



PRODUCT DATA SHEET

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Datasheet



Resources



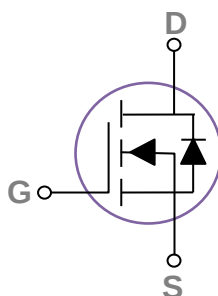
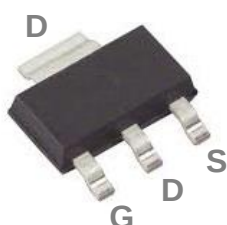
Samples

Please note: Please check the JINGAO Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.jg-semi.cn. Please email any questions regarding the system integration to JINGAO_questions@jgsemi.com.

General Description

These N-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.

SOT223 Pin Configuration



BVDSS	RDSON	ID
60V	70mΩ	5A

Features

- 60V, 5A, $R_{DS(ON)} = 70\text{m}\Omega @ V_{GS} = 10\text{V}$
- Improved dv/dt capability
- Fast switching
- Green Device Available

Applications

- Motor Drive
- Power Tools
- LED Lighting

Absolute Maximum Ratings $T_c=25^\circ\text{C}$ 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 ($T_A=25^\circ\text{C}$)	5	A
	Drain Current – Continuous ($T_A=70^\circ\text{C}$)	4	A
I_{DM}	Drain Current – Pulsed ¹	18	A
P_D	Power Dissipation ($T_A=25^\circ\text{C}$)	1.79	W
	Power Dissipation – Derate above 25°C	0.014	W/ $^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	70	$^\circ\text{C/W}$

Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)
Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	60	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=1mA$	---	0.05	---	$V/^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=60V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=48V$, $V_{GS}=0V$, $T_J=125^\circ\text{C}$	---	---	10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V$, $I_D=5A$	---	70	90	$m\Omega$
		$V_{GS}=4.5V$, $I_D=3A$	---	80	110	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	1.0	1.6	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-5	---	$mV/^\circ\text{C}$
g_{fs}	Forward Transconductance	$V_{DS}=10V$, $I_D=3A$	---	7	---	S

Dynamic and switching Characteristics

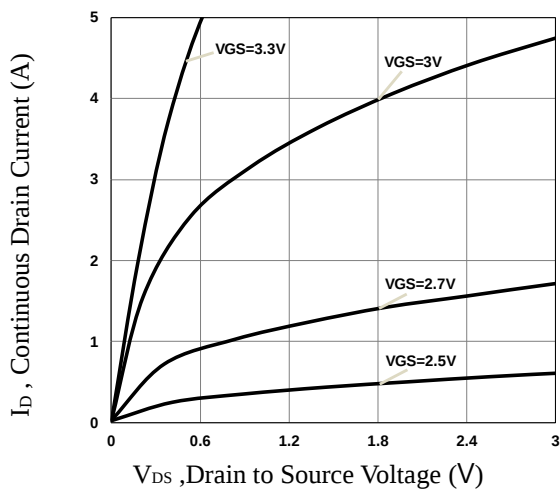
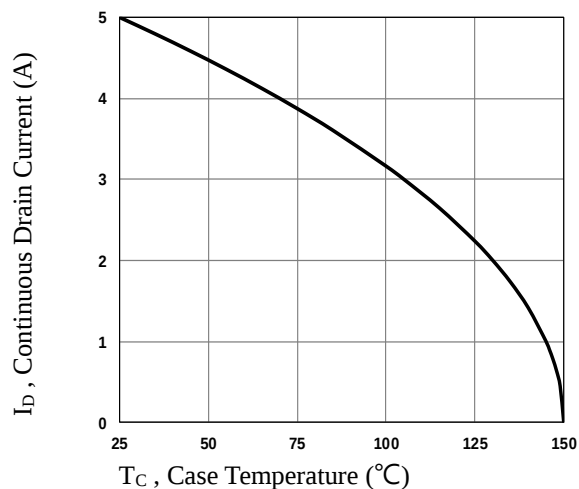
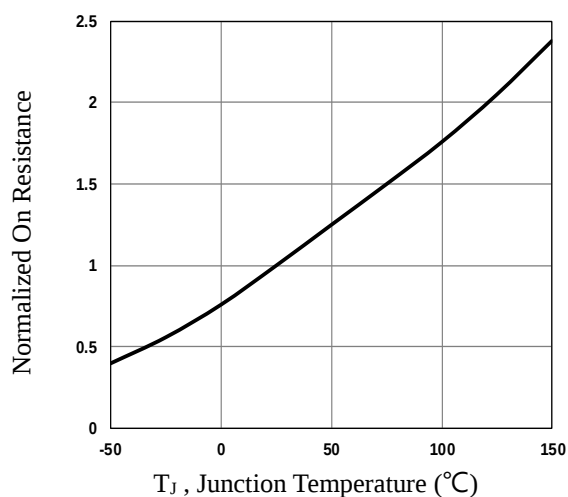
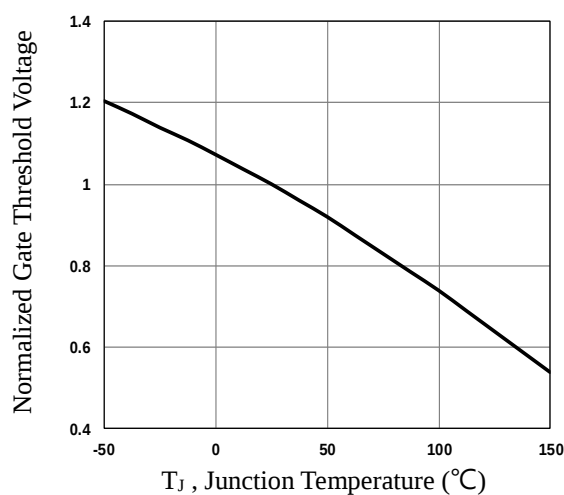
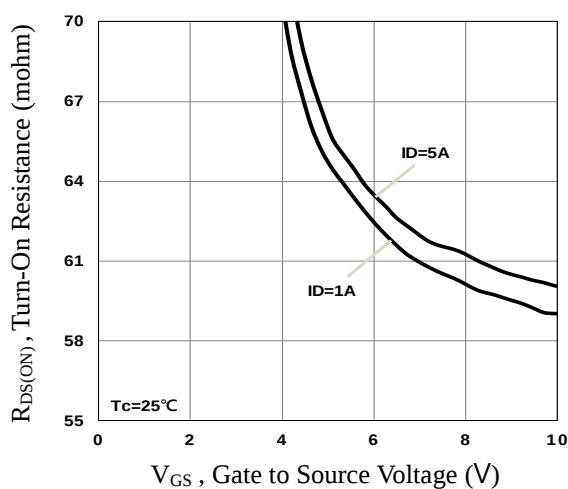
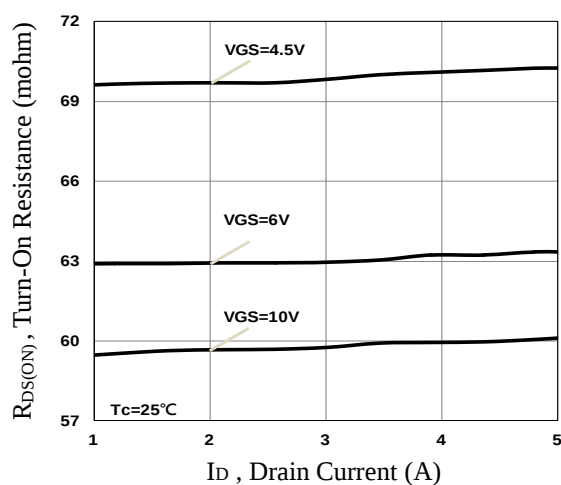
Q_g	Total Gate Charge ^{2, 3}	$V_{DS}=30V$, $V_{GS}=10V$, $I_D=3A$	---	4.6	---	nC
Q_{gs}	Gate-Source Charge ^{2, 3}		---	0.4	---	
Q_{gd}	Gate-Drain Charge ^{2, 3}		---	2	---	
$T_{d(on)}$	Turn-On Delay Time ^{2, 3}	$V_{DD}=30V$, $V_{GS}=10V$, $R_G=6\Omega$ $I_D=3A$	---	2.9	---	ns
T_r	Rise Time ^{2, 3}		---	9.5	---	
$T_{d(off)}$	Turn-Off Delay Time ^{2, 3}		---	18.4	---	
T_f	Fall Time ^{2, 3}		---	5.3	---	
C_{iss}	Input Capacitance	$V_{DS}=30V$, $V_{GS}=0V$, $F=1MHz$	---	360	---	pF
C_{oss}	Output Capacitance		---	30	---	
C_{rss}	Reverse Transfer Capacitance		---	20	---	
R_g	Gate resistance	$V_{GS}=0V$, $V_{DS}=0V$, $F=1MHz$	---	2	---	Ω

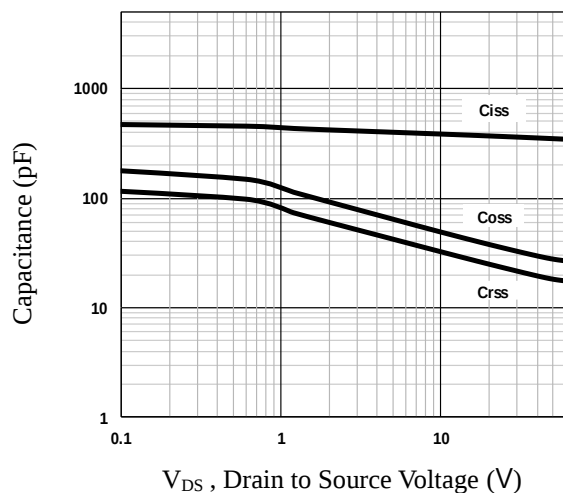
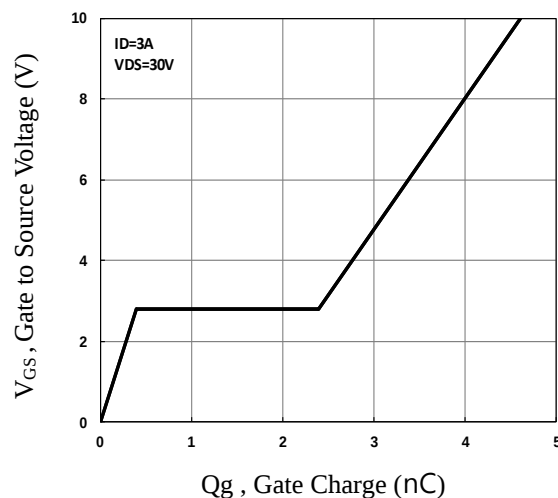
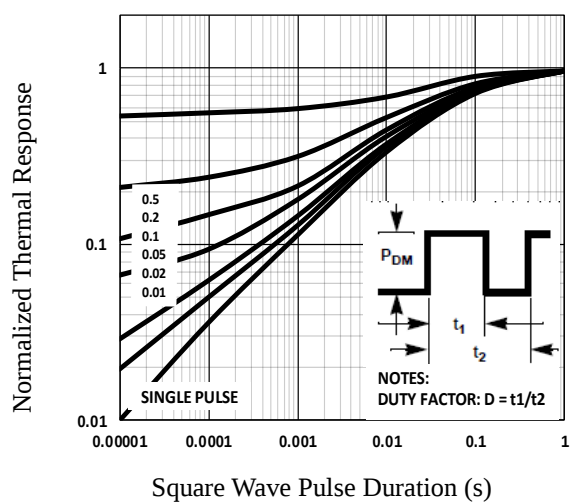
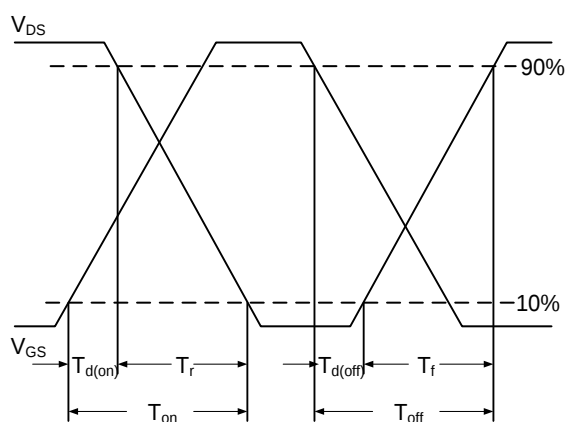
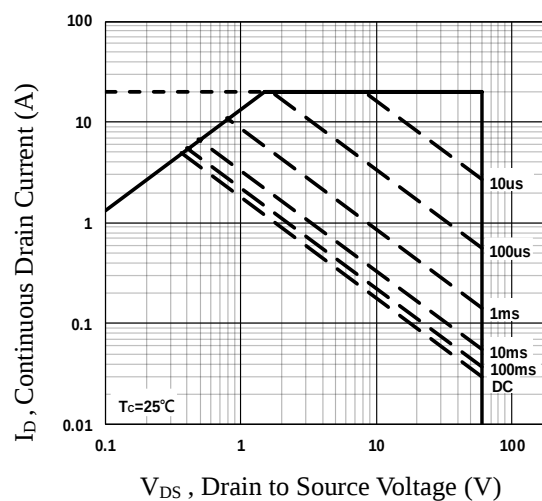
Drain-Source Diode Characteristics and Maximum Ratings

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		---	---	16	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V$, $I_S=1A$, $T_J=25^\circ\text{C}$	---	---	1.2	V
t_{rr}	Reverse Recovery Time ²	$V_R=50V$, $I_S=3A$	---	25	---	ns
Q_{rr}	Reverse Recovery Charge ²	$di/dt=100A/\mu s$, $T_J=25^\circ\text{C}$	---	15	---	nC

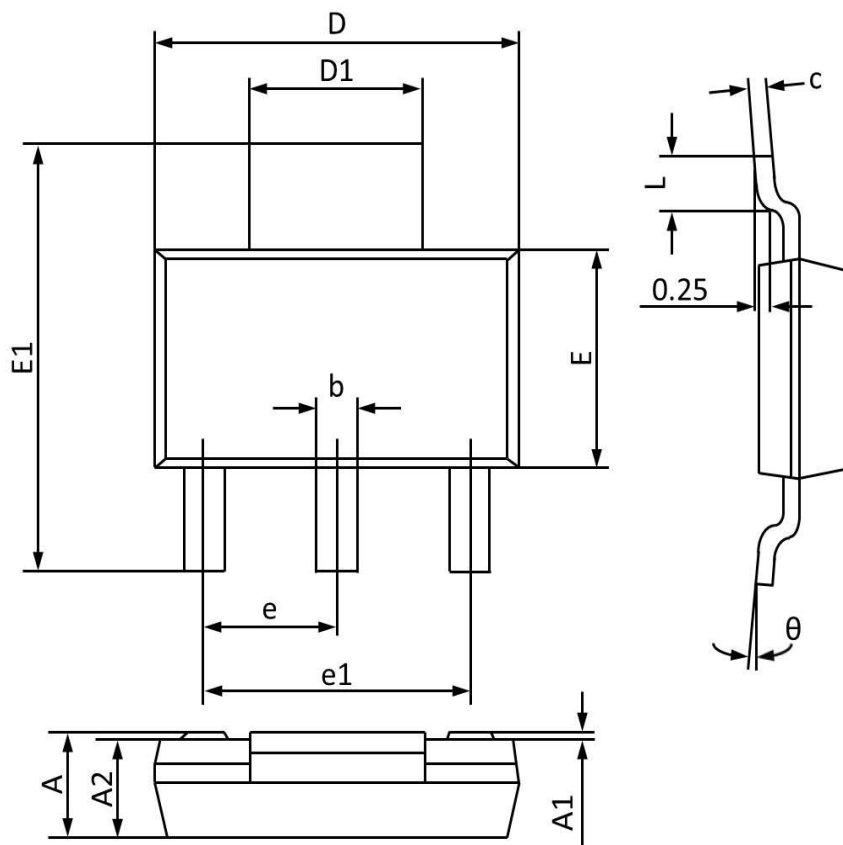
Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V$, $V_{GS}=10V$, $L=0.1mH$, $I_{AS}=12.8A$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$
3. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.


Fig.1 Typical Output Characteristics

Fig.2 Continuous Drain Current vs. T_C

Fig.3 Normalized $R_{DS(on)}$ vs. T_J

Fig.4 Normalized V_{th} vs. T_J

Fig.5 Turn-On Resistance vs. V_{GS}

Fig.6 Turn-On Resistance vs. I_D


Fig.7 Capacitance Characteristics

Fig.8 Gate Charge Characteristics

Fig.9 Normalized Transient Impedance

Fig.11 Switching Time Waveform

SOT223 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.800	1.500	0.071	0.060
A1	0.120	0.000	0.005	0.000
A2	1.750	1.450	0.069	0.057
b	0.820	0.600	0.032	0.024
c	0.350	0.200	0.014	0.008
D	6.700	6.200	0.264	0.244
D1	3.100	2.900	0.122	0.114
E	3.700	3.300	0.146	0.130
E1	7.300	6.700	0.287	0.264
e	2.30(BSC)		0.091(BSC)	
e1	4.700	4.400	0.185	0.173
L	1.150	0.900	0.045	0.035
θ	10°	0°	10°	0°

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