

# MegaMOS™ FET

## IRFP 470

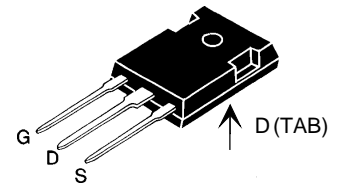
$V_{DSS} = 500\text{ V}$   
 $I_{D(\text{cont})} = 24\text{ A}$   
 $R_{DS(\text{on})} = 0.23\ \Omega$

### N-Channel Enhancement Mode



| Symbol  | Test Conditions   | Maximum Ratings |                  |
|---|---|-----------------|------------------|
| $V_{DSS}$   | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$   | 500             | V                |
| $V_{DGR}$   | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1\text{ M}\Omega$   | 500             | V                |
| $V_{GS}$  | Continuous  | $\pm 20$        | V                |
| $V_{GSM}$   | Transient   | $\pm 30$        | V                |
| $I_{D25}$   | $T_C = 25^\circ\text{C}$  | 24              | A                |
| $I_{DM}$  | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$  | 96              | A                |
| $I_{AR}$  |   | 24              | A                |
| $E_{AR}$  | $T_C = 25^\circ\text{C}$  | 30              | mJ               |
| $dv/dt$   | $I_S \leq I_{DM}$ , $di/dt \leq 100\text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ ,<br>$T_J \leq 150^\circ\text{C}$ , $R_G = 2\ \Omega$ | 5               | V/ns             |
| $P_D$   | $T_C = 25^\circ\text{C}$  | 300             | W                |
| $T_J$   |   | -55 ... +150    | $^\circ\text{C}$ |
| $T_{JM}$  |   | 150             | $^\circ\text{C}$ |
| $T_{stg}$   |   | -55 ... +150    | $^\circ\text{C}$ |
| $M_d$   | Mounting torque   | 1.13/10         | Nm/lb.in.        |
| <b>Weight</b>   |   | 6               | g                |
| Maximum lead temperature for soldering<br>1.6 mm (0.062 in.) from case for 10 s |   | 300             | $^\circ\text{C}$ |

### TO-247 AD



G = Gate,  
 S = Source,  
 D = Drain,  
 TAB = Drain

### Features

- International standard packages
- Low  $R_{DS(\text{on})}$  HDMOS™ process
- Rugged polysilicon gate cell structure
- High commutating  $dv/dt$  rating
- Fast switching times

### Applications

- Switch-mode and resonant-mode power supplies
- Motor controls
- Uninterruptible Power Supplies (UPS)
- DC choppers

### Advantages

- Easy to mount with 1 screw (isolated mounting screw hole)
- Space savings
- High power density

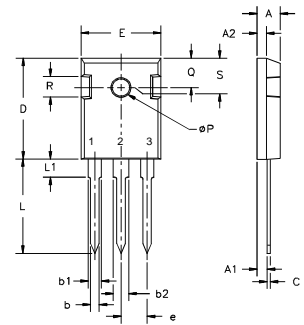
| Symbol              | Test Conditions   | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                                       |
|---------------------|---|---|------|---------------------------------------|
|                     |   | min.  | typ. | max.                                  |
| $V_{DSS}$           | $V_{GS} = 0\text{ V}$ , $I_D = 250\ \mu\text{A}$  | 500   |      | V                                     |
| $V_{GS(\text{th})}$ | $V_{DS} = V_{GS}$ , $I_D = 250\ \mu\text{A}$  | 2   |      | V                                     |
| $I_{GSS}$           | $V_{GS} = \pm 20\text{ V}_{DC}$ , $V_{DS} = 0$  |   |      | $\pm 100\text{ nA}$                   |
| $I_{DSS}$           | $V_{DS} = 0.8 \cdot V_{DSS}$ , $T_J = 25^\circ\text{C}$<br>$V_{GS} = 0\text{ V}$ , $T_J = 125^\circ\text{C}$          |   |      | 25 $\mu\text{A}$<br>250 $\mu\text{A}$ |
| $R_{DS(\text{on})}$ | $V_{GS} = 10\text{ V}$ , $I_D = 0.5 \cdot I_{D25}$<br>Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$ |   |      | 0.23 $\Omega$                         |

| Symbol       | Test Conditions   | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |      |    |
|--------------|---|---|------|------|----|
|              |   | min.  | typ. | max. |    |
| $g_{fs}$     | $V_{DS} = 10\text{ V}; I_D = 0.5 I_{D25}$ , pulse test  | 11  | 21   | S    |    |
| $C_{iss}$    | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$   |   | 4200 | pF   |    |
| $C_{oss}$    |   |   | 450  | pF   |    |
| $C_{rss}$    |   |   | 135  | pF   |    |
| $t_{d(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 I_{D25}$<br>$R_G = 2\ \Omega$ , (External) |   | 24   | 30   | ns |
| $t_r$        |   |   | 33   | 45   | ns |
| $t_{d(off)}$ |   |   | 65   | 80   | ns |
| $t_f$        |   |   | 30   | 40   | ns |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 I_{D25}$                                   |   | 160  | 190  | nC |
| $Q_{gs}$     |   |   | 28   | 40   | nC |
| $Q_{gd}$     |   |   | 75   | 85   | nC |
| $R_{thJC}$   |   |   | 0.42 | K/W  |    |
| $R_{thCK}$   |   | 0.25  |      | K/W  |    |

### Source-Drain Diode

| Symbol   | Test Conditions   | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |       |
|----------|---|---|------|-------|
|          |   | min.  | typ. | max.  |
| $I_S$    | $V_{GS} = 0\text{ V}$   |   |      | 24 A  |
| $I_{SM}$ | Repetitive; pulse width limited by $T_{JM}$   |   |      | 96 A  |
| $V_{SD}$ | $I_F = I_S, V_{GS} = 0\text{ V}$ ,<br>Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$ |   |      | 1.5 V |
| $t_{rr}$ | $I_F = I_S, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$                                    |   | 600  | ns    |

### TO-247 AD Outline



Terminals: 1 - Gate 2 - Drain  
3 - Source Tab - Drain

| Dim.           | Millimeter |       | Inches |       |
|----------------|------------|-------|--------|-------|
|                | Min.       | Max.  | Min.   | Max.  |
| A              | 4.7        | 5.3   | .185   | .209  |
| A <sub>1</sub> | 2.2        | 2.54  | .087   | .102  |
| A <sub>2</sub> | 2.2        | 2.6   | .059   | .098  |
| b              | 1.0        | 1.4   | .040   | .055  |
| b <sub>1</sub> | 1.65       | 2.13  | .065   | .084  |
| b <sub>2</sub> | 2.87       | 3.12  | .113   | .123  |
| C              | .4         | .8    | .016   | .031  |
| D              | 20.80      | 21.46 | .819   | .845  |
| E              | 15.75      | 16.26 | .610   | .640  |
| e              | 5.20       | 5.72  | 0.205  | 0.225 |
| L              | 19.81      | 20.32 | .780   | .800  |
| L1             |            | 4.50  |        | .177  |
| ∅P             | 3.55       | 3.65  | .140   | .144  |
| Q              | 5.89       | 6.40  | 0.232  | 0.252 |
| R              | 4.32       | 5.49  | .170   | .216  |
| S              | 6.15       | BSC   | 242    | BSC   |