

100V P-Channel MOSFETs

General Description

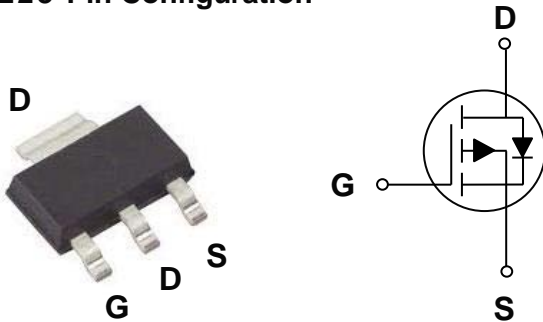
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	RDSON	ID
-100V	200mΩ	-2A

Features

- -100V,-2A, $R_{DS(ON)} = 200m\Omega @ V_{GS} = -10V$
- Improved dv/dt capability
- Fast switching
- Green Device Available

SOT223 Pin Configuration



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	-100	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current – Continuous ($T_A=25^\circ\text{C}$)	-2	A
	Drain Current – Continuous ($T_A=70^\circ\text{C}$)	-1.6	A
I_{DM}	Drain Current – Pulsed ¹	-8	A
EAS	Single Pulse Avalanche Energy ²	24	mJ
IAS	Single Pulse Avalanche Current ²	22	A
P_D	Power Dissipation ($T_A=25^\circ\text{C}$)	1.78	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	$^\circ\text{C}/\text{W}$



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

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-100	---	---	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-100V, V_{GS}=0V, T_J=25\text{ }^\circ\text{C}$	---	---	-1	μA
		$V_{DS}=-80V, V_{GS}=0V, T_J=125\text{ }^\circ\text{C}$	---	---	-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	$V_{GS}=-10V, I_D=-2A$	---	165	200	m Ω
		$V_{GS}=-4.5V, I_D=-1.5A$	---	180	230	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.2	-1.6	-2.2	V
g_{fs}	Forward Transconductance	$V_{DS}=-10V, I_S=-1.5A$	---	6.5	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge ^{2,3}	$V_{DS}=-50V, V_{GS}=-10V, I_D=-1A$	---	20	30	nC
Q_{gs}	Gate-Source Charge ^{2,3}		---	2.4	5	
Q_{gd}	Gate-Drain Charge ^{2,3}		---	3.3	7	
$T_{d(on)}$	Turn-On Delay Time ^{2,3}	$V_{DD}=-50V, V_{GS}=-10V, R_G=6\Omega$ $I_D=-1A$	---	18	27	ns
T_r	Rise Time ^{2,3}		---	8	12	
$T_{d(off)}$	Turn-Off Delay Time ^{2,3}		---	100	150	
T_f	Fall Time ^{2,3}		---	30	45	
C_{iss}	Input Capacitance	$V_{DS}=-50V, V_{GS}=0V, F=1MHz$	---	1280	2000	pF
C_{oss}	Output Capacitance		---	55	100	
C_{rss}	Reverse Transfer Capacitance		---	30	60	
R_g	Gate resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$	---	16	---	Ω

Drain - Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	-2	A
I_{SM}	Pulsed Source Current		---	---	-4	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_S=-1A, T_J=25\text{ }^\circ\text{C}$	---	---	-1	V
t_{rr}	Reverse Recovery Time	$V_R=-100V, I_S=-1A$	---	35	---	ns
Q_{rr}	Reverse Recovery Charge	$di/dt=100A/\mu s, T_J=25\text{ }^\circ\text{C}$	---	30	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=22A, \text{Starting } T_J=25\text{ }^\circ\text{C}$
3. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.

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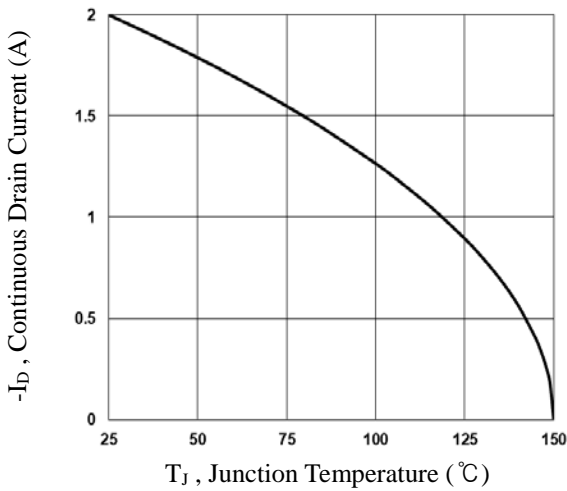


Fig.1 Continuous Drain Current vs. T_J

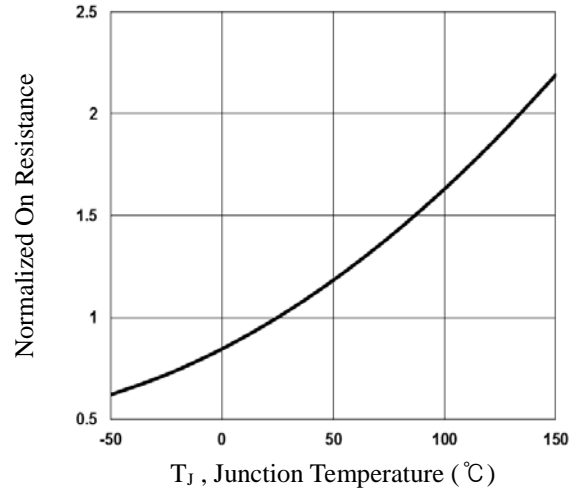


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

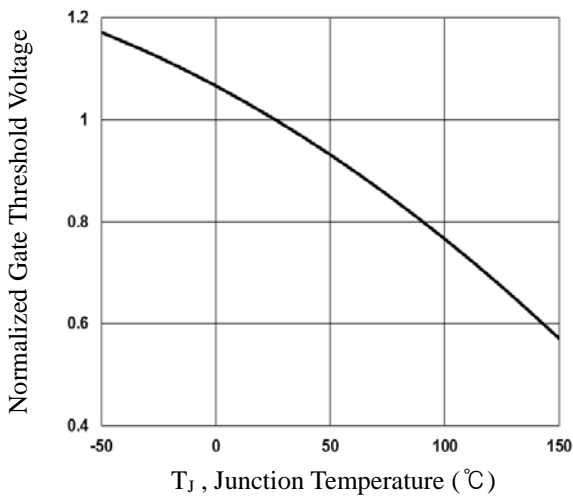


Fig.3 Normalized V_{th} vs. T_J

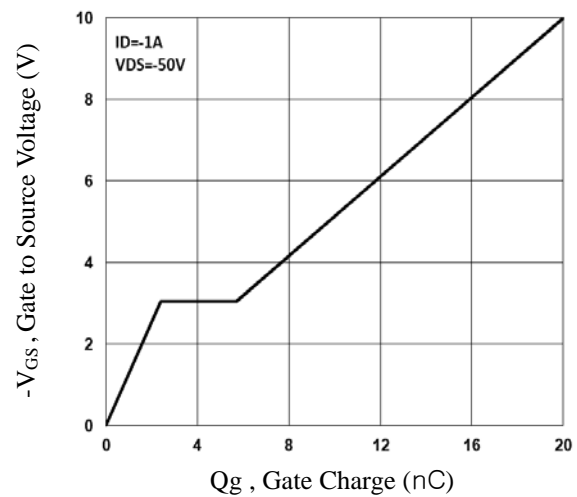


Fig.4 Gate Charge Waveform

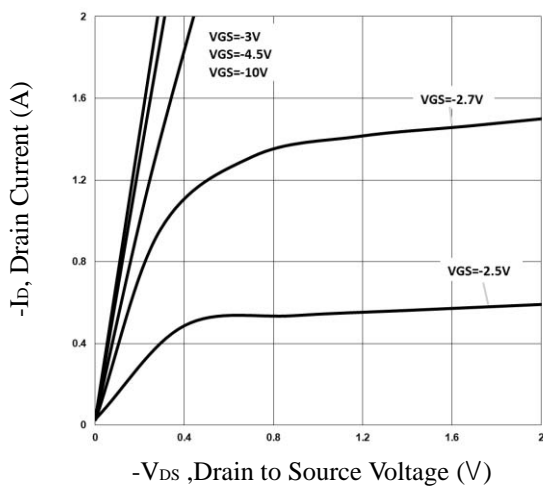


Fig.5 Typical Output Characteristics

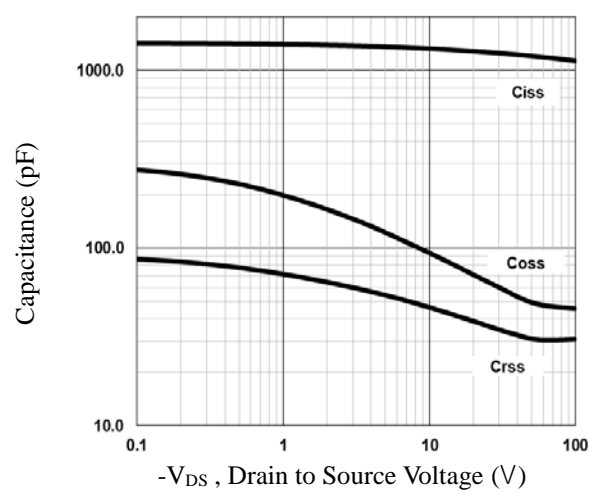


Fig.6 Capacitance Characteristics

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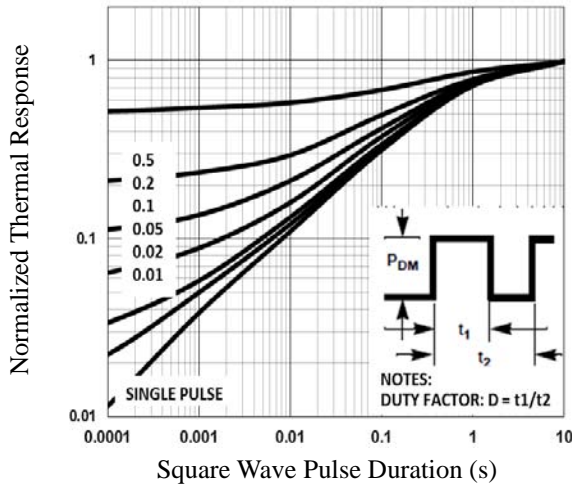


Fig. 7 Normalized Transient Impedance

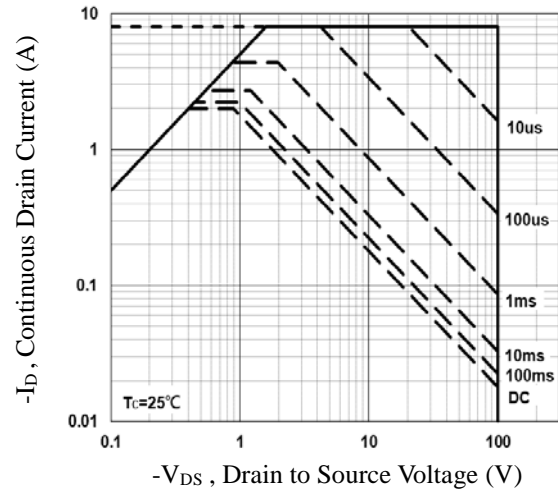


Fig. 8 Maximum Safe Operation Area

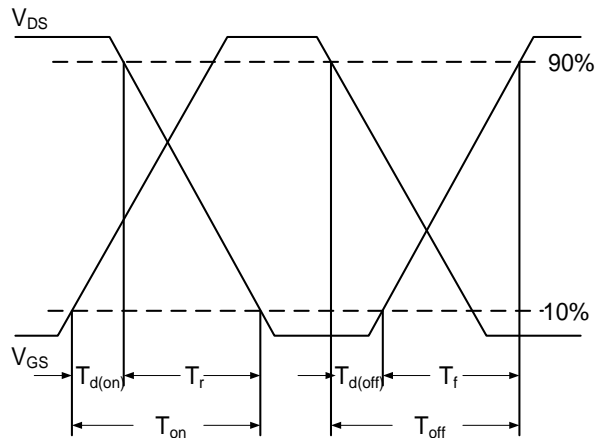


Fig. 9 Switching Time Waveform

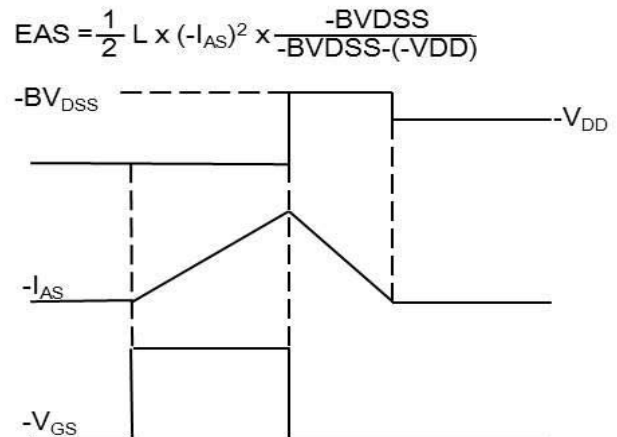
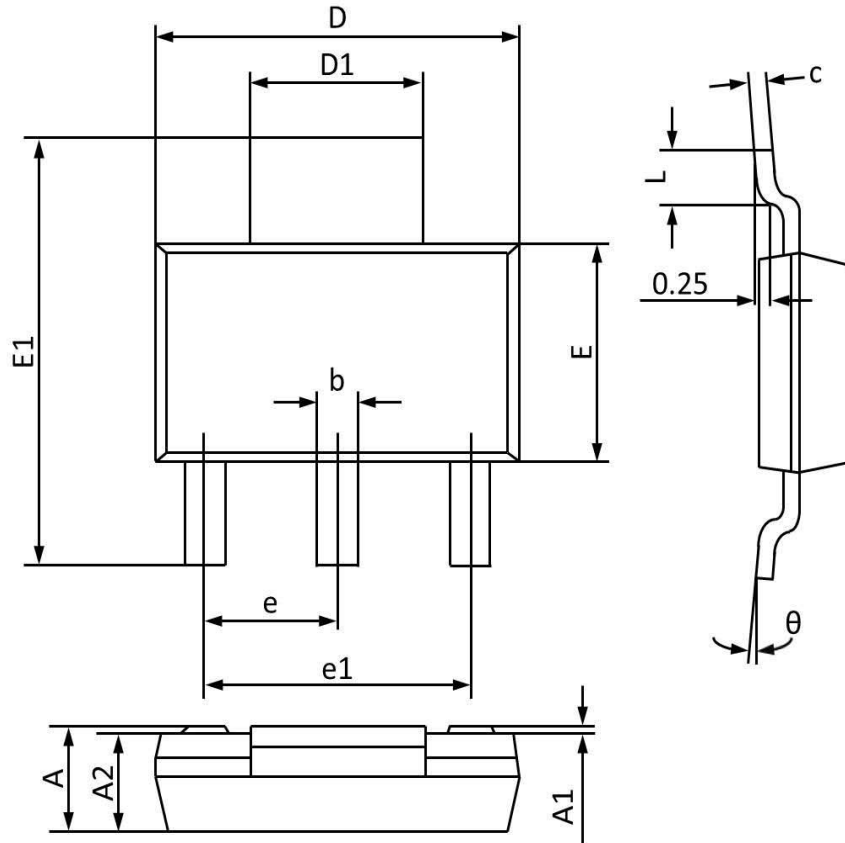


Fig. 10 EAS Waveform

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SOT223 PACKAGE INFORMATION



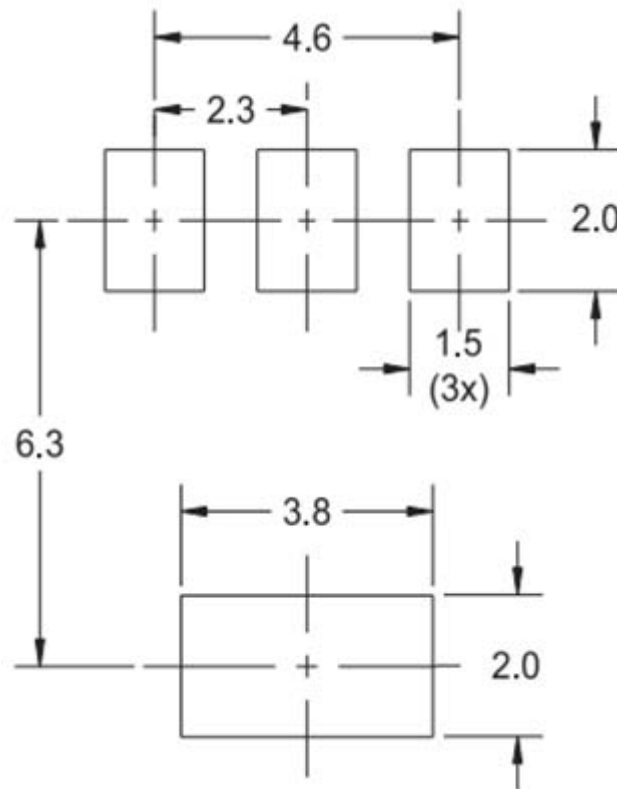
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.800	1.500	0.071	0.060
A1	0.120	0.000	0.005	0.000
A2	1.750	1.450	0.069	0.057
b	0.820	0.600	0.032	0.024
c	0.350	0.200	0.014	0.008
D	6.700	6.200	0.264	0.244
D1	3.100	2.900	0.122	0.114
E	3.700	3.300	0.146	0.130
E1	7.300	6.700	0.287	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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SOT223 RECOMMENDED LAND PATTERN



unit : mm