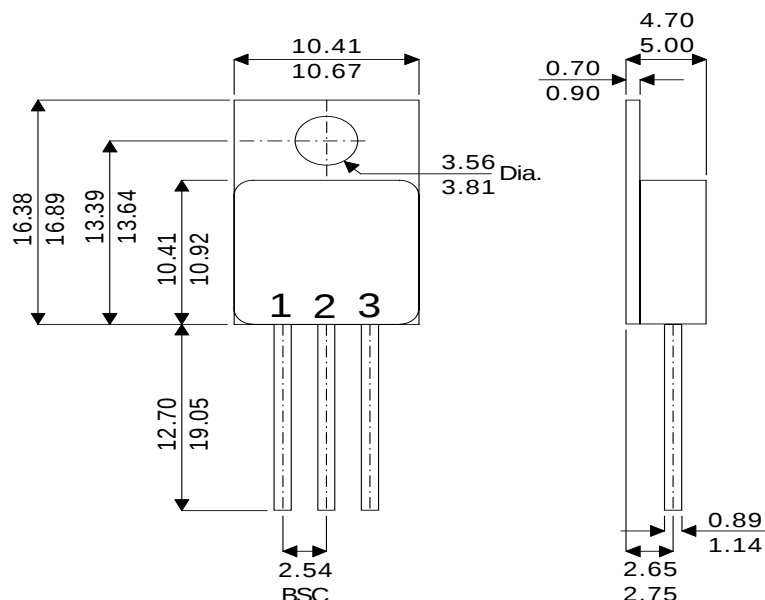


**MECHANICAL DATA**

Dimensions in mm (inches)



**TO-220M – Metal Package**  
**Ceramic Lead Seals**

Pad 1 – Gate

Pad 2 – Drain

Pad 3 – Source

## N-CHANNEL POWER MOSFET FOR HI-REL APPLICATIONS

|               |                |
|---------------|----------------|
| $V_{DSS}$     | 60V            |
| $I_{D(cont)}$ | 20A            |
| $R_{DS(on)}$  | 0.035 $\Omega$ |

**FEATURES**

- HERMETICALLY SEALED TO-220 METAL PACKAGE
- SIMPLE DRIVE REQUIREMENTS
- LIGHTWEIGHT
- ALL LEADS ISOLATED FROM CASE

**AVAILABLE SCREENINGS**
**FULL ASSESSMENT LEVEL**

SEQUENCE A

SEQUENCE B

SEQUENCE C

SEQUENCE D

IRFY044C.MOD

IRFY004C-A

IRFY004C-B

IRF044C-C

IRFY044C-D

IRFY044CJ

IRFY044CJXV

IRFY044CJTX

**ABSOLUTE MAXIMUM RATINGS** ( $T_C = 25^\circ\text{C}$  unless otherwise stated)

|                 |                                                      |                              |
|-----------------|------------------------------------------------------|------------------------------|
| $V_{GS}$        | Gate – Source Voltage                                | $\pm 20\text{V}$             |
| $I_D$           | Continuous Drain Current @ $T_C = 25^\circ\text{C}$  | 20A                          |
| $I_D$           | Continuous Drain Current @ $T_C = 100^\circ\text{C}$ | 20A                          |
| $I_{DM}$        | Pulsed Drain Current                                 | 128A                         |
| $P_D$           | Power Dissipation @ $T_C = 25^\circ\text{C}$         | 60W                          |
|                 | Linear Derating Factor                               | 0.48W/ $^\circ\text{C}$      |
| $T_J, T_{stg}$  | Operating and Storage Temperature Range              | $-55$ to $150^\circ\text{C}$ |
| $R_{\theta JC}$ | Thermal Resistance Junction to Case                  | 2.1 $^\circ\text{C/W}$ max.  |
| $R_{\theta JA}$ | Thermal Resistance Junction to Ambient               | 80 $^\circ\text{C/W}$ max.   |

**ELECTRICAL CHARACTERISTICS** ( $T_C = 25^\circ\text{C}$  unless otherwise stated)

| Parameter                             |                                                                                     | Test Conditions                                                 |                                        | Min. | Typ. | Max.  | Unit |
|---------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------|----------------------------------------|------|------|-------|------|
| STATIC ELECTRICAL RATINGS             |                                                                                     |                                                                 |                                        |      |      |       |      |
| BV <sub>DSS</sub>                     | Drain – Source Breakdown Voltage                                                    | V <sub>GS</sub> = 0                                             | I <sub>D</sub> = 1mA                   | 60   |      |       | V    |
| ΔBV <sub>DSS</sub><br>ΔT <sub>J</sub> | Temperature Coefficient of<br>Breakdown Voltage                                     | Reference to 25°C<br>I <sub>D</sub> = 1mA                       |                                        |      | 0.68 |       | V/°C |
| R <sub>DS(on)</sub>                   | Static Drain – Source On–State<br>Resistance                                        | V <sub>GS</sub> = 10V                                           | I <sub>D</sub> = 20A                   |      |      | 0.035 | Ω    |
| V <sub>GS(th)</sub>                   | Gate Threshold Voltage                                                              | V <sub>DS</sub> = V <sub>GS</sub>                               | I <sub>D</sub> = 250μA                 | 2    |      | 4     | V    |
| g <sub>fs</sub>                       | Forward Transconductance                                                            | V <sub>DS</sub> ≥ 15V                                           | I <sub>D</sub> = 20A                   | 17   |      |       | S(Ω) |
| I <sub>DSS</sub>                      | Zero Gate Voltage Drain Current                                                     | V <sub>GS</sub> = 0                                             | V <sub>DS</sub> = 0.8BV <sub>DSS</sub> |      |      | 25    | μA   |
|                                       |                                                                                     |                                                                 | T <sub>J</sub> = 125°C                 |      |      | 250   |      |
| I <sub>GSS</sub>                      | Forward Gate – Source Leakage                                                       | V <sub>GS</sub> = 20V                                           |                                        |      |      | 100   | nA   |
| I <sub>GSS</sub>                      | Reverse Gate – Source Leakage                                                       | V <sub>GS</sub> = –20V                                          |                                        |      |      | –100  |      |
| DYNAMIC CHARACTERISTICS               |                                                                                     |                                                                 |                                        |      |      |       |      |
| C <sub>iss</sub>                      | Input Capacitance                                                                   | V <sub>GS</sub> = 0                                             |                                        |      | 2400 |       | pF   |
| C <sub>oss</sub>                      | Output Capacitance                                                                  | V <sub>DS</sub> = 25V                                           |                                        |      | 1100 |       |      |
| C <sub>rss</sub>                      | Reverse Transfer Capacitance                                                        | f = 1MHz                                                        |                                        |      | 230  |       |      |
| Q <sub>g</sub>                        | Total Gate Charge                                                                   | V <sub>GS</sub> = 10V                                           |                                        | 39   |      | 88    | nC   |
| Q <sub>gs</sub>                       | Gate – Source Charge                                                                | I <sub>D</sub> = 20A                                            |                                        | 6.7  |      | 15    |      |
| Q <sub>gd</sub>                       | Gate – Drain (“Miller”) Charge                                                      | V <sub>DS</sub> = 0.5BV <sub>DSS</sub>                          |                                        | 18   |      | 52    |      |
| t <sub>d(on)</sub>                    | Turn–On Delay Time                                                                  | V <sub>GS</sub> = 10V                                           |                                        |      |      | 23    | ns   |
| t <sub>r</sub>                        | Rise Time                                                                           | V <sub>DD</sub> = 30V                                           |                                        |      |      | 130   |      |
| t <sub>d(off)</sub>                   | Turn–Off Delay Time                                                                 | I <sub>D</sub> = 20A                                            |                                        |      |      | 81    |      |
| t <sub>f</sub>                        | Fall Time                                                                           | R <sub>G</sub> = 9.1Ω                                           |                                        |      |      | 79    |      |
| SOURCE – DRAIN DIODE CHARACTERISTICS  |                                                                                     |                                                                 |                                        |      |      |       |      |
| I <sub>S</sub>                        | Continuous Source Current                                                           |                                                                 |                                        |      |      | 20    | A    |
| I <sub>SM</sub>                       | Pulse Source Current                                                                |                                                                 |                                        |      |      | 128   |      |
| V <sub>SD</sub>                       | Diode Forward Voltage                                                               | I <sub>S</sub> = 20A                                            | T <sub>J</sub> = 25°C                  |      |      | 2.5   | V    |
|                                       |                                                                                     | V <sub>GS</sub> = 0                                             |                                        |      |      |       |      |
| t <sub>rr</sub>                       | Reverse Recovery Time                                                               | I <sub>F</sub> = 20A                                            | T <sub>J</sub> = 25°C                  |      |      | 220   | ns   |
| Q <sub>rr</sub>                       | Reverse Recovery Charge                                                             | d <sub>i</sub> / d <sub>t</sub> ≤ 100A/μs V <sub>DD</sub> ≤ 50V |                                        |      |      | 1.6   | μC   |
| PACKAGE CHARACTERISTICS               |                                                                                     |                                                                 |                                        |      |      |       |      |
| L <sub>D</sub>                        | Internal Drain Inductance (from 6mm down drain lead pad to centre of die)           |                                                                 |                                        |      | 8.7  |       | nH   |
| L <sub>S</sub>                        | Internal Source Inductance (from 6mm down source lead to centre of source bond pad) |                                                                 |                                        |      | 8.7  |       |      |