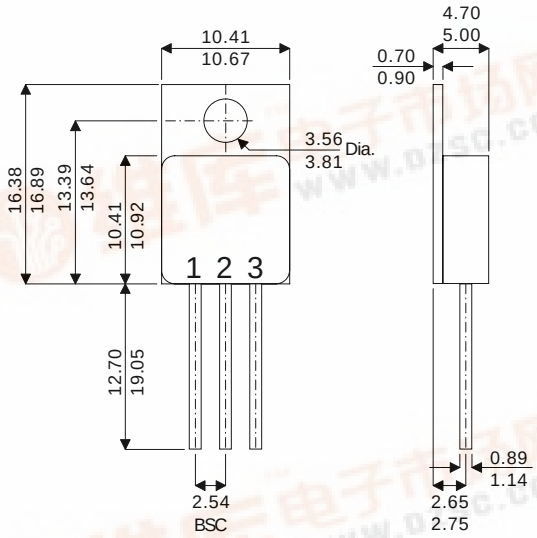
SEME LAB

# IRFY9140

## MECHANICAL DATA
Dimensions in mm (inches)




**TO–220M – Metal Package**

Pad 1 – Gate Pad 2 – Drain Pad 3 – Source

# P–CHANNEL POWER MOSFET FOR HI–REL APPLICATIONS

| | |
|---|---|
| $V_{DSS}$ | -100V |
| $I_{D(cont)}$ | -13A |
| $R_{DS(on)}$ | 0.21Ω |

## FEATURES

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

## ABSOLUTE MAXIMUM RATINGS ($T_{case}$ = 25°C unless otherwise stated)

| | | |
|---|---|---|
| $V_{GS}$ | Gate – Source Voltage | ±20V |
| $I_D$ | Continuous Drain Current @ $T_{case}$ = 25°C | -13A |
| $I_D$ | Continuous Drain Current @ $T_{case}$ = 100°C | -8.2A |
| $I_{DM}$ | Pulsed Drain Current | -52A |
| $P_D$ | Power Dissipation @ $T_{case}$ = 25°C | 60W |
| | Linear Derating Factor | 0.48W/°C |
| $T_J$ , $T_{stg}$ | Operating and Storage Temperature Range | –55 to 150°C |
| $R_{\theta JC}$ | Thermal Resistance Junction to Case | 2.1°C/W max. |
| $R_{\theta JA}$ | Thermal Resistance Junction to Ambient | 80°C/W max. |

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## ELECTRICAL CHARACTERISTICS ($T_C$ = 25°C unless otherwise stated)

| | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| | **STATIC ELECTRICAL RATINGS** | | | | | |
| $BV_{DSS}$ | Drain – Source Breakdown Voltage | $V_{GS}$ = 0 $I_D$ = 1mA | -100 | | | V |
| $\frac{\Delta BV_{DSS}}{\Delta T_J}$ | Temperature Coefficient of Breakdown Voltage | Reference to 25°C $I_D$ = 1mA | | -0.09 | | V/°C |
| $R_{DS(on)}$ | Static Drain – Source On–State Resistance | $V_{GS}$ = 10V $I_D$ = -8.2A | | | 0.21 | Ω |
| | | $V_{GS}$ = 10V $I_D$ = -13A | | | 0.24 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$ = $V_{GS}$ $I_D$ = 250µA | -2 | | -4 | V |
| $g_{fs}$ | Forward Transconductance | $V_{DS}$ ≥ 15V $I_{DS}$ = -8.2A | 6.2 | | | S(℧) |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{GS}$ = 0 $V_{DS}$ = 0.8$BV_{DSS}$ | | | 25 | µA |
| | | $T_J$ = 125°C | | | 250 | |
| $I_{GSS}$ | Forward Gate – Source Leakage | $V_{GS}$ = 20V | | | 100 | nA |
| $I_{GSS}$ | Reverse Gate – Source Leakage | $V_{GS}$ = –20V | | | -100 | |
| | **DYNAMIC CHARACTERISTICS** | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{GS}$ = 0 | | 1400 | | pF |
| $C_{oss}$ | Output Capacitance | $V_{DS}$ = 25V | | 600 | | |
| $C_{rss}$ | Reverse Transfer Capacitance | f = 1MHz | | 200 | | |
| $Q_g$ | Total Gate Charge | $V_{GS}$ = 10V $I_D$ = -13A $V_{DS}$ = 0.5$BV_{DSS}$ | 31 | | 60 | nC |
| $Q_{gs}$ | Gate – Source Charge | $I_D$ = -13A | 3.7 | | 13 | nC |
| $Q_{gd}$ | Gate – Drain (“Miller”) Charge | $V_{DS}$ = 0.5$BV_{DSS}$ | 7 | | 35.2 | |
| $t_{d(on)}$ | Turn–On Delay Time | $V_{DD}$ = -50V $I_D$ = -13A $R_G$ = 9.1Ω | | | 35 | ns |
| $t_r$ | Rise Time | | | | 85 | |
| $t_{d(off)}$ | Turn–Off Delay Time | | | | 85 | |
| $t_f$ | Fall Time | | | | 65 | |
| | **SOURCE – DRAIN DIODE CHARACTERISTICS** | | | | | |
| $I_S$ | Continuous Source Current | | | | -13 | A |
| $I_{SM}$ | Pulse Source Current | | | | -52 | |
| $V_{SD}$ | Diode Forward Voltage | $I_S$ = -13A $T_J$ = 25°C $V_{GS}$ = 0 | | | -4.2 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_S$ = -13A $T_J$ = 25°C | | | 280 | ns |
| $Q_{rr}$ | Reverse Recovery Charge | $d_i$ / $d_t$ ≤ 100A/µs $V_{DD}$ ≤ 50V | | | 3.6 | µC |
| | **PACKAGE CHARACTERISTICS** | | | | | |
| $L_D$ | Internal Drain Inductance (from 6mm down drain lead pad to centre of die) | | | 8.7 | | nH |
| $L_S$ | Internal Source Inductance (from 6mm down source lead to centre of source bond pad) | | | 8.7 | | |