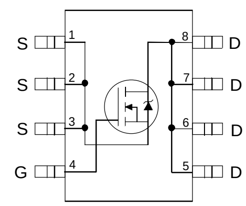
PD - 95168

International
IOR Rectifier

Si4410DYPbF

HEXFET® Power MOSFET

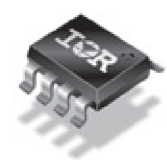
- N-Channel MOSFET
- Low On-Resistance
- Low Gate Charge
- Surface Mount
- Logic Level Drive
- Lead-Free



Top View

V_{DSS} = 30V

$R_{DS(on)}$ = 0.0135Ω



SO-8

Description

This N-channel HEXFET® Power MOSFET is produced using International Rectifier's advanced HEXFET power MOSFET technology. The low on-resistance and low gate charge inherent to this technology make this device ideal for low voltage or battery driven power conversion applications

The SO-8 package with copper leadframe offers enhanced thermal characteristics that allow power dissipation of greater that 800mW in typical board mount applications.

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain- Source Voltage	30	V
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ 10V	±10	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 10V	±8.0	
I_{DM}	Pulsed Drain Current ①	±50	
P_D @T_A = 25°C	Power Dissipation ③	2.5	W
P_D @T_A = 70°C	Power Dissipation ③	1.6	
	Linear Derating Factor	0.02	W/°C
dv/dt	Peak Diode Recovery dv/dt ⑤	5.0	V/ns
E_{AS}	Single Pulse Avalanche Energy④	400	mJ
V_{GS}	Gate-to-Source Voltage	± 20	V
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to + 150	°C

Thermal Resistance

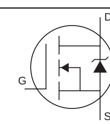
	Parameter	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient③	50	°C/W

09/22/04

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	30	—	—	V	V_{GS} = 0V, I_D = 250μA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.029	—	V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	0.010	0.0135	Ω	V_{GS} = 10V, I_D = 10A ②
		—	0.015	0.020		V_{GS} = 4.5V, I_D = 5.0A ②
$V_{GS(th)}$	Gate Threshold Voltage	1.0	—	—	V	V_{DS} = V_{GS}, I_D = 250μA
g_{fs}	Forward Transconductance	—	35	—	S	V_{DS} = 15V, I_D = 10A
I_{DSS}	Drain-to-Source Leakage Current	—	—	1.0	μA	V_{DS} = 30V, V_{GS} = 0V
		—	—	25		V_{DS} = 30V, 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	—	30	45	nC	I_D = 10A
Q_{gs}	Gate-to-Source Charge	—	5.4	—		V_{DS} = 15V
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	6.5	—		V_{GS} = 10V, See Fig. 10 ②
$t_{d(on)}$	Turn-On Delay Time	—	11	—	ns	V_{DD} = 25V
t_r	Rise Time	—	7.7	—		I_D = 1.0A
$t_{d(off)}$	Turn-Off Delay Time	—	38	—		R_G = 6.0Ω
t_f	Fall Time	—	44	—		R_D = 25Ω, ②
C_{iss}	Input Capacitance	—	1585	—	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	—	739	—		V_{DS} = 15V
C_{rss}	Reverse Transfer Capacitance	—	106	—		f = 1.0MHz, See Fig. 9

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Diode Conduction)③	—	—	2.3	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	50		
V_{SD}	Diode Forward Voltage	—	0.7	1.1	V	T_J = 25°C, I_S = 2.3A, V_{GS} = 0V ②
t_{rr}	Reverse Recovery Time	—	50	80	ns	T_J = 25°C, I_F = 2.3A

Notes:

① Repetitive rating; pulse width limited by max. junction temperature.

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

③ When mounted on FR4 Board, t ≤10 sec

④ Starting T_J = 25°C, L = 8.0mH R_G = 25Ω, I_{AS} = 10A. (See Figure 15)

⑤ I_{SD} ≤2.3A, di/dt ≤ 130A/μs, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ 150°C

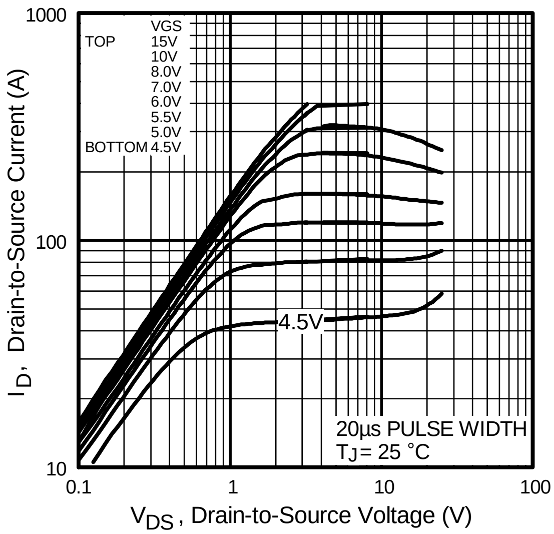


Fig 1. Typical Output Characteristics

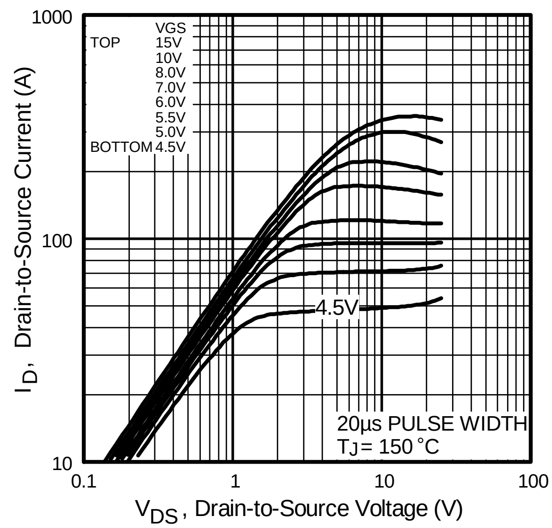


Fig 2. Typical Output Characteristics

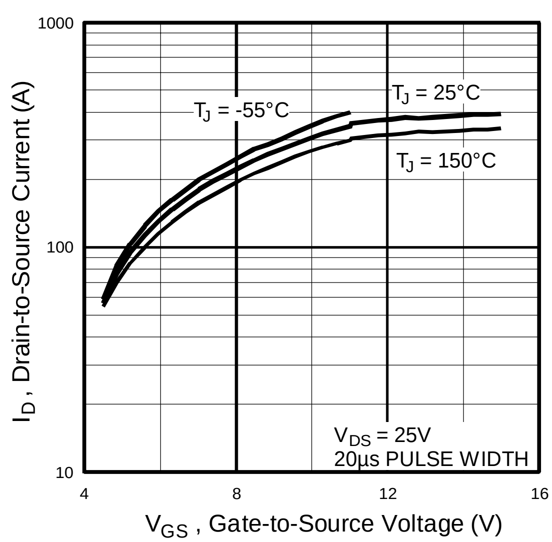


Fig 3. Typical Transfer Characteristics

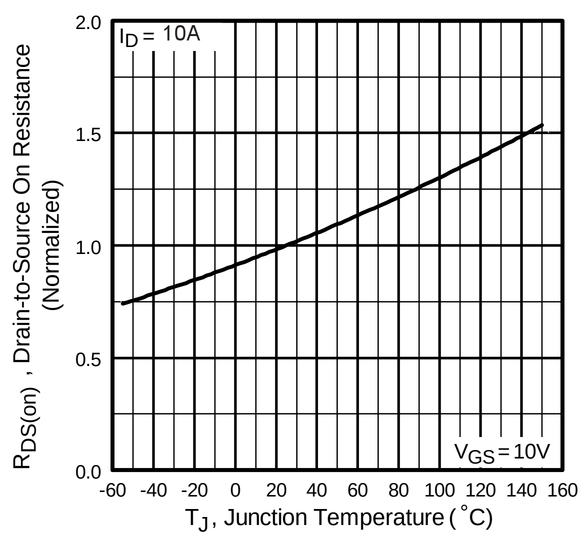


Fig 4. Normalized On-Resistance Vs. Temperature

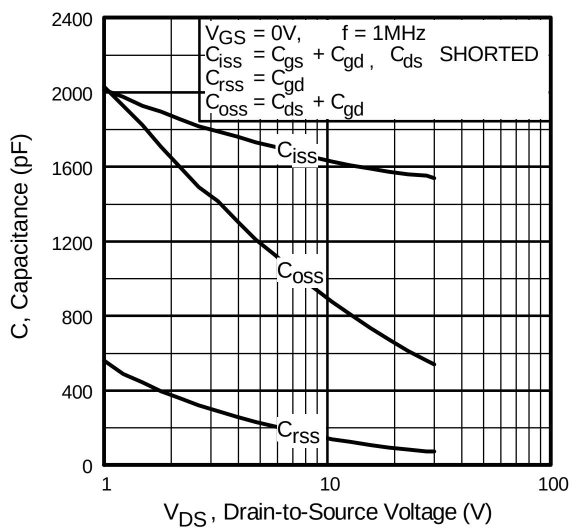


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

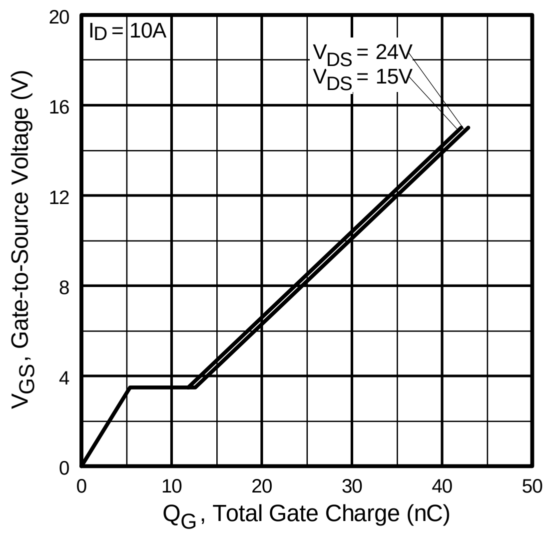


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

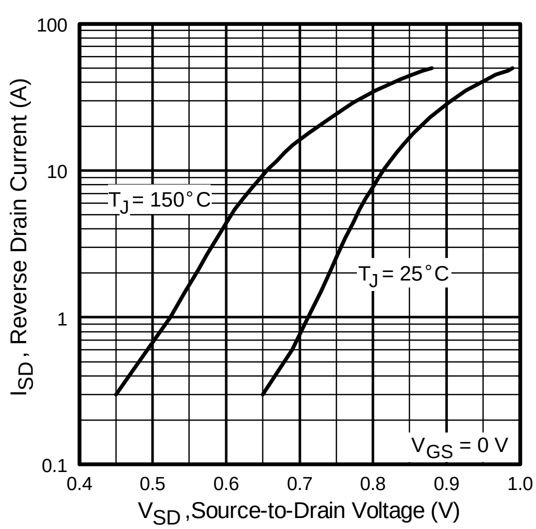


Fig 7. Typical Source-Drain Diode Forward Voltage

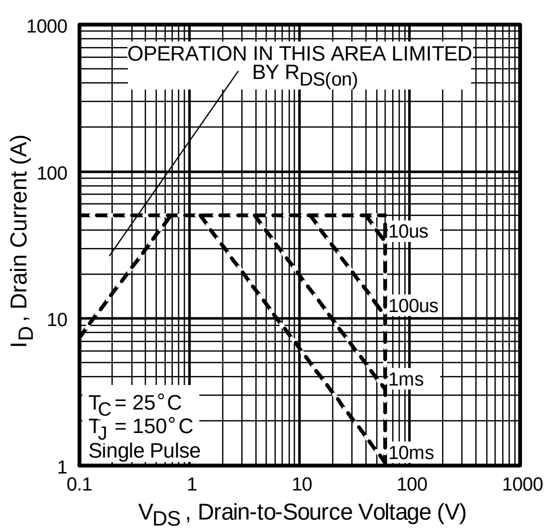


Fig 8. Maximum Safe Operating Area

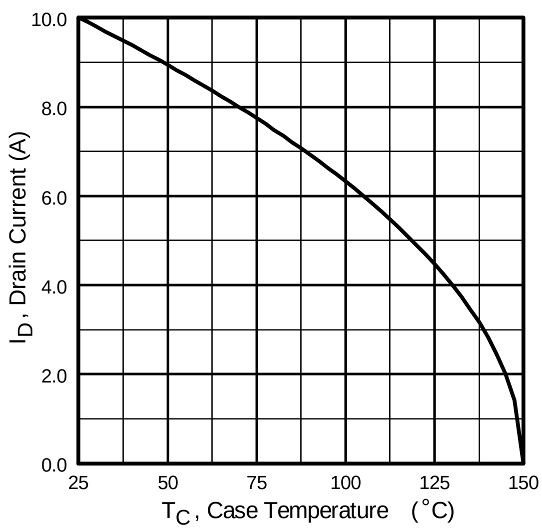


Fig 9. Maximum Drain Current Vs. Case Temperature

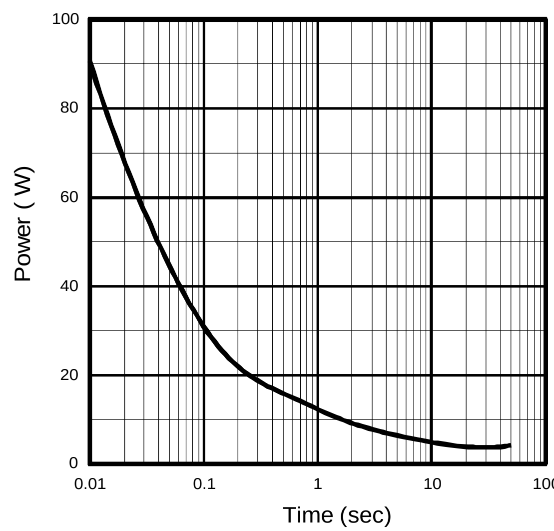


Fig 10. Typical Power Vs. Time

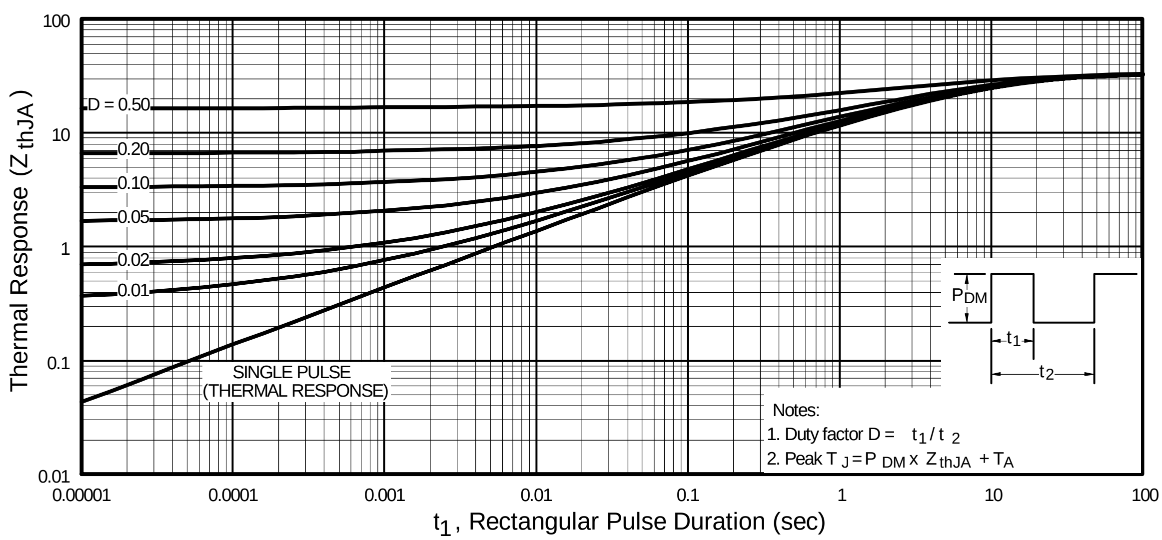


Fig 11. Typical Effective Transient Thermal Impedance, Junction-to-Ambient

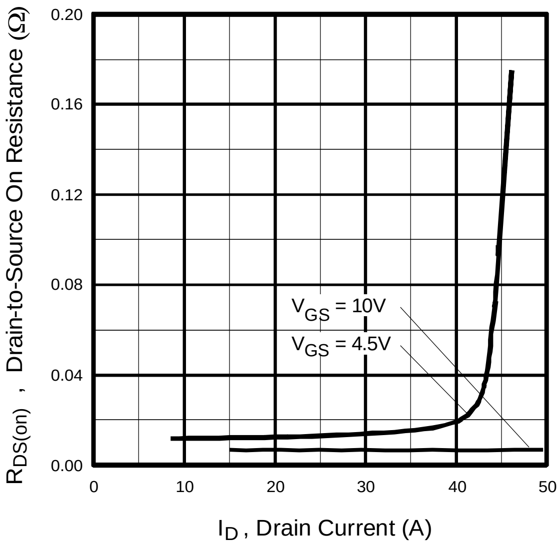


Fig 12. Typical On-Resistance Vs. Drain Current

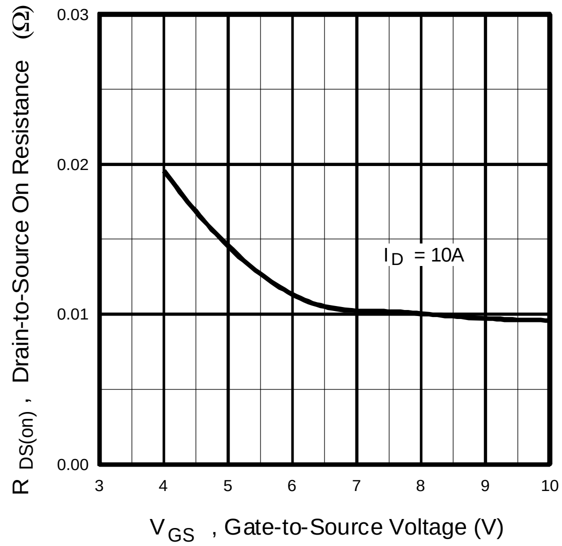


Fig 13. Typical On-Resistance Vs. Gate Voltage

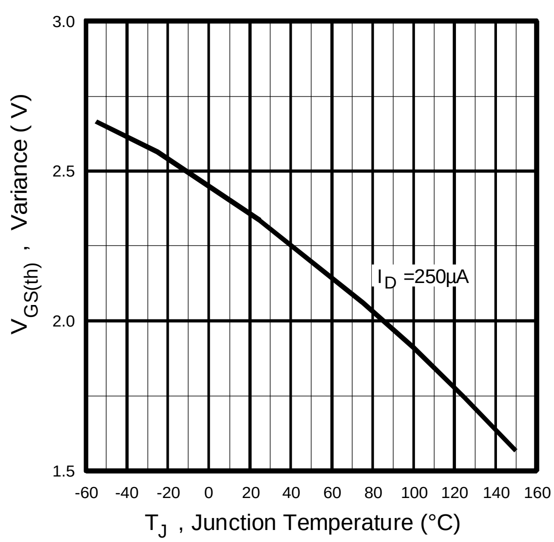


Fig 14. Typical Threshold Voltage Vs.Temperature

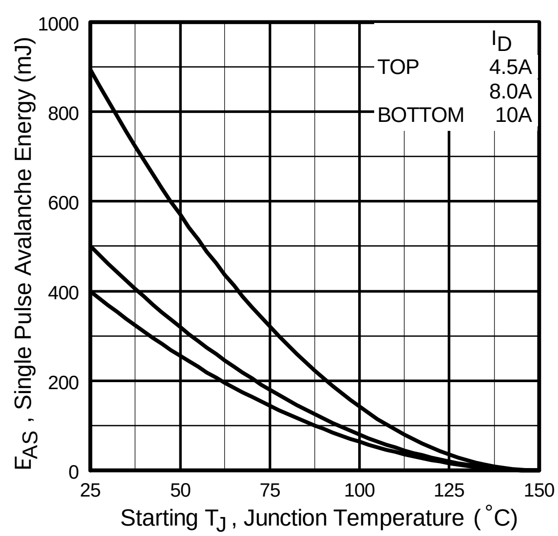
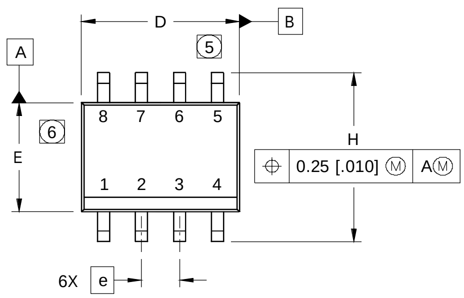


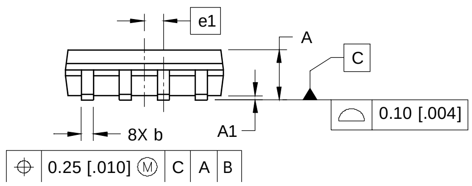
Fig 15. Maximum Avalanche Energy Vs. Drain Current

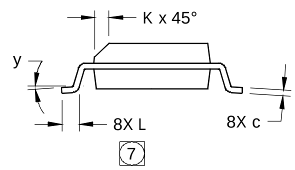
SO-8 Package Outline

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°

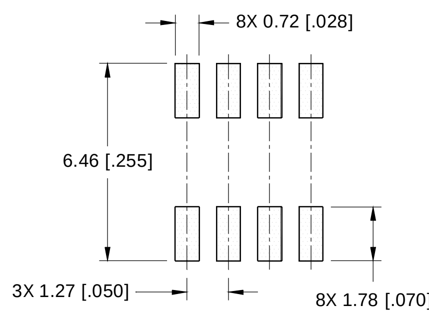




NOTES:

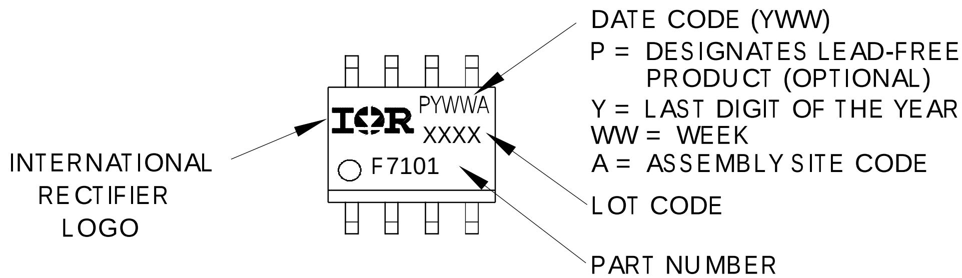
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 [.006].
6. DIMENSION DOES NOT INCLUDE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

FOOTPRINT



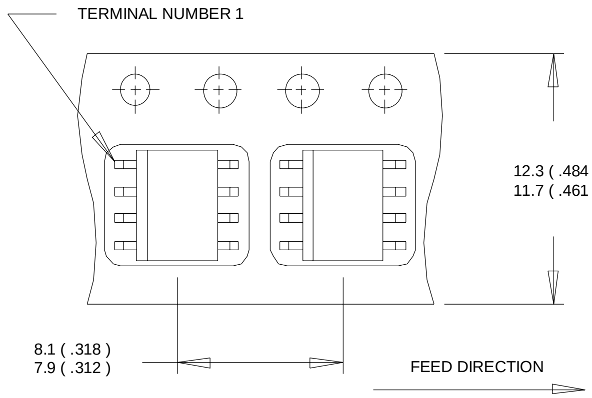
SO-8 Part Marking

EXAMPLE: THIS IS AN IRF7101 (MOSFET)

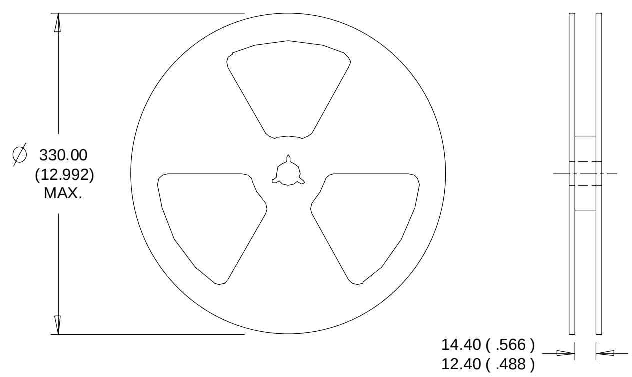


SO-8 Tape and Reel

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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