**STEIFPOWER TECHNOLOGY**

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
40V	2.5mΩ	160A

Features

- *40V, 160A, RDS(ON) =2.5mΩ@VGS = 10V*
- *Improved dv/dt capability*
- *Fast switching*
- *100% EAS Guaranteed*
- *Green Device Available*

Applications

- *MB / VGA / Server Vcore*
- *POL Applications*
- *SMPS 2nd SR*
- *BMS System*

TO220 Pin Configuration

D

G

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RoHS COMPLIANT

Absolute Maximum Ratings Tc=25℃ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current – Continuous (T_C=25℃) (Chip Limitation)	160	A
	Drain Current – Continuous (T_C=100℃) (Chip Limitation)	100	A
I_{DM}	Drain Current – Pulsed[1]	640	A
EAS	Single Pulse Avalanche Energy[2]	360	mJ
IAS	Single Pulse Avalanche Current[2]	85	A
P_D	Power Dissipation (T_C=25℃)	184	W
	Power Dissipation – Derate above 25℃	1.47	W/℃
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{θJA}$	Thermal Resistance Junction to ambient	---	62	℃/W
$R_{θJC}$	Thermal Resistance Junction to Case	---	0.68	℃/W

Electrical Characteristics (T$_J$=25 ℃, unless otherwise noted)

Static State Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV$_{DSS}$	Drain-Source Breakdown Voltage	V$_{GS}$=0V , I$_D$=250uA	40	---	---	V
I$_{DSS}$	Drain-Source Leakage Current	V$_{DS}$=40V , V$_{GS}$=0V , T$_J$=25℃	---	---	1	uA
		V$_{DS}$=32V , V$_{GS}$=0V , T$_J$=85℃	---	---	10	uA
I$_{GSS}$	Gate-Source Leakage Current	V$_{GS}$=±20V , V$_{DS}$=0V	---	---	±100	nA
R$_{DS(ON)}$	Static Drain-Source On-Resistance[3]	V$_{GS}$=10V , I$_D$=30A	---	2.1	2.5	mΩ
		V$_{GS}$=4.5V , I$_D$=15A	---	2.6	3.5	mΩ
V$_{GS(th)}$	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$=250uA	1	1.6	2.5	V
gfs	Forward Transconductance	V$_{DS}$=10V , I$_D$=15A	---	45	---	S

Dynamic Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q$_g$	Total Gate Charge[3,4]	V$_{DS}$=20V , V$_{GS}$=4.5V , I$_D$=10A	---	70	140	nC
Q$_{gs}$	Gate-Source Charge[3,4]		---	15	32	
Q$_{gd}$	Gate-Drain Charge[3,4]		---	40	80	
T$_{d(on)}$	Turn-On Delay Time[3,4]	V$_{DD}$=20V , V$_{GS}$=10V , R$_G$=10Ω I$_D$=10A	---	24.6	48	ns
T$_r$	Rise Time[3,4]		---	62.8	120	
T$_{d(off)}$	Turn-Off Delay Time[3,4]		---	224	440	
T$_f$	Fall Time[3,4]		---	162	320	
C$_{iss}$	Input Capacitance	V$_{DS}$=25V , V$_{GS}$=0V , F=1MHz	---	8000	12000	pF
C$_{oss}$	Output Capacitance		---	550	1000	
C$_{rss}$	Reverse Transfer Capacitance		---	420	800	
R$_g$	Gate resistance	V$_{GS}$=0V, V$_{DS}$=0V, F=1MHz	---	1.2	2.4	Ω

Guaranteed Avalanche Energy

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
EAS	Single Pulse Avalanche Energy	V$_{DD}$=25V, L=0.1mH, IAS=30A	45	---	---	mJ

Drain-Source Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I$_S$	Continuous Source Current	V$_G$=V$_D$=0V , Force Current	---	---	160	A
I$_{SM}$	Pulsed Source Current[3]		---	---	320	A
V$_{SD}$	Diode Forward Voltage[3]	V$_{GS}$=0V , I$_S$=1A , T$_J$=25℃	---	---	1	V
t$_{rr}$	Reverse Recovery Time	V$_{GS}$=0V,I$_S$=20A , di/dt=100A/μs T$_J$=25℃	---	32	---	ns
Q$_{rr}$	Reverse Recovery Charge		---	19	---	nC

Note :
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V$_{DD}$=25V,V$_{GS}$=10V,L=0.1mH,I$_{AS}$=85A.,R$_G$=25Ω, Starting T$_J$=25℃.
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.
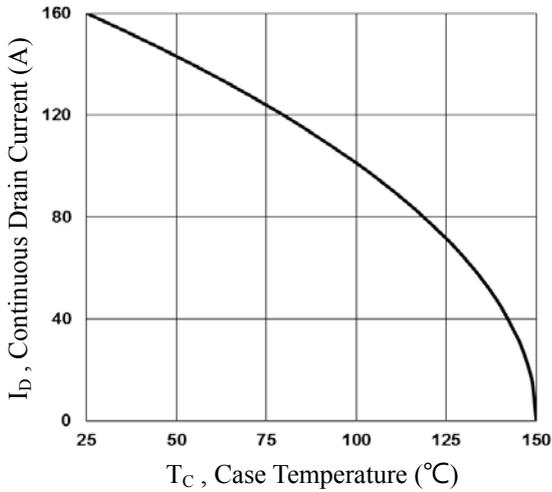
Fig.1   Continuous Drain Current vs. T$_C$
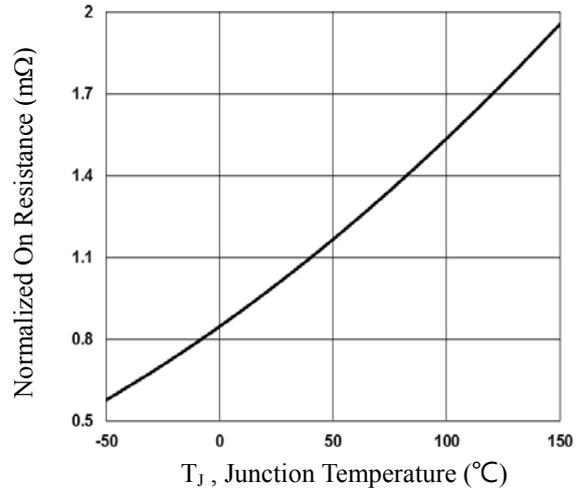
Fig.2   Normalized RDSON vs. T$_J$
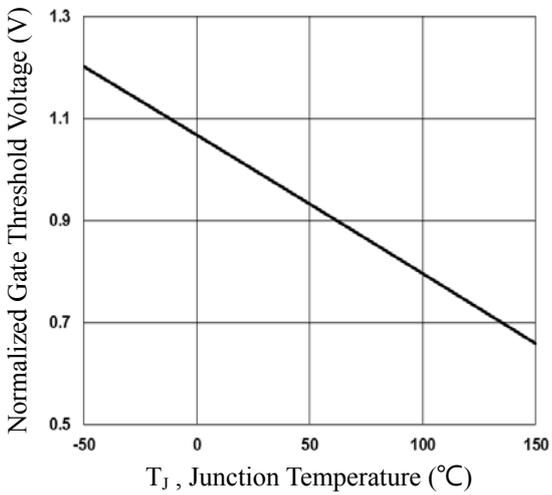
**Fig.3   Normalized V$_{th}$ vs. T$_J$**
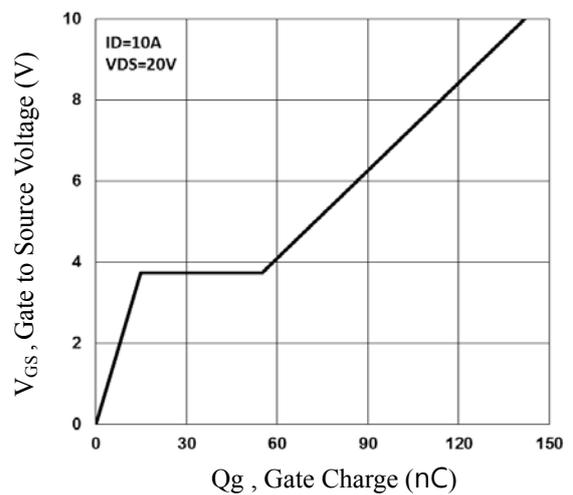
Fig.4   Gate Charge Waveform
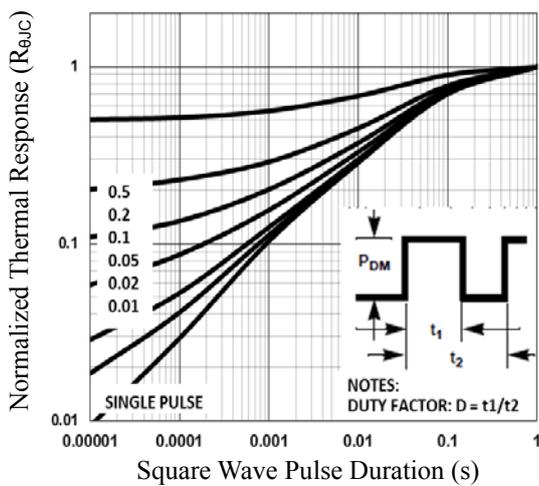
Fig.5   Normalized Transient Impedance
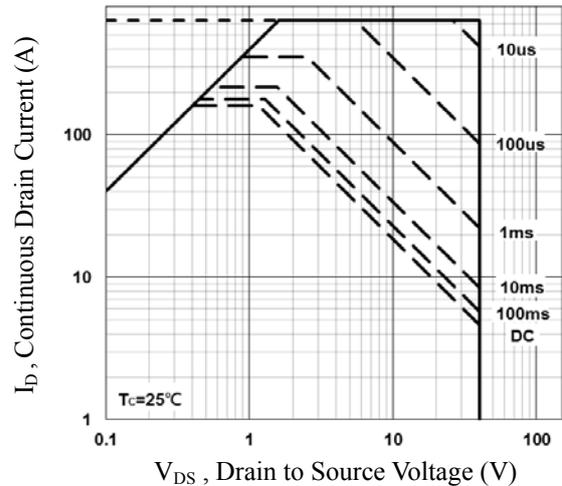
Fig.6   Maximum Safe Operation Area

$$EAS = \frac{1}{2}L \times I_{AS}{}^2 \times \frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$
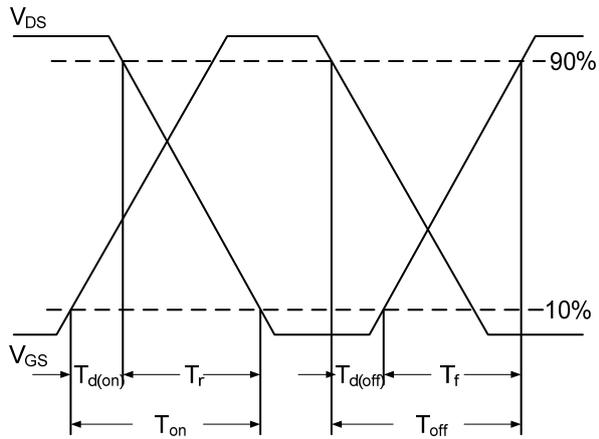
Fig.7   Switching Time Waveform
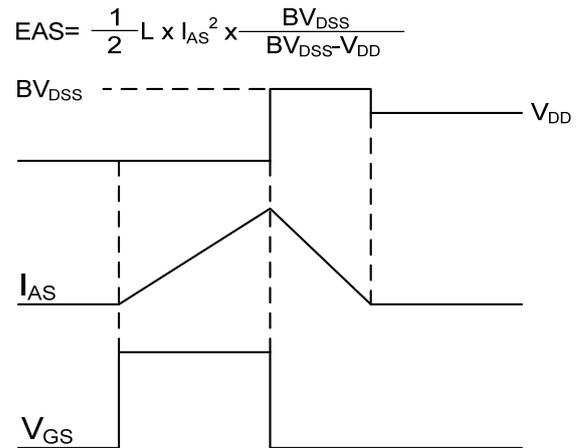
Fig.8   EAS Waveform

TO220 PACKAGE INFORMATION
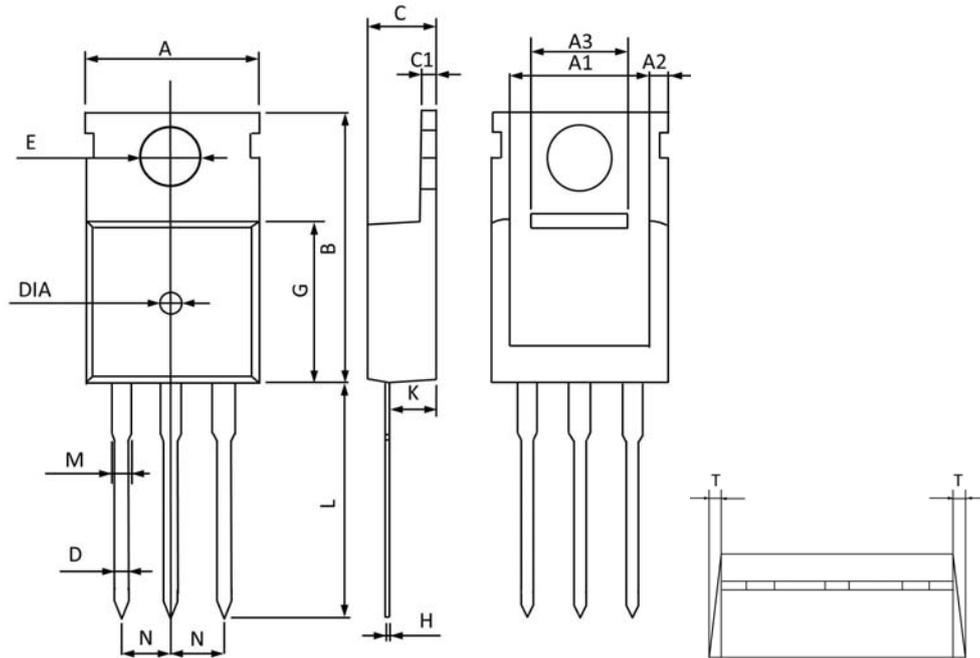
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	10.300	9.700	0.406	0.382
A1	8.840	8.440	0.348	0.332
A2	1.250	1.050	0.049	0.041
A3	5.300	5.100	0.209	0.201
B	16.200	15.400	0.638	0.606
C	4.680	4.280	0.184	0.169
C1	1.500	1.100	0.059	0.043
D	1.000	0.600	0.039	0.024
E	3.800	3.400	0.150	0.134
G	9.300	8.700	0.366	0.343
H	0.600	0.400	0.024	0.016
K	2.700	2.100	0.106	0.083
L	13.600	12.800	0.535	0.504
M	1.500	1.100	0.059	0.043
N	2.590	2.490	0.102	0.098
T	W0.35		W0.014	
DIA	Φ1.5 TYP.	deep0.2 TYP.	Φ0.059 TYP.	deep0.008 TYP.