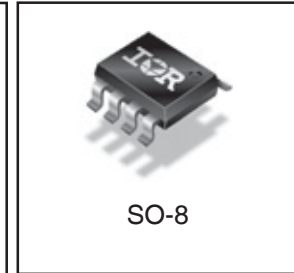
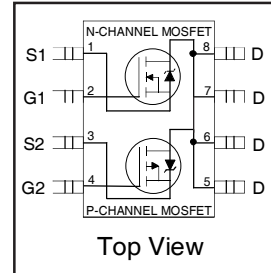


HEXFET® Power MOSFET

| | N-CH | P-CH | |
|-----------------------------------------|-------|-------|----------|
| V_{DS} | 30 | -30 | V |
| $R_{DS(on) max}$ (@ $V_{GS} = 10V$) | 0.029 | 0.058 | Ω |
| Q_g (typical) | 22 | 23 | nC |
| I_D (@ $T_A = 25^\circ C$) | 7.3 | -5.3 | A |



Features

| |
|---------------------------------------------------|
| Industry-standard pinout SO-8 Package |
| Compatible with Existing Surface Mount Techniques |
| RoHS Compliant, Halogen-Free |
| MSL1, Industrial qualification |



Benefits

| |
|----------------------------|
| Multi-Vendor Compatibility |
| Easier Manufacturing |
| Environmentally Friendlier |
| Increased Reliability |

| Base Part Number | Package Type | Standard Pack | | Orderable Part Number |
|------------------|--------------|---------------|----------|-----------------------|
| | | Form | Quantity | |
| IRF7389PbF-1 | SO-8 | Tube/Bulk | 95 | IRF7389PbF-1 |
| | | Tape and Reel | 4000 | IRF7389TRPbF-1 |

Absolute Maximum Ratings ($T_A = 25^\circ C$ Unless Otherwise Noted)

| | Symbol | Maximum | | Units | |
|----------------------------------------------|----------------|--------------------|-----------|-------|---|
| | | N-Channel | P-Channel | | |
| Drain-Source Voltage | V_{DS} | 30 | -30 | V | |
| Gate-Source Voltage | V_{GS} | ± 20 | | | |
| Continuous Drain Current [Ⓢ] | I_D | $T_A = 25^\circ C$ | 7.3 | -5.3 | A |
| | | $T_A = 70^\circ C$ | 5.9 | -4.2 | |
| Pulsed Drain Current | I_{DM} | 30 | -30 | | |
| Continuous Source Current (Diode Conduction) | I_S | 2.5 | -2.5 | | |
| Maximum Power Dissipation [Ⓢ] | P_D | $T_A = 25^\circ C$ | 2.5 | | W |
| | | $T_A = 70^\circ C$ | 1.6 | | |
| Single Pulse Avalanche Energy | E_{AS} | 82 | 140 | mJ | |
| Avalanche Current | I_{AR} | 4.0 | -2.8 | A | |
| Repetitive Avalanche Energy | E_{AR} | 0.20 | | mJ | |
| Peak Diode Recovery dv/dt [Ⓢ] | dv/dt | 3.8 | -2.2 | V/ ns | |
| Junction and Storage Temperature Range | T_J, T_{STG} | -55 to + 150 °C | | | |

Thermal Resistance Ratings

| Parameter | Symbol | Limit | Units |
|------------------------------------------|-----------------|-------|--------------|
| Maximum Junction-to-Ambient [Ⓢ] | $R_{\theta JA}$ | 50 | $^\circ C/W$ |

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

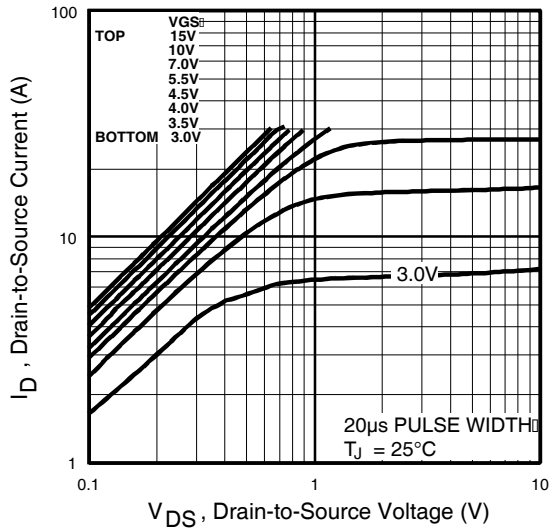
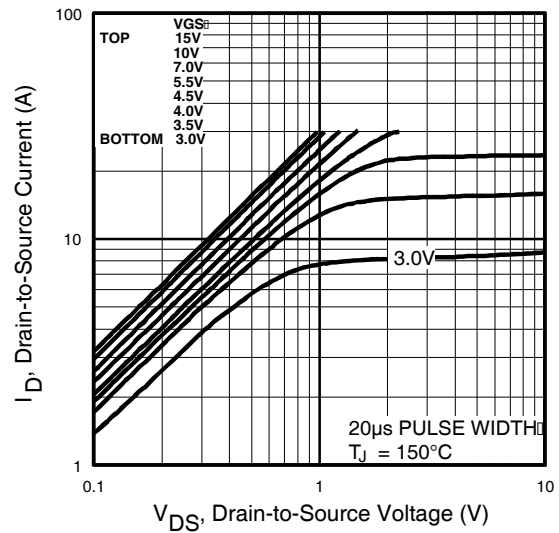
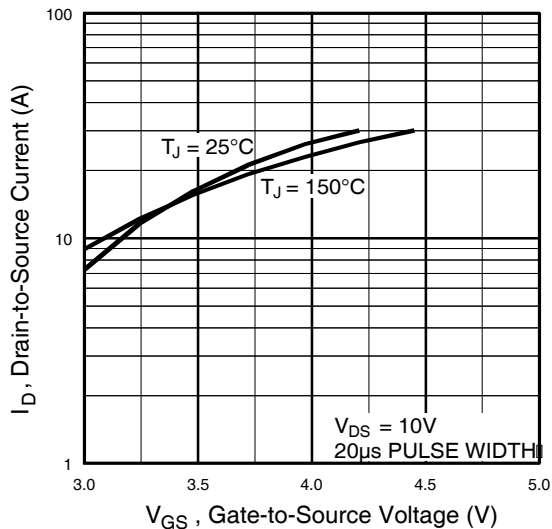
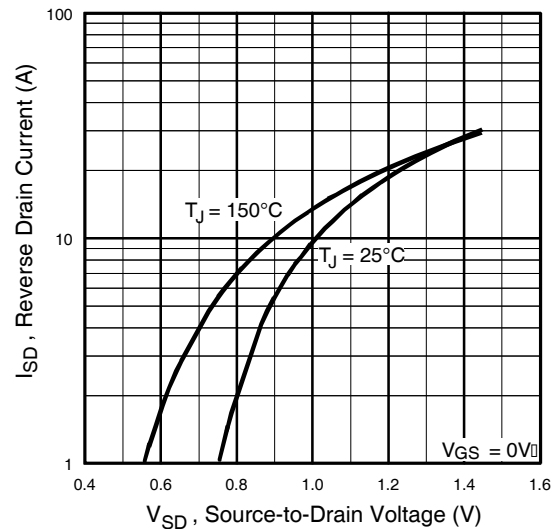
| Parameter | Parameter | Min. | Typ. | Max. | Units | Conditions |
|--------------------------------------|--------------------------------------|------|-------|-------|-------|-----------------------------------------------------------------------------------------------|
| | | | | | | |
| V _{(BR)DSS} | Drain-to-Source Breakdown Voltage | 30 | — | — | V | V _{GS} = 0V, I _D = 250μA |
| | | -30 | — | — | | V _{GS} = 0V, I _D = -250μA |
| ΔV _{(BR)DSS/ΔT_J} | Breakdown Voltage Temp. Coefficient | — | 0.022 | — | V/°C | Reference to 25°C, I _D = 1mA |
| | | — | 0.022 | — | | Reference to 25°C, I _D = -1mA |
| R _{DS(ON)} | Static Drain-to-Source On-Resistance | — | 0.023 | 0.029 | Ω | V _{GS} = 10V, I _D = 5.8A ④ |
| | | — | 0.032 | 0.046 | | V _{GS} = 4.5V, I _D = 4.7A ④ |
| | | — | 0.042 | 0.058 | | V _{GS} = -10V, I _D = -4.9A ④ |
| | | — | 0.076 | 0.098 | | V _{GS} = -4.5V, I _D = -3.6A ④ |
| V _{GS(th)} | Gate Threshold Voltage | 1.0 | — | — | V | V _{DS} = V _{GS} , I _D = 250μA |
| | | -1.0 | — | — | | V _{DS} = V _{GS} , I _D = -250μA |
| g _{fs} | Forward Transconductance | — | 14 | — | S | V _{DS} = 15V, I _D = 5.8A ④ |
| | | — | 7.7 | — | | V _{DS} = -15V, I _D = -4.9A ④ |
| I _{DSS} | Drain-to-Source Leakage Current | — | — | 1.0 | μA | V _{DS} = 24V, V _{GS} = 0V |
| | | — | — | -1.0 | | V _{DS} = -24V, V _{GS} = 0V |
| | | — | — | 25 | | V _{DS} = 24V, V _{GS} = 0V, T _J = 55°C |
| | | — | — | -25 | | V _{DS} = -24V, V _{GS} = 0V, T _J = 55°C |
| I _{GSS} | Gate-to-Source Forward Leakage | — | — | ±100 | nA | V _{GS} = ±20V |
| Q _g | Total Gate Charge | — | 22 | 33 | nC | N-Channel |
| | | — | 23 | 34 | | I _D = 5.8A, V _{DS} = 15V, V _{GS} = 10V ④ |
| Q _{gs} | Gate-to-Source Charge | — | 2.6 | 3.9 | | |
| | | — | 3.8 | 5.7 | | |
| Q _{gd} | Gate-to-Drain ("Miller") Charge | — | 6.4 | 9.6 | | P-Channel |
| | | — | 5.9 | 8.9 | | I _D = -4.9A, V _{DS} = -15V, V _{GS} = -10V |
| t _{d(on)} | Turn-On Delay Time | — | 8.1 | 12 | ns | N-Channel |
| | | — | 13 | 19 | | V _{DD} = 15V, I _D = 1.0A, R _G = 6.0Ω, R _D = 15Ω ④ |
| t _r | Rise Time | — | 8.9 | 13 | | |
| | | — | 13 | 20 | | |
| t _{d(off)} | Turn-Off Delay Time | — | 26 | 39 | | P-Channel |
| | | — | 34 | 51 | | V _{DD} = -15V, I _D = -1.0A, R _G = 6.0Ω, R _D = 15Ω ④ |
| t _f | Fall Time | — | 17 | 26 | | |
| | | — | 32 | 48 | | |
| C _{iss} | Input Capacitance | — | 650 | — | pF | N-Channel |
| | | — | 710 | — | | V _{GS} = 0V, V _{DS} = 25V, f = 1.0MHz |
| C _{oss} | Output Capacitance | — | 320 | — | | |
| | | — | 380 | — | | P-Channel |
| C _{rss} | Reverse Transfer Capacitance | — | 130 | — | | V _{GS} = 0V, V _{DS} = -25V, f = 1.0MHz |
| | | — | 180 | — | | |

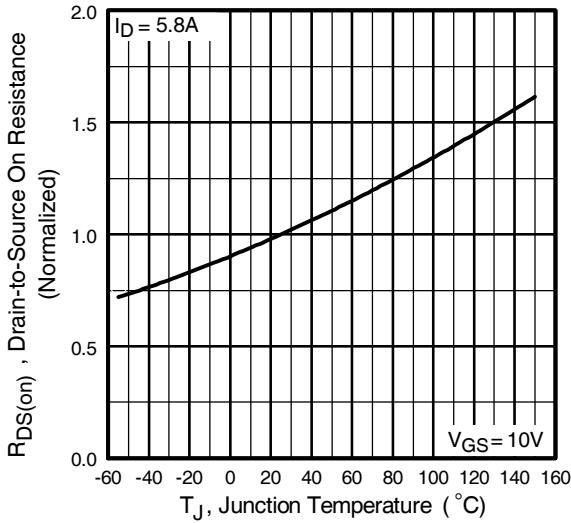
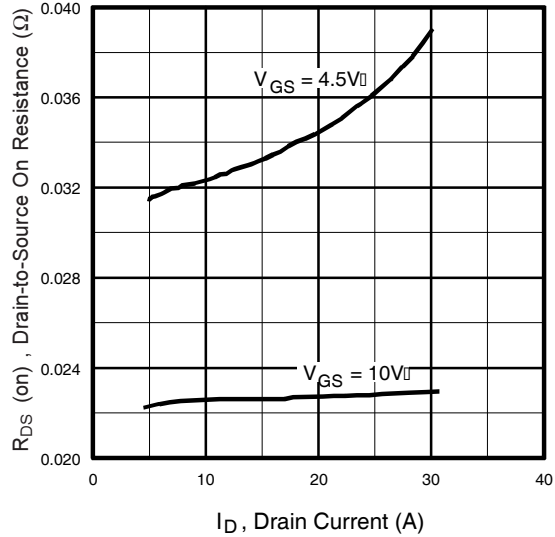
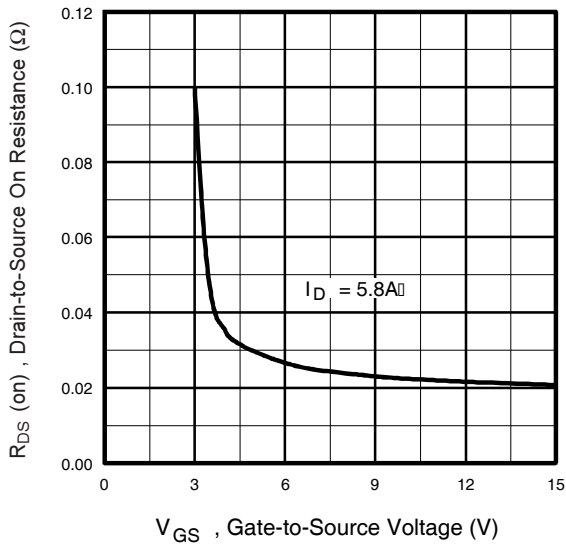
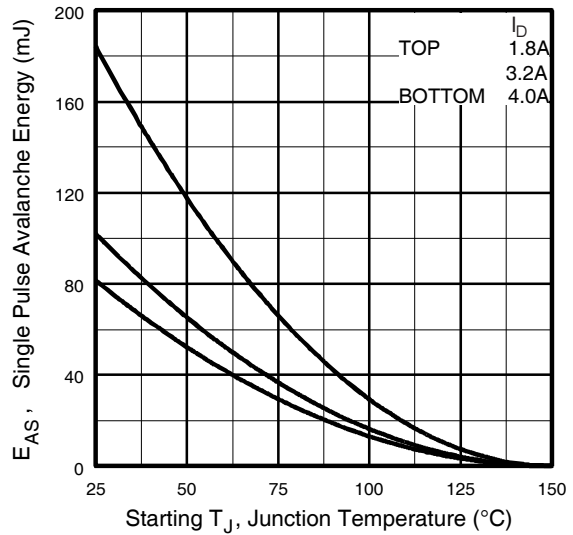
Source-Drain Ratings and Characteristics

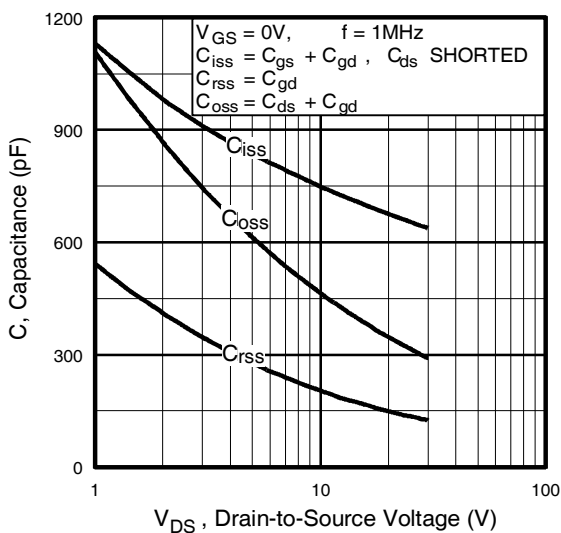
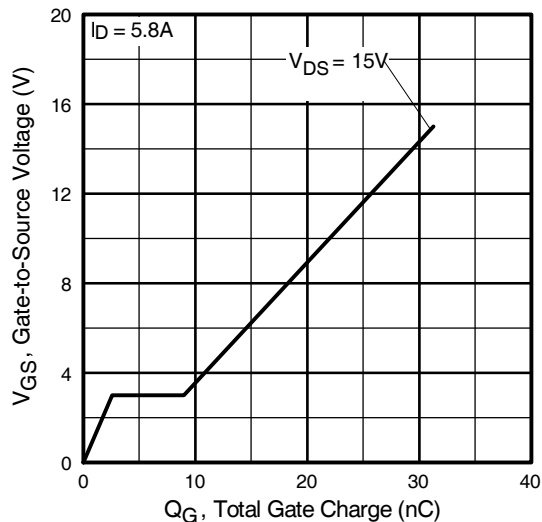
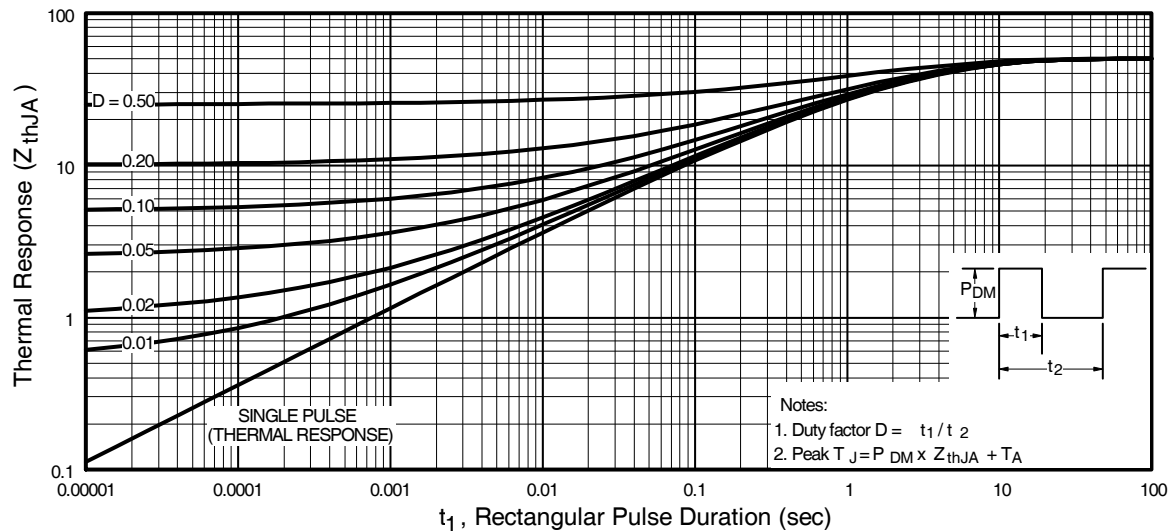
| Parameter | Parameter | Min. | Typ. | Max. | Units | Conditions |
|-----------------|----------------------------------------|------|-------|------|-------|-----------------------------------------------------------------------|
| I _S | Continuous Source Current (Body Diode) | — | — | 2.5 | A | |
| | | — | — | -2.5 | | |
| I _{SM} | Pulsed Source Current (Body Diode) ① | — | — | 30 | | |
| | | — | — | -30 | | |
| V _{SD} | Diode Forward Voltage | — | 0.78 | 1.0 | V | T _J = 25°C, I _S = 1.7A, V _{GS} = 0V ③ |
| | | — | -0.78 | -1.0 | | T _J = 25°C, I _S = -1.7A, V _{GS} = 0V ③ |
| t _{rr} | Reverse Recovery Time | — | 45 | 68 | ns | N-Channel |
| | | — | 44 | 66 | | T _J = 25°C, I _F = 1.7A, di/dt = 100A/μs ④ |
| Q _{rr} | Reverse Recovery Charge | — | 58 | 87 | nC | P-Channel |
| | | — | 42 | 63 | | T _J = 25°C, I _F = -1.7A, di/dt = 100A/μs ④ |

Notes:

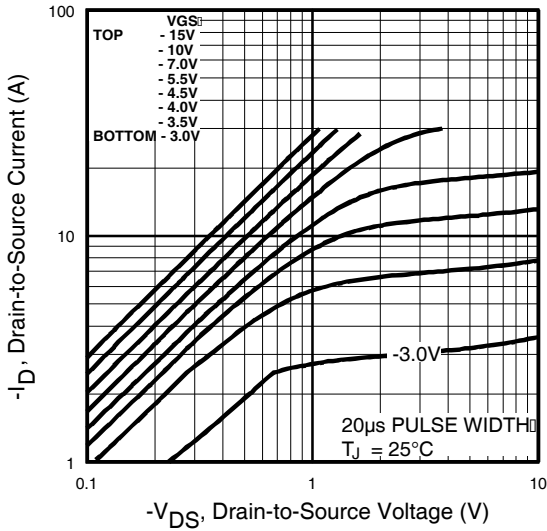
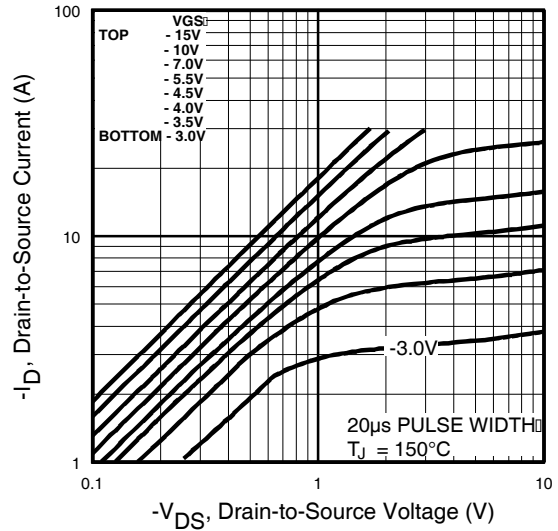
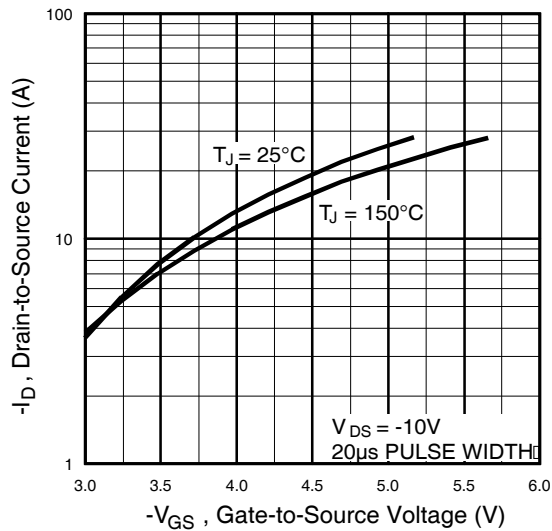
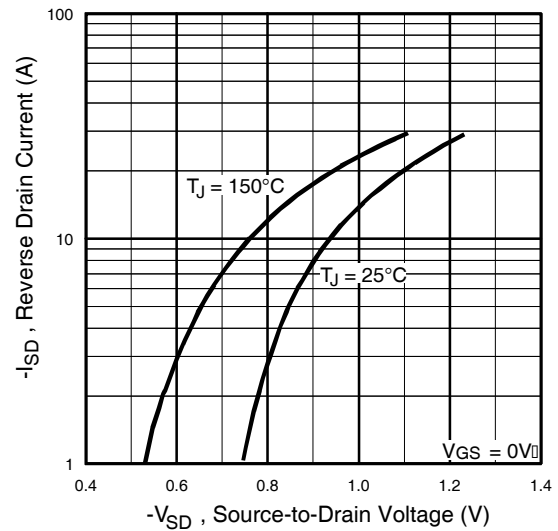
- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 22)
- ② N-Channel I_{SD} ≤ 4.0A, di/dt ≤ 74A/μs, V_{DD} ≤ V_{(BR)DSS}, T_J ≤ 150°C
P-Channel I_{SD} ≤ -2.8A, di/dt ≤ 150A/μs, V_{DD} ≤ V_{(BR)DSS}, T_J ≤ 150°C
- ③ N-Channel Starting T_J = 25°C, L = 10mH R_G = 25Ω, I_{AS} = 4.0A. (See Figure 12)
P-Channel Starting T_J = 25°C, L = 35mH R_G = 25Ω, I_{AS} = -2.8A.
- ④ Pulse width ≤ 300μs; duty cycle ≤ 2%.
- ⑤ Surface mounted on FR-4 board, t ≤ 10sec.

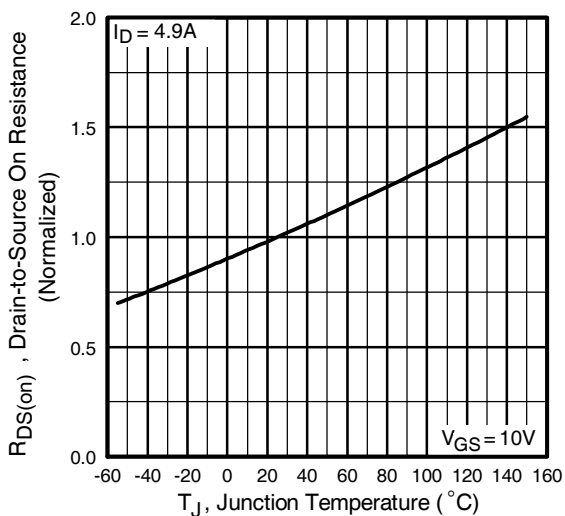
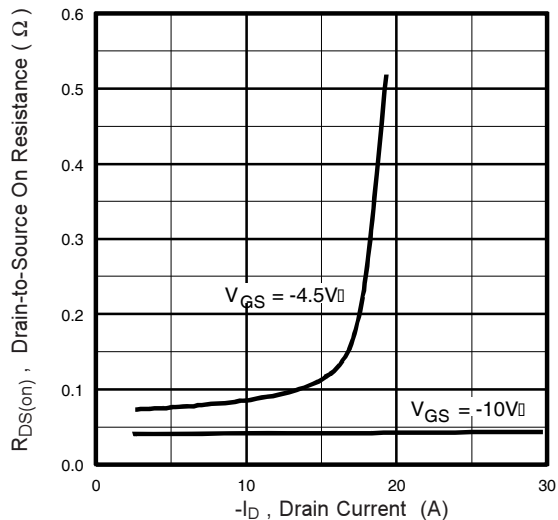
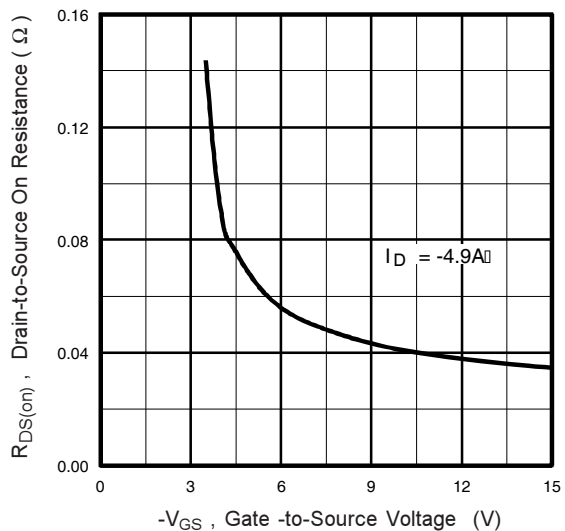
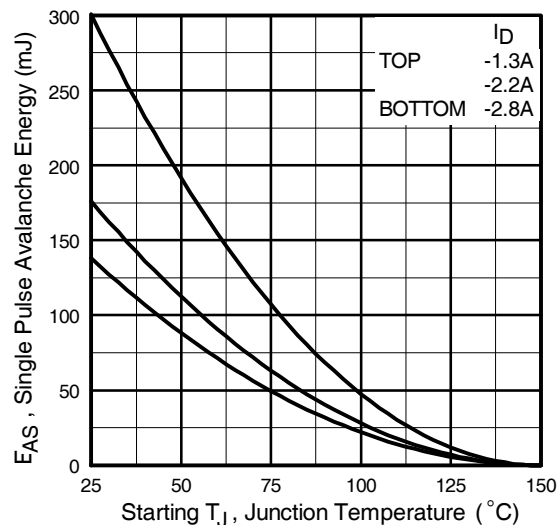
N-Channel

Fig 1. Typical Output Characteristics

Fig 2. Typical Output Characteristics

Fig 3. Typical Transfer Characteristics

Fig 4. Typical Source-Drain Diode Forward Voltage

N-Channel

Fig 5. Normalized On-Resistance Vs. Temperature

Fig 6. Typical On-Resistance Vs. Drain Current

Fig 7. Typical On-Resistance Vs. Gate Voltage

Fig 8. Maximum Avalanche Energy Vs. Drain Current

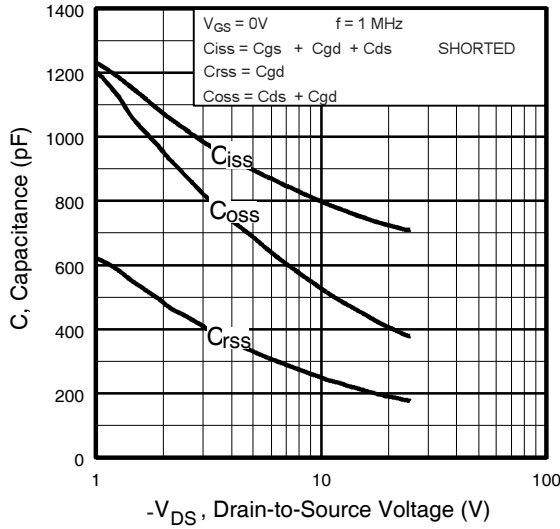
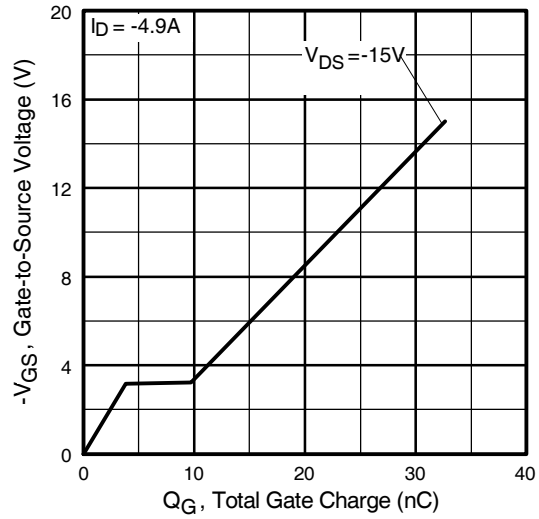
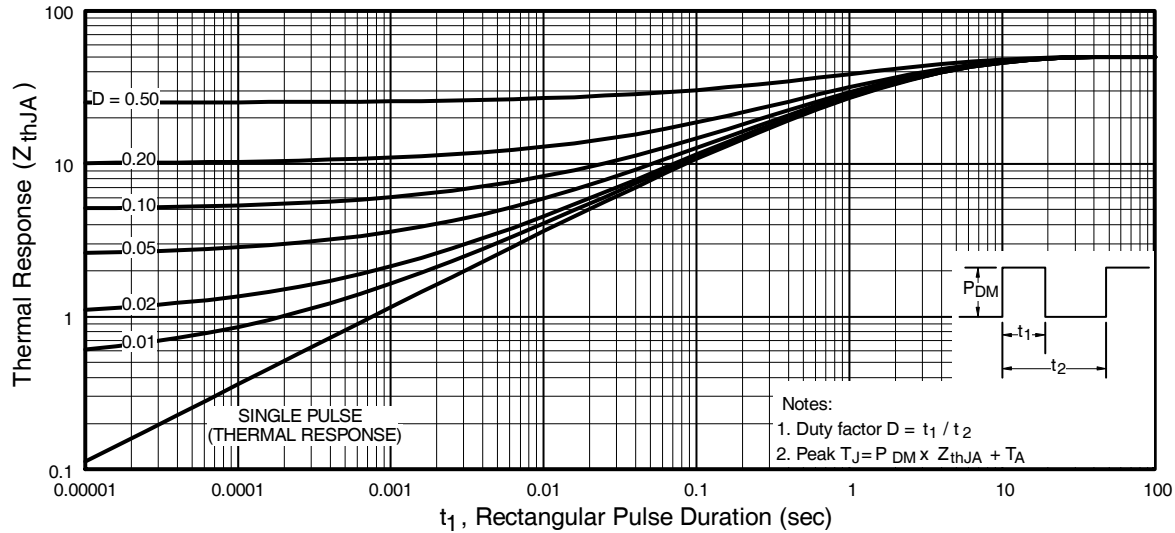
N-Channel

Fig 9. Typical Capacitance Vs. Drain-to-Source Voltage

Fig 10. Typical Gate Charge Vs. Gate-to-Source Voltage

Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

P-Channel


Fig 12. Typical Output Characteristics

Fig 13. Typical Output Characteristics

Fig 14. Typical Transfer Characteristics

Fig 15. Typical Source-Drain Diode Forward Voltage

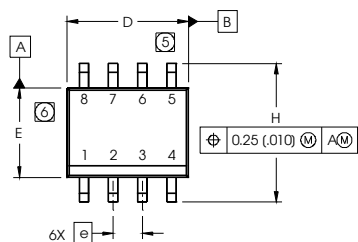
P-Channel

Fig 16. Normalized On-Resistance Vs. Temperature

Fig 17. Typical On-Resistance Vs. Drain Current

Fig 18. Typical On-Resistance Vs. Gate Voltage

Fig 19. Maximum Avalanche Energy Vs. Drain Current

P-Channel

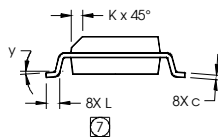
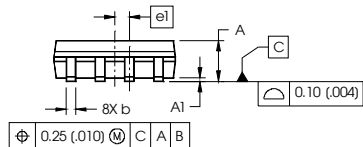

Fig 20. Typical Capacitance Vs. Drain-to-Source Voltage

Fig 21. Typical Gate Charge Vs. Gate-to-Source Voltage

Fig 22. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

SO-8 Package Outline

Dimensions are shown in millimeters (inches)



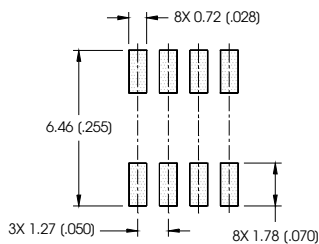
| DIM | INCHES | | MILLIMETERS | |
|-----|------------|-------|-------------|------|
| | MIN | MAX | MIN | MAX |
| A | .0532 | .0688 | 1.35 | 1.75 |
| A1 | .0040 | .0098 | 0.10 | 0.25 |
| b | .013 | .020 | 0.33 | 0.51 |
| c | .0075 | .0098 | 0.19 | 0.25 |
| D | .189 | .1968 | 4.80 | 5.00 |
| E | .1497 | .1574 | 3.80 | 4.00 |
| e | .050 BASIC | | 1.27 BASIC | |
| e1 | .025 BASIC | | 0.635 BASIC | |
| H | .2284 | .2440 | 5.80 | 6.20 |
| K | .0099 | .0196 | 0.25 | 0.50 |
| L | .016 | .050 | 0.40 | 1.27 |
| y | 0° | 8° | 0° | 8° |



NOTES:

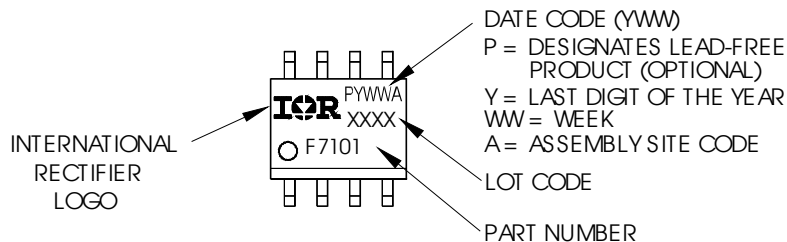
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
- ⑤ DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 (.006).
- ⑥ DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 (.010).
- ⑦ DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.

FOOTPRINT



SO-8 Part Marking Information (Lead-Free)

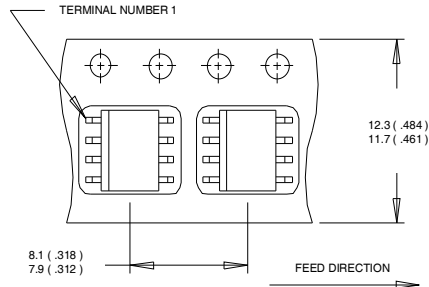
EXAMPLE: THIS IS AN IRF7101 (MOSFET)



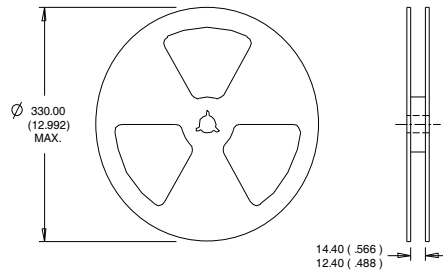
Note: For the most current drawing please refer to IR website at <http://www.irf.com/package/>

SO-8 Tape and Reel

Dimensions are shown in millimeters (inches)



- NOTES:
1. CONTROLLING DIMENSION : MILLIMETER.
 2. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS(INCHES).
 3. OUTLINE CONFORMS TO EIA-481 & EIA-541.



- NOTES:
1. CONTROLLING DIMENSION : MILLIMETER.
 2. OUTLINE CONFORMS TO EIA-481 & EIA-541.

Note: For the most current drawing please refer to IR website at <http://www.irf.com/package/>

Qualification information[†]

| | | |
|----------------------------|------------------------------------------------------------|-----------------------------------------------|
| Qualification level | Industriid (per JEDEC JESD47F ^{††} guidelines) | |
| Moisture Sensitivity Level | SO-8 | MSL1 (per JEDEC J-STD-020D ^{††}) |
| RoHS compliant | Yes | |

[†] Qualification standards can be found at International Rectifier's web site: <http://www.irf.com/product-info/reliability>

^{††} Applicable version of JEDEC standard at the time of product release