

### General Description

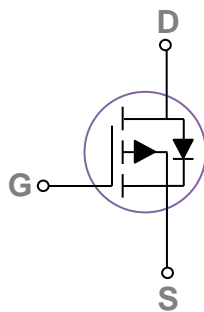
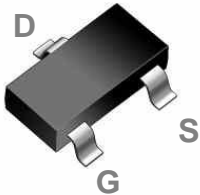
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	RDSON	ID
-60V	95mΩ	-3A

### Features

- -60V,-3A,  $R_{DS(ON)} = 95m\Omega @ V_{GS} = -10V$
- Fast switching
- Green Device Available
- RoHS compliant & Halogen Free

### SOT23 Pin Configuration



### Applications

- Notebook
- Load Switch
- Battery Protection
- Hand-held Instruments

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	-60	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current – Continuous ( $T_A=25^\circ\text{C}$ )	-3	A
	Drain Current – Continuous ( $T_A=70^\circ\text{C}$ )	-2.4	A
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	-12	A
EAS	Single Pulse Avalanche Energy <sup>2</sup>	25	mJ
IAS	Single Pulse Avalanche Current <sup>2</sup>	-18	A
$P_D$	Power Dissipation ( $T_A=25^\circ\text{C}$ )	1.56	W
	Power Dissipation – Derate above $25^\circ\text{C}$	0.0125	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	$^\circ\text{C}/\text{W}$

**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	$V_{GS}=0V, I_D=-250\mu A$	-60	---	---	V
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=-60V, V_{GS}=0V, T_J=25^\circ C$	---	---	-1	$\mu A$
		$V_{DS}=-48V, V_{GS}=0V, T_J=125^\circ C$	---	---	-10	$\mu A$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA

**On Characteristics**

$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-10V, I_D=-2A$	---	79	95	$m\Omega$
		$V_{GS}=-4.5V, I_D=-1A$	---	99	129	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.2	-1.6	-2.5	V
gfs	Forward Transconductance	$V_{DS}=-10V, I_D=-1A$	---	3	---	S

**Dynamic and switching Characteristics**

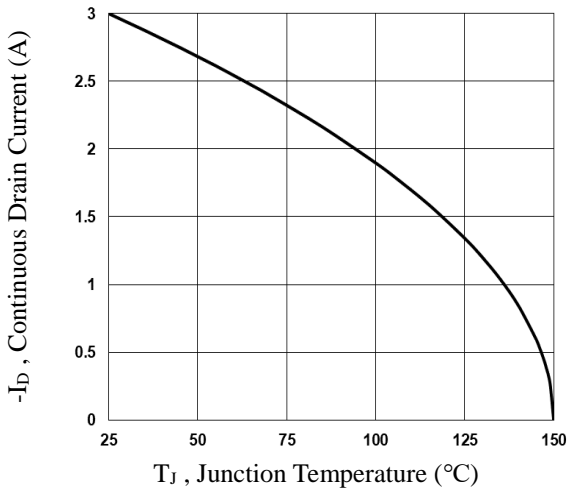
$Q_g$	Total Gate Charge <sup>3, 4</sup>	$V_{DS}=-30V, V_{GS}=-10V, I_D=-1A$	---	10	15	nC
$Q_{gs}$	Gate-Source Charge <sup>3, 4</sup>		---	1.6	2.4	
$Q_{gd}$	Gate-Drain Charge <sup>3, 4</sup>		---	3	4.5	
$T_{d(on)}$	Turn-On Delay Time <sup>3, 4</sup>	$V_{DD}=-30V, V_{GS}=-10V, R_G=6\Omega, I_D=-1A$	---	8	12	ns
$T_r$	Rise Time <sup>3, 4</sup>		---	15.4	23	
$T_{d(off)}$	Turn-Off Delay Time <sup>3, 4</sup>		---	42.8	64	
$T_f$	Fall Time <sup>3, 4</sup>		---	8.4	13	
$C_{iss}$	Input Capacitance	$V_{DS}=-30V, V_{GS}=0V, F=1MHz$	---	785	1178	pF
$C_{oss}$	Output Capacitance		---	175	263	
$C_{rss}$	Reverse Transfer Capacitance		---	112	168	

**Drain-Source Diode Characteristics and Maximum Ratings**

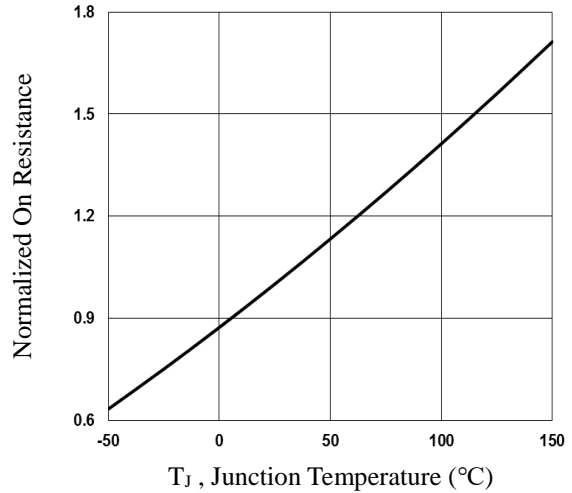
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	-3	A
$I_{SM}$	Pulsed Source Current		---	---	-6	A
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0V, I_S=-1A, T_J=25^\circ C$	---	---	-1	V

Note :

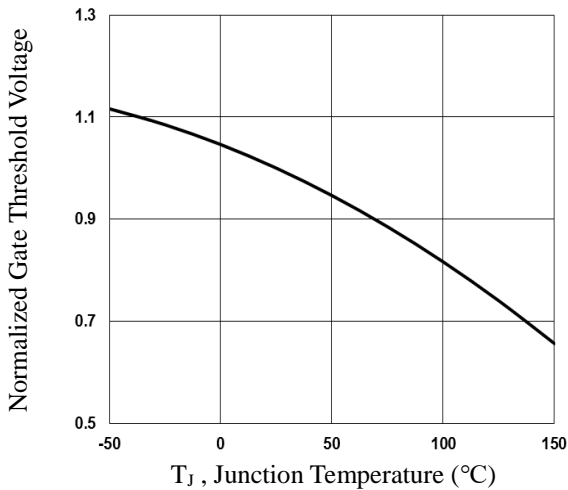
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2.  $V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, I_{AS}=-18A, R_G=25\Omega, \text{Starting } T_J=25^\circ C$ .
3. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$ .
4. Essentially independent of operating temperature.



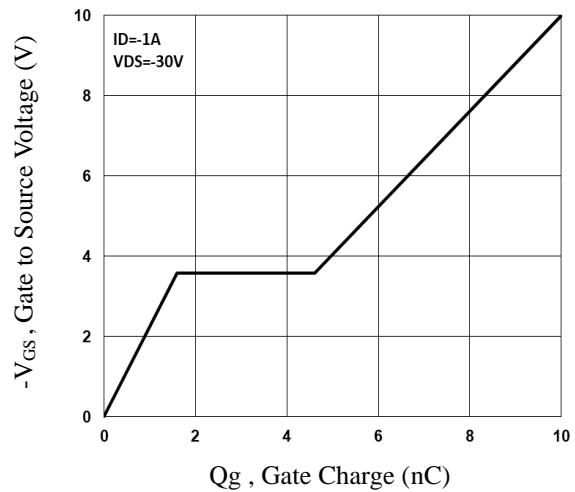
**Fig.1 Continuous Drain Current vs.  $T_J$**



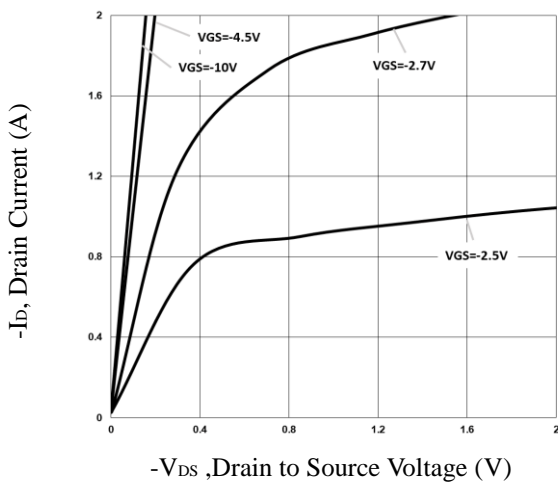
**Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_J$**



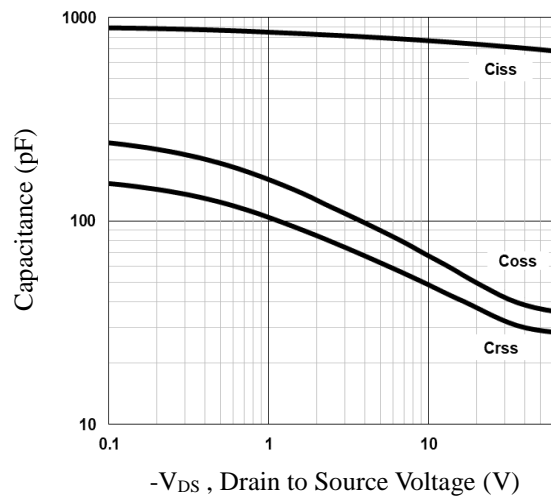
**Fig.3 Normalized  $V_{th}$  vs.  $T_J$**



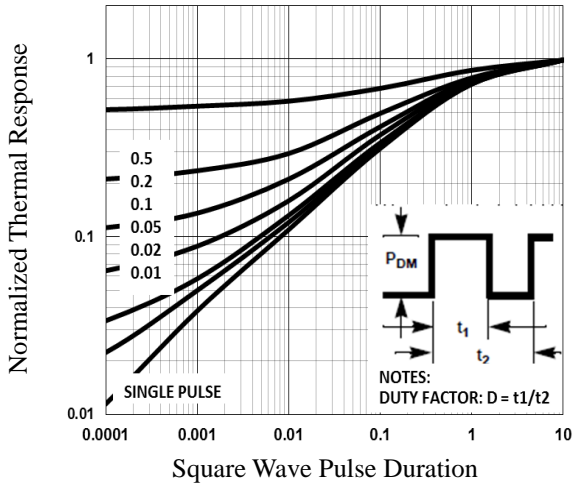
**Fig.4 Gate Charge Waveform**



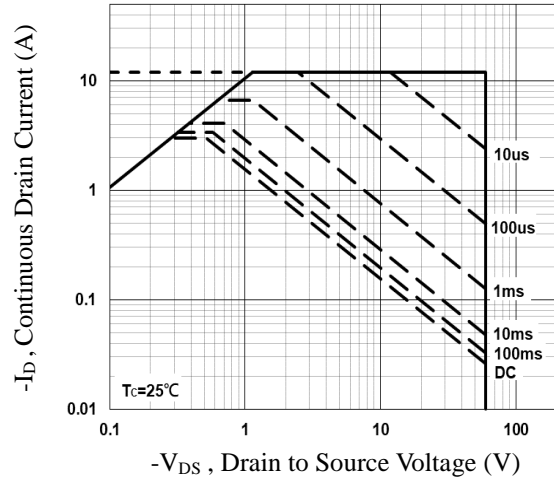
**Fig.5 Typical Output Characteristics**



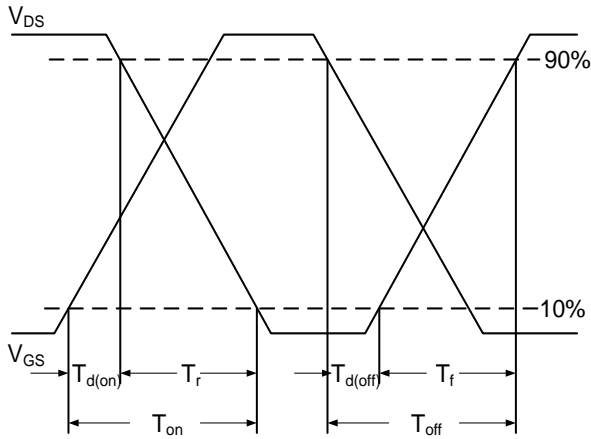
**Fig.6 Capacitance Characteristics**



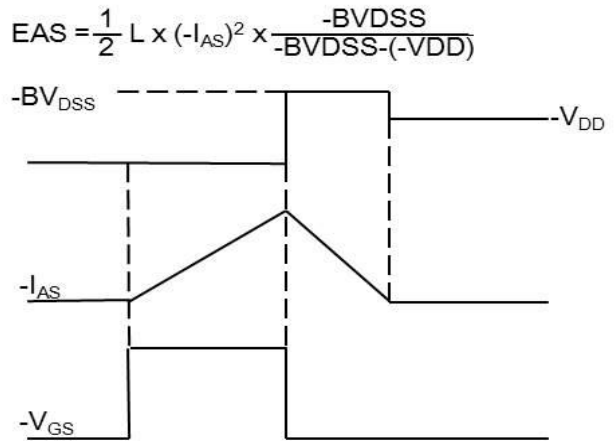
**Fig.7 Normalized Transient Impedance**



**Fig.8 Maximum Safe Operation Area**

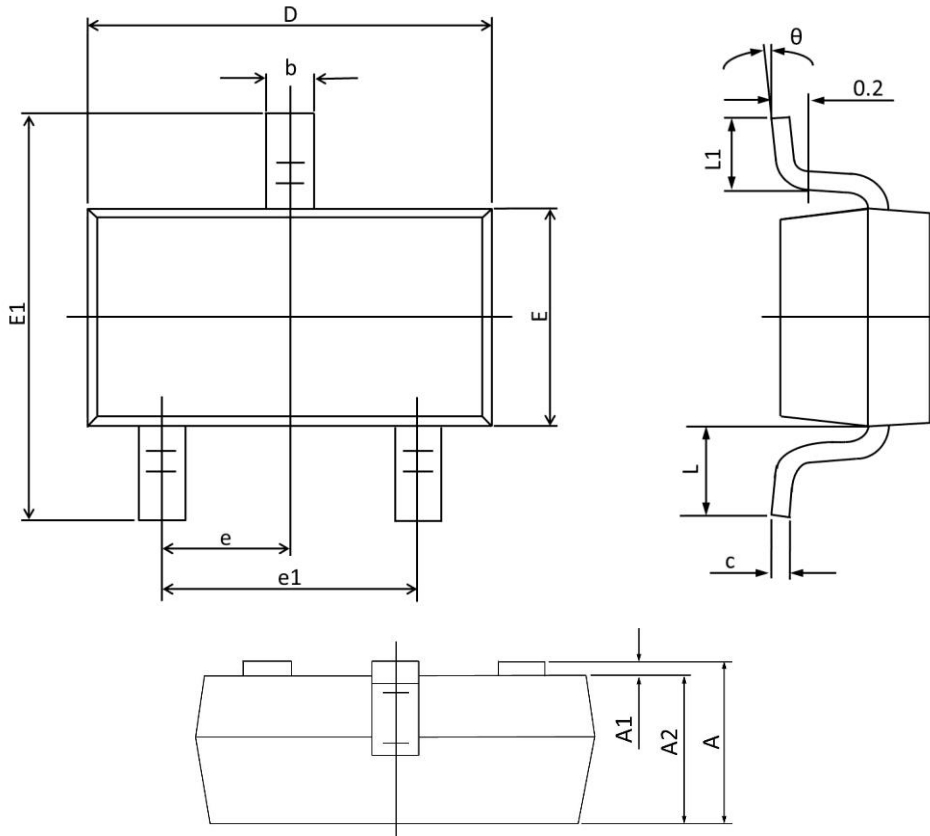


**Fig.9 Switching Time Waveform**



**Fig.10 EAS Waveform**

## SOT23 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.450	0.041	0.057
A1	---	0.150	---	0.006
A2	0.900	1.300	0.035	0.051
b	0.300	0.490	0.012	0.019
c	0.100	0.200	0.004	0.008
D	2.820	3.050	0.111	0.120
E	1.500	1.750	0.059	0.069
E1	2.600	3.000	0.102	0.118
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.700 REF.		0.028 REF.	
L1	0.300	0.600	0.012	0.024
$\theta$	0°	8°	0°	8°