International
IOR Rectifier

PD - 94311

IRF7476

HEXFET® Power MOSFET

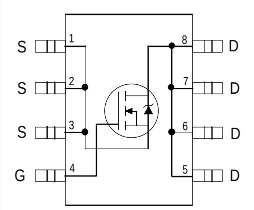
V_{DSS}	$R_{DS(on)}$ max	I_D
12V	8.0mΩ@V_{GS} = 4.5V	15A

Applications

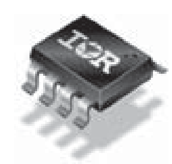
- High Frequency 3.3V and 5V input Point-of-Load Synchronous Buck Converters for Netcom and Computing Applications.
- Power Management for Netcom, Computing and Portable Applications.

Benefits

- Ultra-Low Gate Impedance
- Very Low $R_{DS(on)}$
- Fully Characterized Avalanche Voltage and Current



Top View


SO-8

Absolute Maximum Ratings

Symbol	Parameter	Max.	Units
V_{DS}	Drain-Source Voltage	12	V
V_{GS}	Gate-to-Source Voltage	±12	V
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ 10V	15	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 10V	12	
I_{DM}	Pulsed Drain Current①	120	
P_D @T_A = 25°C	Maximum Power Dissipation④	2.5	W
P_D @T_A = 70°C	Maximum Power Dissipation④	1.6	W
	Linear Derating Factor	0.02	W/°C
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 ④	–––	50	

Notes ① through ④ are on page 8

04/29/02

Static @ 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
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	——	0.014	——	V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	——	6.0	8.0	mΩ	V_{GS} = 4.5V, I_D = 15A ③
		——	12	30		V_{GS} = 2.8V, I_D = 12A ③
$V_{GS(th)}$	Gate Threshold Voltage	0.6	——	1.9	V	V_{DS} = V_{GS}, I_D = 250μA
I_{DSS}	Drain-to-Source Leakage Current	——	——	100	μA	V_{DS} = 9.6V, V_{GS} = 0V
		——	——	250		V_{DS} = 9.6V, V_{GS} = 0V, T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage	——	——	200	nA	V_{GS} = 12V
	Gate-to-Source Reverse Leakage	——	——	-200		V_{GS} = -12V

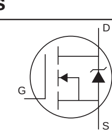
Dynamic @ T_J = 25°C (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
g_{fs}	Forward Transconductance	31	——	——	S	V_{DS} = 6.0V, I_D = 12A
Q_g	Total Gate Charge	——	26	40	nC	I_D = 12A
Q_{gs}	Gate-to-Source Charge	——	4.6	——		V_{DS} = 10V
Q_{gd}	Gate-to-Drain ("Miller") Charge	——	11	——		V_{GS} = 4.5V
Q_{oss}	Output Gate Charge	——	17	——		V_{GS} = 0V, V_{DS} = 5.0V
$t_{d(on)}$	Turn-On Delay Time	——	11	——	ns	V_{DD} = 6.0V
t_r	Rise Time	——	29	——		I_D = 12A
$t_{d(off)}$	Turn-Off Delay Time	——	19	——		R_G = 1.8Ω
t_f	Fall Time	——	8.3	——		V_{GS} = 4.5V ③
C_{iss}	Input Capacitance	——	2550	——	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	——	2190	——		V_{DS} = 6.0V
C_{rss}	Reverse Transfer Capacitance	——	450	——		f = 1.0MHz

Avalanche Characteristics

Symbol	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy②	——	160	mJ
I_{AR}	Avalanche Current①	——	12	A

Diode Characteristics

Symbol	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	——	——	120		
V_{SD}	Diode Forward Voltage	——	0.87	1.2	V	T_J = 25°C, I_S = 12A, V_{GS} = 0V ③
		——	0.73	——		T_J = 125°C, I_S = 12A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time	——	55	82	ns	T_J = 25°C, I_F = 12A, V_R=12V
Q_{rr}	Reverse Recovery Charge	——	59	89	nC	di/dt = 100A/μs ③
t_{rr}	Reverse Recovery Time	——	54	81	ns	T_J = 125°C, I_F = 12A, V_R=12V
Q_{rr}	Reverse Recovery Charge	——	60	90	nC	di/dt = 100A/μs ③

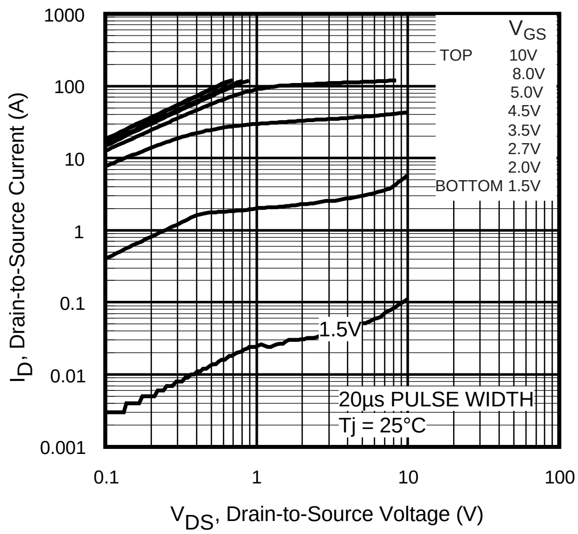


Fig 1. Typical Output Characteristics

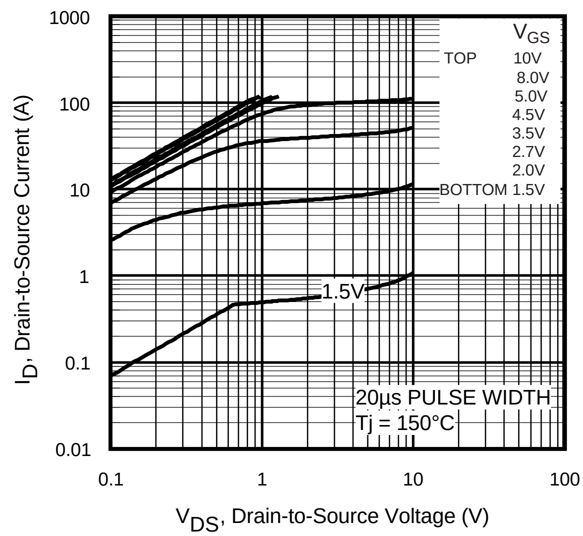


Fig 2. Typical Output Characteristics

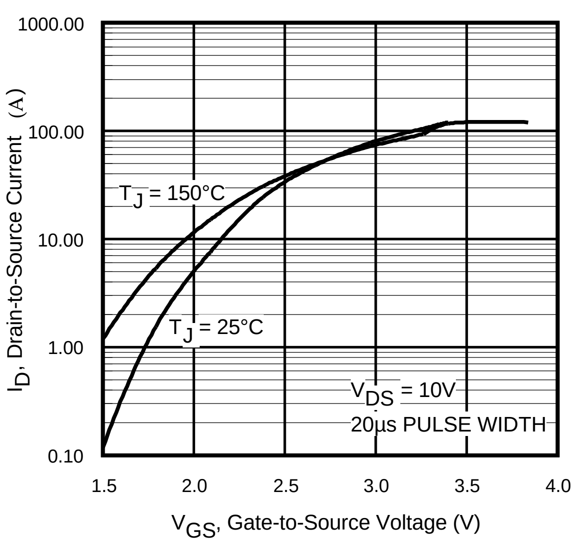


Fig 3. Typical Transfer Characteristics

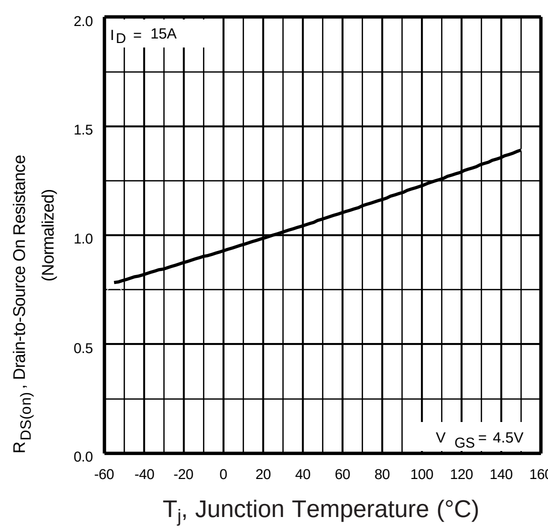


Fig 4. Normalized On-Resistance Vs. Temperature

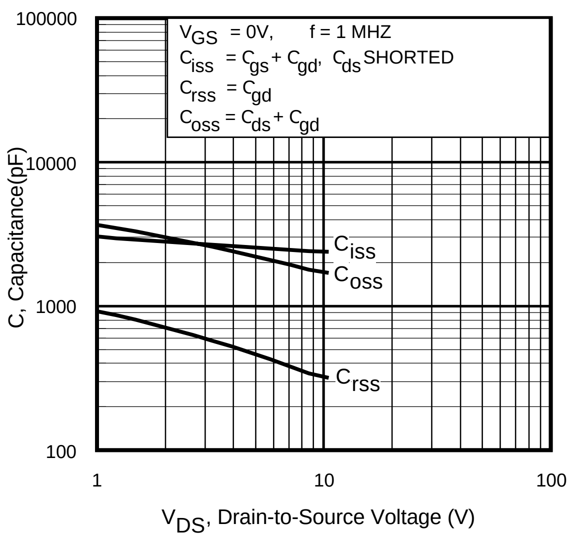


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

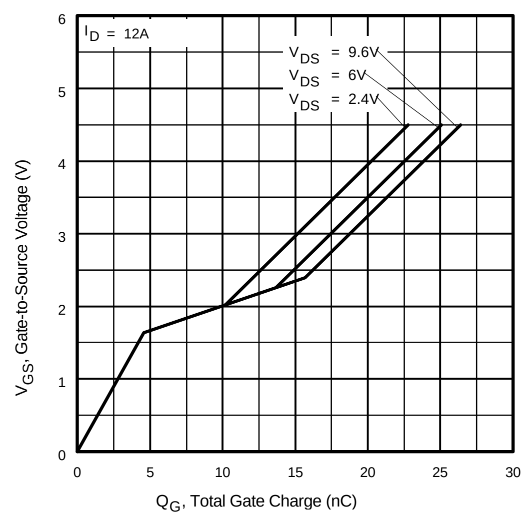


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

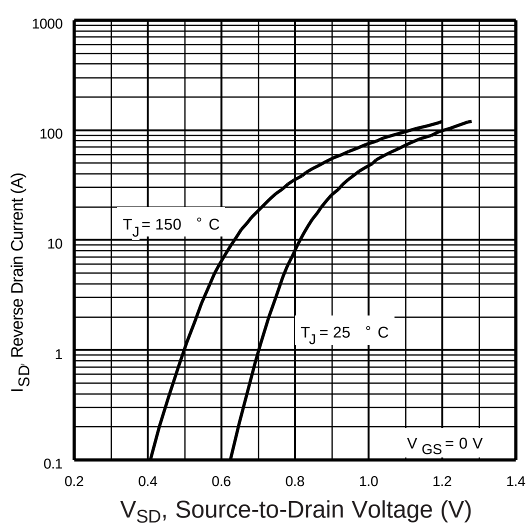


Fig 7. Typical Source-Drain Diode Forward Voltage

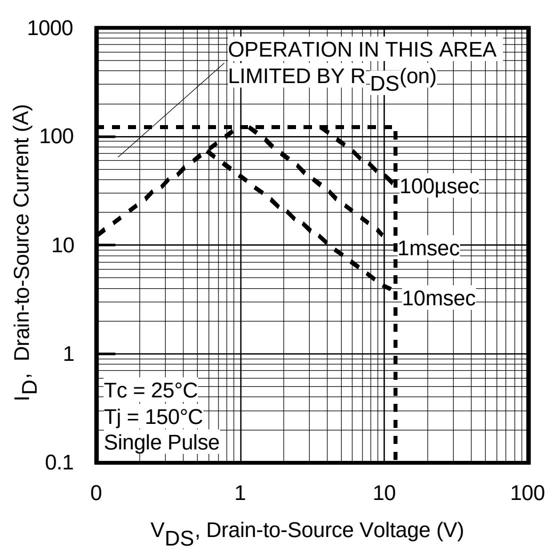


Fig 8. Maximum Safe Operating Area

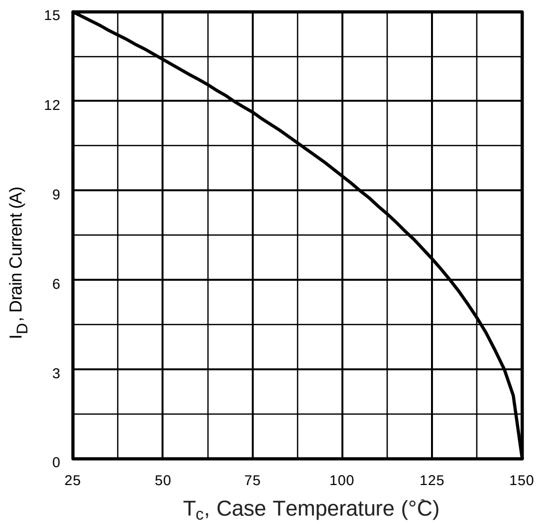


Fig 9. Maximum Drain Current Vs. Case Temperature

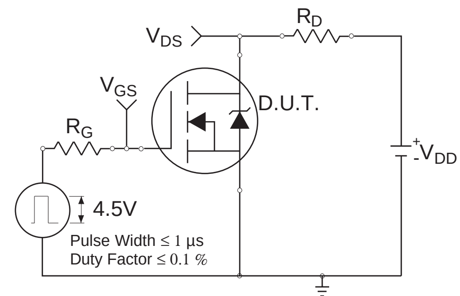


Fig 10a. Switching Time Test Circuit

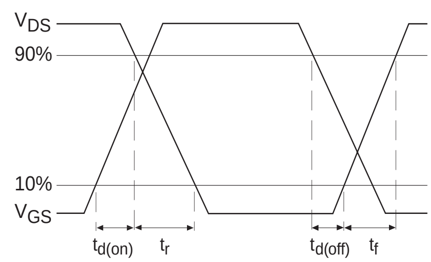


Fig 10b. Switching Time Waveforms

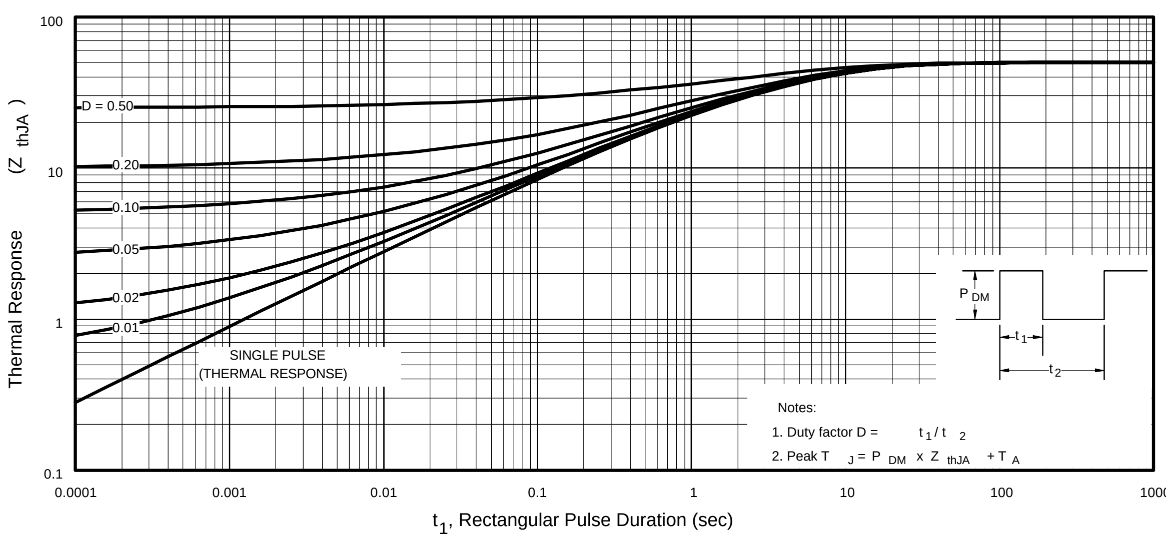


Fig 10. Maximum Effective Transient Thermal Impedance, Junction-to-Case

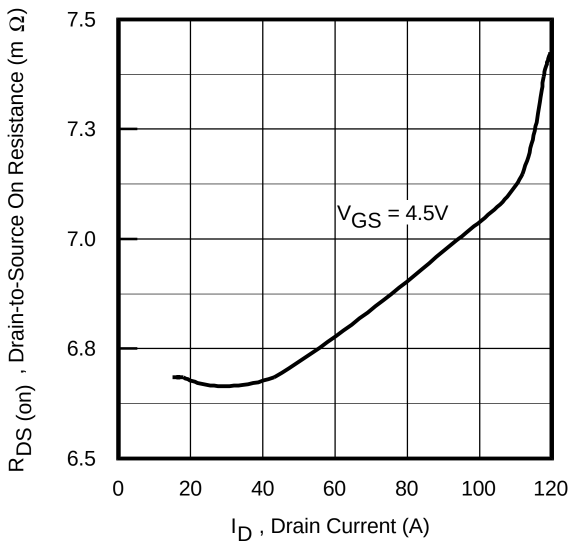


Fig 12. On-Resistance Vs. Drain Current

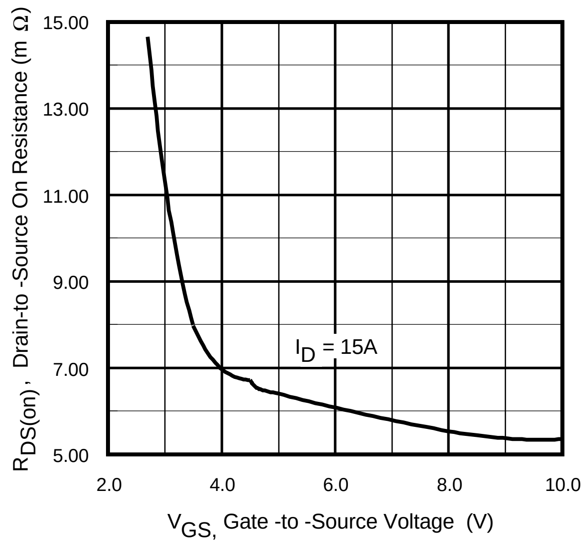


Fig 13. On-Resistance Vs. Gate Voltage

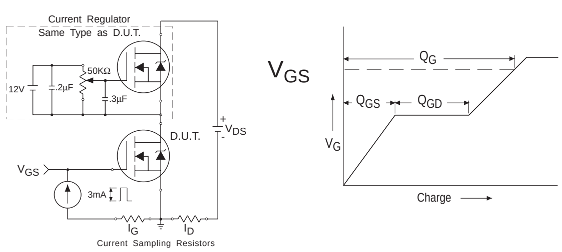
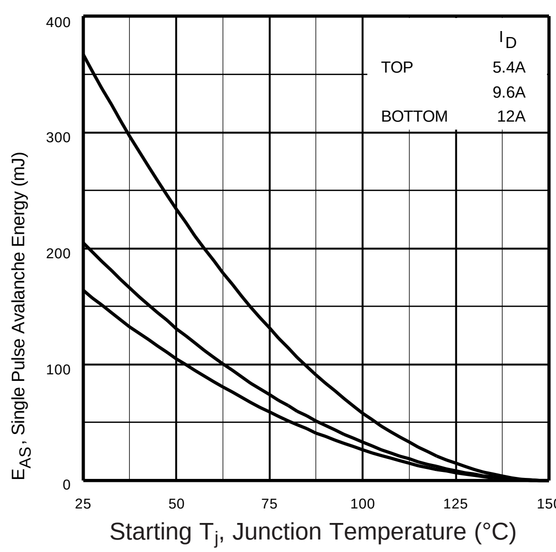


Fig 13a&b. Basic Gate Charge Test Circuit and Waveform



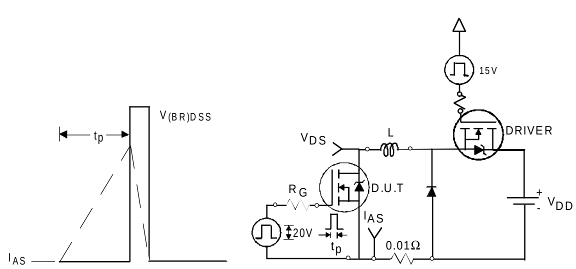
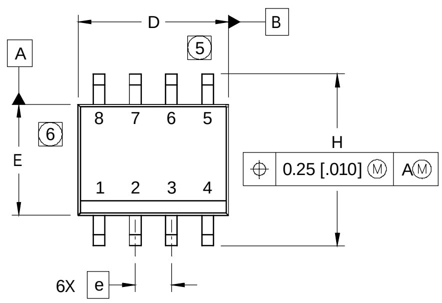


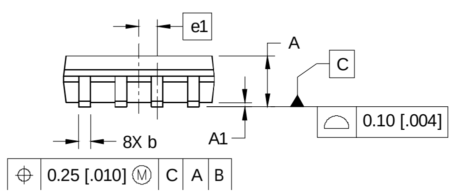
Fig 14a&b. Unclamped Inductive Test circuit and Waveforms

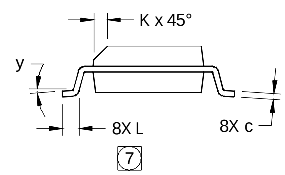
Fig 14c. Maximum Avalanche Energy Vs. Drain Current

SO-8 Package Details



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°



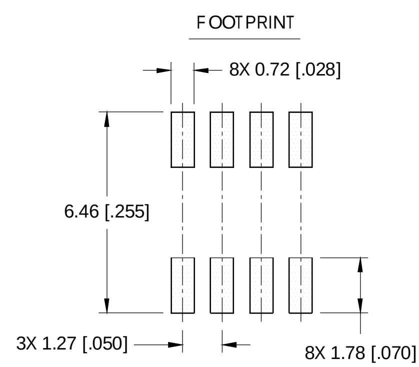


NOTES:
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.

5 DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 [.006].

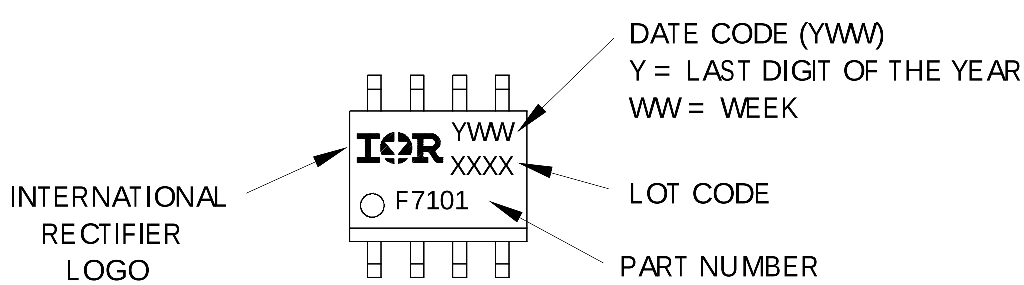
6 DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 [.010].

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

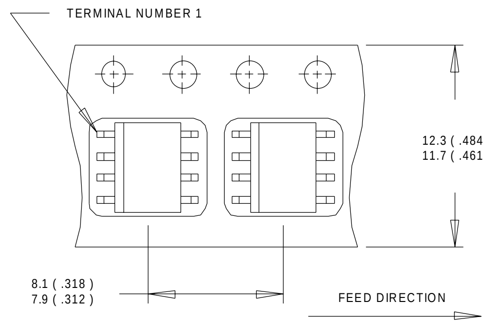


SO-8 Part Marking

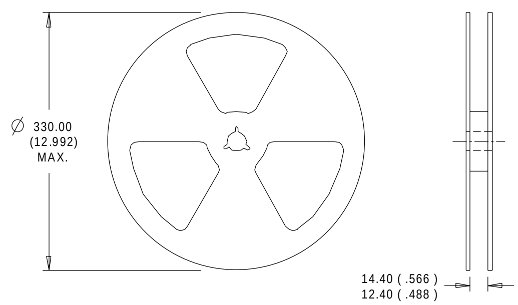
EXAMPLE: THIS IS AN IRF7101 (MOSFET)



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.

Notes:

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

② Starting T_J = 25°C, L = 2.3mH R_G = 25Ω, I_{AS} = 12A.

③ Pulse width ≤ 400µs; duty cycle ≤ 2%.

④ When mounted on 1 inch square copper board.

Data and specifications subject to change without notice.
This product has been designed and qualified for the Industrial market.
Qualification Standards can be found on IR's Web site.

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