KSW12N65K

650V N-Channel MOSFET

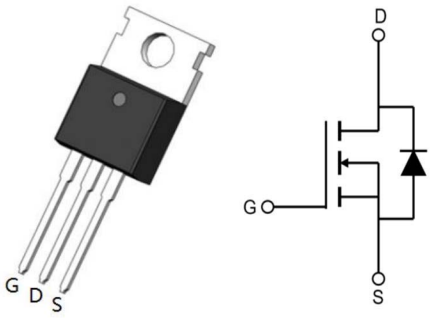
General Description

The KSW12N65K series are from Advanced Power innovated design and silicon process technology to achieve the lowest possible on-resistance 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)
650	550 at V_{GS} = 10 V	12

TO-220 Pin Configuration



Features

- Enhanced Body diode for robusstness and fast reverse recovery
- Optimized switching parameters for better EMI Performance
- Low Rds(on)

Applications

- SMPS with PFC Flyback and LLC topologies
- Hard Switching and Hing Speed Circuit
- Power Factor Correction (PFC)

Absolute Maximum Ratings Tc=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	650	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current – Continuous (T_C=25℃)	12	A
	Drain Current – Continuous (T_C=100℃)	4.5	A
I_{DM}	Drain Current – Pulsed[1]	30	A
P_D	Power Dissipation (T_C=25℃)	50	W
	Power Dissipation (T_C=100℃)	0.8	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	---	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	0.43	℃/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	650	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=600V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=400V , 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=3A	---	550	620	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	2.0	3.0	4.5	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	3.0	---	mV/℃
gfs	Forward Transconductance	V_{DS}=15V , I_S=3A	---	17	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[2,3]	V_{DS}=400V , V_{GS}=10V , I_D=3A	---	13	---	nC
Q_{gs}	Gate-Source Charge[2,3]		---	4	---	
Q_{gd}	Gate-Drain Charge[2,3]		---	6	---	
$T_{d(on)}$	Turn-On Delay Time[2,3]	V_{DS}=400V, I_D=3A V_{GS}=10V,R_G=5Ω	---	13	---	ns
T_r	Rise Time[2,3]		---	22	---	
$T_{d(off)}$	Turn-Off Delay Time[2,3]		---	49	---	
T_f	Fall Time[2,3]		---	25	---	
C_{iss}	Input Capacitance	V_{DS}=100V , V_{GS}=0V , F=1MHz	---	597	---	pF
C_{oss}	Output Capacitance		---	42	---	
C_{rss}	Reverse Transfer Capacitance		---	1.5	---	

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	---	---	5	A
I_{SM}	Pulsed Source Current		---	---	15	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=10A , T_J=25℃	---	---	1.0	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)

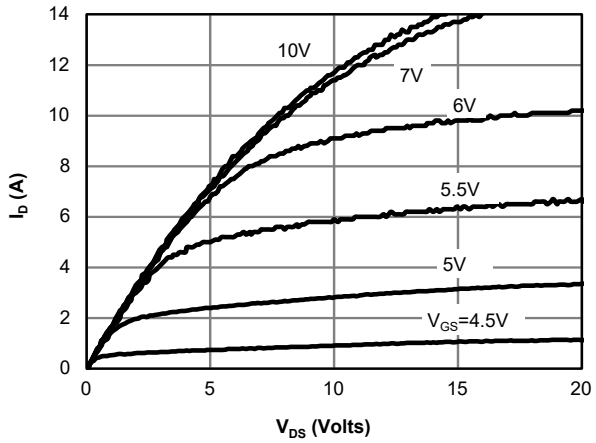


Figure 1: On-Region Characteristics

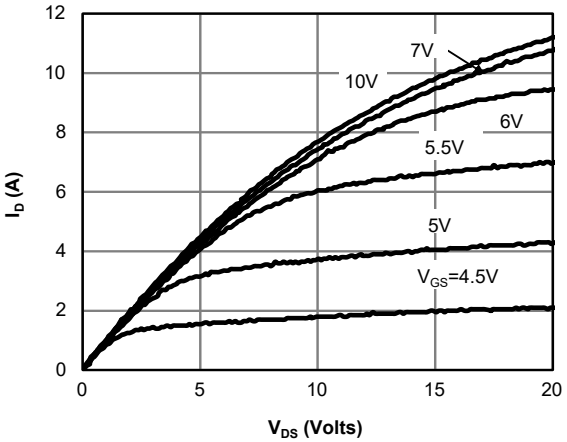


Figure 2: On-Region Characteristics

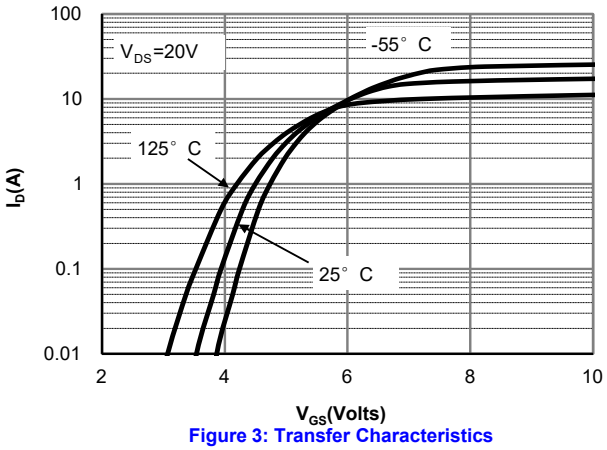


Figure 3: Transfer Characteristics

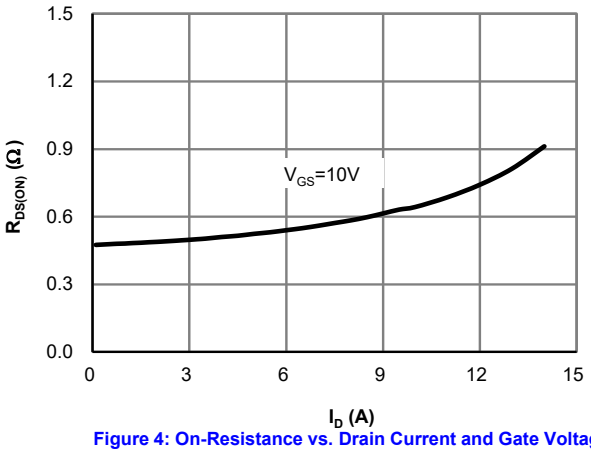


Figure 4: On-Resistance vs. Drain Current and Gate Voltage

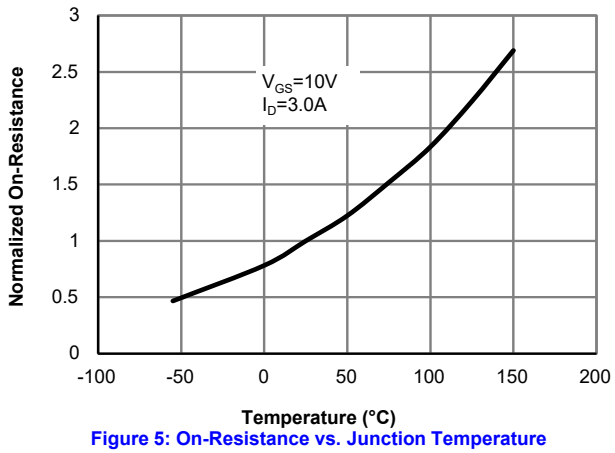


Figure 5: On-Resistance vs. Junction Temperature

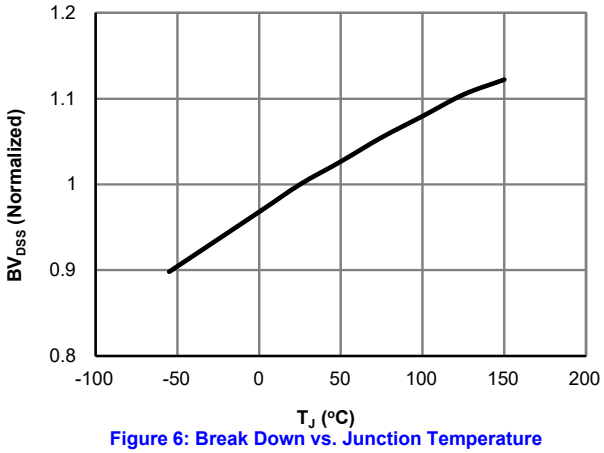


Figure 6: Break Down vs. Junction Temperature

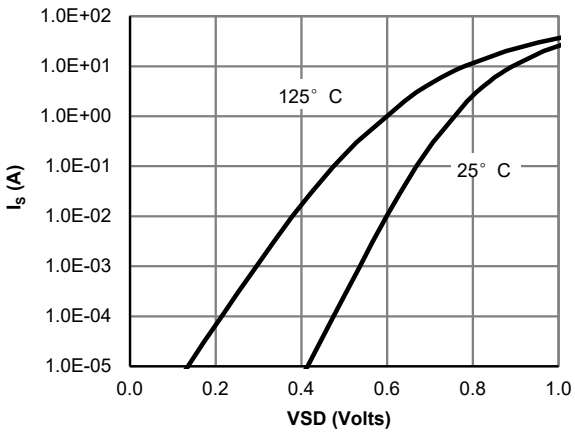


Figure 7: Body-Diode Characteristics

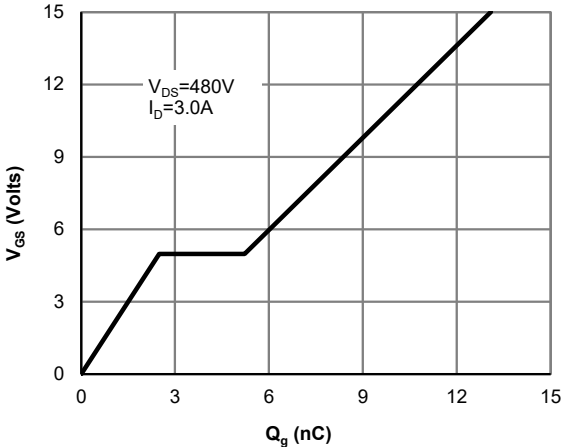


Figure 8: Gate-Charge Characteristics

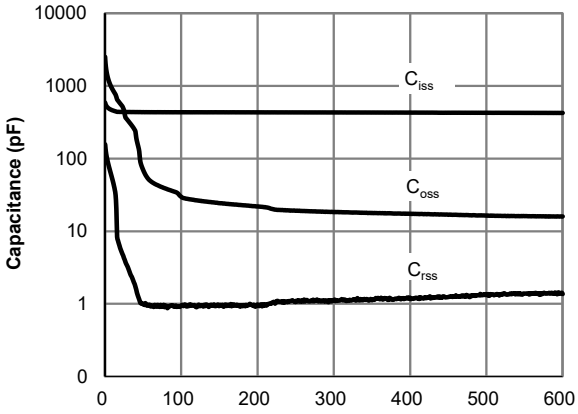


Figure 9: Capacitance Characteristics

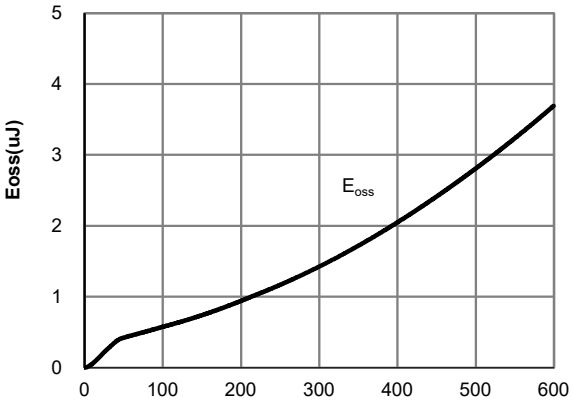


Figure 10: Coss stored Energy

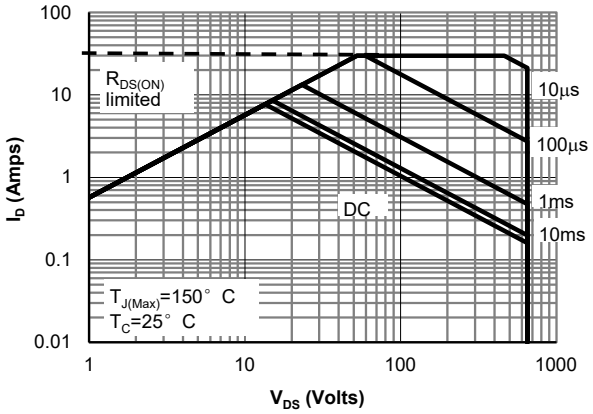


Figure 11: Maximum Forward Biased Safe

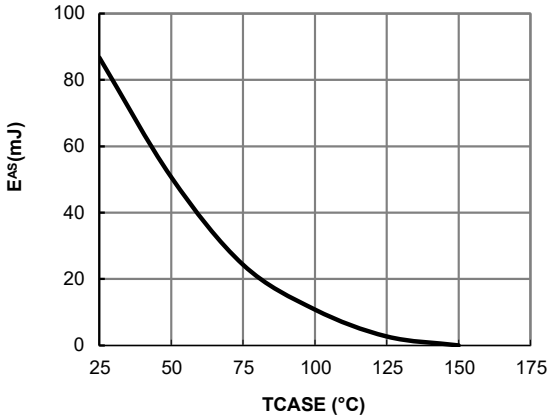


Figure 12: Avalanche energy

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