

**General Description**

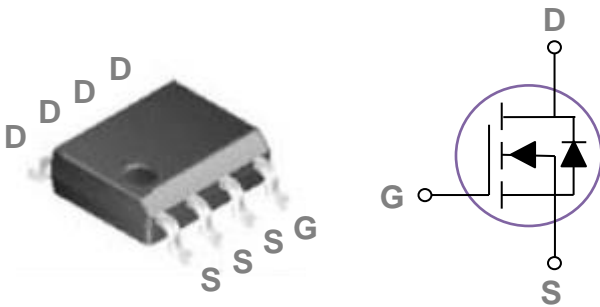
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	RDSON	ID
65V	6.5mΩ	12A

**Features**

- 65V, 12A,  $R_{DS(ON)} = 6.5m\Omega @ V_{GS} = 10V$
- Improved  $dv/dt$  capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

**SOP8 Pin Configuration**



**Applications**

- Networking
- Load Switch
- LED applications
- Quick Charger

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	65	V
$V_{GS}$	Gate-Source Voltage	+20/-12	V
$I_D$	Drain Current – Continuous ( $T_A=25^\circ C$ )	12	A
	Drain Current – Continuous ( $T_A=70^\circ C$ )	9.6	A
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	48	A
EAS	Single Pulse Avalanche Energy <sup>2</sup>	140	mJ
IAS	Single Pulse Avalanche Current <sup>2</sup>	53	A
$V_{SPIKE}$	$V_{DS}$ spike voltage ( $\leq 100ns$ ) <sup>5</sup>	80	V
$P_D$	Power Dissipation ( $T_A=25^\circ C$ )	1.47	W
	Power Dissipation – Derate above $25^\circ C$	0.011	W/ $^\circ C$
$T_{STG}$	Storage Temperature Range	-50 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-50 to 150	$^\circ C$

**Thermal Characteristics**

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	85	$^\circ C/W$

**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**
**Off Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	65	---	---	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BV <sub>DSS</sub> Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =1mA	---	0.03	---	V/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =48V, V <sub>GS</sub> =0V, T <sub>J</sub> =85°C	---	---	10	uA
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =20V, V <sub>DS</sub> =0V	---	---	100	nA

**On Characteristics**

R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =8A	---	5.5	6.5	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =6A	---	8.5	11	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1	1.6	2.5	V
ΔV <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	-5.5	---	mV/°C
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =3A	---	10	---	S

**Dynamic and switching Characteristics**

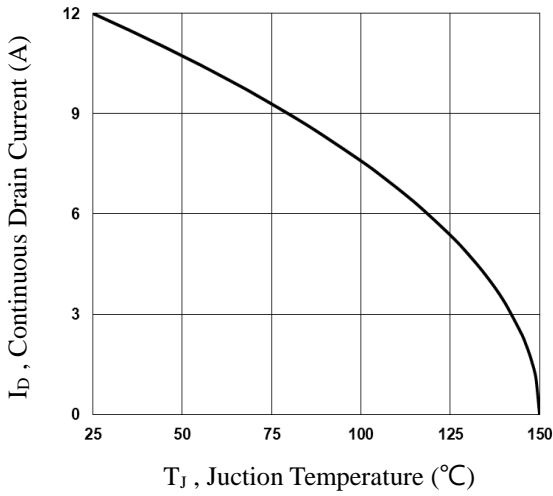
Q <sub>g</sub>	Total Gate Charge <sup>3, 4</sup>	V <sub>DS</sub> =30V, V <sub>GS</sub> =10V, I <sub>D</sub> =10A	---	34.7	70	nC
Q <sub>gs</sub>	Gate-Source Charge <sup>3, 4</sup>		---	4.9	10	
Q <sub>gd</sub>	Gate-Drain Charge <sup>3, 4</sup>		---	11.1	22	
T <sub>d(on)</sub>	Turn-On Delay Time <sup>3, 4</sup>	V <sub>DD</sub> =30V, V <sub>GS</sub> =10V, R <sub>G</sub> =6Ω I <sub>D</sub> =1A	---	10.2	21	ns
T <sub>r</sub>	Rise Time <sup>3, 4</sup>		---	16	32	
T <sub>d(off)</sub>	Turn-Off Delay Time <sup>3, 4</sup>		---	42	84	
T <sub>f</sub>	Fall Time <sup>3, 4</sup>		---	38	76	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, F=1MHz	---	1910	3800	pF
C <sub>oss</sub>	Output Capacitance		---	520	1040	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	30	60	
R <sub>g</sub>	Gate resistance		V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz	---	1.2	

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

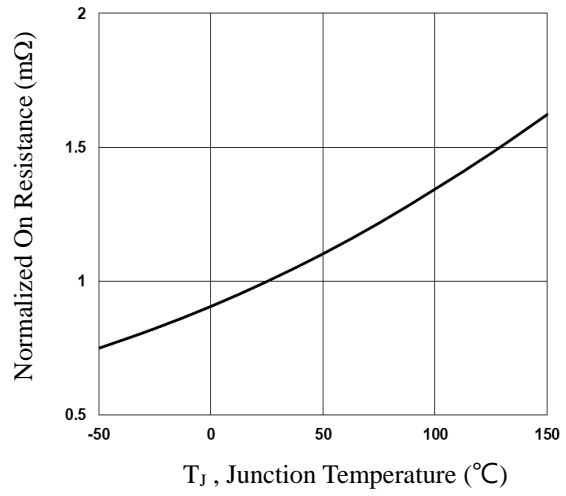
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	12	A
I <sub>SM</sub>	Pulsed Source Current		---	---	24	A
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25°C	---	---	1	V
t <sub>rr</sub>	Reverse Recovery Time	V <sub>GS</sub> =10V, I <sub>S</sub> =10A, di/dt=100A/μs	---	48.4	---	ns
Q <sub>rr</sub>	Reverse Recovery Charge	T <sub>J</sub> =25°C	---	54.2	---	nC

Note :

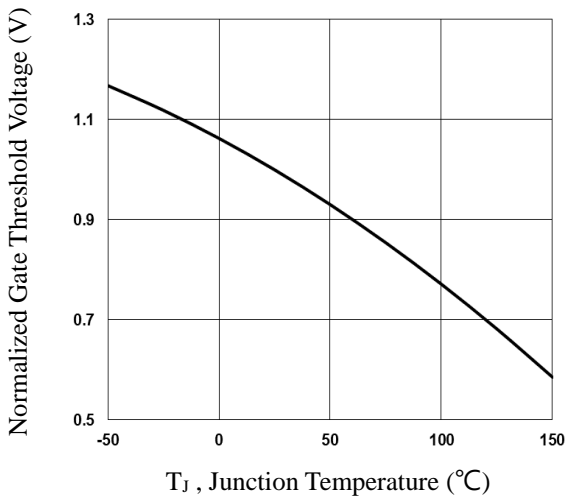
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V<sub>DD</sub>=25V, V<sub>GS</sub>=10V, L=0.1mH, I<sub>AS</sub>=53A., R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C.
3. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.
5. The spike duty cycle 1% max., limited by T<sub>J(max)</sub>=125°C



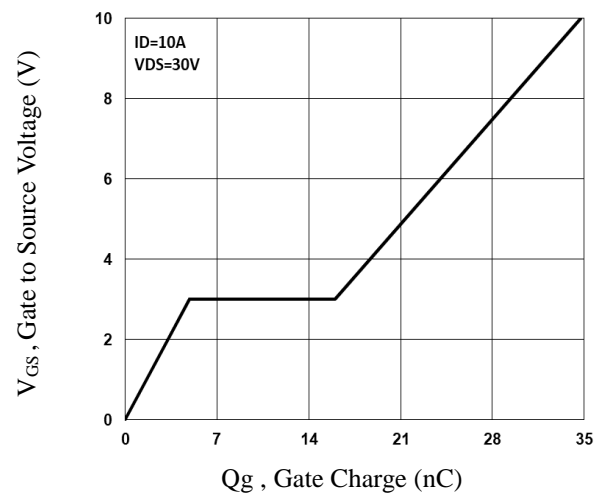
**Fig.1 Continuous Drain Current vs.  $T_J$**



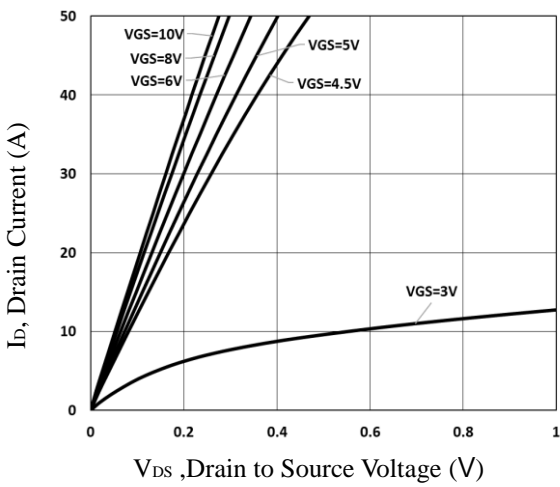
**Fig.2 Normalized  $R_{DS(ON)}$  vs.  $T_J$**



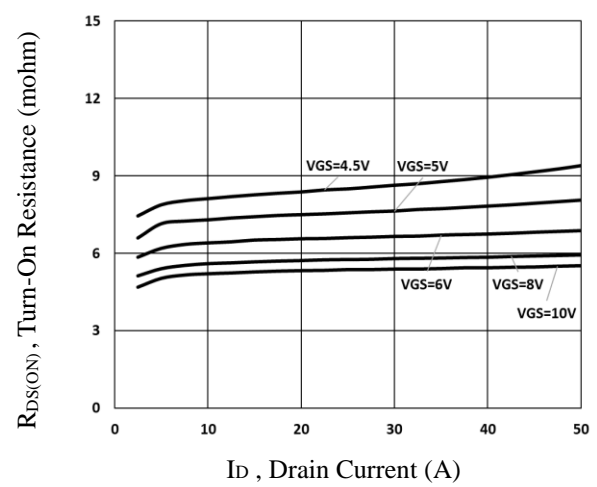
**Fig.3 Normalized  $V_{th}$  vs.  $T_J$**



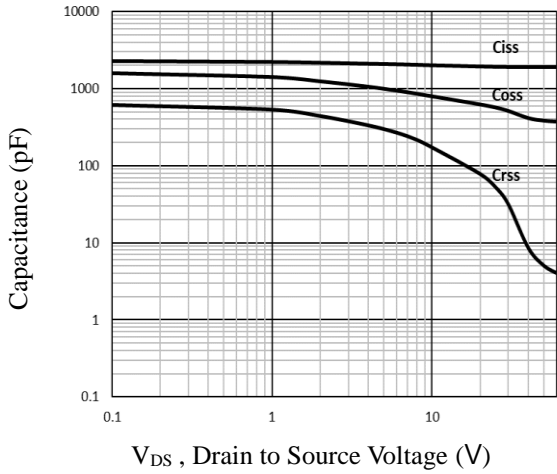
**Fig.4 Gate Charge Characteristics**



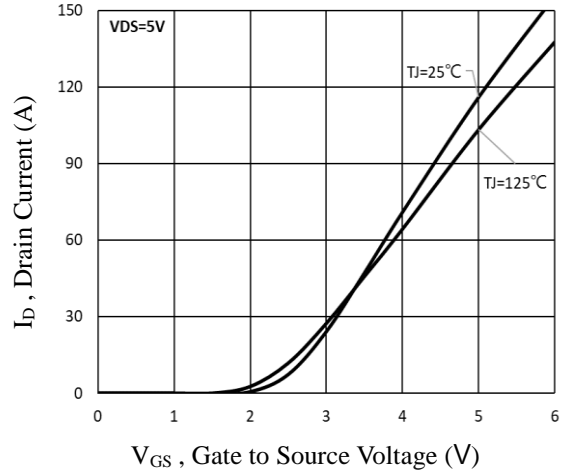
**Fig.5 Typical Output Characteristics**



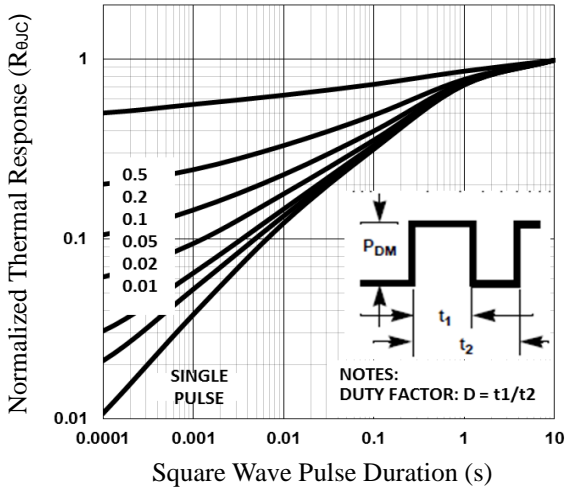
**Fig.6 Turn-On Resistance vs.  $I_D$**



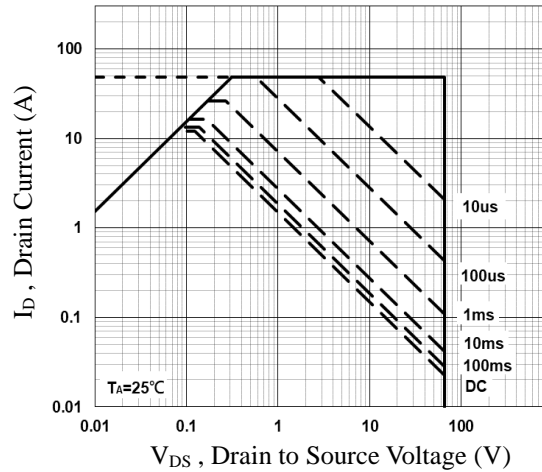
**Fig.7 Capacitance Characteristics**



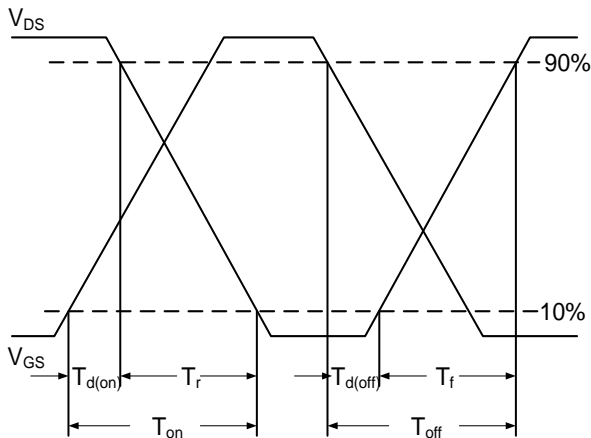
**Fig.8 Transfer Characteristics**



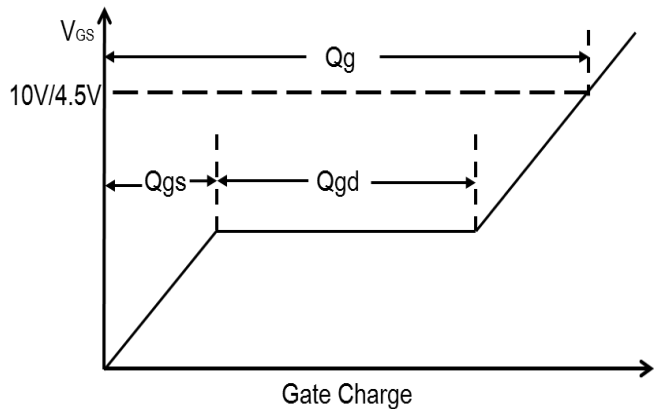
**Fig.9 Normalized Transient Impedance**



**Fig.10 Maximum Safe Operation Area**

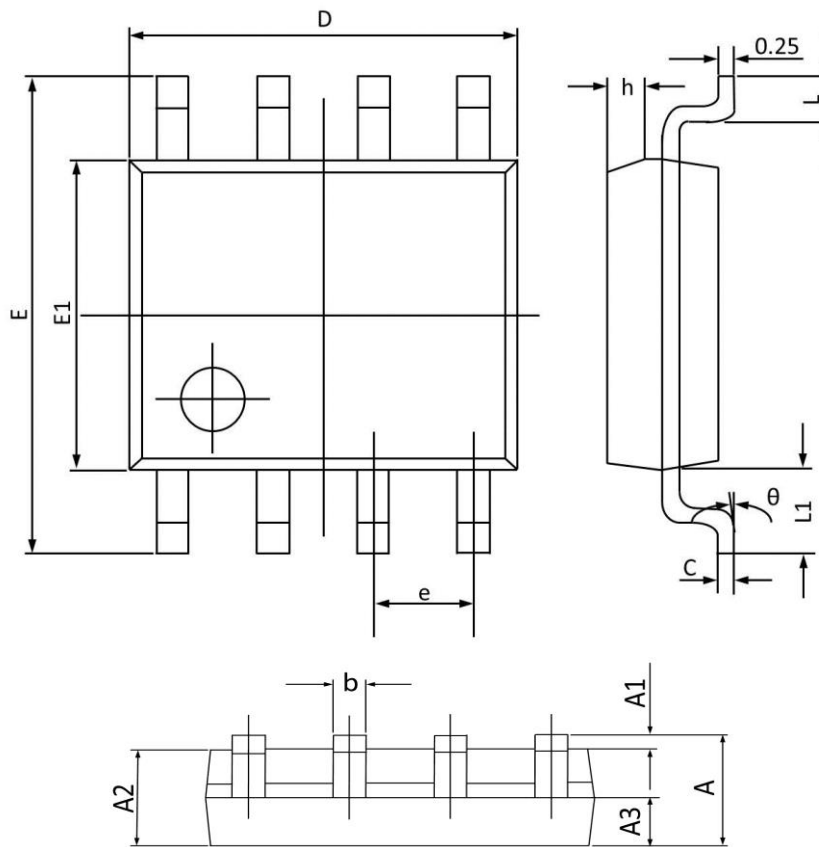


**Fig.11 Switching Time Waveform**



**Fig.12 Gate Charge Waveform**

## SOP8 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°