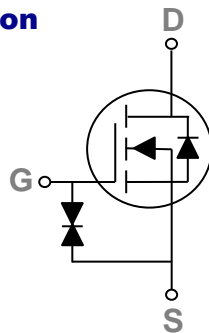


General Description

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.

BVDSS	RDSON	ID
60V	3Ω	0.5A

SOT23-3S Pin Configuration



Features

- 60V,0.5A, $R_{DS(ON)} = 3\Omega @ V_{GS} = 10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available
- G-S ESD Protection Diode Embedded
- ESD protected up to 2KV

Applications

- Motor Drive
- Power Tools
- LED Lighting

Absolute Maximum Ratings $T_c=25^\circ C$ 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 ($T_A=25^\circ C$)	0.5	A
	Drain Current – Continuous ($T_A=70^\circ C$)	0.4	A
I_{DM}	Drain Current – Pulsed ¹	2	A
P_D	Power Dissipation ($T_A=25^\circ C$)	1.56	W
	Power Dissipation – Derate above 25°C	12.5	mW/°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
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	80	°C/W

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 =250μA	60	---	---	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =60V, V _{GS} =0V, T _J =25°C	---	---	1	μA
		V _{DS} =48V, V _{GS} =0V, T _J =125°C	---	---	10	μA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±20	μA

On Characteristics

R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =0.2A	---	1.3	3	Ω
		V _{GS} =4.5V, I _D =0.1A	---	1.5	4	Ω
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250μA	1.2	1.8	2.5	V
g _{fs}	Forward Transconductance	V _{DS} =10V, I _D =0.2A	---	0.5	---	S

Dynamic and switching Characteristics

Q _g	Total Gate Charge ^{2, 3}	V _{DS} =30V, V _{GS} =10V, I _D =0.2A	---	3.7	5.6	nC
Q _{gs}	Gate-Source Charge ^{2, 3}		---	0.9	1.4	
Q _{gd}	Gate-Drain Charge ^{2, 3}		---	0.4	0.6	
T _{d(on)}	Turn-On Delay Time ^{2, 3}	V _{DD} =30V, V _{GS} =10V, R _G =6Ω I _D =0.2A	---	3	6	ns
T _r	Rise Time ^{2, 3}		---	5	10	
T _{d(off)}	Turn-Off Delay Time ^{2, 3}		---	14	27	
T _f	Fall Time ^{2, 3}		---	9	17	
C _{iss}	Input Capacitance	V _{DS} =30V, V _{GS} =0V, F=1MHz	---	25.5	38	pF
C _{oss}	Output Capacitance		---	17	26	
C _{rss}	Reverse Transfer Capacitance		---	7.8	12	

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	---	---	0.5	A
I _{SM}	Pulsed Source Current		---	---	1	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =0.2A, T _J =25°C	---	---	1	V
t _{rr}	Reverse Recovery Time	V _R =50V, I _S =0.2A	---	3.4	---	ns
Q _{rr}	Reverse Recovery Charge	di/dt=100A/μs, T _J =25°C	---	0.7	---	nC

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.

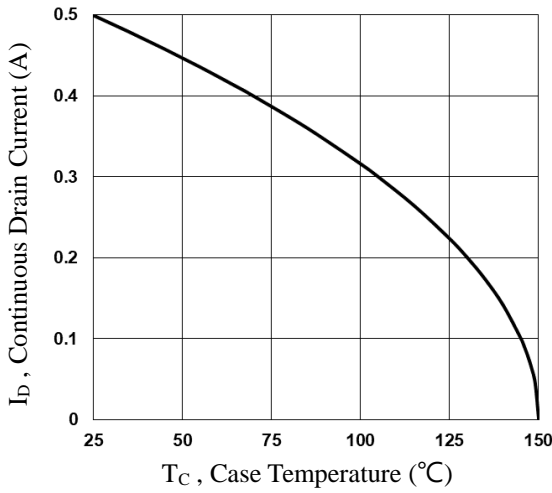


Fig.1 Continuous Drain Current vs. T_c

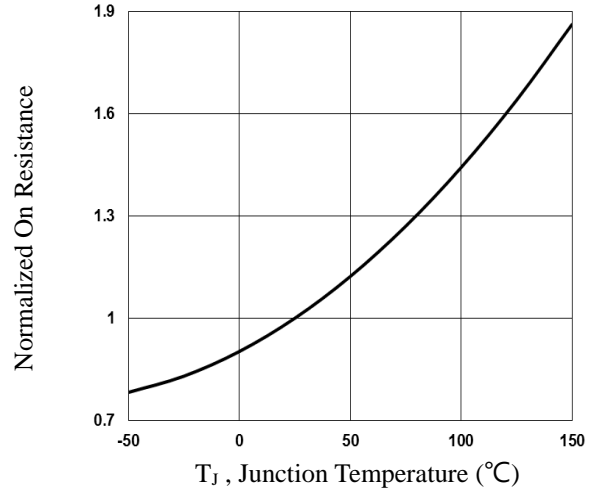


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

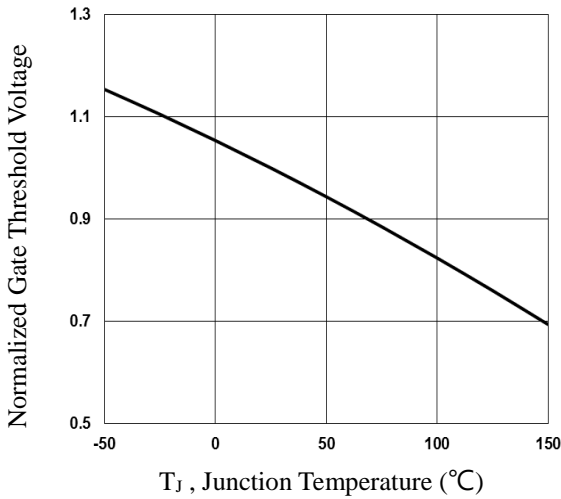


Fig.3 Normalized V_{th} vs. T_j

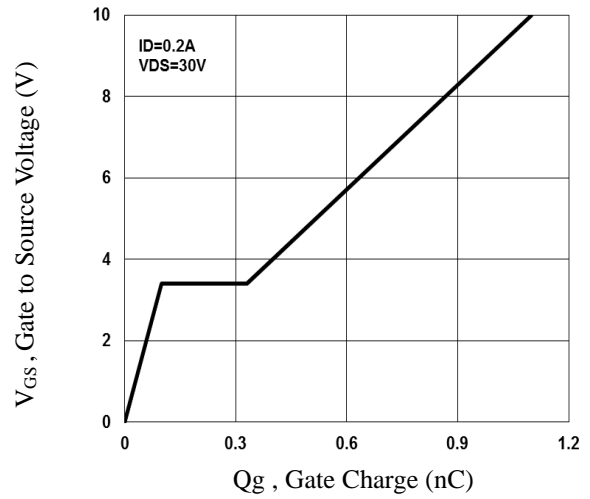


Fig.4 Gate Charge Waveform

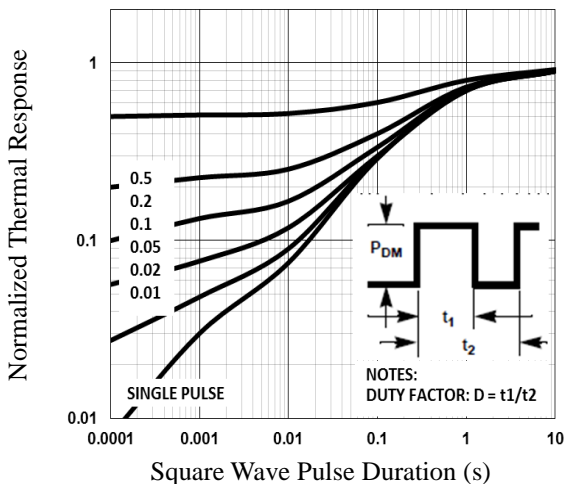


Fig.5 Normalized Transient Impedance

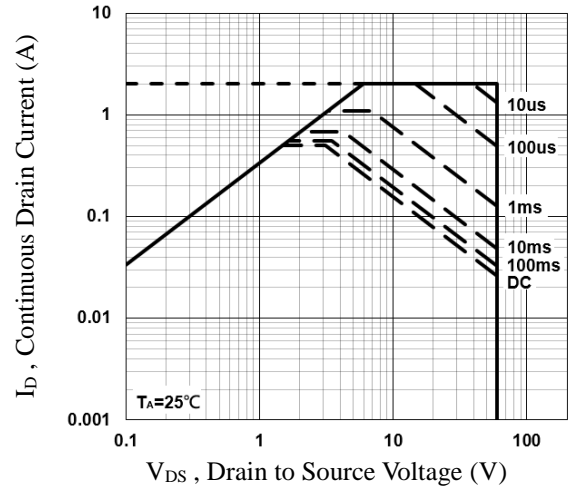


Fig.6 Maximum Safe Operation Area

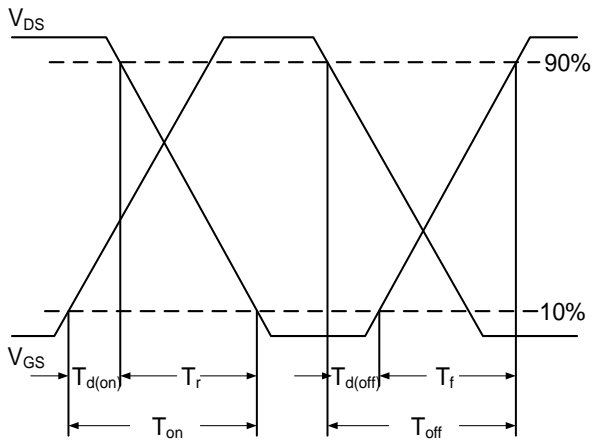


Fig.7 Switching Time Waveform

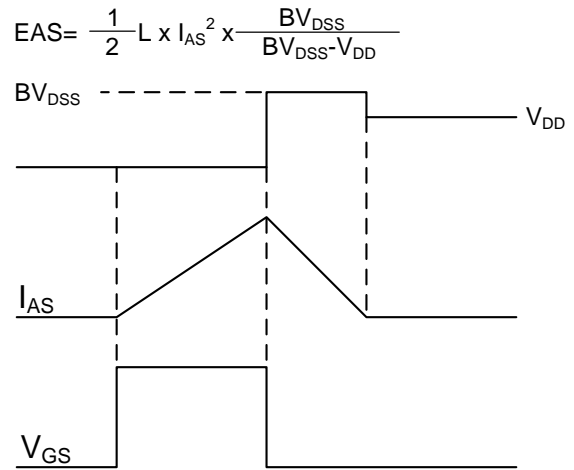
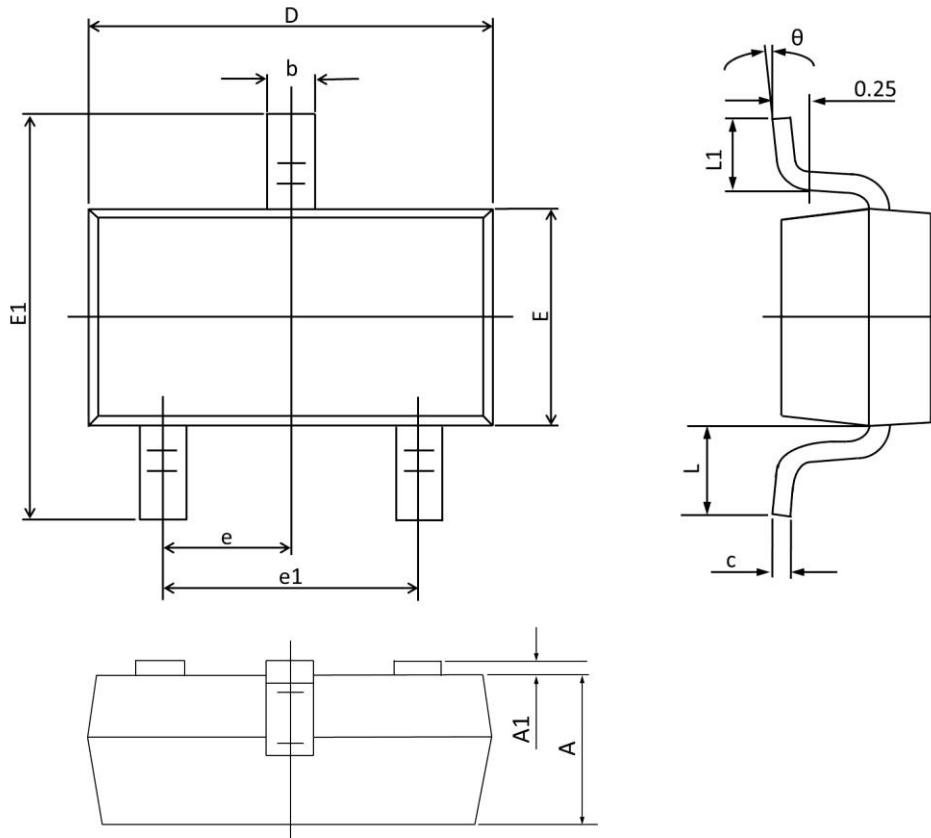


Fig.8 EAS Waveform

SOT23-3S PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max		Min
A	0.900	1.110	A	0.900
A1	0.001	0.100	A1	0.001
b	0.300	0.500	b	0.300
c	0.080	0.180	c	0.080
D	2.800	3.040	D	2.800
E	1.200	1.400	E	1.200
E1	2.100	2.640	E1	2.100
e	0.950 TYP.		0.037 TYP.	
e1	1.780	2.040	e1	1.780
L	0.550 REF.		0.022 REF.	
L1	0.100	0.500	L1	0.100
θ	1°	10°	θ	1°