

### General Description

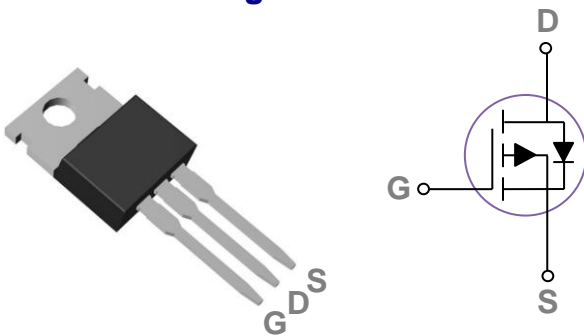
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	R <sub>DS(ON)</sub>	I <sub>D</sub>
-100V	95mΩ	-20A

### Features

- -100V,-20A, R<sub>DS(ON)</sub> =95mΩ@V<sub>GS</sub> = -10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

### TO220 Pin Configuration



### Applications

- Networking
- Load Switch
- LED applications
- Quick Charger

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

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	-100	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub>	Drain Current – Continuous (T <sub>C</sub> =25°C)	-20	A
	Drain Current – Continuous (T <sub>C</sub> =100°C)	-13	A
I <sub>DM</sub>	Drain Current – Pulsed <sup>1</sup>	-80	A
EAS	Single Pulse Avalanche Energy <sup>2</sup>	106	mJ
IAS	Single Pulse Avalanche Current <sup>2</sup>	-46	A
P <sub>D</sub>	Power Dissipation (T <sub>C</sub> =25°C)	128	W
	Power Dissipation – Derate above 25°C	1.02	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	---	62	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction to Case	---	0.98	°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	-100	---	---	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =-100V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	-1	uA
		V <sub>DS</sub> =-80V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°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> =-10A	---	79	95	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-8A	---	86	112	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =-250uA	-1.2	-1.6	-2.5	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =-10V, I <sub>S</sub> =-3A	---	13	---	S

**Dynamic and switching Characteristics**

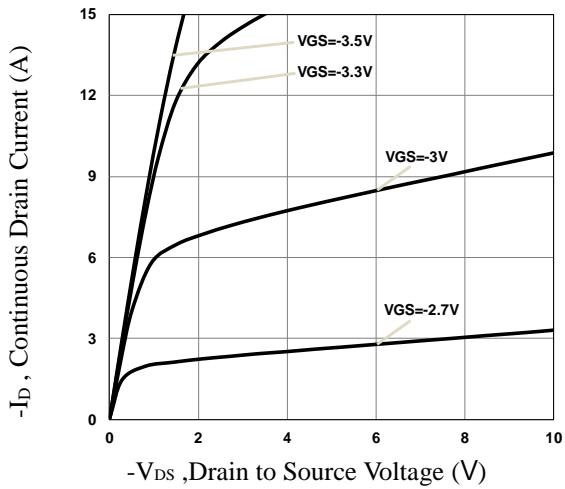
Q <sub>g</sub>	Total Gate Charge <sup>3, 4</sup>	V <sub>DS</sub> =-50V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-10A	---	40	60	nC
Q <sub>gs</sub>	Gate-Source Charge <sup>3, 4</sup>		---	6.5	10	
Q <sub>gd</sub>	Gate-Drain Charge <sup>3, 4</sup>		---	7.2	11	
T <sub>d(on)</sub>	Turn-On Delay Time <sup>3, 4</sup>	V <sub>DD</sub> =-50V, V <sub>GS</sub> =-10V, R <sub>G</sub> =6Ω I <sub>D</sub> =-10A	---	5	10	ns
T <sub>r</sub>	Rise Time <sup>3, 4</sup>		---	10	15	
T <sub>d(off)</sub>	Turn-Off Delay Time <sup>3, 4</sup>		---	15	20	
T <sub>f</sub>	Fall Time <sup>3, 4</sup>		---	10	15	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-50V, V <sub>GS</sub> =0V, F=1MHz	---	2600	3900	pF
C <sub>oss</sub>	Output Capacitance		---	80	120	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	56	85	

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

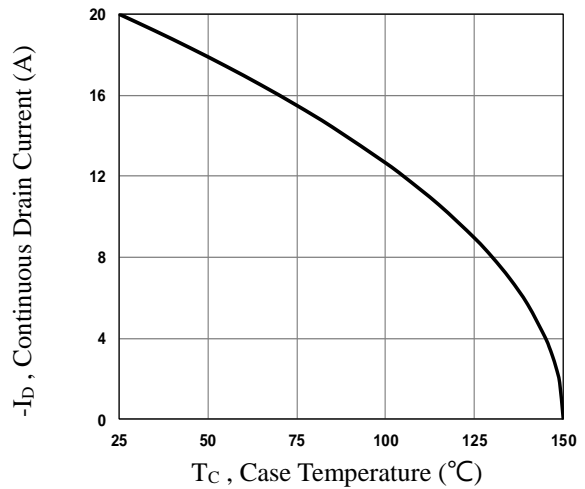
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	-20	A
I <sub>SM</sub>	Pulsed Source Current		---	---	-40	A
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =-1A, T <sub>J</sub> =25°C	---	---	-1	V
t <sub>rr</sub>	Reverse Recovery Time	V <sub>R</sub> =-100V, I <sub>S</sub> =-10A	---	50	---	ns
Q <sub>rr</sub>	Reverse Recovery Charge	di/dt=100A/μs, T <sub>J</sub> =25°C	---	60	---	nC

Note :

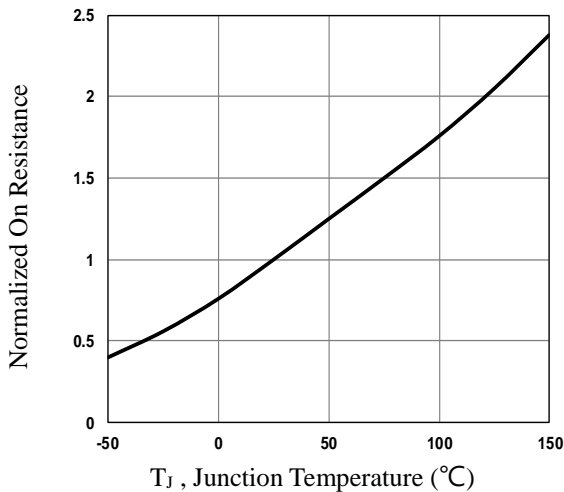
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V<sub>DD</sub>=-80V, V<sub>GS</sub>=-10V, L=0.1mH, I<sub>AS</sub>=-46A., Starting T<sub>J</sub>=25°C
3. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.



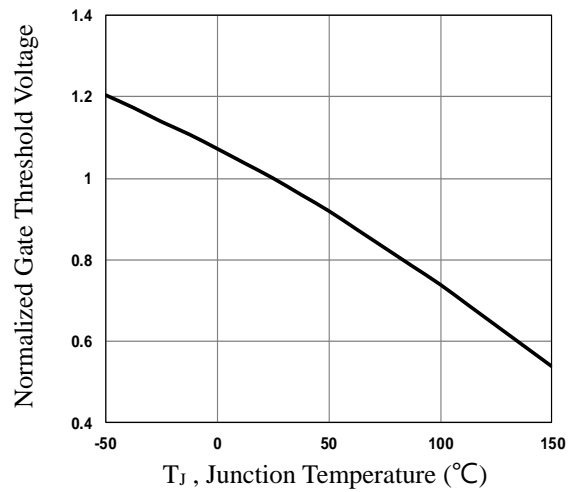
**Fig.1 Typical Output Characteristics**



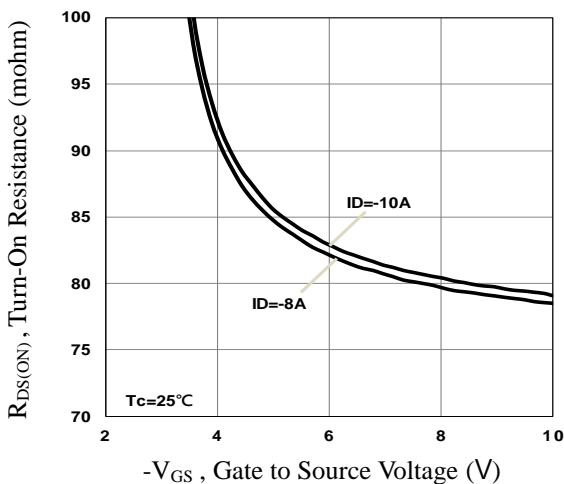
**Fig.2 Continuous Drain Current vs. T<sub>c</sub>**



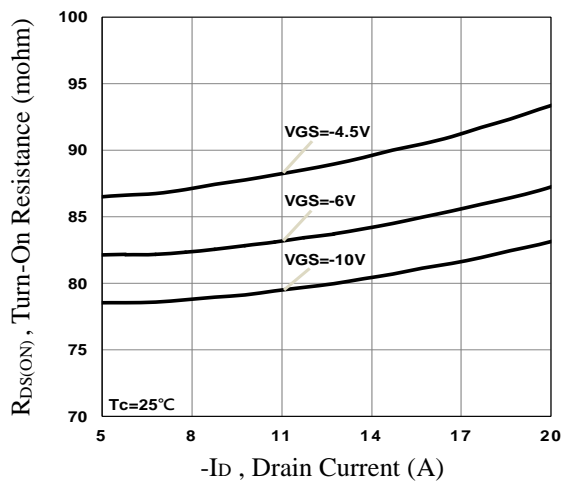
**Fig.3 Normalized R<sub>DS(on)</sub> vs. T<sub>j</sub>**



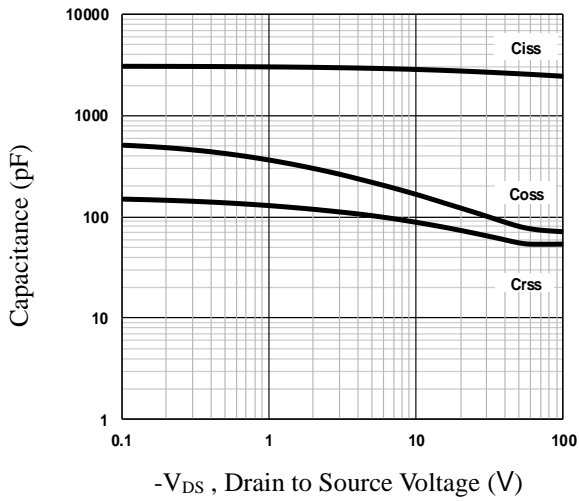
**Fig.4 Normalized V<sub>th</sub> vs. T<sub>j</sub>**



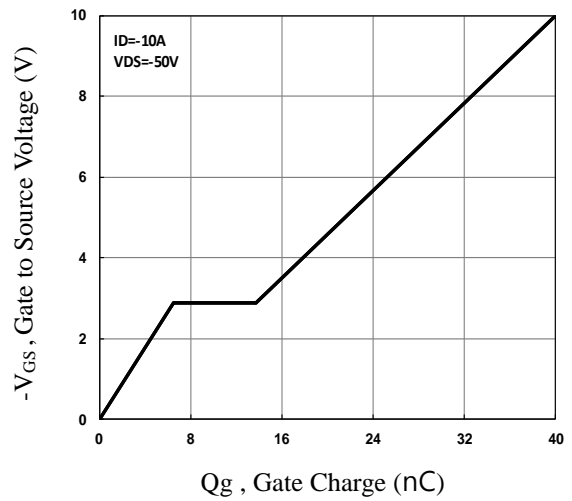
**Fig.5 Turn-On Resistance vs. V<sub>GS</sub>**



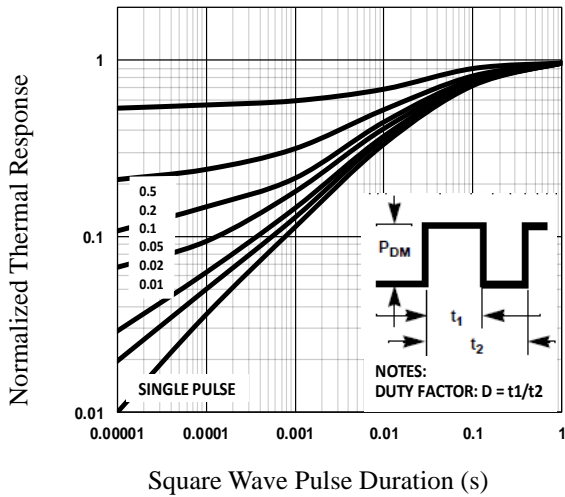
**Fig.6 Turn-On Resistance vs. I<sub>D</sub>**



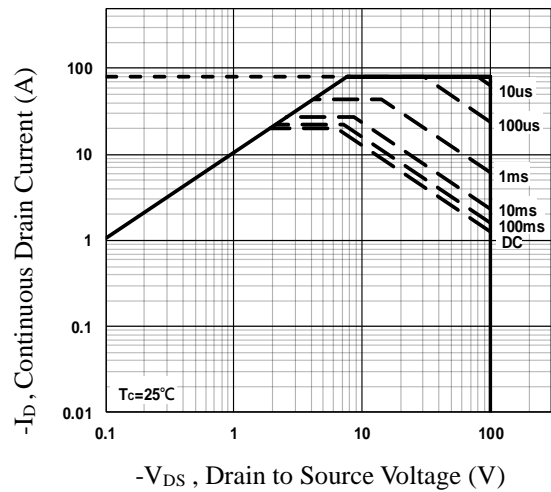
**Fig.7 Capacitance Characteristics**



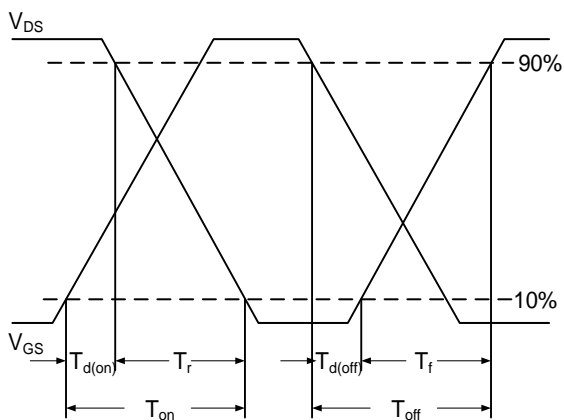
**Fig.8 Gate Charge Characteristics**



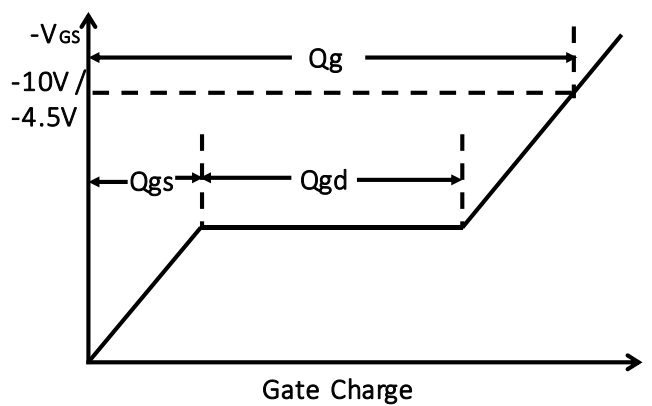
**Fig.9 Normalized Transient Impedance**



**Fig.10 Maximum Safe Operation Area**

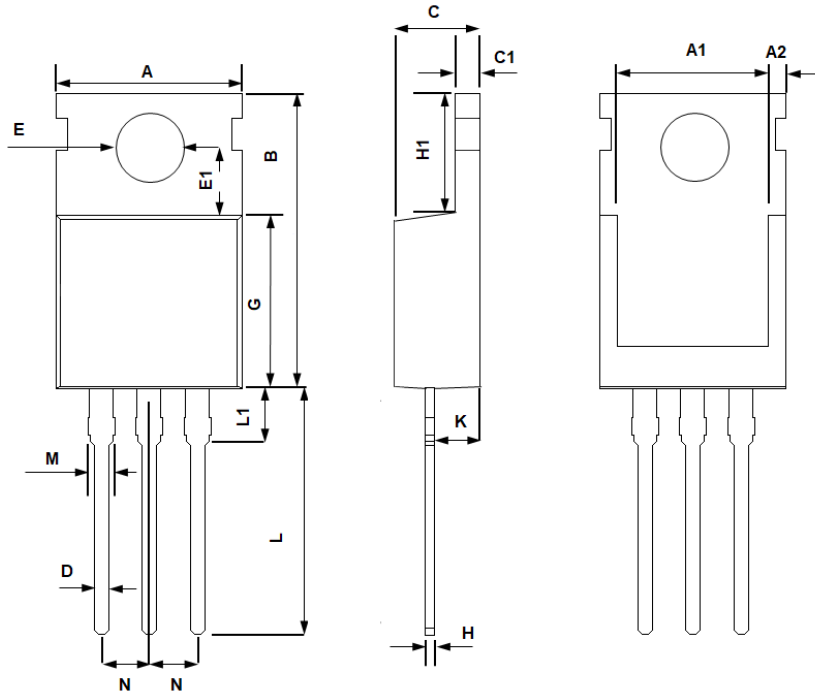


**Fig.11 Switching Time Waveform**



**Fig.12 Gate Charge Waveform**

## TO220 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	10.400	9.700	0.409	0.382
A1	8.900	7.400	0.350	0.291
A2	1.400	0.800	0.055	0.031
B	16.500	14.500	0.650	0.571
C	4.750	4.200	0.187	0.165
C1	1.500	1.100	0.059	0.043
D	1.000	0.600	0.039	0.024
E	4.000	3.300	0.157	0.130
E1	3.800	3.400	0.150	0.134
G	9.400	8.400	0.370	0.331
H	0.600	0.200	0.024	0.008
H1	6.850	6.200	0.270	0.244
K	2.850	2.100	0.112	0.083
L	14.000	12.500	0.551	0.492
L1	4.000	2.700	0.157	0.106
M	1.750	1.100	0.069	0.043
N	2.640	2.440	0.104	0.096