

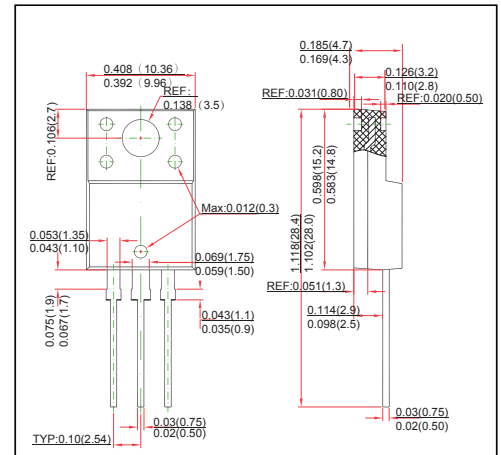
## TO-220F Plastic-Encapsulate MOSFETS

### Features

- Low Intrinsic Capacitances
- Excellent Switching Characteristics
- Extended Safe Operating Area
- Unrivalled Gate Charge : 16 nC (Typ.)
- BVDSS=600V, ID=5.5A
- Lower RDS(on) : 2.0Ω (Max) @VG=10V
- 100% Avalanche Tested
- 600V N-Channel MOSFET

### MECHANICAL DATA

- Case style: TO-220F molded plastic
- Mounting position: any



## MAXIMUM RATINGS AND CHARACTERISTICS

@ 25°C Ambient Temperature (unless otherwise noted)

Symbol	Parameter	6N60	Units
V <sub>DSS</sub>	Drain-Source Voltage	600	V
I <sub>D</sub>	Drain Current -continuous (Tc=25°C)	5.5*	A
	-continuous (Tc=100°C)	2.2*	A
V <sub>GS</sub>	Gate-Source Voltage	± 30	V
E <sub>AS</sub>	Single Pulsed Avanche Energy (Note1)	300	mJ
I <sub>AR</sub>	Avalanche Current (Note2)	5.5	A
P <sub>D</sub>	Power Dissipation (Tc=25°C)	40	W
T <sub>J</sub> , T <sub>STG</sub>	Operating and Storage Temperature Range	-55 ~ +150	°C
TL	Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds	300	°C

### Thermal Characteristics

Symbol	Parameter	Typ.	Max	Units
R <sub>θJC</sub>	Thermal Resistance, Junction to Case	--	3.2	°C/W
R <sub>θJA</sub>	Thermal Resistance, Junction to Ambient	--	62.5	°C/W

\* Drain current limited by maximum junction temperature.

## RATINGS AND CHARACTERISTIC CURVES

### MOSFET ELECTRICAL CHARACTERISTICS $T_A=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Test Condition	Min	Typ	Max	Units
<b>Off Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$I_D=250\ \mu\text{A}, V_{GS}=0$	600	--	--	V
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temperature Coefficient	$I_D=250\ \mu\text{A}$ , Reference to $25^\circ\text{C}$	--	0.6	--	$\text{V}/^\circ\text{C}$
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=600\text{V}, V_{GS}=0\text{V}$	--	--	1	$\mu\text{A}$
		$V_{DS}=480\text{V}, T_C=125^\circ\text{C}$			10	$\mu\text{A}$
$I_{GSSF}$	Gate-body leakage Current, Forward	$V_{GS}=+30\text{V}, V_{DS}=0\text{V}$	--	--	100	nA
$I_{GSSR}$	Gate-body leakage Current, Reverse	$V_{GS}=-30\text{V}, V_{DS}=0\text{V}$	--	--	-100	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	Gate Threshold Voltage	$I_D=250\ \mu\text{A}, V_{DS}=V_{GS}$	2	--	4	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	$I_D=2.75\text{A}, V_{GS}=10\text{V}$	--	--	2.0	$\Omega$
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=25\text{V}, V_{GS}=0,$ $f=1.0\text{MHz}$	--	620	810	pF
$C_{oss}$	Output Capacitance		--	65	85	pF
$C_{rss}$	Reverse Transfer Capacitance		--	7	10	pF
<b>Switching Characteristics</b>						
$T_d(on)$	Turn-On Delay Time	$V_{DD}=300\text{V}, I_D=5.5\text{A}$ $R_G=25\ \Omega$ (Note 3,4)	--	15	40	nS
$T_r$	Turn-On Rise Time		--	45	100	nS
$T_d(off)$	Turn-Off Delay Time		--	45	100	nS
$T_f$	Turn-Off Time		--	45	100	nS
$Q_g$	Total Gate Charge	$V_{DS}=480, V_{GS}=10\text{V},$ $I_D=5.5\text{A}$ (Note 3,4)	--	16	20	nC
$Q_{gs}$	Gate-Source Charge		--	3.5	--	nC
$Q_{gd}$	Gate-Drain Charge			6.5	--	nC
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_S$	Maximum Continuous Drain-Source Diode Forward Current		--	--	5.5	A
$I_{SM}$	Maximum Pulsed Drain-Source Diode Forward Current		--	--	22	A
$V_{SD}$	Drain-Source Diode Forward Voltage	$I_D=5.5\text{A}$	--	--	1.4	V
$t_{rr}$	Reverse Recovery Time	$I_S=5.5\text{A}, V_{GS}=0\text{V}$	--	310	--	nS
$Q_{rr}$	Reverse Recovery Charge	$di_f/dt=100\text{A}/\mu\text{s}$ (Note3)	--	2.1	--	$\mu\text{C}$
*Notes	1, $L=18.2\text{mH}, I_{AS}=5.5\text{A}, V_{DD}=50\text{V}, R_G=25\ \Omega$ , Starting $T_J=25^\circ\text{C}$ 2, Repetitive Rating : Pulse width limited by maximum junction temperature 3, Pulse Test : Pulse Width $\leq 300\ \mu\text{s}$ , Duty Cycle $\leq 2\%$ 4, Essentially Independent of Operating Temperature					

## ■ Typical Characteristics RATINGS AND CHARACTERISTIC CURVES

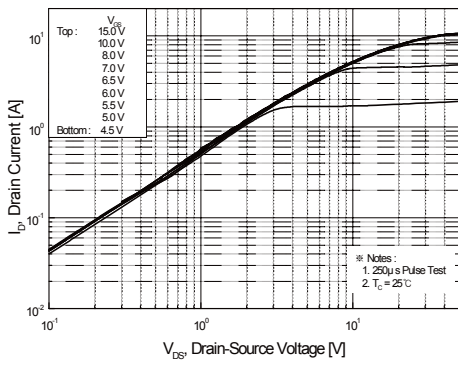


Figure 1. On-Region Characteristics

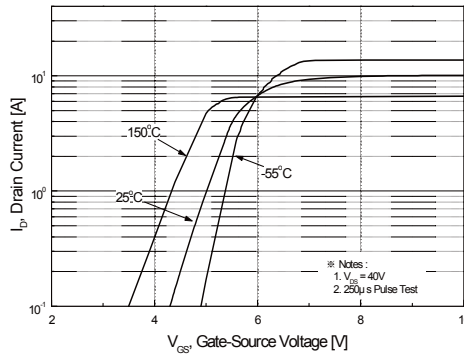


Figure 2. Transfer Characteristics

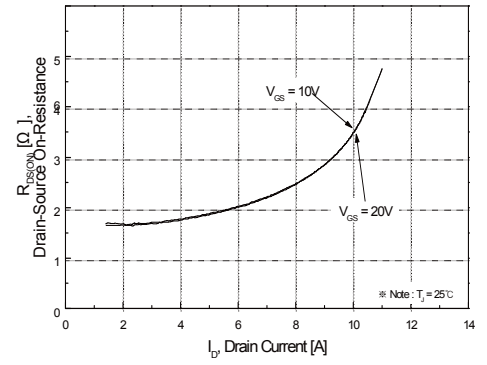


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

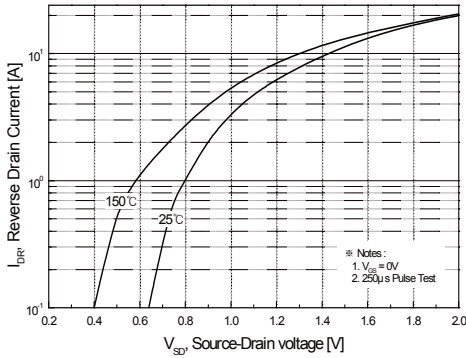


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

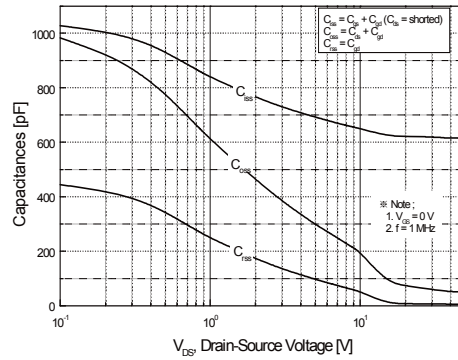


Figure 5. Capacitance Characteristics

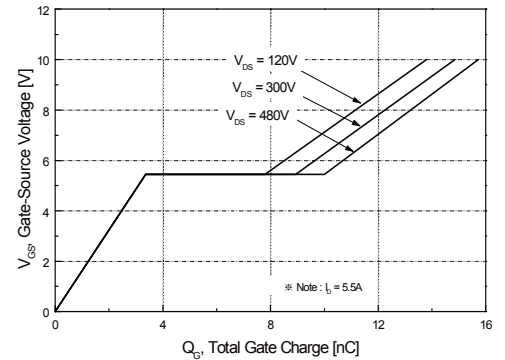


Figure 6. Gate Charge Characteristics

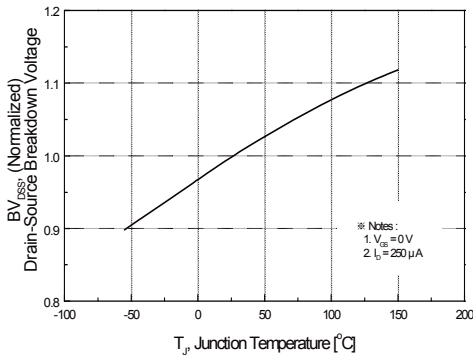


Figure 7. Breakdown Voltage Variation vs Temperature

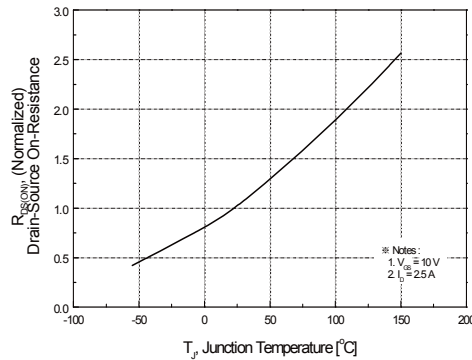


Figure 8. On-Resistance Variation vs Temperature

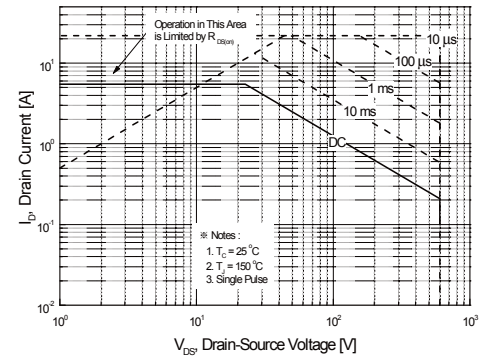


Figure 9-2. Maximum Safe Operating Area

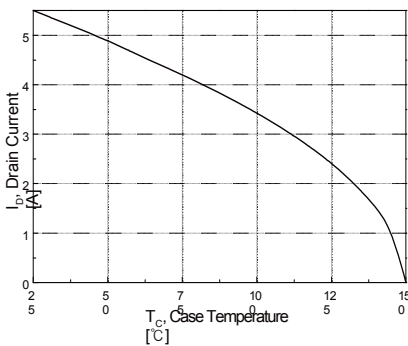


Figure 10. Maximum Drain Current vs Case Temperature

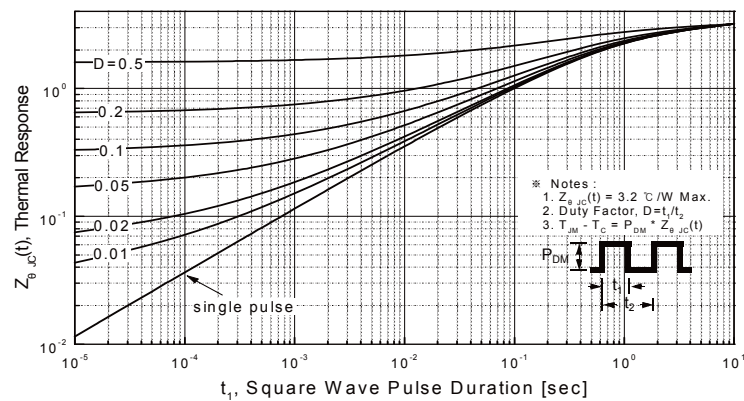


Figure 11-2. Transient Thermal Response Curve for WGF6N60