International
IOR Rectifier

SMPS MOSFET

IRF7460PbF

HEXFET® Power MOSFET

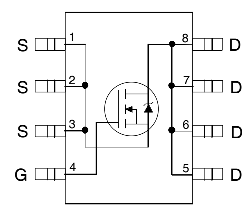
Applications

- High Frequency Isolated DC-DC Converters with Synchronous Rectification for Telecom and Industrial Use
- High Frequency Buck Converters for Computer Processor Power
- Lead-Free

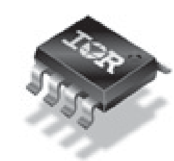
Benefits

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

V_{DSS}	$R_{DS(on)}$ max(mΩ)	I_D
20V	10@V_{GS} = 10V	12A



Top View


SO-8

Absolute Maximum Ratings

Symbol	Parameter	Max.	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-to-Source Voltage	± 20	V
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ 10V	12	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 10V	10	
I_{DM}	Pulsed Drain Current①	100	
P_D @T_A = 25°C	Maximum Power Dissipation③	2.5	W
P_D @T_A = 70°C	Maximum Power Dissipation③	1.6	W
	Linear Derating Factor	0.02	mW/°C
T_J , T_{STG}	Junction and Storage Temperature Range	-55 to + 150	°C

Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
$R_{θJL}$	Junction-to-Drain Lead	——	20	°C/W
$R_{θJA}$	Junction-to-Ambient ⑤	——	50	

Notes ① through ⑤ are on page 8

10/12/04

Static @ 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	–––	0.089	–––	V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	–––	7.2	10	mΩ	V_{GS} = 10V, I_D = 12A ④
		–––	10.5	14		V_{GS} = 4.5V, I_D = 9.6A ④
$V_{GS(th)}$	Gate Threshold Voltage	1.0	–––	3.0	V	V_{DS} = V_{GS}, I_D = 250μA
I_{DSS}	Drain-to-Source Leakage Current	–––	–––	20	μA	V_{DS} = 16V, V_{GS} = 0V
		–––	–––	100		V_{DS} = 16V, V_{GS} = 0V, T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage	–––	–––	200	nA	V_{GS} = 16V
	Gate-to-Source Reverse Leakage	–––	–––	-200		V_{GS} = -16V

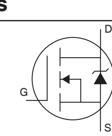
Dynamic @ T_J = 25°C (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
g_{fs}	Forward Transconductance	26	–––	–––	S	V_{DS} = 16V, I_D = 9.6A
Q_g	Total Gate Charge	–––	19	–––	nC	I_D = 9.6A
Q_{gs}	Gate-to-Source Charge	–––	6.9	–––		V_{DS} = 10V
Q_{gd}	Gate-to-Drain ("Miller") Charge	–––	6.0	–––		V_{GS} = 4.5V, ④
Q_{oss}	Output Gate Charge	–––	17	26		V_{GS} = 0V, V_{DS} = 10V
$t_{d(on)}$	Turn-On Delay Time	–––	11	–––	ns	V_{DD} = 10V
t_r	Rise Time	–––	6.9	–––		I_D = 9.6A
$t_{d(off)}$	Turn-Off Delay Time	–––	12	–––		R_G = 1.8Ω
t_f	Fall Time	–––	4.3	–––		V_{GS} = 4.5V ④
C_{iss}	Input Capacitance	–––	2050	–––	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	–––	1060	–––		V_{DS} = 10V
C_{rss}	Reverse Transfer Capacitance	–––	150	–––		ƒ = 1.0MHz

Avalanche Characteristics

Symbol	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy②	–––	240	mJ
I_{AR}	Avalanche Current①	–––	9.6	A

Diode Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	–––	–––	2.3	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	–––	–––	100		
V_{SD}	Diode Forward Voltage	–––	0.8	1.3	V	T_J = 25°C, I_S = 9.6A, V_{GS} = 0V ④
		–––	0.66	–––		T_J = 125°C, I_S = 9.6A, V_{GS} = 0V ④
t_{rr}	Reverse Recovery Time	–––	44	66	ns	T_J = 25°C, I_F = 9.6A, V_R=10V
Q_{rr}	Reverse Recovery Charge	–––	60	90	nC	di/dt = 100A/μs ④
t_{rr}	Reverse Recovery Time	–––	44	66	ns	T_J = 125°C, I_F = 9.6A, V_R=10V
Q_{rr}	Reverse Recovery Charge	–––	64	96	nC	di/dt = 100A/μs ④

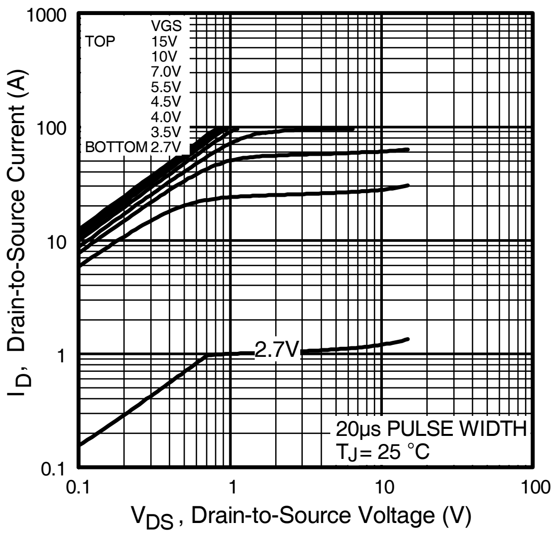


Fig 1. Typical Output Characteristics

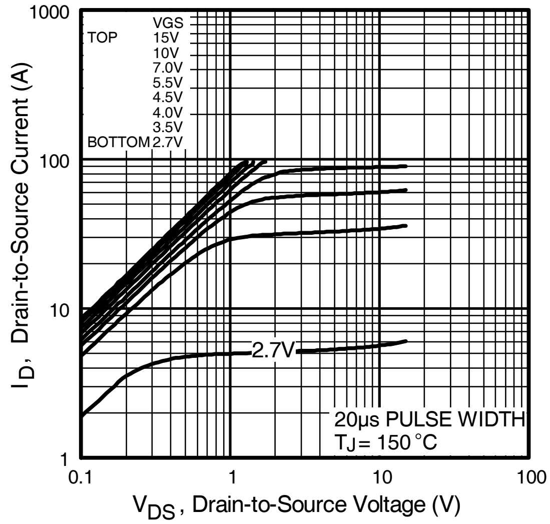


Fig 2. Typical Output Characteristics

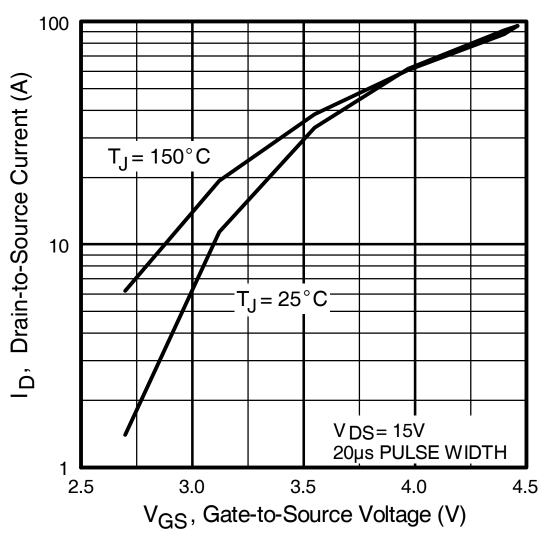


Fig 3. Typical Transfer Characteristics

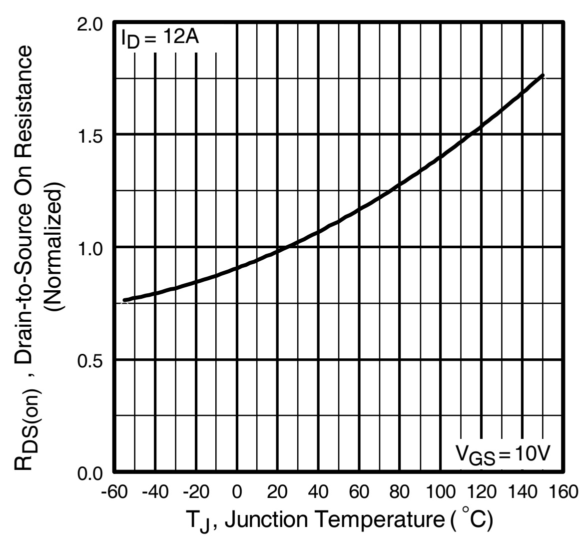


Fig 4. Normalized On-Resistance Vs. Temperature

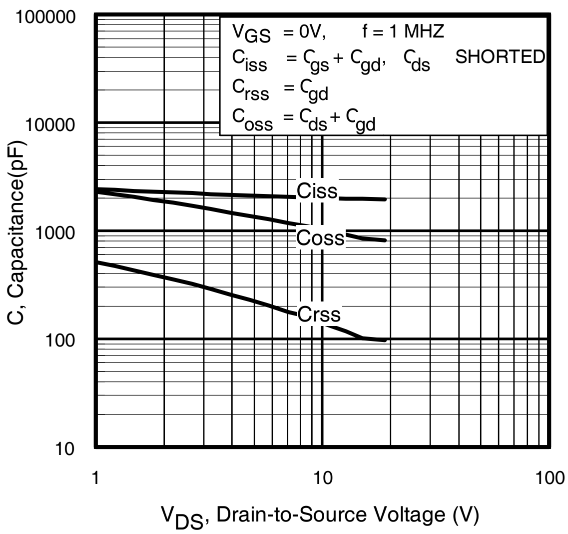


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

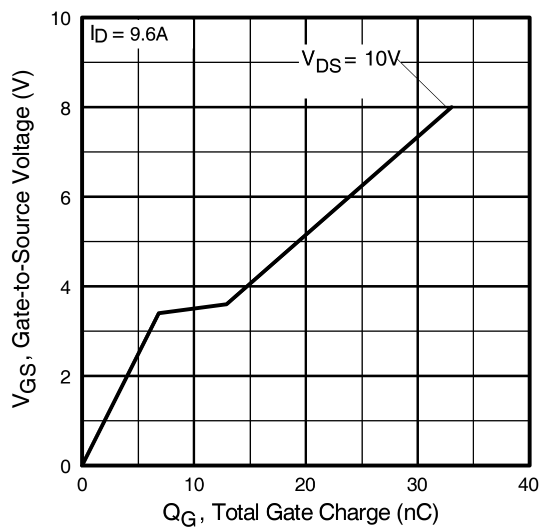


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

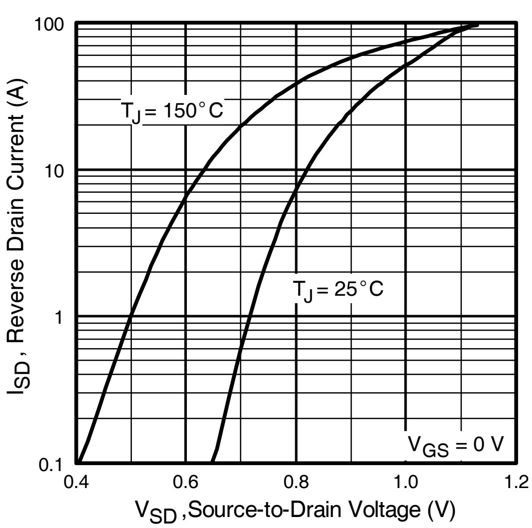


Fig 7. Typical Source-Drain Diode Forward Voltage

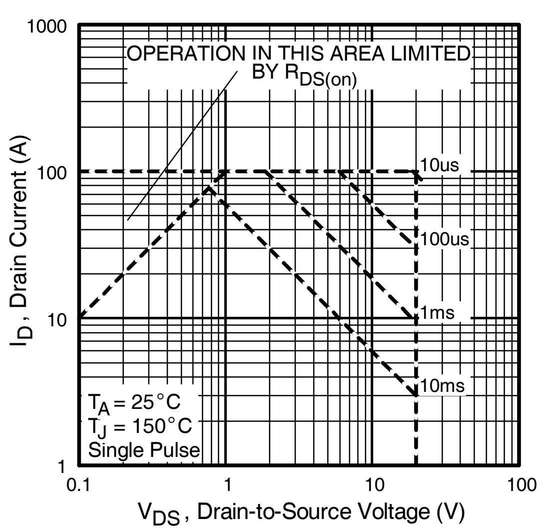
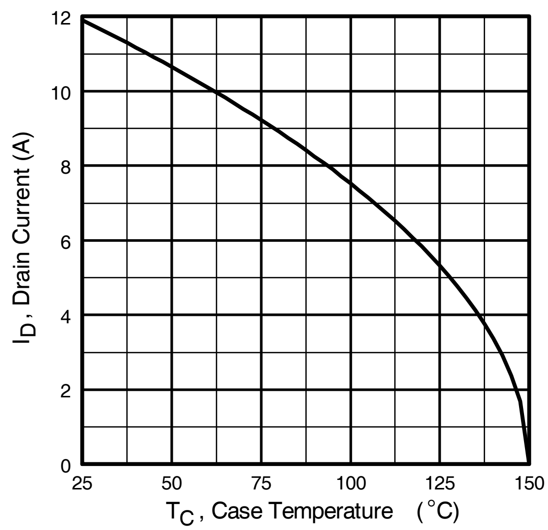


Fig 8. Maximum Safe Operating Area

Fig 6. On-Resistance Vs. Drain Current



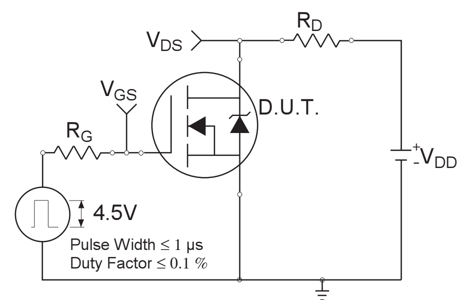


Fig 10a. Switching Time Test Circuit

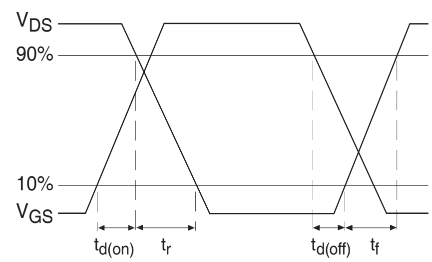


Fig 10b. Switching Time Waveforms

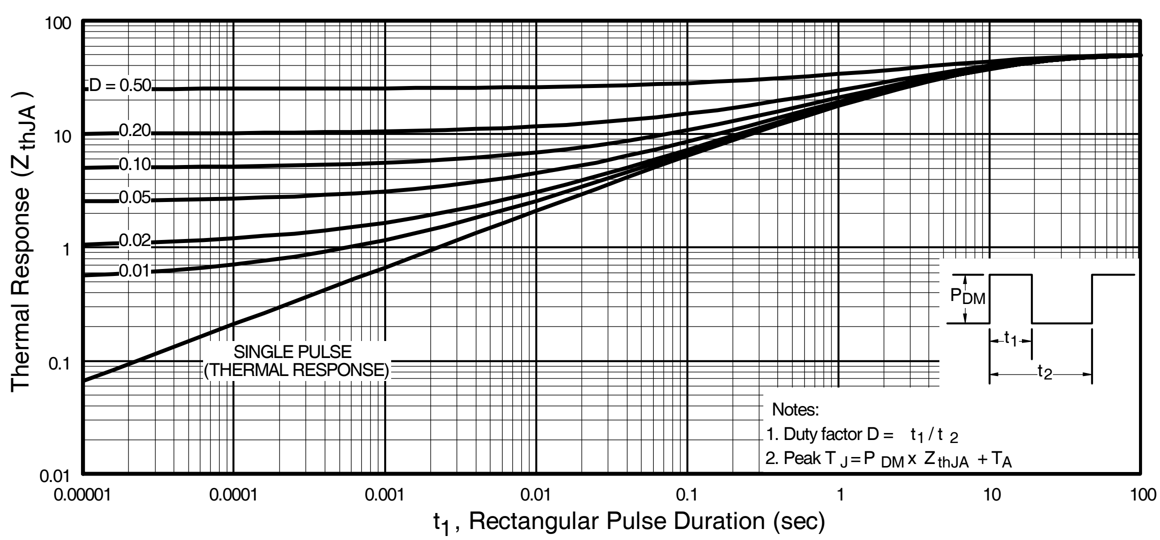


Fig 10. Maximum Effective Transient Thermal Impedance, Junction-to-Case

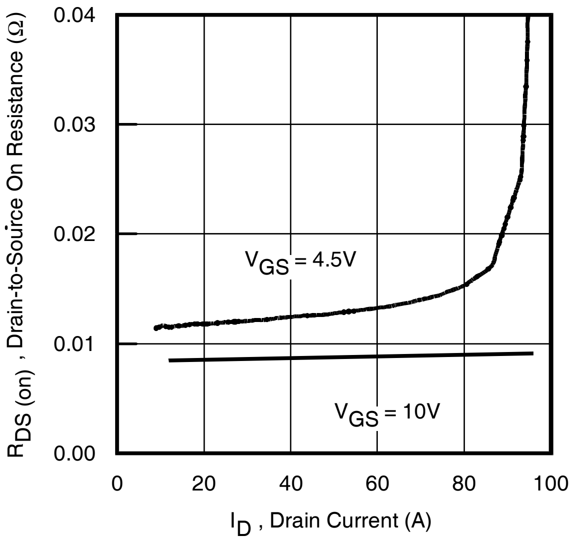


Fig 12. On-Resistance Vs. Drain Current

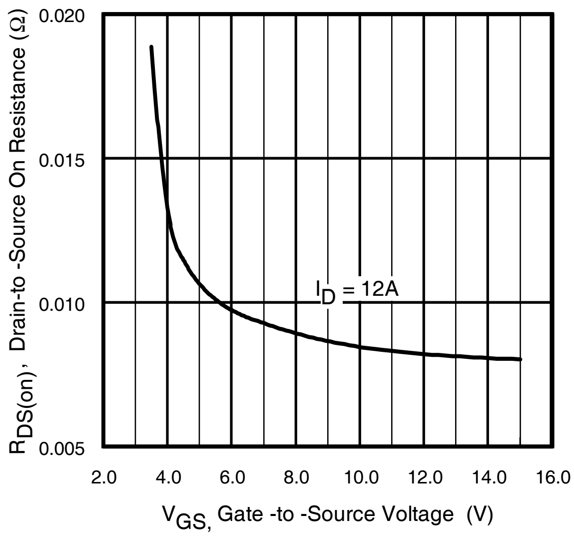


Fig 13. On-Resistance Vs. Gate Voltage

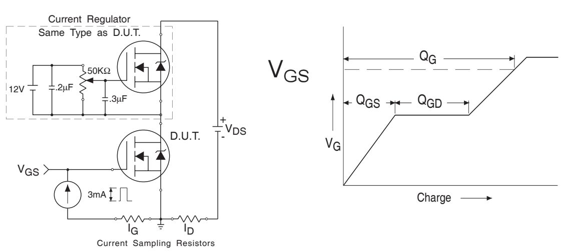


Fig 13a&b. Basic Gate Charge Test Circuit and Waveform

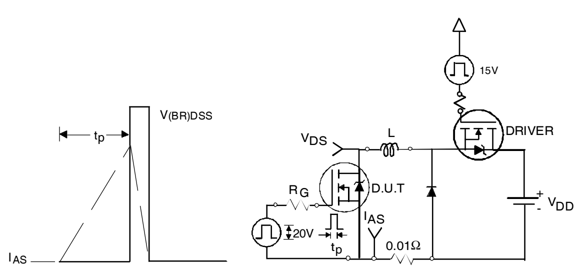


Fig 14a&b. Unclamped Inductive Test circuit and Waveforms

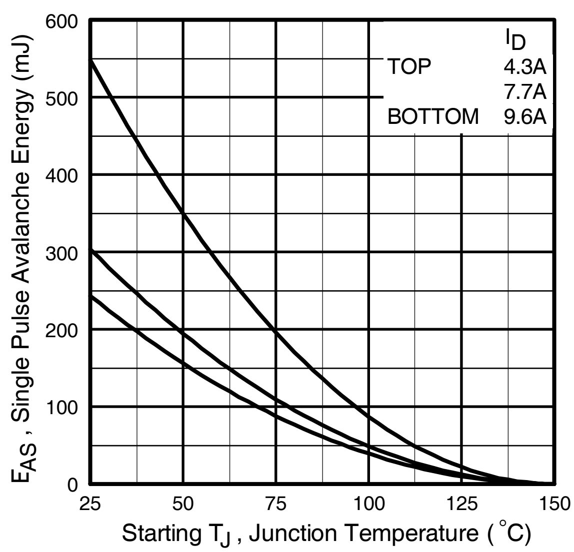
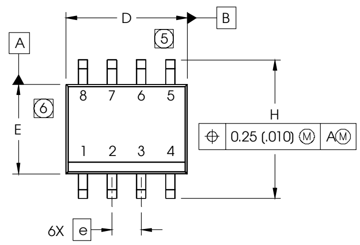


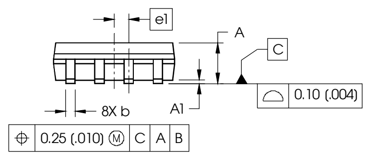
Fig 14c. Maximum Avalanche Energy Vs. Drain Current

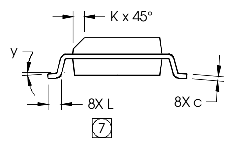
SO-8 Package Outline

Dimensions are shown in milimeters (inches)



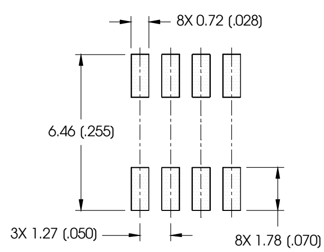
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40	1.27
y	0°	8°	0°	8°





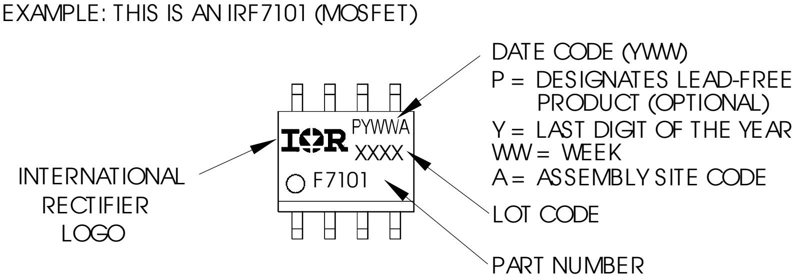
NOTES:
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 [.006].
6. DIMENSION DOES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

FOOTPRINT



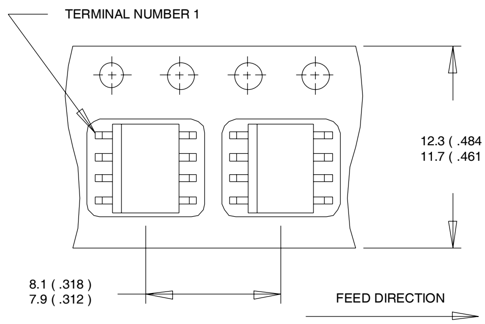
SO-8 Part Marking Information (Lead-Free)

EXAMPLE: THIS IS AN IRF7101 (MOSFET)

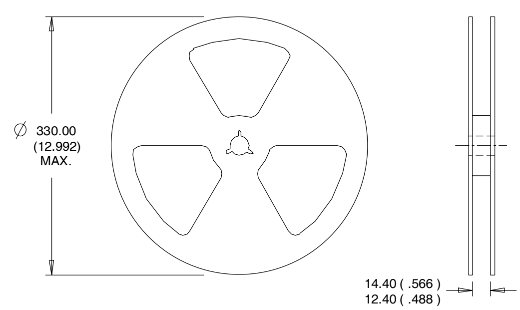


SO-8 Tape and Reel

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.

Notes:

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

② Starting T_J = 25°C, L = 5.2mH R_G = 25Ω, I_{AS} = 9.6A.

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

④ When mounted on 1 inch square copper board, t<10 sec

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

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