

General Description

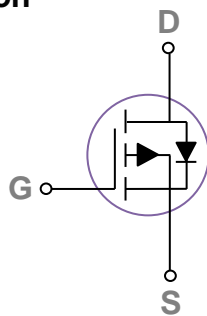
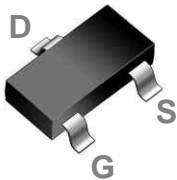
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	R _{DS(ON)}	I _D
-60V	200mΩ	-2A

Features

- -60V, -2A, R_{DS(ON)} = 200mΩ @V_{GS} = -10V
- Improved dv/dt capability
- Fast switching
- Green Device Available

SOT23 Pin Configuration



Applications

- Motor Drive
- Power Tools
- LED Lighting

Absolute Maximum Ratings T_c=25 °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 °C)	-2	A
	Drain Current – Continuous (T _A =70 °C)	-1.6	A
I _{DM}	Drain Current – Pulsed ¹	-6	A
P _D	Power Dissipation (T _A =25 °C)	1.56	W
	Power Dissipation – Derate above 25 °C	0.012	W/°C
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction to ambient	---	80	°C/W



RM2309

Electrical Characteristics (T_J=25°C, 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
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =-1mA	---	-0.05	---	V/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-60V, V _{GS} =0V, T _J =25°C	---	---	-1	uA
		V _{DS} =-48V, V _{GS} =0V, T _J =125°C	---	---	-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 =-2A	---	200	220	mΩ
		V _{GS} =-4.5V, I _D =-1.5A	---	250	300	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-1.2	-1.9	-2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	5	---	mV/°C
g _{fs}	Forward Transconductance	V _{DS} =-10V, I _D =-2A	---	3.5	---	S

Dynamic and switching Characteristics

Q _g	Total Gate Charge ^{2,3}	V _{DS} =-30V, V _{GS} =-10V, I _D =-2A	---	8.2	12	nC
Q _{gs}	Gate-Source Charge ^{2,3}		---	1.8	3.6	
Q _{gd}	Gate-Drain Charge ^{2,3}		---	1.5	3	
T _{d(on)}	Turn-On Delay Time ^{2,3}	V _{DD} =-30V, V _{GS} =-10V, R _G =6Ω I _D =-1A	---	5.2	10	ns
T _r	Rise Time ^{2,3}		---	19	36	
T _{d(off)}	Turn-Off Delay Time ^{2,3}		---	35	67	
T _f	Fall Time ^{2,3}		---	10.6	20	
C _{iss}	Input Capacitance	V _{DS} =-30V, V _{GS} =0V, F=1MHz	---	425	615	pF
C _{oss}	Output Capacitance		---	35	50	
C _{rss}	Reverse Transfer Capacitance		---	20	30	
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	---	17	---	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	---	---	-2	A
I _{SM}	Pulsed Source Current		---	---	-4	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =-1A, T _J =25°C	---	---	-1	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.

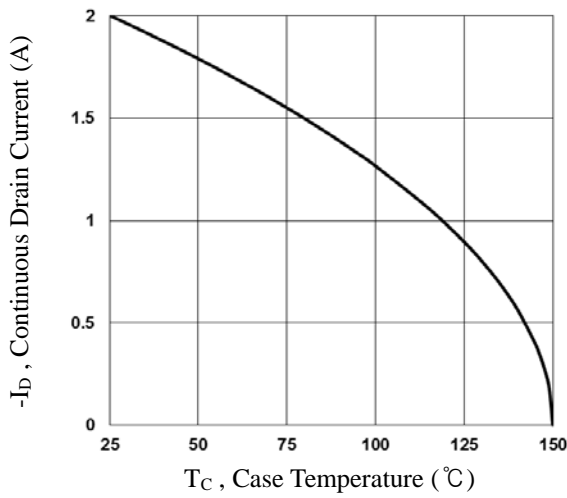


Fig.1 Continuous Drain Current vs. TC

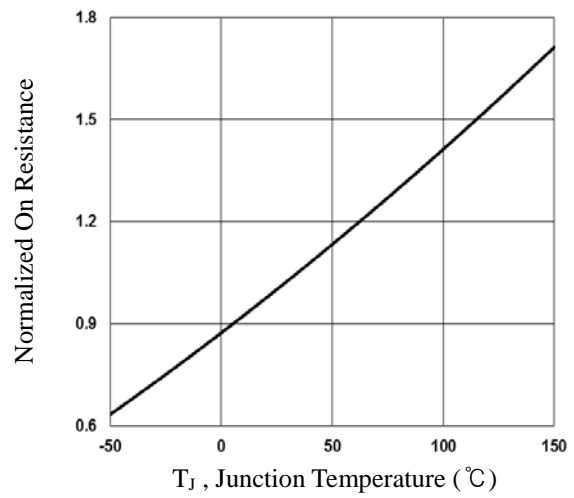


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

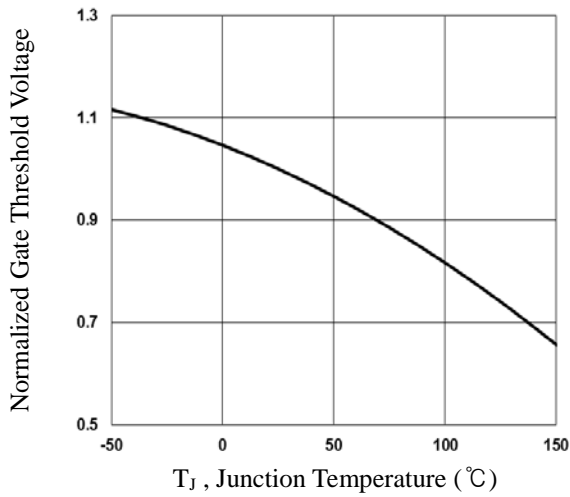


Fig.3 Normalized V_{th} vs. T_J

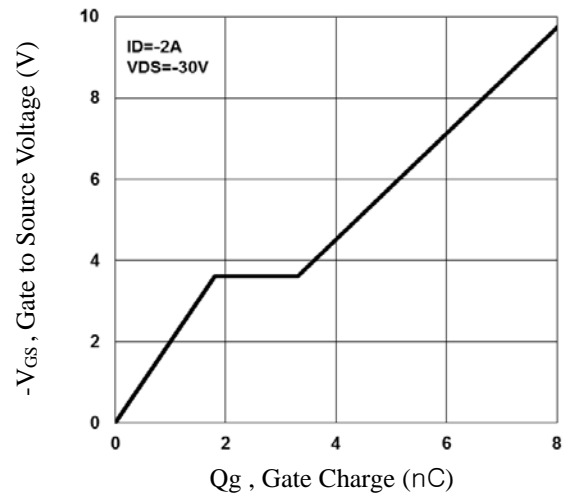


Fig.4 Gate Charge Waveform

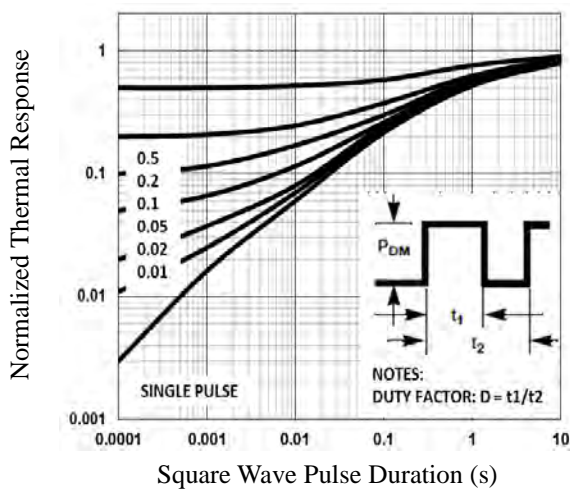


Fig.5 Normalized Transient Impedance

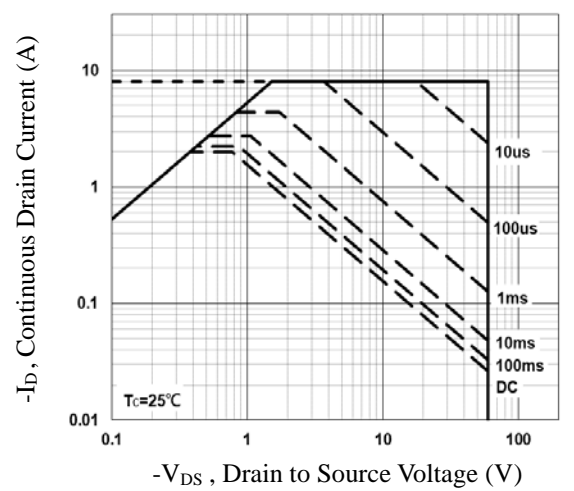


Fig.6 Maximum Safe Operation Area

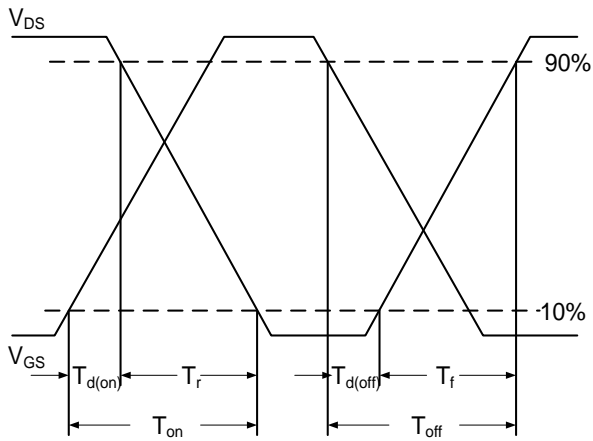


Fig.7 Switching Time Waveform

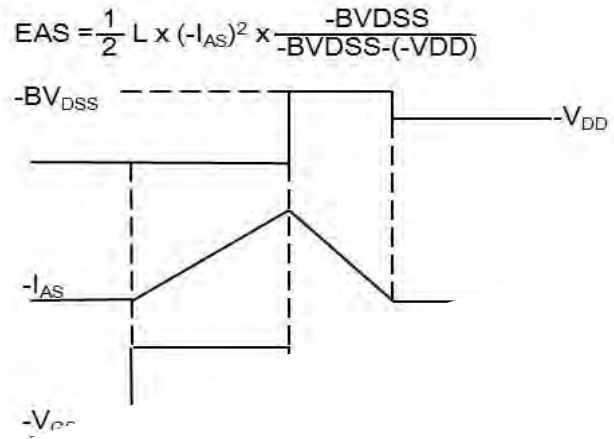
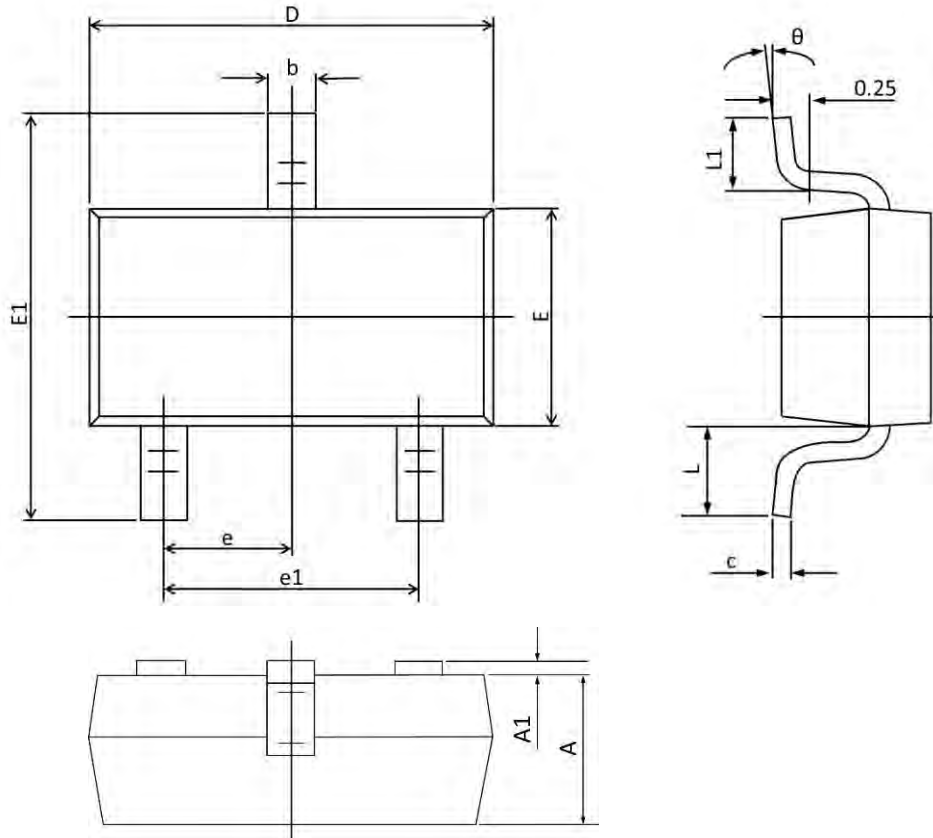


Fig.8 EAS Waveform

SOT23 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.110	0.035	0.044
A1	0.001	0.100	0.000	0.004
b	0.300	0.500	0.012	0.020
c	0.080	0.180	0.003	0.008
D	2.800	3.040	0.110	0.120
E	1.200	1.400	0.047	0.055
E1	2.100	2.640	0.080	0.104
e	0.950 TYP.		0.037 TYP.	
e1	1.780	2.040	0.070	0.080
L	0.550 REF.		0.022 REF.	
L1	0.100	0.500	0.004	0.020
θ	1°	10°	1°	10°