KST3139NR

-20V P-Channel MOSFET

General Description

These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications

Product Summary

V_{DS} (V)	$R_{DS(on)}$ (mΩ)	I_D (A)
-20	480 at V_{GS} = 4.5 V	-0.70
	670 at V_{GS} = 2.5 V	-0.63

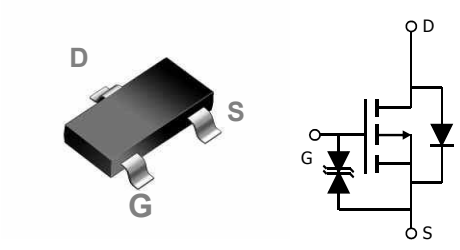
Features

- High-Side Switching
- Low On-Resistance
- Low Threshold
- Fast Switching Speed

Applications

- Drivers:Relays, Solenoids, Lamps, Hammers, Displays, Memories
- Battery Operated Systems
- Power Supply Converter Circuits
- Load/Power Switching Cell Phones, Pagers

SOT-523 Plastic-Encapsulate



1. GATE
2. SOURCE
3. DRAIN

Absolute Maximum Ratings Tc=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D	Drain Current – Continuous (T_C=25℃)	-0.70	A
	Drain Current – Continuous (T_C=100℃)	-0.40	A
I_{DM}	Drain Current – Pulsed[1]	-2.3	A
P_D	Power Dissipation (T_C=25℃)	0.26	W
	Power Dissipation (T_C=100℃)	0.003	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	---	460	℃/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	154	℃/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	-20	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-20V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=-20V , V_{GS}=0V , T_J=125℃	---	---	10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±10V , V_{DS}=0V	---	---	±20	uA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=-4.5V , I_D=-1A	---	480	---	mΩ
		V_{GS}=-2.5V , I_D=-1A	---	670	---	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	-0.35	-0.6	-1.1	V
gfs	Forward Transconductance	V_{DS}=-5V , I_S=-0.5A	---	1	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge	V_{DS}=-10V , V_{GS}=-5V , I_D=-0.3A	---	2.3	---	nC
Q_{gs}	Gate-Source Charge		---	0.7	---	
Q_{gd}	Gate-Drain Charge		---	0.9	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=-10V,I_D=200mA, V_{GS}=4.5V,R_G=10Ω	---	7.5	---	ns
T_r	Rise Time		---	5.0	---	
$T_{d(off)}$	Turn-Off Delay Time		---	16	---	
T_f	Fall Time		---	8.4	---	
C_{iss}	Input Capacitance	V_{DS}=-10V , V_{GS}=0V , F=1MHz	---	160	---	pF
C_{oss}	Output Capacitance		---	28	---	
C_{rss}	Reverse Transfer Capacitance		---	16	---	

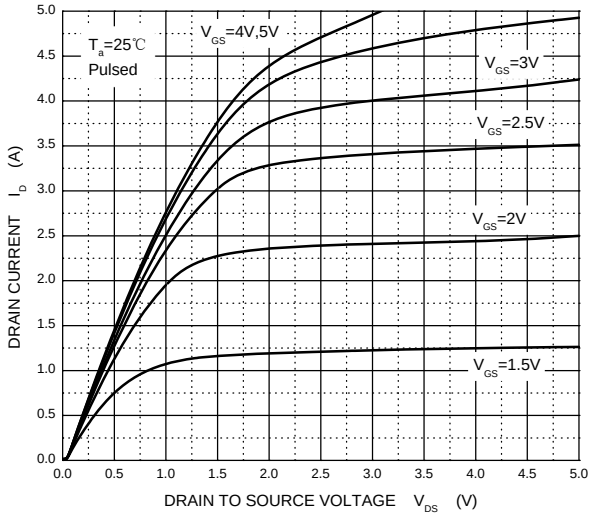
Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	-0.70	A
I_{SM}	Pulsed Source Current		---	---	-1.0	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=-0.5A , T_J=25℃	---	---	-1.0	V

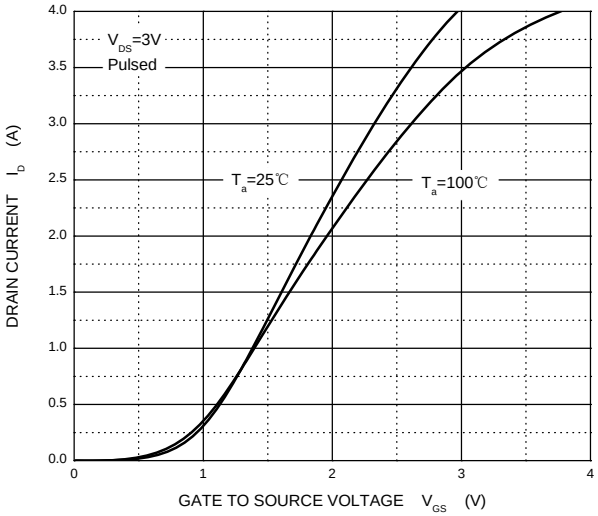
Note :

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

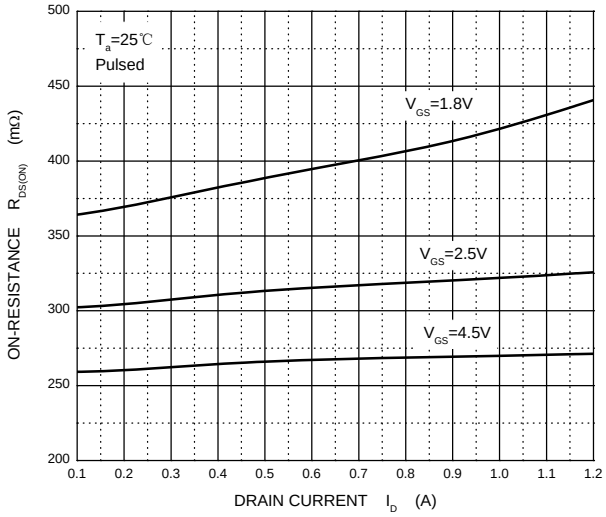
Output Characteristics



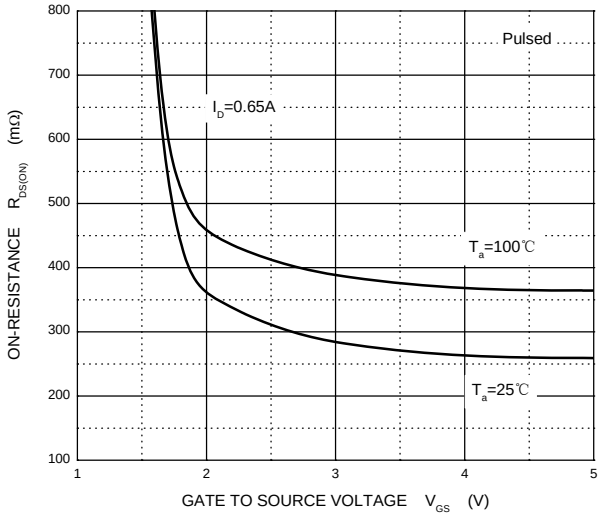
Transfer Characteristics



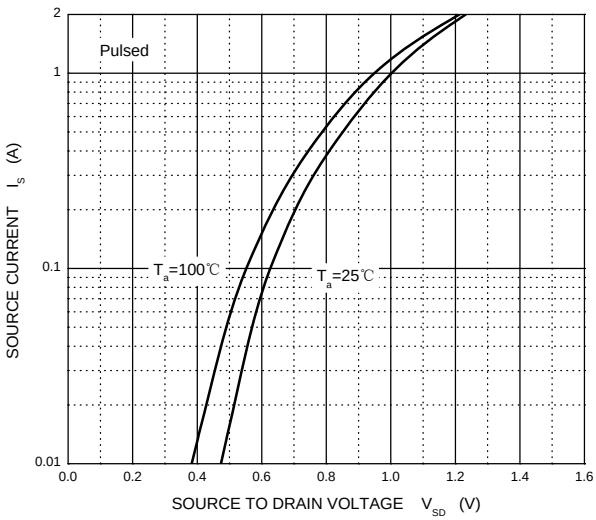
$R_{DS(ON)}$ —— I_D



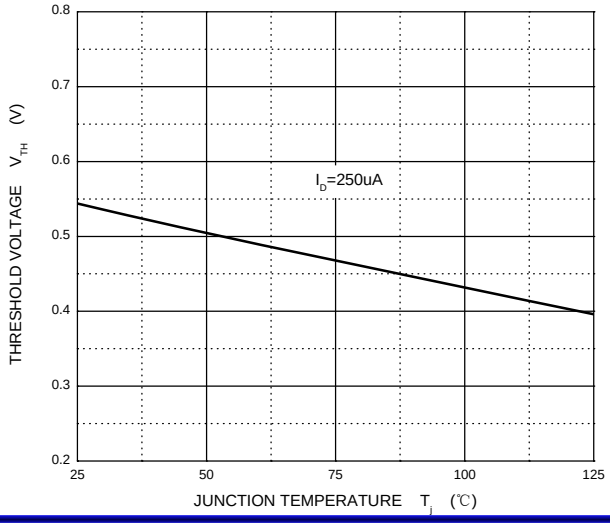
$R_{DS(ON)}$ —— V_{GS}



I_S —— V_{SD}



Threshold Voltage



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