

### General Description

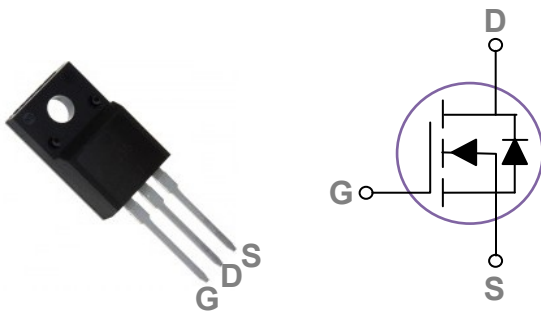
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	R <sub>DS(ON)</sub>	I <sub>D</sub>
100V	115mΩ	10A

### Features

- 100V,10A , R<sub>DS(ON)</sub>=115mΩ@V<sub>GS</sub>=10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

### TO220F Pin Configuration



### Applications

- Networking
- Load Switch
- LED applications

### Absolute Maximum Ratings T<sub>c</sub>=25°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)	10	A
	Drain Current – Continuous (T <sub>C</sub> =100°C)	6.3	A
I <sub>DM</sub>	Drain Current – Pulsed <sup>1</sup>	40	A
EAS	Single Pulse Avalanche Energy <sup>2</sup>	6	mJ
IAS	Single Pulse Avalanche Current <sup>2</sup>	11	A
P <sub>D</sub>	Power Dissipation (T <sub>C</sub> =25°C)	26.6	W
	Power Dissipation – Derate above 25°C	0.21	W/°C
T <sub>STG</sub>	Storage Temperature Range	-50 to 150	°C
T <sub>J</sub>	Operating Junction Temperature Range	-50 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	---	3.7	°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	$V_{GS}=0V, I_D=250\mu A$	100	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	$BV_{DSS}$ Temperature Coefficient	Reference to $25^\circ\text{C}$ , $I_D=1\text{mA}$	---	0.09	---	$V/^\circ\text{C}$
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=100V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	$\mu A$
		$V_{DS}=80V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	10	$\mu A$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA

**On Characteristics**

$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=10A$	---	90	115	m $\Omega$
		$V_{GS}=4.5V, I_D=8A$	---	95	120	m $\Omega$
$V_{GS(th)}$	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		---	-5	---	$\text{mV}/^\circ\text{C}$
gfs	Forward Transconductance	$V_{DS}=10V, I_D=2A$	---	8.7	---	S

**Dynamic and switching Characteristics**

$Q_g$	Total Gate Charge <sup>3,4</sup>	$V_{DS}=50V, V_{GS}=10V, I_D=2A$	---	20	40	nC
$Q_{gs}$	Gate-Source Charge <sup>3,4</sup>		---	3.2	6	
$Q_{gd}$	Gate-Drain Charge <sup>3,4</sup>		---	3.6	7	
$T_{d(on)}$	Turn-On Delay Time <sup>3,4</sup>	$V_{DD}=50V, V_{GS}=10V, R_G=3.3\Omega$ $I_D=1A$	---	18	36	ns
$T_r$	Rise Time <sup>3,4</sup>		---	4	8	
$T_{d(off)}$	Turn-Off Delay Time <sup>3,4</sup>		---	40	80	
$T_f$	Fall Time <sup>3,4</sup>		---	3	6	
$C_{iss}$	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, F=1\text{MHz}$	---	1400	2800	pF
$C_{oss}$	Output Capacitance		---	60	120	
$C_{rss}$	Reverse Transfer Capacitance		---	35	70	
$R_g$	Gate resistance		$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	2	

**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		---	---	20	A
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1	V
$t_{rr}$	Reverse Recovery Time <sup>3</sup>	$I_S=1A, di/dt=100A/\mu s, T_J=25^\circ\text{C}$	---	38	---	ns
$Q_{rr}$	Reverse Recovery Charge <sup>3</sup>		---	27	---	nC

**Note :**

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2.  $V_{DD}=25V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=11A, R_G=25\Omega$ , 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.

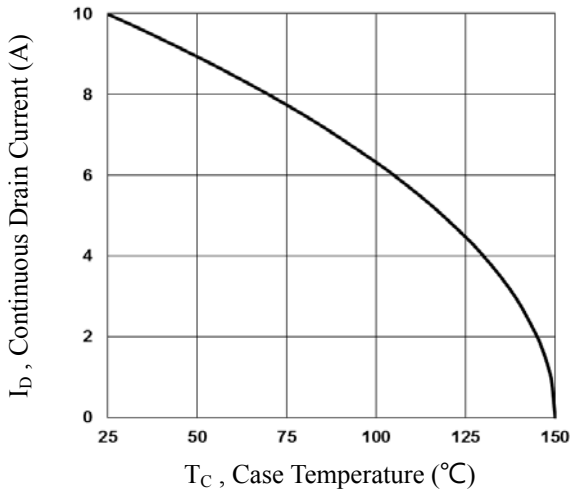


Fig.1 Continuous Drain Current vs.  $T_c$

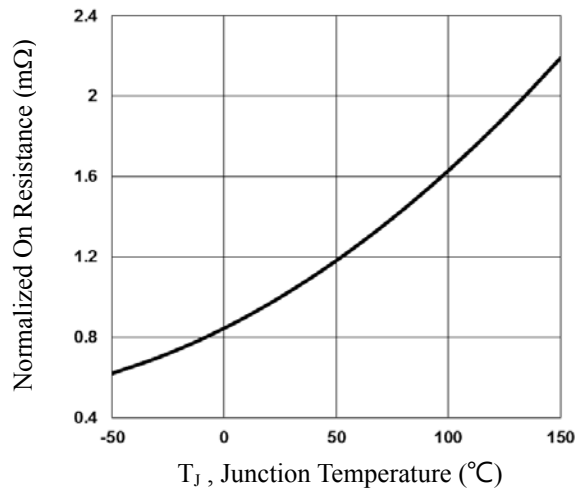


Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_j$

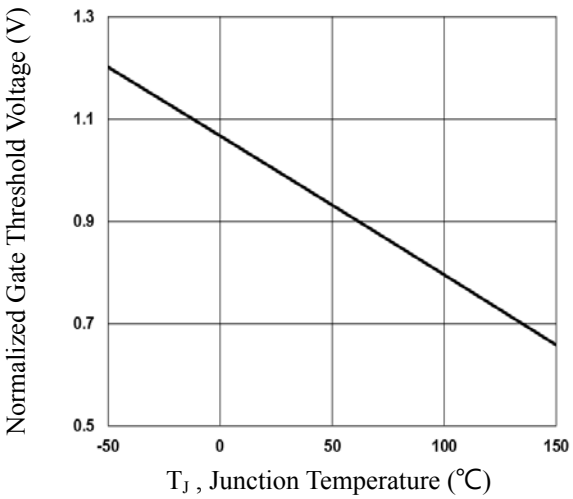


Fig.3 Normalized  $V_{th}$  vs.  $T_j$

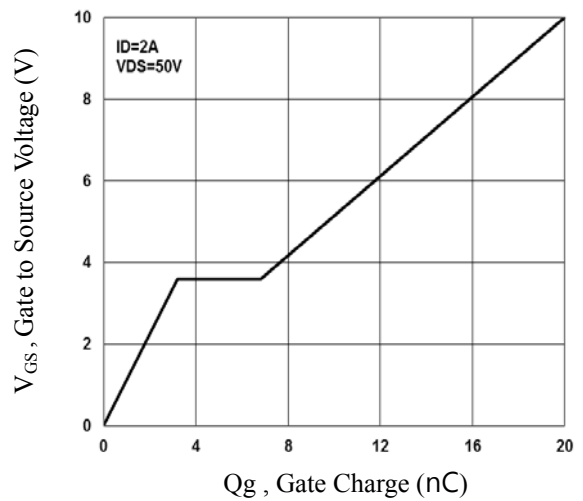


Fig.4 Gate Charge Waveform

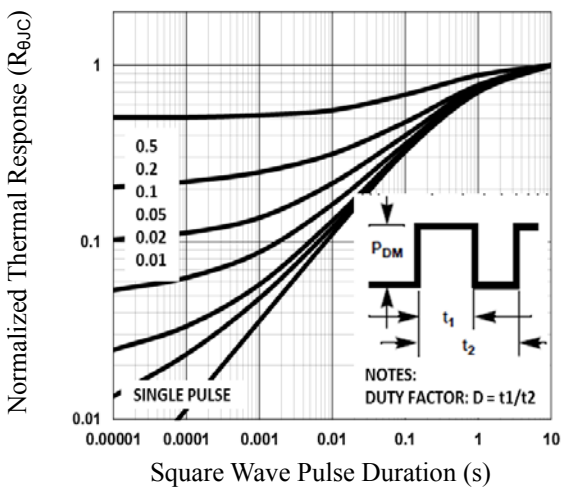


Fig.5 Normalized Transient Impedance

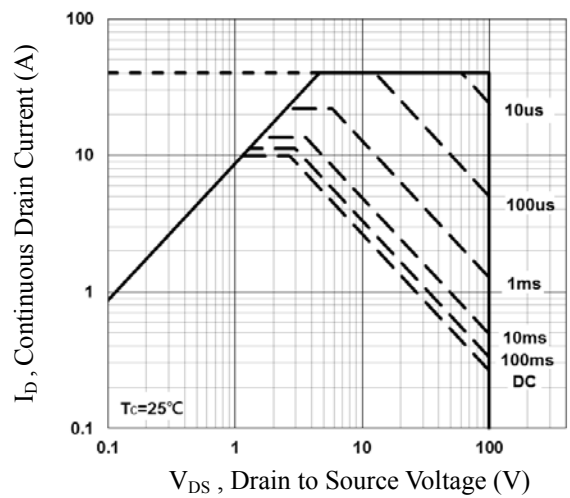


Fig.6 Maximum Safe Operation Area

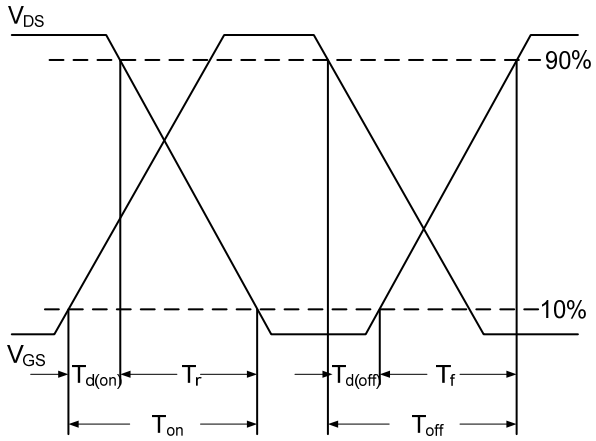


Fig.7 Switching Time Waveform

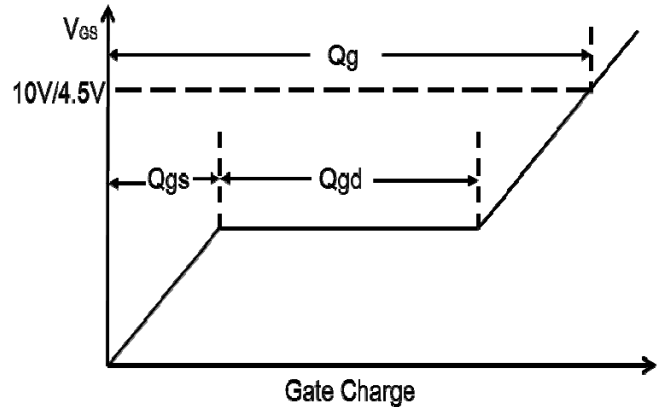
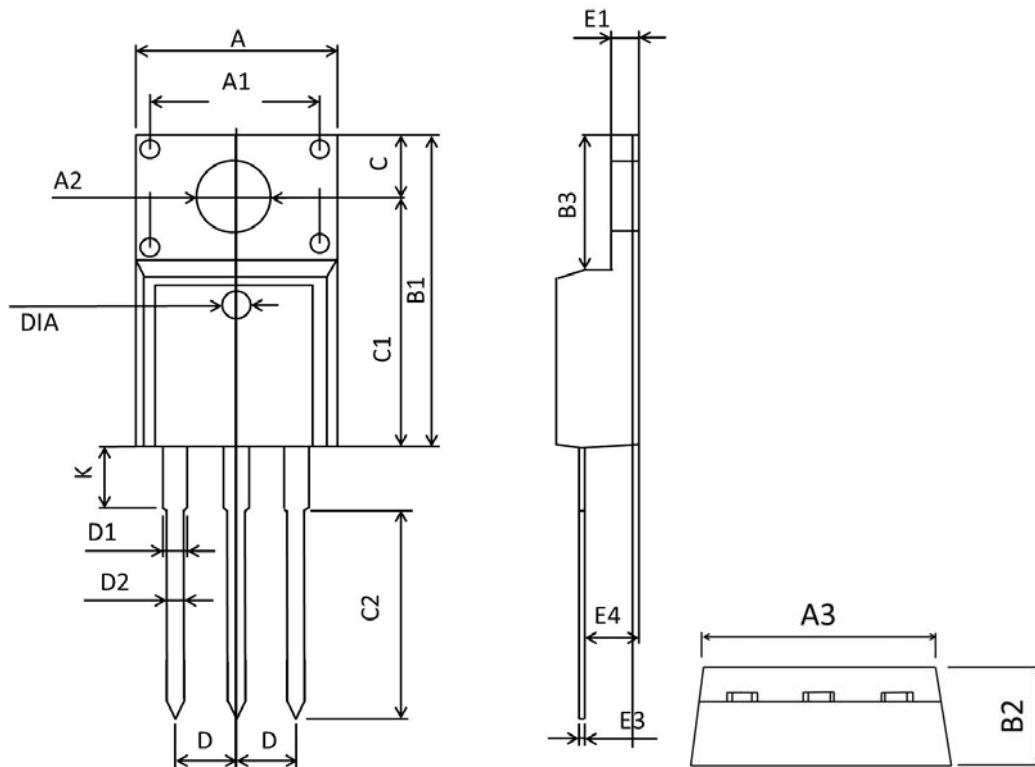


Fig.8 Gate Charge Waveform

## TO220F PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	9.860	10.460	0.389	0.411
A1	6.900	7.100	0.272	0.279
A2	3.100	3.500	0.123	0.137
B1	9.500	9.900	0.375	0.389
B2	4.500	4.900	0.178	0.192
B3	6.480	6.880	0.256	0.271
C	3.100	3.500	0.123	0.137
C1	12.270	12.870	0.484	0.506
C2	12.580	13.380	0.496	0.526
D	2.490	2.590	0.099	0.101
D1	1.070	1.470	0.043	0.057
D2	0.700	0.900	0.028	0.035
K	2.900	3.300	0.115	0.129
E1	2.340	2.740	0.093	0.107
E3	0.400	0.600	0.016	0.023
E4	2.560	2.960	0.101	0.116
DIA	1.45	1.55	0.058	0.061