

### General Description

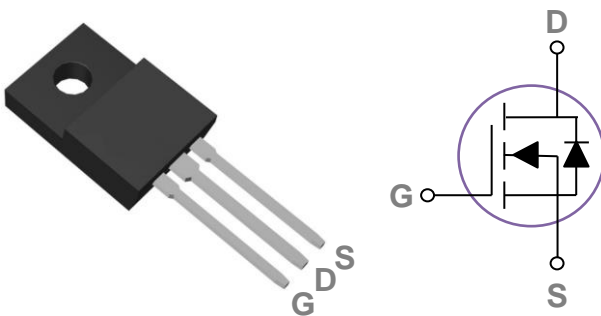
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	RDSON	ID
100V	4.6mΩ	100A

### Features

- 100V,100A,  $R_{DS(ON)} = 4.6m\Omega @ V_{GS} = 10V$
- Improved  $dv/dt$  capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

### TO220F 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
$V_{DS}$	Drain-Source Voltage	100	V
$V_{GS}$	Gate-Source Voltage	+20/-12	V
$I_D$	Drain Current – Continuous ( $T_c=25^\circ\text{C}$ )	100	A
	Drain Current – Continuous ( $T_c=100^\circ\text{C}$ )	64	A
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	400	A
EAS	Single Pulse Avalanche Energy <sup>2</sup>	605	mJ
IAS	Single Pulse Avalanche Current <sup>2</sup>	110	A
$P_D$	Power Dissipation ( $T_c=25^\circ\text{C}$ )	114	W
	Power Dissipation – Derate above $25^\circ\text{C}$	0.91	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
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	1.1	°C/W

**Electrical Characteristics ( $T_J=25\text{ }^\circ\text{C}$ , 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
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=100V, V_{GS}=0V, T_J=25^\circ C$	---	---	1	$\mu A$
		$V_{DS}=80V, V_{GS}=0V, T_J=85^\circ C$	---	---	10	$\mu A$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=20V, V_{DS}=0V$	---	---	100	nA

**On Characteristics**

$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=20A$	---	3.8	4.6	m $\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	2	3	4	V

**Dynamic and switching Characteristics<sup>3</sup>**

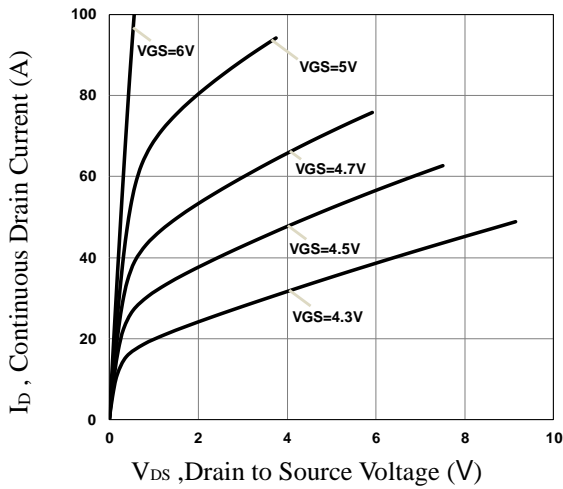
$Q_g$	Total Gate Charge	$V_{DS}=50V, V_{GS}=10V, I_D=50A$	---	88	175	nC
$Q_{gs}$	Gate-Source Charge		---	18.5	37	
$Q_{gd}$	Gate-Drain Charge		---	28.3	56	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=50V, V_{GS}=10V, R_G=3.3\Omega$ $I_D=50A$	---	20.6	42	ns
$T_r$	Rise Time		---	19.8	40	
$T_{d(off)}$	Turn-Off Delay Time		---	66	132	
$T_f$	Fall Time		---	117	234	
$C_{iss}$	Input Capacitance	$V_{DS}=50V, V_{GS}=0V, F=1MHz$	---	5100	10200	pF
$C_{oss}$	Output Capacitance		---	1045	2090	
$C_{rss}$	Reverse Transfer Capacitance		---	35	70	
$R_g$	Gate resistance	$V_{GS}=0V, V_{DS}=0V, F=1MHz$	---	1.97	---	$\Omega$

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

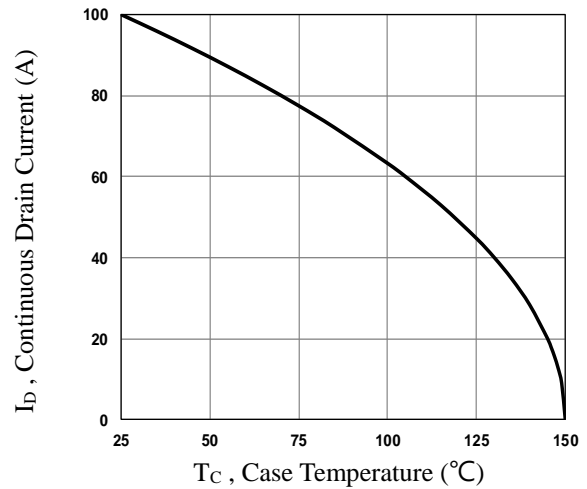
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	100	A
$I_{SM}$	Pulsed Source Current		---	---	200	A
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0V, I_S=1A, T_J=25^\circ C$	---	---	1	V
$t_{rr}$	Reverse Recovery Time	$V_R=100V, I_S=10A$	---	71	---	ns
$Q_{rr}$	Reverse Recovery Charge	$di/dt=100A/\mu s, T_J=25^\circ C$	---	165	---	nC

Note :

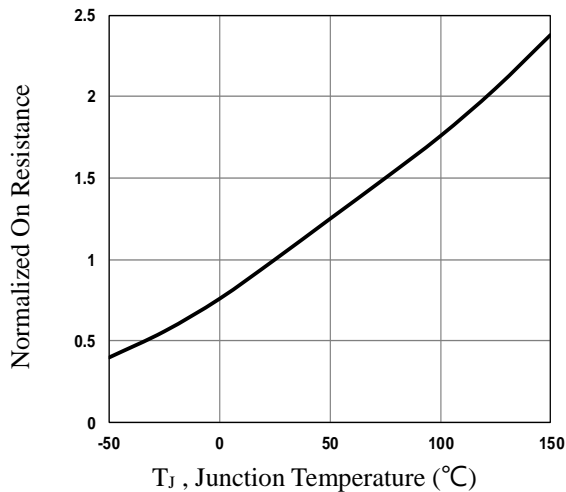
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2.  $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=110A, R_G=25\Omega, \text{Starting } T_J=25^\circ C$ .
3. Essentially independent of operating temperature.



**Fig.1 Typical Output Characteristics**



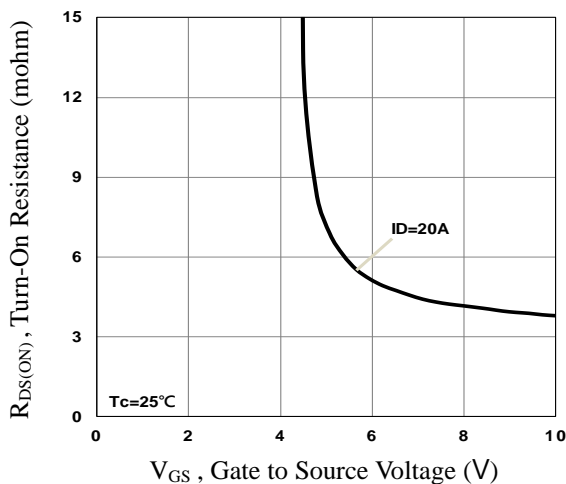
**Fig.2 Continuous Drain Current vs.  $T_C$**



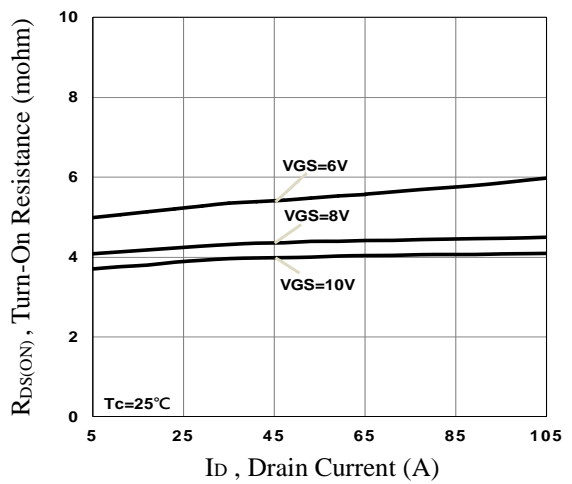
**Fig.3 Normalized  $R_{DS(on)}$  vs.  $T_J$**



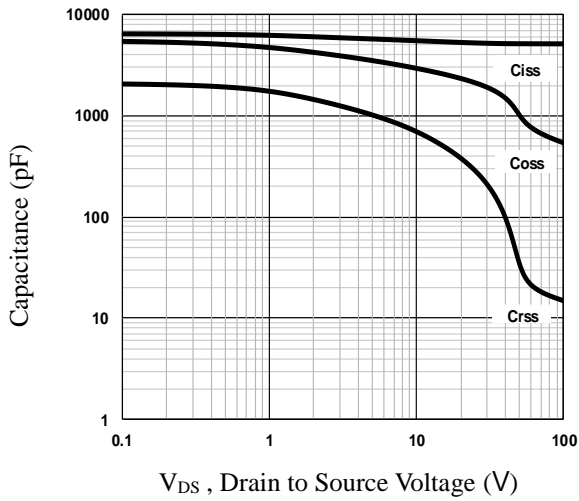
**Fig.4 Normalized  $V_{th}$  vs.  $T_J$**



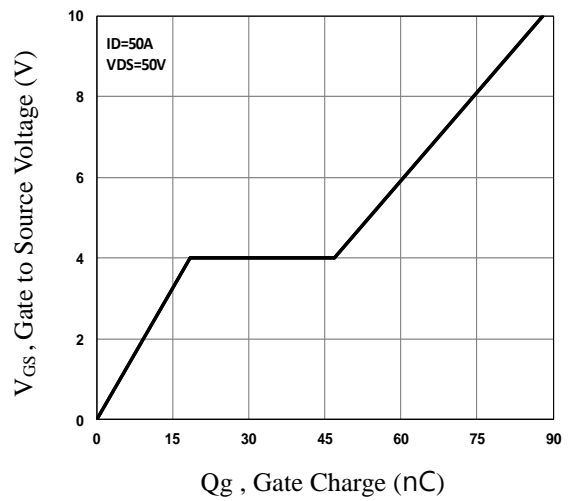
**Fig.5 Turn-On Resistance vs.  $V_{GS}$**



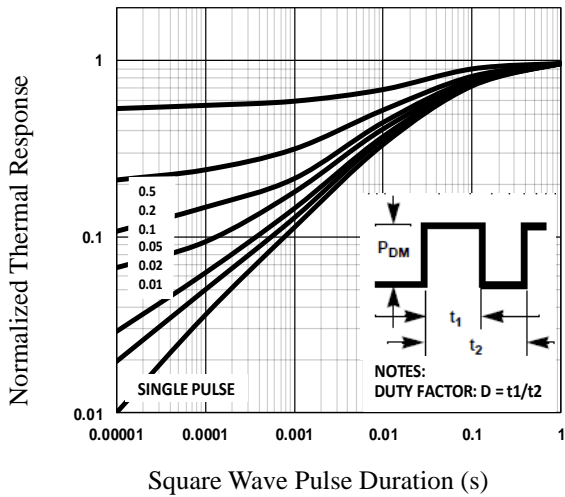
**Fig.6 Turn-On Resistance vs.  $I_D$**



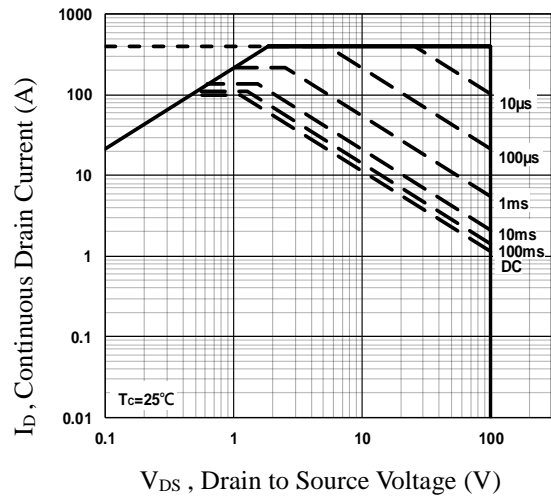
**Fig.7 Capacitance Characteristics**



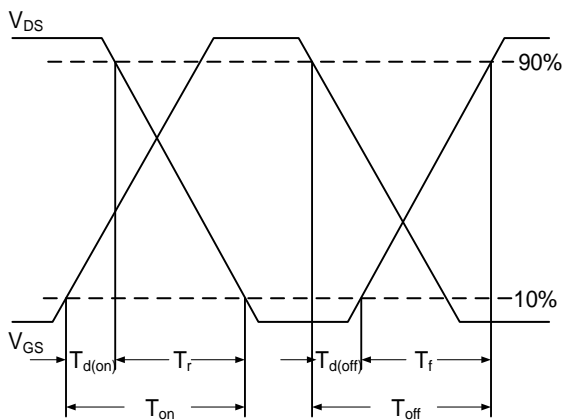
**Fig.8 Gate Charge Characteristics**



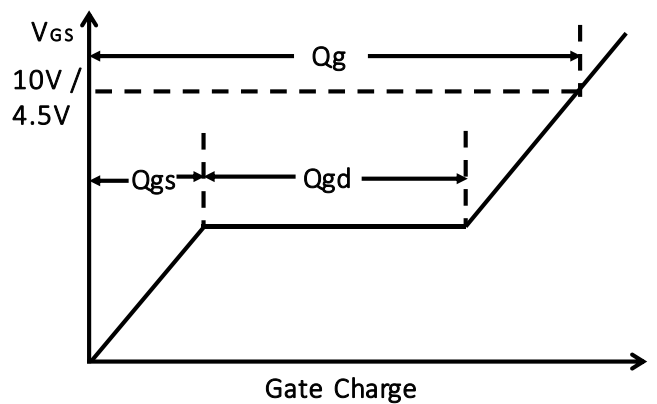
**Fig.9 Normalized Transient Impedance**



**Fig.10 Maximum Safe Operation Area**

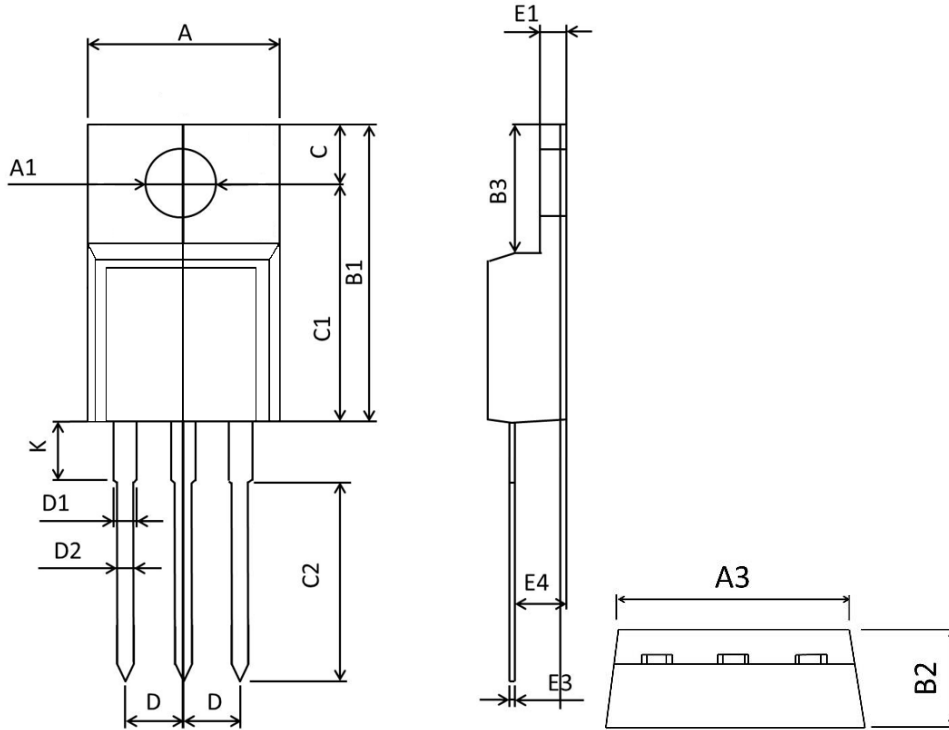


**Fig.11 Switching Time Waveform**



**Fig.12 Gate Charge Waveform**

## TO220F PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	9.860	10.460	0.389	0.411
A1	3.100	3.500	0.122	0.138
B1	15.450	16.300	0.608	0.642
B2	4.400	5.000	0.173	0.197
B3	6.280	7.100	0.247	0.280
C	3.100	3.500	0.122	0.138
C1	12.270	12.870	0.483	0.507
C2	9.600	10.520	0.378	0.414
D	2.540BSC		0.1BSC	
D1	1.070	1.470	0.042	0.058
D2	0.600	1.000	0.024	0.039
K	2.800	3.500	0.110	0.138
E1	2.340	2.740	0.092	0.108
E3	0.350	0.650	0.014	0.026
E4	2.460	2.960	0.097	0.117