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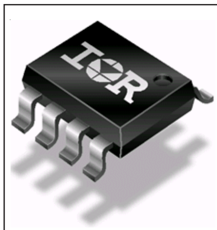
IOR Rectifier

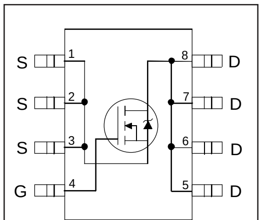
PD-95265

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_G Tested
- Lead-Free



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 CHARACTERISTICS⑤

	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	

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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	mA	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

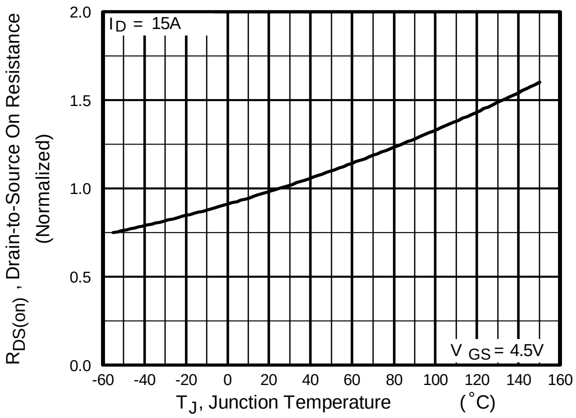


Figure 1. Normalized On-Resistance vs. Temperature

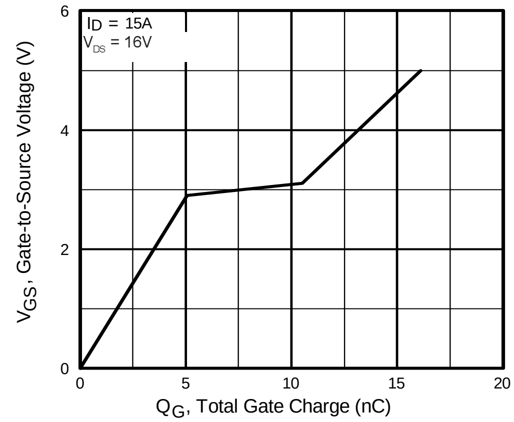


Figure 2. Gate-to-Source Voltage vs. Typical Gate Charge

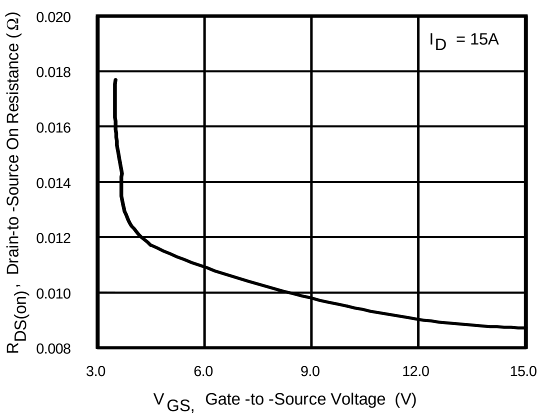


Figure 3. Typical Rds(on) vs. Gate-to-Source Voltage

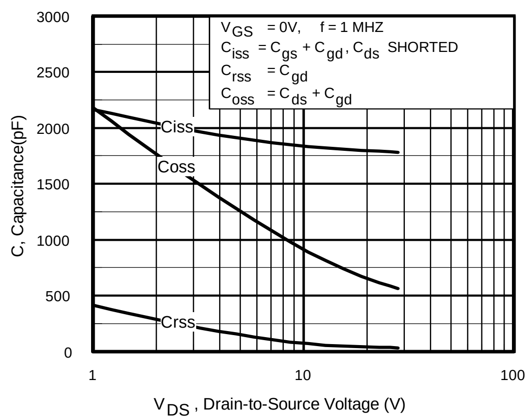


Figure 4. Typical Capacitance vs. Drain-to-Source Voltage

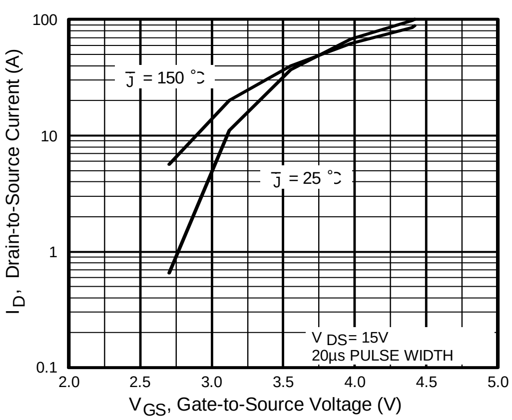


Figure 5. Typical Transfer Characteristics

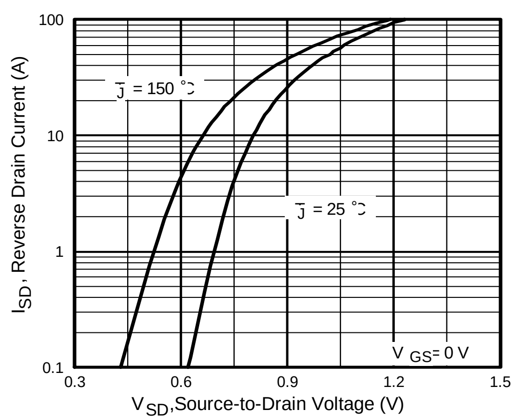


Figure 6. Typical Source-Drain Diode Forward Voltage

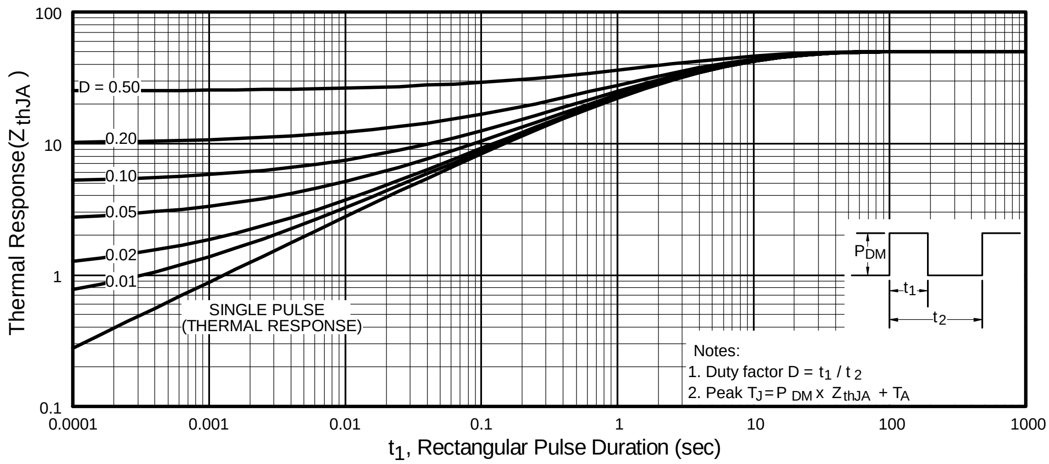


Figure 7. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

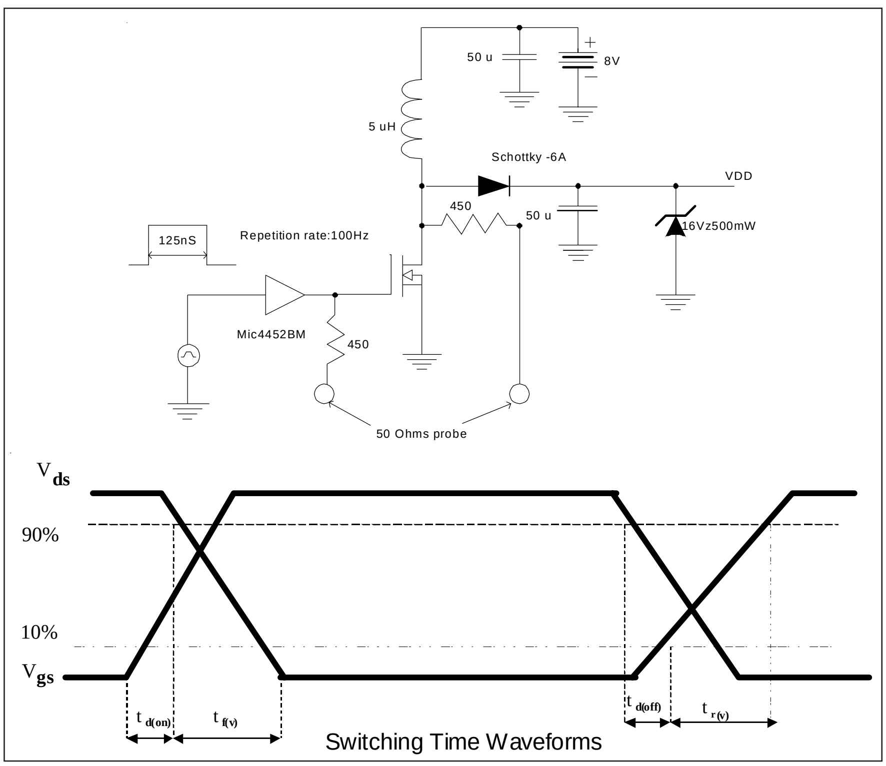
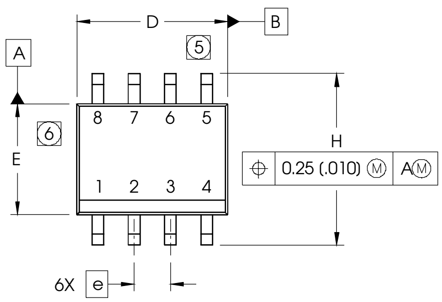


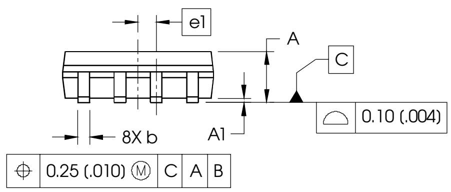
Figure 8. Clamped Inductive load test diagram and switching waveform

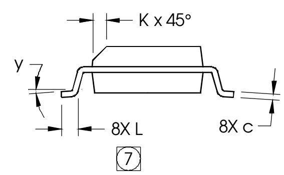
SO-8 Package Outline

Dimensions are shown in millimeters (inches)



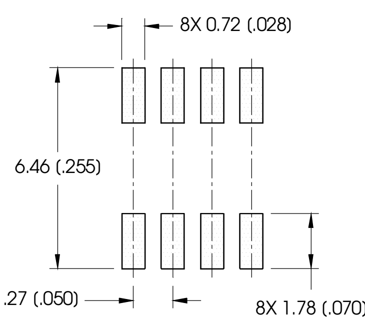
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e 1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40	1.27
y	0°	8°	0°	8°





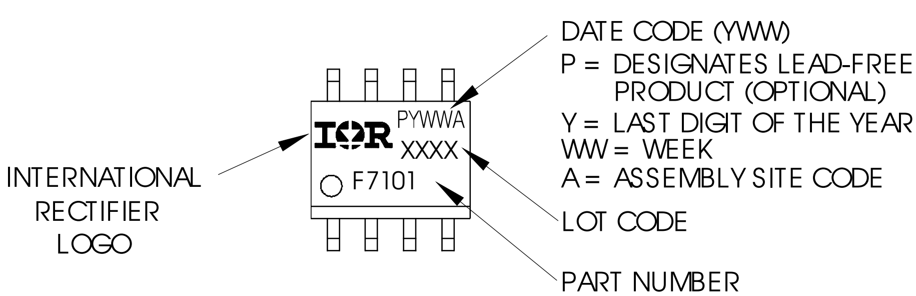
NOTES:
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 [.006].
6. DIMENSION DOES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

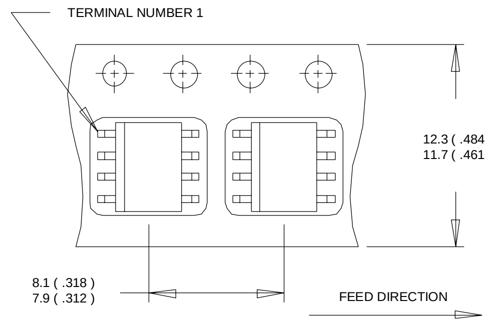


SO-8 Part Marking

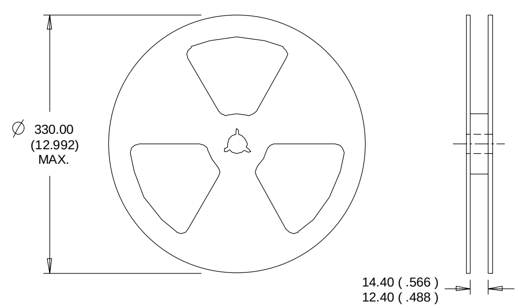
EXAMPLE: THIS IS AN IRF7101 (MOSFET)



SO-8 Tape and Reel



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.

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