

# IRF7101PbF

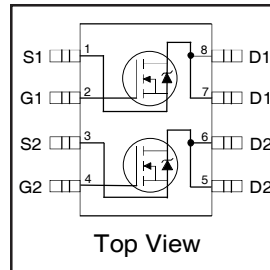
## HEXFET® Power MOSFET

- Advanced Process Technology
- Ultra Low On-Resistance
- Dual N-Channel MOSFET
- Surface Mount
- Available in Tape & Reel
- Dynamic dv/dt Rating
- Fast Switching
- Lead-Free

### Description

Fourth Generation HEXFETs from International Rectifier utilize advanced processing techniques to achieve the lowest possible on-resistance per silicon area. This benefit, combined with the fast switching speed and ruggedized device design that HEXFET Power MOSFETs are well known for, provides the designer with an extremely efficient device for use in a wide variety of applications.

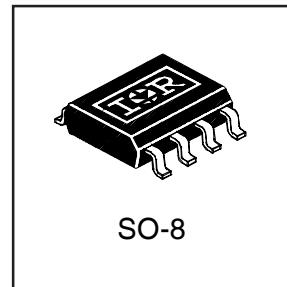
The SO-8 has been modified through a customized leadframe for enhanced thermal characteristics and dual-die capability making it ideal in a variety of power applications. With these improvements, multiple devices can be used in an application with dramatically reduced board space. The package is designed for vapor phase, infra red, or wave soldering techniques. Power dissipation of greater than 0.8W is possible in a typical PCB mount application.



$$V_{DSS} = 20V$$

$$R_{DS(on)} = 0.10\Omega$$

$$I_D = 3.5A$$



SO-8

### Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	3.5	A
$I_D @ T_A = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	2.3	
$I_{DM}$	Pulsed Drain Current ①	14	
$P_D @ T_C = 25^\circ C$	Power Dissipation	2.0	W
	Linear Derating Factor	0.016	W/°C
$V_{GS}$	Gate-to-Source Voltage	$\pm 12$	V
dv/dt	Peak Diode Recovery dv/dt ②	3.0	V/nS
$T_J, T_{STG}$	Junction and Storage Temperature Range	-55 to +150	°C
	Soldering Temperature, for 10 seconds	300(1.6mm from case)	

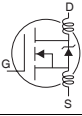
### Thermal Resistance Ratings

	Parameter	Min.	Typ.	Max	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient ④	—	—	62.5	°C/W

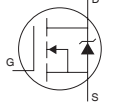
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IR Rectifier

## Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	20	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.025	—	V/ $^\circ\text{C}$	Reference to $25^\circ\text{C}, I_D = 1\text{mA}$
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	—	—	0.10 0.15	$\Omega$	$V_{GS} = 10V, I_D = 1.8A$ ③ $V_{GS} = 4.5V, I_D = 1.0A$ ③
$V_{GS(th)}$	Gate Threshold Voltage	1.0	—	3.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
$g_{fs}$	Forward Transconductance	1.1	—	—	S	$V_{DS} = 15V, I_D = 3.5A$ ③
$I_{DSS}$	Drain-to-Source Leakage Current	—	—	2.0 250	$\mu A$	$V_{DS} = 20V, V_{GS} = 0V$ $V_{DS} = 16V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
$I_{GSS}$	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 12V$
	Gate-to-Source Reverse Leakage	—	—	-100	nA	$V_{GS} = -12V$
$Q_g$	Total Gate Charge	—	—	15	nC	$I_D = 1.8A$
$Q_{gs}$	Gate-to-Source Charge	—	—	2.0	nC	$V_{DS} = 16V$
$Q_{gd}$	Gate-to-Drain ("Miller") Charge	—	—	3.6	nC	$V_{GS} = 10V$
$t_{d(on)}$	Turn-On Delay Time	—	7.0	—	ns	$V_{DD} = 10V$ $I_D = 1.8A$ $R_G = 8.2\Omega$ $R_D = 26\Omega$
$t_r$	Rise Time	—	10	—		
$t_{d(off)}$	Turn-Off Delay Time	—	24	—		
$t_f$	Fall Time	—	30	—		
$L_D$	Internal Drain Inductance	—	4.0	—	nH	Between lead, 6mm(0.25in.) from package and center of die contact 
$L_S$	Internal Source Inductance	—	6.0	—		
$C_{iss}$	Input Capacitance	—	320	—	pF	$V_{GS} = 0V$
$C_{oss}$	Output Capacitance	—	250	—		$V_{DS} = 15V$
$C_{rss}$	Reverse Transfer Capacitance	—	75	—		$f = 1.0\text{MHz}$

## Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	2.0	A	MOSFET symbol showing the integral reverse p-n junction diode. 
$I_{SM}$	Pulsed Source Current (Body Diode) ①	—	—	14		
$V_{SD}$	Diode Forward Voltage	—	—	1.2	V	$T_J = 25^\circ\text{C}, I_S = 1.7A, V_{GS} = 0V$ ③
$t_{rr}$	Reverse Recovery Time	—	36	54	ns	$T_J = 25^\circ\text{C}, I_F = 1.7A$
$Q_{rr}$	Reverse Recovery Charge	—	41	62	nC	$di/dt = 100A/\mu s$ ③
$t_{on}$	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by $L_S + L_D$ )				

### Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ②  $I_{SD} \leq 3.5A, di/dt \leq 90A/\mu s, V_{DD} \leq V_{(BR)DSS}, T_J \leq 150^\circ\text{C}$
- ③ Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$ .
- ④ Surface mounted on FR-4 board,  $t \leq 10\text{sec}$ .

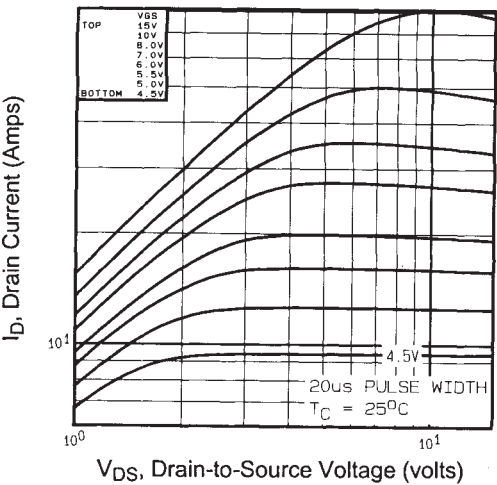


Fig 1. Typical Output Characteristics,

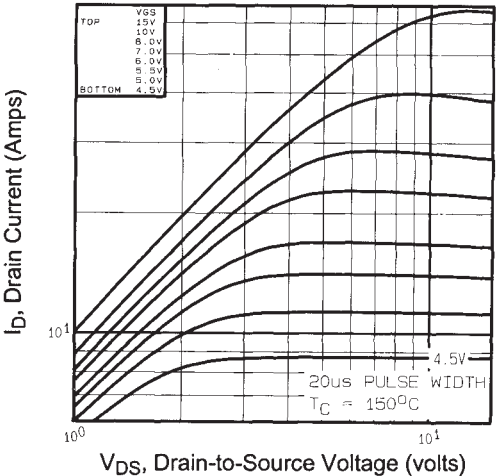


Fig 2. Typical Output Characteristics,

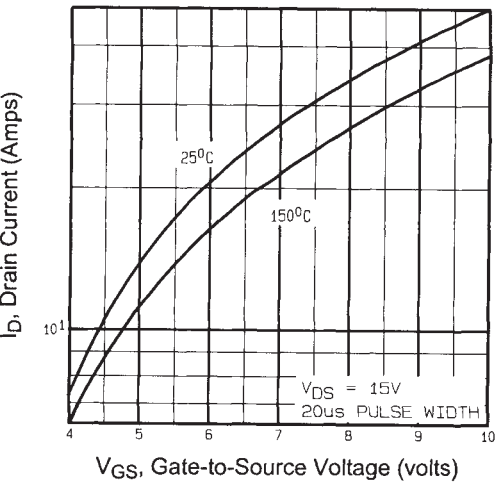


Fig 3. Typical Transfer Characteristics

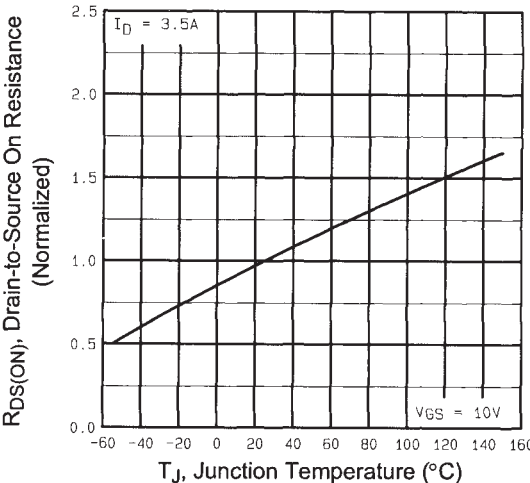
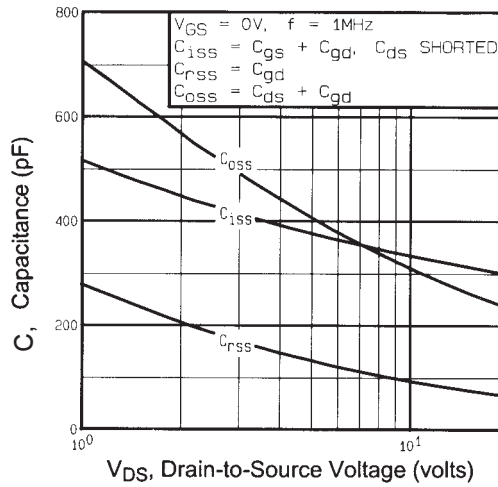


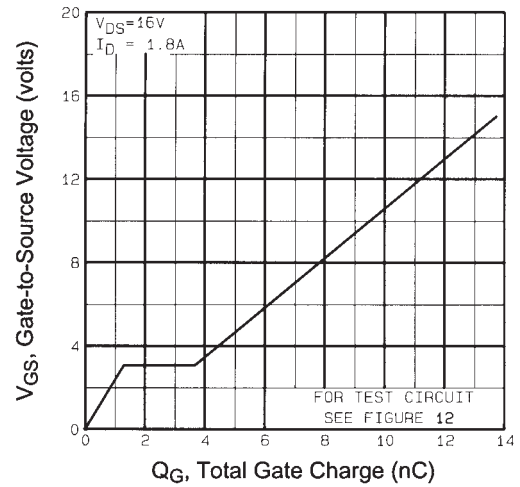
Fig 4. Normalized On-Resistance  
Vs. Temperature

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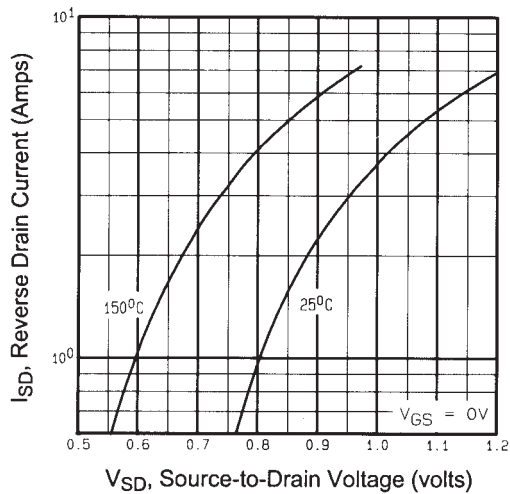
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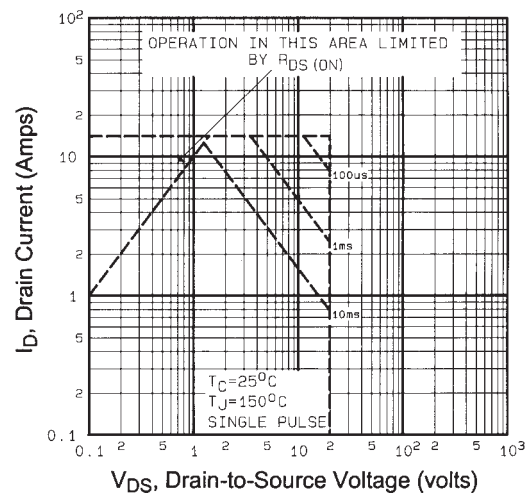
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



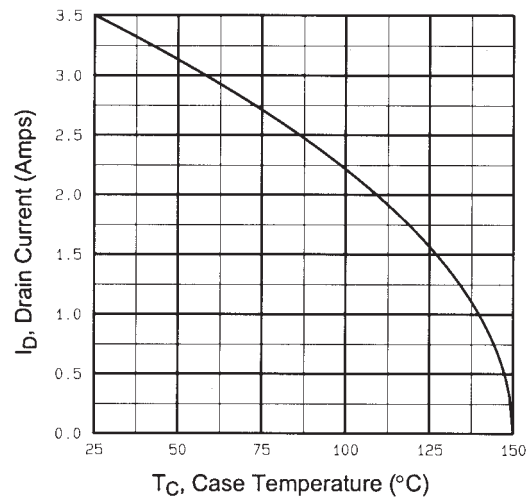
**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage



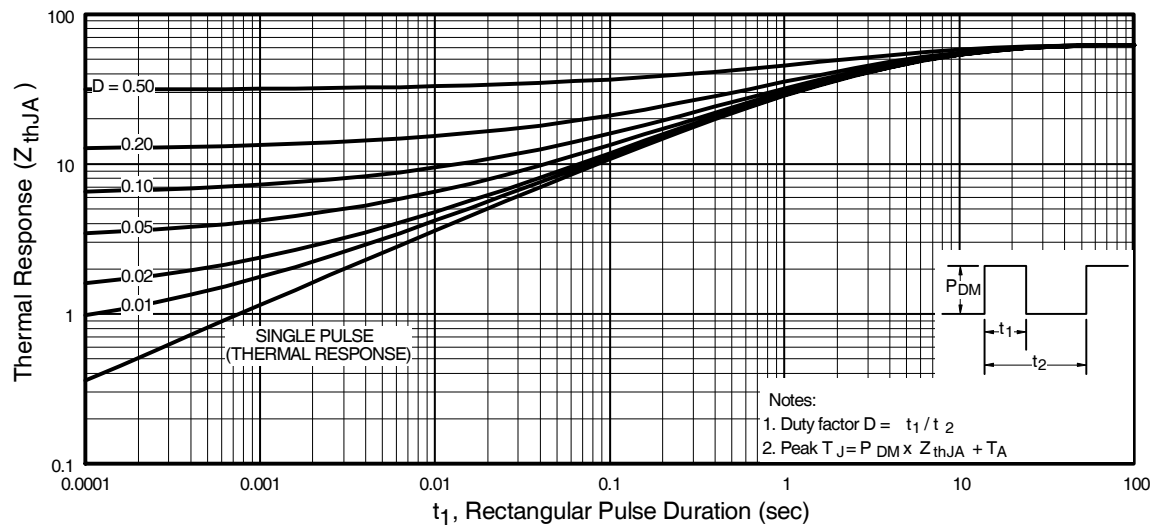
**Fig 7.** Typical Source-Drain Diode Forward Voltage



**Fig 8.** Maximum Safe Operating Area



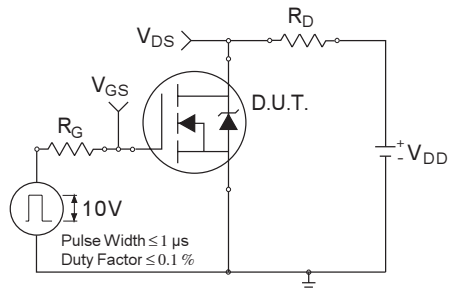
**Fig 9.** Maximum Drain Current Vs. Case Temperature



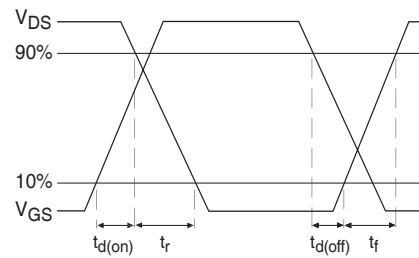
**Fig 10.** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

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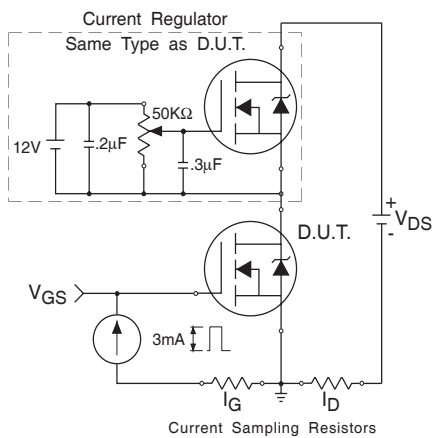
International  
**IOR** Rectifier



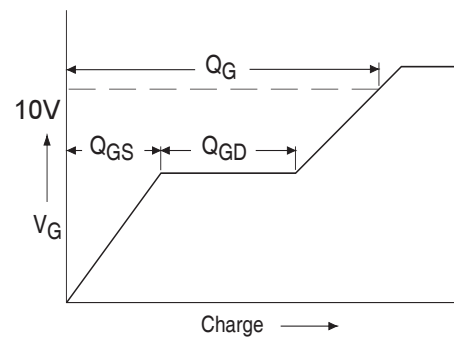
**Fig 11a.** Switching Time Test Circuit



**Fig 11b.** Switching Time Waveforms

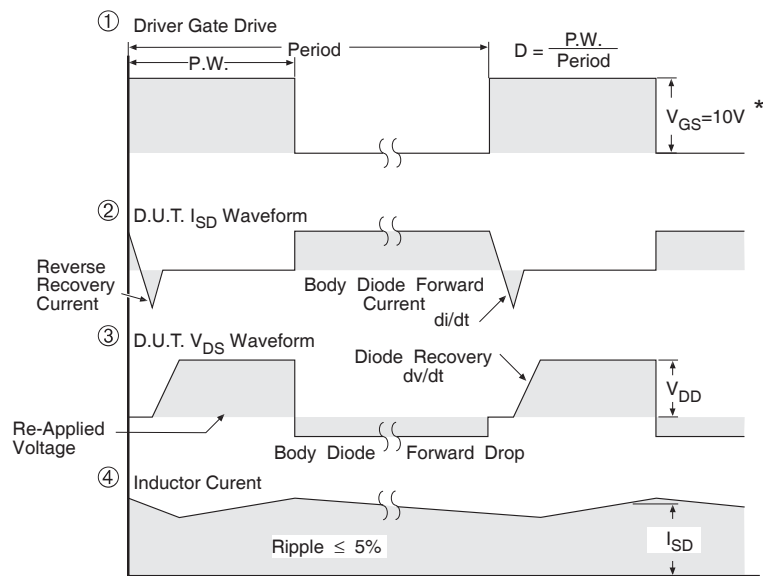
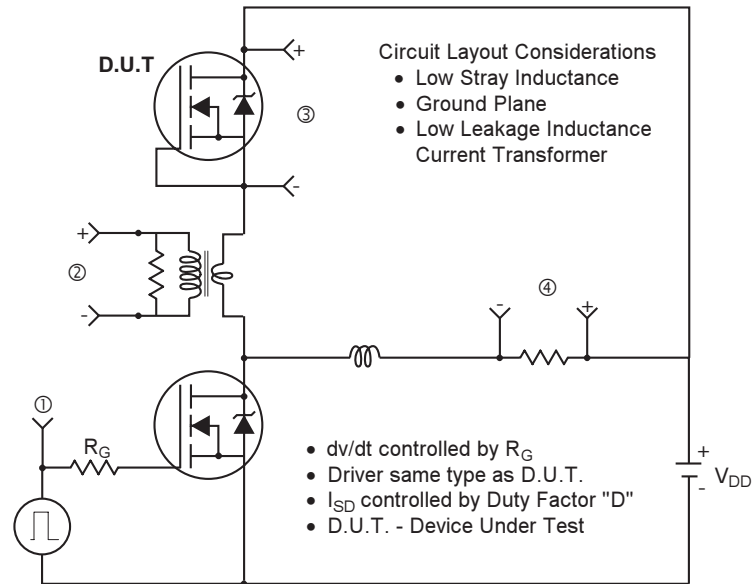


**Fig 12a.** Gate Charge Test Circuit



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

## Peak Diode Recovery dv/dt Test Circuit



\*  $V_{GS} = 5V$  for Logic Level Devices

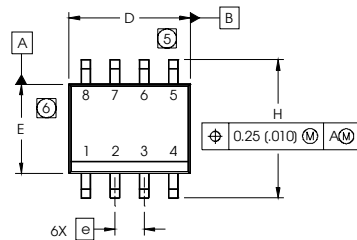
**Fig 13. For N-Channel HEXFETS**

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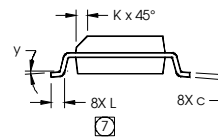
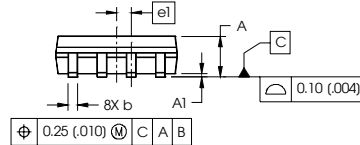
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## SO-8 Package Outline

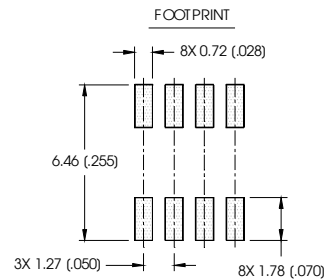
Dimensions are shown in millimeters (inches)



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
Al	.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°

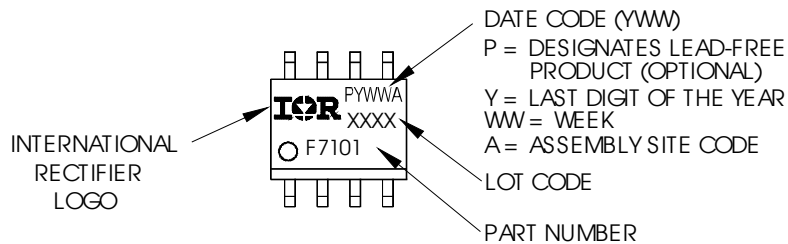


- NOTES:
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
  2. CONTROLLING DIMENSION: MILLIMETER
  3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
  4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
  5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 (.006).
  6. DIMENSION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



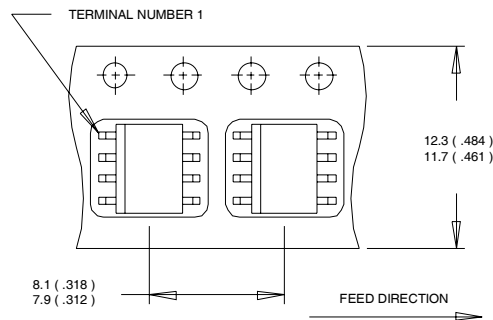
## SO-8 Part Marking Information (Lead-Free)

EXAMPLE: THIS IS AN IRF7101 (MOSFET)



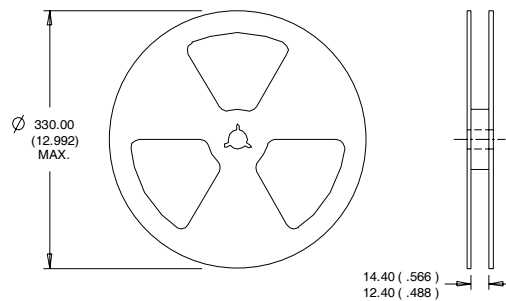
## SO-8 Tape and Reel

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.

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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