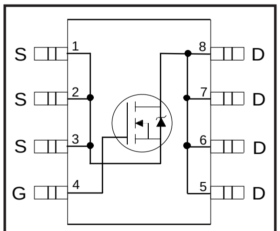
International
IOR Rectifier

IRF1902PbF

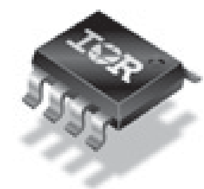
HEXFET® Power MOSFET

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

V_{DSS}	$R_{DS(on)}$ max (mΩ)	I_D
20V	85@V_{GS} = 4.5V	4.0A
	170@V_{GS} = 2.7V	3.2A



Top View



SO-8

Description

These N-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	20	V
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ 4.5V	4.2	A
I_D @ T_A= 70°C	Continuous Drain Current, V_{GS} @ 4.5V	3.4	
I_{DM}	Pulsed Drain Current ①	17	
P_D @T_A = 25°C	Power Dissipation ③	2.5	W
P_D @T_A = 70°C	Power Dissipation③	1.6	
	Linear Derating Factor	0.02	mW/°C
V_{GS}	Gate-to-Source Voltage	± 12	V
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to + 150	°C

Thermal Resistance

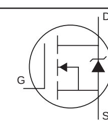
Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JL}$	Junction-to-Drain Lead	——	20	°C/W
$R_{\theta JA}$	Junction-to-Ambient ③	——	50	

8/10/04

Electrical Characteristics @ T_J = 25°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 = 250μA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	——	0.019	——	V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	——	——	85	mΩ	V_{GS} = 4.5V, I_D = 4.0A ②
		——	——	170		V_{GS} = 2.7V, I_D = 3.2A ②
$V_{GS(th)}$	Gate Threshold Voltage	0.70	——	——	V	V_{DS} = V_{GS}, I_D = 250μA
g_{fs}	Forward Transconductance	5.6	——	——	S	V_{DS} = 10V, I_D = 4.0A
I_{DSS}	Drain-to-Source Leakage Current	——	——	1.0	μA	V_{DS} = 16V, V_{GS} = 0V
		——	——	25		V_{DS} = 16V, V_{GS} = 0V, T_J = 70°C
I_{GSS}	Gate-to-Source Forward Leakage	——	——	100	nA	V_{GS} = 12V
	Gate-to-Source Reverse Leakage	——	——	-100		V_{GS} = -12V
Q_g	Total Gate Charge	——	5.0	7.5	nC	I_D = 4.2A
Q_{gs}	Gate-to-Source Charge	——	1.2	——		V_{DS} = 10V
Q_{gd}	Gate-to-Drain ("Miller") Charge	——	1.8	——		V_{GS} = 4.5V
$t_{d(on)}$	Turn-On Delay Time	——	5.9	——	ns	V_{DD} = 10V ②
t_r	Rise Time	——	13	——		I_D = 1.0A
$t_{d(off)}$	Turn-Off Delay Time	——	23	——		R_G = 53Ω
t_f	Fall Time	——	19	——		V_{GS} = 4.5V
C_{iss}	Input Capacitance	——	310	——	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	——	130	——		V_{DS} = 15V
C_{rss}	Reverse Transfer Capacitance	——	55	——		f = 1.0MHz

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	–––	–––	4.2	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	–––	–––	17		
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	——	38	57	ns	T_J = 25°C, I_F = 2.5A
Q_{rr}	Reverse Recovery Charge	——	42	63	nC	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

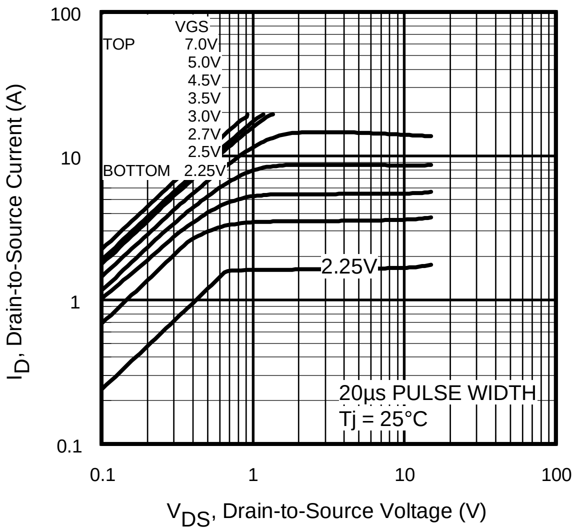


Fig 1. Typical Output Characteristics

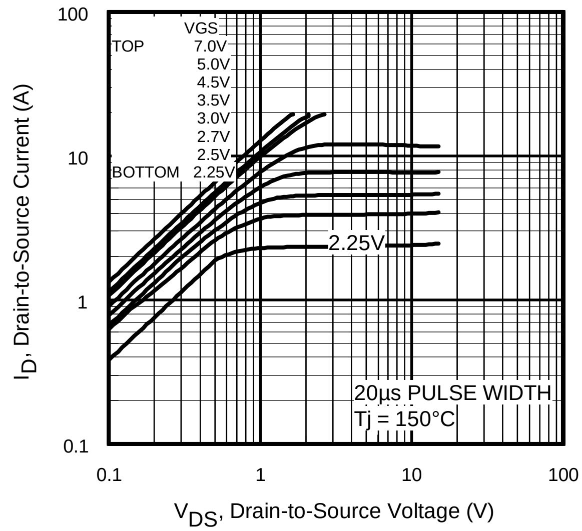


Fig 2. Typical Output Characteristics

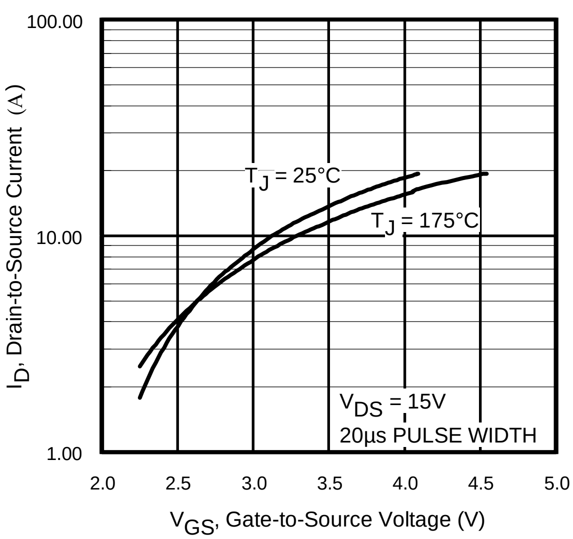


Fig 3. Typical Transfer Characteristics

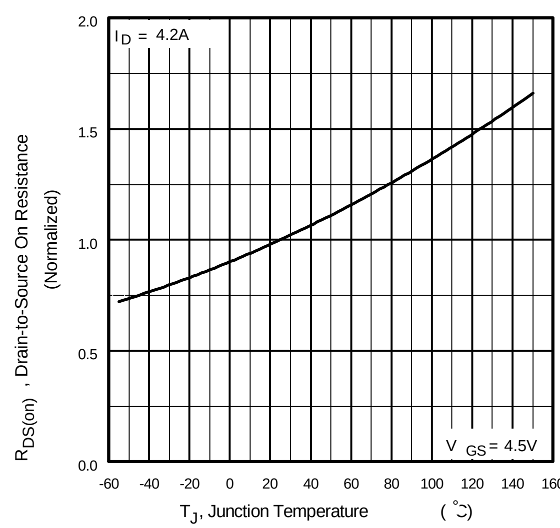


Fig 4. Normalized On-Resistance Vs. Temperature

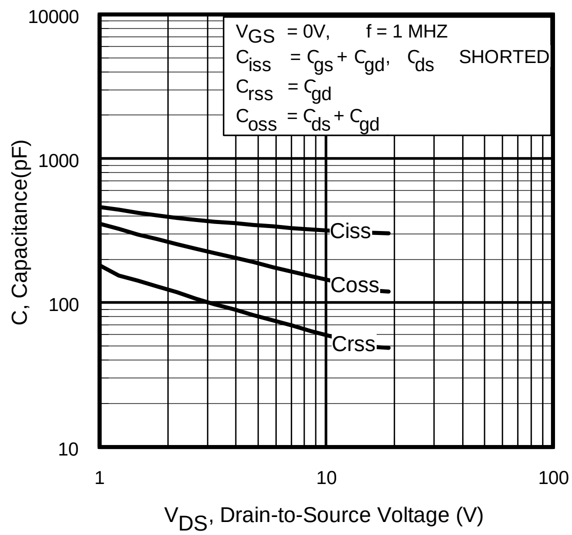


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

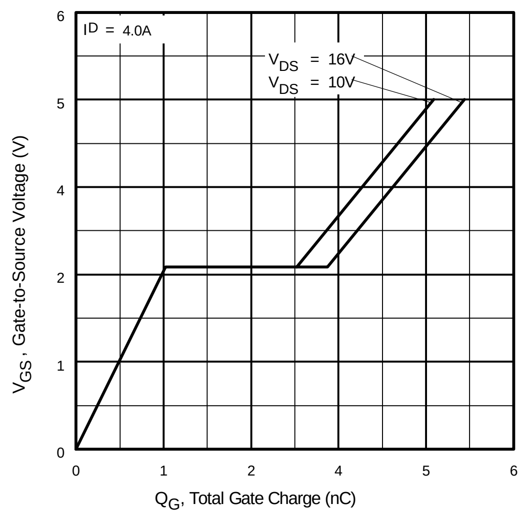


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

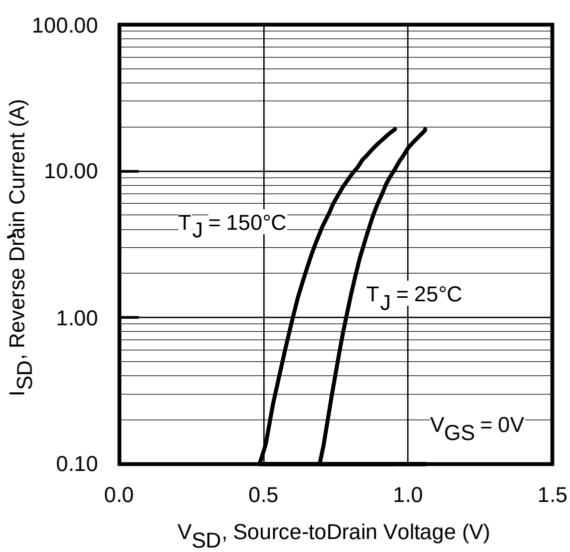


Fig 7. Typical Source-Drain Diode Forward Voltage

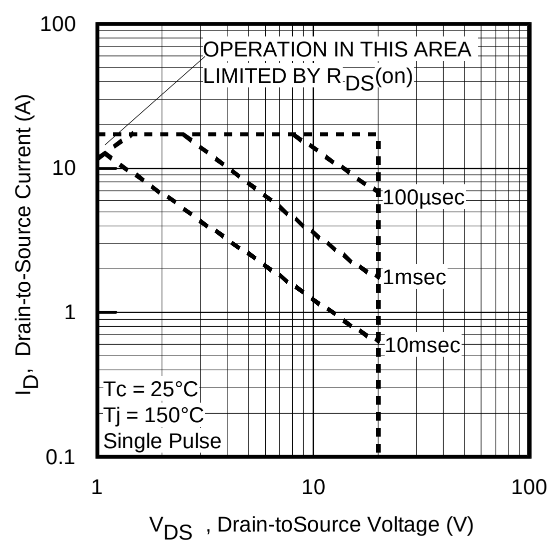


Fig 8. Maximum Safe Operating Area

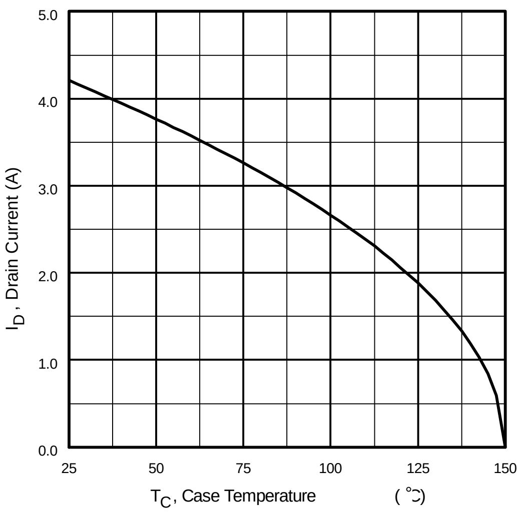


Fig 9. Maximum Drain Current Vs. Case Temperature

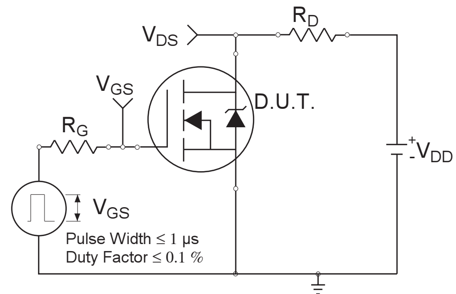


Fig 10a. Switching Time Test Circuit

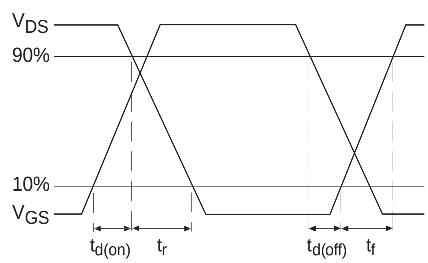


Fig 10b. Switching Time Waveforms

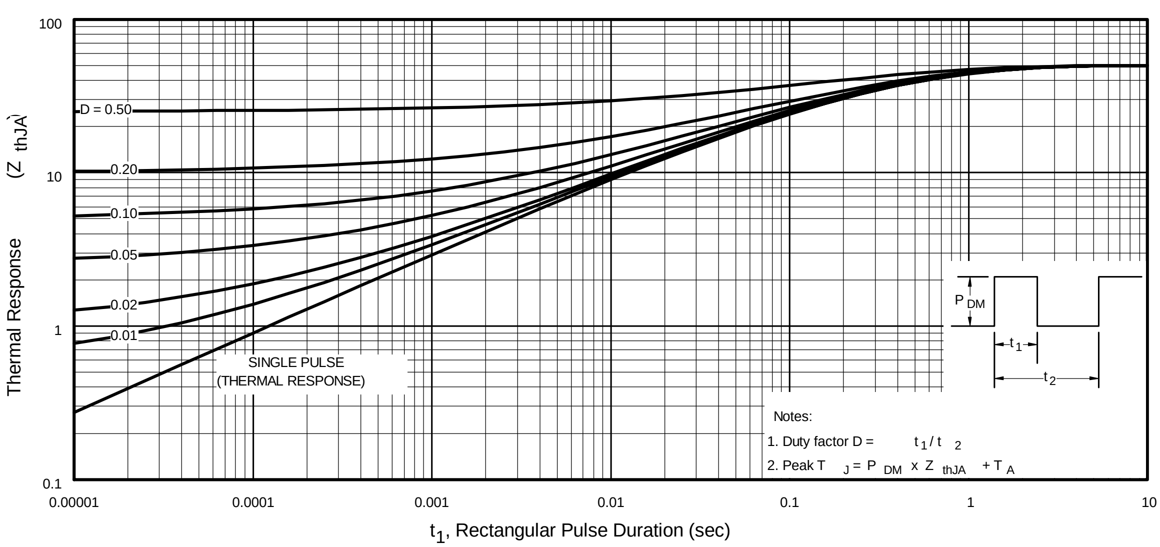


Fig 11. Typical Effective Transient Thermal Impedance, Junction-to-Ambient

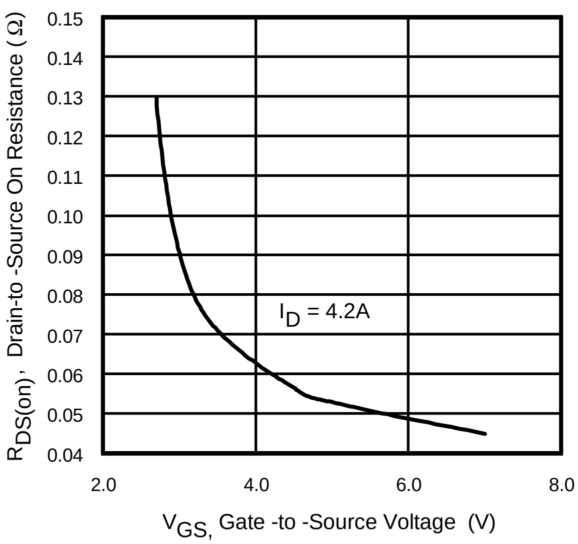


Fig 12. Typical On-Resistance Vs. Gate Voltage

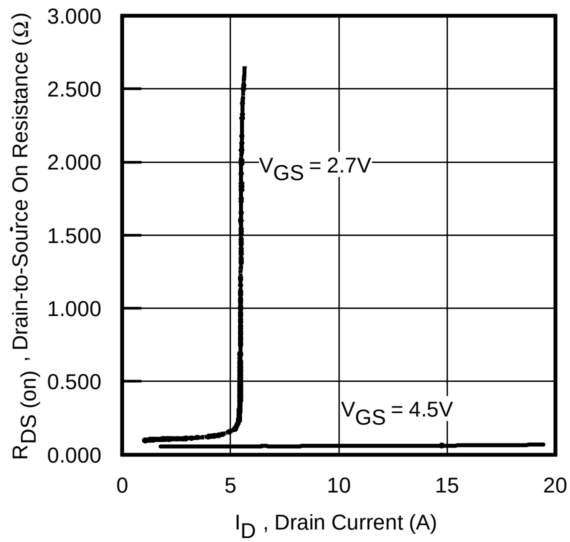


Fig 13. Typical On-Resistance Vs. Drain Current

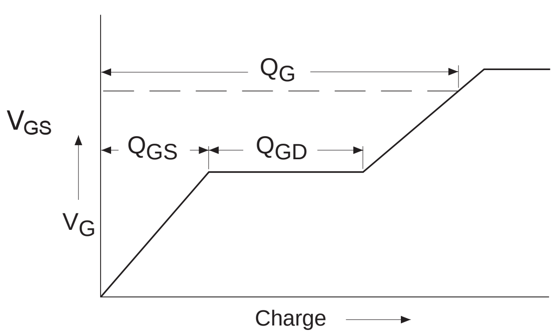


Fig 14a. Basic Gate Charge Waveform

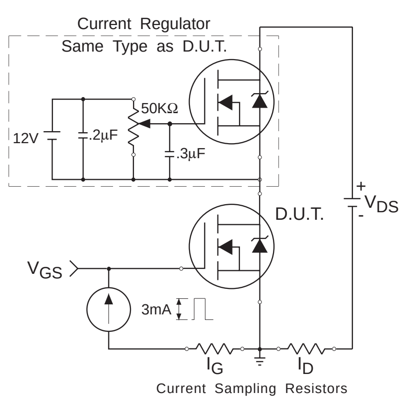


Fig 14b. Gate Charge Test Circuit

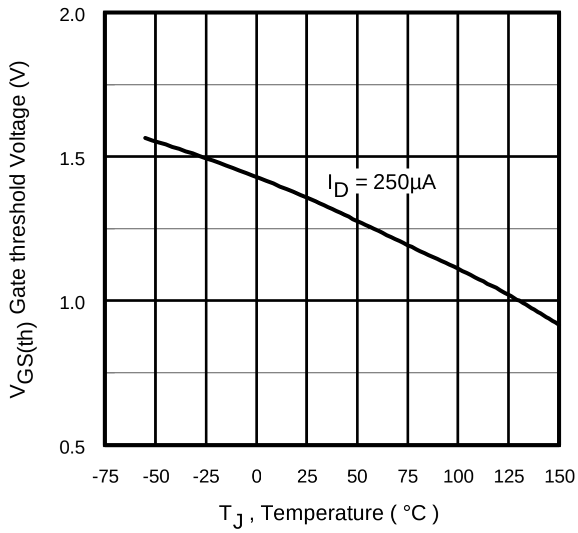


Fig 15. Typical Threshold Voltage Vs. Junction Temperature

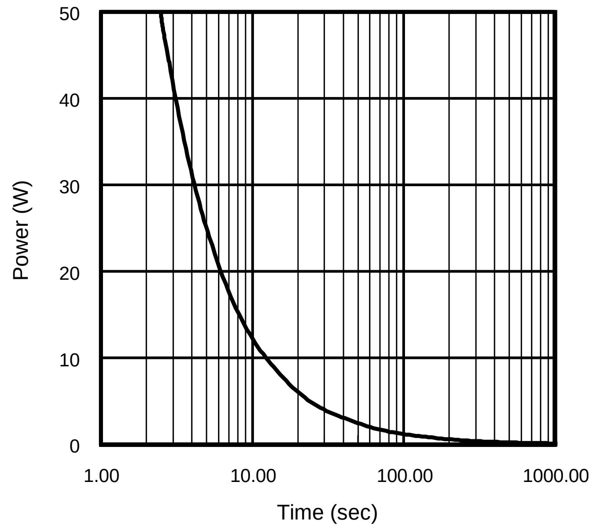
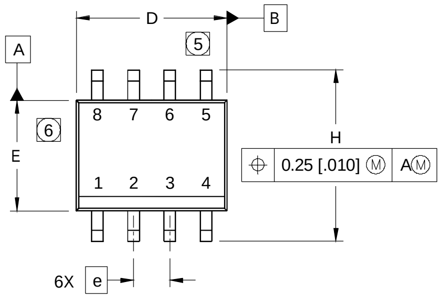


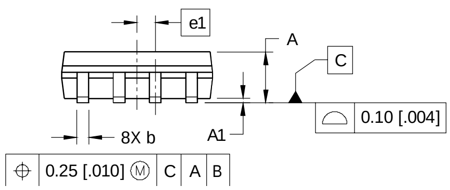
Fig 16. Typical Power Vs. Time

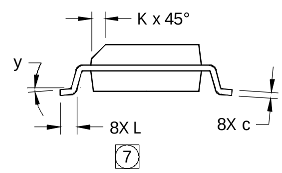
SO-8 Package Outline

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	
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:

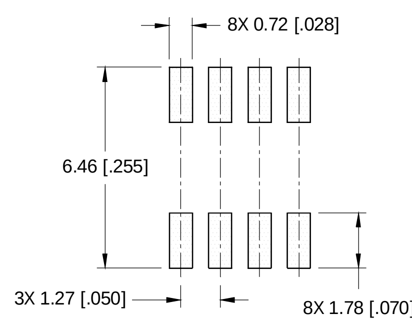
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.

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].

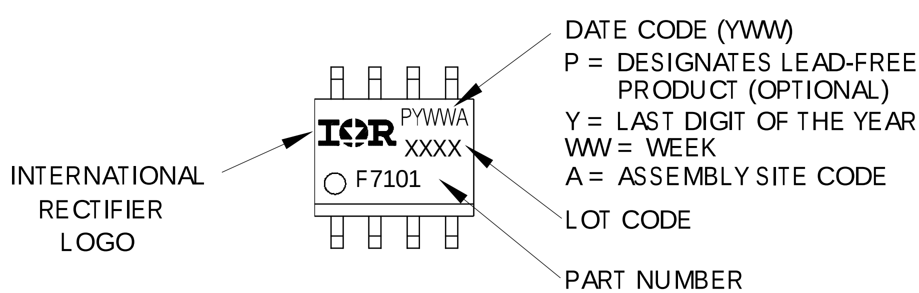
7 DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.

FOOTPRINT

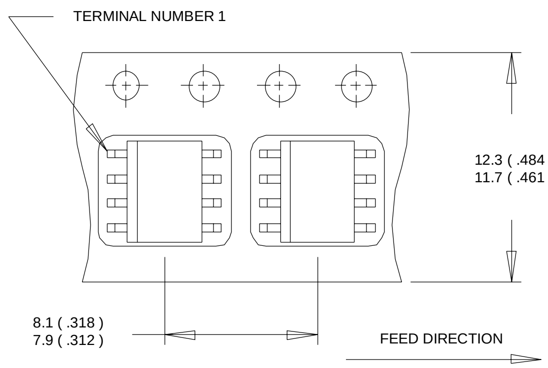


SO-8 Part Marking

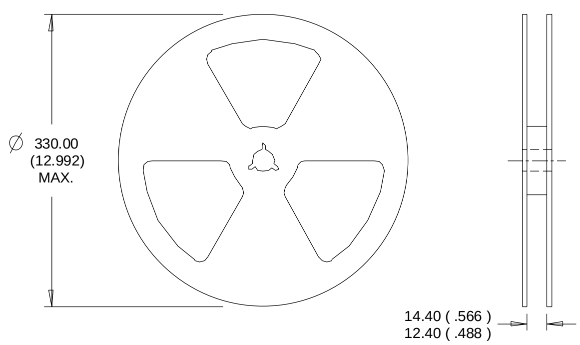
EXAMPLE: THIS IS AN IRF7101 (MOSFET)



SO-8 Tape and Reel



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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