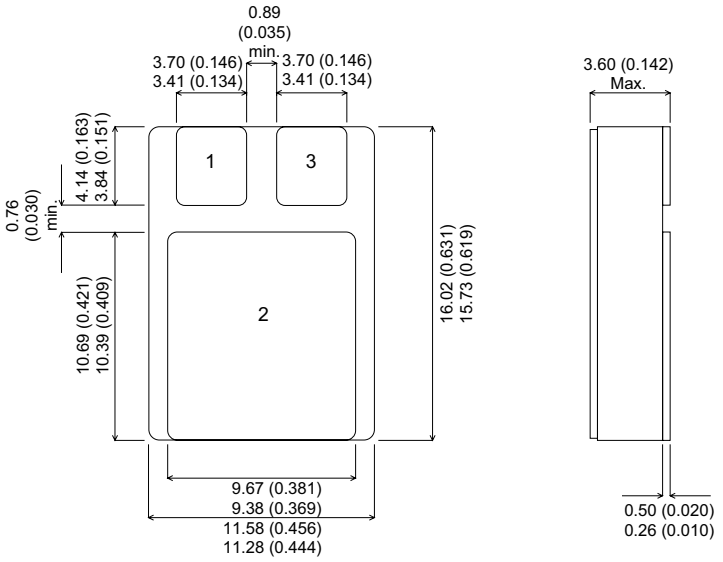
# IRF140SMD

**MECHANICAL DATA**
Dimensions in mm (inches)




**SMD1 Package**

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

# N–CHANNEL POWER MOSFET

| | |
|---|---|
| $V_{DSS}$ | 100V |
| $I_{D(cont)}$ | 13.9A |
| $R_{DS(on)}$ | 0.077Ω |

## FEATURES

- **HERMETICALLY SEALED SURFACE MOUNT PACKAGE**
- **SMALL FOOTPRINT – EFFICIENT USE OF PCB SPACE.**
- **SIMPLE DRIVE REQUIREMENTS**
- **LIGHTWEIGHT**
- **HIGH PACKING DENSITIES**

**Note:** IRFNxxx also available with pins 1 and 3 reversed.

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

| | | | |
|---|---|---|---|
| $V_{GS}$ | Gate – Source Voltage | | ±20V |
| $I_D$ | Continuous Drain Current | ($V_{GS}$ = 0 , $T_{case}$ = 25°C) | 22A |
| $I_D$ | Continuous Drain Current | ($V_{GS}$ = 0 , $T_{case}$ = 100°C) | 13.9A |
| $I_{DM}$ | Pulsed Drain Current [1] | | 88A |
| $P_D$ | Power Dissipation @ $T_{case}$ = 25°C | | 75W |
| | Linear Derating Factor | | 0.6W/°C |
| $E_{AS}$ | Single Pulse Avalanche Energy [2] | | 250mJ |
| dv/dt | Peak Diode Recovery [3] | | 5.5V/ns |
| $T_J$ , $T_{stg}$ | Operating and Storage Temperature Range | | –55 to 150°C |
| $T_L$ | Package Mounting Surface Temperature (for 5 sec) | | 300°C |
| $R_{\theta JC}$ | Thermal Resistance Junction to Case | | 1.67°C/W |
| $R_{\theta J–PCB}$ | Thermal Resistance Junction to PCB (Typical) | | 4°C/W |

**Notes**

1) Pulse Test: Pulse Width ≤ 300ms, δ ≤ 2%
2) @ $V_{DD}$ = 25V , L ≥ 0.8mH , $R_G$ = 25Ω , Peak $I_L$ = 22A , Starting $T_J$ = 25°C
3) @ $I_{SD}$ ≤ 22A , di/dt ≤ 170A/μs , $V_{DD}$ ≤ $BV_{DSS}$ , $T_J$ ≤ 150°C , SUGGESTED $R_G$ = 9.1Ω

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SEME LAB

# IRF140SMD

## ELECTRICAL CHARACTERISTICS ($T_{amb}$ = 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 | | 0.13 | | V/°C |
| $R_{DS(on)}$ | Static Drain – Source On–State Resistance [1] | $V_{GS}$ = 10V $I_D$ = 13.9A | | | 0.077 | Ω |
| | | $V_{GS}$ = 10V $I_D$ = 22A | | | 0.125 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$ = $V_{GS}$ $I_D$ = 250µA | 2 | | 4 | V |
| $g_{fs}$ | Forward Transconductance [1] | $V_{DS}$ ≥ 15V $I_{DS}$ = 13.9A | 9.1 | | | 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 | | 1660 | | pF |
| $C_{oss}$ | Output Capacitance | $V_{DS}$ = 25V | | 550 | | |
| $C_{rss}$ | Reverse Transfer Capacitance | f = 1MHz | | 120 | | |
| $Q_g$ | Total Gate Charge [1] | $V_{GS}$ = 10V $I_D$ = 22A $V_{DS}$ = 0.5$BV_{DSS}$ | 30 | | 59 | nC |
| $Q_{gs}$ | Gate – Source Charge [1] | $I_D$ = 22A $V_{DS}$ = 0.5$BV_{DSS}$ | 2.4 | | 12 | nC |
| $Q_{gd}$ | Gate – Drain (“Miller”) Charge [1] | | 12 | | 30.7 | |
| $t_{d(on)}$ | Turn–On Delay Time | $V_{DD}$ = 50V $I_D$ = 22A $R_G$ = 9.1Ω | | | 21 | ns |
| $t_r$ | Rise Time | | | | 145 | |
| $t_{d(off)}$ | Turn–Off Delay Time | | | | 64 | |
| $t_f$ | Fall Time | | | | 105 | |
| | **SOURCE – DRAIN DIODE CHARACTERISTICS** | | | | | |
| $I_S$ | Continuous Source Current | | | | 22 | A |
| $I_{SM}$ | Pulse Source Current [2] | | | | 88 | |
| $V_{SD}$ | Diode Forward Voltage | $I_S$ = 22A $T_J$ = 25°C $V_{GS}$ = 0 | | | 1.5 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_F$ = 22A $T_J$ = 25°C | | | 400 | ns |
| $Q_{rr}$ | Reverse Recovery Charge | $d_i / d_t$ ≤ 100A/µs $V_{DD}$ ≤ 50V | | | 2.9 | µC |
| $t_{on}$ | Forward Turn–On Time | | | Negligible | | |
| | **PACKAGE CHARACTERISTICS** | | | | | |
| $L_D$ | Internal Drain Inductance (from centre of drain pad to die) | | | 0.8 | | nH |
| $L_S$ | Internal Source Inductance (from centre of source pad to end of source bond wire) | | | 2.8 | | |

**Notes**

1) Pulse Test: Pulse Width ≤ 300ms, δ ≤ 2%

2) Repetitive Rating – Pulse width limited by maximum junction temperature.

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