

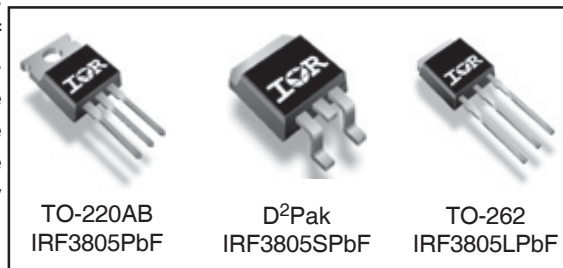
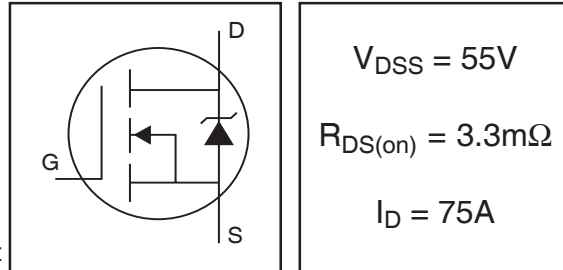
Features

- Advanced Process Technology
- Ultra Low On-Resistance
- 175°C Operating Temperature
- Fast Switching
- Repetitive Avalanche Allowed up to Tjmax
- Lead-Free

Description

Specifically designed for Automotive applications, this HEXFET® Power MOSFET utilizes the latest processing techniques to achieve extremely low on-resistance per silicon area. Additional features of this design are a 175°C junction operating temperature, fast switching speed and improved repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in Automotive applications and a wide variety of other applications.

HEXFET® Power MOSFET



Absolute Maximum Ratings

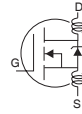
| | Parameter | Max. | Units |
|------------------------------|--|--------------------------|-------|
| $I_D @ T_C = 25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V$ (Silicon Limited) | 210 | A |
| $I_D @ T_C = 100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V$ (Silicon Limited) | 150 | |
| $I_D @ T_C = 25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V$ (Package limited) | 75 | |
| I_{DM} | Pulsed Drain Current ① | 890 | |
| $P_D @ T_C = 25^\circ C$ | Power Dissipation | 300 | W |
| | Linear Derating Factor | 2.0 | W/°C |
| V_{GS} | Gate-to-Source Voltage | ± 20 | V |
| E_{AS} (Thermally limited) | Single Pulse Avalanche Energy ② | 650 | mJ |
| E_{AS} (Tested) | Single Pulse Avalanche Energy Tested Value ③ | 940 | |
| I_{AR} | Avalanche Current ④ | See Fig.12a, 12b, 15, 16 | A |
| E_{AR} | Repetitive Avalanche Energy ⑤ | | mJ |
| T_J | Operating Junction and | -55 to + 175 | °C |
| T_{STG} | Storage Temperature Range | | |
| | Soldering Temperature, for 10 seconds | 300 (1.6mm from case) | |
| | Mounting Torque, 6-32 or M3 screw ⑦ | 10 lbf•in (1.1N•m) | |

Thermal Resistance

| | Parameter | Typ. | Max. | Units |
|-----------------|--------------------------------------|------|-------|-------|
| $R_{\theta JC}$ | Junction-to-Case ⑧ | — | 0.5 ⑨ | °C/W |
| $R_{\theta CS}$ | Case-to-Sink, Flat Greased Surface ⑩ | 0.50 | — | |
| $R_{\theta JA}$ | Junction-to-Ambient ⑪ ⑫ | — | 62 | |
| $R_{\theta JA}$ | Junction-to-Ambient (PCB Mount) ⑬ ⑭ | — | 40 | |

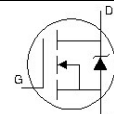
Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

| | Parameter | Min. | Typ. | Max. | Units | Conditions |
|--|--------------------------------------|------|-------|------|-------|---|
| V _{(BR)DSS} | Drain-to-Source Breakdown Voltage | 55 | — | — | V | V _{GS} = 0V, I _D = 250μA |
| ΔV _{(BR)DSS} /ΔT _J | Breakdown Voltage Temp. Coefficient | — | 0.051 | — | V/°C | Reference to 25°C, I _D = 1mA |
| R _{DS(on)} | Static Drain-to-Source On-Resistance | — | 2.6 | 3.3 | mΩ | V _{GS} = 10V, I _D = 75A ③ |
| V _{GS(th)} | Gate Threshold Voltage | 2.0 | — | 4.0 | V | V _{DS} = V _{GS} , I _D = 250μA |
| g _{fs} | Forward Transconductance | 75 | — | — | V | V _{DS} = 25V, I _D = 75A |
| I _{DSS} | Drain-to-Source Leakage Current | — | — | 20 | μA | V _{DS} = 55V, V _{GS} = 0V |
| | | — | — | 250 | | V _{DS} = 55V, V _{GS} = 0V, T _J = 125°C |
| I _{GSS} | Gate-to-Source Forward Leakage | — | — | 200 | nA | V _{GS} = 20V |
| | Gate-to-Source Reverse Leakage | — | — | -200 | | V _{GS} = -20V |
| Q _g | Total Gate Charge | — | 190 | 290 | | I _D = 75A |
| Q _{gs} | Gate-to-Source Charge | — | 52 | — | nC | V _{DS} = 44V |
| Q _{gd} | Gate-to-Drain ("Miller") Charge | — | 72 | — | | V _{GS} = 10V ③ |
| t _{d(on)} | Turn-On Delay Time | — | 20 | — | | V _{DD} = 28V |
| t _r | Rise Time | — | 150 | — | | I _D = 75A |
| t _{d(off)} | Turn-Off Delay Time | — | 87 | — | ns | R _G = 2.6 Ω |
| t _f | Fall Time | — | 93 | — | | V _{GS} = 10V ③ |
| L _D | Internal Drain Inductance | — | 4.5 | — | nH | Between lead, 6mm (0.25in.) from package and center of die contact |
| L _S | Internal Source Inductance | — | 7.5 | — | | |
| C _{iss} | Input Capacitance | — | 7960 | — | | V _{GS} = 0V |
| C _{oss} | Output Capacitance | — | 1260 | — | | V _{DS} = 25V |
| C _{rss} | Reverse Transfer Capacitance | — | 630 | — | pF | f = 1.0MHz |
| C _{oss} | Output Capacitance | — | 4400 | — | | V _{GS} = 0V, V _{DS} = 1.0V, f = 1.0MHz |
| C _{oss} | Output Capacitance | — | 980 | — | | V _{GS} = 0V, V _{DS} = 44V, f = 1.0MHz |
| C _{oss eff.} | Effective Output Capacitance | — | 1550 | — | | V _{GS} = 0V, V _{DS} = 0V to 44V ④ |

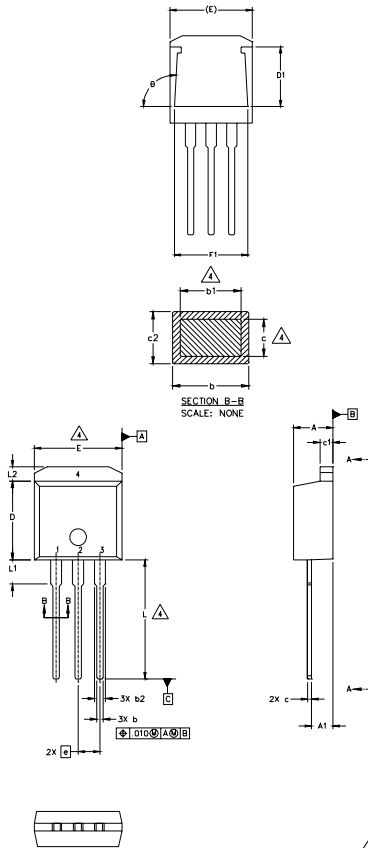


Source-Drain Ratings and Characteristics

| | Parameter | Min. | Typ. | Max. | Units | Conditions |
|-----------------|---|--|------|------|-------|---|
| I _S | Continuous Source Current (Body Diode) | — | — | 75 | A | MOSFET symbol showing the integral reverse |
| I _{SM} | Pulsed Source Current (Body Diode) ① | — | — | 890 | | p-n junction diode. |
| V _{SD} | Diode Forward Voltage | — | — | 1.3 | V | T _J = 25°C, I _S = 75A, V _{GS} = 0V ③ |
| t _{rr} | Reverse Recovery Time | — | 36 | 54 | ns | T _J = 25°C, I _F = 75A, V _{DD} = 28V |
| Q _{rr} | Reverse Recovery Charge | — | 47 | 71 | nC | di/dt = 100A/μs ③ |
| t _{on} | Forward Turn-On Time | Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD) | | | | |



TO-262 Package Outline (Dimensions are shown in millimeters (inches))



| SYMBOL | DIMENSIONS | | | | NOTES |
|--------|-------------|-------|----------|------|-------|
| | MILLIMETERS | | INCHES | | |
| | MIN. | MAX. | MIN. | MAX. | |
| A | 4.06 | 4.83 | .160 | .190 | 4 |
| A1 | 2.03 | 2.92 | .080 | .115 | |
| b | 0.51 | 0.99 | .020 | .039 | |
| b1 | 0.51 | 0.89 | .020 | .035 | |
| b2 | 1.14 | 1.40 | .045 | .055 | 4 |
| c | 0.38 | 0.63 | .015 | .025 | |
| c1 | 1.14 | 1.40 | .045 | .055 | 3 |
| c2 | 0.43 | .063 | .017 | .029 | |
| D | 8.51 | 9.65 | .335 | .380 | 3 |
| D1 | 5.33 | | .210 | | |
| E | 9.65 | 10.67 | .380 | .420 | 3 |
| E1 | 6.22 | | .245 | | |
| e | 2.54 BSC | | .100 BSC | | |
| L | 13.46 | 14.09 | .530 | .555 | |
| L1 | 3.56 | 3.71 | .140 | .146 | |
| L2 | | 1.65 | | .065 | |

LEAD ASSIGNMENTS

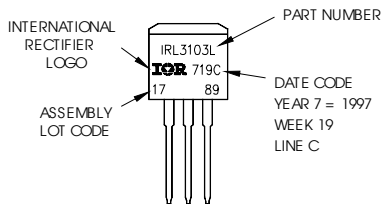
| HEXFET | IGBT |
|------------|-------------|
| 1.- GATE | 1-GATE |
| 2.- DRAIN | 2-COLLECTOR |
| 3.- SOURCE | 3-EMITTER |
| 4.- DRAIN | 4-COLLECTOR |

- NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994
 2. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES]
 3. DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED 0.127 [.005"] PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTMOST EXTREMES OF THE PLASTIC BODY.
 4. DIMENSION b1 AND c1 APPLY TO BASE METAL ONLY.
 5. CONTROLLING DIMENSION: INCH.

TO-262 Part Marking Information

EXAMPLE: THIS IS AN IRL3103L
 LOT CODE 1789
 ASSEMBLED ON WW 19, 1997
 IN THE ASSEMBLY LINE "C"

Note: "P" in assembly line position indicates "Lead-Free"



OR

