

20 STERN AVE.  
SPRINGFIELD, NEW JERSEY 07081  
U.S.A.

**IRFF212,213**

**1.8 AMPERES  
200, 150 VOLTS  
R<sub>DS(ON)</sub> = 2.4 Ω**

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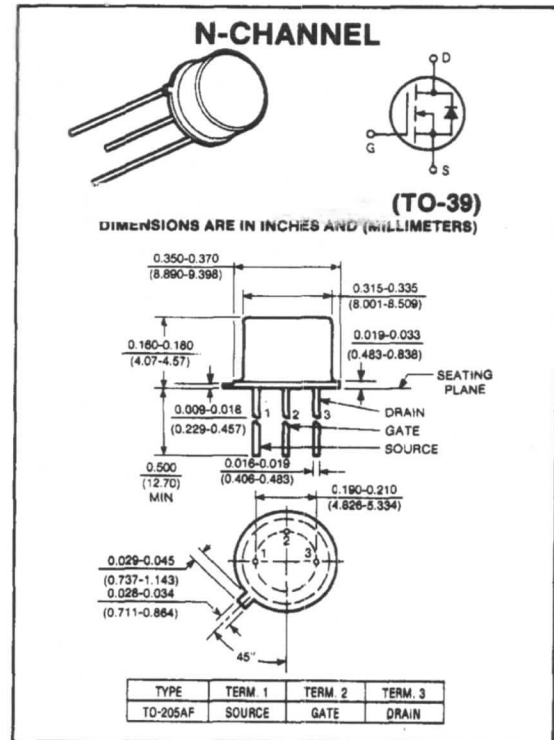
# POWER-MOS FET

## FIELD EFFECT POWER TRANSISTOR

This design has been optimized to give superior performance in most switching applications including: switching power supplies, inverters, converters and solenoid/relay drivers. Also, the extended safe operating area with good linear transfer characteristics makes it well suited for many linear applications such as audio amplifiers and servo motors.

### Features

- Polysilicon gate — Improved stability and reliability
- No secondary breakdown — Excellent ruggedness
- Ultra-fast switching — Independent of temperature
- Voltage controlled — High transconductance
- Low input capacitance — Reduced drive requirement
- Excellent thermal stability — Ease of paralleling



maximum ratings ( $T_C = 25^\circ C$ ) (unless otherwise specified)

| RATING   | SYMBOL         | IRFF212    | IRFF213    | UNITS         |
|--|----------------|------------|------------|---------------|
| Drain-Source Voltage                             | $V_{DSS}$      | 200        | 150        | Volts         |
| Drain-Gate Voltage, $R_{GS} = 1M\Omega$          | $V_{DGR}$      | 200        | 150        | Volts         |
| Continuous Drain Current @ $T_C = 25^\circ C$    | $I_D$          | 1.8        | 1.8        | A             |
| Pulsed Drain Current <sup>(1)</sup>              | $I_{DM}$       | 7.5        | 7.5        | A             |
| Gate-Source Voltage                              | $V_{GS}$       | $\pm 20$   | $\pm 20$   | Volts         |
| Total Power Dissipation @ $T_C = 25^\circ C$     | $P_D$          | 15         | 15         | Watts         |
| Derate Above $25^\circ C$                        |                | .12        | .12        | W/ $^\circ C$ |
| Operating and Storage Junction Temperature Range | $T_J, T_{STG}$ | -55 to 150 | -55 to 150 | $^\circ C$    |

### thermal characteristics

|   |                 |      |      |              |
|---|-----------------|------|------|--------------|
| Thermal Resistance, Junction to Case  | $R_{\theta JC}$ | 8.33 | 8.33 | $^\circ C/W$ |
| Thermal Resistance, Junction to Ambient   | $R_{\theta JA}$ | 175  | 175  | $^\circ C/W$ |
| Maximum Lead Temperature for Soldering Purposes: 1/16" from Case for 10 Seconds | $T_L$           | 260  | 260  | $^\circ C$   |

(1) Repetitive Rating: Pulse width limited by max. junction temperature.

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electrical characteristics ( $T_C = 25^\circ\text{C}$ ) (unless otherwise specified)

| CHARACTERISTIC | SYMBOL | MIN | TYP | MAX | UNIT |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

off characteristics

|  |                    |           |            |        |             |         |
|--|--------------------|-----------|------------|--------|-------------|---------|
| Drain-Source Breakdown Voltage<br>( $V_{GS} = 0V, I_D = 250 \mu A$ )   | IRFF212<br>IRFF213 | BVDSS     | 200<br>150 | —<br>— | —<br>—      | Volts   |
| Zero Gate Voltage Drain Current<br>( $V_{DS} = \text{Max Rating}, V_{GS} = 0V, T_C = 25^\circ\text{C}$ )<br>( $V_{DS} = \text{Max Rating}, \times 0.8, V_{GS} = 0V, T_C = 125^\circ\text{C}$ ) |                    | $I_{DSS}$ | —<br>—     | —<br>— | 250<br>1000 | $\mu A$ |
| Gate-Source Leakage Current<br>( $V_{GS} = \pm 20V$ )  |                    | $I_{GSS}$ | —          | —      | $\pm 100$   | nA      |

on characteristics\*

|  |                          |              |      |   |     |       |
|--|--------------------------|--------------|------|---|-----|-------|
| Gate Threshold Voltage<br>( $V_{DS} = V_{GS}, I_D = 250 \mu A$ )           | $T_C = 25^\circ\text{C}$ | $V_{GS(TH)}$ | 2.0  | — | 4.0 | Volts |
| On-State Drain Current<br>( $V_{GS} = 10V, V_{DS} = 10V$ )                 |                          | $I_{D(ON)}$  | 1.8  | — | —   | A     |
| Static Drain-Source On-State Resistance<br>( $V_{GS} = 10V, I_D = 1.25A$ ) |                          | $R_{DS(ON)}$ | —    | — | 2.4 | Ohms  |
| Forward Transconductance<br>( $V_{DS} = 10V, I_D = 1.25A$ )                |                          | $g_{fs}$     | 0.72 | — | —   | mhos  |

dynamic characteristics

|                              |                     |           |   |   |     |    |
|------------------------------|---------------------|-----------|---|---|-----|----|
| Input Capacitance            | $V_{GS} = 0V$       | $C_{iss}$ | — | — | 150 | pF |
| Output Capacitance           | $V_{DS} = 25V$      | $C_{oss}$ | — | — | 80  | pF |
| Reverse Transfer Capacitance | $f = 1 \text{ MHz}$ | $C_{rss}$ | — | — | 25  | pF |

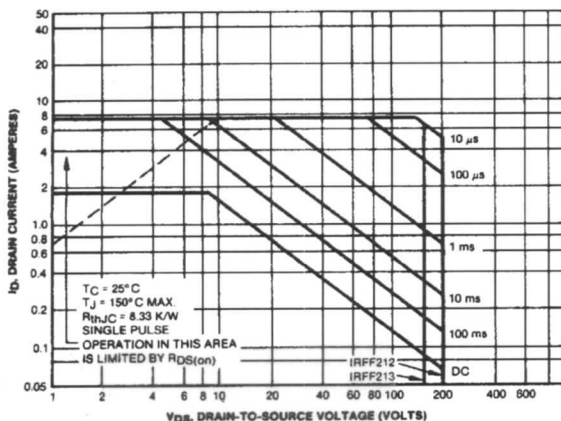
switching characteristics\*

|                     |   |              |   |    |   |    |
|---------------------|---|--------------|---|----|---|----|
| Turn-on Delay Time  | $V_{DS} = 90V$                            | $t_{d(on)}$  | — | 8  | — | ns |
| Rise Time           | $I_D = 1.25A, V_{GS} = 15V$               | $t_r$        | — | 15 | — | ns |
| Turn-off Delay Time | $R_{GEN} = 50\Omega, R_{GS} = 12.5\Omega$ | $t_{d(off)}$ | — | 10 | — | ns |
| Fall Time           | ( $R_{GS} \text{ (EQUIV.)} = 10\Omega$ )  | $t_f$        | — | 8  | — | ns |

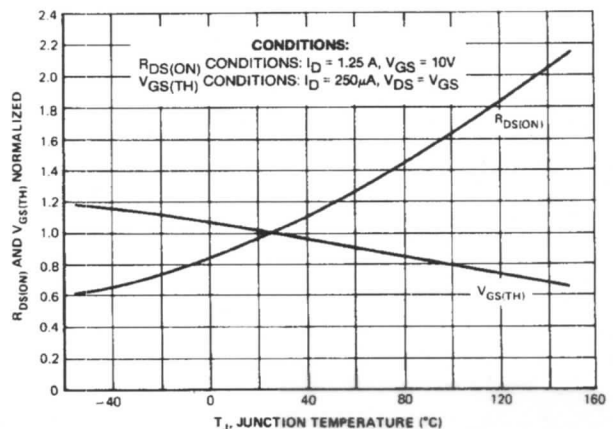
source-drain diode ratings and characteristics\*

|  |                      |   |            |     |               |
|--|----------------------|---|------------|-----|---------------|
| Continuous Source Current  | $I_S$                | — | —          | 1.8 | A             |
| Pulsed Source Current  | $I_{SM}$             | — | —          | 7.5 | A             |
| Diode Forward Voltage<br>( $T_C = 25^\circ\text{C}, V_{GS} = 0V, I_S = 2.0A$ )                   | $V_{SD}$             | — | —          | 1.8 | Volts         |
| Reverse Recovery Time<br>( $I_S = 2.2A, dI_S/dt = 100A/\mu\text{sec}, T_C = 125^\circ\text{C}$ ) | $t_{rr}$<br>$Q_{RR}$ | — | 290<br>2.0 | —   | ns<br>$\mu C$ |

\*Pulse Test: Pulse width  $\leq 300 \mu s$ , duty cycle  $\leq 2\%$



MAXIMUM SAFE OPERATING AREA



TYPICAL NORMALIZED  $R_{DS(ON)}$  AND  $V_{GS(TH)}$  VS. TEMP.