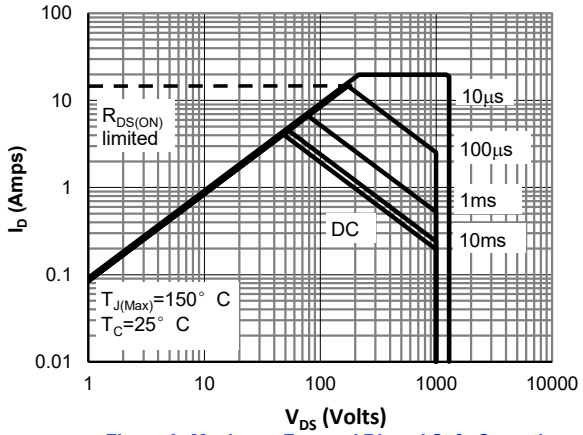


Figure 9: Maximum Forward Biased Safe Operating

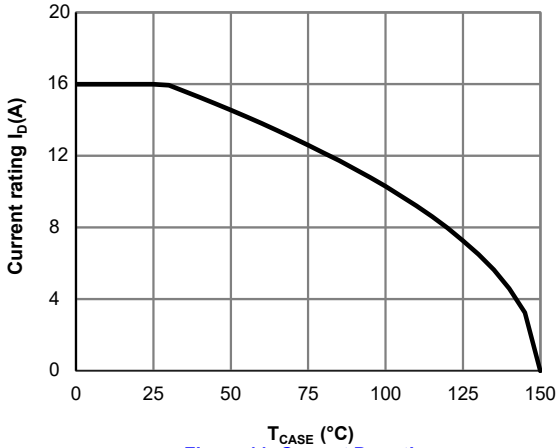


Figure 11: Current De-rating

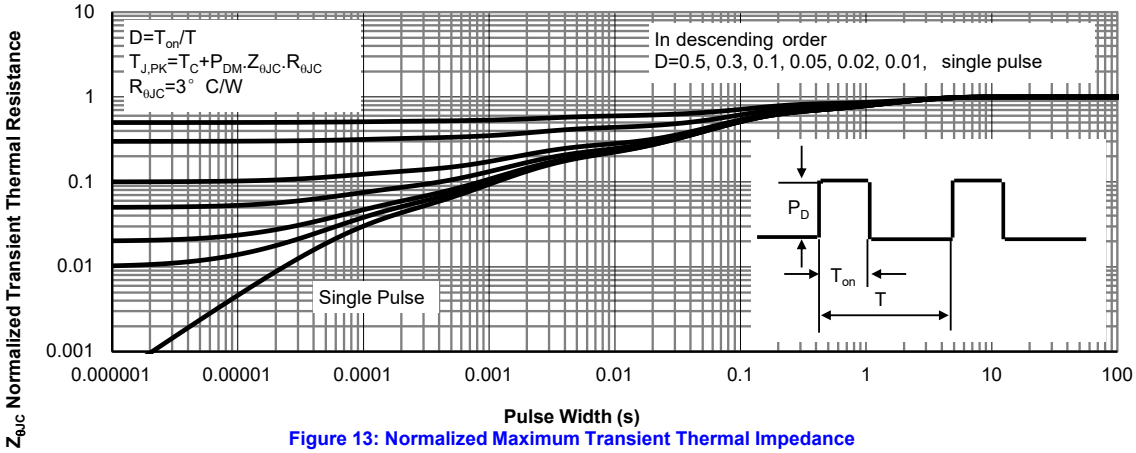


Figure 13: Normalized Maximum Transient Thermal Impedance

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