



POWER-MOS FET

FIELD EFFECT POWER TRANSISTOR

**IRF250,251
D86FN2,M2**

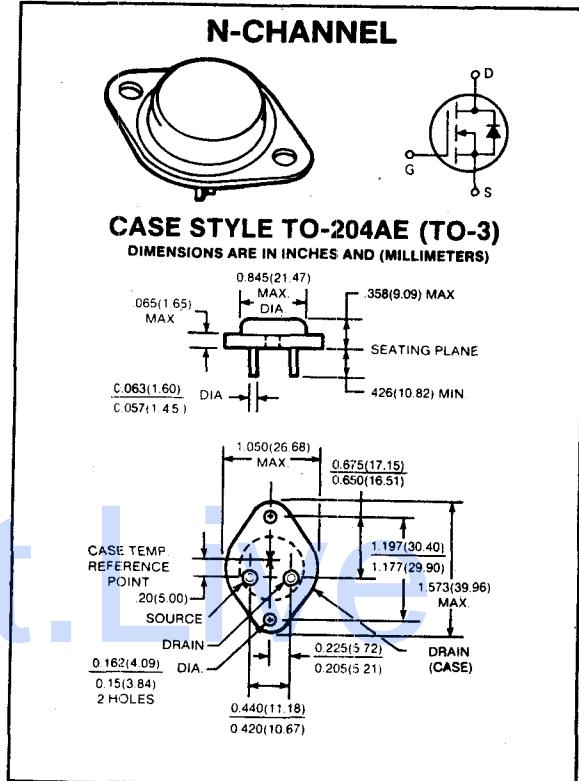
30 AMPERES
200, 150 VOLTS
 $R_{DS(ON)} = 0.085 \Omega$

This series of N-Channel Enhancement-mode Power MOSFETs utilizes GE's advanced Power DMOS technology to achieve low on-resistance with excellent device ruggedness and reliability.

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 | IRF250/D86FN2 | IRF251/D86FM2 | UNITS |
|---|----------------|---------------|---------------|-----------------------|
| Drain-Source Voltage | V_{DSS} | 200 | 150 | Volts |
| Drain-Gate Voltage, $R_{GS} = 1M\Omega$ | V_{DGR} | 200 | 150 | Volts |
| Continuous Drain Current @ $T_C = 25^\circ C$ @ $T_C = 100^\circ C$ | I_D | 30 19 | 30 19 | A A |
| Pulsed Drain Current ⁽¹⁾ | I_{DM} | 120 | 120 | A |
| Gate-Source Voltage | V_{GS} | ± 20 | ± 20 | Volts |
| Total Power Dissipation @ $T_C = 25^\circ C$ Derate Above $25^\circ C$ | P_D | 150 1.2 | 150 1.2 | Watts $W/^\circ C$ |
| 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 | $R_{\theta JC}$ | 0.83 | 0.83 | $^\circ C/W$ |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 30 | 30 | $^\circ C/W$ |
| Maximum Lead Temperature for Soldering Purposes: $\frac{1}{8}''$ from Case for 5 Seconds | T_L | 260 | 260 | $^\circ C$ |

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

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

| CHARACTERISTIC | SYMBOL | MIN | TYP | MAX | UNIT |
|---|--------------------------------|--------------|--------|-------------|---------|
| off characteristics | | | | | |
| Drain-Source Breakdown Voltage ($V_{GS} = 0V$, $I_D = 250 \mu A$) | IRF250/D86FN2 IRF251/D86FM2 | BVDSS 150 | 200 | — | Volts |
| Zero Gate Voltage Drain Current ($V_{DS} = \text{Max Rating}$, $V_{GS} = 0V$, $T_C = 25^\circ C$) ($V_{DS} = \text{Max Rating} \times 0.8$, $V_{GS} = 0V$, $T_C = 125^\circ C$) | $ I_{DSS} $ | — — | — — | 250 1000 | μA |
| Gate-Source Leakage Current ($V_{GS} = \pm 20V$) | $ I_{GSS} $ | — | — | ± 100 | nA |

on characteristics*

| | | | | | | |
|---|--------------------|---------------|-----|-------|-------|-------|
| Gate Threshold Voltage ($V_{DS} = V_{GS}$, $I_D = 250 \mu A$) | $T_C = 25^\circ C$ | $V_{GS(TH)}$ | 2.0 | — | 4.0 | Volts |
| On-State Drain Current ($V_{GS} = 10V$, $V_{DS} = 10V$) | | $ I_{D(ON)} $ | 30 | — | — | A |
| Static Drain-Source On-State Resistance ($V_{GS} = 10V$, $I_D = 16A$) | | $R_{DS(ON)}$ | — | 0.075 | 0.085 | Ohms |
| Forward Transconductance ($V_{DS} = 10V$, $I_D = 16A$) | | g_{fs} | 7.2 | 10 | — | mhos |

dynamic characteristics

| | | | | | | |
|------------------------------|--|-----------|---|------|------|----|
| Input Capacitance | $V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1 MHz$ | C_{iss} | — | 2800 | 3000 | pF |
| Output Capacitance | | C_{oss} | — | 520 | 1200 | pF |
| Reverse Transfer Capacitance | | C_{rss} | — | 120 | 500 | pF |

switching characteristics*

| | | | | | | |
|---------------------|--|--------------|---|----|---|----|
| Turn-on Delay Time | $V_{DS} = 90V$ $I_D = 16A$, $V_{GS} = 15V$ $R_{GEN} = 50\Omega$, $R_{GS} = 12.5\Omega$ (R_{GS} (EQUIV.) = 10Ω) | $t_{d(on)}$ | — | 20 | — | ns |
| Rise Time | | t_r | — | 75 | — | ns |
| Turn-off Delay Time | | $t_{d(off)}$ | — | 90 | — | ns |
| Fall Time | | t_f | — | 65 | — | ns |

source-drain diode ratings and characteristics*

| | | | | | |
|---|----------------------|--------|------------|-----|---------------|
| Continuous Source Current | I_S | — | — | 30 | A |
| Pulsed Source Current | I_{SM} | — | — | 120 | A |
| Diode Forward Voltage ($T_C = 25^\circ C$, $V_{GS} = 0V$, $I_S = 30A$) | V_{SD} | — | 1.3 | 2.0 | Volts |
| Reverse Recovery Time ($I_S = 30A$, $dI_S/dt = 100A/\mu s$, $T_C = 125^\circ C$) | t_{rr} Q_{RR} | — — | 345 4.5 | — | ns μC |

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

