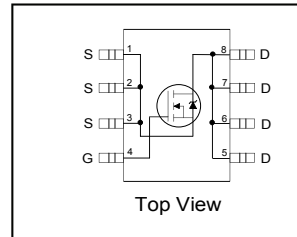


**HEXFET® Chip-Set for DC-DC Converters**

- N Channel Application Specific MOSFETs
- Ideal for Mobile DC-DC Converters
- Low Conduction Losses
- Low Switching Losses
- Lead-Free


**Description**

This new device employs advanced HEXFET Power MOSFET technology to achieve an unprecedented balance of on-resistance and gate charge. The reduced conduction and switching losses make this device ideal for high efficiency DC-DC Converters that power the latest generation of mobile microprocessors.

The IRF7805PbF offers maximum efficiency for mobile CPU core DC-DC converters.

**Devices Features**

|                           | <b>IRF7805PbF</b> |
|---------------------------|-------------------|
| <b>V<sub>DS</sub></b>     | <b>30V</b>        |
| <b>R<sub>DS(on)</sub></b> | <b>11mΩ</b>       |
| <b>Q<sub>g</sub></b>      | <b>31nC</b>       |
| <b>Q<sub>sw</sub></b>     | <b>11.5nC</b>     |
| <b>Q<sub>oss</sub></b>    | <b>36nC</b>       |

| <b>G</b> | <b>D</b> | <b>S</b> |
|----------|----------|----------|
| Gate     | Drain    | Source   |

| Base part number | Package Type | Standard Pack |          | Orderable Part Number |
|------------------|--------------|---------------|----------|-----------------------|
|                  |              | Form          | Quantity |                       |
| IRF7805PbF       | SO-8         | Tape and Reel | 4000     | IRF7805PbF            |

| Symbol                                 | Parameter   | Max.         | Units |
|--|---|--------------|-------|
| V <sub>DS</sub>                        | Drain-Source Voltage                                | 30           | V     |
| V <sub>GS</sub>                        | Gate-to-Source Voltage                              | ± 12         |       |
| I <sub>D</sub> @ T <sub>A</sub> = 25°C | Continuous Drain Current, V <sub>GS</sub> @ 10V ③   | 13           | A     |
| I <sub>D</sub> @ T <sub>A</sub> = 70°C | Continuous Drain Current, V <sub>GS</sub> @ 10V ③   | 10           |       |
| I <sub>DM</sub>                        | Pulsed Drain Current ①                              | 100          |       |
| P <sub>D</sub> @ T <sub>A</sub> = 25°C | Maximum Power Dissipation ③                         | 2.5          | W     |
| P <sub>D</sub> @ T <sub>A</sub> = 70°C | Maximum Power Dissipation ③                         | 1.6          |       |
|  | Linear Derating Factor                              | 0.02         | W/°C  |
| T <sub>J</sub><br>T <sub>STG</sub>     | Operating Junction and<br>Storage Temperature Range | -55 to + 150 | °C    |

**Thermal Resistance**

| Symbol           | Parameter                | Typ. | Max. | Units |
|------------------|--------------------------|------|------|-------|
| R <sub>θJL</sub> | Junction-to-Drain Lead ⑤ | —    | 20   | °C/W  |
| R <sub>θJA</sub> | Junction-to-Ambient ③    | —    | 50   |       |

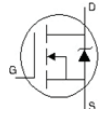
**Static @  $T_J = 25^\circ\text{C}$  (unless otherwise specified)**

|               | Parameter                              | Min. | Typ. | Max. | Units      | Conditions   |
|---------------|--|------|------|------|------------|--|
| $V_{(BR)DSS}$ | Drain-to-Source Breakdown Voltage ⑥    | 30   | —    | —    | V          | $V_{GS} = 0V, I_D = 250\mu A$                        |
| $R_{DS(on)}$  | Static Drain-to-Source On-Resistance ⑥ | —    | 9.2  | 11   | m $\Omega$ | $V_{GS} = 4.5V, I_D = 7.0A$ ②                        |
| $V_{GS(th)}$  | Gate Threshold Voltage ⑥               | 1.0  | —    | 3.0  | V          | $V_{DS} = V_{GS}, I_D = 250\mu A$                    |
| $I_{DSS}$     | Drain-to-Source Leakage Current        | —    | —    | 70   | $\mu A$    | $V_{DS} = 30V, V_{GS} = 0V$                          |
|               |  | —    | —    | 10   |            | $V_{DS} = 24V, V_{GS} = 0V$                          |
|               |  | —    | —    | 150  |            | $V_{DS} = 24V, V_{GS} = 0V, T_J = 100^\circ\text{C}$ |
| $I_{GSS}$     | Gate-to-Source Forward Leakage         | —    | —    | 100  | nA         | $V_{GS} = 12V$                                       |
|               | Gate-to-Source Reverse Leakage         | —    | —    | -100 |            | $V_{GS} = -12V$                                      |

**Dynamic Electrical Characteristics @  $T_J = 25^\circ\text{C}$  (unless otherwise specified)**

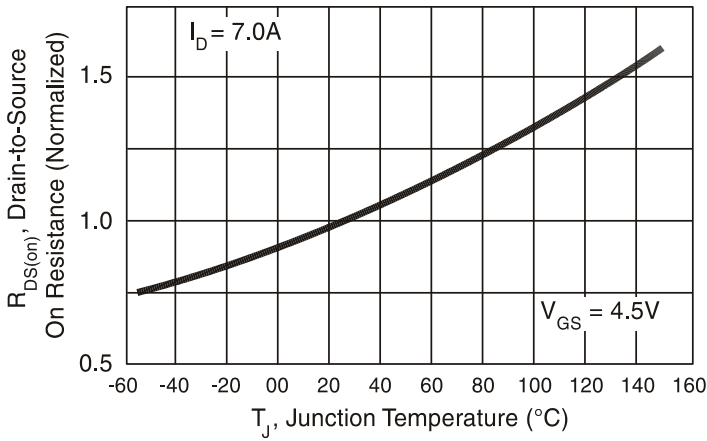
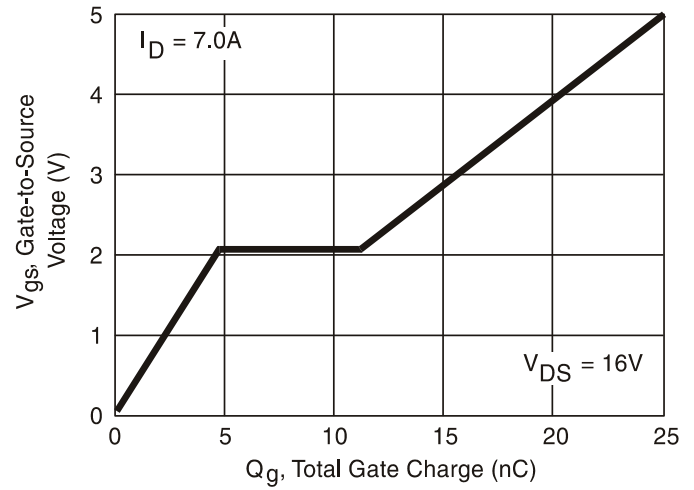
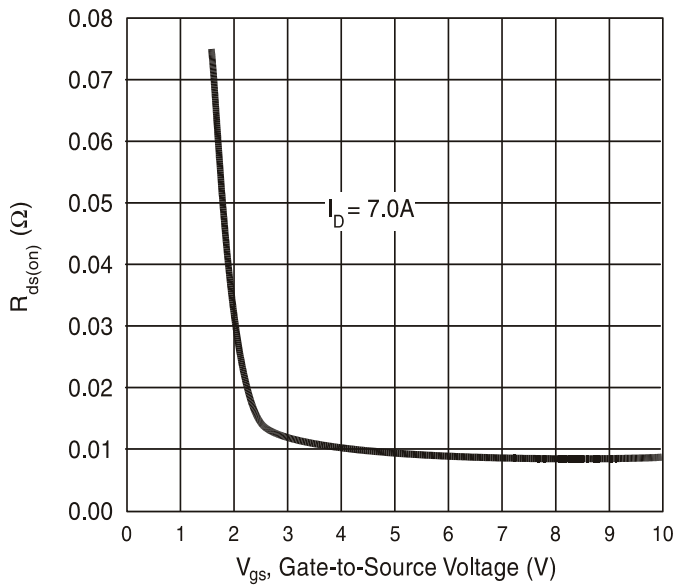
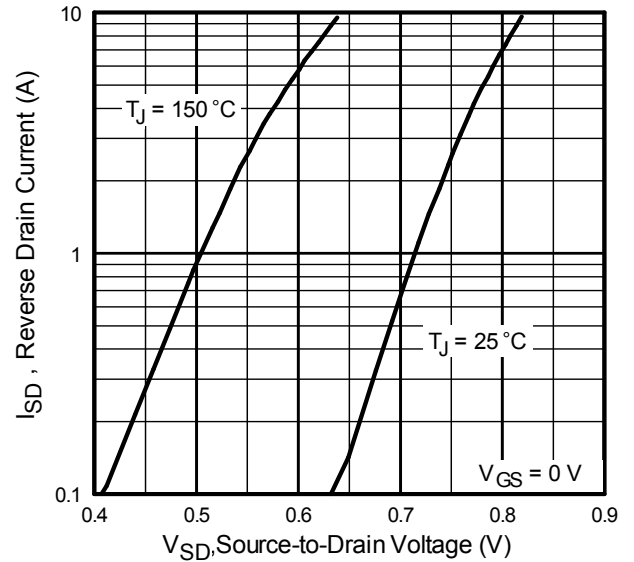
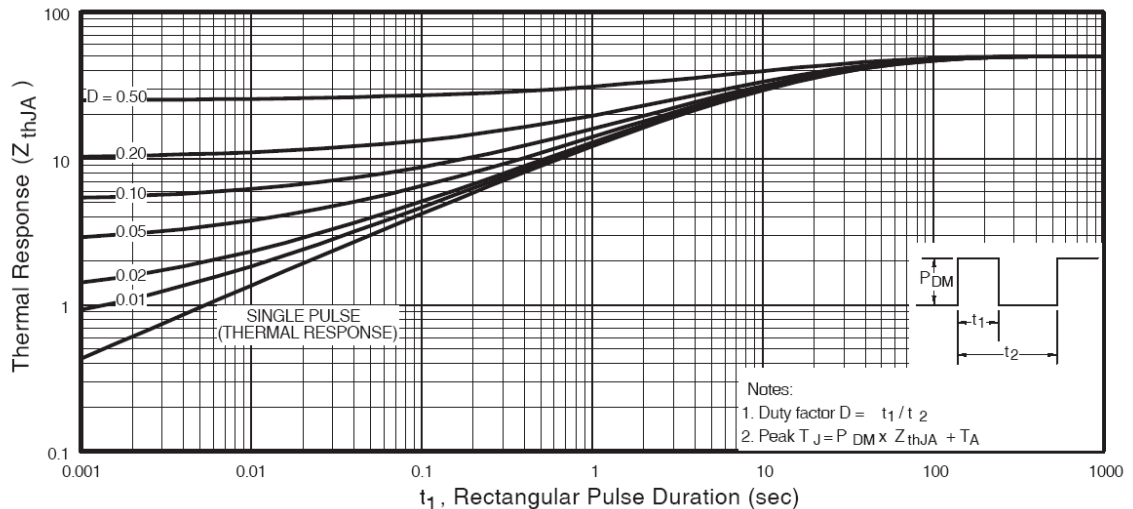
|              |  |     |     |      |          |  |
|--------------|--|-----|-----|------|----------|--|
| $Q_g$        | Total Gate Charge ⑥                    | —   | 22  | 31   | nC       | $V_{GS} = 5.0V$<br>$V_{DS} = 16V$<br>$I_D = 7.0A$                                    |
| $Q_{gs1}$    | Pre -Vth Gate-to-Source Charge         | —   | 3.7 | —    |          |  |
| $Q_{gs2}$    | Post-Vth Gate-to-Source Charge         | —   | 1.4 | —    |          |  |
| $Q_{gd}$     | Gate-to-Drain Charge                   | —   | 6.8 | —    |          |  |
| $Q_{sw}$     | Switch Charge ( $Q_{gs2} + Q_{gd}$ ) ⑥ | —   | 8.2 | 11.5 |          |  |
| $Q_{oss}$    | Output Charge ⑥                        | —   | 30  | 36   | nC       | $V_{DS} = 16V, V_{GS} = 0V$  |
| $R_G$        | Gate Resistance                        | 0.5 | —   | 1.7  | $\Omega$ |  |
| $t_{d(on)}$  | Turn-On Delay Time                     | —   | 16  | —    | ns       | $V_{DD} = 16V, V_{GS} = 4.5V$ ②<br>$I_D = 7.0A$<br>$R_G = 2\Omega$<br>Resistive Load |
| $t_r$        | Rise Time                              | —   | 20  | —    |          |  |
| $t_{d(off)}$ | Turn-Off Delay Time                    | —   | 38  | —    |          |  |
| $t_f$        | Fall Time                              | —   | 16  | —    |          |  |

**Diode Characteristics**

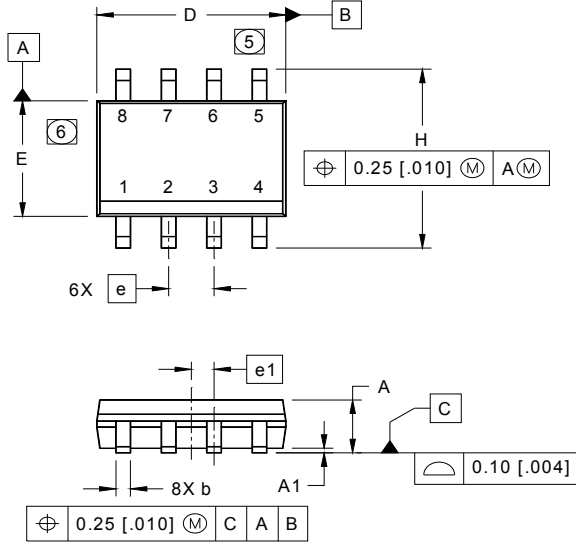
|          | Parameter                                | Min. | Typ. | Max. | Units | Conditions  |
|----------|--|------|------|------|-------|---|
| $I_S$    | Continuous Source Current (Body Diode) ① | —    | —    | 2.5  | A     | MOSFET symbol showing the integral reverse p-n junction diode.  |
| $I_{SM}$ | Pulsed Source Current (Body Diode)       | —    | —    | 106  |       |   |
| $V_{SD}$ | Diode Forward Voltage ⑥                  | —    | —    | 1.2  | V     | $T_J = 25^\circ\text{C}, I_S = 7.0A, V_{GS} = 0V$   |
| $Q_{rr}$ | Reverse Recovery Charge ④                | —    | 88   | —    | nC    | $di/dt = 700A/\mu s$<br>$V_{DS} = 16V, V_{GS} = 0V, I_S = 7.0A$   |
| $Q_{rr}$ | Reverse Recovery Charge ④                | —    | 55   | —    |       | $di/dt = 700A/\mu s$ (with 10BQ040)<br>$V_{DS} = 16V, V_{GS} = 0V, I_S = 7.0A$  |

**Notes:**

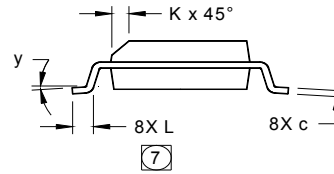
- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$ .
- ③ When mounted on 1" in square copper board,  $t < 10$  sec.
- ④ Typ = measured -  $Q_{oss}$
- ⑤  $R_\theta$  is measured at  $T_J$  of approximately  $90^\circ\text{C}$ .
- ⑥ Devices are 100% tested to these parameters.


**Fig. 1** Normalized On-Resistance vs. Temperature

**Fig. 2** Typical Gate Charge vs. Gate-to-Source Voltage

**Fig. 3** Typical  $R_{ds(on)}$  vs. Gate-to-Source Voltage

**Fig. 4** Typical Source-Drain Diode Forward Voltage

**Fig. 5.** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

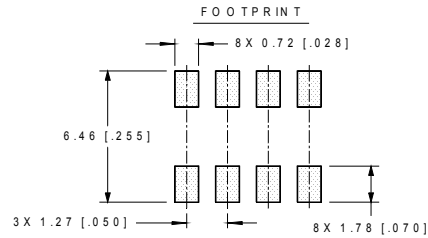
## SO-8 Package Outline (Dimensions are shown in millimeters (inches))



| 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  |      |
| e 1 | .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°   |

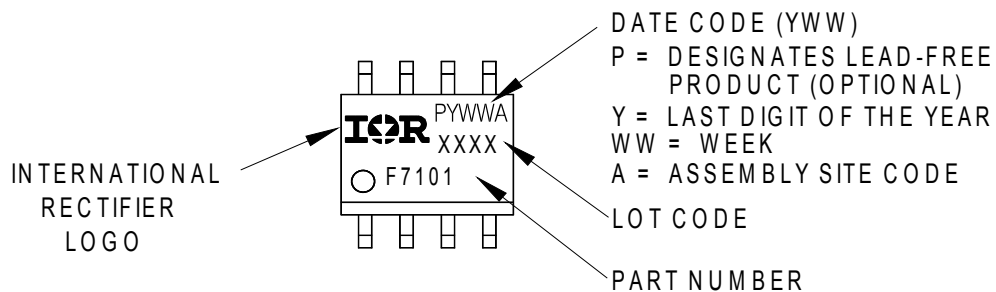


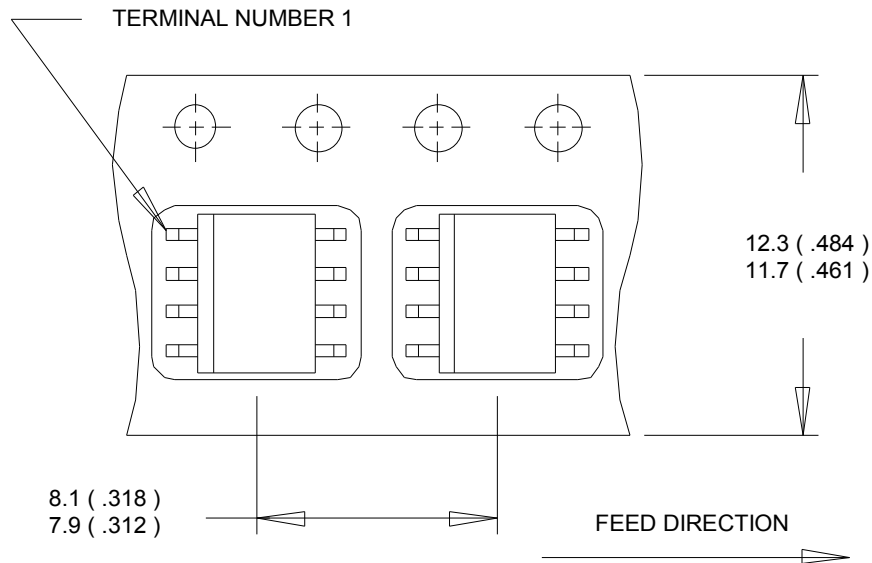
- NOTES:
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
  2. CONTROLLING DIMENSION: MILLIMETER
  3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
  4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
  5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 [0.006].
  6. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 [0.010].
  7. DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.



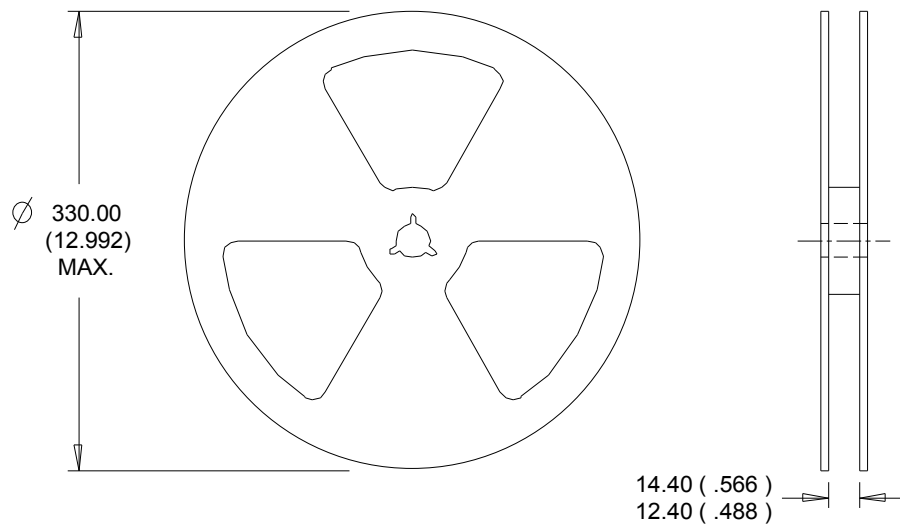
## SO-8 Part Marking Information

EXAMPLE: THIS IS AN IRF7101 (MOSFET)



**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.

**Qualification Information**

|                                   |          |                                 |
|-----------------------------------|----------|---------------------------------|
| <b>Qualification Level</b>        | Consumer |                                 |
| <b>Moisture Sensitivity Level</b> | SO-8     | MSL1<br>(per JEDEC J-STD-020D)† |
| <b>RoHS Compliant</b>             | Yes      |                                 |

† Applicable version of JEDEC standard at the time of product release.

**Revision History**

| Date       | Comments  |
|------------|---|
| 08/23/2016 | <ul style="list-style-type: none"> <li>Changed datasheet with Infineon logo - all pages.</li> <li>Corrected typo Qoss from typ/max "3.0nC/3.6nC" to "30nC/36nC" on page 2.</li> <li>Added disclaimer on last page.</li> </ul> |

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