

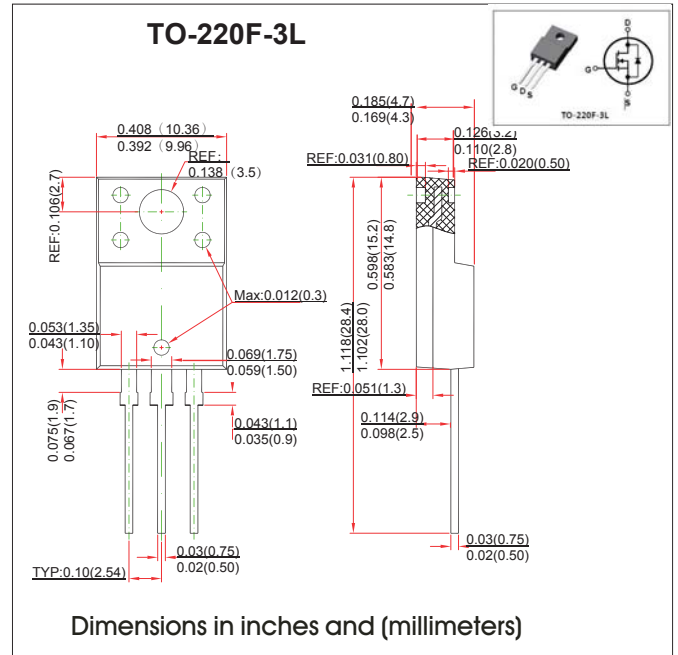
TO-220-3L Plastic-Encapsulate MOSFETS

Features

- 600V N-Channel Power MOSFET
- $R_{DS(ON)} < 3.6\Omega @ V_{GS} = 10V, I_D = 1.5A$
- Fast switching capability
- Lead free in compliance with EU RoHS directive.
- Improved dv/dt capability, high ruggedness

MECHANICAL DATA

- Case style: TO-220F-3L molded plastic
- Mounting position: any



MAXIMUM RATINGS AND CHARACTERISTICS

@ 25°C Ambient Temperature (unless otherwise noted)

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|-------------------------------|------------------------|-----------|------------|------|
| Drain-Source Voltage | | V_{DSS} | 600 | V |
| Gate-Source Voltage | | V_{GSS} | ± 30 | V |
| Avalanche Current (Note 2) | | I_{AR} | 3.0 | A |
| Continuous Drain Current | | I_D | 3.0 | A |
| Pulsed Drain Current (Note 2) | | I_{DM} | 12 | A |
| Avalanche Energy | Single Pulsed (Note 3) | E_{AS} | 200 | mJ |
| Power Dissipation | TO-220/TO-262/TO-263 | P_D | 75 | W |
| | ITO-220 | | 34 | W |
| | TO-251/TO-252 | | 50 | W |
| Junction Temperature | | T_J | +150 | °C |
| Operating Temperature | | T_{OPR} | -55 ~ +150 | °C |
| Storage Temperature | | T_{STG} | -55 ~ +150 | °C |

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Repetitive Rating : Pulse width limited by T_J .

3. $L = 44.4mH, I_{AS}=3A, V_{DD}=50V, R_G=25 \Omega, \text{Starting } T_J = 25^\circ C$

THERMAL DATA

| PARAMETER | | SYMBOL | RATING | UNIT |
|---------------------|---------------------------------|---------------|--------|------|
| Junction to Ambient | TO-220/ITO-220 TO-262/TO-263 | θ_{JA} | 62.5 | °C/W |
| | TO-251/ TO-252 | | 110 | |
| | TO-220/TO-262/TO-263 | | 1.70 | |
| Junction to Case | ITO-220 | θ_{JC} | 3.70 | °C/W |
| | TO-251/ TO-252 | | 2.6 | |



RATINGS AND CHARACTERISTIC CURVES

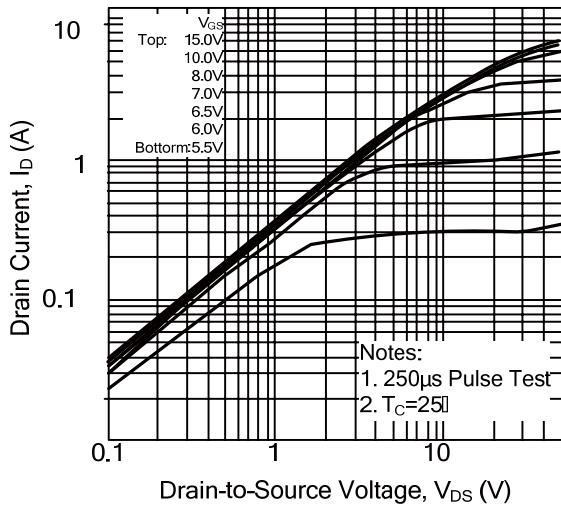
MOSFET ELECTRICAL CHARACTERISTICS $T_A=25^\circ\text{C}$ unless otherwise specified

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--|--------------|--|-----|------|------|----------|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS} = 0V, I_D = 250\mu A$ | 600 | | | V |
| Drain-Source Leakage Current | I_{DSS} | $V_{DS} = 600V, V_{GS} = 0V$ | | | 10 | μA |
| Gate-Source Leakage Current | Forward | I_{GSS} | | | 100 | nA |
| | Reverse | | | | -100 | nA |
| ON CHARACTERISTICS | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 2.0 | | 4.0 | V |
| Static Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=1.5A$ | | | 3.6 | Ω |
| DYNAMIC CHARACTERISTICS | | | | | | |
| Input Capacitance | C_{ISS} | $V_{DS} = 25V, V_{GS} = 0V,$ $f = 1MHz$ | | 350 | 450 | pF |
| Output Capacitance | C_{OSS} | | | 50 | 65 | pF |
| Reverse Transfer Capacitance | C_{RSS} | | | 5.5 | 7.5 | pF |
| SWITCHING CHARACTERISTICS | | | | | | |
| Turn-On Delay Time | $t_{D(ON)}$ | $V_{DD}=30V, I_D=0.5A,$ $R_G=25\Omega$ (Note 1, 2) | | 35 | 50 | ns |
| Turn-On Rise Time | t_R | | | 60 | 70 | ns |
| Turn-Off Delay Time | $t_{D(OFF)}$ | | | 100 | 150 | ns |
| Turn-Off Fall Time | t_F | | | 65 | 75 | ns |
| Total Gate Charge | Q_G | $V_{DS}=50V, I_D=1.3A, I_G=100\mu A$ $V_{GS}=10V$ (Note 1, 2) | | 18.5 | 23 | nC |
| Gate-Source Charge | Q_{GS} | | | 5.2 | - | nC |
| Gate-Drain Charge | Q_{GD} | | | 4.9 | - | nC |
| SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS | | | | | | |
| Drain-Source Diode Forward Voltage | V_{SD} | $V_{GS}=0V, I_S=3.0A$ | | | 1.4 | V |
| Maximum Continuous Drain-Source Diode Forward Current | I_S | | | | 3.0 | A |
| Maximum Pulsed Drain-Source Diode Forward Current | I_{SM} | | | | 12 | A |
| Reverse Recovery Time | t_{rr} | $V_{GS} = 0V, I_S = 3A,$ | | 210 | | ns |
| Reverse Recovery Charge | Q_{RR} | $di_F/dt = 100A/\mu s$ (Note 1) | | 1.2 | | μC |

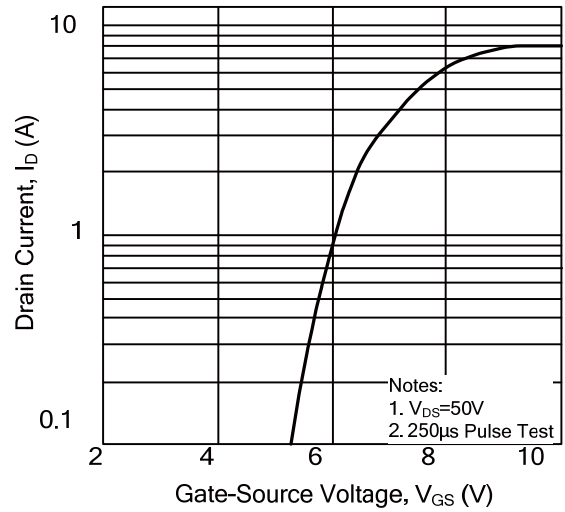
- Notes: 1. Pulse Test: Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$
 2. Essentially independent of operating temperature

RATINGS AND CHARACTERISTIC CURVES

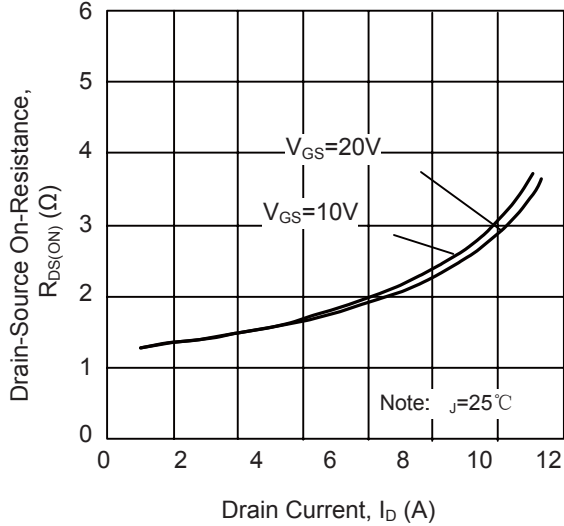
On-State Characteristics



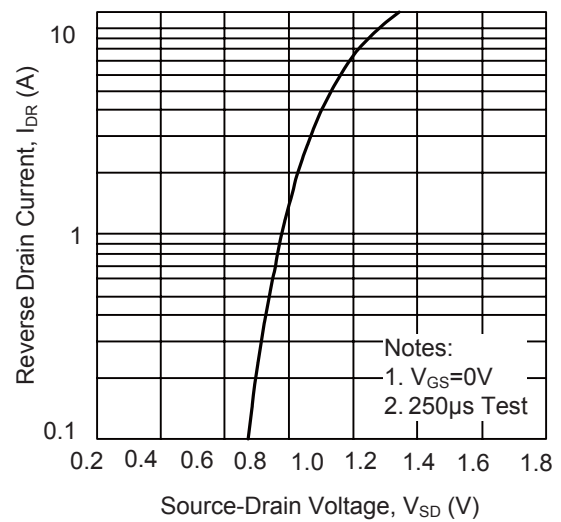
Transfer Characteristics



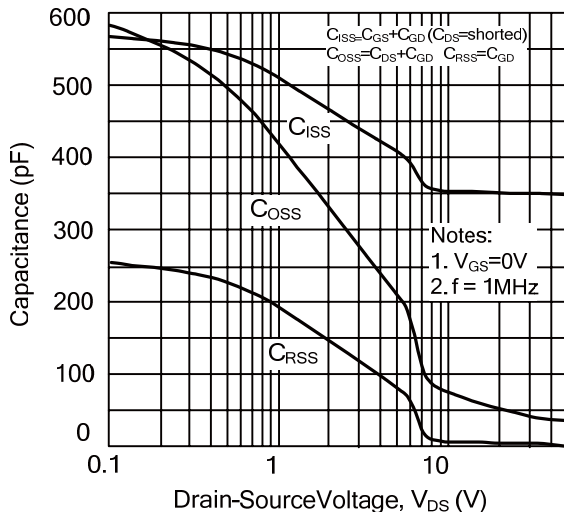
On-Resistance Variation vs. Drain Current and Gate Voltage



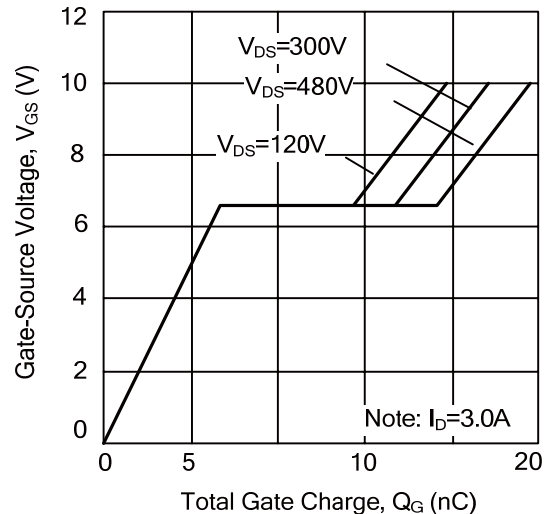
On State Current vs. Allowable Case Temperature



Capacitance Characteristics (Non-Repetitive)



Gate Charge Characteristics





RATINGS AND CHARACTERISTIC CURVES

