

General Description

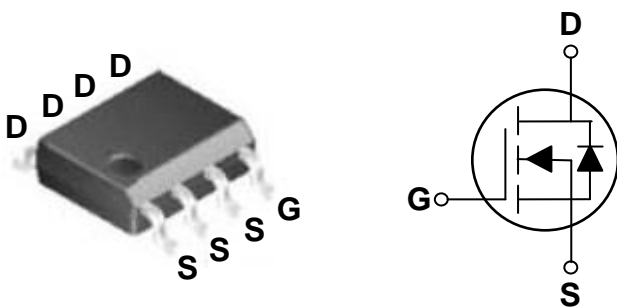
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	R _{DS(ON)}	ID
60V	12mΩ	10A

Features

- 60V, 10A, R_{DS(ON)} = 12mΩ @V_{GS} = 10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

SOP8 Pin Configuration



Applications

- Motor Drive
- Power Tools
- LED Lighting



Absolute Maximum Ratings T_c=25°C unless otherwise noted

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	60	V
V _{GS}	Gate-Source Voltage	±20	V
I _D	Drain Current – Continuous (T _C =25°C)	10	A
	Drain Current – Continuous (T _C =100°C)	6.3	A
I _{DM}	Drain Current – Pulsed ¹	40	A
EAS	Single Pulse Avalanche Energy ²	61	mJ
IAS	Single Pulse Avalanche Current ²	35	A
P _D	Power Dissipation (T _C =25°C)	2.5	W
	Power Dissipation – Derate above 25°C	0.02	W/°C
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	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	$V_{GS}=0V, I_D=250\mu A$	60	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=1\text{mA}$	---	0.07	---	$V/^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=60V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=48V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance ³	$V_{GS}=10V, I_D=10A$	---	10	12	m Ω
		$V_{GS}=4.5V, I_D=6A$	---	12	15	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.6	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4	---	$\text{mV}/^\circ\text{C}$
gfs	Forward Transconductance	$V_{DS}=10V, I_D=6A$	---	11.7	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge ^{3,4}	$V_{DS}=30V, V_{GS}=10V, I_D=10A$	---	39.2	59	nC
Q_{gs}	Gate-Source Charge ^{3,4}		---	5.9	9	
Q_{gd}	Gate-Drain Charge ^{3,4}		---	8.8	14	
$T_{d(on)}$	Turn-On Delay Time ^{3,4}	$V_{DD}=15V, V_{GS}=10V, R_G=6\Omega$ $I_D=1A$	---	9.6	18	ns
T_r	Rise Time ^{3,4}		---	28.2	54	
$T_{d(off)}$	Turn-Off Delay Time ^{3,4}		---	45.3	86	
T_f	Fall Time ^{3,4}		---	10.9	21	
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, F=1\text{MHz}$	---	2100	3050	pF
C_{oss}	Output Capacitance		---	165	240	
C_{rss}	Reverse Transfer Capacitance		---	80	120	
R_g	Gate resistance		$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	1.6	

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	---	---	10	A
I_{SM}	Pulsed Source Current ³		---	---	40	A
V_{SD}	Diode Forward Voltage ³	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	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. $V_{DD}=25V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=35A, R_G=25\Omega$, 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.

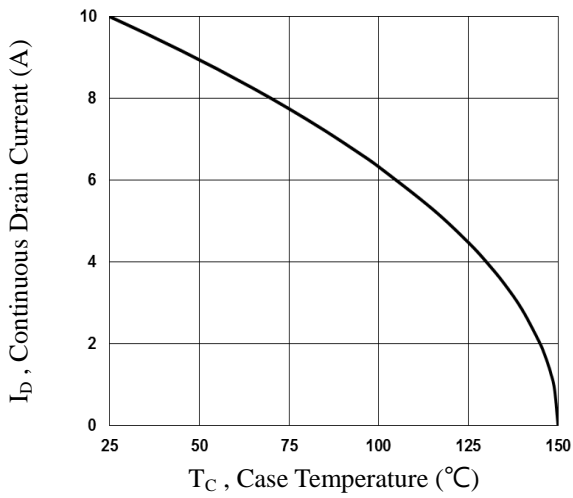


Fig.1 Continuous Drain Current vs. T_c

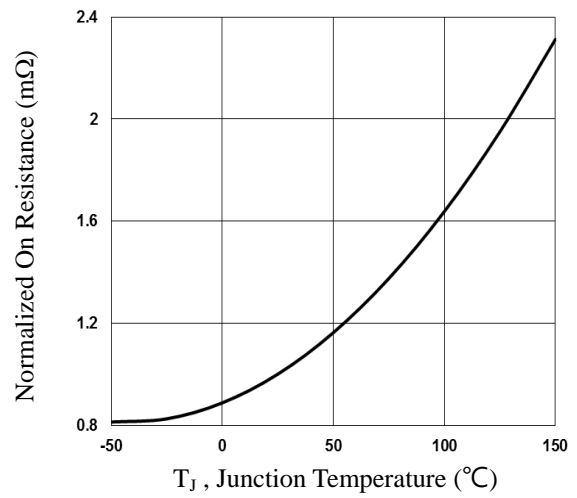


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

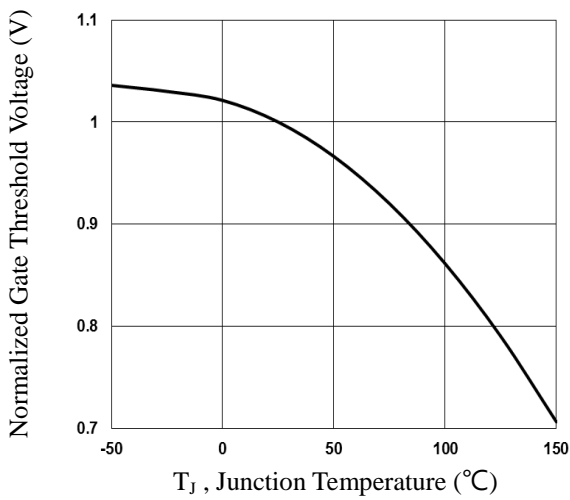


Fig.3 Normalized V_{th} vs. T_j

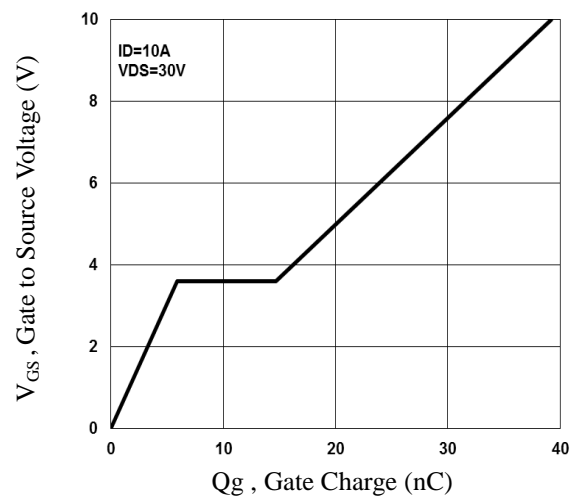


Fig.4 Gate Charge Waveform

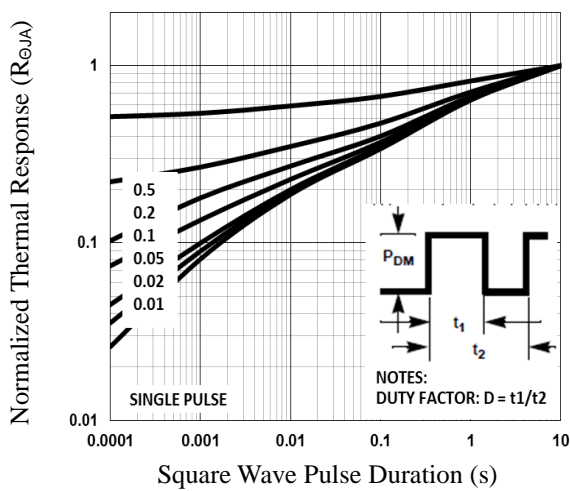


Fig.5 Normalized Transient Response

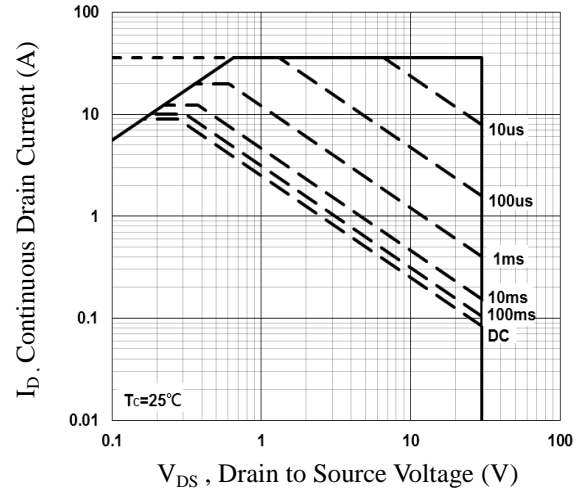


Fig.6 Maximum Safe Operation Area

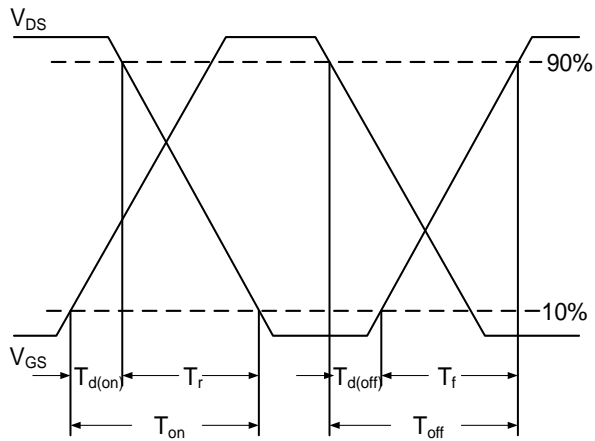


Fig.7 Switching Time Waveform

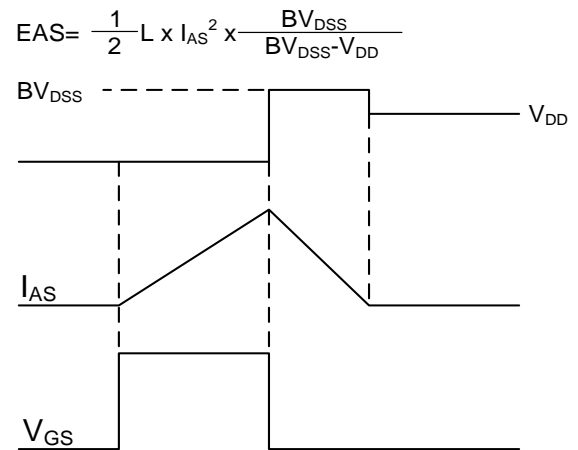
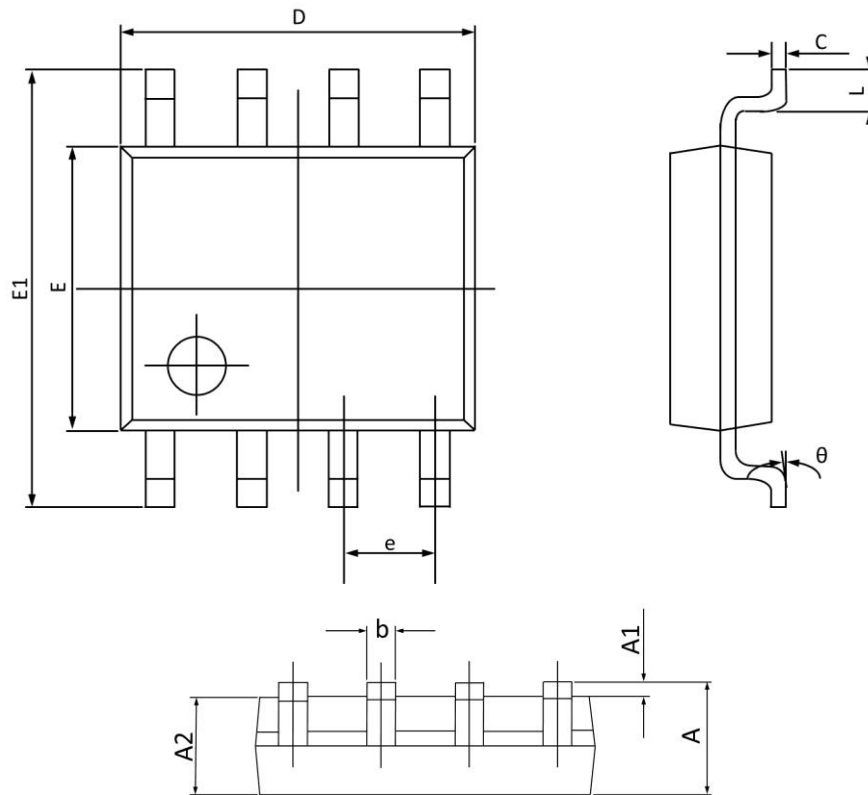


Fig.8 EAS Waveform

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Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.750	1.350	0.069	0.053
A1	0.250	0.100	0.010	0.004
A2	1.500	1.300	0.059	0.051
b	0.490	0.350	0.019	0.014
C	0.260	0.190	0.010	0.007
D	5.100	4.700	0.201	0.185
E	4.100	3.700	0.161	0.146
E1	6.200	5.800	0.244	0.228
e	1.27BSC		0.05BSC	
L	0.900	0.400	0.035	0.016
theta	8°	0°	8°	0°