

100V N-Channel MOSFETs

General Description

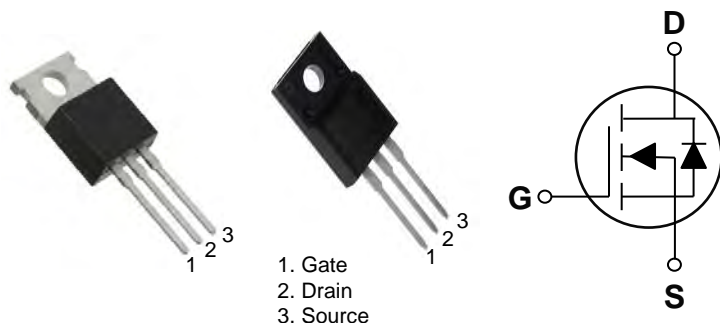
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	RDSON	ID
100V	4.2mΩ	150A

Features

- 100V, 150A, $R_{DS(ON)} = 4.2m\Omega @ V_{GS} = 10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

TO-220/F Pin Configuration/F



Applications

- Networking
- Load Switch
- LED applications
- Quick Charger

Absolute Maximum Ratings ($T_c=25^\circ C$ 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 ($T_c=25^\circ C$)	150	A
	Drain Current – Continuous ($T_c=100^\circ C$)	100	A
I_{DM}	Drain Current – Pulsed ¹	600	A
EAS	Single Pulse Avalanche Energy ²	378	mJ
IAS	Single Pulse Avalanche Current ²	87	A
P_D	Power Dissipation ($T_c=25^\circ C$) TO-220	275	W
	Power Dissipation ($T_c=25^\circ C$) TO-220F	66.1	W/ $^\circ C$
T_{STG}	Storage Temperature Range	-50 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-50 to 150	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient TO-220/F	---	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction to Case TO-220	---	0.45	$^\circ C/W$
	Thermal Resistance Junction to Case TO-220F	---	1.89	



FTK0980P/F

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

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=20A$	---	3.5	4.2	m Ω
		$V_{GS}=4.5V, I_D=15A$	---	4.5	6.0	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.8	2.5	V
g_{fs}	Forward Transconductance	$V_{DS}=10V, I_D=3A$	---	20	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge ^{3, 4}	$V_{DS}=80V, V_{GS}=10V, I_D=10A$	---	110	165	nC
Q_{gs}	Gate-Source Charge ^{3, 4}		---	11.5	18	
Q_{gd}	Gate-Drain Charge ^{3, 4}		---	28	42	
$T_{d(on)}$	Turn-On Delay Time ^{3, 4}	$V_{DD}=50V, V_{GS}=10V, R_G=6\Omega, I_D=1A$	---	23	46	ns
T_r	Rise Time ^{3, 4}		---	32	64	
$T_{d(off)}$	Turn-Off Delay Time ^{3, 4}		---	157	320	
T_f	Fall Time ^{3, 4}		---	115	230	
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, F=1\text{MHz}$	---	6680	13300	pF
C_{oss}	Output Capacitance		---	1690	3380	
C_{rss}	Reverse Transfer Capacitance		---	78	156	
R_g	Gate resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	1.9	---	Ω

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	150	A
I_{SM}	Pulsed Source Current		---	---	300	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_S=1A, T_J=25^{\circ}\text{C}$	---	---	1	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=87A, R_G=25\Omega, \text{Starting } T_J=25^{\circ}\text{C}$.
3. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.

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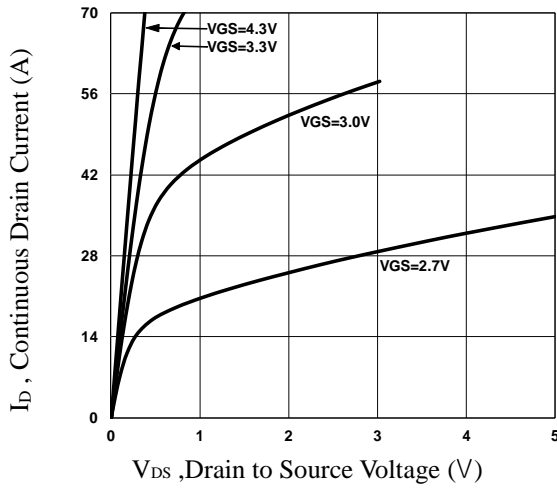


Fig.1 Typical Output Characteristics

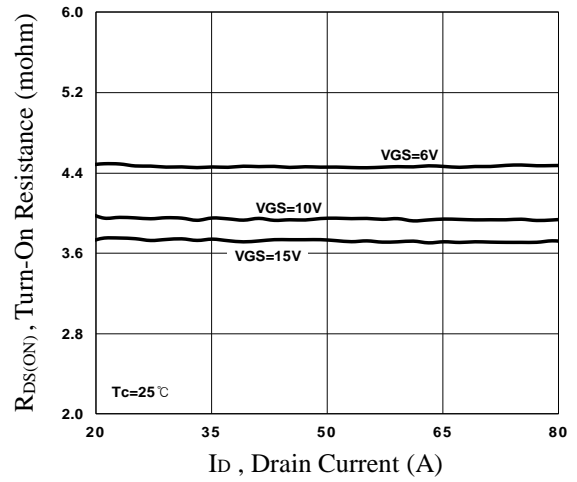


Fig.2 Turn-On Resistance vs. I_D

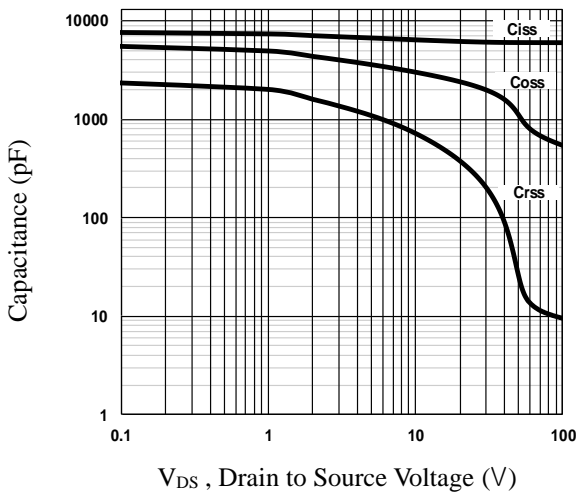


Fig.3 Capacitance Characteristics

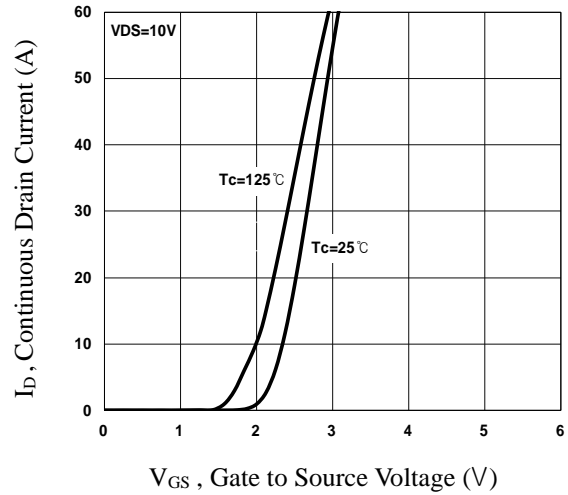


Fig.4 Transfer Characteristics

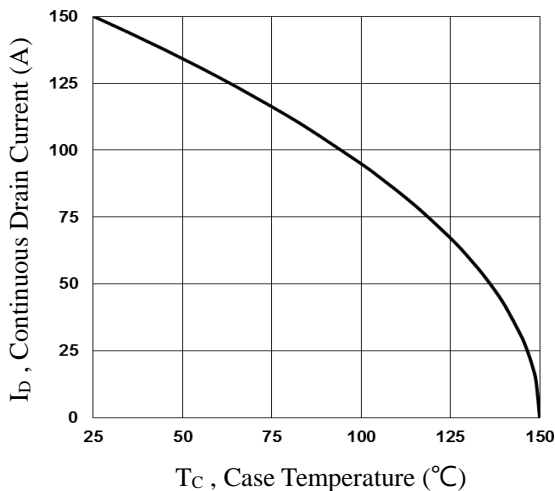


Fig.5 Continuous Drain Current vs. T_c

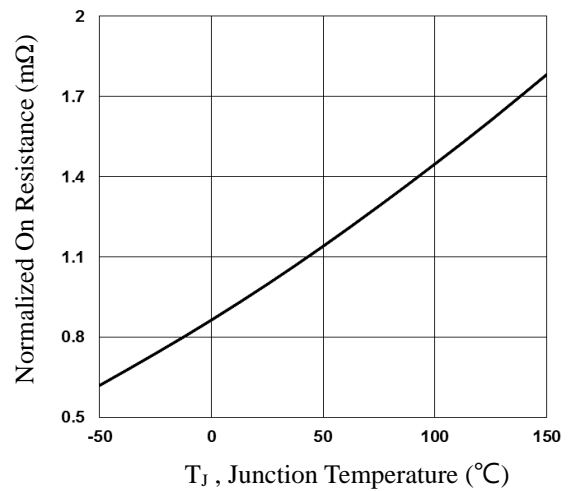


Fig.6 Normalized R_{DS(ON)} vs. T_j

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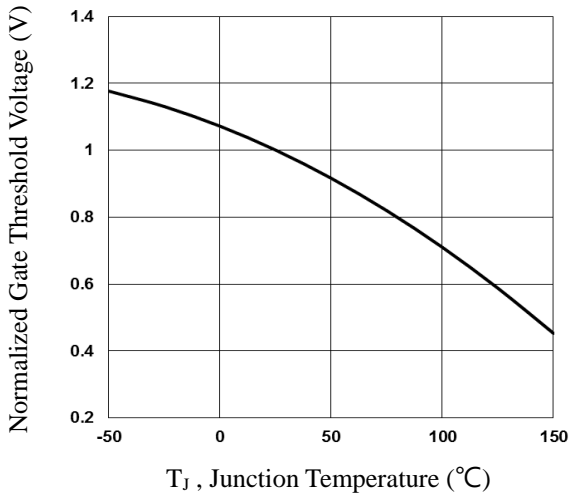


Fig.7 Normalized Vth vs. T_J

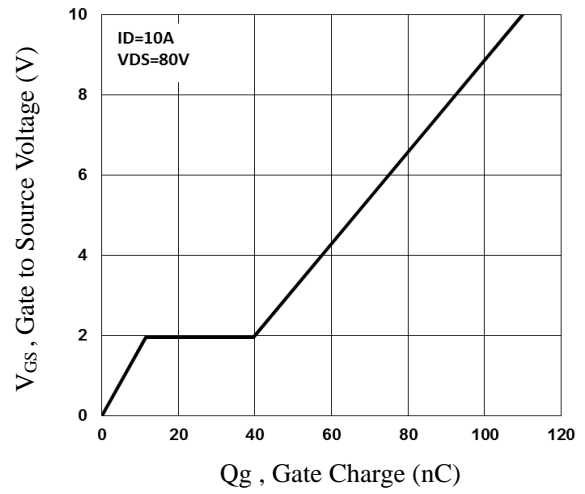


Fig.8 Gate Charge Characteristics

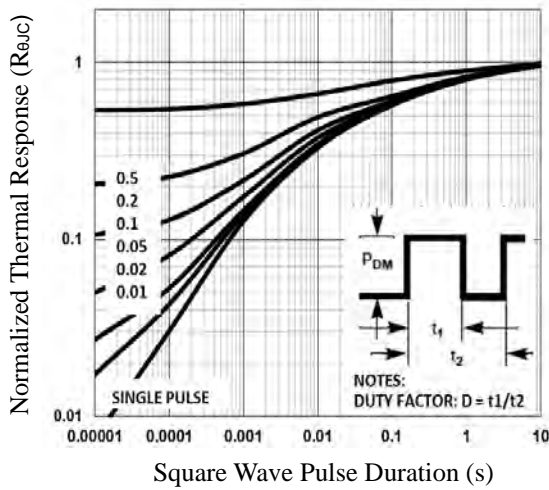


Fig.9 Normalized Transient Impedance

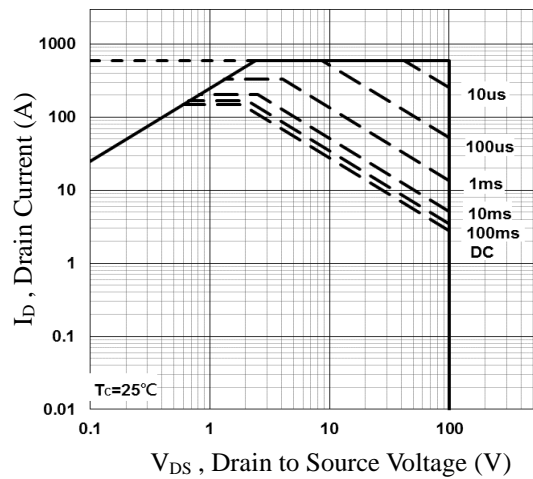


Fig.10 Maximum Safe Operation Area

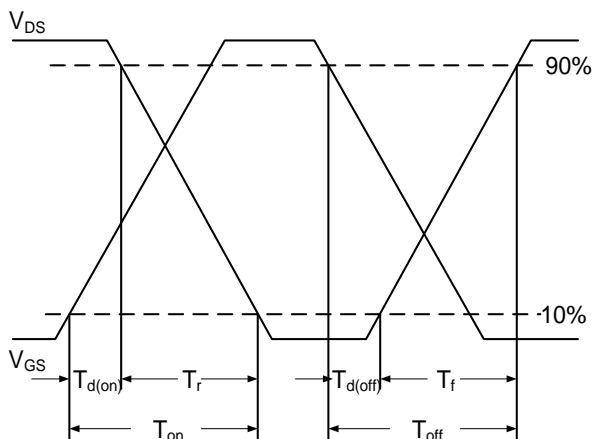


Fig.11 Switching Time Waveform

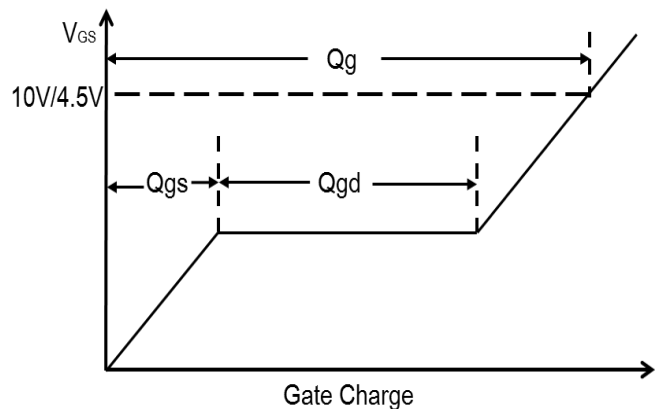
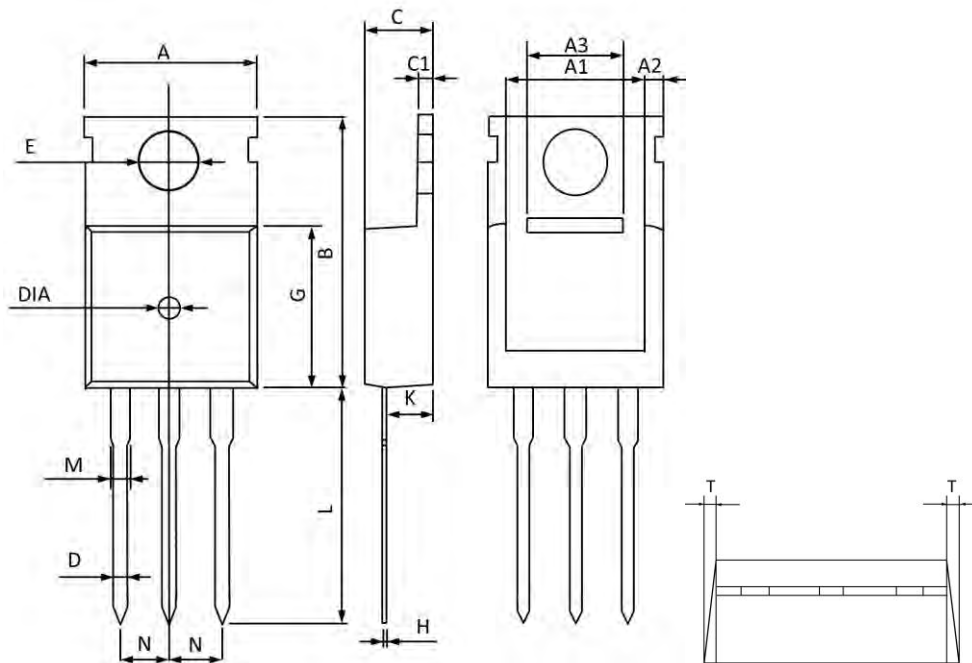


Fig.12 Gate Charge Waveform

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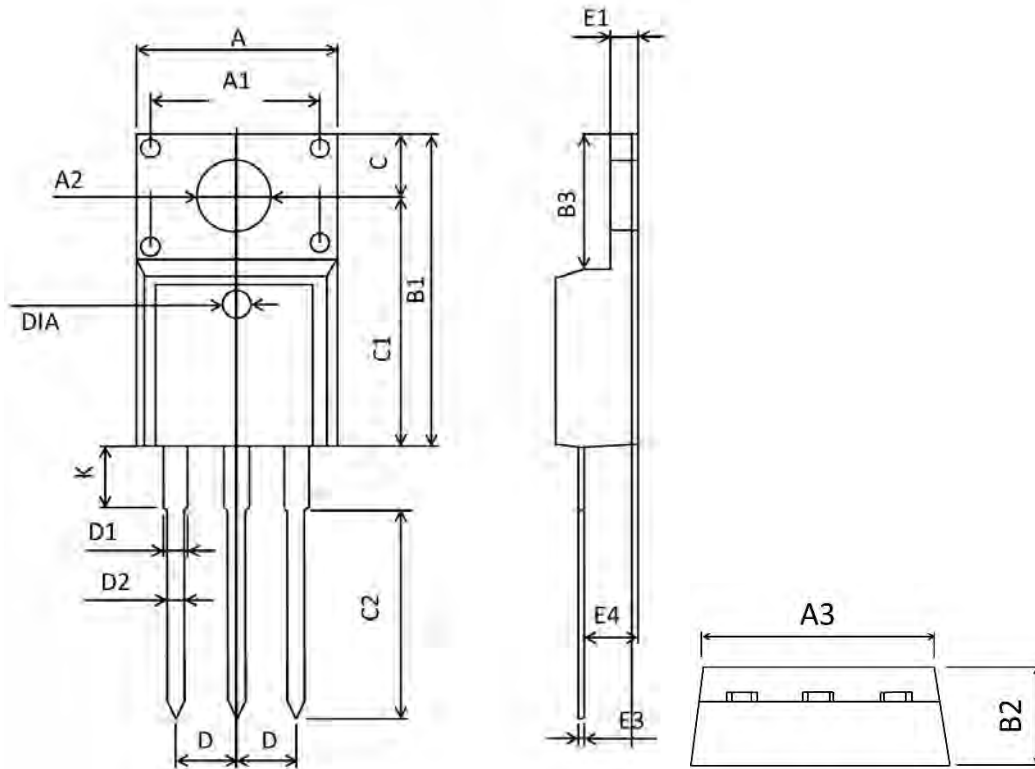
TO-220 PACKAGE INFORMATION



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.

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TO-220F 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	0.280
A2	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
DIA	1.35	1.65	0.053	0.065