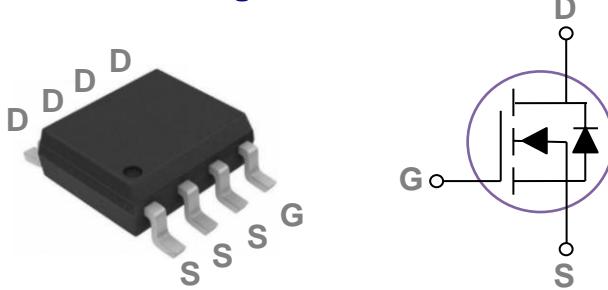


### General Description

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.

### SOP8 Pin Configuration



BVDSS	RDS(ON)	ID
30V	18mΩ	9A

### Features

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

### Applications

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

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current – Continuous ( $T_A=25^\circ C$ )	9	A
	Drain Current – Continuous ( $T_A=70^\circ C$ )	7	A
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	36	A
EAS	Single Pulse Avalanche Energy <sup>2</sup>	32	mJ
IAS	Single Pulse Avalanche Current <sup>2</sup>	8	A
$P_D$	Power Dissipation ( $T_A=25^\circ C$ )	2.5	W
	Power Dissipation – Derate above $25^\circ C$	0.02	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	---	50	$^\circ C/W$

**Electrical Characteristics ( $T_J=25^\circ\text{C}$ , unless otherwise noted)**
**Off Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$\text{BV}_{\text{DSS}}$	Drain-Source Breakdown Voltage	$V_{\text{GS}}=0\text{V}$ , $I_{\text{D}}=250\mu\text{A}$	30	---	---	V
$\Delta \text{BV}_{\text{DSS}}/\Delta T_J$	$\text{BV}_{\text{DSS}}$ Temperature Coefficient	Reference to $25^\circ\text{C}$ , $I_{\text{D}}=1\text{mA}$	---	0.04	---	$\text{V}/^\circ\text{C}$
$I_{\text{DSS}}$	Drain-Source Leakage Current	$V_{\text{DS}}=30\text{V}$ , $V_{\text{GS}}=0\text{V}$ , $T_J=25^\circ\text{C}$	---	---	1	$\mu\text{A}$
		$V_{\text{DS}}=24\text{V}$ , $V_{\text{GS}}=0\text{V}$ , $T_J=125^\circ\text{C}$	---	---	10	$\mu\text{A}$
$I_{\text{GSS}}$	Gate-Source Leakage Current	$V_{\text{GS}}=\pm 20\text{V}$ , $V_{\text{DS}}=0\text{V}$	---	---	$\pm 100$	nA

**On Characteristics**

$R_{\text{DS(ON)}}$	Static Drain-Source On-Resistance <sup>3</sup>	$V_{\text{GS}}=10\text{V}$ , $I_{\text{D}}=8\text{A}$	---	16	18	$\text{m}\Omega$
		$V_{\text{GS}}=4.5\text{V}$ , $I_{\text{D}}=5\text{A}$	---	23	28	$\text{m}\Omega$
$V_{\text{GS(th)}}$	Gate Threshold Voltage	$V_{\text{GS}}=V_{\text{DS}}$ , $I_{\text{D}}=250\mu\text{A}$	1.2	1.6	2	V
$\Delta V_{\text{GS(th)}}$	$V_{\text{GS(th)}}$ Temperature Coefficient		---	-4	---	$\text{mV}/^\circ\text{C}$
$g_{\text{fs}}$	Forward Transconductance	$V_{\text{DS}}=10\text{V}$ , $I_{\text{D}}=5\text{A}$	---	4	---	S

**Dynamic and switching Characteristics**

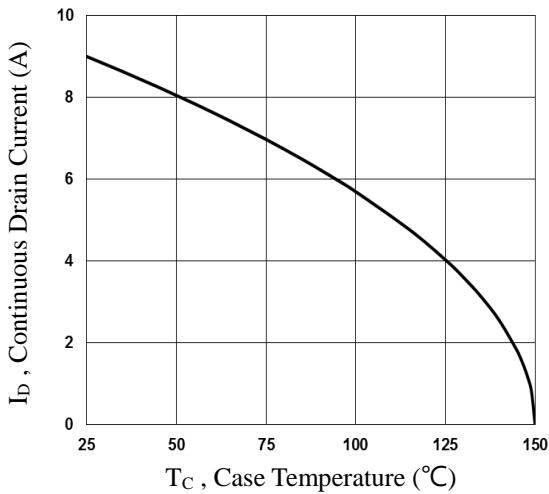
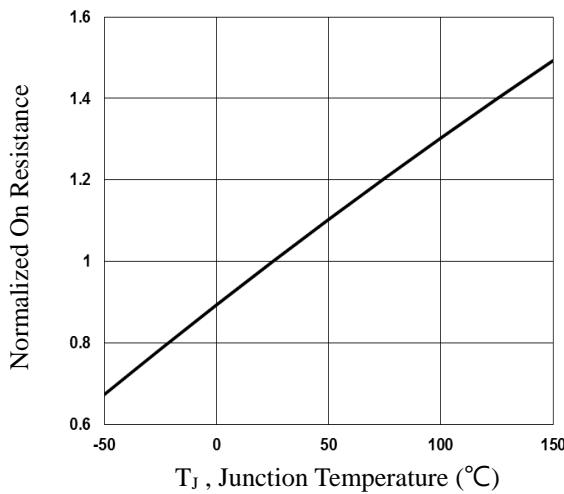
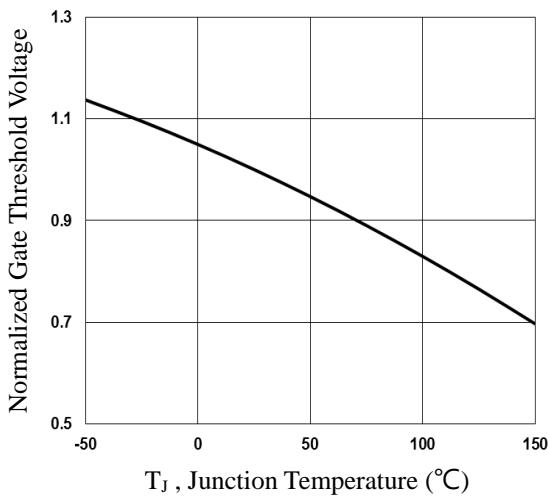
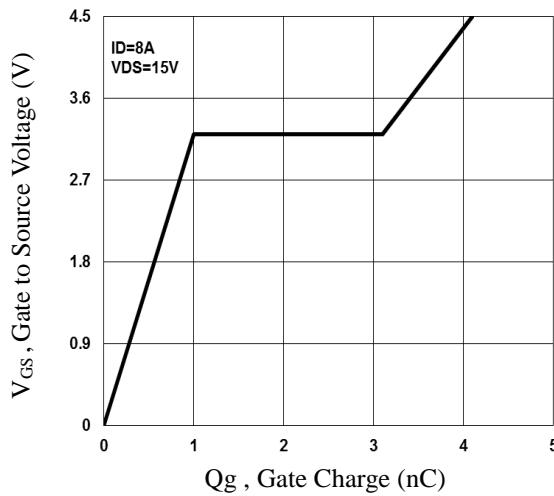
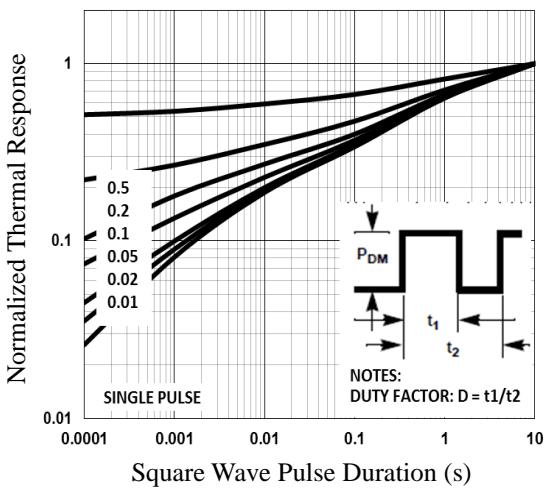
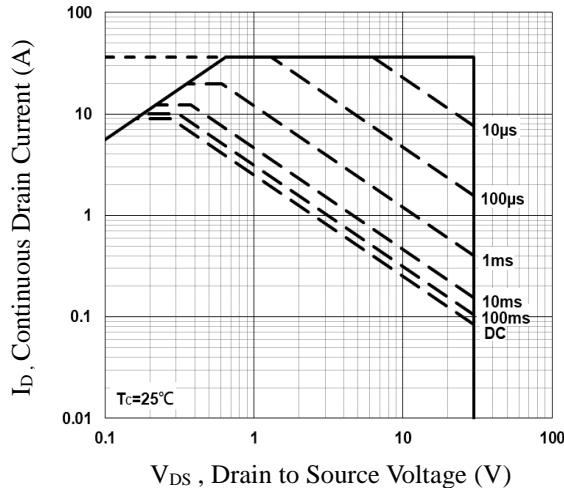
$Q_g$	Total Gate Charge <sup>3, 4</sup>	$V_{\text{DS}}=15\text{V}$ , $V_{\text{GS}}=4.5\text{V}$ , $I_{\text{D}}=8\text{A}$	---	4.1	6	nC
$Q_{\text{gs}}$	Gate-Source Charge <sup>3, 4</sup>		---	1	1.4	
$Q_{\text{gd}}$	Gate-Drain Charge <sup>3, 4</sup>		---	2.1	4	
$T_{\text{d(on)}}$	Turn-On Delay Time 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

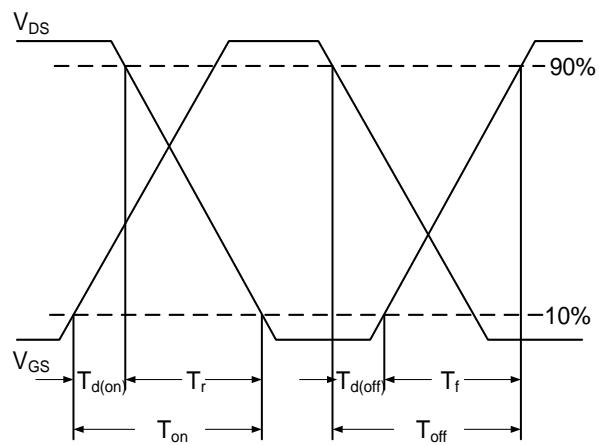
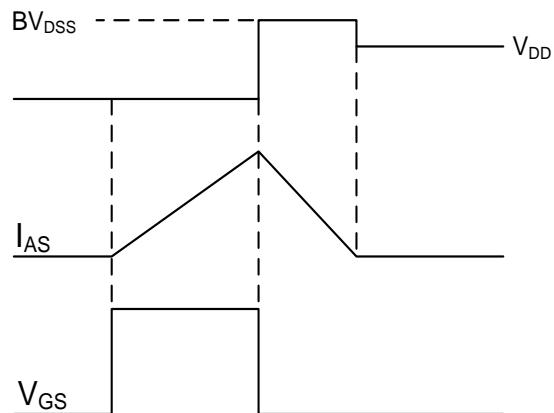
**Drain-Source Diode Characteristics and Maximum Ratings**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_s$	Continuous Source Current	$V_G=V_D=0\text{V}$ , Force Current	---	---	9	A
$I_{\text{SM}}$	Pulsed Source Current <sup>3</sup>		---	---	36	A
$V_{\text{SD}}$	Diode Forward Voltage <sup>3</sup>	$V_{\text{GS}}=0\text{V}$ , $I_{\text{s}}=1\text{A}$ , $T_J=25^\circ\text{C}$	---	---	1	V

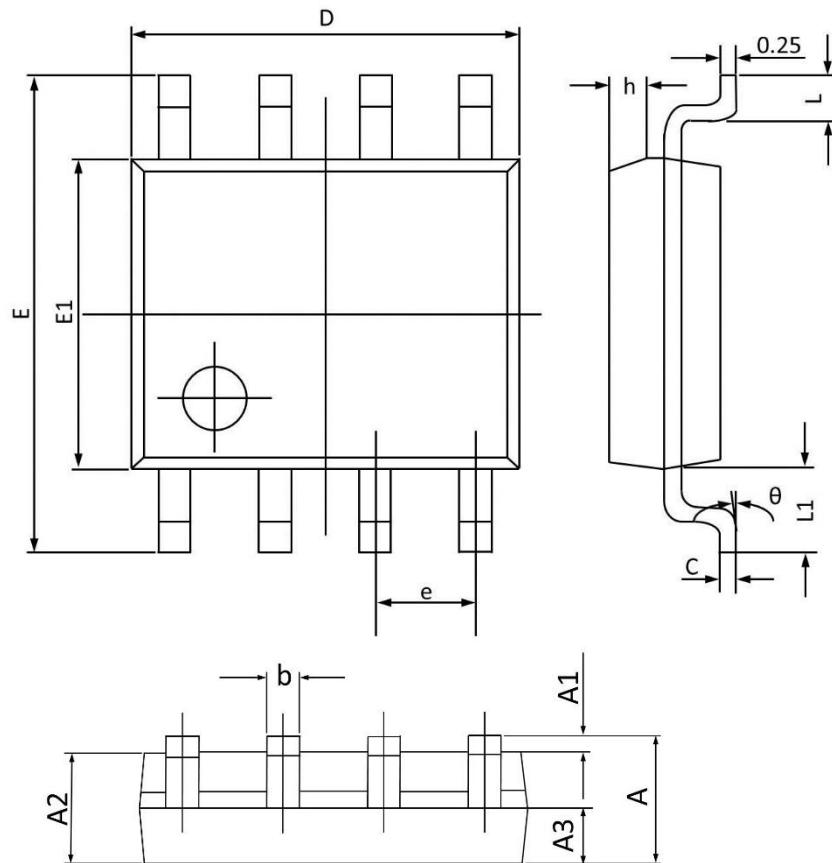
Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2.  $V_{\text{DD}}=25\text{V}$ ,  $V_{\text{GS}}=10\text{V}$ ,  $L=1\text{mH}$ ,  $I_{\text{AS}}=8\text{A}$ ,  $R_{\text{G}}=25\Omega$ , Starting  $T_J=25^\circ\text{C}$ .
3. The data tested by pulsed, pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .
4. Essentially independent of operating temperature.


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

**Fig.2 Normalized RD<sub>SON</sub> 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**


**Fig.7** Switching Time Waveform

**Fig.8** EAS Waveform

## SOP8 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.800	0.053	0.069
A1	0.050	0.250	0.002	0.010
A2	1.250	1.650	0.049	0.065
A3	0.500	0.700	0.020	0.028
b	0.300	0.510	0.012	0.020
c	0.150	0.260	0.006	0.010
D	4.700	5.100	0.185	0.201
E	5.800	6.200	0.228	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	0.020
L	0.400	1.000	0.016	0.039
L1	1.050(BSC)		0.041(BSC)	
θ	0°	8°	0°	8°