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PD- 93892C

International
IOR Rectifier

SMPS MOSFET

IRF7458

HEXFET® Power MOSFET

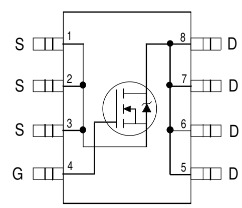
V_{DSS}	$R_{DS(on)}$ max	I_D
30V	**8.0mΩ**	**14A**

Applications

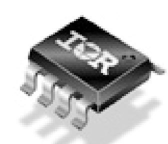
- High Frequency Isolated DC-DC Converters with Synchronous Rectification for Telecom and Industrial Use
- High Frequency Buck Converters for Computer Processor Power

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	30	V
V_{GS}	Gate-to-Source Voltage	± 30	V
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ 10V	14	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 10V	11	
I_{DM}	Pulsed Drain Current①	110	
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
$R_{\theta JL}$	Junction-to-Drain Lead	–––	20	°C/W
$R_{\theta JA}$	Junction-to-Ambient ④	–––	50	

Notes ① through ④ are on page 8

3/25/01

Static @ 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	——	6.3	8.0	mΩ	V_{GS} = 16V, I_D = 14A ③
		——	7.0	9.0		V_{GS} = 10V, I_D = 11A ③
$V_{GS(th)}$	Gate Threshold Voltage	2.0	——	4.0	V	V_{DS} = V_{GS}, I_D = 250μA
I_{DSS}	Drain-to-Source Leakage Current	——	——	20	μA	V_{DS} = 24V, V_{GS} = 0V
		——	——	100		V_{DS} = 24V, V_{GS} = 0V, T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage	——	——	200	nA	V_{GS} = 24V
	Gate-to-Source Reverse Leakage	——	——	-200		V_{GS} = -24V

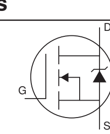
Dynamic @ T_J = 25°C (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
g_{fs}	Forward Transconductance	26	——	——	S	V_{DS} = 15V, I_D = 11A
Q_g	Total Gate Charge	——	39	59		I_D = 11A
Q_{gs}	Gate-to-Source Charge	——	11	17	nC	V_{DS} = 15V
Q_{gd}	Gate-to-Drain ("Miller") Charge	——	8.7	13		V_{GS} = 10V ③
Q_{oss}	Output Gate Charge	——	29	44		V_{GS} = 0V, V_{DS} = 16V
$t_{d(on)}$	Turn-On Delay Time	——	10	——		V_{DD} = 15V
t_r	Rise Time	——	4.6	——	ns	I_D = 11A
$t_{d(off)}$	Turn-Off Delay Time	——	22	——		R_G = 1.8Ω
t_f	Fall Time	——	5.0	——		V_{GS} = 10V ③
C_{iss}	Input Capacitance	——	2410	——		V_{GS} = 0V
C_{oss}	Output Capacitance	——	1100	——		V_{DS} = 15V
C_{rss}	Reverse Transfer Capacitance	——	110	——	pF	f = 1.0MHz

Avalanche Characteristics

Symbol	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy②	——	280	mJ
I_{AR}	Avalanche Current①	——	11	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	——	——	110		
V_{SD}	Diode Forward Voltage	——	0.82	1.3	V	T_J = 25°C, I_S = 11A, V_{GS} = 0V ③
		——	0.68	——		T_J = 125°C, I_S = 11A, V_{GS} = 0V
t_{rr}	Reverse Recovery Time	——	51	77	ns	T_J = 25°C, I_F = 11A, V_R= 20V
Q_{rr}	Reverse Recovery Charge	——	87	130	nC	di/dt = 100A/μs ③
t_{rr}	Reverse Recovery Time	——	52	78	ns	T_J = 125°C, I_F = 11A, V_R=20V
Q_{rr}	Reverse Recovery Charge	——	93	140	nC	di/dt = 100A/μs ③

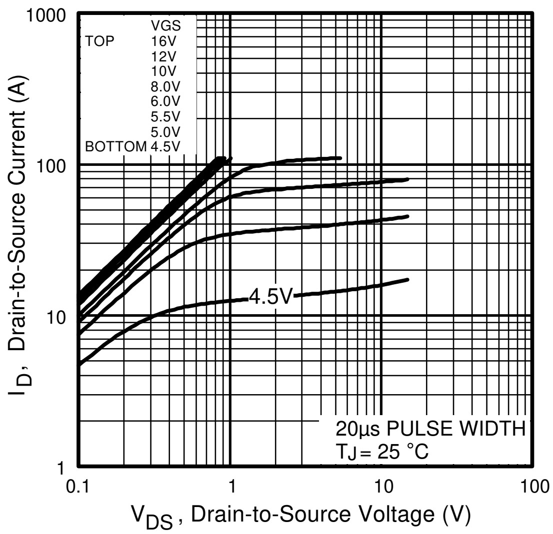


Fig 1. Typical Output Characteristics

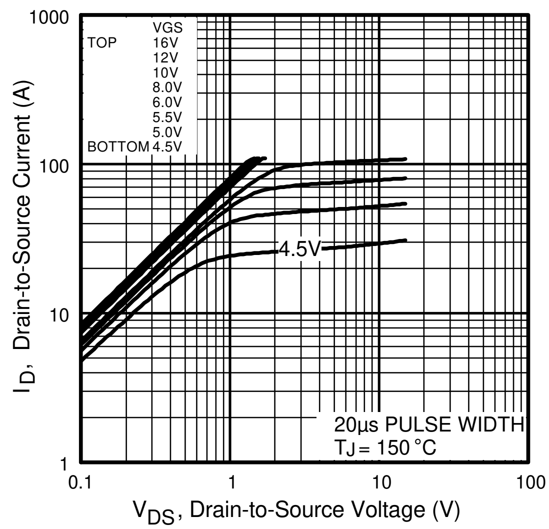


Fig 2. Typical Output Characteristics

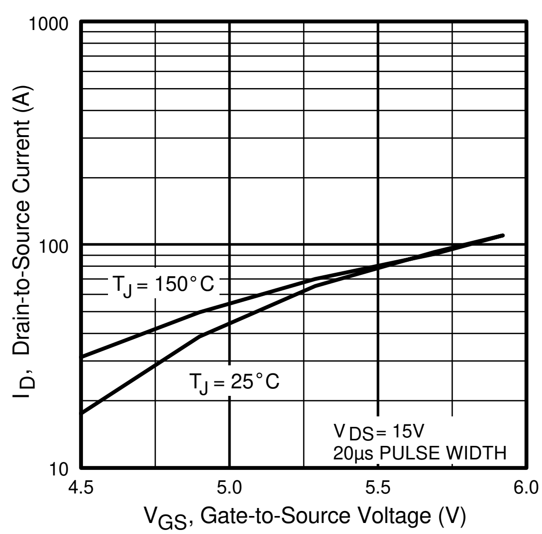


Fig 3. Typical Transfer Characteristics

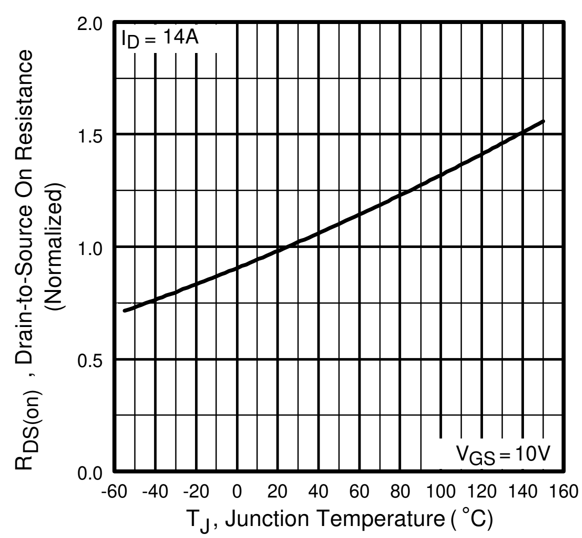


Fig 4. Normalized On-Resistance Vs. Temperature

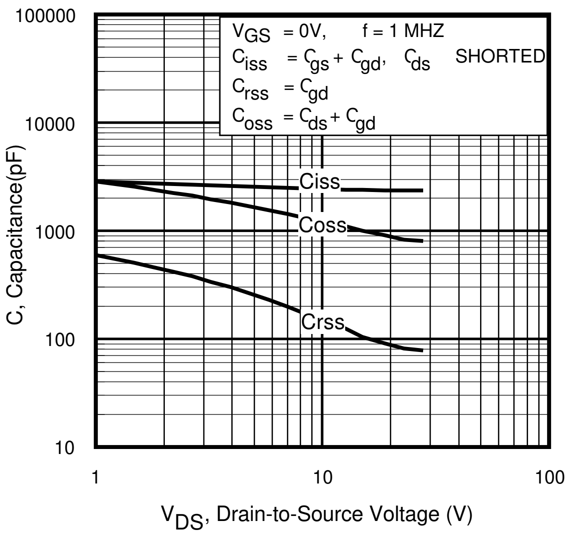


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

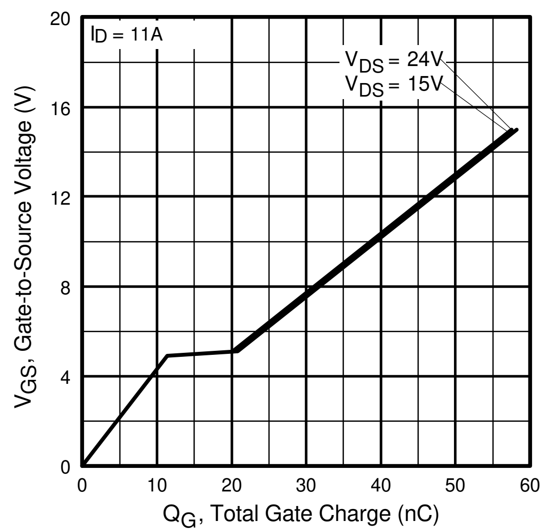


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

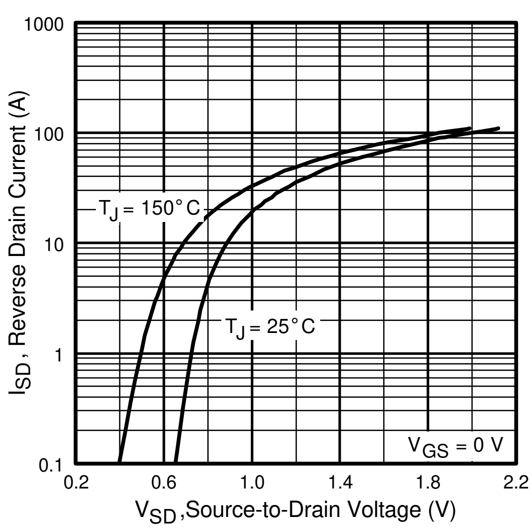


Fig 7. Typical Source-Drain Diode Forward Voltage

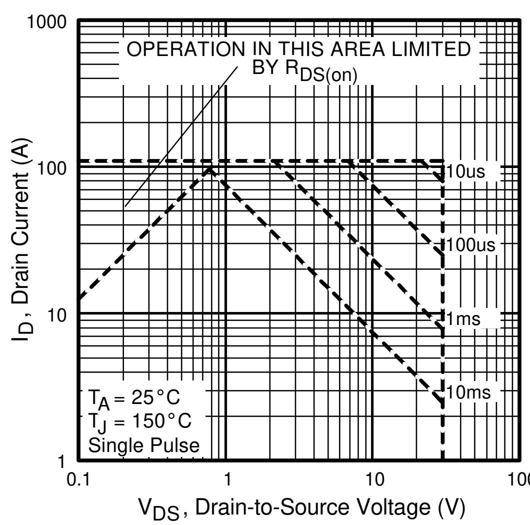
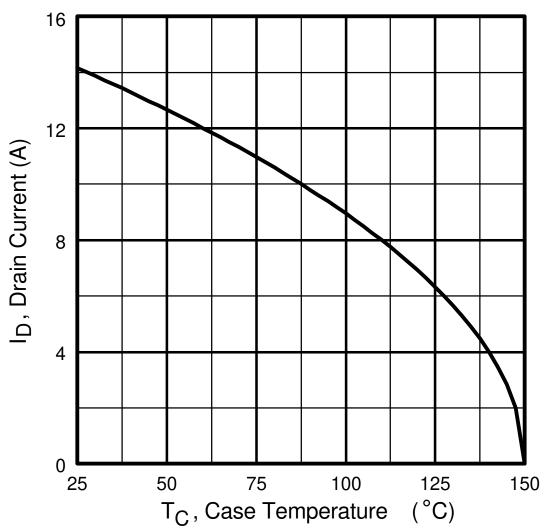


Fig 8. Maximum Safe Operating Area

Fig 6. On-Resistance Vs. Drain Current



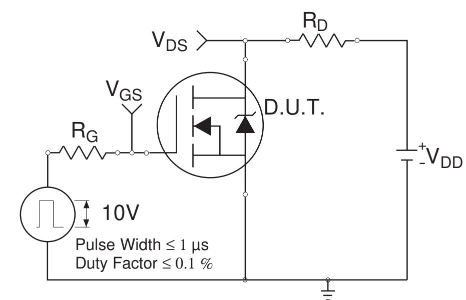


Fig 10a. Switching Time Test Circuit

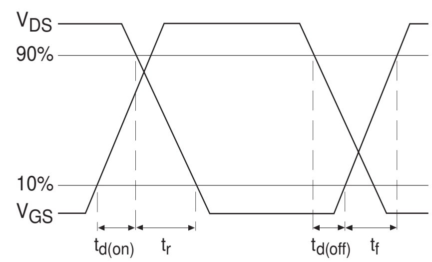


Fig 10b. Switching Time Waveforms

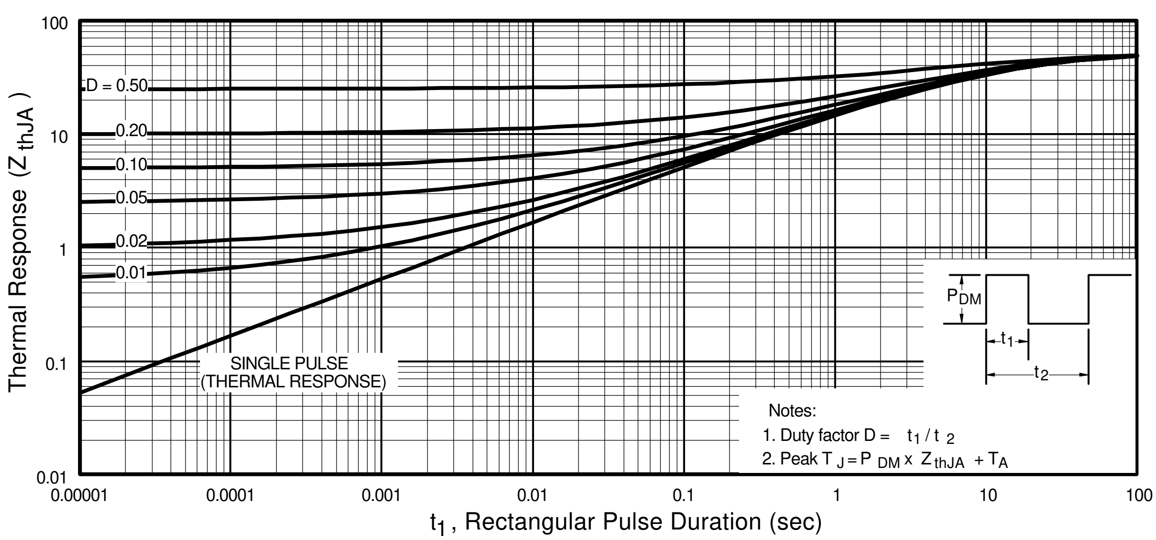


Fig 10. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

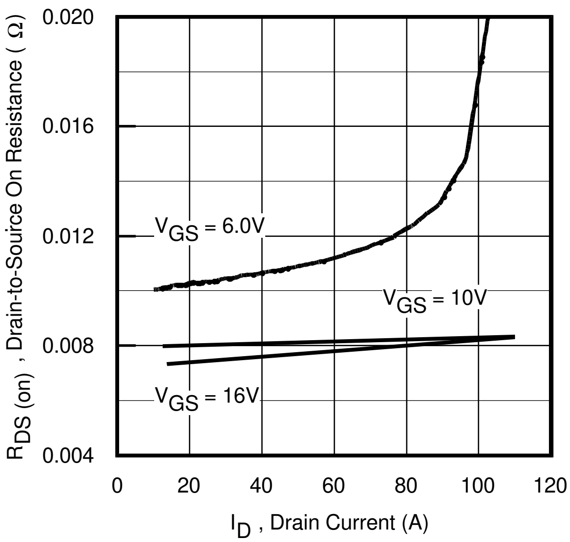


Fig 12. On-Resistance Vs. Drain Current

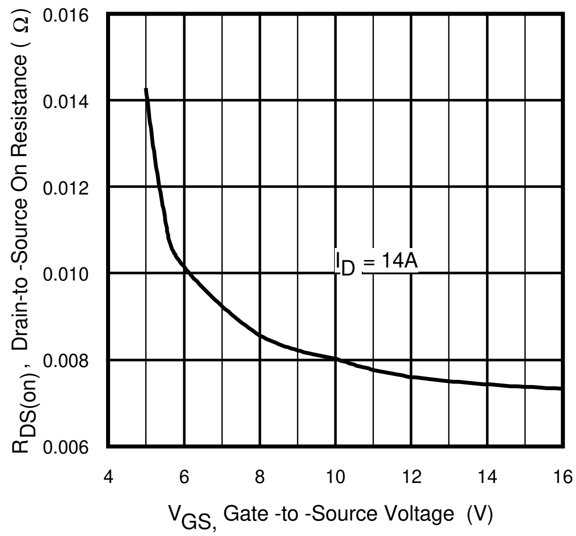


Fig 13. On-Resistance Vs. Gate Voltage

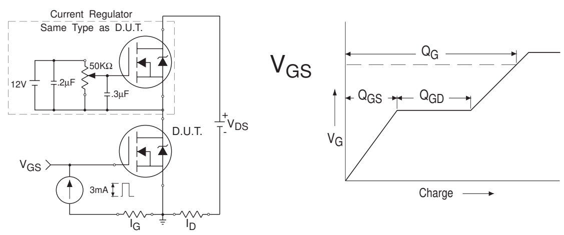


Fig 13a&b. Basic Gate Charge Test Circuit and Waveform

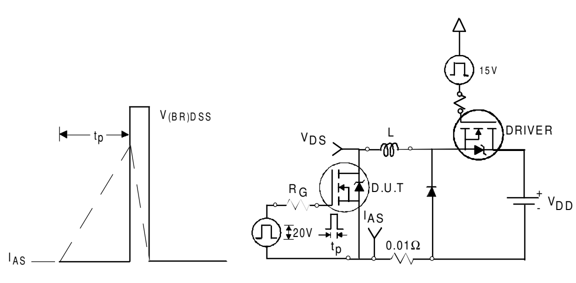


Fig 14a&b. Unclamped Inductive Test circuit and Waveforms

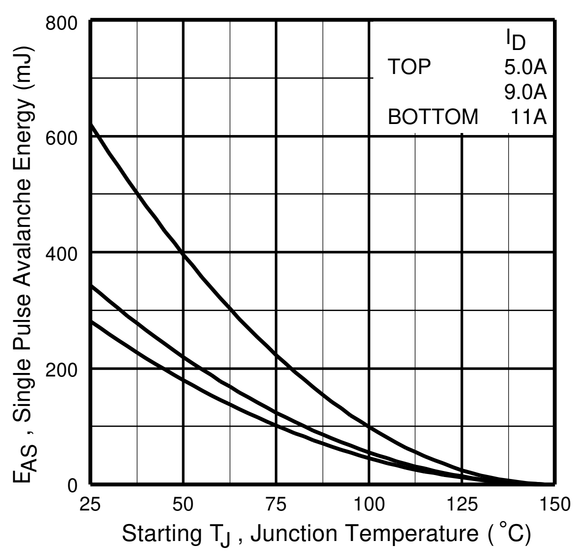
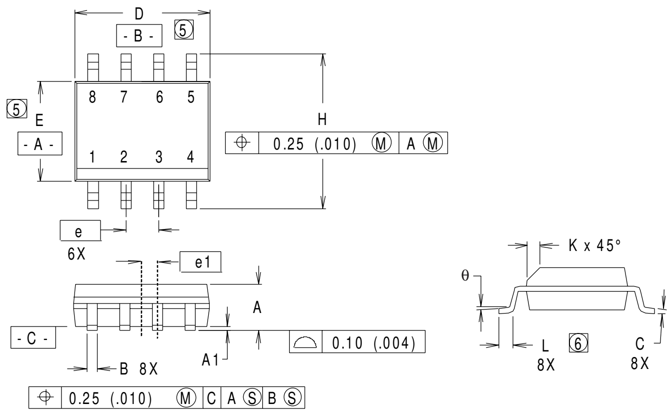


Fig 14c. Maximum Avalanche Energy Vs. Drain Current

SO-8 Package Details

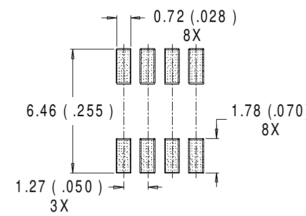


DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
B	.014	.018	0.36	0.46
C	.0075	.0098	0.19	0.25
D	.189	.196	4.80	4.98
E	.150	.157	3.81	3.99
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.011	.019	0.28	0.48
L	0.16	.050	0.41	1.27
θ	0°	8°	0°	8°

NOTES:

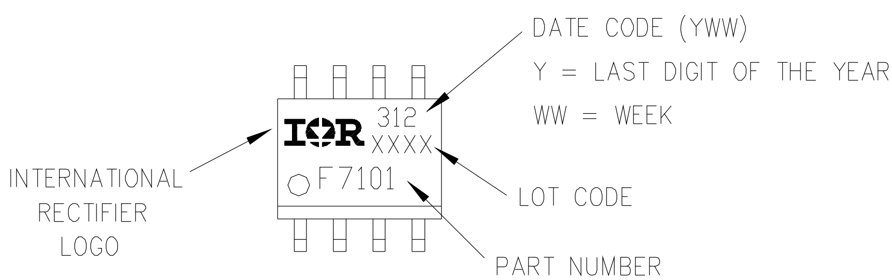
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1982.
2. CONTROLLING DIMENSION : INCH.
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS MOLD PROTRUSIONS NOT TO EXCEED 0.25 (.006).
6. DIMENSIONS IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE..

RECOMMENDED FOOTPRINT

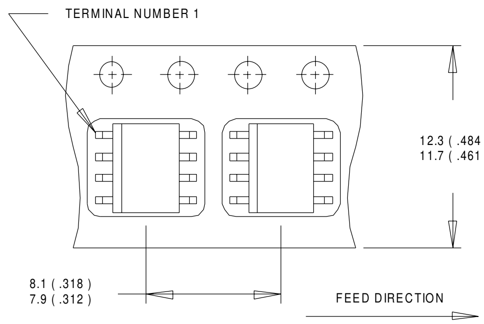


SO-8 Part Marking

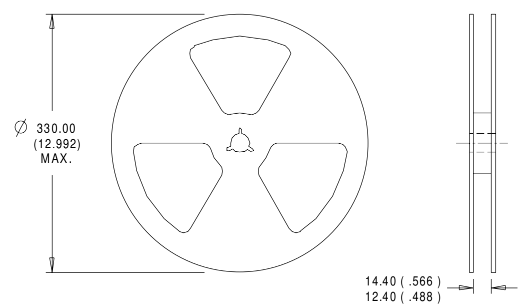
EXAMPLE: THIS IS AN IRF7101



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 = 4.6mH $R_G = 25\Omega$, $I_{AS} = 11A$.

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 Industrial market.
Qualification Standards can be found on IR's Web site.

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