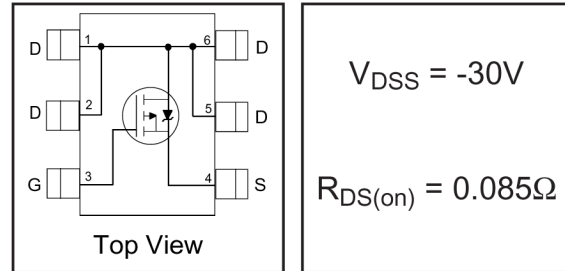


# IRF5800PbF

HEXFET® Power MOSFET

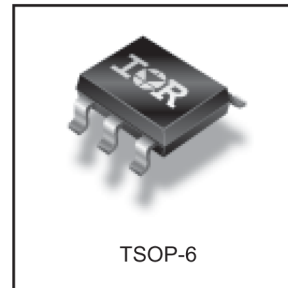
- Ultra Low On-Resistance
- P-Channel MOSFET
- Surface Mount
- Available in Tape & Reel
- Low Gate Charge
- Lead-Free



## Description

These P-channel MOSFETs from International Rectifier utilize advanced processing techniques to achieve the extremely low on-resistance per silicon area. This benefit provides the designer with an extremely efficient device for use in battery and load management applications.

The TSOP-6 package with its customized leadframe produces a HEXFET® power MOSFET with  $R_{DS(on)}$  60% less than a similar size SOT-23. This package is ideal for applications where printed circuit board space is at a premium. Its unique thermal design and  $R_{DS(on)}$  reduction enables a current-handling increase of nearly 300% compared to the SOT-23.



## Absolute Maximum Ratings

|                          | Parameter                                  | Max.         | Units |
|--------------------------|--------------------------------------------|--------------|-------|
| $V_{DS}$                 | Drain- Source Voltage                      | -30          | V     |
| $I_D @ T_A = 25^\circ C$ | Continuous Drain Current, $V_{GS} @ -4.5V$ | -4.0         | A     |
| $I_D @ T_A = 70^\circ C$ | Continuous Drain Current, $V_{GS} @ -4.5V$ | -3.2         |       |
| $I_{DM}$                 | Pulsed Drain Current ①                     | -32          |       |
| $P_D @ T_A = 25^\circ C$ | Power Dissipation                          | 2.0          | W     |
| $P_D @ T_A = 70^\circ C$ | Power Dissipation                          | 1.3          |       |
|                          | Linear Derating Factor                     | 0.016        | W/°C  |
| $E_{AS}$                 | Single Pulse Avalanche Energy④             | 20.6         | mJ    |
| $V_{GS}$                 | Gate-to-Source Voltage                     | $\pm 20$     | V     |
| $T_J, T_{STG}$           | Junction and Storage Temperature Range     | -55 to + 150 | °C    |

## Thermal Resistance

|                 | Parameter                    | Max. | Units |
|-----------------|------------------------------|------|-------|
| $R_{\theta JA}$ | Maximum Junction-to-Ambient③ | 62.5 | °C/W  |

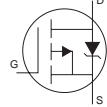
# IRF5800PbF

International  
 Rectifier

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

|                                 | Parameter                            | Min. | Typ. | Max.  | Units               | Conditions                                           |
|---------------------------------|--------------------------------------|------|------|-------|---------------------|------------------------------------------------------|
| $V_{(BR)DSS}$                   | Drain-to-Source Breakdown Voltage    | -30  | —    | —     | V                   | $V_{GS} = 0V, I_D = -250\mu A$                       |
| $\Delta V_{(BR)DSS}/\Delta T_J$ | Breakdown Voltage Temp. Coefficient  | —    | 0.02 | —     | V/ $^\circ\text{C}$ | Reference to $25^\circ\text{C}, I_D = 1\text{mA}$    |
| $R_{DS(on)}$                    | Static Drain-to-Source On-Resistance | —    | —    | 0.085 | $\Omega$            | $V_{GS} = -10V, I_D = -4.0A$ ②                       |
|                                 |                                      | —    | —    | 0.150 |                     | $V_{GS} = -4.5V, I_D = -3.0A$ ②                      |
| $V_{GS(th)}$                    | Gate Threshold Voltage               | -1.0 | —    | —     | V                   | $V_{DS} = V_{GS}, I_D = -250\mu A$                   |
| $g_{fs}$                        | Forward Transconductance             | 3.5  | —    | —     | S                   | $V_{DS} = -10V, I_D = -4.0A$                         |
| $I_{DSS}$                       | Drain-to-Source Leakage Current      | —    | —    | -1.0  | $\mu A$             | $V_{DS} = -24V, V_{GS} = 0V$                         |
|                                 |                                      | —    | —    | -5.0  |                     | $V_{DS} = -24V, V_{GS} = 0V, T_J = 70^\circ\text{C}$ |
| $I_{GSS}$                       | Gate-to-Source Forward Leakage       | —    | —    | -100  | nA                  | $V_{GS} = -20V$                                      |
|                                 | Gate-to-Source Reverse Leakage       | —    | —    | 100   |                     | $V_{GS} = 20V$                                       |
| $Q_g$                           | Total Gate Charge                    | —    | 11.4 | 17    | nC                  | $I_D = -4.0A$                                        |
| $Q_{gs}$                        | Gate-to-Source Charge                | —    | 2.3  | —     |                     | $V_{DS} = -16V$                                      |
| $Q_{gd}$                        | Gate-to-Drain ("Miller") Charge      | —    | 2.2  | —     |                     | $V_{GS} = -10V$ ②                                    |
| $t_{d(on)}$                     | Turn-On Delay Time                   | —    | 11.4 | 17    | ns                  | $V_{DD} = -15V, V_{GS} = -10V$                       |
| $t_r$                           | Rise Time                            | —    | 11   | 17    |                     | $I_D = -1.0A$                                        |
| $t_{d(off)}$                    | Turn-Off Delay Time                  | —    | 24   | 36    |                     | $R_G = 6.0\Omega$                                    |
| $t_f$                           | Fall Time                            | —    | 14   | 20    |                     | $R_D = 15\Omega,$ ②                                  |
| $C_{iss}$                       | Input Capacitance                    | —    | 535  | —     | pF                  | $V_{GS} = 0V$                                        |
| $C_{oss}$                       | Output Capacitance                   | —    | 94   | —     |                     | $V_{DS} = -25V$                                      |
| $C_{rss}$                       | Reverse Transfer Capacitance         | —    | 68   | —     |                     | $f = 1.0\text{MHz}$                                  |

## Source-Drain Ratings and Characteristics

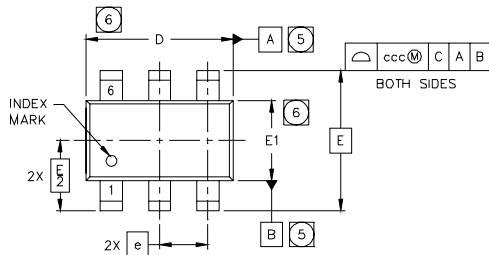
|          | Parameter                              | Min. | Typ. | Max. | Units | Conditions                                                                                                                                           |
|----------|----------------------------------------|------|------|------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| $I_S$    | Continuous Source Current (Body Diode) | —    | —    | -2.0 | A     | MOSFET symbol showing the integral reverse p-n junction diode.  |
| $I_{SM}$ | Pulsed Source Current (Body Diode) ①   | —    | —    | -32  |       |                                                                                                                                                      |
| $V_{SD}$ | Diode Forward Voltage                  | —    | —    | -1.2 | V     | $T_J = 25^\circ\text{C}, I_S = -2.0A, V_{GS} = 0V$ ②                                                                                                 |
| $t_{rr}$ | Reverse Recovery Time                  | —    | 19   | 28   | ns    | $T_J = 25^\circ\text{C}, I_F = -2.0A$                                                                                                                |
| $Q_{rr}$ | Reverse Recovery Charge                | —    | 16   | 24   | nC    | $di/dt = -100A/\mu s$ ②                                                                                                                              |

### Notes:

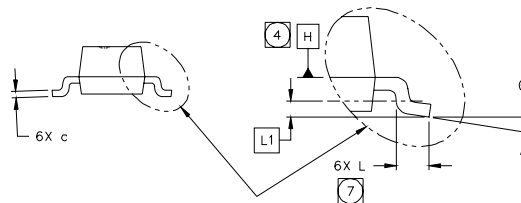
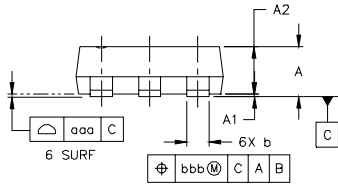
- ① Repetitive rating; pulse width limited by max. junction temperature.  
 ② Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$ .

- ③ Surface mounted on FR-4 board,  $t \leq 5\text{sec}$ .  
 ④ Starting  $T_J = 25^\circ\text{C}, L = 2.5\text{mH}$   
 $R_G = 25\Omega, I_{AS} = -4.0A$ . (See Fig 10)

## TSOP-6 Package Outline

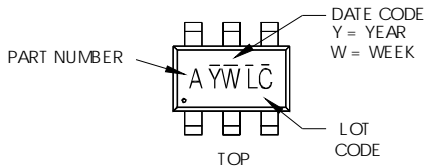


| SYMBOL | MO-193AA DIMENSIONS |      |      |           |       |       |
|--------|---------------------|------|------|-----------|-------|-------|
|        | MILLIMETERS         |      |      | INCHES    |       |       |
|        | MIN                 | NOM  | MAX  | MIN       | NOM   | MAX   |
| A      | ---                 | ---  | 1.10 | ---       | ---   | .0433 |
| A1     | 0.01                | ---  | 0.10 | .0004     | ---   | .0039 |
| A2     | 0.80                | 0.90 | 1.00 | .0315     | .0354 | .0393 |
| b      | 0.25                | ---  | 0.50 | .0099     | ---   | .0196 |
| c      | 0.10                | ---  | 0.26 | .004      | ---   | .010  |
| D      | 2.90                | 3.00 | 3.10 | .115      | .118  | .122  |
| E      | 2.75 BSC            |      |      | .108 BSC  |       |       |
| E1     | 1.30                | 1.50 | 1.70 | .052      | .059  | .066  |
| e      | 1.00 BSC            |      |      | .039 BSC  |       |       |
| L      | 0.20                | 0.40 | 0.60 | .0079     | .0157 | .0236 |
| L1     | 0.30 BSC            |      |      | .0118 BSC |       |       |
| θ      | 0°                  | ---  | 8°   | 0°        | ---   | 8°    |
| aaa    | 0.10                |      |      | .004      |       |       |
| bbb    | 0.15                |      |      | .006      |       |       |
| ccc    | 0.25                |      |      | .010      |       |       |



## TSOP-6 Part Marking Information

W = (1-26) IF PRECEDED BY LAST DIGIT OF CALENDAR YEAR



PART NUMBER CODE REFERENCE:

- A = SI3443DV
- B = IRF5800
- C = IRF5850
- D = IRF5851
- E = IRF5852
- F = IRF5801
- I = IRF5805
- J = IRF5806
- K = IRF5810
- L = IRF5804
- M = IRF5803
- N = IRF5802

Note: A line above the work week  
 (as shown here) indicates Lead-Free.

| YEAR | Y | WORK WEEK | W |
|------|---|-----------|---|
| 2001 | 1 | 01        | A |
| 2002 | 2 | 02        | B |
| 2003 | 3 | 03        | C |
| 2004 | 4 | 04        | D |
| 2005 | 5 |           |   |
| 2006 | 6 |           |   |
| 2007 | 7 |           |   |
| 2008 | 8 |           |   |
| 2009 | 9 |           |   |
| 2010 | 0 | 24        | X |
|      |   | 25        | Y |
|      |   | 26        | Z |

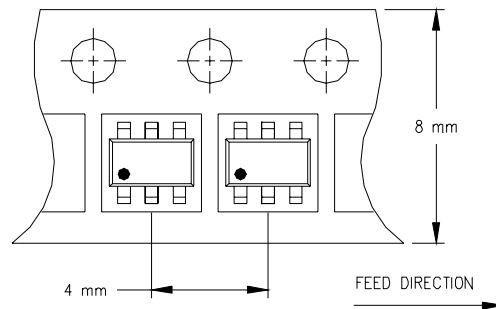
W = (27-52) IF PRECEDED BY A LETTER

| YEAR | Y | WORK WEEK | W |
|------|---|-----------|---|
| 2001 | A | 27        | A |
| 2002 | B | 28        | B |
| 2003 | C | 29        | C |
| 2004 | D | 30        | D |
| 2005 | E |           |   |
| 2006 | F |           |   |
| 2007 | G |           |   |
| 2008 | H |           |   |
| 2009 | J |           |   |
| 2010 | K | 50        | X |
|      |   | 51        | Y |
|      |   | 52        | Z |

# IRF5800PbF

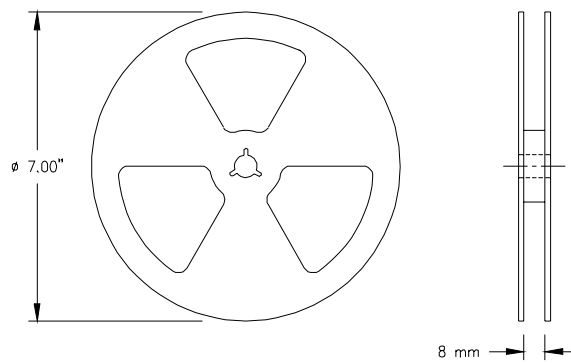
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**IR** Rectifier

## TSOP-6 Tape & Reel Information



NOTES:

1. OUTLINE CONFORMS TO EIA-481 & EIA-541.



NOTES:

1. OUTLINE CONFORMS TO EIA-481 & EIA-541.

Data and specifications subject to change without notice.  
This product has been designed and qualified for the Consumer market.  
Qualifications Standards can be found on IR's Web site.

International  
**IR** Rectifier