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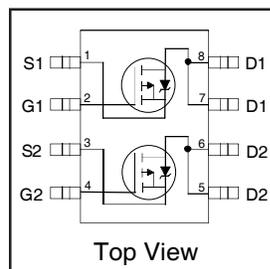
PD - 96105B

# International IR Rectifier

# IRF7306QPbF

HEXFET® Power MOSFET

- Advanced Process Technology
- Ultra Low On-Resistance
- Dual P Channel MOSFET
- Surface Mount
- Available in Tape & Reel
- 150°C Operating Temperature
- Lead-Free

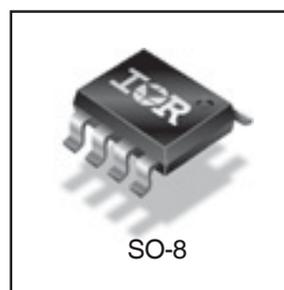


$V_{DSS} = -30V$
$R_{DS(on)} = 0.10\Omega$

## Description

These HEXFET® Power MOSFET's in a Dual SO-8 package utilize the latest processing techniques to achieve extremely low on-resistance per silicon area. Additional features of these HEXFET Power MOSFET's are a 150°C junction operating temperature, fast switching speed and improved repetitive avalanche rating. These benefits combine to make this design an extremely efficient and reliable device for use in a wide variety of applications.

The efficient SO-8 package provides enhanced thermal characteristics and dual MOSFET die capability making it ideal in a variety of power applications. This dual, surface mount SO-8 can dramatically reduce board space and is also available in Tape & Reel.



Base part number	Orderable part number	Package Type	Standard Pack		EOL Notice	Replacement Part Number
			Form	Quantity		
IRF7306QPbF	IRF7306QTRPbF	SO-8	Tape and Reel	4000	EOL 529	<a href="#">Please search the EOL part number on IR's website for guidance</a>
	IRF7306QPbF	SO-8	Tube	95	EOL 527	

## Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_A = 25^\circ C$	10 Sec. Pulsed Drain Current, $V_{GS} @ -10V$	-4.0	A
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V$	-3.6	
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ -10V$	-2.9	
$I_{DM}$	Pulsed Drain Current $\text{\textcircled{D}}$	-14	
$P_D @ T_A = 25^\circ C$	Power Dissipation	2.0	W
	Linear Derating Factor	0.016	W/°C
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$dv/dt$	Peak Diode Recovery $dv/dt$ $\text{\textcircled{D}}$	-5.0	V/ns
$T_J, T_{STG}$	Junction and Storage Temperature Range	-55 to +150	°C

## Thermal Resistance Ratings

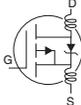
	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient $\text{\textcircled{D}}$	—	62.5	°C/W

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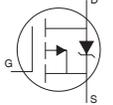
# IRF7306QPbF

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## Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
V <sub>(BR)DSS</sub>	Drain-to-Source Breakdown Voltage	-30	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
ΔV <sub>(BR)DSS/ΔT</sub>	Breakdown Voltage Temp. Coefficient	—	-0.037	—	V/°C	Reference to 25°C, I <sub>D</sub> = -1mA
R <sub>DS(ON)</sub>	Static Drain-to-Source On-Resistance	—	—	0.10	Ω	V <sub>GS</sub> = -10V, I <sub>D</sub> = -1.8A ③
		—	—	0.16		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -1.5A ③
V <sub>GS(th)</sub>	Gate Threshold Voltage	-1.0	—	—	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
g <sub>fs</sub>	Forward Transconductance	2.5	—	—	S	V <sub>DS</sub> = -24V, I <sub>D</sub> = -1.8A
I <sub>DSS</sub>	Drain-to-Source Leakage Current	—	—	-1.0	μA	V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V
		—	—	-25		V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 125°C
I <sub>GSS</sub>	Gate-to-Source Forward Leakage	—	—	-100	nA	V <sub>GS</sub> = -20V
	Gate-to-Source Reverse Leakage	—	—	100		V <sub>GS</sub> = 20V
Q <sub>g</sub>	Total Gate Charge	—	—	25	nC	I <sub>D</sub> = -1.8A
Q <sub>gs</sub>	Gate-to-Source Charge	—	—	2.9		V <sub>DS</sub> = -24V
Q <sub>gd</sub>	Gate-to-Drain ("Miller") Charge	—	—	9.0		V <sub>GS</sub> = -10V, See Fig. 6 and 12 ③
t <sub>d(on)</sub>	Turn-On Delay Time	—	11	—	ns	V <sub>DD</sub> = -15V I <sub>D</sub> = -1.8A R <sub>G</sub> = 6.0Ω R <sub>D</sub> = 8.2Ω, See Fig. 10 ③
t <sub>r</sub>	Rise Time	—	17	—		
t <sub>d(off)</sub>	Turn-Off Delay Time	—	25	—		
t <sub>f</sub>	Fall Time	—	18	—		
L <sub>D</sub>	Internal Drain Inductance	—	4.0	—	nH	Between lead tip and center of die contact 
L <sub>S</sub>	Internal Source Inductance	—	6.0	—		
C <sub>iss</sub>	Input Capacitance	—	440	—	pF	V <sub>GS</sub> = 0V V <sub>DS</sub> = -25V f = 1.0MHz, See Fig. 5
C <sub>oss</sub>	Output Capacitance	—	200	—		
C <sub>rss</sub>	Reverse Transfer Capacitance	—	93	—		

## Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)	—	—	-2.5	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I <sub>SM</sub>	Pulsed Source Current (Body Diode) ①	—	—	-14		
V <sub>SD</sub>	Diode Forward Voltage	—	—	-1.0	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = -1.8A, V <sub>GS</sub> = 0V ③
t <sub>rr</sub>	Reverse Recovery Time	—	53	80	ns	T <sub>J</sub> = 25°C, I <sub>F</sub> = -1.8A
Q <sub>rr</sub>	Reverse Recovery Charge	—	66	99	nC	di/dt = 100A/μs ③
t <sub>on</sub>	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L <sub>S</sub> +L <sub>D</sub> )				

**Notes:**

① Repetitive rating; pulse width limited by max. junction temperature. ( See fig. 11 )

③ Pulse width ≤ 300μs; duty cycle ≤ 2%.

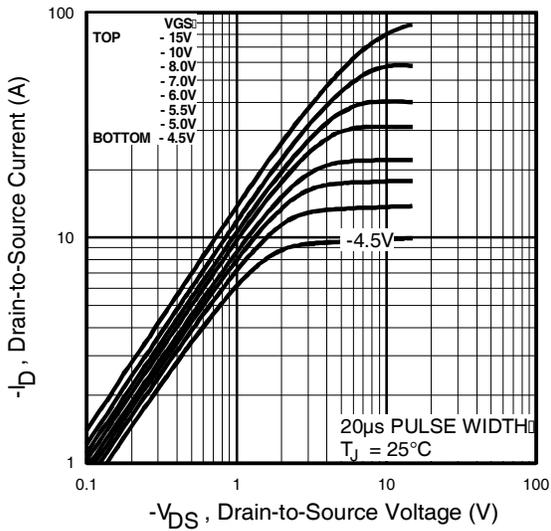
② I<sub>SD</sub> ≤ -1.8A, di/dt ≤ 90A/μs, V<sub>DD</sub> ≤ V<sub>(BR)DSS</sub>, T<sub>J</sub> ≤ 150°C

④ Surface mounted on FR-4 board, t ≤ 10sec.

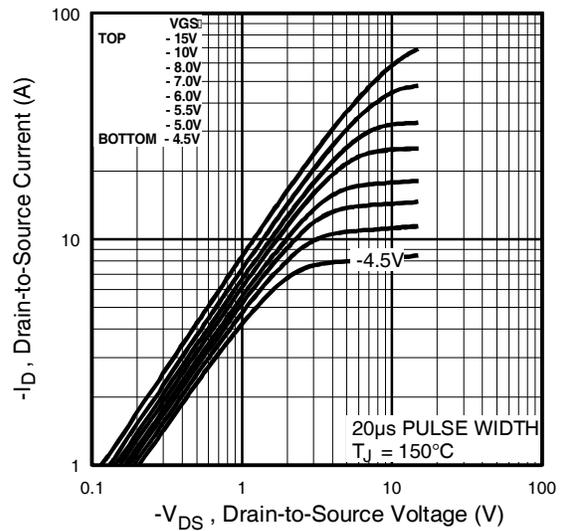
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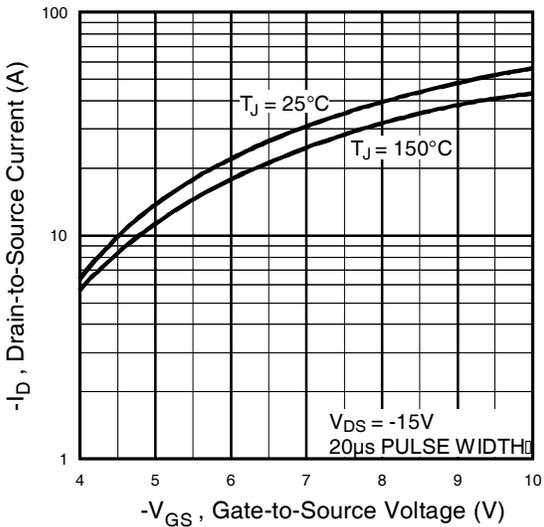
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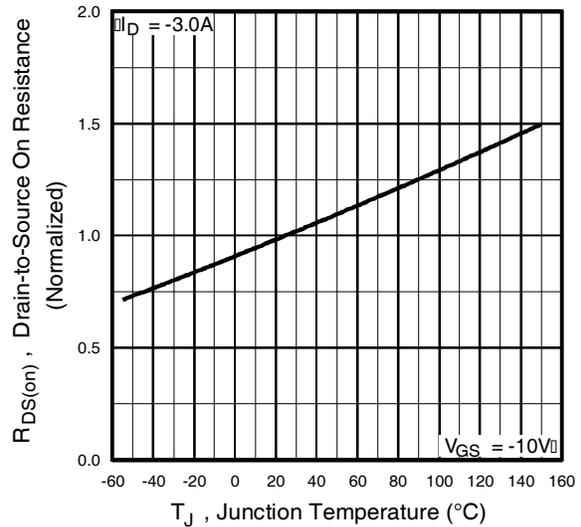
**Fig 1.** Typical Output Characteristics



**Fig 2.** Typical Output Characteristics



**Fig 3.** Typical Transfer Characteristics

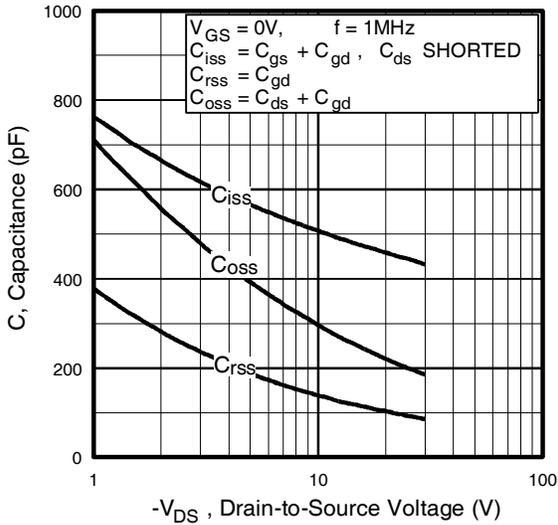


**Fig 4.** Normalized On-Resistance Vs. Temperature

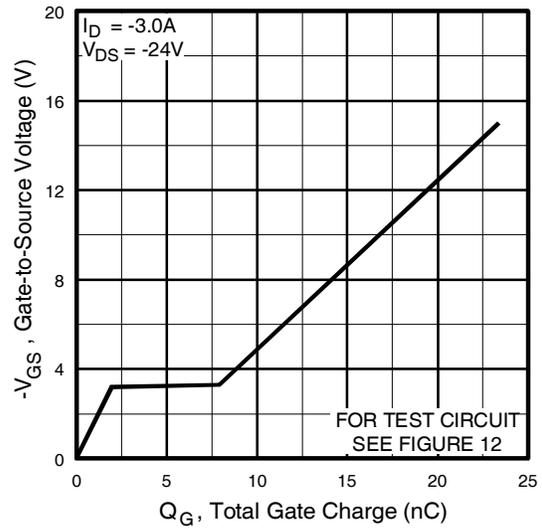
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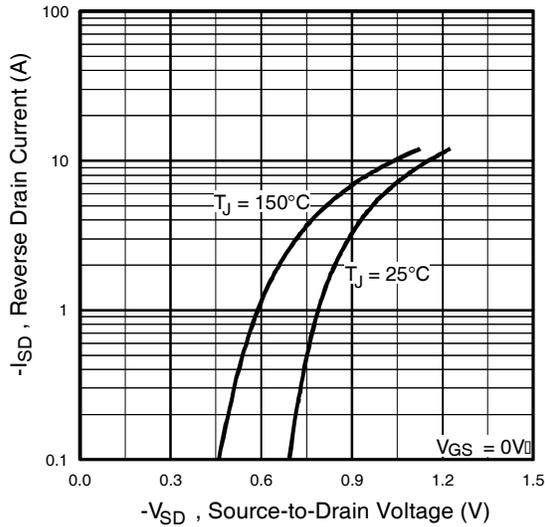
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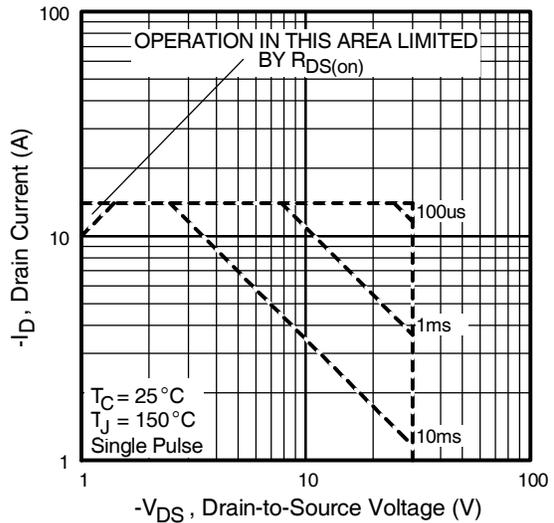
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage



**Fig 7.** Typical Source-Drain Diode Forward Voltage

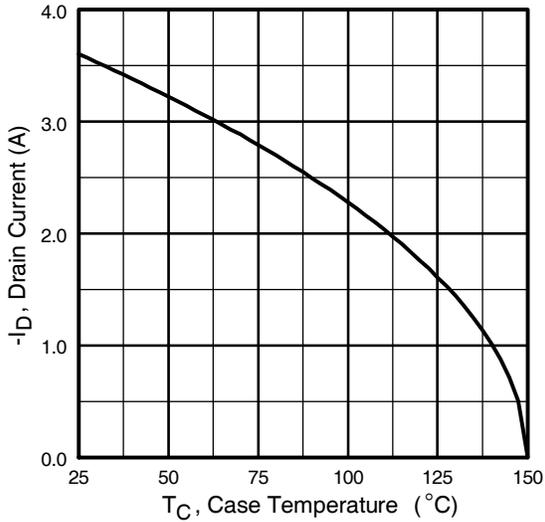


**Fig 8.** Maximum Safe Operating Area

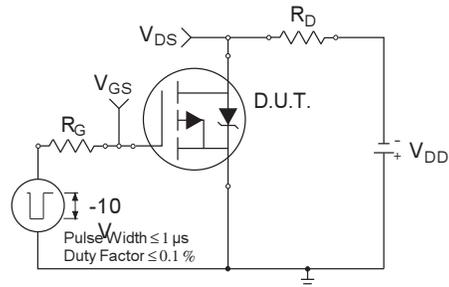
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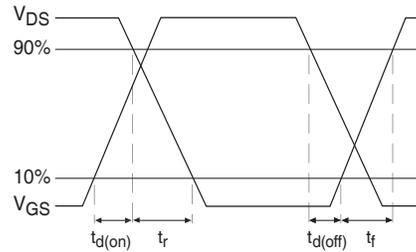
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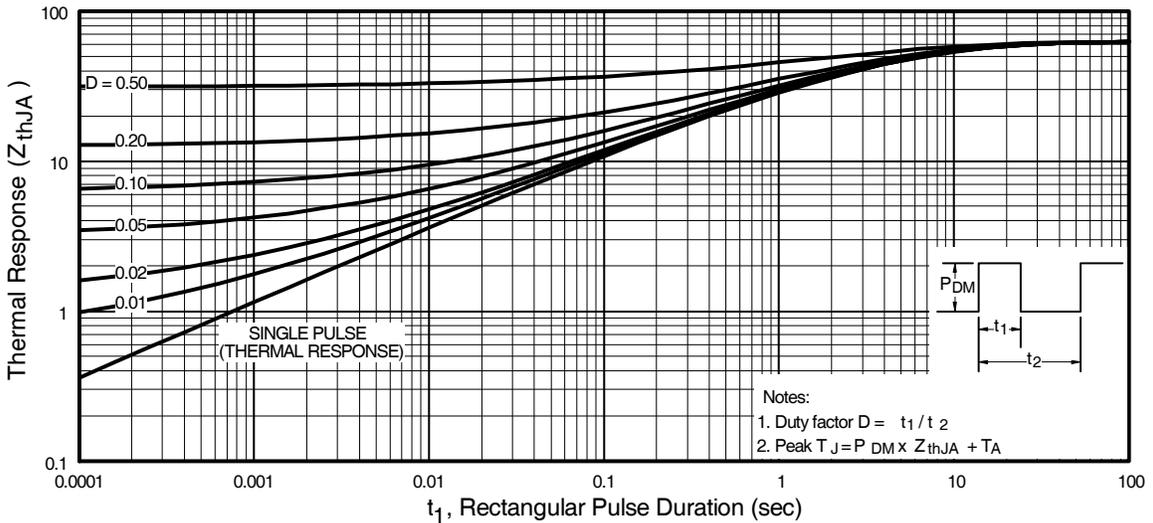
**Fig 9.** Maximum Drain Current Vs. Ambient Temperature



**Fig 10a.** Switching Time Test Circuit



**Fig 10b.** Switching Time Waveforms

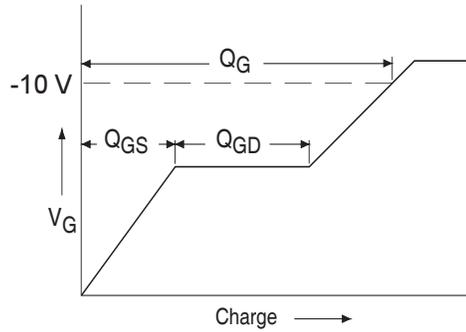


**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

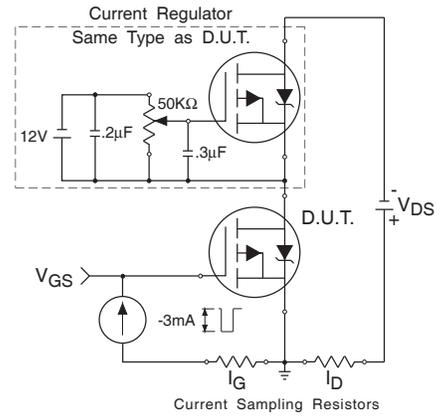
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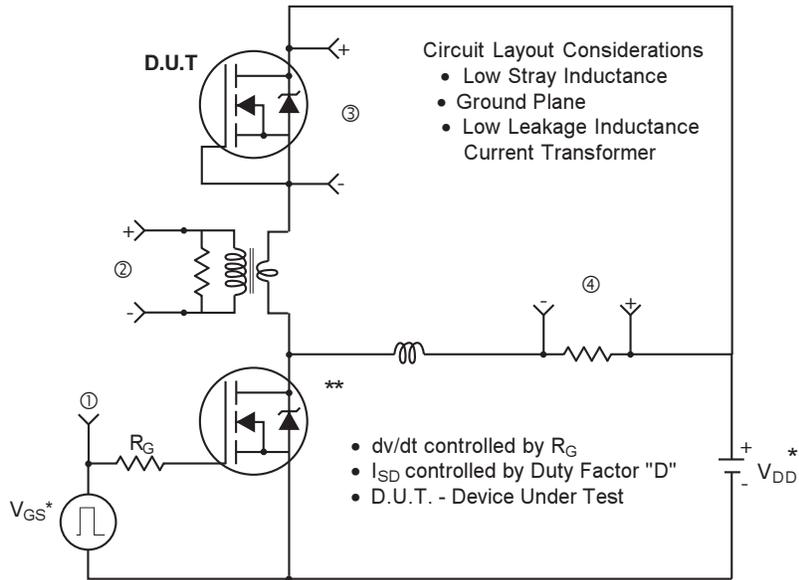


**Fig 12a.** Basic Gate Charge Waveform



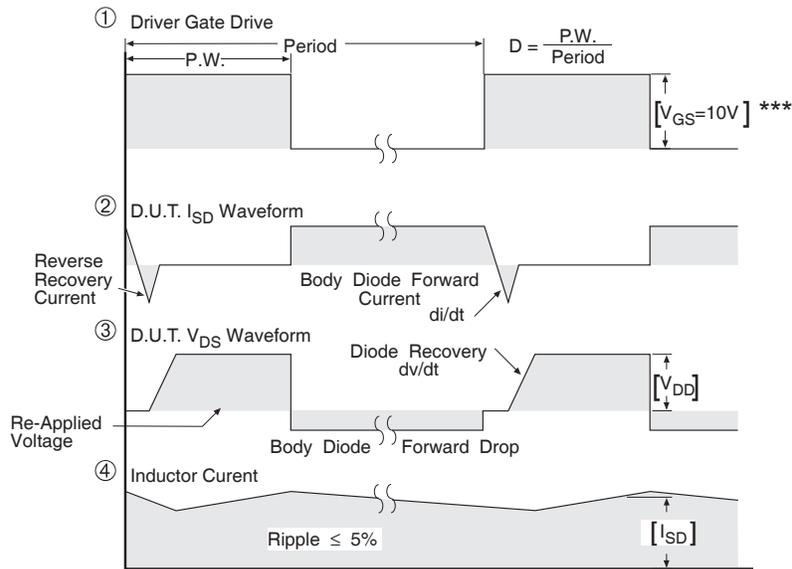
**Fig 12b.** Gate Charge Test Circuit

**Peak Diode Recovery dv/dt Test Circuit**



\* Reverse Polarity for P-Channel

\*\* Use P-Channel Driver for P-Channel Measurements



\*\*\*  $V_{GS} = 5.0V$  for Logic Level and 3V Drive Devices

**Fig 13. For P-Channel HEXFETS**

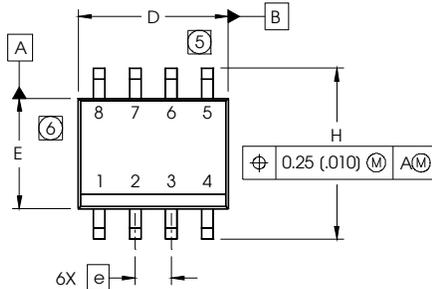
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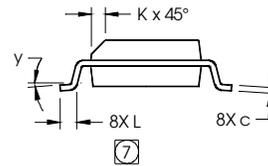
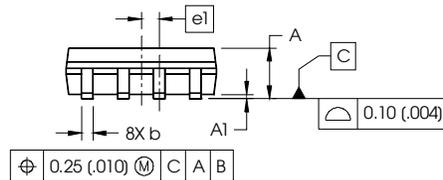
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## SO-8 Package Outline

Dimensions are shown in millimeters (inches)



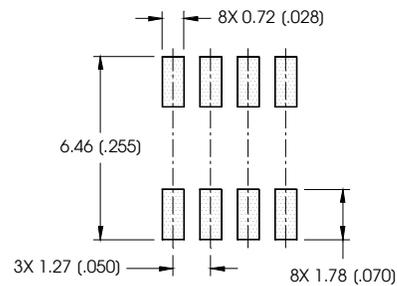
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40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



**NOTES:**

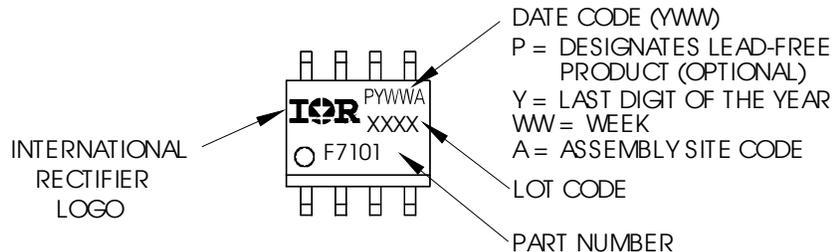
- DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
- CONTROLLING DIMENSION: MILLIMETER
- DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
- OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
- DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 (.006).
- DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 (.010).
- DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.

**FOOTPRINT**



## SO-8 Part Marking

EXAMPLE: THIS IS AN IRF7101 (MOSFET)



**Notes:**

- For an Automotive Qualified version of this part please see <http://www.irf.com/product-info/auto/>
- For the most current drawing please refer to IR website at <http://www.irf.com/package/>

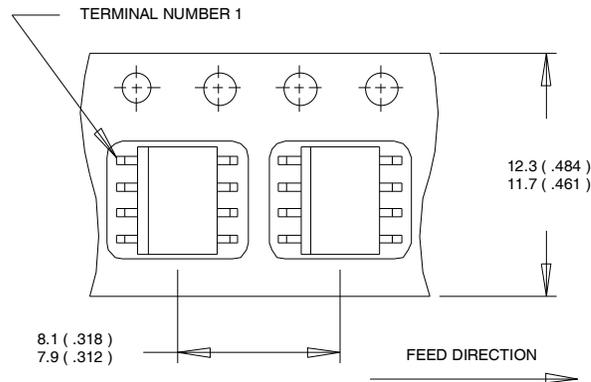
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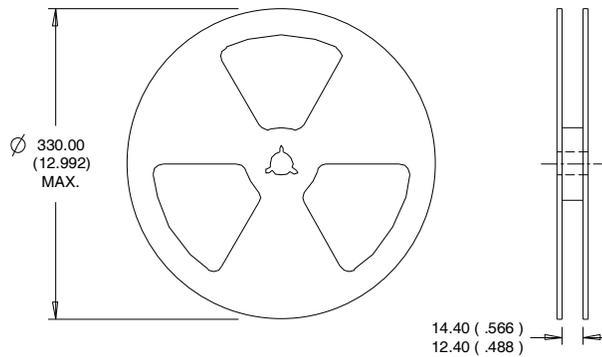
**SO-8 Tape and Reel**

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.

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

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### Qualification Information<sup>†</sup>

Qualification level	Industrial <sup>†</sup>	
	(per JEDEC JESD47F <sup>††</sup> guidelines)	
Moisture Sensitivity Level	SO-8	MSL1 (per JEDEC J-STD-020D <sup>††</sup> )
RoHS Compliant	Yes	

<sup>†</sup> Qualification standards can be found at International Rectifier's web site  
<http://www.irf.com/product-info/reliability>

<sup>††</sup> Applicable version of JEDEC standard at the time of product release.

### Revision History

Date	Comments
7/2/2014	• Added ordering information to reflect the End-Of-life

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**IR WORLD HEADQUARTERS:** 101 N. Sepulveda Blvd., El Segundo, California 90245, USA  
To contact International Rectifier, please visit <http://www.irf.com/whoto-call/>