

## 100V N-Channel MOSFETs

### General Description

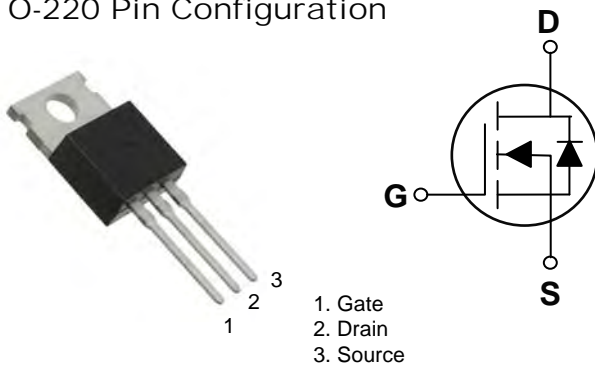
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	R <sub>DS(ON)</sub>	I <sub>D</sub>
100V	3.5mΩ	160A

### Features

- 100V, 160A, R<sub>DS(ON)</sub> = 3.5mΩ @ V<sub>GS</sub> = 10V
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

### TO-220 Pin Configuration



### Applications

- Networking
- Load Switch
- LED applications
- Quick Charger

### 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) (Chip Limitation)	160	A
	Drain Current – Continuous (T <sub>C</sub> =100°C) (Chip Limitation)	100	A
I <sub>DM</sub>	Drain Current – Pulsed <sup>1</sup>	640	A
EAS	Single Pulse Avalanche Energy <sup>2</sup>	280	mJ
IAS	Single Pulse Avalanche Current <sup>2</sup>	75	A
P <sub>D</sub>	Power Dissipation (T <sub>C</sub> =25°C)	208	W
	Power Dissipation – Derate above 25°C	1.66	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	---	0.6	°C/W



# FTK0970P

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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
$\Delta BV_{DSS}/\Delta T_J$	$BV_{DSS}$ Temperature Coefficient	Reference to $25^{\circ}\text{C}, I_D=1\text{mA}$	---	0.05	---	$\text{V}/^{\circ}\text{C}$
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=100V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	---	---	1	$\mu\text{A}$
		$V_{DS}=80V, V_{GS}=0V, T_J=125^{\circ}\text{C}$	---	---	10	$\mu\text{A}$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA

### On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=20A$	---	2.8	3.5	m $\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.5	2.5	3.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-5	---	$\text{mV}/^{\circ}\text{C}$
gfs	Forward Transconductance	$V_{DS}=10V, I_D=3A$	---	15	---	S

### Dynamic and switching Characteristics

$Q_g$	Total Gate Charge <sup>3,4</sup>	$V_{DS}=80V, V_{GS}=10V, I_D=10A$	---	295	450	nC
$Q_{gs}$	Gate-Source Charge <sup>3,4</sup>		---	70	140	
$Q_{gd}$	Gate-Drain Charge <sup>3,4</sup>		---	75	150	
$T_{d(on)}$	Turn-On Delay Time <sup>3,4</sup>	$V_{DD}=50V, V_{GS}=10V, R_G=6\Omega$ $I_D=1A$	---	66.2	120	ns
$T_r$	Rise Time <sup>3,4</sup>		---	79.6	160	
$T_{d(off)}$	Turn-Off Delay Time <sup>3,4</sup>		---	242	480	
$T_f$	Fall Time <sup>3,4</sup>		---	103	200	
$C_{iss}$	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, F=1\text{MHz}$	---	17800	26000	pF
$C_{oss}$	Output Capacitance		---	980	1900	
$C_{riss}$	Reverse Transfer Capacitance		---	78	150	
$R_g$	Gate resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	1.8	3.6	$\Omega$

### Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current	$V_G=V_D=0V$ , Force Current	---	---	160	A
$I_{SM}$	Pulsed Source Current		---	---	320	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	$V_{GS}=0V, I_S=10A,$	---	64	---	ns
$Q_{rr}$	Reverse Recovery Charge	$dI/dt=100A/\mu s, T_J=25^{\circ}\text{C}$	---	150	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2.  $V_{DD}=50V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=75A., R_G=25\Omega$ , 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.

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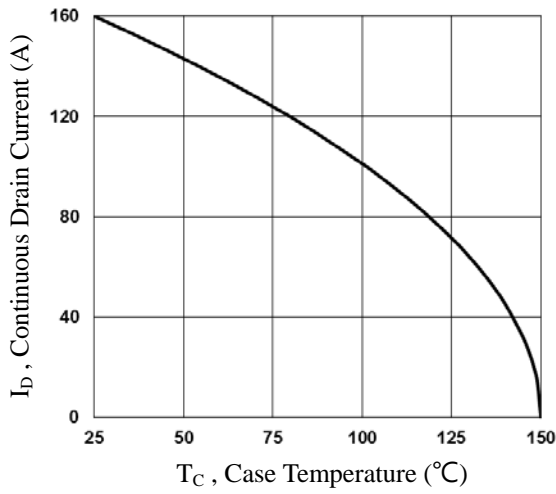


Fig.1 Continuous Drain Current vs.  $T_C$

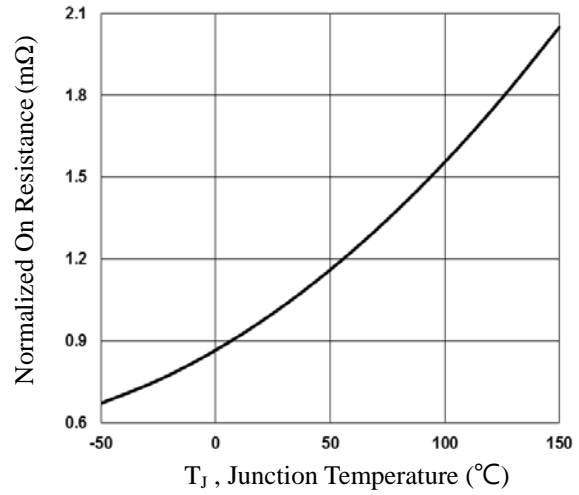


Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_J$

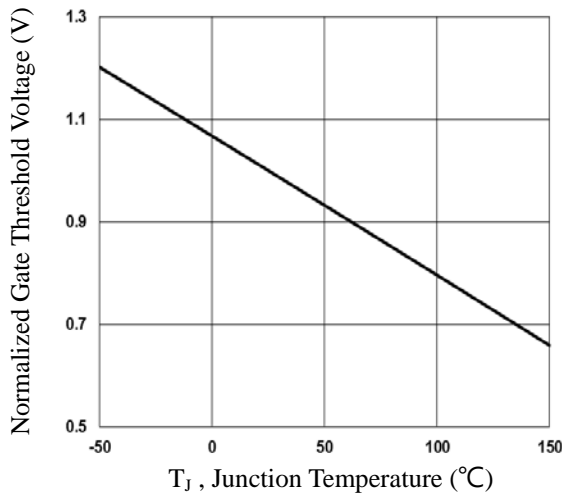


Fig.3 Normalized  $V_{th}$  vs.  $T_J$

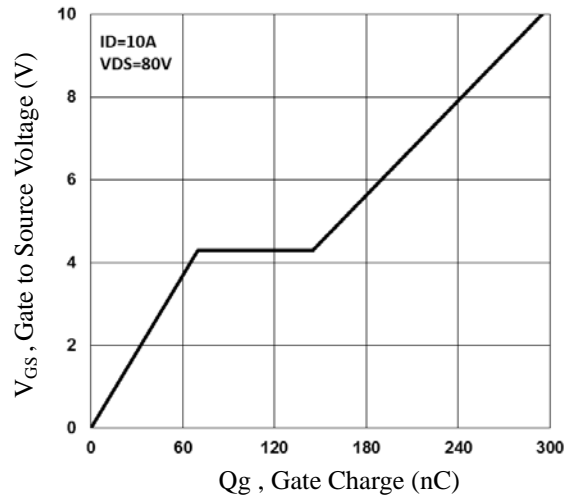


Fig.4 Gate Charge Characteristics

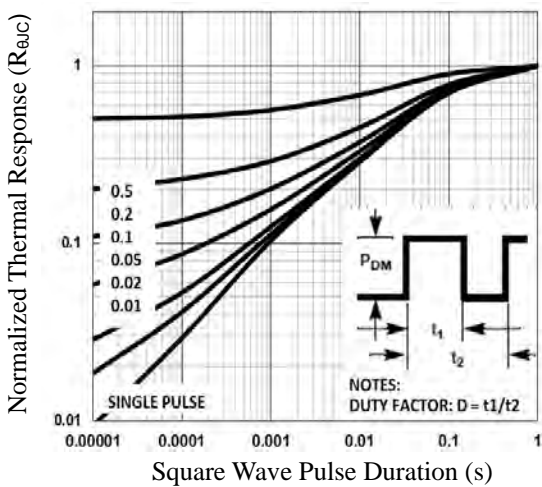


Fig.5 Normalized Transient Impedance

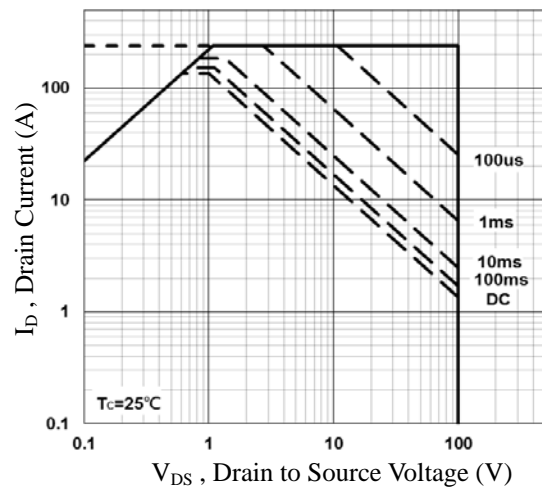


Fig.6 Maximum Safe Operation Area

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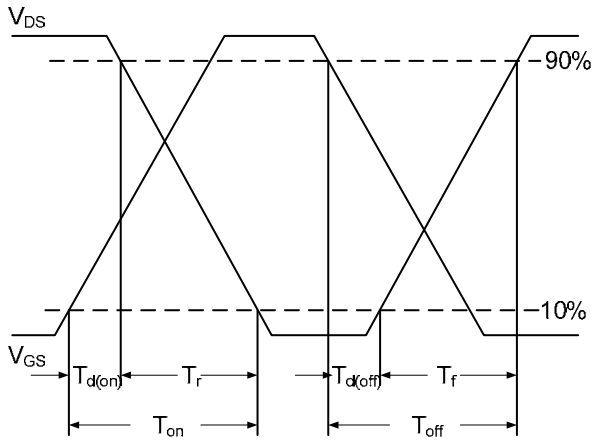


Fig.7 Switching Time Waveform

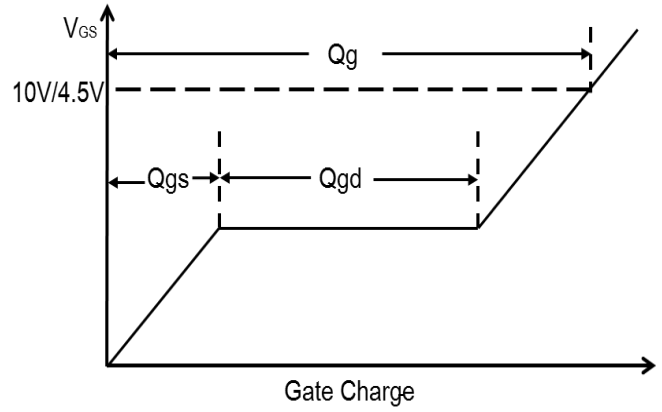
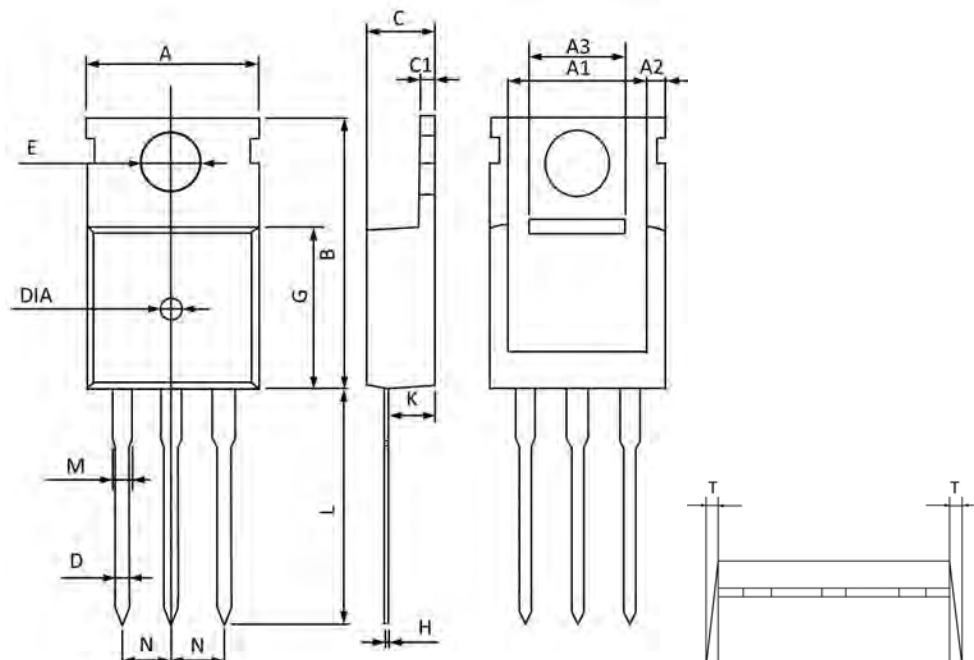


Fig.8 Gate Charge Waveform

## 100V N-Channel MOSFETs

### 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.