

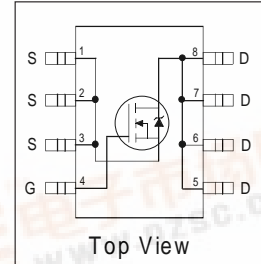
International
IR Rectifier

PD - 93810
PD - 93811
IRF7809A/IRF7811A

PROVISIONAL DATASHEET

- N-Channel Application-Specific MOSFETs
- Ideal for CPU Core DC-DC Converters
- Low Conduction Losses
- Low Switching Losses
- Minimizes Parallel MOSFETs for high current applications

HEXFET® Chipset for DC-DC Converters



Description

These new devices employ advanced HEXFET® Power MOSFET technology to achieve an unprecedented balance of on-resistance and gate charge. The reduced conduction and switching losses make them ideal for high efficiency DC-DC converters that power the latest generation of microprocessors.

Both the IRF7809A and IRF7811A have been optimized and are 100% tested for all parameters that are critical in synchronous buck converters including $R_{DS(on)}$, gate charge and Cdv/dt-induced turn-on immunity. The IRF7809A offers particularly low $R_{DS(on)}$ and high Cdv/dt immunity for synchronous FET applications. The IRF7811A offers an extremely low combination of Q_{sw} & $R_{DS(on)}$ for reduced losses in control FET applications.

The package is designed for vapor phase, infra-red, convection, or wave soldering techniques. Power dissipation of greater than 2W is possible in a typical PCB mount application.

DEVICE RATINGS

| | IRF7809A | IRF7811A |
|--------------|----------|----------|
| V_{DS} | 30V | 28V |
| $R_{DS(on)}$ | 8.5 mΩ | 12 mΩ |
| Q_G | 73 nC | 23 nC |
| Q_{sw} | 22.5 nC | 7 nC |
| Q_{oss} | 30 nC | 31 nC |

Absolute Maximum Ratings

| Parameter | Symbol | IRF7809A | IRF7811A | Units |
|---|--|------------|----------|-------|
| Drain-Source Voltage | V_{DS} | 30 | 28 | V |
| Gate-Source Voltage | V_{GS} | ±12 | | |
| Continuous Drain or Source Current ($V_{GS} \geq 4.5V$) | I_D | 14.5 | 11.4 | A |
| | $T_A = 25^\circ C$ $T_L = 90^\circ C$ | 14.2 | 11.2 | |
| Pulsed Drain Current① | I_{DM} | 100 | 100 | |
| Power Dissipation | P_D | 2.5 | | W |
| | $T_A = 25^\circ C$ $T_L = 90^\circ C$ | 2.4 | | |
| Junction & Storage Temperature Range | T_J, T_{STG} | -55 to 150 | | °C |
| Continuous Source Current (Body Diode) | I_S | 2.5 | 2.5 | A |
| Pulsed Source Current① | I_{SM} | 50 | 50 | |

Thermal Resistance

| Parameter | Symbol | Max. | Units |
|------------------------------|-----------------|------|-------|
| Maximum Junction-to-Ambient③ | $R_{\theta JA}$ | 50 | °C/W |
| Maximum Junction-to-Lead | $R_{\theta JL}$ | 25 | °C/W |



IRF7809A/IRF7811A

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| Electrical Characteristics | | IRF7809A | | | IRF7811A | | | Units | Conditions |
|------------------------------------|--------------|----------|------|-----------|----------|------|-----------|------------|--|
| Parameter | | Min | Typ | Max | Min | Typ | Max | | |
| Drain-to-Source Breakdown Voltage* | V_{DS} | 30 | - | - | 28 | - | - | V | $V_{GS} = 0V, I_D = 250\mu A$ |
| Static Drain-Source on Resistance* | $R_{DS(on)}$ | | 7 | 8.5 | | 10 | 12 | m Ω | $V_{GS} = 4.5V, I_D = 15A$ ② |
| Gate Threshold Voltage* | $V_{GS(th)}$ | 1.0 | | | 1.0 | | | V | $V_{DS} = V_{GS}, I_D = 250\mu A$ |
| Drain-Source Leakage Current* | I_{DSS} | | | 30 | | | 30 | μA | $V_{DS} = 24V, V_{GS} = 0$ |
| | | | | 150 | | | 150 | | $V_{DS} = 24V, V_{GS} = 0,$ $T_j = 100^\circ C$ |
| Gate-Source Leakage Current* | I_{GSS} | | | ± 100 | | | ± 100 | nA | $V_{GS} = \pm 12V$ |
| Total Gate Chg Cont FET* | Q_G | | 61 | 75 | | 19 | 23 | nC | $V_{GS} = 5V, I_D = 15A, V_{DS} = 16V$ |
| Total Gate Chg Sync FET* | Q_G | | 55 | 73 | | 17 | 20.5 | | $V_{GS} = 5V, V_{DS} < 100mV$ |
| Pre-Vth Gate-Source Charge | Q_{GS1} | | 14 | | | 2.7 | | | $V_{DS} = 16V, I_D = 15A$ |
| Post-Vth Gate-Source Charge | Q_{GS2} | | 3.5 | | | 1.3 | | | |
| Gate to Drain Charge | Q_{GD} | | 13.5 | | | 4.5 | | | |
| Switch Chg($Q_{GS2} + Q_{GD}$)* | Q_{sw} | | 17 | 22.5 | | 5.8 | 7.0 | | |
| Output Charge* | Q_{oss} | | 25 | 30 | | 26 | 31 | | $V_{DS} = 16V, V_{GS} = 0$ |
| Gate Resistance | R_G | | 1.1 | | | 1.8 | | Ω | |
| Turn-on Delay Time | $t_{d(on)}$ | | 19 | | | 8 | | ns | $V_{DD} = 16V, I_D = 15A$ $V_{GS} = 5V$ Clamped Inductive Load |
| Rise Time | t_r | | 9 | | | 4 | | | |
| Turn-off Delay Time | $t_{d(off)}$ | | 32 | | | 16 | | | |
| Fall Time | t_f | | 12 | | | 8 | | | |
| Input Capacitance | C_{iss} | - | 7300 | - | - | 1800 | - | pF | $V_{DS} = 16V, V_{GS} = 0$ |
| Output Capacitance | C_{oss} | - | 900 | - | - | 900 | - | | |
| Reverse Transfer Capacitance | C_{rss} | - | 350 | - | - | 60 | - | | |

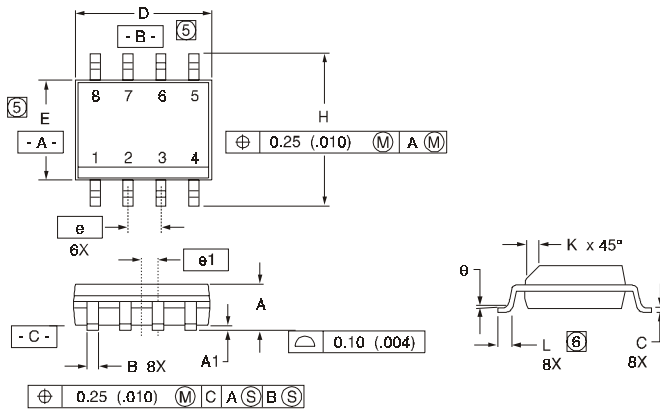
Source-Drain Rating & Characteristics

| Parameter | | Min | Typ | Max | Min | Typ | Max | Units | Conditions |
|---|-------------|-----|-----|-----|-----|-----|-----|-------|--|
| Diode Forward Voltage* | V_{SD} | | | 1.0 | | | 1.0 | V | $I_S = 15A$ ②, $V_{GS} = 0V$ |
| Reverse Recovery Charge④ | Q_{rr} | | 94 | | | 82 | | nC | $di/dt \sim 700A/\mu s$ $V_{DS} = 16V, V_{GS} = 0V, I_S = 15A$ |
| Reverse Recovery Charge (with Parallel Schottky)④ | $Q_{rr(s)}$ | | 87 | | | 74 | | | $di/dt = 700A/\mu s$ (with 10BQ040) $V_{DS} = 16V, V_{GS} = 0V, I_S = 15A$ |

Notes:

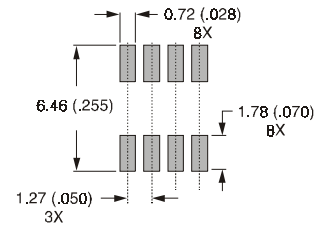
- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Pulse width $\leq 300 \mu s$; duty cycle $\leq 2\%$.
- ③ When mounted on 1 inch square copper board, $t < 10$ sec.
- ④ Typ = measured - Q_{oss}
- * Devices are 100% tested to these parameters.

SO-8 Package Outline



| DIM | INCHES | | MILLIMETERS | |
|----------|------------|-------|-------------|------|
| | MIN | MAX | MIN | MAX |
| A | .0532 | .0688 | 1.35 | 1.75 |
| A1 | .0040 | .0098 | 0.10 | 0.25 |
| B | .014 | .018 | 0.36 | 0.46 |
| C | .0075 | .0098 | 0.19 | 0.25 |
| D | .189 | .196 | 4.80 | 4.98 |
| E | .150 | .157 | 3.81 | 3.99 |
| e | .050 BASIC | | 1.27 BASIC | |
| e1 | .025 BASIC | | 0.635 BASIC | |
| H | .2284 | .2440 | 5.80 | 6.20 |
| K | .011 | .019 | 0.28 | 0.48 |
| L | .16 | .050 | 0.41 | 1.27 |
| θ | 0° | 8° | 0° | 8° |

RECOMMENDED FOOTPRINT

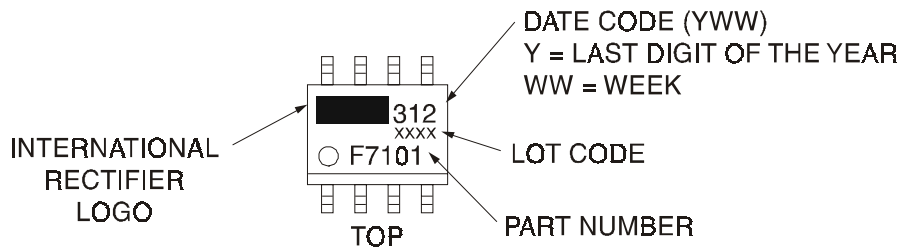


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1982.
2. CONTROLLING DIMENSION: INCH.
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 0.25 (.006).
- ⑥ DIMENSIONS IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE..

Part Marking Information

EXAMPLE: THIS IS AN IRF7101

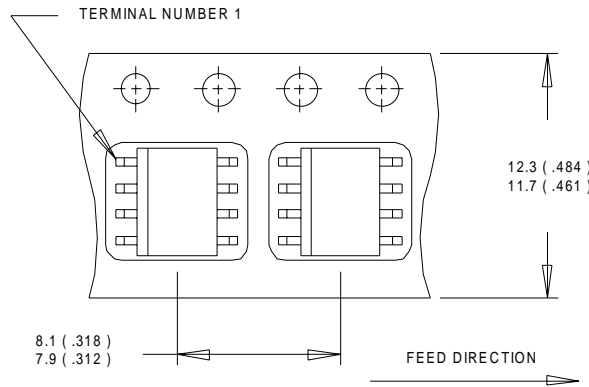


IRF7809A/IRF7811A

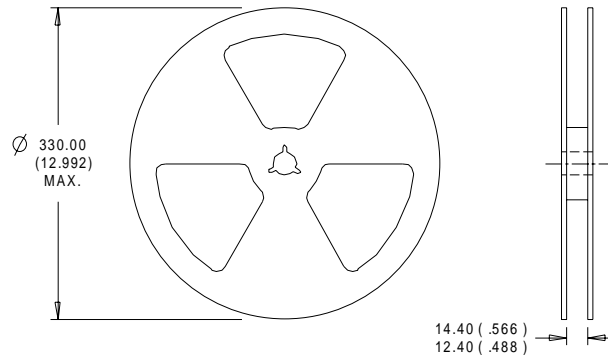
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SO-8 Tape & Reel Information

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.

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<http://www.irf.com/> Data and specifications subject to change without notice. 1/00