

### General Description

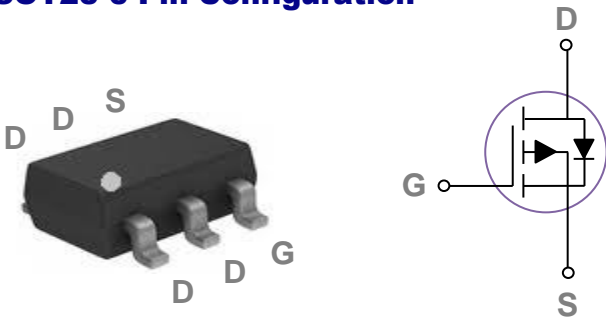
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	R <sub>DS(ON)</sub>	ID
-60V	96mΩ	-3.3A

### Features

- -60V, -3.3A, R<sub>DS(ON)</sub> = 96mΩ @ V<sub>GS</sub> = -10V
- Improved dv/dt capability
- Fast switching
- Green Device Available

### SOT23-6 Pin Configuration



### Applications

- Motor Drive
- Power Tools
- LED Lighting

### Absolute Maximum Ratings T<sub>c</sub>=25°C unless otherwise noted

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	-60	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub>	Drain Current – Continuous (T <sub>A</sub> =25°C)	-3.3	A
	Drain Current – Continuous (T <sub>A</sub> =70°C)	-2.6	A
I <sub>DM</sub>	Drain Current – Pulsed <sup>1</sup>	-13.2	A
EAS	Single Pulse Avalanche Energy <sup>2</sup>	25	mJ
IAS	Single Pulse Avalanche Current <sup>2</sup>	-18	A
P <sub>D</sub>	Power Dissipation (T <sub>A</sub> =25°C)	2	W
	Power Dissipation – Derate above 25°C	0.016	W/°C
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C

### Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction to ambient	---	62.5	°C/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	$V_{DS}=-60V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	-1	$\mu A$
		$V_{DS}=-48V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	-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	$V_{GS}=-10V, I_D=-2A$	---	80	96	$m\Omega$
		$V_{GS}=-4.5V, I_D=-1A$	---	100	130	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.0	-1.6	-2.5	V
gfs	Forward Transconductance	$V_{DS}=-10V, I_D=-1A$	---	3	---	S

**Dynamic and switching Characteristics**

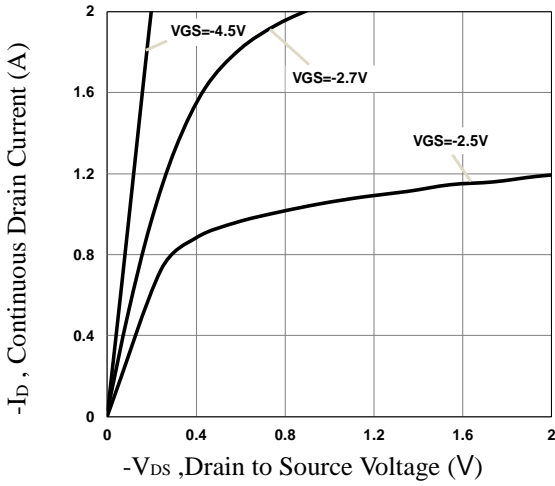
$Q_g$	Total Gate Charge <sup>3, 4</sup>	$V_{DS}=-30V, V_{GS}=-10V, I_D=-1A$	---	10	15	nC
$Q_{gs}$	Gate-Source Charge <sup>3, 4</sup>		---	1.6	3.2	
$Q_{gd}$	Gate-Drain Charge <sup>3, 4</sup>		---	3	6	
$T_{d(on)}$	Turn-On Delay Time <sup>3, 4</sup>	$V_{DD}=-30V, V_{GS}=-10V, R_G=6\Omega$ $I_D=-1A$	---	8	16	ns
$T_r$	Rise Time <sup>3, 4</sup>		---	15.4	30	
$T_{d(off)}$	Turn-Off Delay Time <sup>3, 4</sup>		---	42.8	80	
$T_f$	Fall Time <sup>3, 4</sup>		---	8.4	16	
$C_{iss}$	Input Capacitance	$V_{DS}=-30V, V_{GS}=0V, F=1\text{MHz}$	---	720	1080	pF
$C_{oss}$	Output Capacitance		---	42	63	
$C_{rss}$	Reverse Transfer Capacitance		---	32	48	
$R_g$	Gate resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	22	---	$\Omega$

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

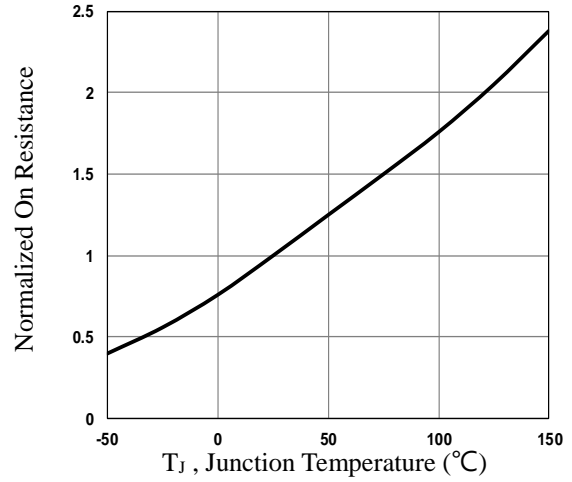
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current	$V_G=V_D=0V$ , Force Current	---	---	-3.3	A
$I_{SM}$	Pulsed Source Current		---	---	-6.6	A
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0V, I_S=-1A, T_J=25^\circ\text{C}$	---	---	-1	V
$t_{rr}$	Reverse Recovery Time	$V_R=-50V, I_S=-1A$	---	30	---	ns
$Q_{rr}$	Reverse Recovery Charge	$di/dt=100A/\mu s, T_J=25^\circ\text{C}$	---	15	---	nC

Note :

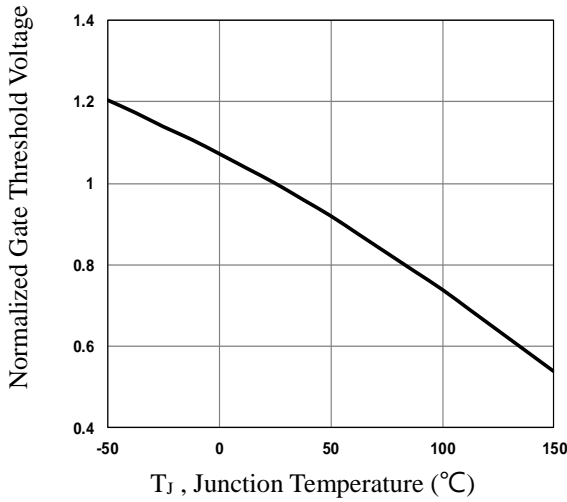
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2.  $V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, I_{AS}=-18A, R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$ .
3. The data tested by pulsed , pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
4. Essentially independent of operating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



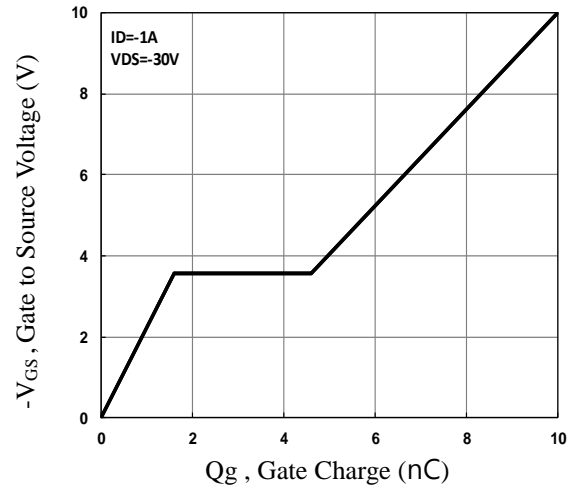
**Fig.1 Typical Output Characteristics**



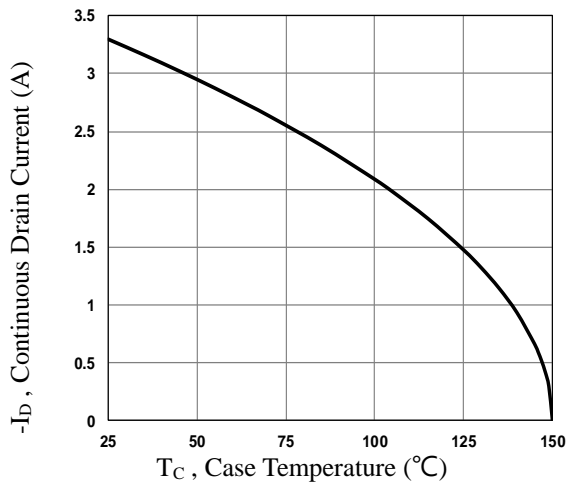
**Fig.2 Normalized R\_DS(on) vs. T\_J**



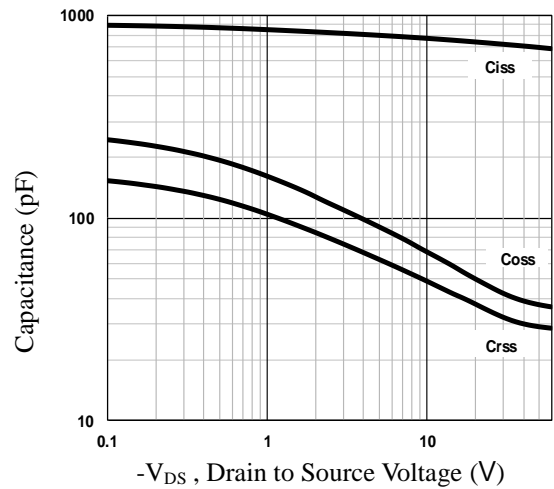
**Fig.3 Normalized V<sub>th</sub> vs. T\_J**



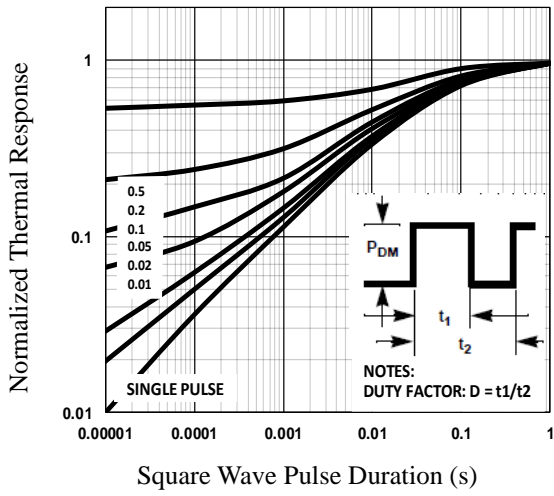
**Fig.4 Gate Charge Waveform**



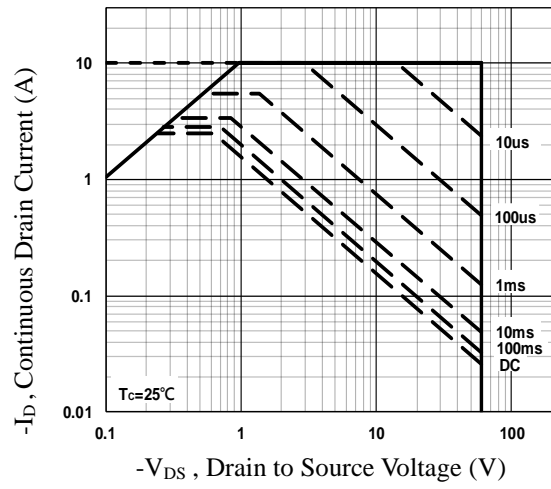
**Fig.5 Continuous Drain Current vs. T<sub>c</sub>**



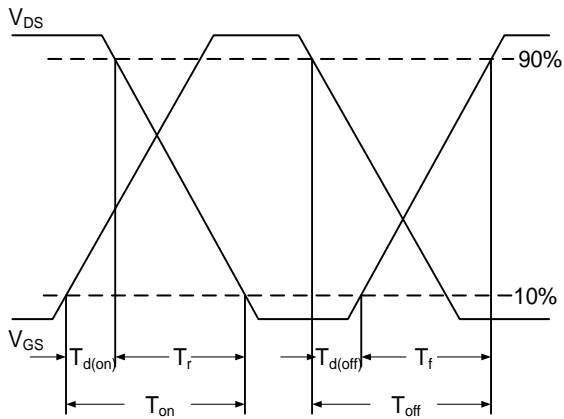
**Fig.6 Capacitance Characteristics**



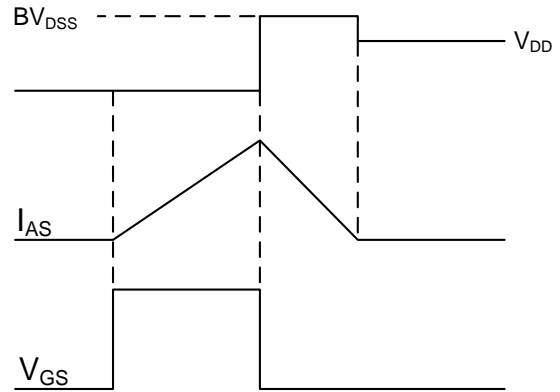
**Fig.7 Normalized Transient Impedance**



**Fig.8 Maximum Safe Operation Area**

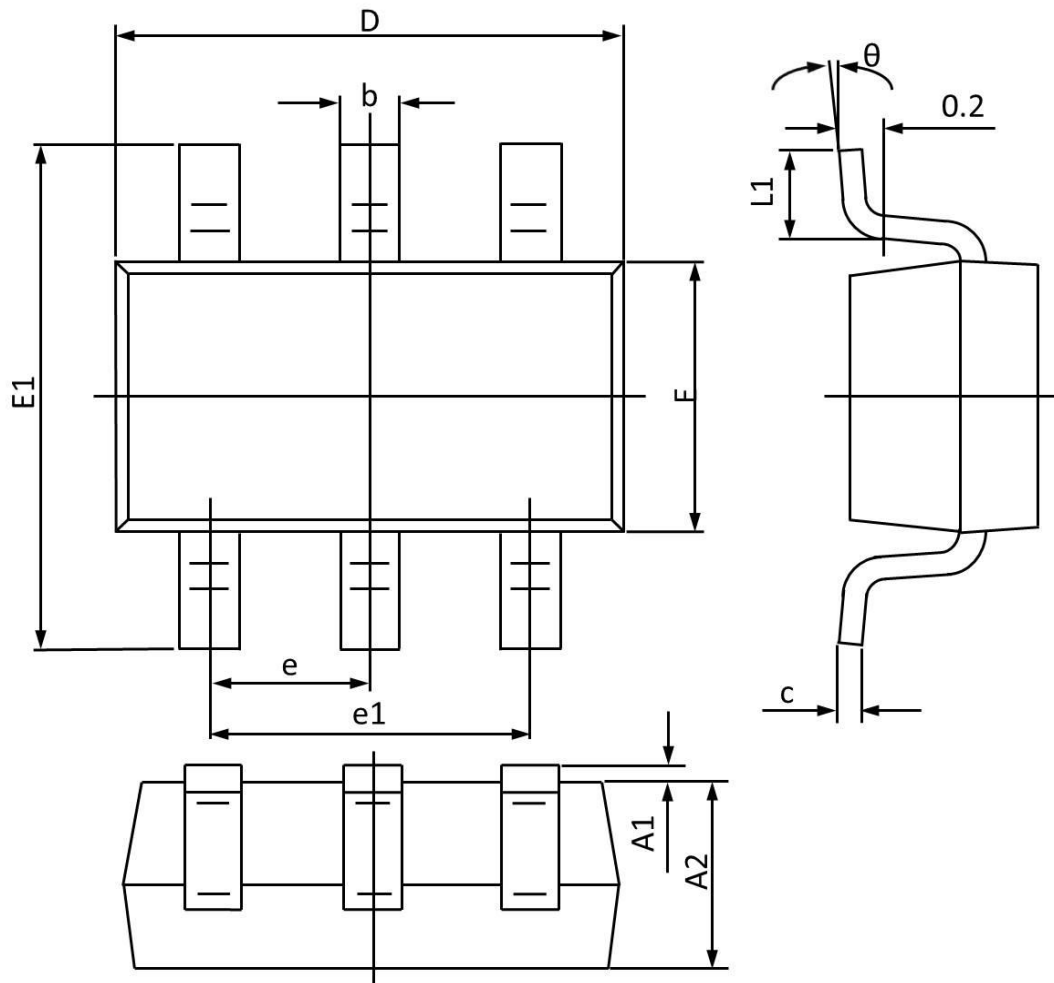


**Fig.9 Switching Time Waveform**



**Fig.10 EAS Waveform**

## SOT23-6 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A1	---	0.150	---	0.006
A2	0.900	1.300	0.035	0.051
b	0.300	0.500	0.012	0.019
c	0.100	0.200	0.004	0.008
D	2.800	3.050	0.110	0.120
E1	2.600	3.000	0.103	0.118
F	1.500	1.800	0.059	0.071
e	0.950 TYP		0.037 TYP	
e1	1.900 TYP		0.075 TYP	
L1	0.250	0.600	0.010	0.024
$\theta$	0°	8°	0°	8°