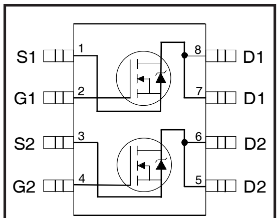
International
IOR Rectifier

PD -96085A

IRF7103IPbF

HEXFET® Power MOSFET

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



Top View

V_{DSS} = 50V

$R_{DS(on)}$ = 0.130Ω

I_D = 3.0A

Description

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.


SO-8

Absolute Maximum Ratings

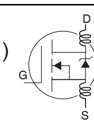
	Parameter	Max.	Units
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ 10V	3.0	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 10V	2.3	
I_{DM}	Pulsed Drain Current ①	10	
P_D @T_A = 25°C	Power Dissipation	2.0	W
	Linear Derating Factor	0.016	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
dv/dt	Peak Diode Recovery dv/dt ②	4.5	V/nS
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to + 150	°C

Thermal Resistance Ratings

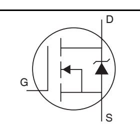
	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient ④	—	—	62.5	°C/W

02/09/10

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	50	–––	–––	V	V_{GS} = 0V, I_D = 250μA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	–––	0.049	–––	V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	–––	0.11	0.13	Ω	V_{GS} = 10V, I_D = 3.0A ③
		–––	0.16	0.20		V_{GS} = 4.5V, I_D = 1.5A ③
$V_{GS(th)}$	Gate Threshold Voltage	1.0	–––	3.0	V	V_{DS} = V_{GS}, I_D = 250μA
g_{fs}	Forward Transconductance	–––	3.8	–––	S	V_{DS} = 15V, I_D = 3.0A ③
I_{DSS}	Drain-to-Source Leakage Current	–––	–––	2.0	μA	V_{DS} = 40V, V_{GS} = 0V
		–––	–––	25		V_{DS} = 40V, V_{GS} = 0V, T_J = 55 °C
I_{GSS}	Gate-to-Source Forward Leakage	–––	–––	100	nA	V_{GS} = 20V
	Gate-to-Source Reverse Leakage	–––	–––	-100		V_{GS} = - 20V
Q_g	Total Gate Charge	–––	12	30	nC	I_D = 2.0A
Q_{gs}	Gate-to-Source Charge	–––	1.2	–––		V_{DS} = 25V
Q_{gd}	Gate-to-Drain ("Miller") Charge	–––	3.5	–––		V_{GS} = 10V ③
$t_{d(on)}$	Turn-On Delay Time	–––	9.0	20	ns	V_{DD} = 25V
t_r	Rise Time	–––	8.0	20		I_D = 1.0A
$t_{d(off)}$	Turn-Off Delay Time	–––	45	70		R_G = 6.0Ω
t_f	Fall Time	–––	25	50		R_D = 25Ω ③
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	–––	290	–––	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	–––	140	–––		V_{DS} = 25V
C_{rss}	Reverse Transfer Capacitance	–––	37	–––		f = 1.0MHz

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	–––	–––	12		
V_{SD}	Diode Forward Voltage	–––	–––	1.2	V	T_J = 25°C, I_S = 1.5A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time	–––	70	100	ns	T_J = 25°C, I_F = 1.5A
Q_{rr}	Reverse RecoveryCharge	–––	110	170	nC	di/dt = 100A/μs 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 $I_{SD} \leq$ 1.8A, di/dt $\leq$ 90A/μs, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq$ 150°C

③ Pulse width $\leq$ 300μs; duty cycle $\leq$ 2%.

④ Surface mounted on FR-4 board, t $\leq$ 10sec.

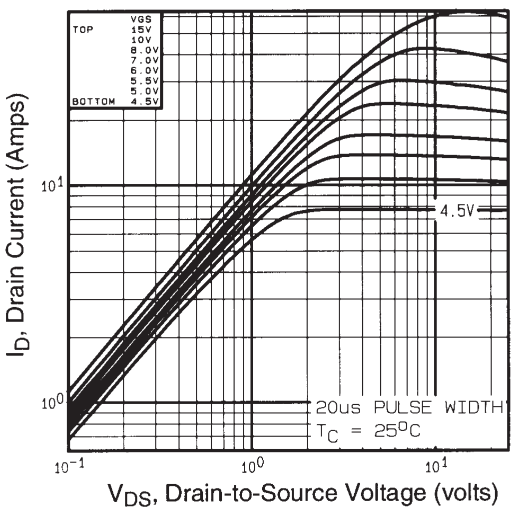


Fig 1. Typical Output Characteristics,

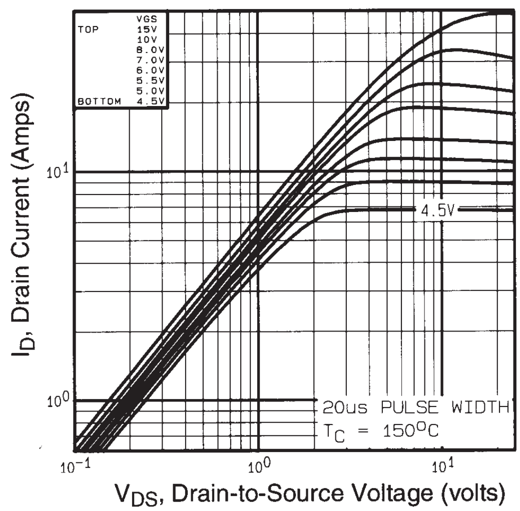


Fig 2. Typical Output Characteristics,

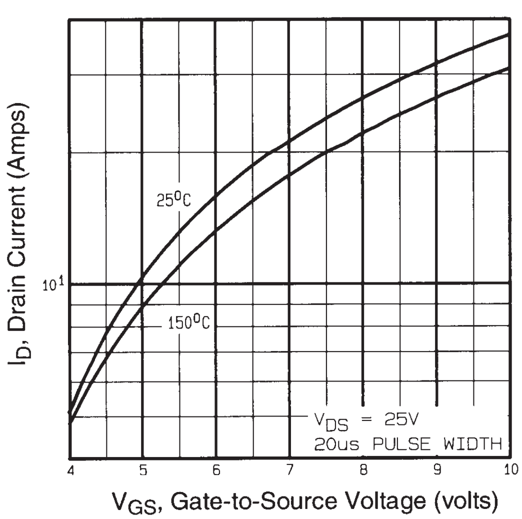


Fig 3. Typical Transfer Characteristics

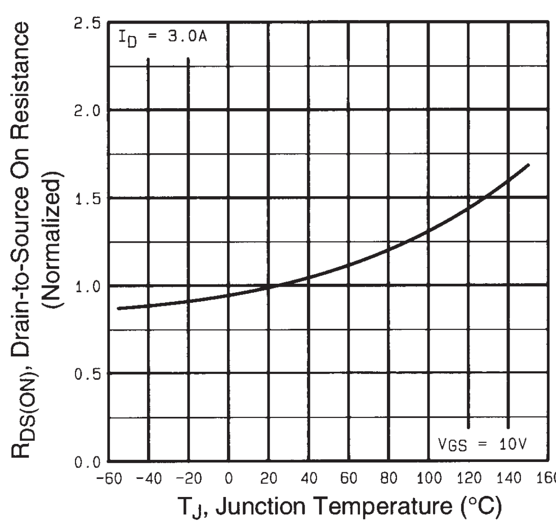


Fig 4. Normalized On-Resistance Vs. Temperature

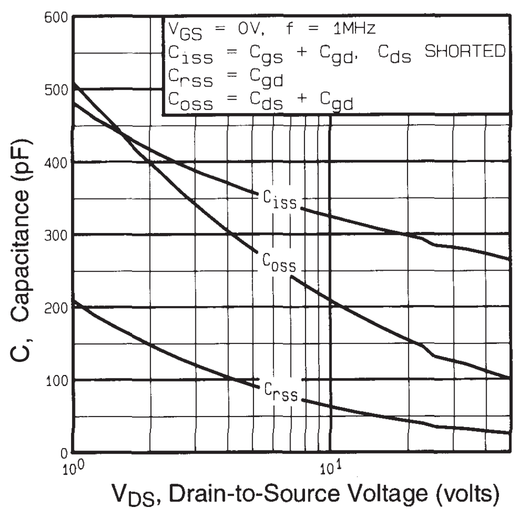


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

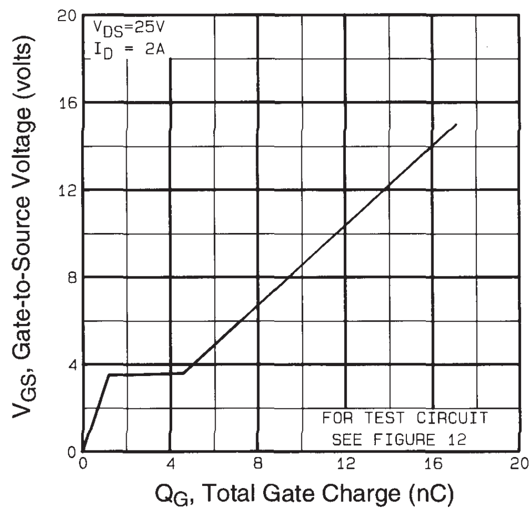


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

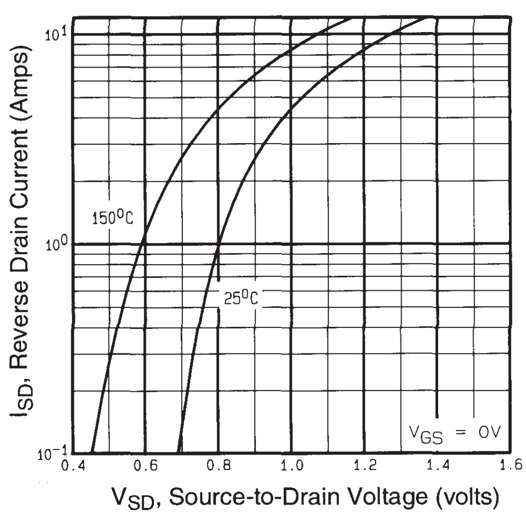


Fig 7. Typical Source-Drain Diode Forward Voltage

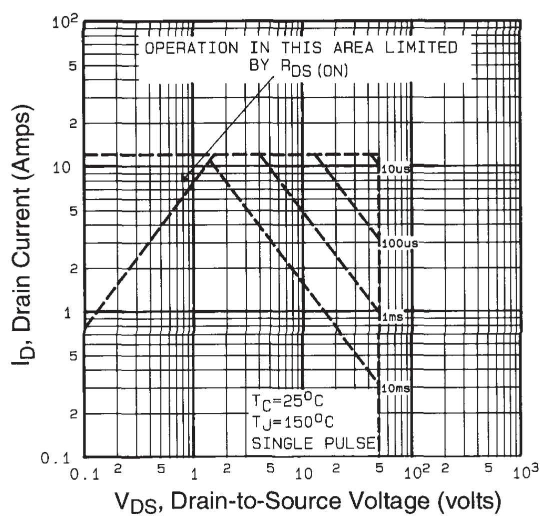


Fig 8. Maximum Safe Operating Area

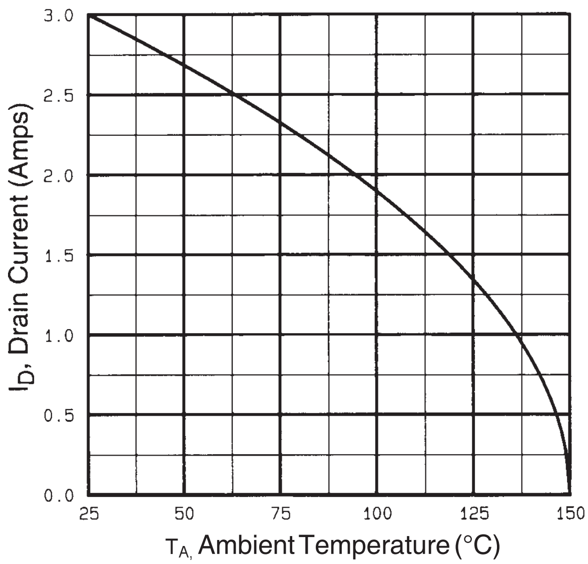


Fig 9. Maximum Drain Current Vs. Ambient Temperature

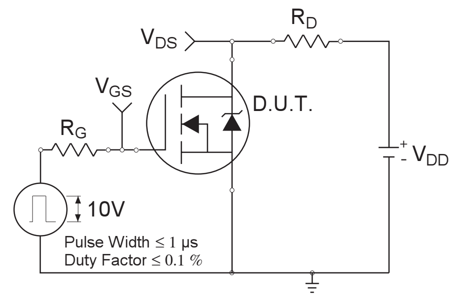


Fig 10a. Switching Time Test Circuit

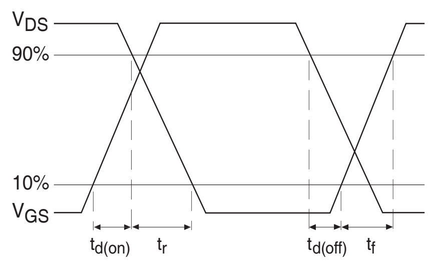


Fig 10b. Switching Time Waveforms

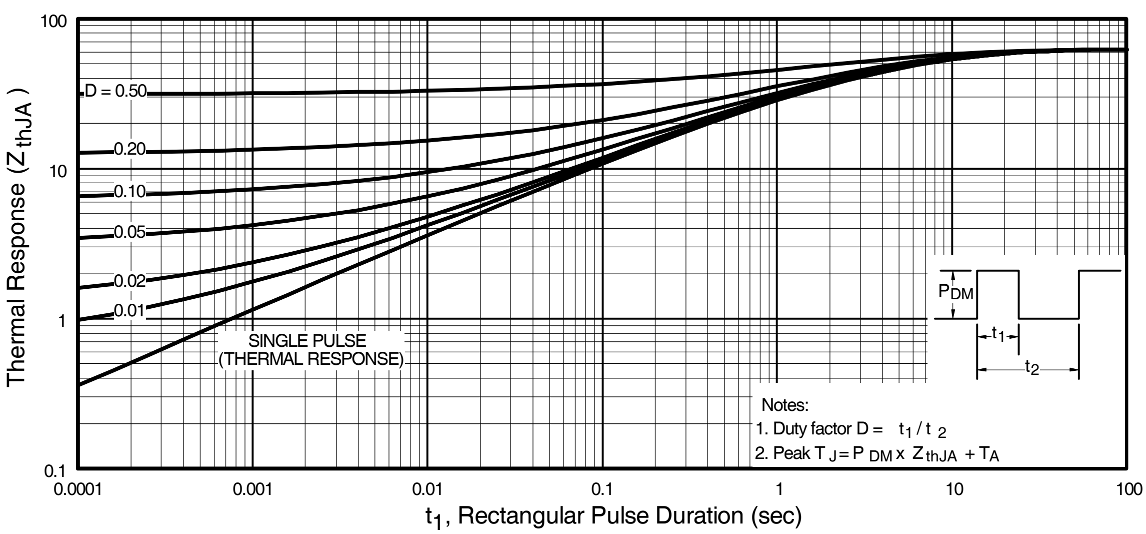


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

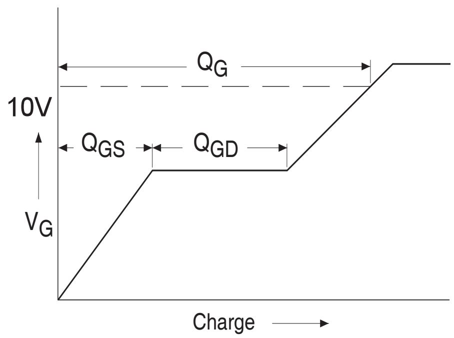


Fig 12a. Basic Gate Charge Waveform

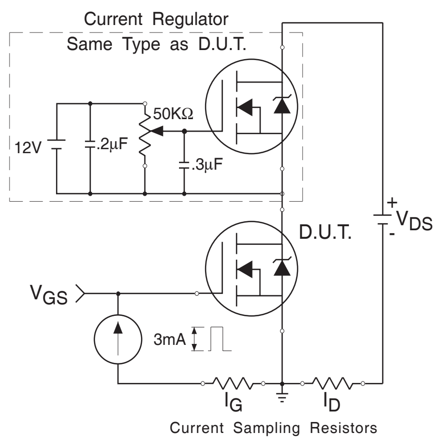
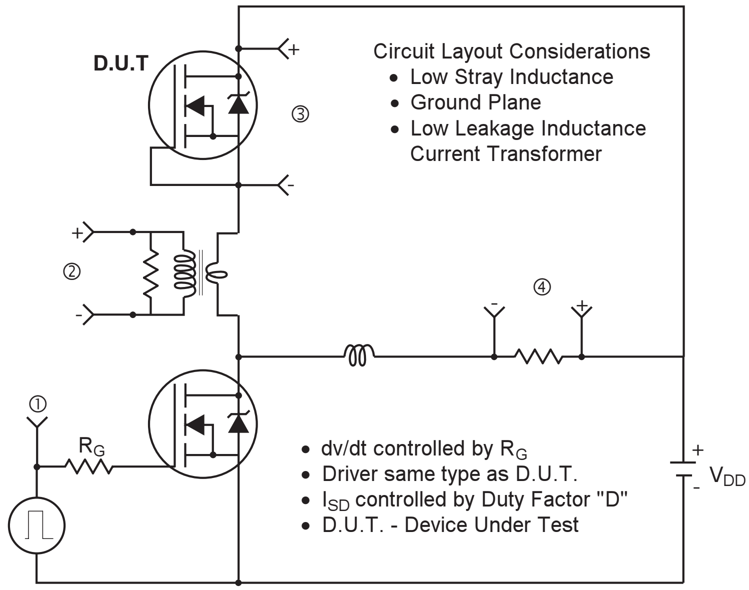
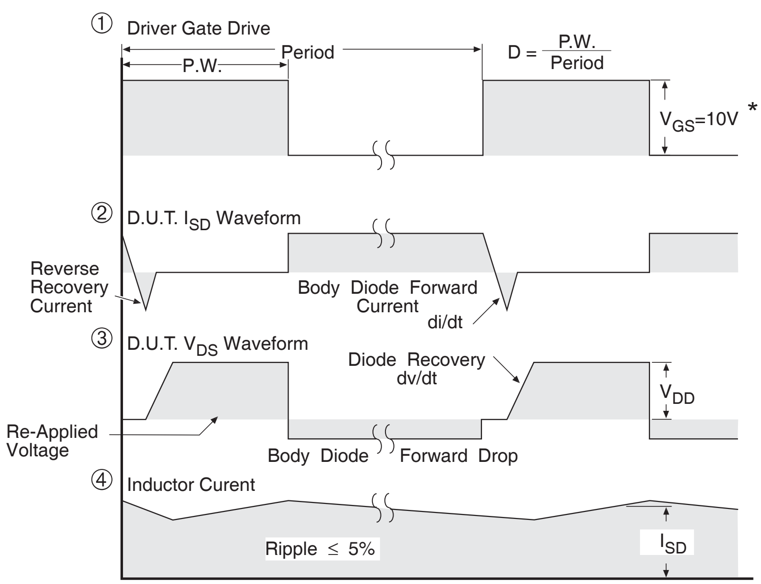


Fig 12b. Gate Charge Test Circuit

Peak Diode Recovery dv/dt Test Circuit



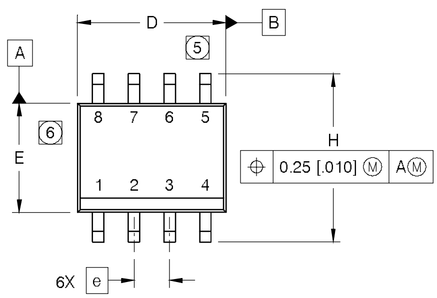


* VGS = 5V for Logic Level Devices

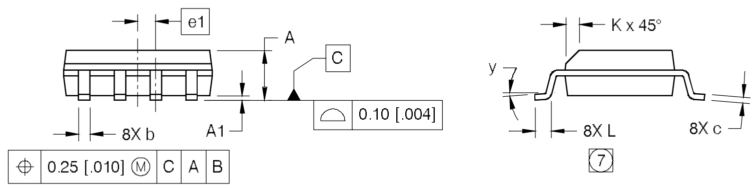
Fig 13. For N-Channel HEXFETS

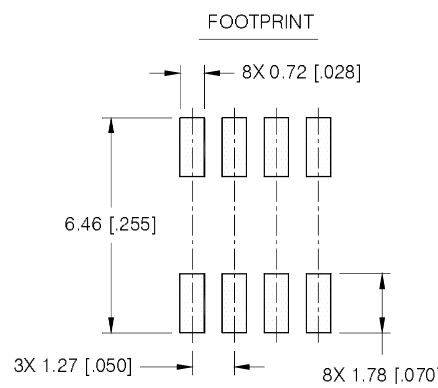
SO-8 Package Outline(Mosfet & Fetky)

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°



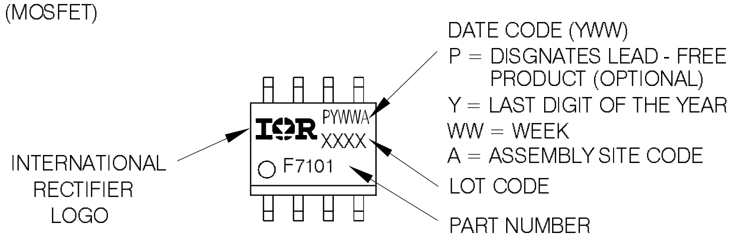


NOTES:

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.

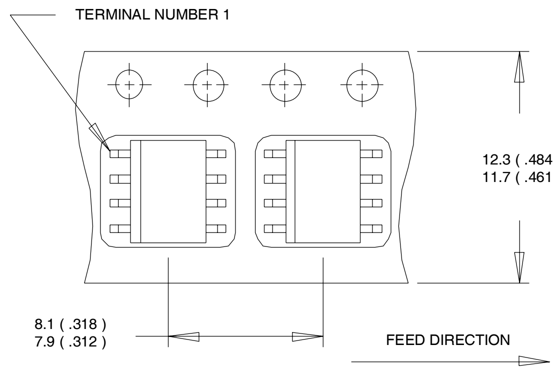
SO-8 Part Marking Information

EXAMPLE: THIS IS AN IRF7101 (MOSFET)

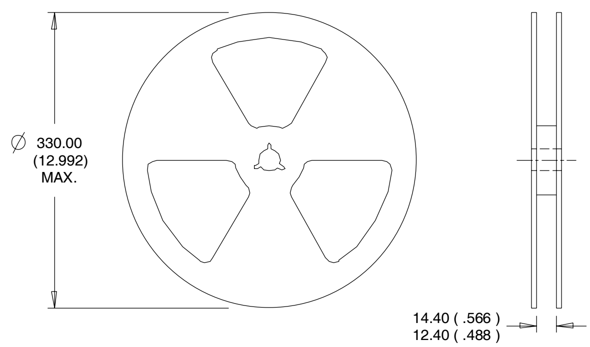


Note: For the most current drawing please refer to IR website at http://www.irf.com/package/

SO-8 Tape and Reel (Dimensions are shown in milimeters (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 Industrial market.
Qualifications Standards can be found on IR's Web site.

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