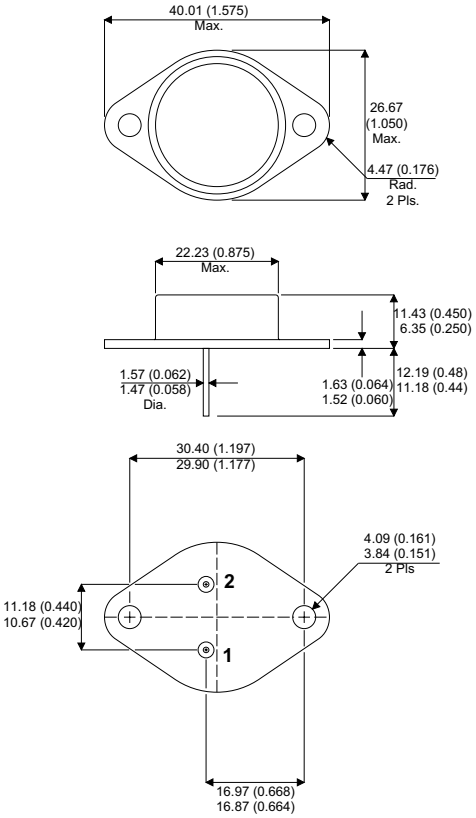
# IRF5210

## MECHANICAL DATA

Dimensions in mm (inches)




**TO–3 Metal Package**

Pin 1 – Gate Pin 2 – Source Case – Drain

# P–CHANNEL MOSFET IN A TO3 FOR HIGH RELIABILITY APPLICATIONS.

| | |
|---|---|
| $V_{DSS}$ | 100V |
| $I_D$ | 40A |
| $R_{DS(on)}$ | 0.07Ω |

## FEATURES

- **FAST SWITCHING**
- **SCREENING OPTIONS AVAILABLE**

## 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) | 40A |
| $I_D$ | Continuous Drain Current | ($T_{case}$ = 100°C) | 29A |
| $I_{DM}$ | Pulsed Drain Current [1] | | 140A |
| $P_D$ | Power Dissipation | | 200W |
| | Linear Derating Factor | | 1.3W/°C |
| $E_{AS}$ | Single Pulse Avalanche Energy [2] | | 780mJ |
| $E_{AR}$ | Repetitive Avalanche Energy [1] | | 21mJ |
| $T_J$ , $T_{stg}$ | Operating Junction and Storage Temperature Range | | –55 to +150°C |
| $R_{\theta JC}$ | Junction – Case Thermal Resistance | | 0.75°C/W |
| $R_{\theta JA}$ | Junction – Ambient Thermal Resistance | | 62°C/W |

**Notes**

1) Repetitive rating; pulse width limited by max. junction temperature.
2) $V_{DD}$ = –25V , L = 3.5mH , $R_G$ = 25Ω , $I_{AS}$ = –21A , Starting $T_J$ = 25°C

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SEME LAB

# IRF5210

## ELECTRICAL CHARACTERISTICS ($T_{case}$ = 25°C unless otherwise stated)

| | Parameter | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| | **STATIC ELECTRICAL RATINGS** | | | | | | |
| $V_{(BR)DSS}$ | Drain – Source Breakdown Voltage | $V_{GS}$ = 0V | $I_D$ = –250μA | –100 | | | V |
| $R_{DS(on)}$ | Static Drain to Source On Resistance [4] | $V_{GS}$ = –10V | $I_D$ = –24A | | | 0.07 | Ω |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$ = $V_{GS}$ | $I_D$ = –250μA | – 2.0 | | –4.0 | V |
| $g_{fs}$ | Forward Transconductance | $V_{DS}$ = –8V | $I_D$ = –20A | 14 | | | S |
| $I_{DSS}$ | Drain to Source Leakage Current | $V_{DS}$ = 100V | $V_{GS}$ = 0V | | | –25 | μA |
| | | $V_{DS}$ = 100V | $V_{GS}$ = 0V $T_J$ = 125°C | | | –250 | |
| $I_{GSS}$ | Gate to Source Forward Leakage | $V_{GS}$ = 20V | | | | 100 | nA |
| $I_{GSS}$ | Gate to Source Reverse Leakage | $V_{GS}$ = -20V | | | | –100 | |
| | **DYNAMIC CHARACTERISTICS** | | | | | | |
| Ciss | Input Capacitance | $V_{GS}$ = 0V | | | 2700 | | pF |
| $C_{oss}$ | Output Capacitance | $V_{DS}$ = –25V | | | 790 | | |
| $C_{rss}$ | Reverse Transfer Capacitance | f = 1MHz | | | 450 | | |
| $Q_g$ | Total Gate Charge[4] | $I_D$ = –21A | | | | 180 | nC |
| $Q_{gs}$ | Gate – Source Charge[4] | $V_{DS}$ = –80V | $V_{GS}$ = –10V | | | 25 | |
| $Q_{gd}$ | Gate – Drain (“Miller”) Charge[4] | | | | | 97 | |
| $t_{d(on)}$ | Turn–On Delay Time[4] | $V_{DD}$ = –50V | | | 17 | | ns |
| $t_r$ | Rise Time[4] | $I_D$ = –21A | | | 86 | | |
| $t_{d(off)}$ | Turn–Off Delay Time[4] | $R_G$ = 2.5Ω | | | 79 | | |
| $t_f$ | Fall Time[4] | $R_G$ = 2.4Ω | | | 81 | | |
| | **SOURCE – DRAIN CHARACTERISTICS** | | | | | | |
| $I_S$ | Continuous Source Current | MOSFET symbol showing the | | | | –40 | A |
| $I_{SM}$ | Pulse Source Current [1] | integral reverse p-n junction | | | | –140 | |
| $V_{SD}$ | Diode Forward Voltage [4] | $T_J$ = 25°C, $I_S$ = 21A, $V_{GS}$ = 0V | | | | –1.6 | V |
| $t_{rr}$ | Reverse Recovery Time [4] | $d_i / d_t$ ≤ –100A/μs | | | 170 | 260 | ns |
| $Q_{rr}$ | Reverse Recovery Charge [4] | $T_J$ = 25°C, $I_F$ = -21A | | | 1.2 | 1.8 | μC |
| $t_{on}$ | Forward Turn–On Time | negligible | | | | | — |
| | **PACKAGE CHARACTERISTICS** | | | | | | |
| $L_D$ | Internal Drain | Between lead, 6mm(0.25in.) from | | | | 4.5 | nH |
| $L_S$ | Internal Source Inductance | package and center of die contact | | | | 7.5 | |

**Notes**

1) Repetitive rating; pulse width limited by max. junction temperature.
2) $V_{DD}$ = –25V , L = 3.5mH , $R_G$ = 25Ω , $I_{AS}$ = –21A , Starting $T_J$ = 25°C
3) $I_{SD}$ ≤ –6.5A , di/dt ≤ –100A/μs , $V_{DD}$ ≤ $BV_{DSS}$ , $T_J$ ≤ 150°C , Suggested $R_G$ = 7.5Ω
4) Pulse Test: Pulse Width ≤ 300ms, δ ≤ 2%

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