

## 40V P-Channel MOSFETs

### General Description

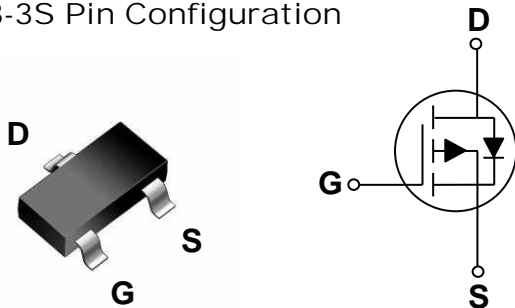
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	RDSON	ID
-40V	68mΩ	-2.9A

### Features

- -40V,-2.9A, RDS(ON) =68mΩ@VGS = -10V
- Fast switching
- Green Device Available
- Suit for -4.5V Gate Drive Applications

### SOT23-3S Pin Configuration



### Applications

- POL Applications
- Load Switch
- LED Application

### Absolute Maximum Ratings (Tc=25°C unless otherwise noted)

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	-40	V
V <sub>GS</sub>	Gate-Source Voltage	± 20	V
I <sub>D</sub>	Drain Current – Continuous (T <sub>A</sub> =25°C)	-2.9	A
	Drain Current – Continuous (T <sub>A</sub> =100°C)	-2.32	A
I <sub>DM</sub>	Drain Current – Pulsed <sup>1</sup>	-11.6	A
P <sub>D</sub>	Power Dissipation (T <sub>A</sub> =25°C)	1	W
	Power Dissipation – Derate above 25°C	8	mW/°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	---	125	°C/W



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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	$V_{GS}=0V, I_D=-250\mu A$	-40	---	---	V
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=-40V, V_{GS}=0V, T_J=25\text{ }^\circ\text{C}$	---	---	-1	$\mu A$
		$V_{DS}=-32V, V_{GS}=0V, T_J=125\text{ }^\circ\text{C}$	---	---	-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	$V_{GS}=-10V, I_D=-2A$	---	55	68	m $\Omega$
		$V_{GS}=-4.5V, I_D=-1A$	---	75	100	m $\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.0	-1.65	-2.5	V
gfs	Forward Transconductance	$V_{DS}=-10V, I_D=-1A$	---	3	---	S

### Dynamic and switching Characteristics

$Q_g$	Total Gate Charge <sup>2, 3</sup>	$V_{DS}=-32V, V_{GS}=-10V, I_D=-2A$	---	6.4	13	nC
$Q_{gs}$	Gate-Source Charge <sup>2, 3</sup>		---	0.5	2	
$Q_{gd}$	Gate-Drain Charge <sup>2, 3</sup>		---	2.7	6	
$T_{d(on)}$	Turn-On Delay Time <sup>2, 3</sup>	$V_{DD}=-20V, V_{GS}=-10V, R_G=6\Omega$ $I_D=-1A$	---	12	24	ns
$T_r$	Rise Time <sup>2, 3</sup>		---	9	20	
$T_{d(off)}$	Turn-Off Delay Time <sup>2, 3</sup>		---	45	90	
$T_f$	Fall Time <sup>2, 3</sup>		---	5	10	
$C_{iss}$	Input Capacitance	$V_{DS}=-25V, V_{GS}=0V, F=1MHz$	---	600	1200	pF
$C_{oss}$	Output Capacitance		---	60	120	
$C_{rss}$	Reverse Transfer Capacitance		---	43	80	

### Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	-2.9	A
$I_{SM}$	Pulsed Source Current		---	---	-5.8	A
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0V, I_S=-1A, T_J=25\text{ }^\circ\text{C}$	---	---	-1	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

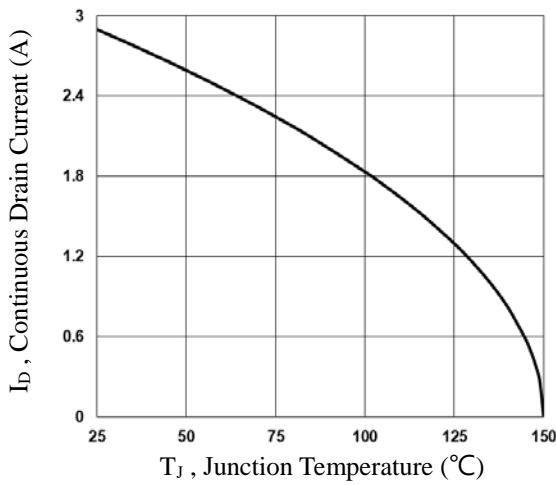


Fig.1 Continuous Drain Current vs.  $T_J$

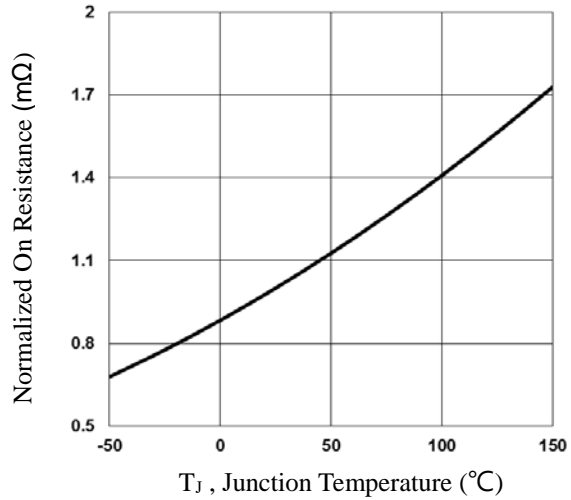


Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_J$

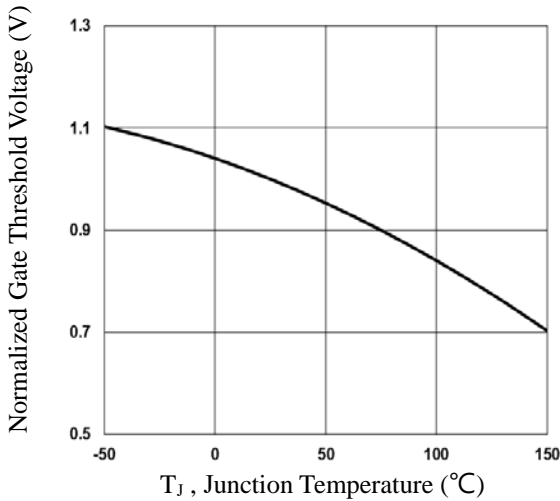


Fig.3 Normalized  $V_{th}$  vs.  $T_J$

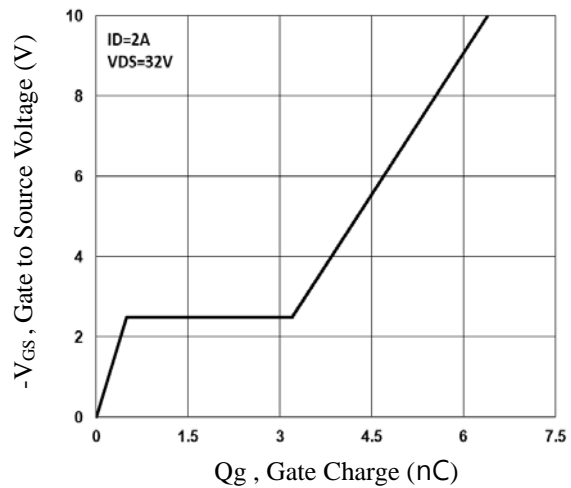


Fig.4 Gate Charge Waveform

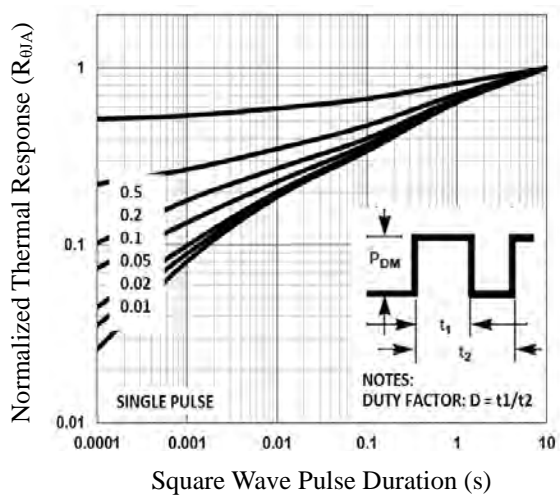


Fig.5 Normalized Transient Impedance

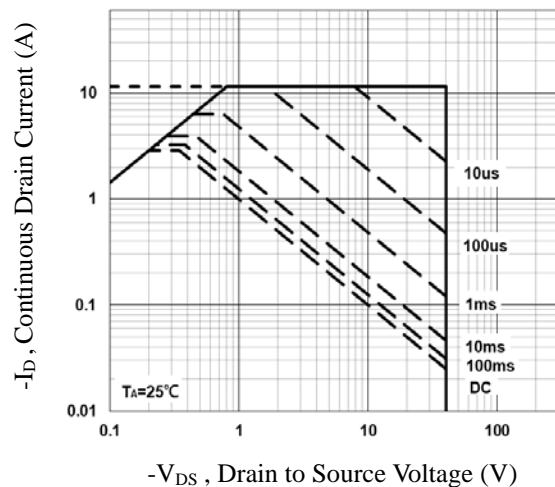


Fig.6 Maximum Safe Operation Area

## Typical Performance Characteristics(Con.)

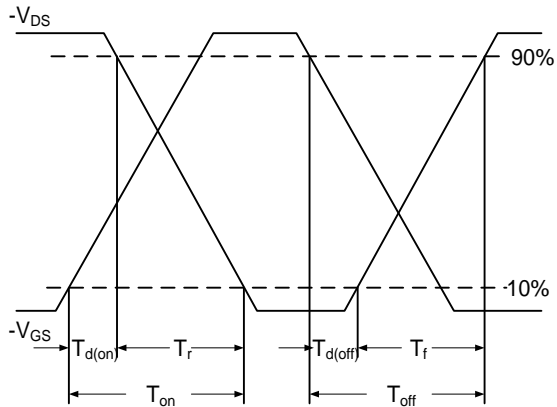


Fig.7 Switching Time Waveform

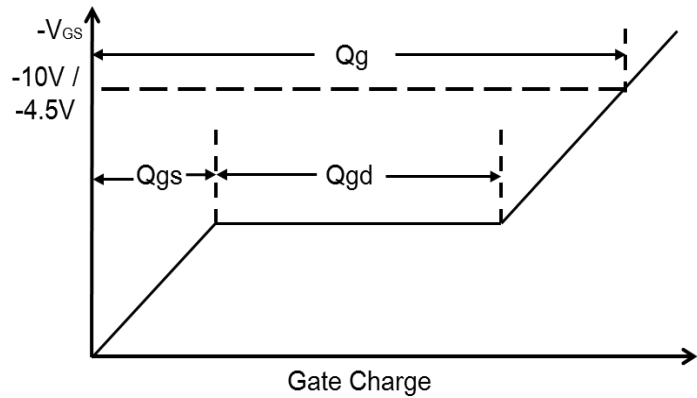
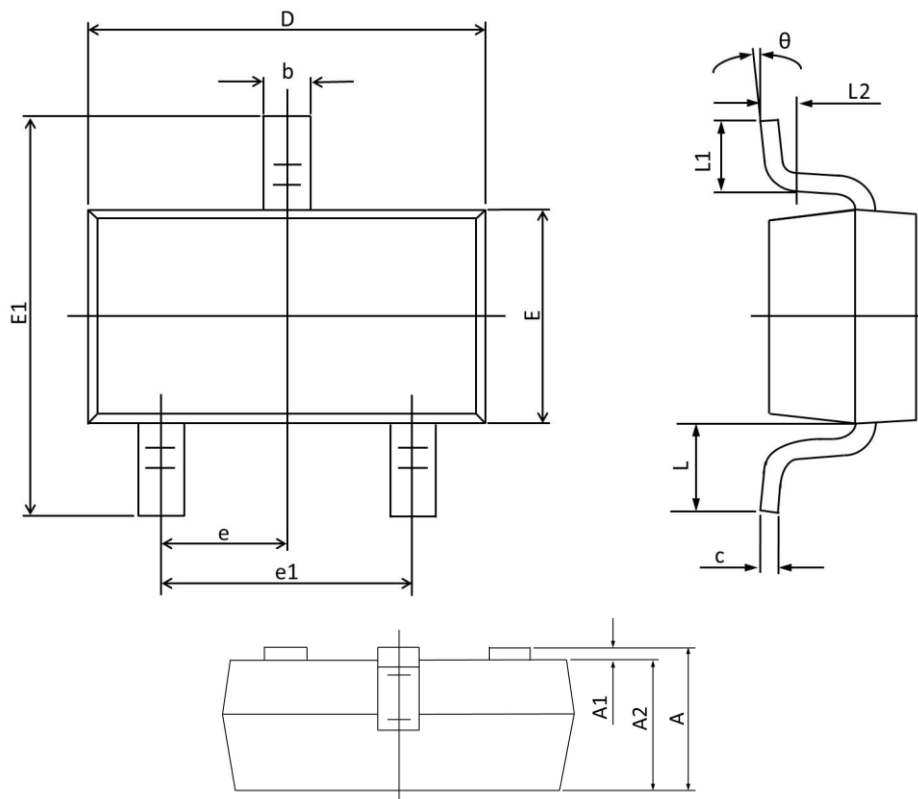


Fig.8 Gate Charge Waveform

## SOT23-3S PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Max	Min	Max	Min
<b>A</b>	1.150	0.900	0.045	0.035
<b>A1</b>	0.100	0.000	0.004	0.000
<b>A2</b>	1.050	0.900	0.041	0.035
<b>b</b>	0.500	0.300	0.020	0.012
<b>c</b>	0.150	0.080	0.006	0.003
<b>D</b>	3.000	2.800	0.118	0.110
<b>E</b>	1.400	1.200	0.055	0.047
<b>E1</b>	2.550	2.250	0.100	0.089
<b>e</b>	0.95 TYP.		0.037 TYP.	
<b>e1</b>	2.000	1.800	0.079	0.071
<b>L</b>	0.55 REF.		0.022 REF.	
<b>L1</b>	0.500	0.300	0.020	0.012
<b>L2</b>	0.25 TYP.		0.01 TYP.	
<b><math>\theta</math></b>	8°	0°	8°	0°