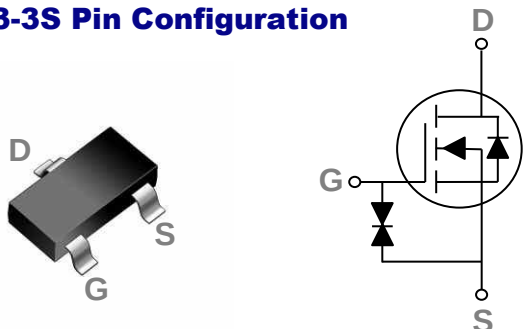


General Description

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.

SOT23-3S Pin Configuration



BVDSS	RDS(ON)	ID
50V	3.5Ω	0.3A

Features

- 50V, 0.3A, $R_{DS(ON)} = 3.5\Omega @ V_{GS} = 10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available
- G-S ESD Protection Diode Embedded

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	50	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current – Continuous ($T_c = 25^\circ\text{C}$)	0.3	A
	Drain Current – Continuous ($T_c = 100^\circ\text{C}$)	0.2	A
I_{DM}	Drain Current – Pulsed ¹	1.2	A
P_D	Power Dissipation ($T_c = 25^\circ\text{C}$)	0.35	W
	Power Dissipation – Derate above 25°C	0.003	W/ $^\circ\text{C}$
T_{STG}	Storage Temperature Range	-50 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-50 to 150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	357	$^\circ\text{C/W}$

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	$V_{GS}=0V$, $I_D=250\mu A$	50	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=1mA$	---	0.04	---	$V/^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=50V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=40V$, $V_{GS}=0V$, $T_J=125^\circ\text{C}$	---	---	100	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 10	μA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V$, $I_D=0.5A$	---	1.2	3.5	Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	1	1.6	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4	---	$mV/^\circ\text{C}$
g_{fs}	Forward Transconductance	$V_{DS}=10V$, $I_D=0.1A$	---	0.24	---	S

Dynamic and switching Characteristics

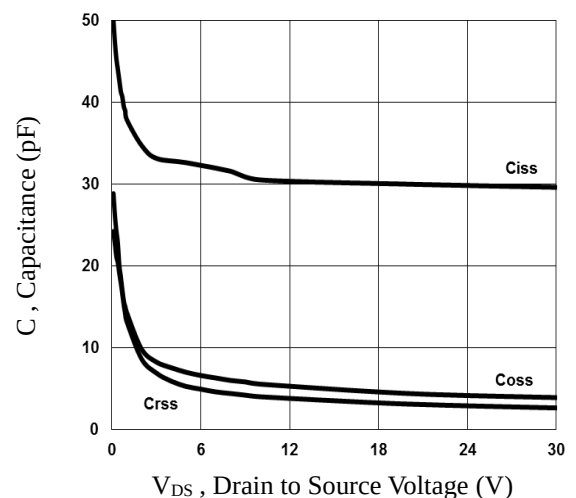
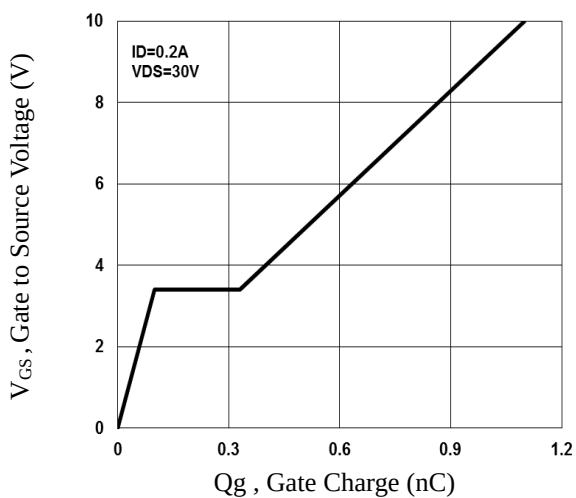
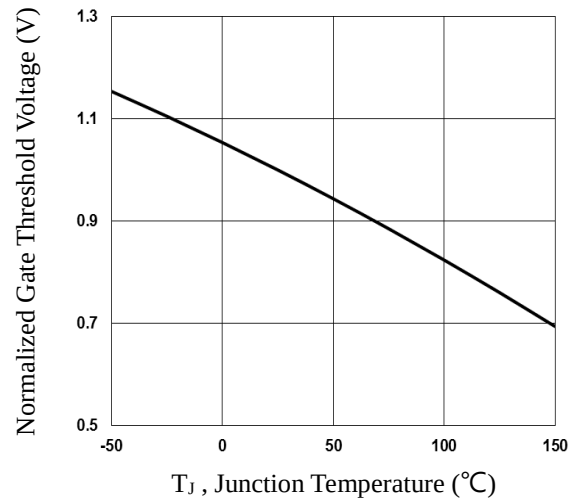
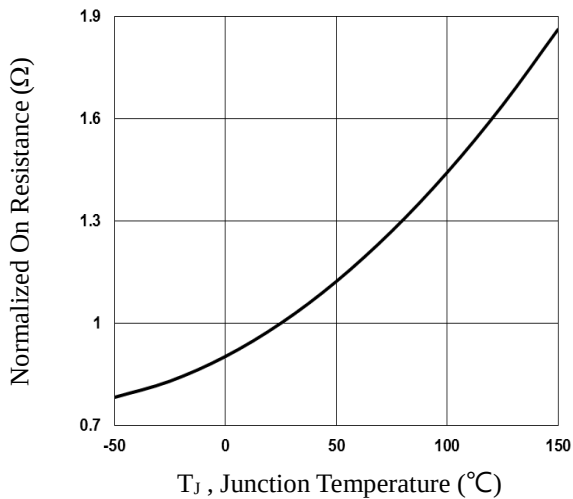
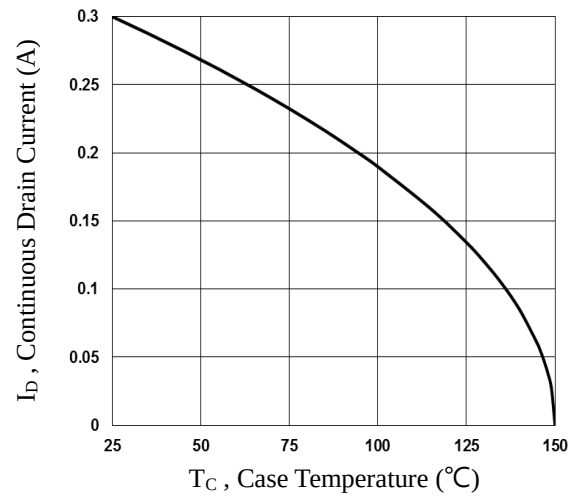
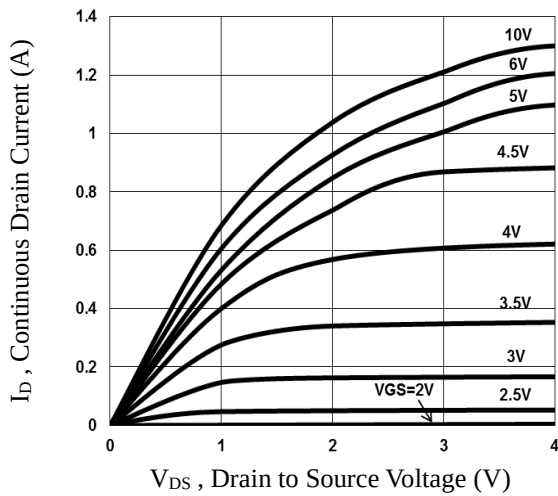
Q_g	Total Gate Charge ^{2, 3}	$V_{DS}=30V$, $V_{GS}=10V$, $I_D=0.2A$	---	1.1	2	nC
Q_{gs}	Gate-Source Charge ^{2, 3}		---	0.1	0.2	
Q_{gd}	Gate-Drain Charge ^{2, 3}		---	0.23	0.5	
$T_{d(on)}$	Turn-On Delay Time ^{2, 3}	$V_{DD}=30V$, $V_{GS}=10V$, $R_G=6\Omega$ $I_D=0.2A$	---	3	6	ns
T_r	Rise Time ^{2, 3}		---	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	$V_{DS}=10V$, $V_{GS}=0V$, $F=1MHz$	---	30.6	45	pF
C_{oss}	Output Capacitance		---	5.5	10	
C_{rss}	Reverse Transfer Capacitance		---	4	8	

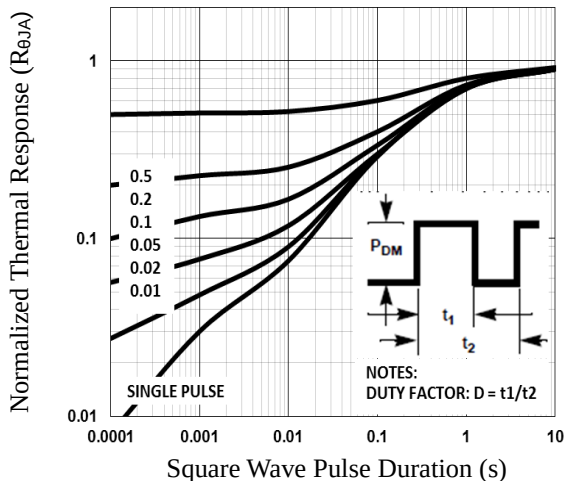
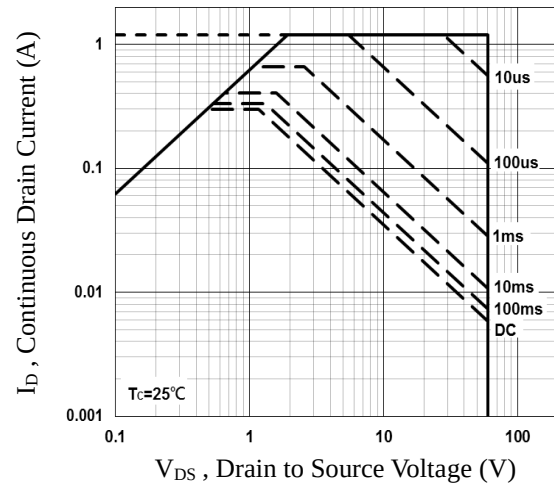
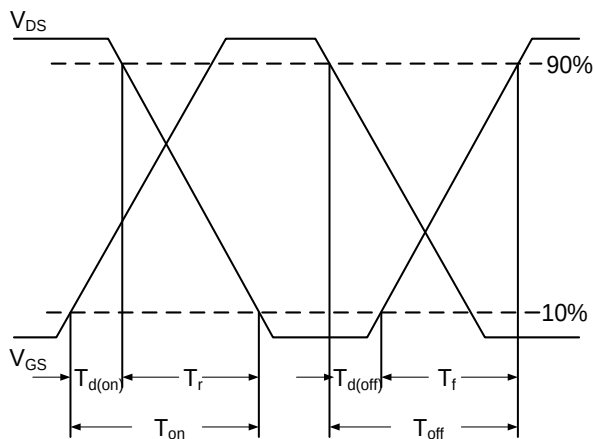
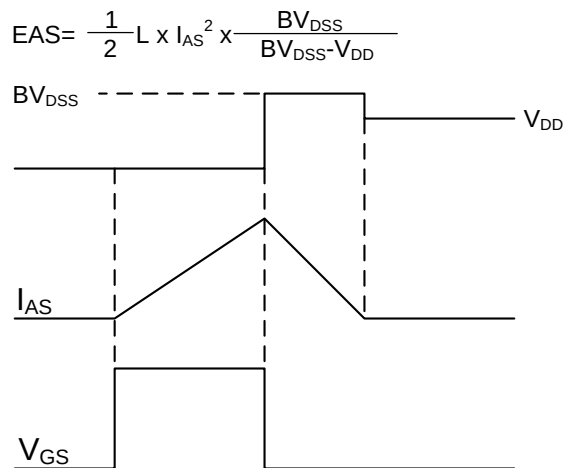
Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	0.3	A
I_{SM}	Pulsed Source Current		---	---	1.2	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 ²	$V_{GS}=30V, I_S=1A$, $dI/dt=100A/\mu s$ $T_J=25^\circ\text{C}$	---	---	---	ns
Q_{rr}	Reverse Recovery Charge ²		---	---	---	nC

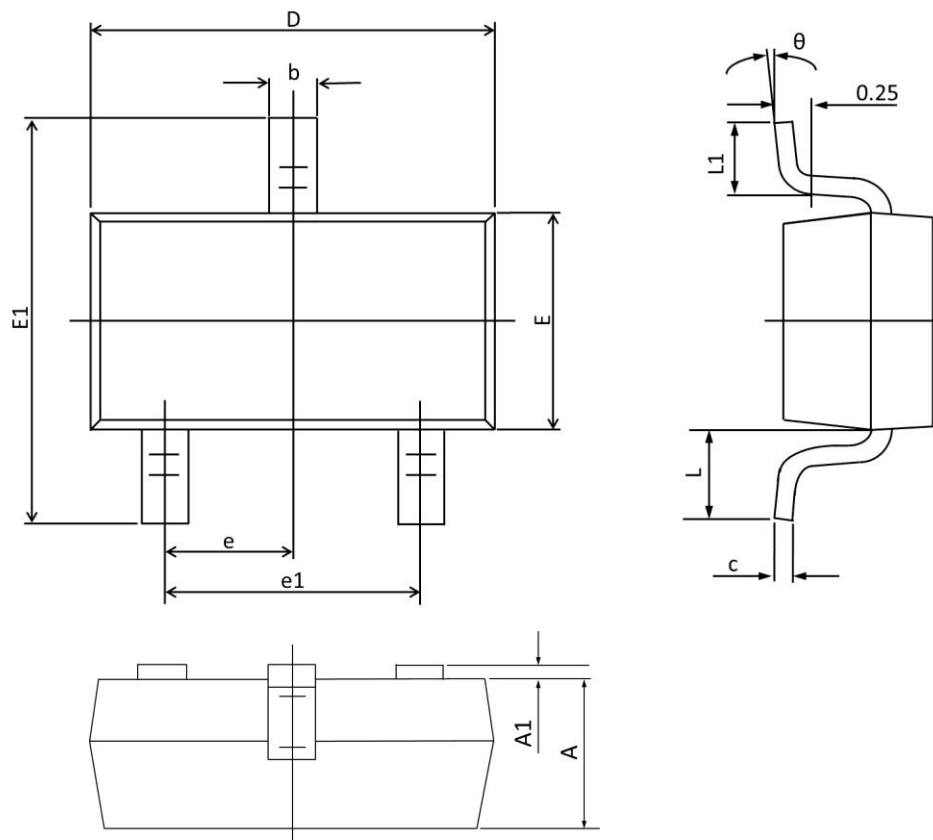
Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V, V_{GS}=10V, L=1mH, I_{AS}=7A, R_G=25\Omega$, 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.7 Normalized Transient Impedance

Fig.8 Maximum Safe Operation Area

Fig.9 Switching Time Waveform

Fig.10 EAS Waveform

SOT23-3S PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.000	0.035	0.039
A1	0.000	0.100	0.000	0.004
b	0.300	0.500	0.012	0.020
c	0.090	0.110	0.003	0.004
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	1°	7°	1°	7°