



**THE DATASHEET OF
HCPL-3150-500E**



IRF7420PbF

HEXFET® Power MOSFET

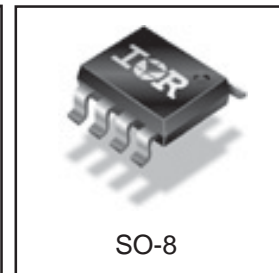
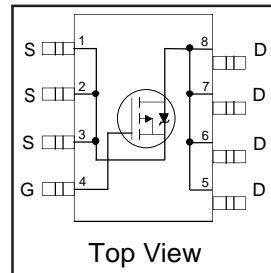
- Ultra Low On-Resistance
- P-Channel MOSFET
- Surface Mount
- Available in Tape & Reel
- Lead-Free

V_{DSS}	$R_{DS(on) \text{ max}}$	I_D
-12V	14mΩ @ $V_{GS} = -4.5V$	-11.5A
	17.5mΩ @ $V_{GS} = -2.5V$	-9.8A
	26mΩ @ $V_{GS} = -1.8V$	-8.1A

Description

These P-Channel HEXFET® Power MOSFETs from International Rectifier utilize advanced processing techniques to achieve the extremely low on-resistance per silicon area. This benefit provides the designer with an extremely efficient device for use in battery and load management applications..

The SO-8 has been modified through a customized leadframe for enhanced thermal characteristics and multiple-die capability making it ideal in a variety of power applications. With these improvements, multiple devices can be used in an application with dramatically reduced board space. The package is designed for vapor phase, infrared, or wave soldering techniques.



Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain- Source Voltage	-12	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V$	-11.5	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V$	-9.2	
I_{DM}	Pulsed Drain Current ①	-46	
$P_D @ T_A = 25^\circ C$	Power Dissipation ③	2.5	W
$P_D @ T_A = 70^\circ C$	Power Dissipation ③	1.6	
	Linear Derating Factor	20	mW/°C
V_{GS}	Gate-to-Source Voltage	±8	V
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to +150	°C

Thermal Resistance

	Parameter	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient ③	50	°C/W

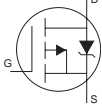
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International
IR Rectifier

Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
V _{(BR)DSS}	Drain-to-Source Breakdown Voltage	-12	—	—	V	V _{GS} = 0V, I _D = -250μA
ΔV _{(BR)DSS/ΔT_J}	Breakdown Voltage Temp. Coefficient	—	0.007	—	V/°C	Reference to 25°C, I _D = -1mA
R _{DS(on)}	Static Drain-to-Source On-Resistance	—	—	14	mΩ	V _{GS} = -4.5V, I _D = -11.5A ②
		—	—	17.5		V _{GS} = -2.5V, I _D = -9.8A ②
		—	—	26		V _{GS} = -1.8V, I _D = -8.1A ②
V _{GS(th)}	Gate Threshold Voltage	-0.4	—	-0.9	V	V _{DS} = V _{GS} , I _D = -250μA
g _{fs}	Forward Transconductance	32	—	—	S	V _{DS} = -10V, I _D = -11.5A
I _{DSS}	Drain-to-Source Leakage Current	—	—	-1.0	μA	V _{DS} = -9.6V, V _{GS} = 0V
		—	—	-25		V _{DS} = -9.6V, V _{GS} = 0V, T _J = 70°C
I _{GSS}	Gate-to-Source Forward Leakage	—	—	-100	nA	V _{GS} = -8V
	Gate-to-Source Reverse Leakage	—	—	100		V _{GS} = 8V
Q _g	Total Gate Charge	—	38	—	nC	I _D = -11.5A
Q _{gs}	Gate-to-Source Charge	—	8.1	—		V _{DS} = -6V
Q _{gd}	Gate-to-Drain ("Miller") Charge	—	8.7	—		V _{GS} = -4.5V ②
t _{d(on)}	Turn-On Delay Time	—	8.8	13	ns	V _{DD} = -6V, V _{GS} = -4.5V
t _r	Rise Time	—	8.8	13		I _D = -1.0A
t _{d(off)}	Turn-Off Delay Time	—	291	437		R _D = 6Ω
t _f	Fall Time	—	225	338		R _G = 6Ω ②
C _{iss}	Input Capacitance	—	3529	—		pF
C _{oss}	Output Capacitance	—	1013	—	V _{DS} = -10V	
C _{rss}	Reverse Transfer Capacitance	—	656	—	f = 1.0MHz	

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I _S	Continuous Source Current (Body Diode)	—	—	-2.5	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I _{SM}	Pulsed Source Current (Body Diode) ①	—	—	-46		
V _{SD}	Diode Forward Voltage	—	—	-1.2	V	T _J = 25°C, I _S = -2.5A, V _{GS} = 0V ②
t _{rr}	Reverse Recovery Time	—	62	93	ns	T _J = 25°C, I _F = -2.5A
Q _{rr}	Reverse Recovery Charge	—	61	92	μC	di/dt = -100A/μs ②

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Pulse width ≤ 400μs; duty cycle ≤ 2%.
- ③ Surface mounted on 1 in square Cu board, t ≤ 10sec.

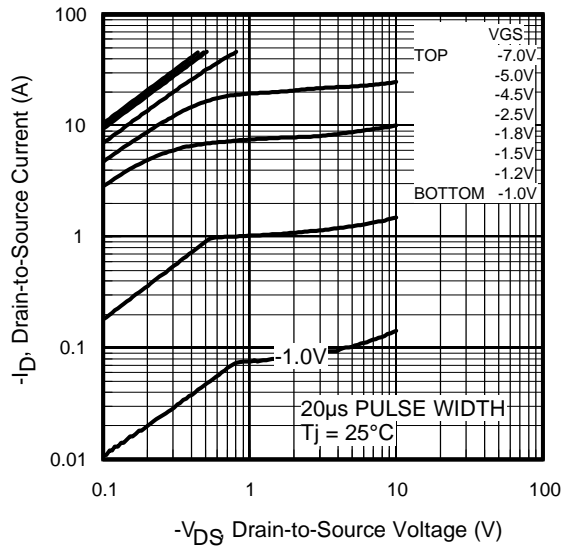


Fig 1. Typical Output Characteristics

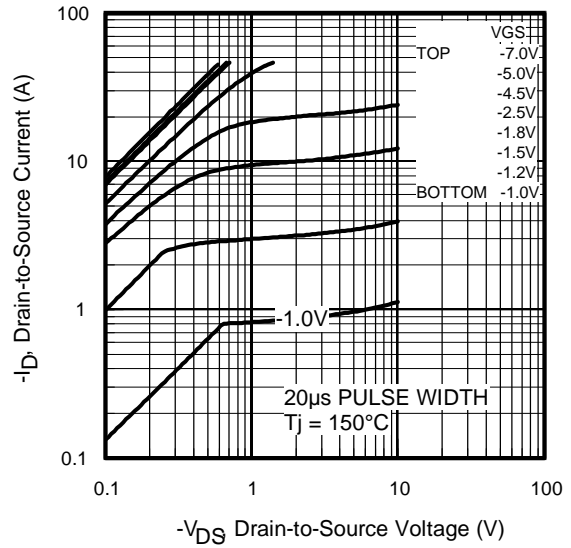


Fig 2. Typical Output Characteristics

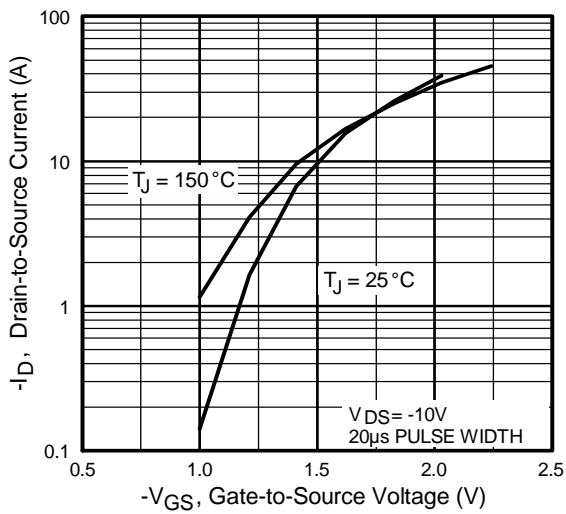


Fig 3. Typical Transfer Characteristics

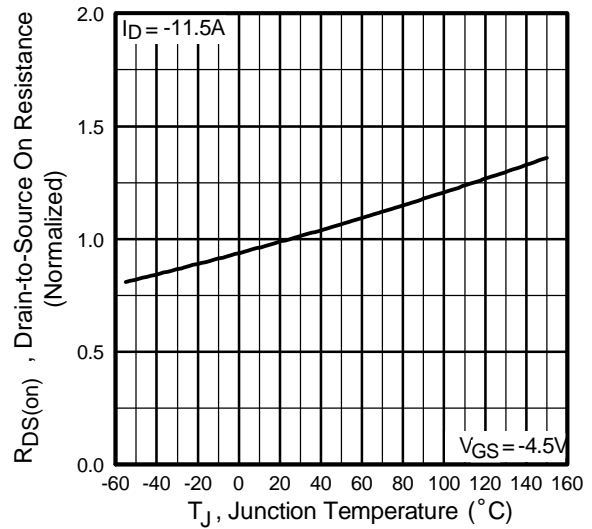


Fig 4. Normalized On-Resistance Vs. Temperature

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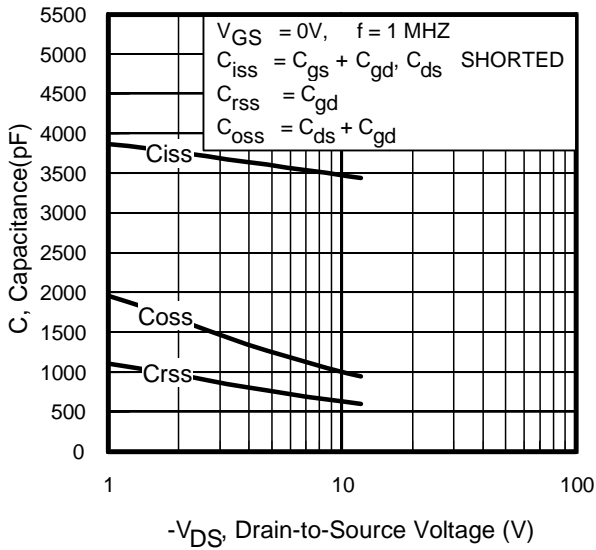


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

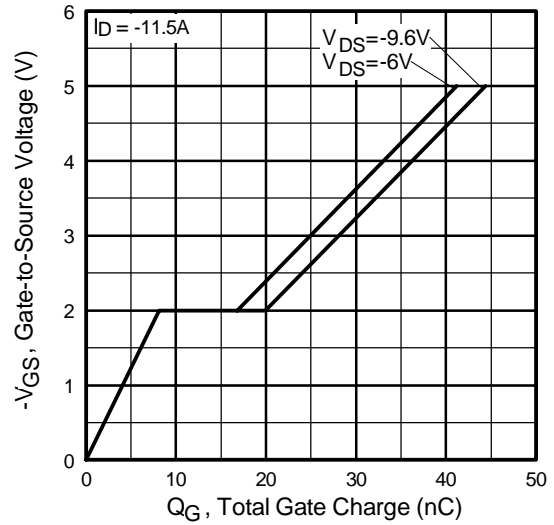


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

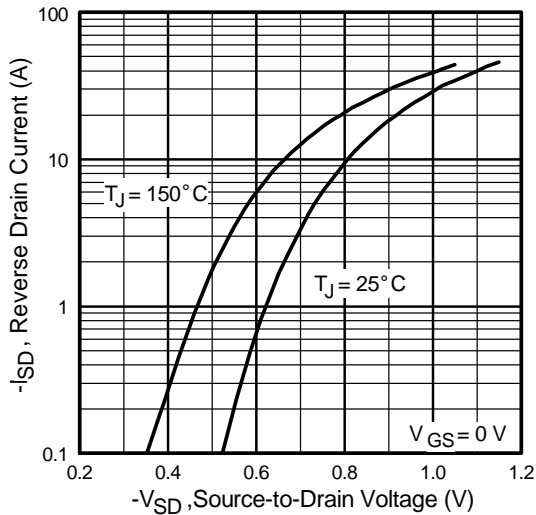


Fig 7. Typical Source-Drain Diode Forward Voltage

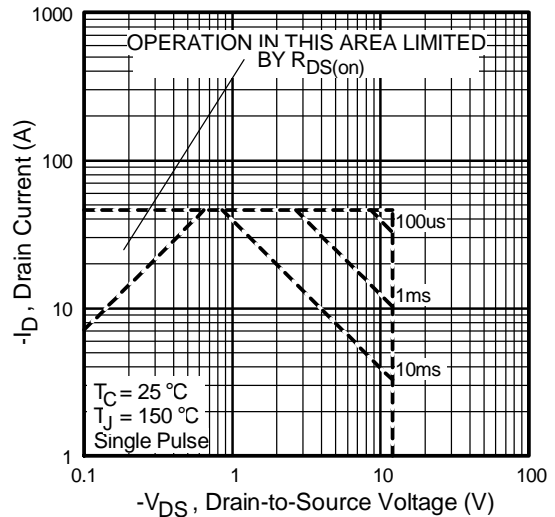


Fig 8. Maximum Safe Operating Area

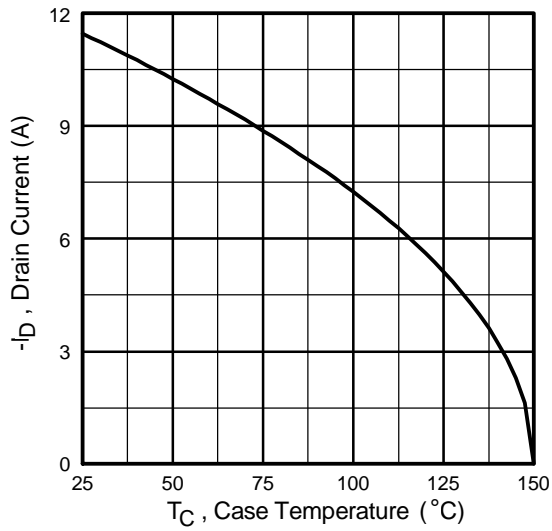


Fig 9. Maximum Drain Current Vs. Case Temperature

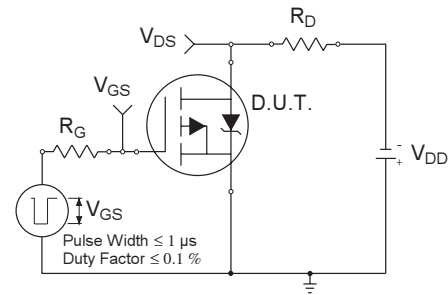


Fig 10a. Switching Time Test Circuit

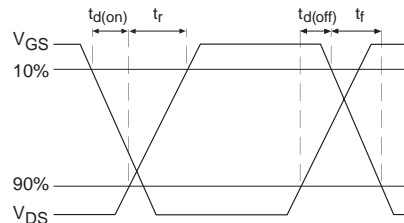


Fig 10b. Switching Time Waveforms

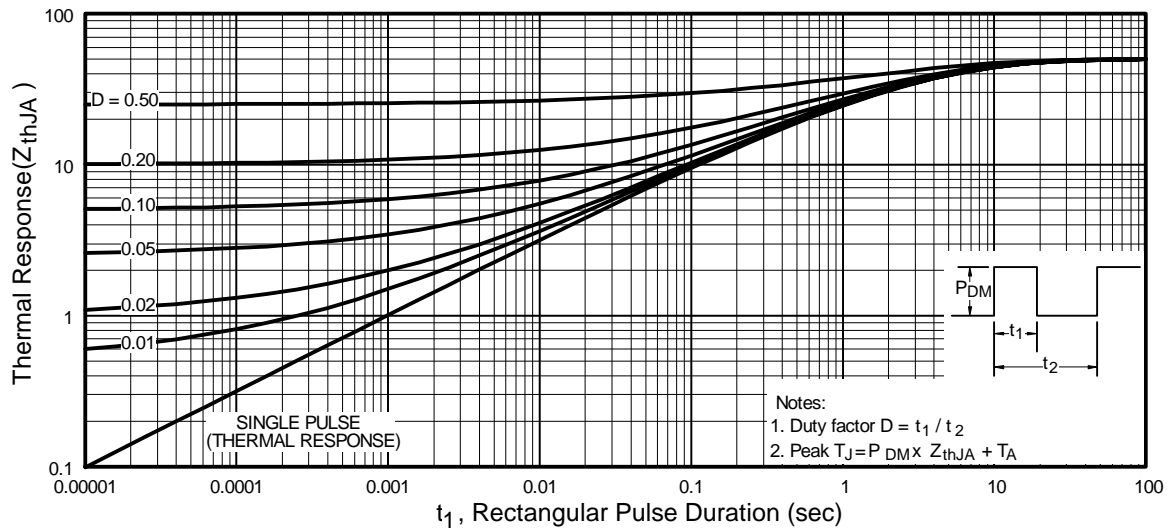


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

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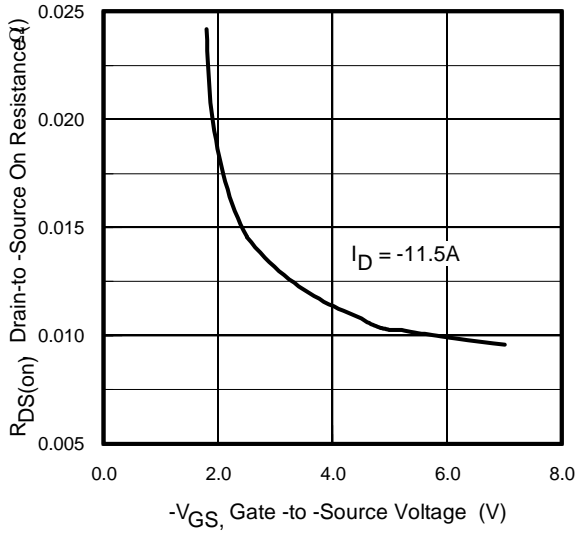


Fig 12. Typical On-Resistance Vs. Gate Voltage

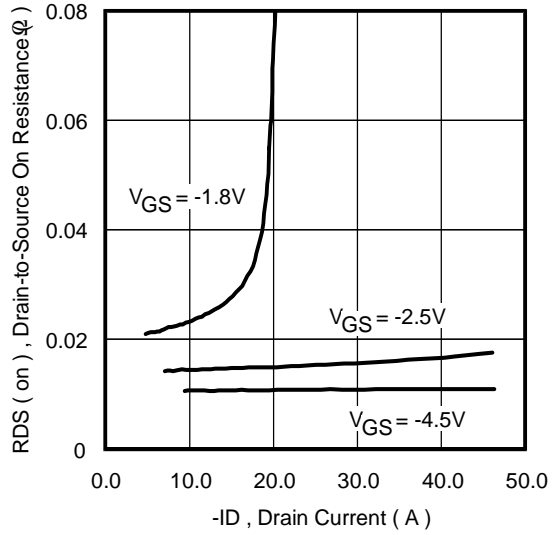


Fig 13. Typical On-Resistance Vs. Drain Current

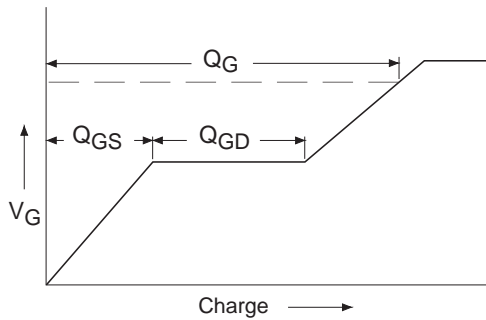


Fig 14a. Basic Gate Charge Waveform

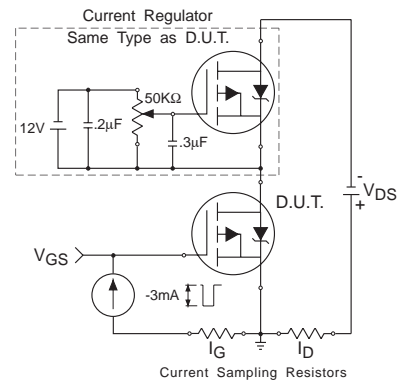


Fig 14b. Gate Charge Test Circuit

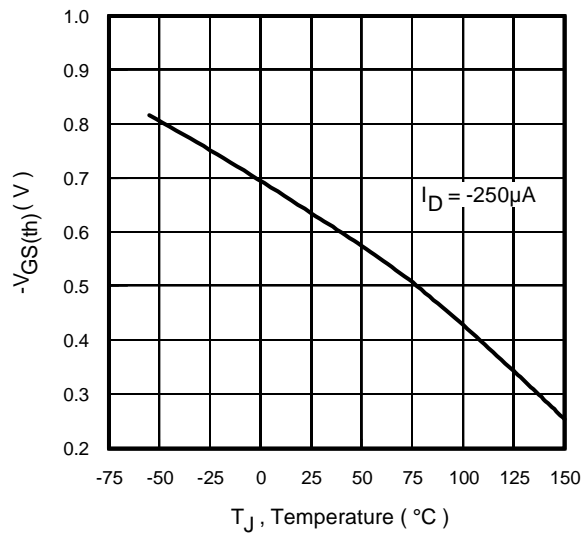


Fig 15. Typical $V_{GS(th)}$ Vs. Junction Temperature

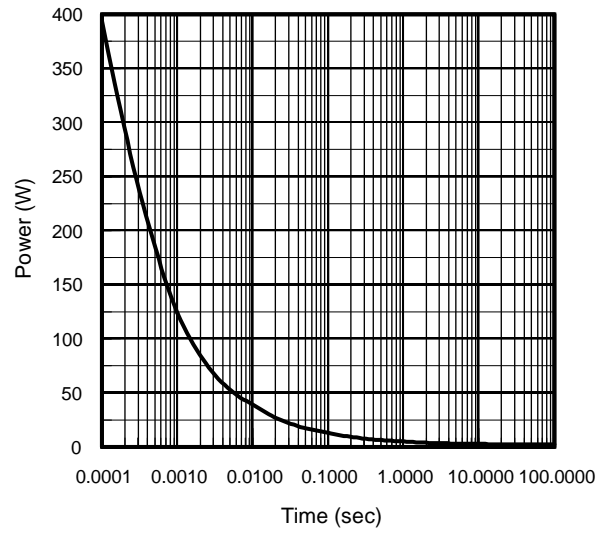
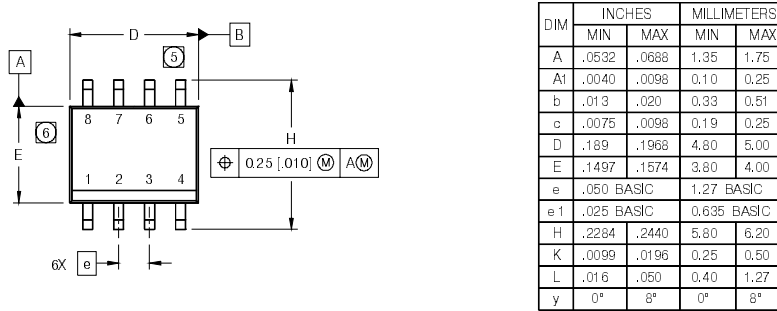


Fig 16. Typical Power Vs. Time

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SO-8 Package Outline

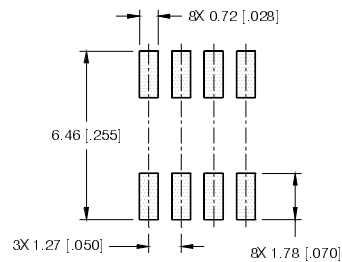
Dimensions are shown in millimeters (inches)



NOTES:

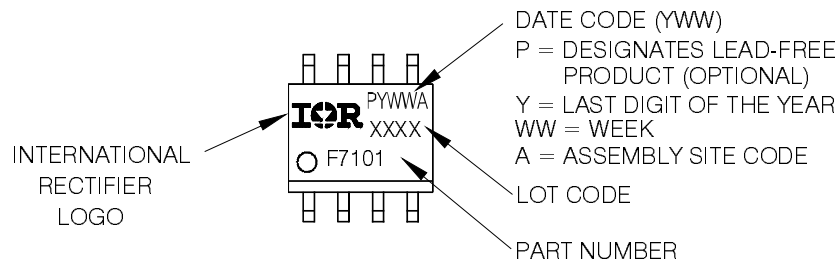
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 [0.006].
6. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 [0.010].
7. DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.

FOOTPRINT



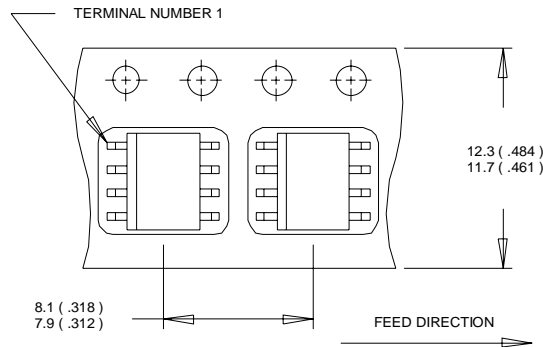
SO-8 Part Marking Information (Lead-Free)

EXAMPLE: THIS IS AN IRF7101 (MOSFET)

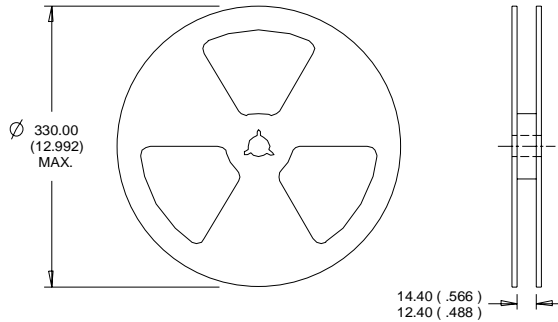


SO-8 Tape and Reel

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.

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