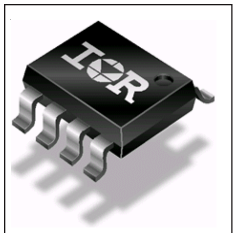
International Rectifier

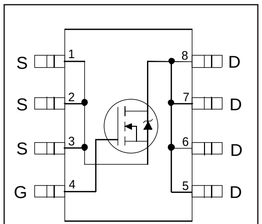
PD-94009B

IRF7811AV

- 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_G Tested



SO-8



Top View

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 $R_{DS(on)}$, gate charge and Cdv/dt-induced turn-on immunity. The IRF7811AV offers an extremely low combination of Q_{sw} & $R_{DS(on)}$ 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 ⑤

	IRF7811AV
$R_{DS(on)}$	11 mΩ
Q_G	17 nC
Q_{SW}	6.7 nC
Q_{OSS}	8.1 nC

Absolute Maximum Ratings

Parameter		Symbol	IRF7811AV	Units
Drain-to-Source Voltage		V_{DS}	30	V
Gate-to-Source Voltage		V_{GS}	±20	
Continuous Output Current	$T_A = 25°C$	I_D	10.8	A
($V_{GS} \geq 4.5V$)	$T_L = 90°C$		11.8	
Pulsed Drain Current ①		I_{DM}	100	
Power Dissipation ③	$T_A = 25°C$	P_D	2.5	W
	$T_L = 90°C$		3.0	
Junction & Storage Temperature Range		T_J , T_{STG}	-55 to 150	°C
Continuous Source Current (Body Diode)		I_S	2.5	A
Pulsed Source Current ①		I_{SM}	50	

Thermal Resistance

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ③⑥	$R_{\theta JA}$	–––	50	°C/W
Maximum Junction-to-Lead ⑥	$R_{\theta JL}$	–––	20	

11/01/05

Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Units	Conditions
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	30	—	—	V	V_{GS} = 0V, I_D = 250µA
Static Drain-to-Source On-Resistance	$R_{DS(on)}$	—	11	14	mΩ	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 = 250µA
Drain-to-Source Leakage Current	I_{DSS}	—	—	50	µA	V_{DS} = 30V, V_{GS} = 0V
		—	—	20	µA	V_{DS} = 24V, V_{GS} = 0V
		—	—	100	µA	V_{DS} = 24V, V_{GS} = 0V, T_J = 100°C
Gate-to-Source Leakage Current	I_{GSS}	—	—	±100	nA	V_{GS} = ± 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		V_{GS} = 5.0V, V_{DS} < 100mV
Pre-Vth Gate-to-Source Charge	Q_{gs1}	—	3.4	—		V_{DS} = 16V, I_D = 15A
Post-Vth Gate-to-Source Charge	Q_{gs2}	—	1.6	—		
Gate-to-Drain ("Miller") Charge	Q_{gd}	—	5.1	—		
Switch Charge (Q_{gs2} + Q_{gd})	Q_{SW}	—	6.7	—		
Output Charge	Q_{OSS}	—	8.1	12		V_{DS} = 16V, V_{GS} = 0
Gate Resistance	R_G	0.5	—	4.4	Ω	
Turn-On Delay Time	$t_{d(on)}$	—	8.6	—	ns	V_{DD} = 16V
Rise Time	t_r	—	21	—		I_D = 15A
Turn-Off Delay Time	$t_{d(off)}$	—	43	—		V_{GS} = 5.0V
Fall Time	t_f	—	10	—		Clamped Inductive Load
Input Capacitance	C_{iss}	—	1801	—	pF	V_{GS} = 0V
Output Capacitance	C_{oss}	—	723	—		V_{DS} = 10V
Reverse Transfer Capacitance	C_{rss}	—	46	—		

Diode Characteristics

Parameter	Symbol	Min	Typ	Max	Units	Conditions
Diode Forward Voltage	V_{SD}	—	—	1.3	V	T_J = 25°C, I_S = 15A ② ,V_{GS} = 0V
Reverse Recovery Charge ④	Q_{rr}	—	50	—	nC	di/dt = 700A/µs V_{DD} = 16V, V_{GS} = 0V, I_D = 15A
Reverse Recovery Charge (with Parallel Schottsky) ④	Q_{rr}	—	43	—	nC	di/dt = 700A/µs , (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 ≤ 400 µs; duty cycle ≤ 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_θ is measured at T_J approximately 90°C

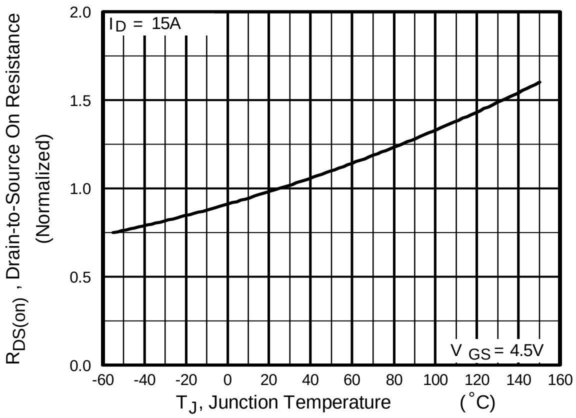


Figure 1. Normalized On-Resistance vs. Temperature

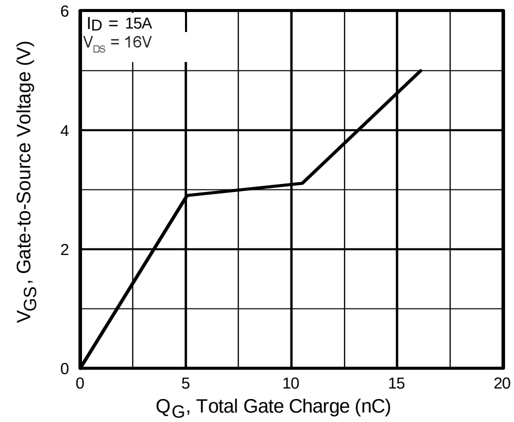


Figure 2. Gate-to-Source Voltage vs. Typical Gate Charge

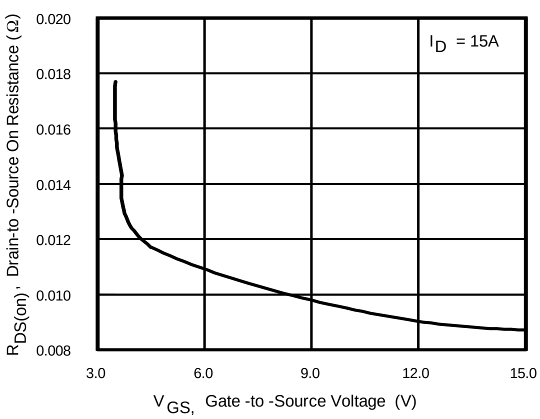


Figure 3. Typical Rds(on) vs. Gate-to-Source Voltage

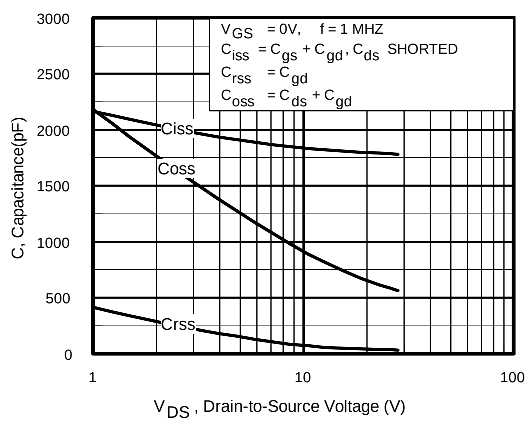


Figure 4. Typical Capacitance vs. Drain-to-Source Voltage

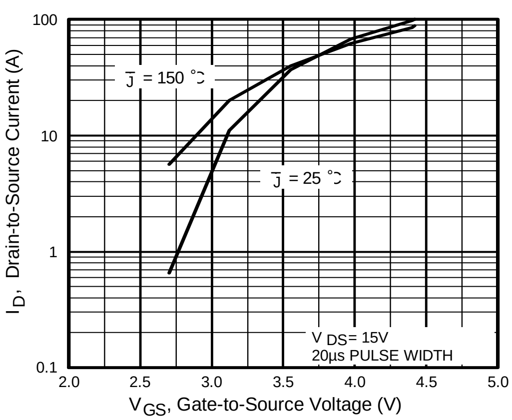


Figure 5. Typical Transfer Characteristics

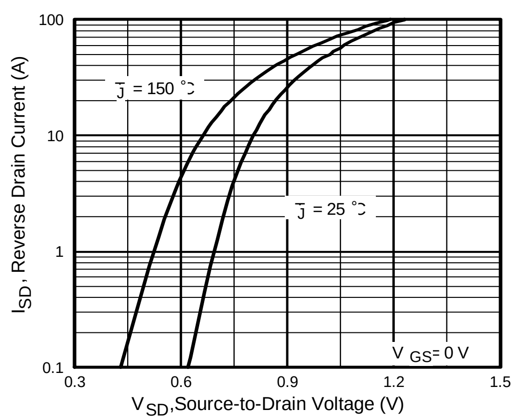


Figure 6. Typical Source-Drain Diode Forward Voltage

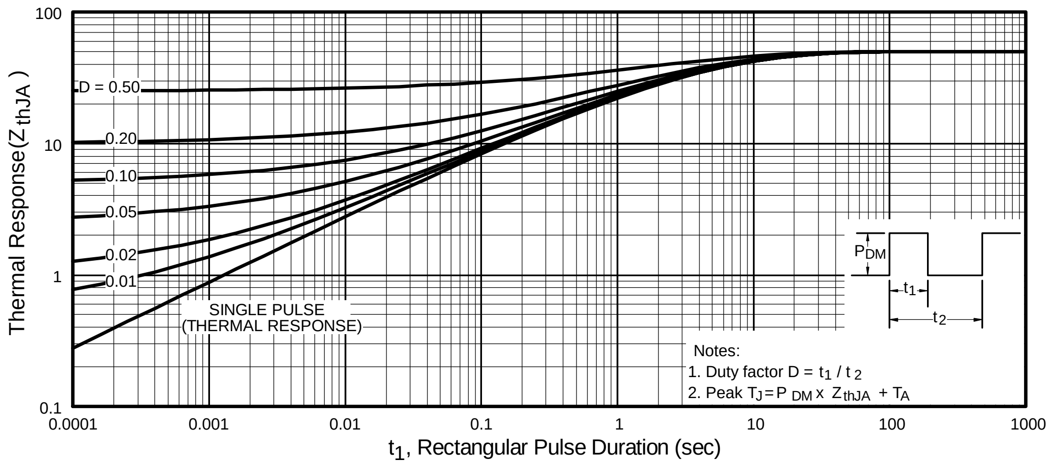


Figure 7. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

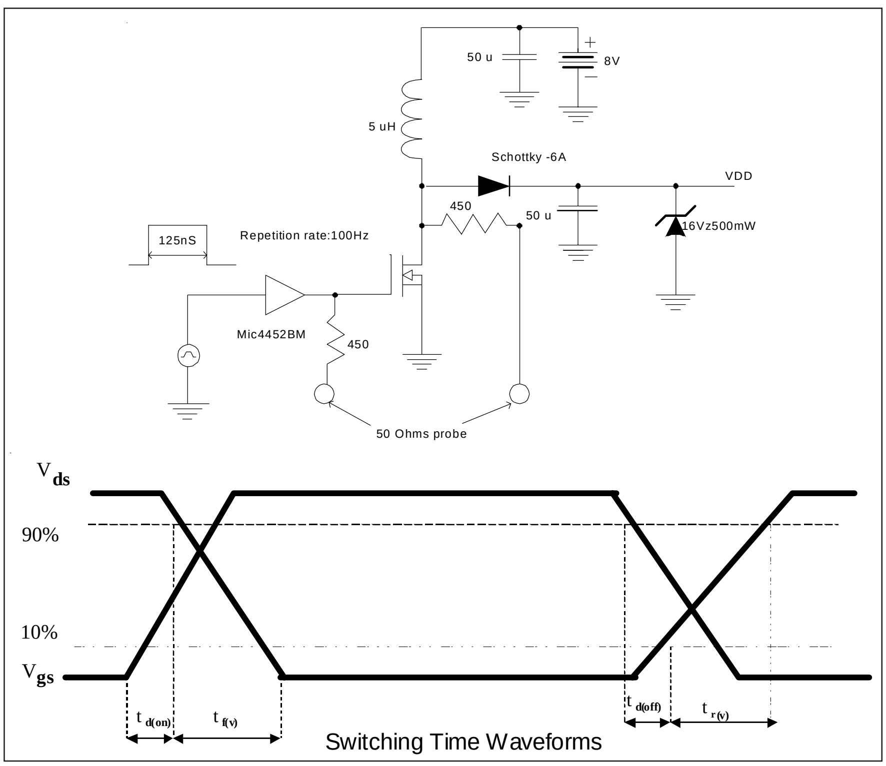
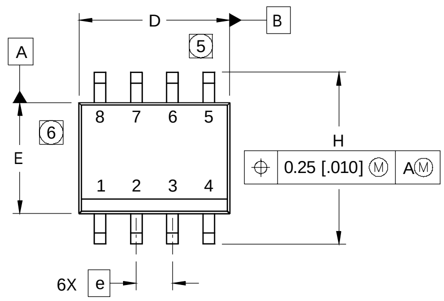


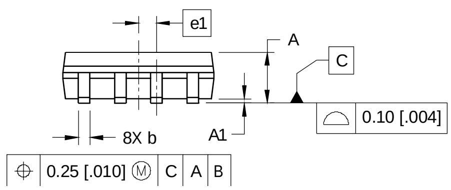
Figure 8. Clamped Inductive load test diagram and switching waveform

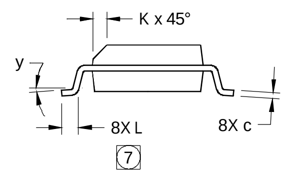
SO-8 Package Outline

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	
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:

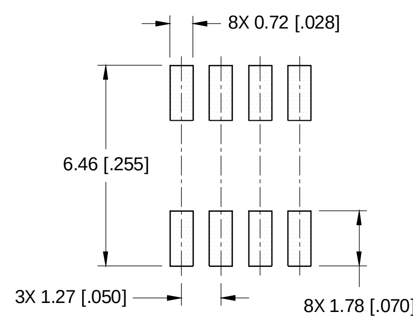
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.

5 DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 [.006].

6 DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 [.010].

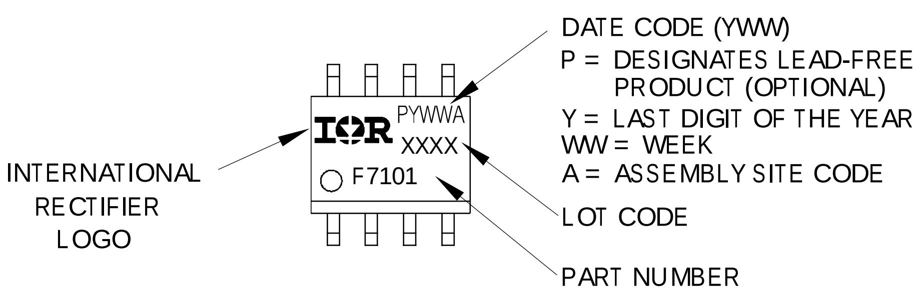
7 DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.

FOOTPRINT



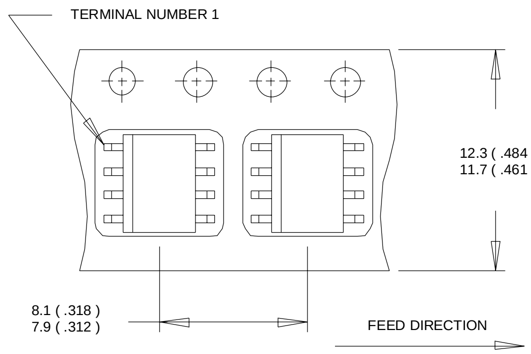
SO-8 Part Marking

EXAMPLE: THIS IS AN IRF7101 (MOSFET)

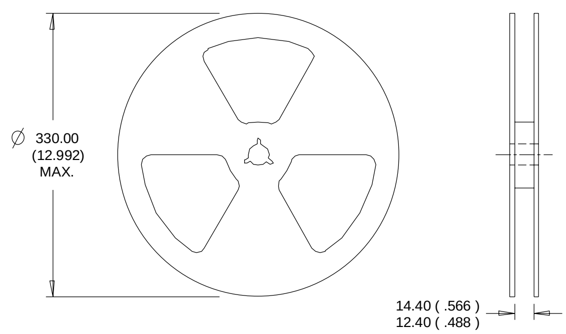


SO-8 Tape and Reel

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.

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

International IOR Rectifier

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