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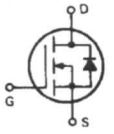
# IRF630,631
# D84DN2,M2

**9.0 AMPERES**
**200, 150 VOLTS**
**$R_{DS(ON)}$ = 0.4 Ω**

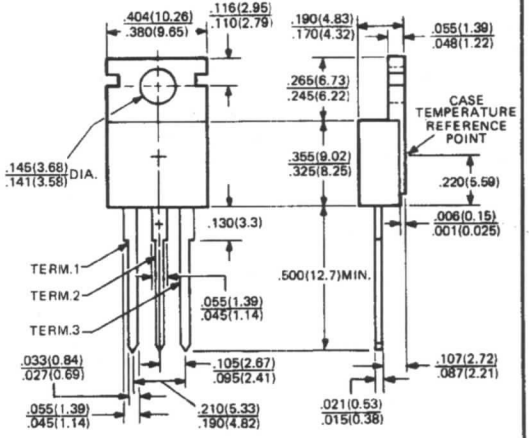
# POWER·MOS FET
## FIELD EFFECT POWER TRANSISTOR

**N-CHANNEL**






**CASE STYLE TO-220AB**
DIMENSIONS ARE IN INCHES AND (MILLIMETERS)




| UNIT | TYPE | TERM.1 | TERM.2 | TERM.3 | TAB |
|---|---|---|---|---|---|
| POWER MOS FET | TO-220-AB | GATE | DRAIN | SOURCE | DRAIN |

**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°C) (unless otherwise specified)

| RATING | SYMBOL | IRF630/D84DN2 | IRF631/D84DM2 | UNITS |
|---|---|---|---|---|
| Drain-Source Voltage | $V_{DSS}$ | 200 | 150 | Volts |
| Drain-Gate Voltage, $R_{GS}$ = 1MΩ | $V_{DGR}$ | 200 | 150 | Volts |
| Continuous Drain Current @ $T_C$ = 25°C<br>@ $T_C$ = 100°C | $I_D$ | 9.0<br>6.0 | 9.0<br>6.0 | A<br>A |
| Pulsed Drain Current(1) | $I_{DM}$ | 36 | 36 | A |
| Gate-Source Voltage | $V_{GS}$ | ±20 | ±20 | Volts |
| Total Power Dissipation @ $T_C$ = 25°C<br>Derate Above 25°C | $P_D$ | 75<br>0.6 | 75<br>0.6 | Watts<br>W/°C |
| Operating and Storage Junction Temperature Range | $T_J$, $T_{STG}$ | -55 to 150 | -55 to 150 | °C |

## thermal characteristics

| | | | | |
|---|---|---|---|---|
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 1.67 | 1.67 | °C/W |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 80 | 80 | °C/W |
| Maximum Lead Temperature for Soldering Purposes: ⅛" from Case for 5 Seconds | $T_L$ | 260 | 260 | °C |

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

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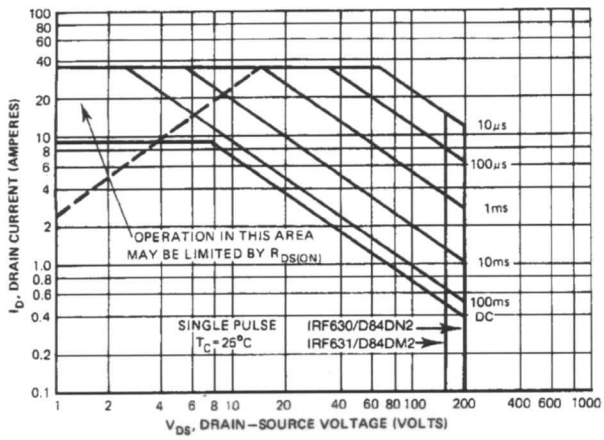
**Quality Semi-Conductors**

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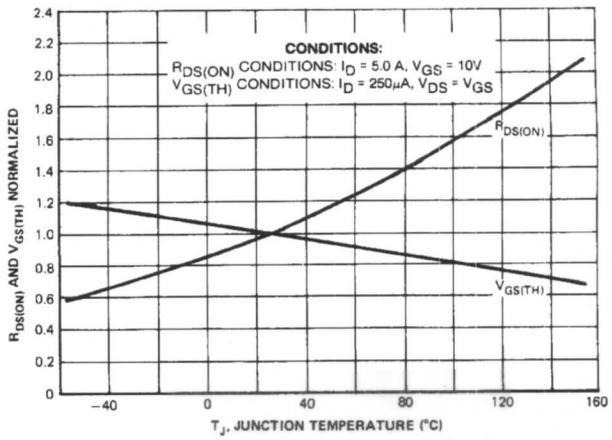
## electrical characteristics ($T_C$ = 25° C) (unless otherwise specified)

| CHARACTERISTIC | | SYMBOL | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| **off characteristics** | | | | | | |
| Drain-Source Breakdown Voltage ($V_{GS}$ = 0V, $I_D$ = 250 μA) | IRF630/D84DN2<br>IRF631/D84DM2 | $BV_{DSS}$ | 200<br>150 | —<br>— | —<br>— | Volts |
| Zero Gate Voltage Drain Current ($V_{DS}$ = Max Rating, $V_{GS}$ = 0V, $T_C$ = 25°C)<br>($V_{DS}$ = Max Rating, × 0.8, $V_{GS}$ = 0V, $T_C$ = 125°C) | | $I_{DSS}$ | —<br>— | —<br>— | 250<br>1000 | μA |
| Gate-Source Leakage Current ($V_{GS}$ = ±20V) | | $I_{GSS}$ | — | — | ±500 | nA |
| **on characteristics*** | | | | | | |
| Gate Threshold Voltage ($V_{DS}$ = $V_{GS}$, $I_D$ = 250 μA) | $T_C$ = 25°C | $V_{GS(TH)}$ | 2.0 | — | 4.0 | Volts |
| On-State Drain Current ($V_{GS}$ = 10V, $V_{DS}$ = 10V) | | $I_{D(ON)}$ | 9.0 | — | — | A |
| Static Drain-Source On-State Resistance ($V_{GS}$ = 10V, $I_D$ = 5.0A) | | $R_{DS(ON)}$ | — | 0.34 | 0.4 | Ohms |
| Forward Transconductance ($V_{DS}$ = 10V, $I_D$ = 5.0A) | | $g_{fs}$ | 2.4 | 3.0 | — | mhos |
| **dynamic characteristics** | | | | | | |
| Input Capacitance | $V_{GS}$ = 0V | $C_{iss}$ | — | 650 | 800 | pF |
| Output Capacitance | $V_{DS}$ = 25V | $C_{oss}$ | — | 150 | 450 | pF |
| Reverse Transfer Capacitance | f = 1 MHz | $C_{rss}$ | — | 30 | 150 | pF |
| **switching characteristics*** | | | | | | |
| Turn-on Delay Time | $V_{DS}$ = 90V | $t_{d(on)}$ | — | 15 | — | ns |
| Rise Time | $I_D$ = 5.0A, $V_{GS}$ = 15V | $t_r$ | — | 25 | — | ns |
| Turn-off Delay Time | $R_{GEN}$ = 50Ω, $R_{GS}$ = 12.5Ω | $t_{d(off)}$ | — | 30 | — | ns |
| Fall Time | ($R_{GS\ (EQUIV.)}$ = 10Ω) | $t_f$ | — | 20 | — | ns |
| **source-drain diode ratings and characteristics*** | | | | | | |
| Continuous Source Current | | $I_S$ | — | — | 9.0 | A |
| Pulsed Source Current | | $I_{SM}$ | — | — | 36.0 | A |
| Diode Forward Voltage ($T_C$ = 25°C, $V_{GS}$ = 0V, $I_S$ = 9.0A) | | $V_{SD}$ | — | 1.0 | 2.0 | Volts |
| Reverse Recovery Time ($I_S$ = 9.0A, $dI_S/dt$ = 100A/μsec, $T_C$ = 125°C) | | $t_{rr}$<br>$Q_{RR}$ | —<br>— | 300<br>2.5 | —<br>— | ns<br>μC |

*Pulse Test: Pulse width ≤ 300 μs, duty cycle ≤ 2%




**MAXIMUM SAFE OPERATING AREA**




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

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