

## 30V N-Channel MOS FETs

### General Description

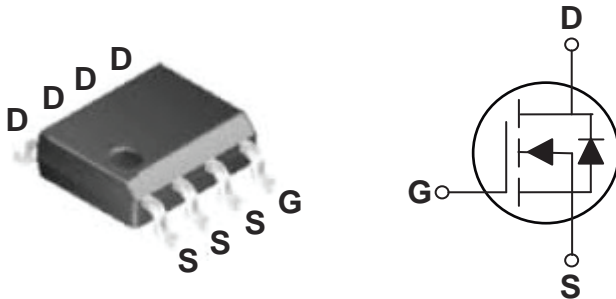
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	RDSON	ID
30V	18mΩ	9A

### Features

- 30V,9A, RDS(ON) =18mΩ @VGS = 10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

### SOP-8 Pin Configuration



### Applications

- MB / VGA / Vcore
- POL Applications
- SMPS 2<sup>nd</sup> SR

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

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	30	V
V <sub>GS</sub>	Gate-Source Voltage	± 20	V
I <sub>D</sub>	Drain Current – Continuous (T <sub>C</sub> =25 °C)	9	A
	Drain Current – Continuous (T <sub>C</sub> =100 °C)	5.7	A
I <sub>DM</sub>	Drain Current – Pulsed <sup>1</sup>	36	A
EAS	Single Pulse Avalanche Energy <sup>2</sup>	32	mJ
IAS	Single Pulse Avalanched Current <sup>2</sup>	8	A
P <sub>D</sub>	Power Dissipation (T <sub>C</sub> =25 °C)	2.5	W
	Power Dissipation – Derate above 25 °C	0.02	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	---	50	°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	$V_{GS}=0V, I_D=250\mu A$	30	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	$BV_{DSS}$ Temperature Coefficient	Reference to $25^\circ\text{C}$ , $I_D=1mA$	---	0.04	---	V/ $^\circ\text{C}$
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=30V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	$\mu A$
		$V_{DS}=24V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	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 <sup>3</sup>	$V_{GS}=10V, I_D=8A$	---	16	18	m $\Omega$
		$V_{GS}=4.5V, I_D=5A$	---	23	28	m $\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.6	2	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4	---	mV/ $^\circ\text{C}$
gfs	Forward Transconductance	$V_{DS}=10V, I_D=5A$	---	4	---	S

### Dynamic and switching Characteristics

$Q_g$	Total Gate Charge <sup>3,4</sup>	$V_{DS}=15V, V_{GS}=4.5V, I_D=8A$	---	4.1	6	nC
$Q_{gs}$	Gate-Source Charge <sup>3,4</sup>		---	1	1.4	
$Q_{gd}$	Gate-Drain Charge <sup>3,4</sup>		---	2.1	4	
$T_{d(on)}$	Turn-On Delay Time <sup>3,4</sup>	$V_{DD}=15V, V_{GS}=10V, R_G=6\Omega$ $I_D=1A$	---	2.8	5	ns
$T_r$	Rise Time <sup>3,4</sup>		---	7.2	14	
$T_{d(off)}$	Turn-Off Delay Time <sup>3,4</sup>		---	15.8	30	
$T_f$	Fall Time <sup>3,4</sup>		---	4.6	9	
$C_{iss}$	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, F=1MHz$	---	345	500	pF
$C_{oss}$	Output Capacitance		---	55	80	
$C_{rss}$	Reverse Transfer Capacitance		---	32	45	
Rg	Gate resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$	---	3.2	6.4	$\Omega$

### 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	---	---	9	A
$I_{SM}$	Pulsed Source Current <sup>3</sup>		---	---	36	A
$V_{SD}$	Diode Forward Voltage <sup>3</sup>	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1	V
$t_{rr}$	Reverse Recovery Time	$V_{GS}=0V, I_S=1A, di/dt=100A/\mu s$	---	---	---	ns
$Q_{rr}$	Reverse Recovery Charge	$T_J=25^\circ\text{C}$	---	---	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2.  $V_{DD}=25V, V_{GS}=10V, L=1mH, I_{AS}=8A, R_G=25\Omega$ , 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.

# Typical Performance Characteristics

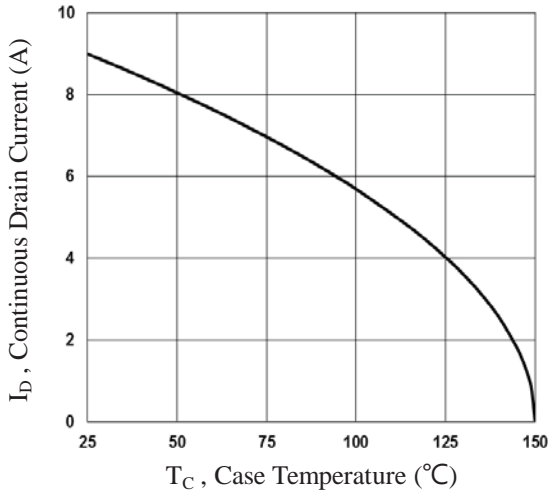


Fig.1 Continuous Drain Current vs.  $T_c$

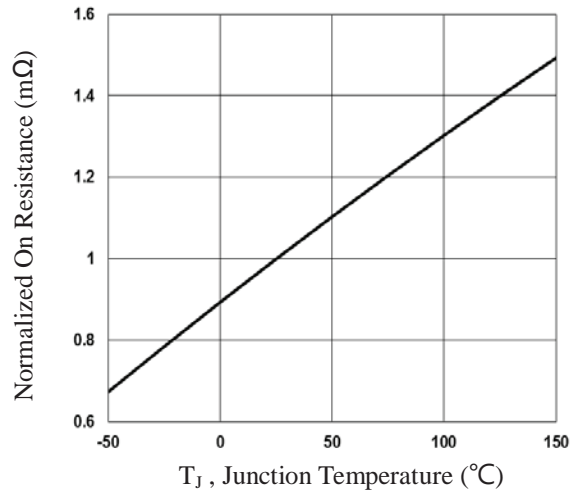


Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_j$

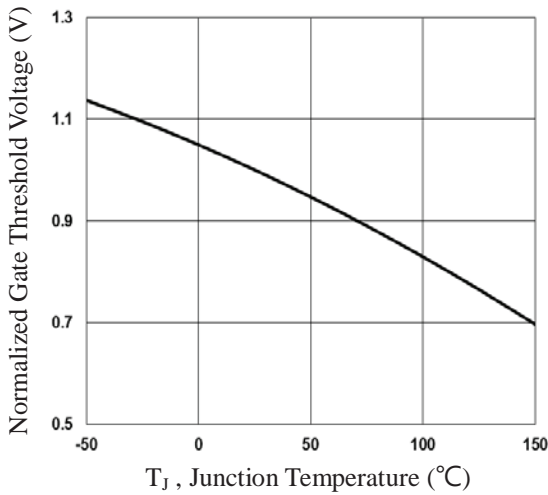


Fig.3 Normalized  $V_{th}$  vs.  $T_j$

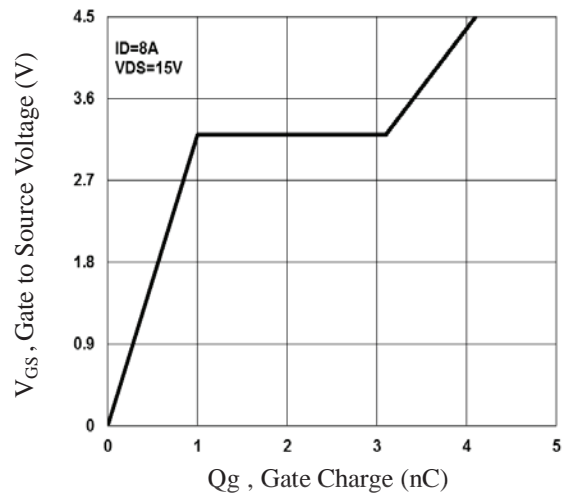


Fig.4 Gate Charge Waveform

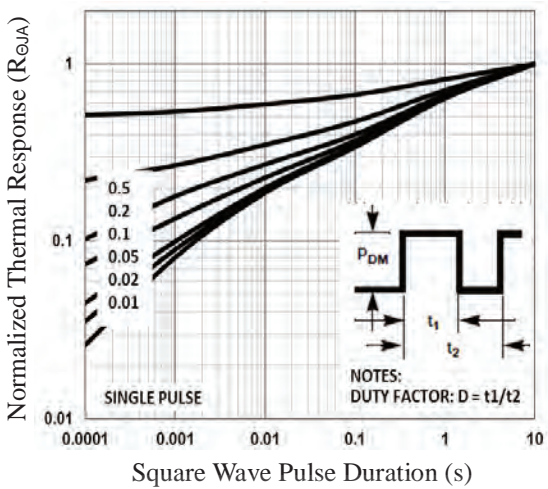


Fig.5 Normalized Transient Response

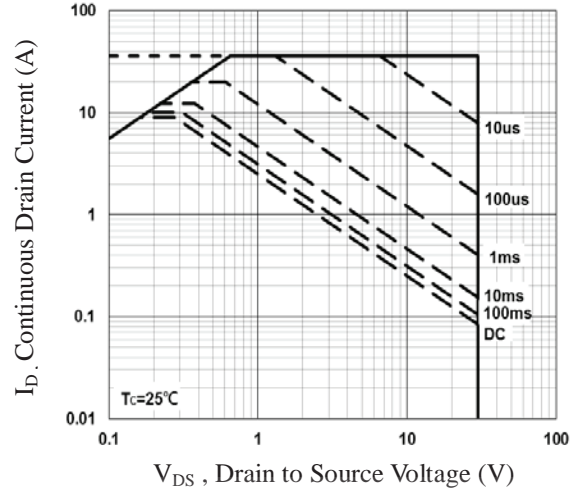


Fig.6 Maximum Safe Operation Area

## Typical Performance Characteristics(Con.)

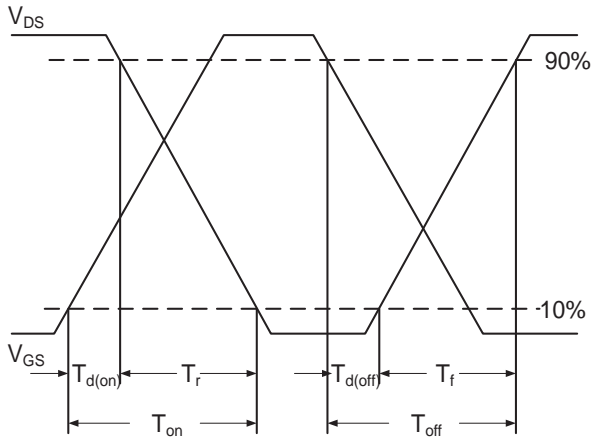


Fig.7 Switching Time Waveform

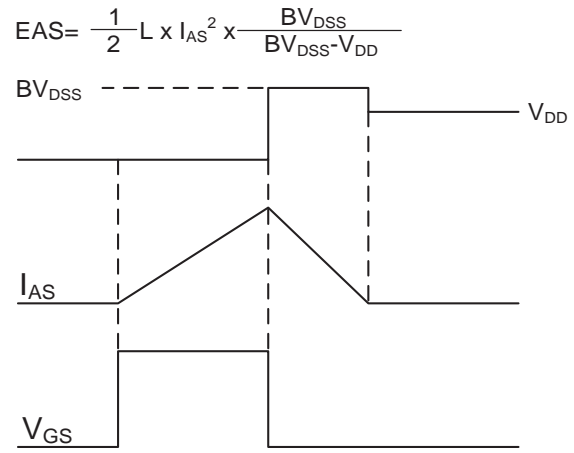
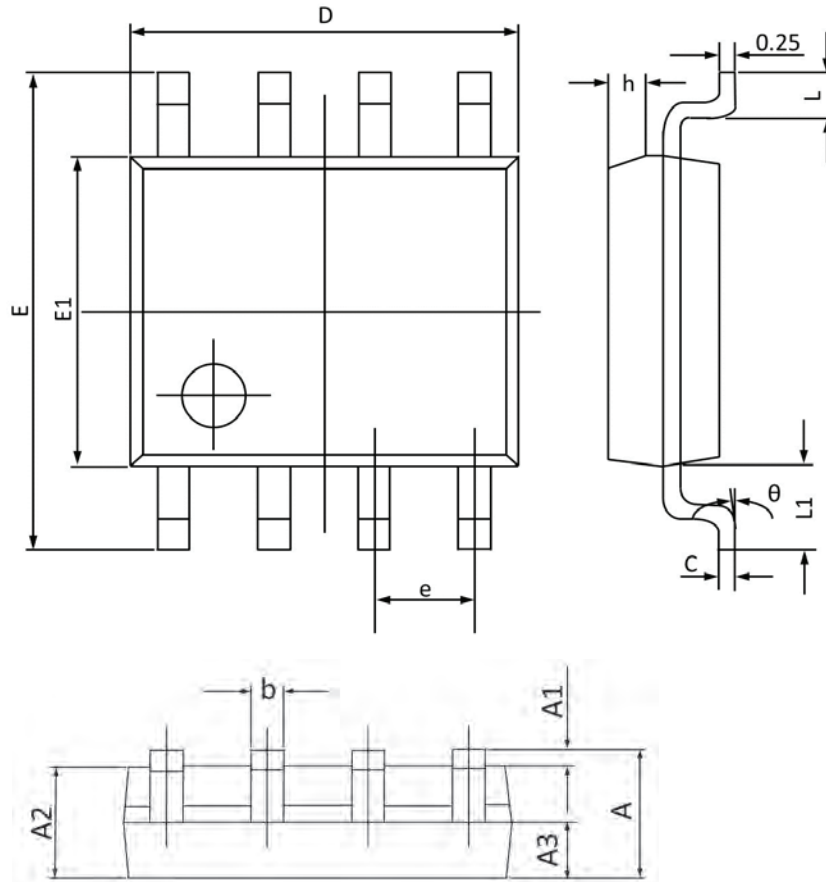


Fig.8 EAS Waveform

**SOP-8 PACKAGE INFORMATION**


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.068
A1	0.100	0.250	0.004	0.009
A2	1.300	1.500	0.052	0.059
A3	0.600	0.700	0.024	0.027
b	0.390	0.480	0.016	0.018
c	0.210	0.260	0.009	0.010
D	4.700	5.100	0.186	0.200
E	5.800	6.200	0.229	0.244
E1	3.700	4.100	0.146	0.161
e	1.270(BSC)		0.050(BSC)	
h	0.250	0.500	0.010	0.019
L	0.500	0.800	0.019	0.031
L1	1.050(BSC)		0.041(BSC)	
$\theta$	0°	8°	0°	8°