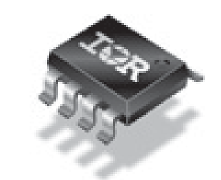
International IOR Rectifier

PD-94031D

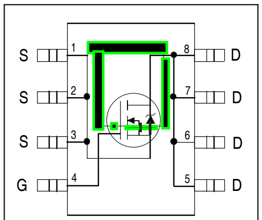
IRF7811W

HEXFET® Power MOSFET for DC-DC Converters

- N-Channel Application-Specific MOSFETs
- Ideal for CPU Core DC-DC Converters
- Low Conduction Losses
- Low Switching Losses
- 100% Tested for R_G



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 IRF7811W 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 IRF7811W offers particulary low $R_{DS(on)}$ and high Cdv/dt immunity for synchronous FET applications.

The package is designed for vapor phase, infra-red, convection, or wave soldering techniques. Power dissipation of greater than 3W is possible in a typical PCB mount application.

DEVICE CHARACTERISTICS⑤

	IRF7811W
$R_{DS(on)}$	9.0mΩ
Q_G	22nC
Q_{sw}	10.1nC
Q_{oss}	12nC

Absolute Maximum Ratings

Parameter		Symbol	IRF7811W	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±12	
Continuous Drain or Source	T_A = 25°C	I_D	14	A
Current ($V_{GS} \geq$ 4.5V)	T_L = 90°C		13	
Pulsed Drain Current①		I_{DM}	109	
Power Dissipation	T_A = 25°C	P_D	3.1	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	3.8	A
Pulsed Source Current①		I_{SM}	109	

Thermal Resistance

Parameter		Max.	Units
Maximum Junction-to-Ambient③	$R_{\theta JA}$	40	°C/W
Maximum Junction-to-Lead	$R_{\theta JL}$	20	°C/W

01/06/09

Electrical Characteristics

Parameter		Min	Typ	Max	Units	Conditions
Drain-to-Source Breakdown Voltage	BV_{DSS}	30	–	–	V	V_{GS} = 0V, I_D = 250µA
Static Drain-Source on Resistance	$R_{DS(on)}$		9.0	12	mΩ	V_{GS} = 4.5V, I_D = 15A②
Gate Threshold Voltage	$V_{GS(th)}$	1.0			V	V_{DS} = V_{GS}, I_D = 250µA
Drain-Source Leakage Current	I_{DSS}			30	µA	V_{DS} = 24V, V_{GS} = 0
				150	µA	V_{DS} = 24V, V_{GS} = 0, Tj = 100°C
Gate-Source Leakage Current	I_{GSS}			±100	nA	V_{GS} = ±12V
Total Gate Chg Cont FET	Q_G		22	33	nC	V_{GS}=5.0V, I_D=15A, V_{DS}=16V
Total Gate Chg Sync FET	Q_G		16.3		nC	V_{GS} = 5V, V_{DS}< 100mV
Pre-Vth Gate-Source Charge	Q_{GS1}		3.5		nC	V_{DS} = 16V, I_D = 15A, V_{GS} = 5.0V
Post-Vth Gate-Source Charge	Q_{GS2}		1.2		nC	
Gate to Drain Charge	Q_{GD}		8.8		nC	
Switch Chg(Q_{gs2} + Q_{gd})	Q_{sw}		10.1		nC	
Output Charge	Q_{oss}		12		nC	V_{DS} = 16V, V_{GS} = 0
Gate Resistance	R_G		2.0	4.0	Ω	
Turn-on Delay Time	$t_{d(on)}$		11		ns	V_{DD} = 16V, I_D = 15A
Rise Time	t_r		11		ns	V_{GS} = 5.0V
Turn-off Delay Time	$t_{d(off)}$		29		ns	Clamped Inductive Load
Fall Time	t_f		9.9		ns	
Input Capacitance	C_{iss}	–	2335	–	pF	V_{DS} = 16V, V_{GS} = 0
Output Capacitance	C_{oss}	–	400	–	pF	
Reverse Transfer Capacitance	C_{rss}	–	119	–	pF	

Source-Drain Rating & Characteristics

Parameter		Min	Typ	Max	Units	Conditions
Diode Forward Voltage*	V_{SD}			1.25	V	I_S = 15A②, V_{GS} = 0V
Reverse Recovery Charge④	Q_{rr}		45		nC	di/dt ~ 700A/µs V_{DS} = 16V, V_{GS} = 0V, I_S = 15A
Reverse Recovery Charge (with Parallel Schottky)④	$Q_{rr(s)}$		41		nC	di/dt = 700A/µs (with 10BQ040) V_{DS} = 16V, V_{GS} = 0V, I_S = 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
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.

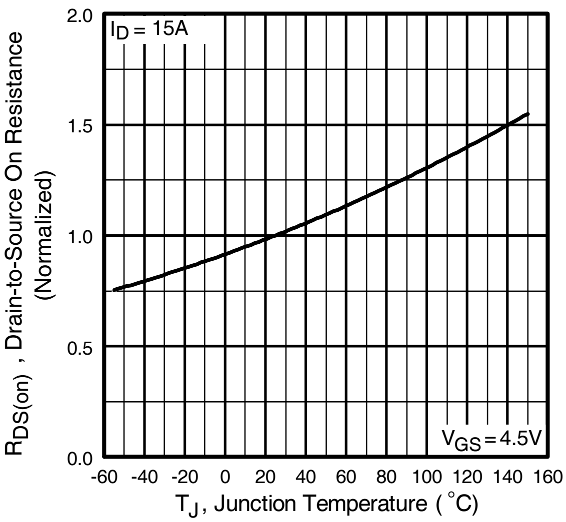


Fig 1. Normalized On-Resistance Vs. Temperature

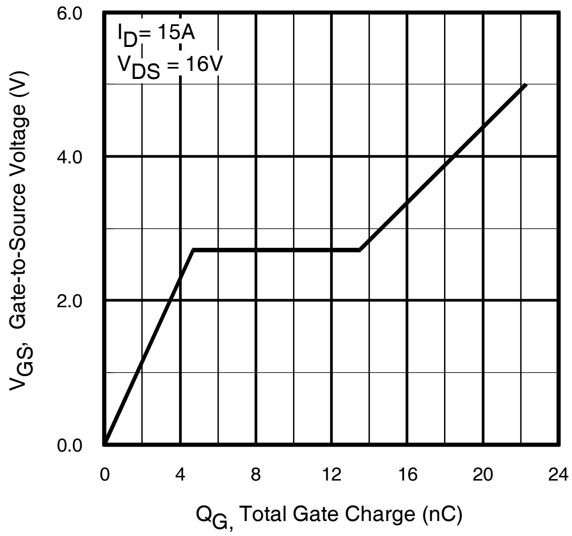


Fig 2. Typical Gate Charge Vs. Gate-to-Source Voltage

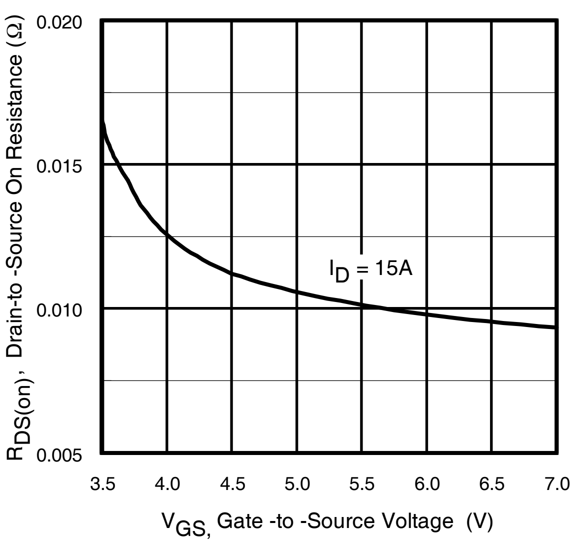


Fig 3. On-Resistance Vs. Gate Voltage

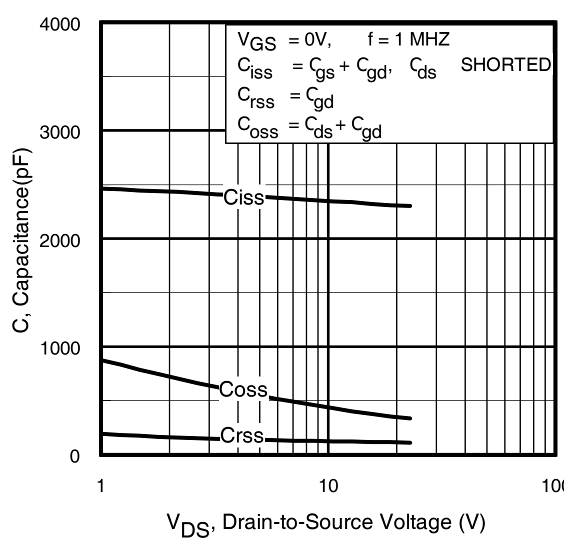


Fig 4. Typical Capacitance Vs. Drain-to-Source Voltage

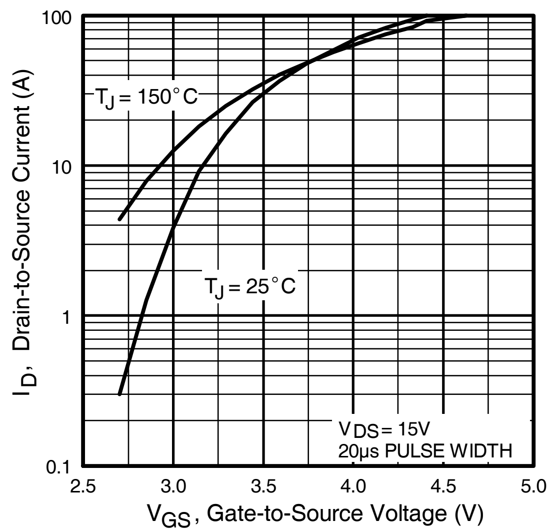


Fig 5. Typical Transfer Characteristics

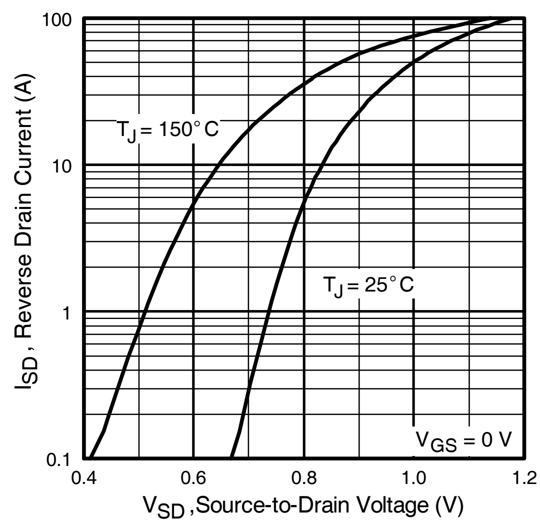


Fig 6. Typical Source-Drain Diode Forward Voltage

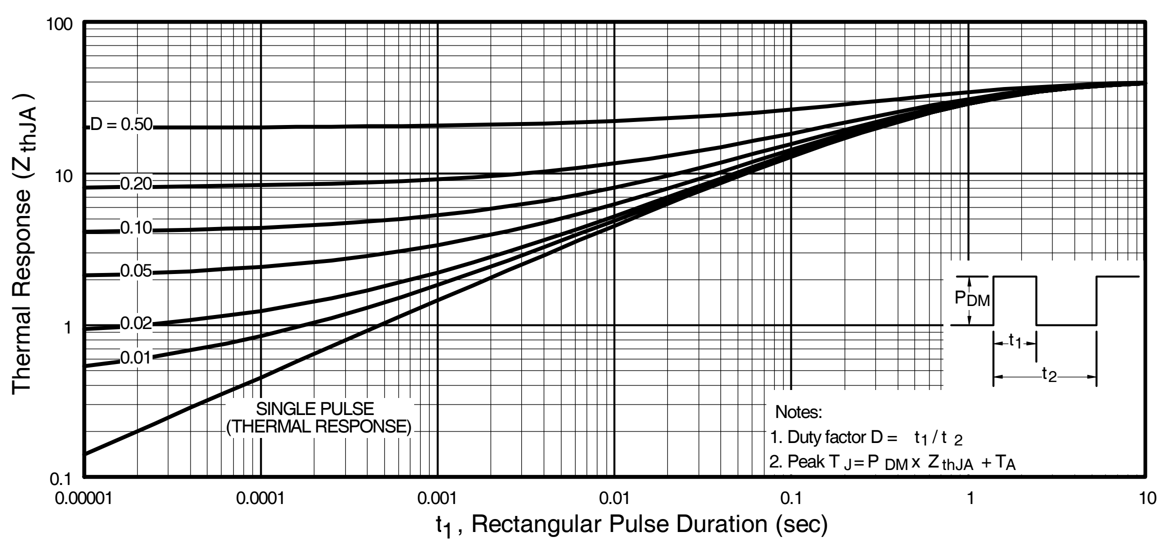
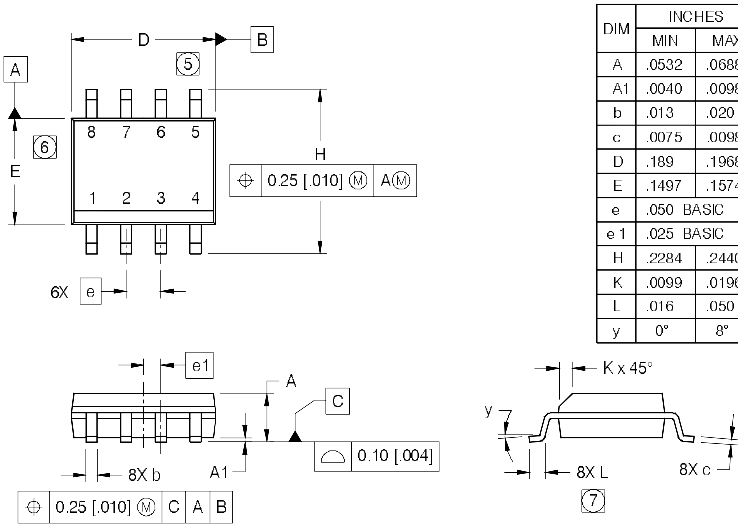


Figure 7. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

SO-8 Package Outline(Mosfet & Fetky)

Dimensions are shown in milimeters (inches)

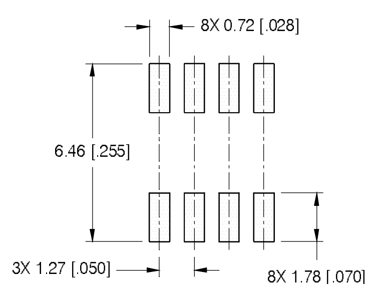


DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e 1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40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

NOTES:

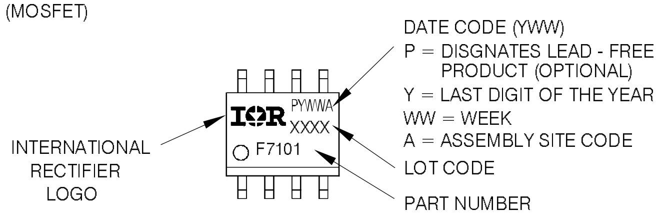
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 [.006].
6. DIMENSION DOES NOT INCLUDE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

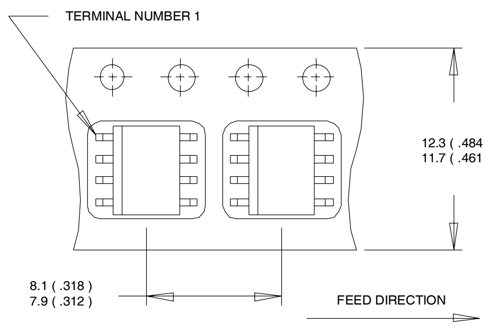
EXAMPLE: THIS IS AN IRF7101 (MOSFET)



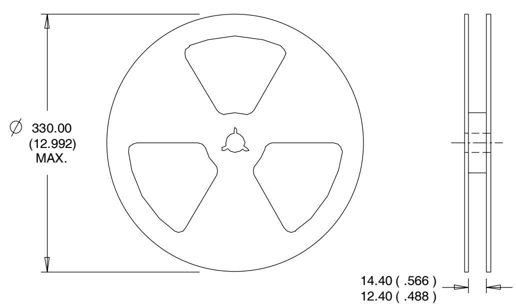
Note: For the most current drawing please refer to IR website at: http://www.irf.com/package/

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

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