

General Description

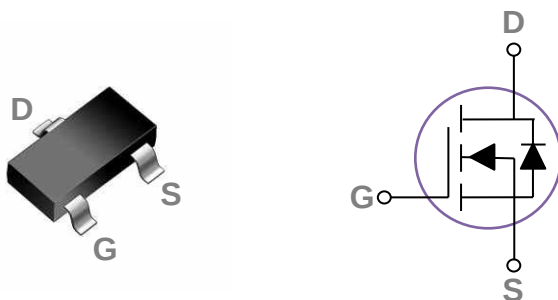
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	RDS(ON)	ID
40V	46mΩ	4A

Features

- 40V, 4A, $R_{DS(ON)} = 46m\Omega$ @ $V_{GS} = 10V$
- Improved dv/dt capability
- Fast switching
- Green Device Available

SOT23-3S Pin Configuration



Applications

- MB / VGA / Vcore
- Load Switch
- Hand-Held Instrument

Absolute Maximum Ratings $T_c=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current – Continuous ($T_A=25^\circ\text{C}$)	4	A
	Drain Current – Continuous ($T_A=70^\circ\text{C}$)	3.2	A
I_{DM}	Drain Current – Pulsed ¹	16	A
P_D	Power Dissipation ($T_A=25^\circ\text{C}$)	1.56	W
	Power Dissipation – Derate above 25°C	0.012	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	---	80	$^\circ\text{C/W}$

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	$V_{GS}=0V$, $I_D=250\mu A$	40	---	---	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=40V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=32V$, $V_{GS}=0V$, $T_J=125^\circ\text{C}$	---	---	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	$V_{GS}=10V$, $I_D=3A$	---	38	46	$m\Omega$
		$V_{GS}=4.5V$, $I_D=2A$	---	53	69	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	1.2	1.8	2.5	V

Dynamic and switching Characteristics

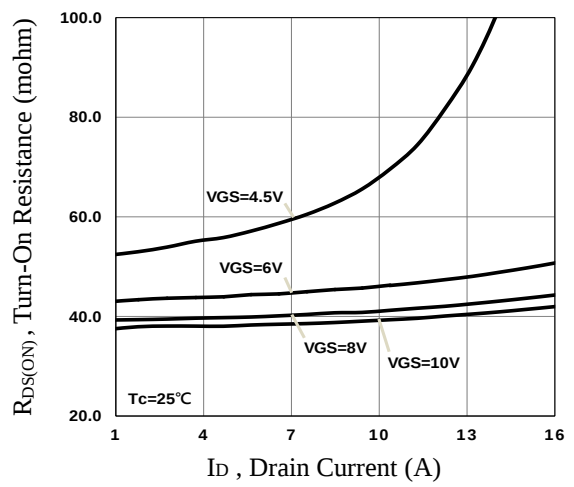
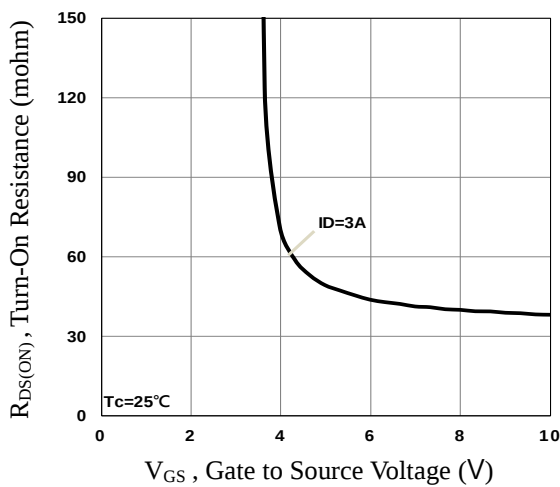
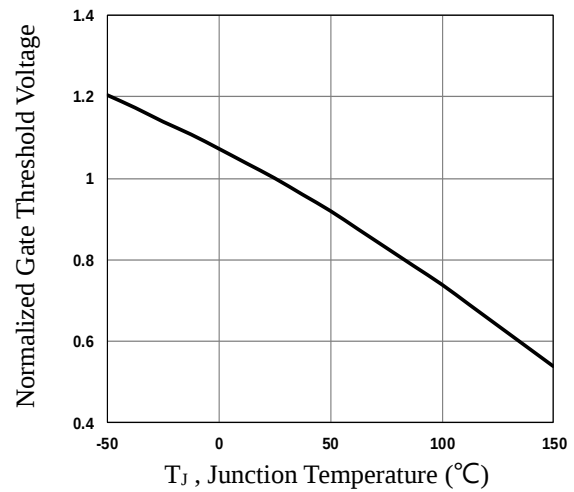
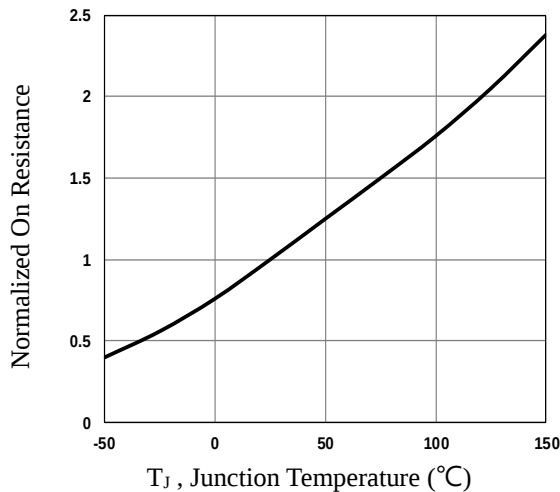
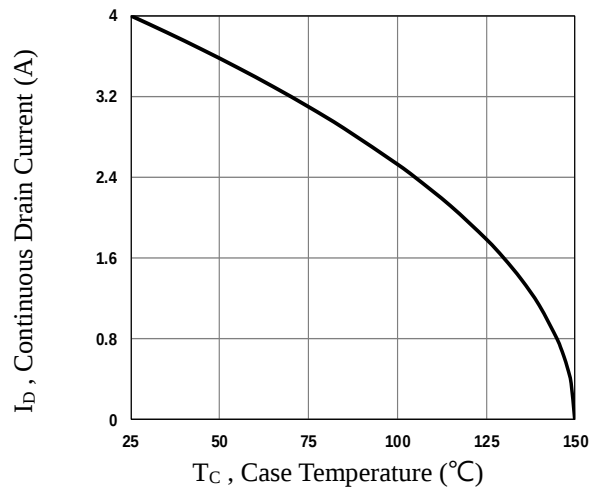
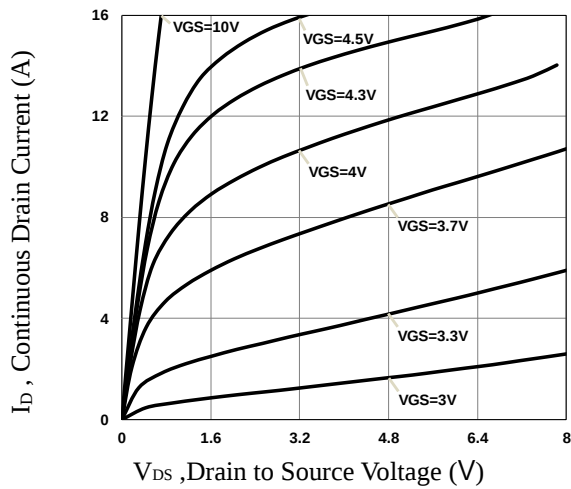
Q_g	Total Gate Charge ^{2, 3}	$V_{DS}=20V$, $V_{GS}=10V$, $I_D=2A$	---	4.5	7	nC
			---	2.4	4	
			---	0.52	2	
Q_{gs}	Gate-Source Charge ^{2, 3}	$V_{DS}=20V$, $V_{GS}=4.5V$, $I_D=2A$	---	1.1	3	ns
Q_{gd}	Gate-Drain Charge ^{2, 3}		---	2	7.5	
$T_{d(on)}$	Turn-On Delay Time ^{2, 3}		---	18	30	
T_r	Rise Time ^{2, 3}	$V_{DD}=20V$, $V_{GS}=10V$, $R_G=25\Omega$ $I_D=2A$	---	9	15	pF
$T_{d(off)}$	Turn-Off Delay Time ^{2, 3}		---	255	400	
T_f	Fall Time ^{2, 3}		---	40	60	
C_{iss}	Input Capacitance	$V_{DS}=20V$, $V_{GS}=0V$, $F=1\text{MHz}$	---	25	40	Ω
C_{oss}	Output Capacitance		---	1.4	---	
C_{rss}	Reverse Transfer Capacitance		---	---	---	
R_g	Gate resistance	$V_{GS}=0V$, $V_{DS}=0V$, $F=1\text{MHz}$	---	---	---	

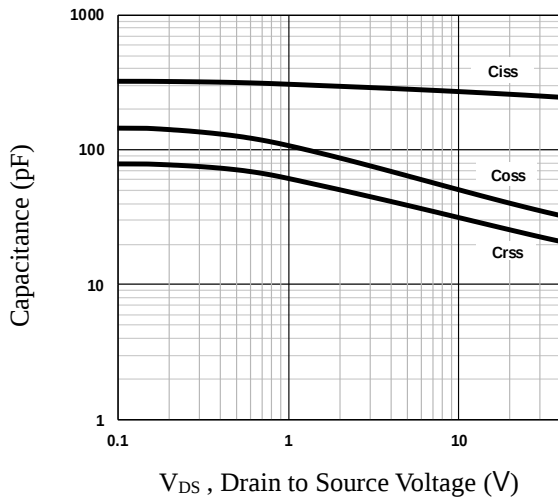
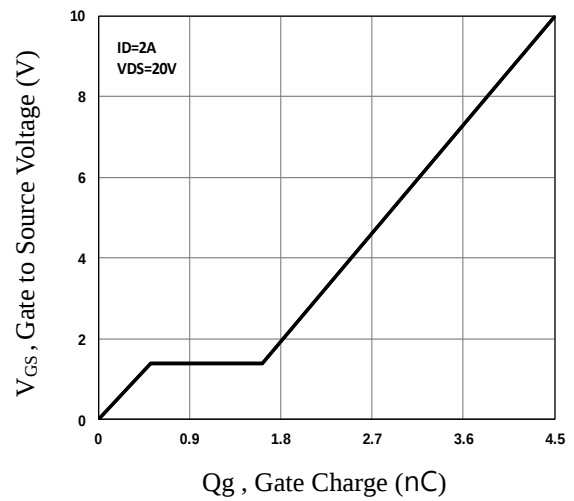
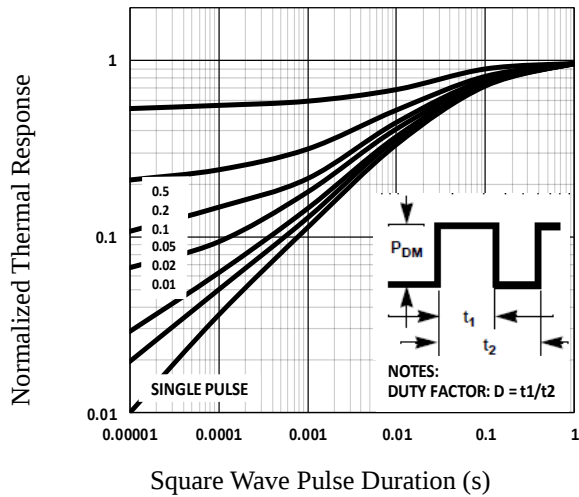
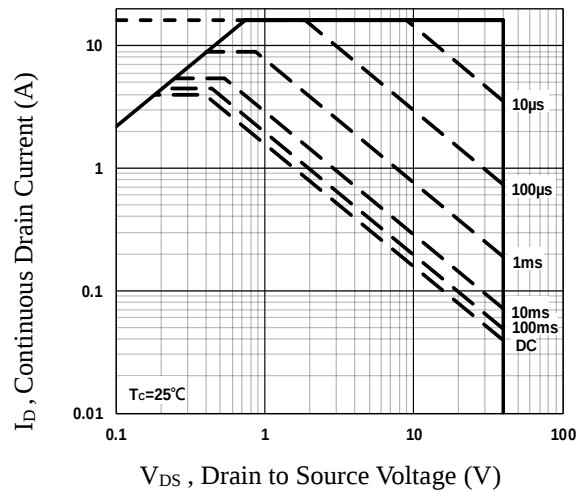
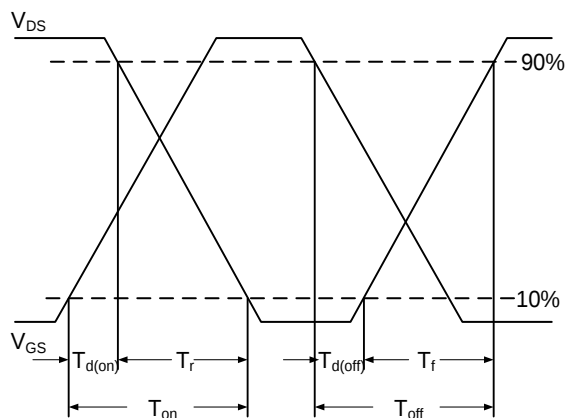
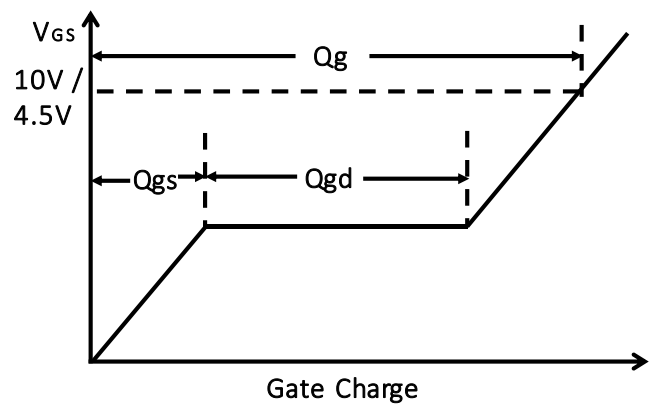
Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	4	A
I_{SM}	Pulsed Source Current		---	---	8	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V$, $I_S=1A$, $T_J=25^\circ\text{C}$	---	---	1	V
t_{rr}	Reverse Recovery Time	$V_R=30V$, $I_S=2A$ $di/dt=100A/\mu s$, $T_J=25^\circ\text{C}$	---	16	---	ns
Q_{rr}	Reverse Recovery Charge		---	5.5	---	nC

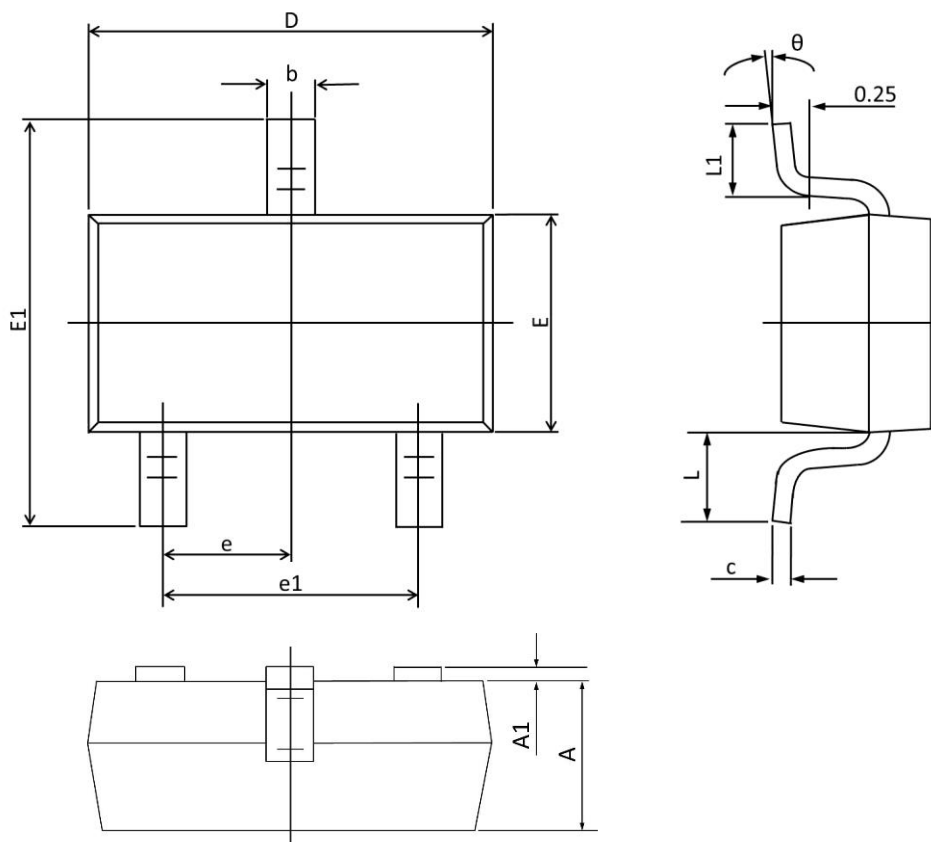
Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
3. Essentially independent of operating temperature.



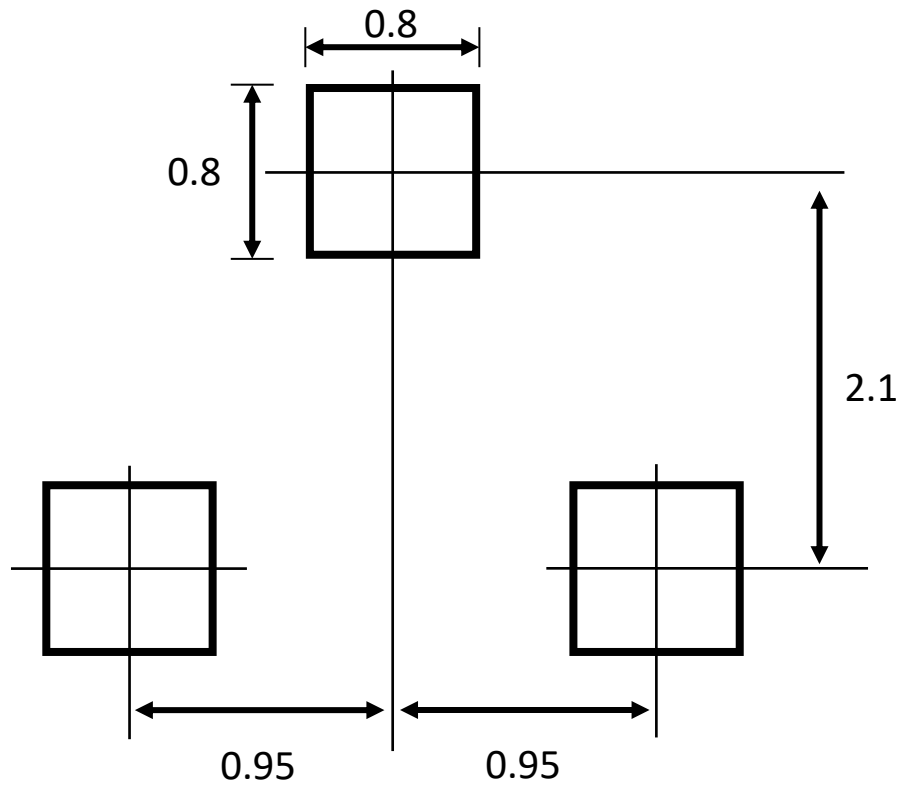

Fig.7 Capacitance Characteristics

Fig.8 Gate Charge Characteristics

Fig.9 Normalized Transient Impedance

Fig.10 Maximum Safe Operation Area

Fig.11 Switching Time Waveform

Fig.12 Gate Charge Waveform

SOT23-3S PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
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	2.700	3.100	0.106	0.122
E	1.100	1.500	0.043	0.059
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°

SOT23-3S RECOMMENDED LAND PATTERN



unit : mm