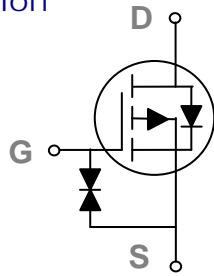
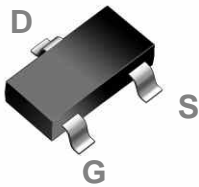


### General Description

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.

### SOT23-3S Pin Configuration



BVDSS	RDSON	ID
-20V	43mΩ	-4A

- -20V,-4A,  $R_{DS(ON)} = 43m\Omega @ V_{GS} = -4.5V$
- Low gate charge (typical  $Q_{gd} 4.5nC$ )
- G-S ESD Protection Diode Embedded
- Fast switching
- Green Device Available
- Suit for -1.8V Gate Drive Applications

### Applications

- Notebook
- Load Switch
- LED applications

### Absolute Maximum Ratings ( $T_C=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	-20	V
$V_{GS}$	Gate-Source Voltage	$\pm 8$	V
$I_D$	Drain Current – Continuous ( $T_C=25^\circ C$ )	-4	A
	Drain Current – Continuous ( $T_C=100^\circ C$ )	-2.4	A
$I_{DM}$	Drain Current – Pulsed (Note 1)	-16	A
$P_D$	Power Dissipation ( $T_C=25^\circ C$ )	0.9	W
	Power Dissipation – Derate above $25^\circ C$	0.0072	W/ $^\circ C$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$

### Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	140	$^\circ C/W$

**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	$V_{GS}=0V, I_D=-250\mu A$	-20	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	$BV_{DSS}$ Temperature Coefficient	Reference to $25^\circ\text{C}$ , $I_D=-1\text{mA}$	---	-0.02	---	$V/^\circ\text{C}$
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=-20V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	-1	$\mu A$
		$V_{DS}=-20V, V_{GS}=0V, T_J=125^\circ\text{C}$			-100	$\mu A$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 8V, V_{DS}=0V$	---	---	$\pm 10$	$\mu A$

**On Characteristics**

$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-4.5V, I_D=-4A$	---	37	43	$m\Omega$
		$V_{GS}=-2.5V, I_D=-3A$	---	45	54	$m\Omega$
		$V_{GS}=-1.8V, I_D=-2A$			56	73
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-0.3	-0.55	-1	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	3	---	$mV/^\circ\text{C}$

**Dynamic and switching Characteristics**

$Q_g$	Total Gate Charge (10V)	$V_{DS}=-10V, V_{GS}=-4.5V, I_D=-4A$ (Note 2,3)	---	17	---	nC
$Q_{gs}$	Gate-Source Charge		---	1.3	---	
$Q_{gd}$	Gate-Drain Charge		---	4.5	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-10V, V_{GS}=-4.5V, R_G=3\Omega,$ $I_D=-1A$ (Note 2,3)	---	9.5	---	ns
$T_r$	Rise Time		---	17	---	
$T_{d(off)}$	Turn-Off Delay Time		---	90	---	
$T_f$	Fall Time		---	30	---	
$C_{iss}$	Input Capacitance	$V_{DS}=-10V, V_{GS}=0V, F=1\text{MHz}$	---	1450	---	pF
$C_{oss}$	Output Capacitance		---	200	---	
$C_{rss}$	Reverse Transfer Capacitance		---	160	---	

**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		---	---	-16	A
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0V, I_S=-1A, T_J=25^\circ\text{C}$	---	-0.75	-1.2	V

**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.

Typical Performance Characteristics

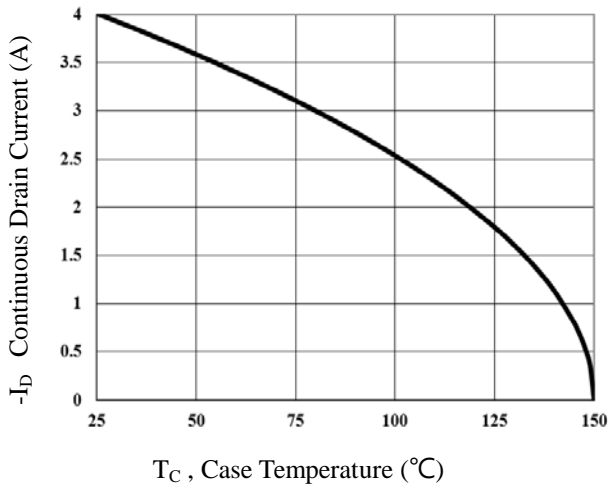


Fig.1 Typical Output Characteristics

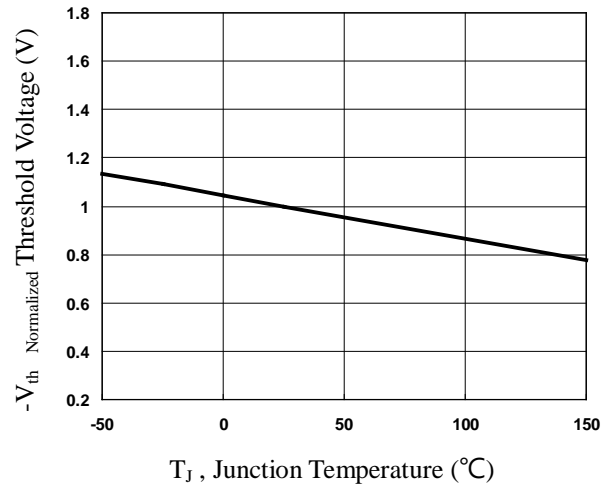


Fig.2 Normalized Vth vs. Junction Temperature

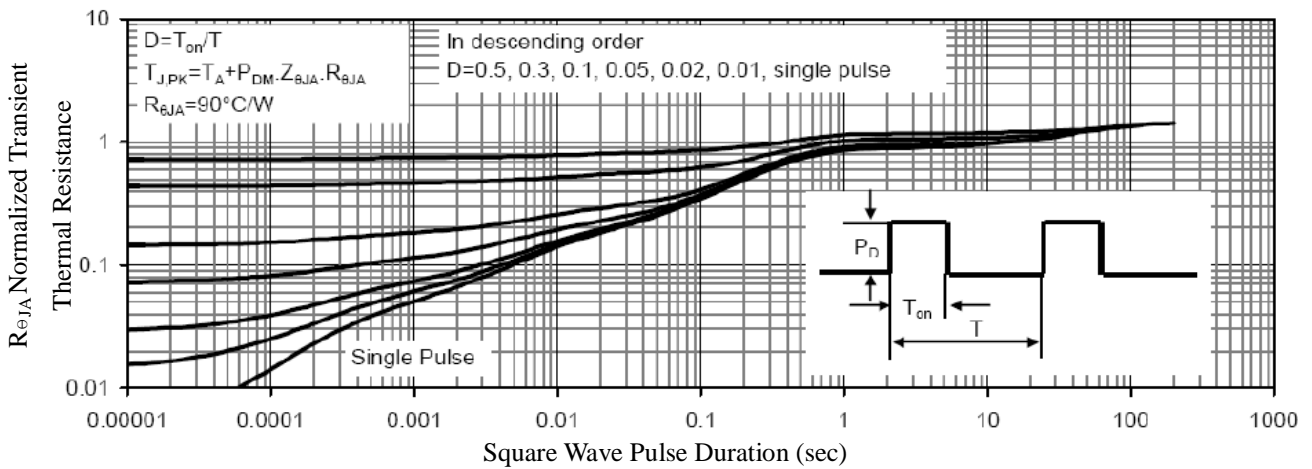


Fig.3 Normalized Maximum Effective Transient Thermal Impedance

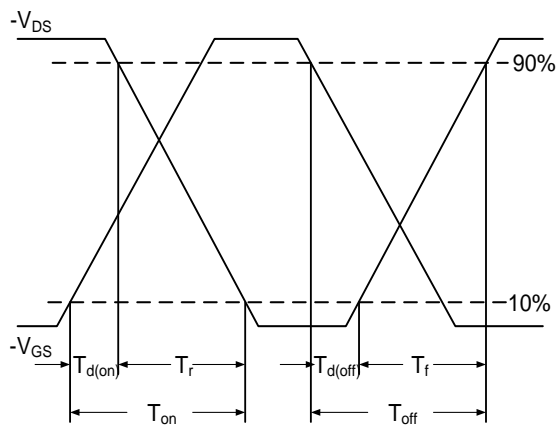


Fig.4 Switching Time Waveform

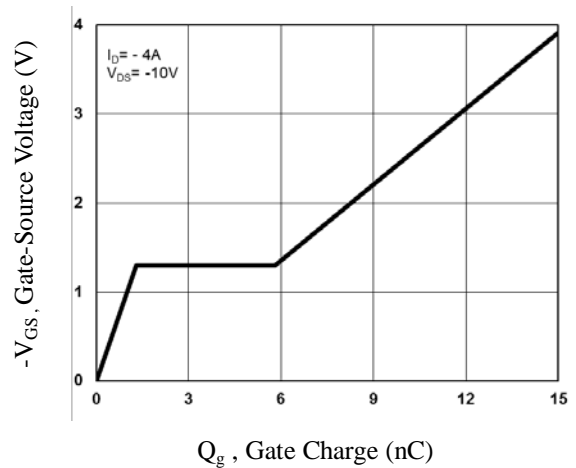
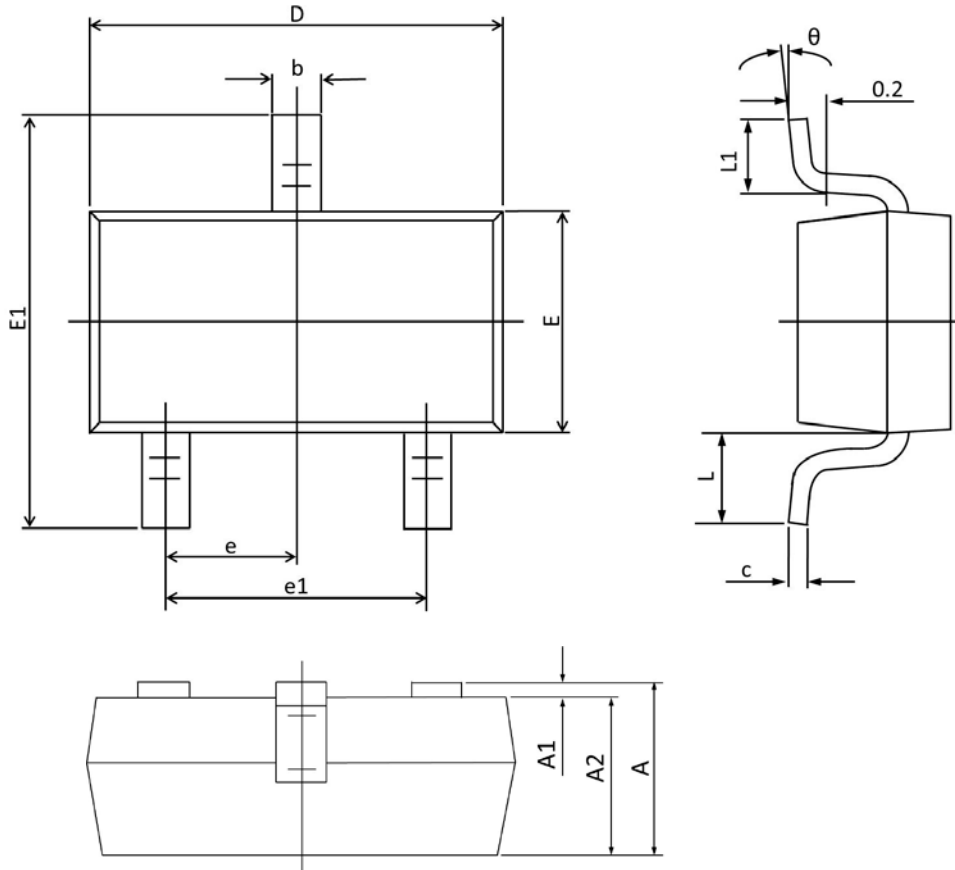


Fig.5 Gate Charge Waveform

### 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	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
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
$\theta$	0°	8°	0°	8°