

# IRF7811AVPbF

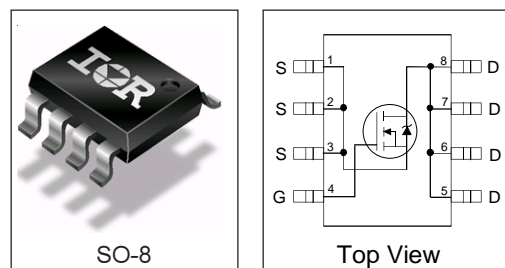
- N-Channel Application-Specific MOSFETs
- Ideal for CPU Core DC-DC Converters
- Low Conduction Losses
- Low Switching Losses
- Minimizes Parallel MOSFETs for high current applications
- 100% R<sub>G</sub> Tested
- Lead-Free

## 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 it ideal for high efficiency DC-DC converters that power the latest generation of microprocessors.

The IRF7811AV has been optimized for all parameters that are critical in synchronous buck converters including R<sub>DS(on)</sub>, gate charge and C<sub>dv/dt</sub>-induced turn-on immunity. The IRF7811AV offers an extremely low combination of Q<sub>sw</sub> & R<sub>DS(on)</sub> for reduced losses in both control and synchronous 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 CHARACTERISTICS<sup>⑤</sup>

	IRF7811AV
R <sub>DS(on)</sub>	11 mΩ
Q <sub>G</sub>	17 nC
Q <sub>sw</sub>	6.7 nC
Q <sub>oss</sub>	8.1 nC

## Absolute Maximum Ratings

Parameter	Symbol	IRF7811AV	Units
Drain-to-Source Voltage	V <sub>DS</sub>	30	V
Gate-to-Source Voltage	V <sub>GS</sub>	±20	
Continuous Output Current (V <sub>GS</sub> ≥ 4.5V)	T <sub>A</sub> = 25°C	10.8	A
	T <sub>L</sub> = 90°C	11.8	
Pulsed Drain Current <sup>①</sup>	I <sub>DM</sub>	100	
Power Dissipation <sup>③</sup>	T <sub>A</sub> = 25°C	2.5	W
	T <sub>L</sub> = 90°C	3.0	
Junction & Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to 150	°C
Continuous Source Current (Body Diode)	I <sub>S</sub>	2.5	A
Pulsed Source Current <sup>①</sup>	I <sub>SM</sub>	50	

## Thermal Resistance

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient <sup>②⑥</sup>	R <sub>θJA</sub>	—	50	°C/W
Maximum Junction-to-Lead <sup>⑥</sup>	R <sub>θJL</sub>	—	20	

## Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Units	Conditions
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	30	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
Static Drain-to-Source On-Resistance	$R_{DS(on)}$	—	11	14	m $\Omega$	$V_{GS} = 4.5V, I_D = 15A$ ②
Gate Threshold Voltage	$V_{GS(th)}$	1.0	—	3.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
Drain-to-Source Leakage Current	$I_{DSS}$	—	—	50	$\mu A$	$V_{DS} = 30V, V_{GS} = 0V$
		—	—	20	$\mu A$	$V_{DS} = 24V, V_{GS} = 0V$
		—	—	100	mA	$V_{DS} = 24V, V_{GS} = 0V, T_J = 100^\circ C$
Gate-to-Source Leakage Current	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 20V$
Total Gate Charge, Control FET	$Q_g$	—	17	26	nC	$V_{DS} = 24V, I_D = 15A, V_{GS} = 5.0V$
Total Gate Charge, Synch FET	$Q_g$	—	14	21	nC	$V_{GS} = 5.0V, V_{DS} < 100mV$
Pre-V <sub>th</sub> Gate-to-Source Charge	$Q_{gs1}$	—	3.4	—	nC	$V_{DS} = 16V, I_D = 15A$
Post-V <sub>th</sub> Gate-to-Source Charge	$Q_{gs2}$	—	1.6	—	nC	
Gate-to-Drain ("Miller") Charge	$Q_{gd}$	—	5.1	—	nC	
Switch Charge ( $Q_{gs2} + Q_{gd}$ )	$Q_{SW}$	—	6.7	—	nC	
Output Charge	$Q_{OSS}$	—	8.1	12	nC	
Gate Resistance	$R_G$	0.5	—	4.4	$\Omega$	$V_{DS} = 16V, V_{GS} = 0$
Turn-On Delay Time	$t_{d(on)}$	—	8.6	—	ns	$V_{DD} = 16V$ $I_D = 15A$ $V_{GS} = 5.0V$ Clamped Inductive Load
Rise Time	$t_r$	—	21	—	ns	
Turn-Off Delay Time	$t_{d(off)}$	—	43	—	ns	
Fall Time	$t_f$	—	10	—	ns	
Input Capacitance	$C_{iss}$	—	1801	—	pF	$V_{GS} = 0V$
Output Capacitance	$C_{oss}$	—	723	—	pF	$V_{DS} = 10V$
Reverse Transfer Capacitance	$C_{rss}$	—	46	—	pF	

## Diode Characteristics

Parameter	Symbol	Min	Typ	Max	Units	Conditions
Diode Forward Voltage	$V_{SD}$	—	—	1.3	V	$T_J = 25^\circ C, I_S = 15A$ ②, $V_{GS} = 0V$
Reverse Recovery Charge ④	$Q_{rr}$	—	50	—	nC	$di/dt = 700A/\mu s$ $V_{DD} = 16V, V_{GS} = 0V, I_D = 15A$
Reverse Recovery Charge (with Parallel Schottsky) ④	$Q_{rr}$	—	43	—	nC	$di/dt = 700A/\mu s$ , (with 10BQ040) $V_{DD} = 16V, V_{GS} = 0V, I_D = 15A$

### Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Pulse width  $\leq 400 \mu s$ ; duty cycle  $\leq 2\%$ .
- ③ When mounted on 1 inch square copper board,  $t < 10$  sec.
- ④ Typ = measured -  $Q_{oss}$
- ⑤ Typical values of  $R_{DS(on)}$  measured at  $V_{GS} = 4.5V$ ,  $Q_g$ ,  $Q_{SW}$  and  $Q_{OSS}$  measured at  $V_{GS} = 5.0V$ ,  $I_F = 15A$ .
- ⑥  $R_{\theta}$  is measured at  $T_J$  approximately  $90^\circ C$

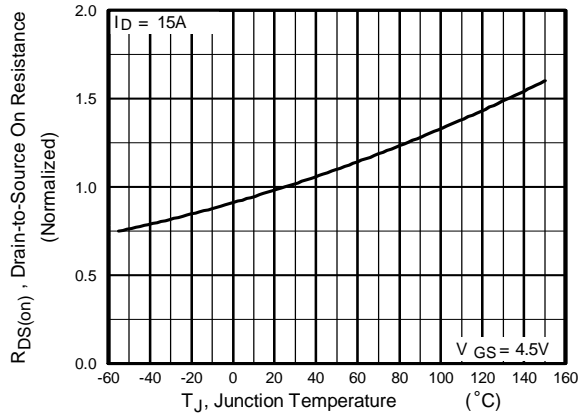


Figure 1. Normalized On-Resistance vs. Temperature

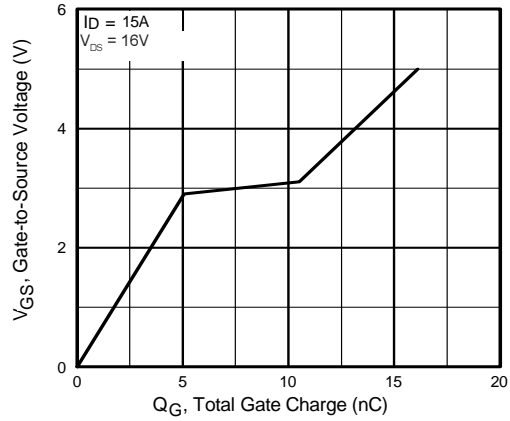


Figure 2. Gate-to-Source Voltage vs. Typical Gate Charge

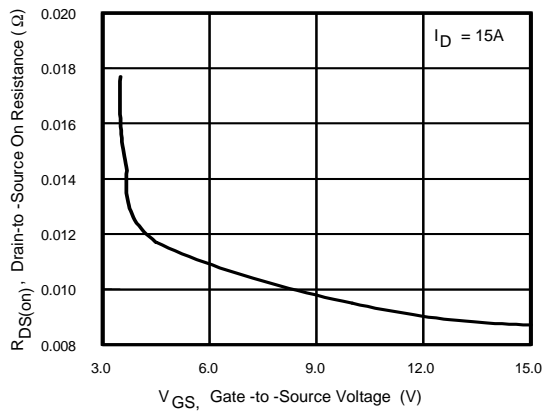


Figure 3. Typical  $R_{DS(on)}$  vs. Gate-to-Source Voltage

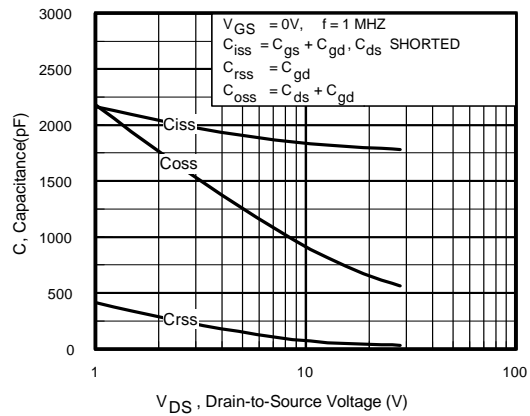


Figure 4. Typical Capacitance vs. Drain-to-Source Voltage

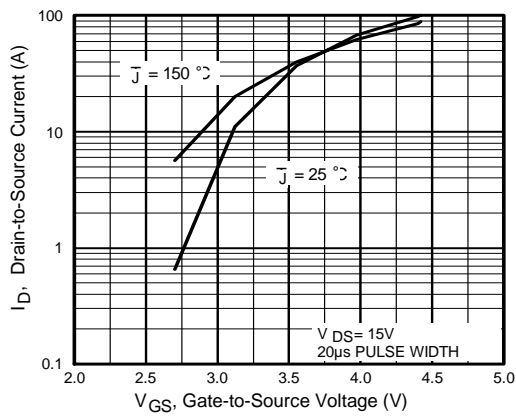


Figure 5. Typical Transfer Characteristics

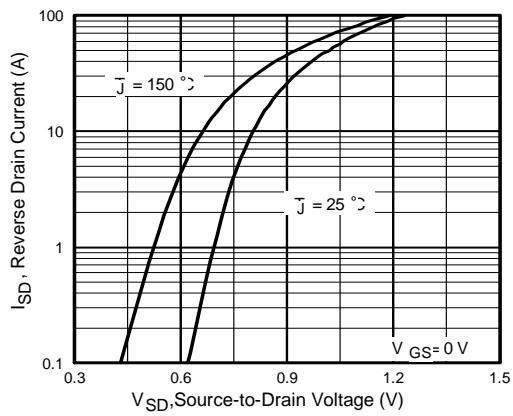


Figure 6. Typical Source-Drain Diode Forward Voltage

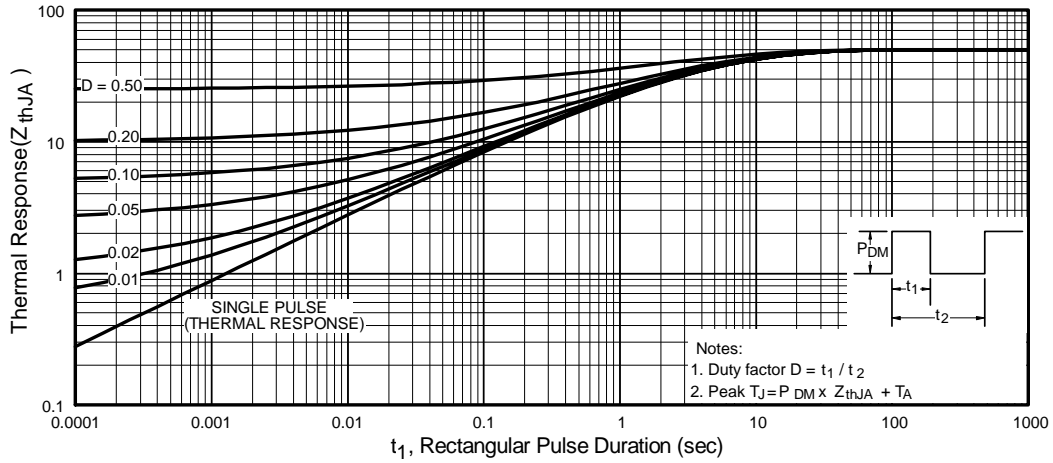


Figure 7. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

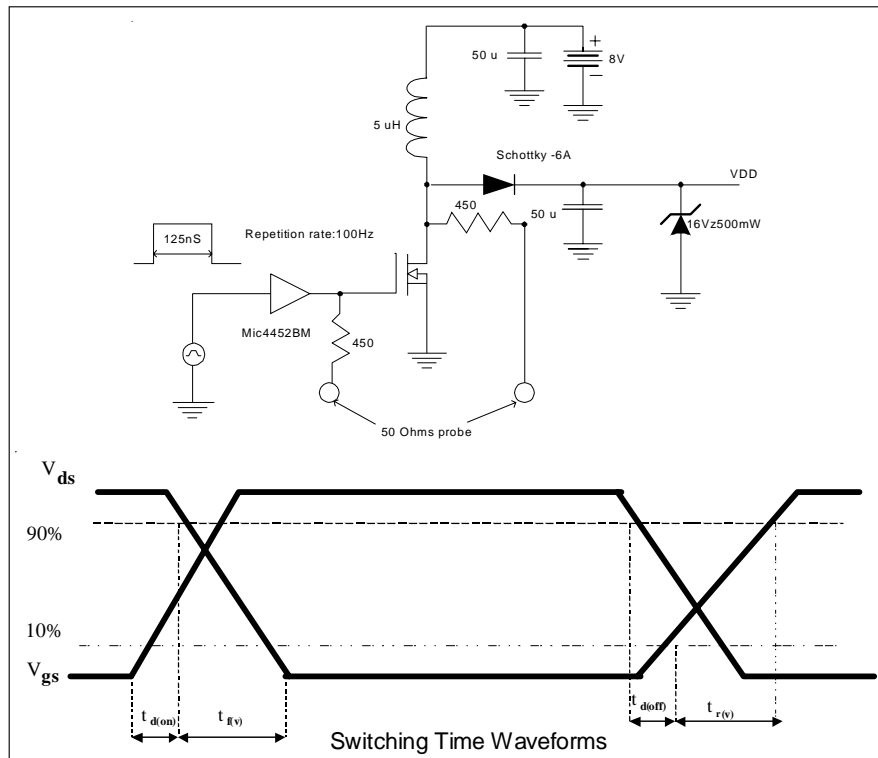
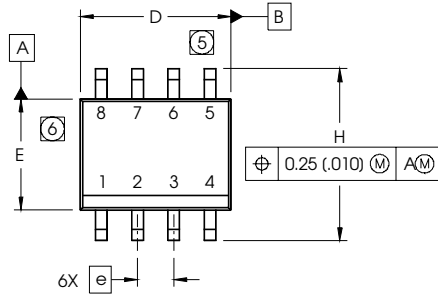


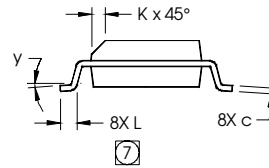
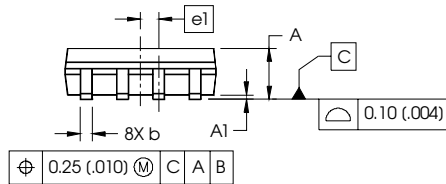
Figure 8. Clamped Inductive load test diagram and switching waveform

## SO-8 Package Outline

Dimensions are shown in millimeters (inches)



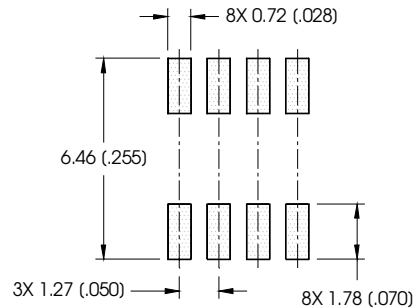
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40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



**NOTES:**

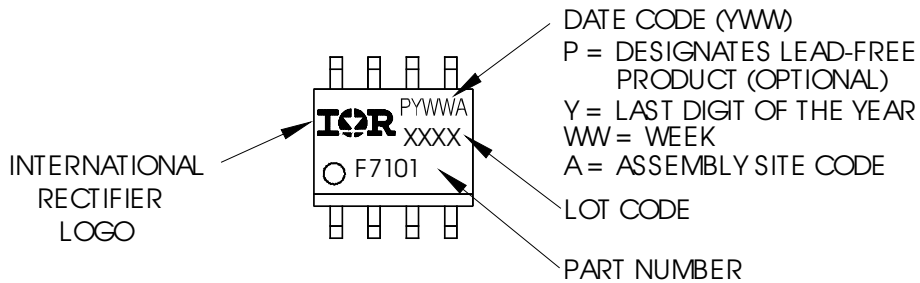
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 (.006).
6. DIMENSION DOES NOT INCLUDE 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

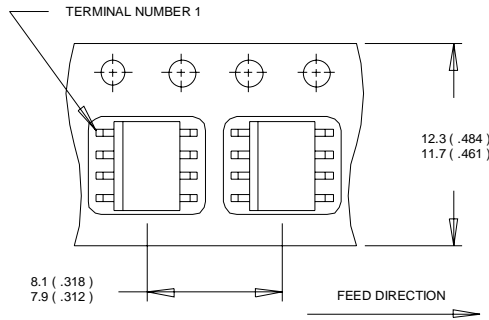
EXAMPLE: THIS IS AN IRF7101 (MOSFET)



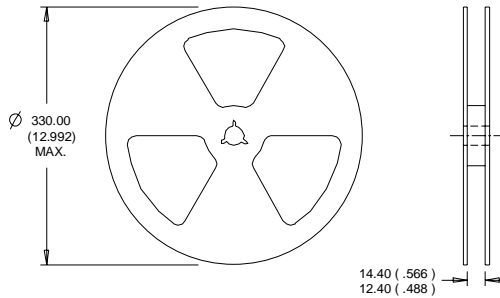
# IRF7811AVPbF

International  
**IR** Rectifier

## SO-8 Tape and Reel



- 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.

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

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