KSZ6013

-60V P-Channel MOSFET

General Description

The KSZ6013 uses advanced MOSFET technology to provide excellent R_{DS}(ON), low gate charge fast switching and excellent avalanche characteristics. This device is specially designed to get better ruggedness and suitable to use in

Product Summary

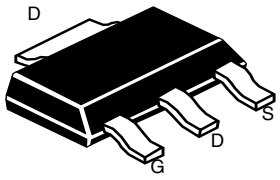
V_{DS} (V)	R_{DS}(on) (mΩ)	I_D (A)
-60	100 at V_{GS} = 10 V	-4.2
	130 at V_{GS} = 4.5 V	-3.0

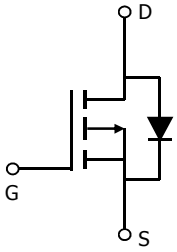
Features

- *High density cell design for ultra low R_{DS}(on)*
- *Green Device Available*
- *Excellent package for good heat dissipation*

SOT223 Pin Configuration

SOT-223





Applications

- *Power switching application*
- *Uninterruptible power supply*
- *Power Management in DC/AC Inverer Systems*

100% UIS TESTED!
100% ΔVds TESTED!

Absolute Maximum Ratings T_C=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-60	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current – Continuous (T_C=25℃)	-4.2	A
	Drain Current – Continuous (T_C=100℃)	-2.5	A
I_{DM}	Drain Current – Pulsed[1]	-18	A
P_D	Power Dissipation (T_C=25℃)	3.6	W
	Power Dissipation – Derate above 25℃	0.5	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	---	59	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	2.67	℃/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	-60	---	---	V
$\triangle BV_{DSS}/\triangle T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.01	---	V/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-40V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=-40V , 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=-3A	---	100	118	mΩ
		V_{GS}=4.5V , I_D=-2A	---	130	151	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.0	1.58	2.2	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	1.6	---	mV/℃
gfs	Forward Transconductance	V_{DS}=10V , I_S=-2A	---	20	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[2,3]	V_{DS}=-20V , V_{GS}=-10V , I_D=-2.0A	---	14	19	nC
Q_{gs}	Gate-Source Charge[2,3]		---	2.4	4.3	
Q_{gd}	Gate-Drain Charge[2,3]		---	5.5	8.3	
$T_{d(on)}$	Turn-On Delay Time[2,3]	V_{DS}=-20V , V_{GS}=-10V , R_G=3.0 Ω I_D=-1A	---	8.7	13	ns
T_r	Rise Time[2,3]		---	4.1	6	
$T_{d(off)}$	Turn-Off Delay Time[2,3]		---	26.6	33	
T_f	Fall Time[2,3]		---	4.7	6.5	
C_{iss}	Input Capacitance	V_{DS}=-20V , V_{GS}=0V , F=1MHz	---	1306	1650	pF
C_{oss}	Output Capacitance		---	167	210	
C_{rss}	Reverse Transfer Capacitance		---	65	86	

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	---	---	-4.0	A
I_{SM}	Pulsed Source Current		---	---	-10	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=-1A , 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.

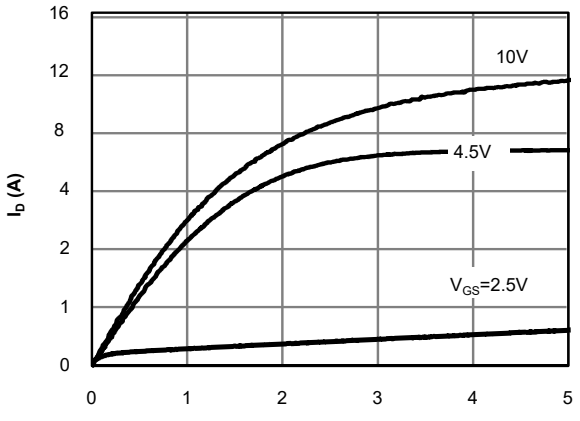


Figure 1: On-Region Characteristics (Note E)

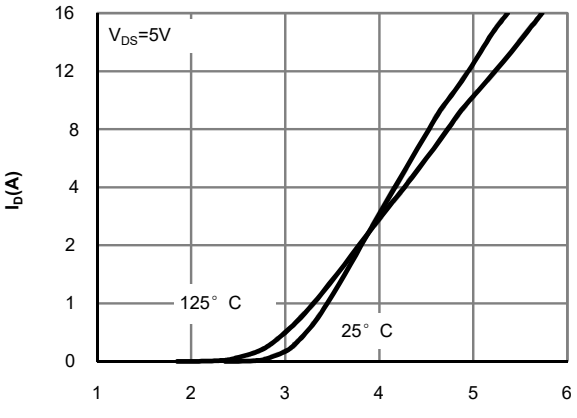


Figure 2: Transfer Characteristics (Note E)

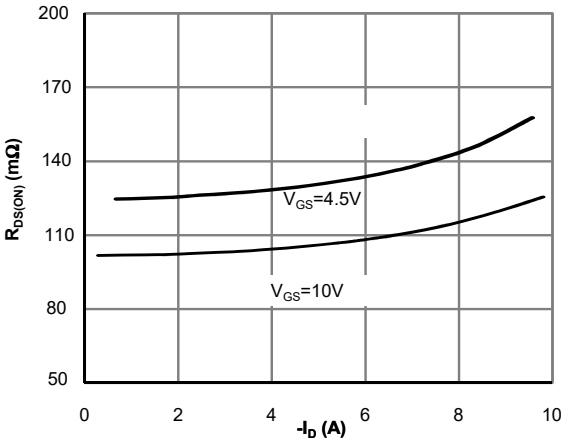


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

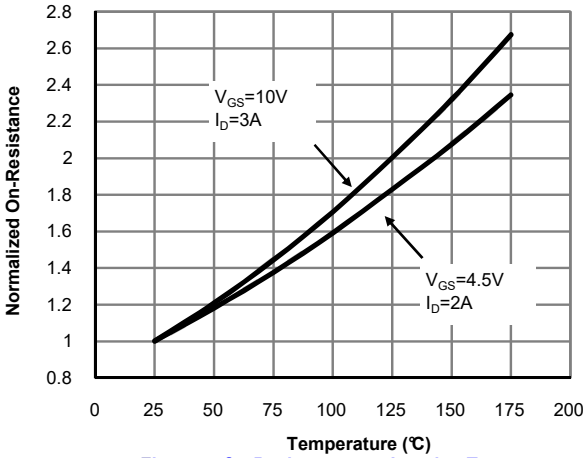


Figure 4: On-Resistance vs. Junction Temperature (Note E)

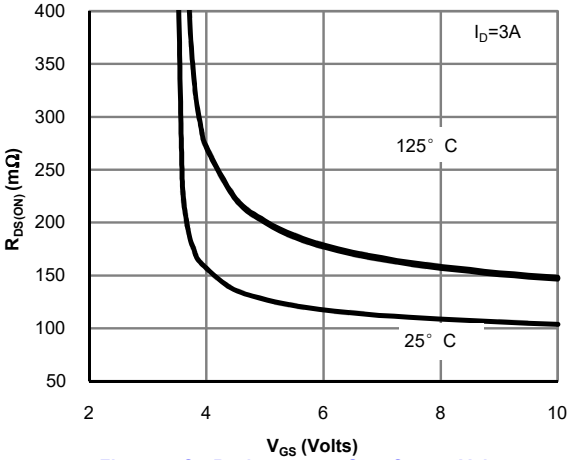


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

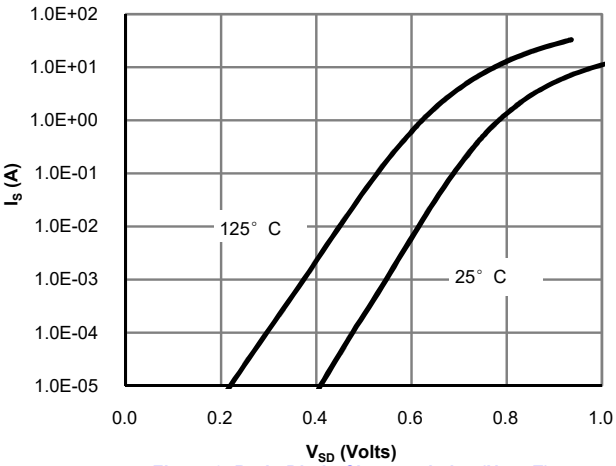


Figure 6: Body-Diode Characteristics (Note E)

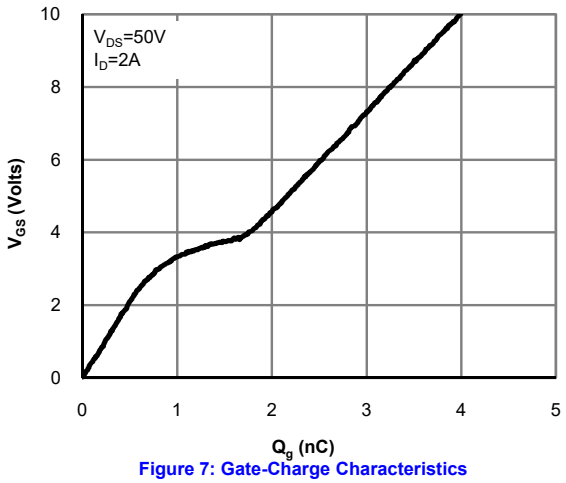


Figure 7: Gate-Charge Characteristics

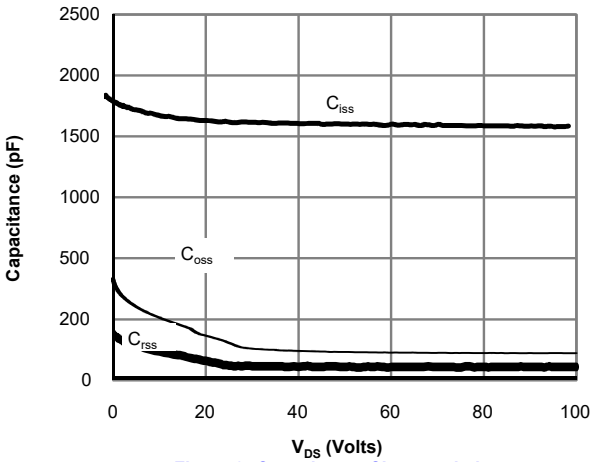


Figure 8: Capacitance Characteristics

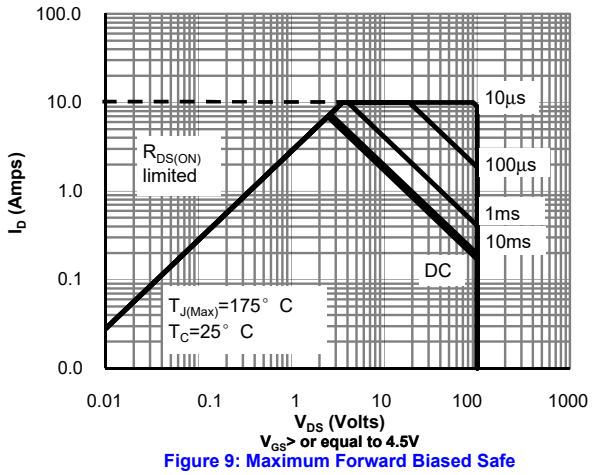


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

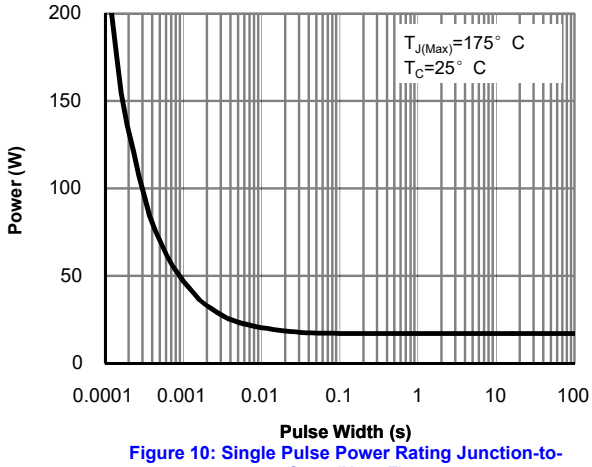


Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

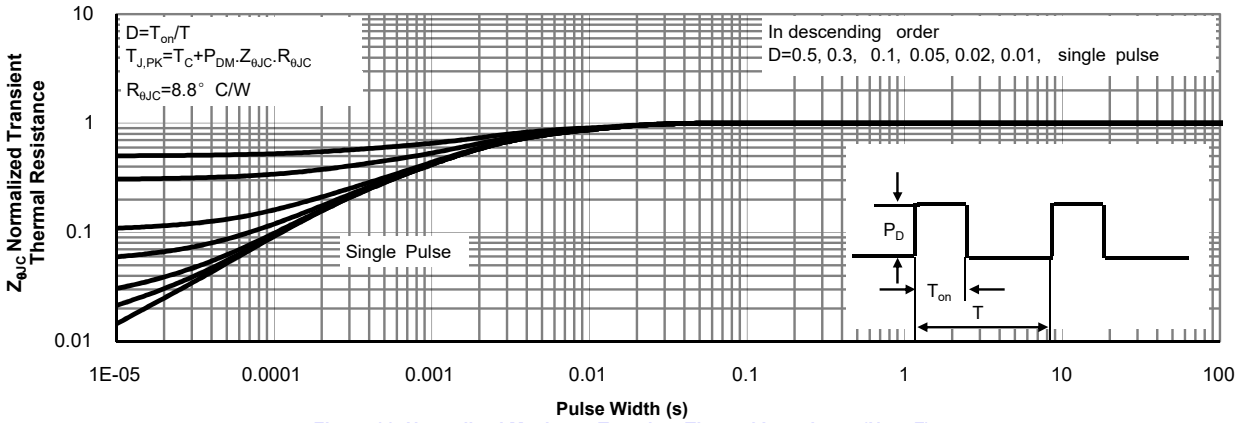


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

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