

IRF830

Power Field Effect Transistor N-Channel Enhancement Mode Silicon Gate TMOS

This TMOS Power FET is designed for high voltage, high speed power switching applications such as switching regulators, converters, solenoid and relay drivers.

- Silicon Gate for Fast Switching Speeds
- Low $R_{DS(on)}$ to Minimize On-Losses, Specified at Elevated Temperature
- Rugged — SOA is Power Dissipation Limited
- Source-to-Drain Diode Characterized for Use with Inductive Loads

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|--|----------------|------------------|------------------------------|
| Drain-Source Voltage | V_{DS} | 500 | Vdc |
| Drain-Gate Voltage ($R_{GS} = 1.0 \text{ M}\Omega$) | V_{DGR} | 500 | Vdc |
| Gate-Source Voltage | V_{GS} | ± 20 | Vdc |
| Drain Current Continuous, $T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$ Peak, $T_C = 25^\circ\text{C}$ | I_D | 4.5 3.0 18 | Adc |
| Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C | P_D | 75 0.6 | Watts W/ $^\circ\text{C}$ |
| Operating and Storage Temperature Range | T_J, T_{stg} | -55 to 150 | $^\circ\text{C}$ |

THERMAL CHARACTERISTICS

| | | | |
|---|------------------------------------|--------------|--------------------|
| Thermal Resistance — Junction-to-Case — Junction-to-Ambient | $R_{\theta JC}$ $R_{\theta JA}$ | 1.67 62.5 | $^\circ\text{C/W}$ |
| Maximum Lead Temperature for Soldering Purposes, 1/8" from Case for 5 Seconds | T_L | 300 | $^\circ\text{C}$ |

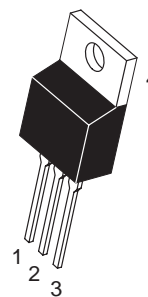
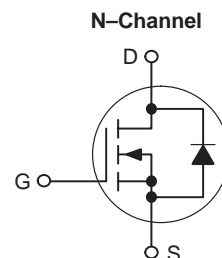
See the MTM4N45 Data Sheet for a complete set of design curves for the product on this data sheet. Design curves of the MTP4N45 are applicable for this product.



ON Semiconductor

<http://onsemi.com>

TMOS POWER FET
4.5 AMPERES
500 VOLTS
 $R_{DS(on)} = 1.5 \Omega$



TO-220AB
CASE 221A
STYLE 5

PIN ASSIGNMENT

| Pin | Assignment |
|-----|------------|
| 1 | Gate |
| 2 | Drain |
| 3 | Source |
| 4 | Drain |

ORDERING INFORMATION

| Device | Package | Shipping |
|--------|----------|---------------|
| IRF830 | TO-220AB | 50 Units/Rail |

IRF830

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

| Characteristic | Symbol | Min | Max | Unit |
|----------------|--------|-----|-----|------|
|----------------|--------|-----|-----|------|

OFF CHARACTERISTICS

| | | | | |
|---|----------------------|--------|------------|------|
| Drain-to-Source Breakdown Voltage (V _{GS} = 0 Vdc, I _D = 0.25 mAdc) | V _{(BR)DSS} | 500 | — | Vdc |
| Zero Gate Voltage Drain Current (V _{DS} = Rated V _{DSS} , V _{GS} = 0 Vdc) (V _{DS} = 0.8 Rated V _{DSS} , V _{GS} = 0 Vdc, T _J = 125°C) | I _{DSS} | — — | 0.2 1.0 | mAdc |
| Gate-Body Leakage Current, Forward (V _{GSF} = 20 Vdc, V _{DS} = 0) | I _{GSS(f)} | — | 100 | nAdc |
| Gate-Body Leakage Current, Reverse (V _{GSR} = 20 Vdc, V _{DS} = 0) | I _{GSS(r)} | — | 100 | nAdc |

ON CHARACTERISTICS ⁽¹⁾

| | | | | |
|--|---------------------|-----|-----|------|
| Gate Threshold Voltage (V _{DS} = V _{GS} , I _D = 0.25 mA) | V _{GS(th)} | 2.0 | 4.0 | Vdc |
| Static Drain-to-Source On-Resistance (V _{GS} = 10 Vdc, I _D = 2.5 Adc) | R _{DS(on)} | — | 1.5 | Ohm |
| On-State Drain Current (V _{GS} = 10 V) (V _{DS} ≥ 6.75 Vdc) | I _{D(on)} | 4.5 | — | Adc |
| Forward Transconductance (V _{DS} ≥ 6.75 Vdc, I _D = 2.5 Adc) | g _{FS} | 2.5 | — | mhos |

DYNAMIC CHARACTERISTICS

| | | | | | |
|------------------------------|---|------------------|---|-----|----|
| Input Capacitance | (V _{DS} = 25 Vdc, V _{GS} = 0 Vdc, f = 1.0 MHz) | C _{iss} | — | 800 | pF |
| Output Capacitance | | C _{oss} | — | 200 | |
| Reverse Transfer Capacitance | | C _{rss} | — | 60 | |

SWITCHING CHARACTERISTICS ⁽¹⁾

| | | | | | |
|---------------------|--|---------------------|----------|----|----|
| Turn-On Delay Time | (V _{DD} = 200 Vdc, I _D = 2.5 Apk, R _G = 15 Ω) | t _{d(on)} | — | 30 | ns |
| Rise Time | | t _r | — | 30 | |
| Turn-Off Delay Time | | t _{d(off)} | — | 55 | |
| Fall Time | | t _f | — | 30 | |
| Total Gate Charge | (V _{DS} = 0.8 Rated V _{DSS} , V _{GS} = 10 Vdc, I _D = Rated I _D) | Q _g | 22 (Typ) | 30 | nC |
| Gate-Source Charge | | Q _{gs} | 12 (Typ) | — | |
| Gate-Drain Charge | | Q _{gd} | 10 (Typ) | — | |

SOURCE-DrAIN DIODE CHARACTERISTICS ⁽¹⁾

| | | | | | |
|-----------------------|--|-----------------|-----------------------------|-----|-----|
| Forward On-Voltage | (I _S = Rated I _D , V _{GS} = 0) | V _{SD} | 1.1 (Typ) | 1.6 | Vdc |
| Forward Turn-On Time | | t _{on} | Limited by stray inductance | | |
| Reverse Recovery Time | | t _{rr} | 450 (Typ) | — | ns |

INTERNAL PACKAGE INDUCTANCE

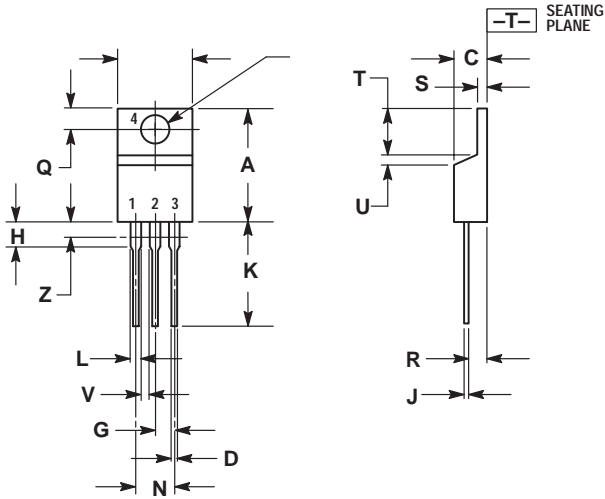
| | | | | |
|--|----------------|------------------------|--------|----|
| Internal Drain Inductance (Measured from the contact screw on tab to center of die) (Measured from the drain lead 0.25" from package to center of die) | L _D | 3.5 (Typ) 4.5 (Typ) | — — | nH |
| Internal Source Inductance (Measured from the source lead 0.25" from package to source bond pad) | L _S | 7.5 (Typ) | — | |

(1) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.

IRF830

PACKAGE DIMENSIONS

TO-220AB
CASE 221A-09
ISSUE Z




- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: INCH.
 3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

| DIM | INCHES | | MILLIMETERS | |
|-----|--------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 0.570 | 0.620 | 14.48 | 15.75 |
| B | 0.380 | 0.405 | 9.66 | 10.28 |
| C | 0.160 | 0.190 | 4.07 | 4.82 |
| D | 0.025 | 0.035 | 0.64 | 0.88 |
| F | 0.142 | 0.147 | 3.61 | 3.73 |
| G | 0.095 | 0.105 | 2.42 | 2.66 |
| H | 0.110 | 0.155 | 2.80 | 3.93 |
| J | 0.018 | 0.025 | 0.46 | 0.64 |
| K | 0.500 | 0.562 | 12.70 | 14.27 |
| L | 0.045 | 0.060 | 1.15 | 1.52 |
| N | 0.190 | 0.210 | 4.83 | 5.33 |
| Q | 0.100 | 0.120 | 2.54 | 3.04 |
| R | 0.080 | 0.110 | 2.04 | 2.79 |
| S | 0.045 | 0.055 | 1.15 | 1.39 |
| T | 0.235 | 0.255 | 5.97 | 6.47 |
| U | 0.000 | 0.050 | 0.00 | 1.27 |
| V | 0.045 | --- | 1.15 | --- |
| Z | --- | 0.080 | --- | 2.04 |

- STYLE 5:
- PIN 1. GATE
2. DRAIN
3. SOURCE
4. DRAIN

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