

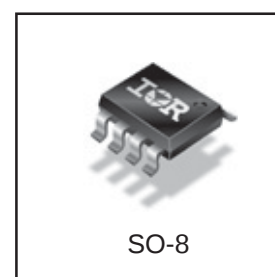
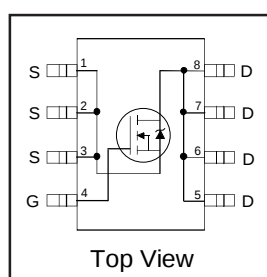
Applications

- 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(m Ω)	I_D
40V	17@$V_{GS} = 10V$	9.0A

**Absolute Maximum Ratings**

Symbol	Parameter	Max.	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-to-Source Voltage	± 20	V
I_D @ $T_A = 25^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V	9.0	A
I_D @ $T_A = 70^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V	7.3	
I_{DM}	Pulsed Drain Current①	73	
P_D @ $T_A = 25^\circ\text{C}$	Maximum Power Dissipation③	2.5	W
P_D @ $T_A = 70^\circ\text{C}$	Maximum Power Dissipation③	1.6	W
	Linear Derating Factor	0.02	mW/ $^\circ\text{C}$
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to + 150	$^\circ\text{C}$

Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JL}$	Junction-to-Drain Lead	—	20	$^\circ\text{C/W}$
$R_{\theta JA}$	Junction-to-Ambient ④	—	50	

Notes ① through ④ are on page 8
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Static @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	40	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.04	—	V/°C	Reference to 25°C , $I_D = 1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	12	17	m Ω	$V_{GS} = 10V, I_D = 9.0A$ ③
		—	15.5	21		$V_{GS} = 4.5V, I_D = 7.2A$ ③
$V_{GS(th)}$	Gate Threshold Voltage	1.0	—	3.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	20	μA	$V_{DS} = 32V, V_{GS} = 0V$
		—	—	100		$V_{DS} = 32V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	200	nA	$V_{GS} = 16V$
	Gate-to-Source Reverse Leakage	—	—	-200		$V_{GS} = -16V$

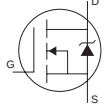
Dynamic @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
g_{fs}	Forward Transconductance	17	—	—	S	$V_{DS} = 20V, I_D = 7.2A$
Q_g	Total Gate Charge	—	15	23	nC	$I_D = 7.2A$
Q_{gs}	Gate-to-Source Charge	—	7.0	11		$V_{DS} = 20V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	5.0	8.0		$V_{GS} = 4.5V$ ③
Q_{oss}	Output Gate Charge	—	16	24		$V_{GS} = 0V, V_{DS} = 16V$
$t_{d(on)}$	Turn-On Delay Time	—	11	—	ns	$V_{DD} = 20V$
t_r	Rise Time	—	2.2	—		$I_D = 7.2A$
$t_{d(off)}$	Turn-Off Delay Time	—	14	—		$R_G = 1.8\Omega$
t_f	Fall Time	—	3.5	—		$V_{GS} = 4.5V$ ③
C_{iss}	Input Capacitance	—	2000	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	480	—		$V_{DS} = 20V$
C_{rss}	Reverse Transfer Capacitance	—	28	—		$f = 1.0MHz$

Avalanche Characteristics

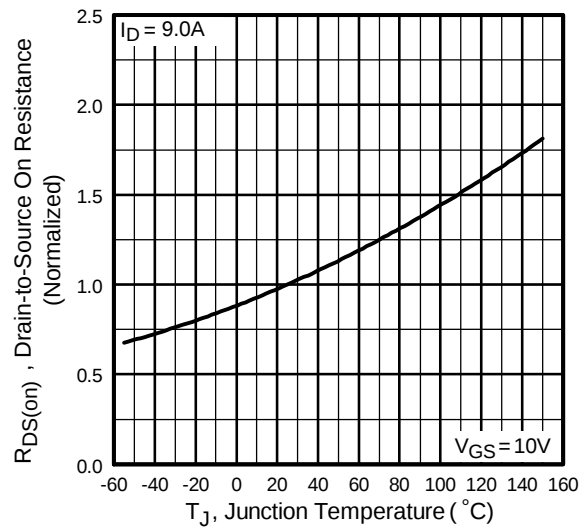
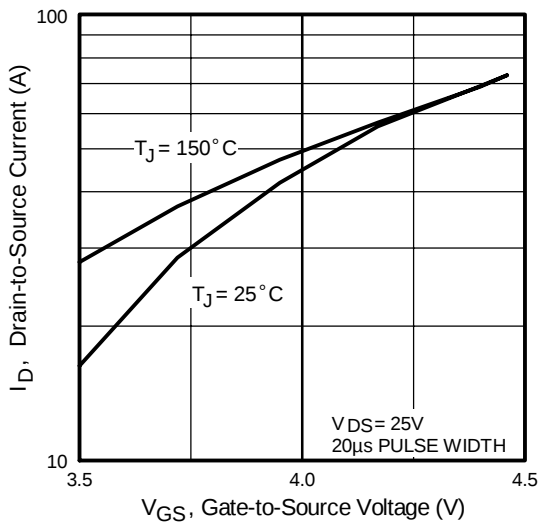
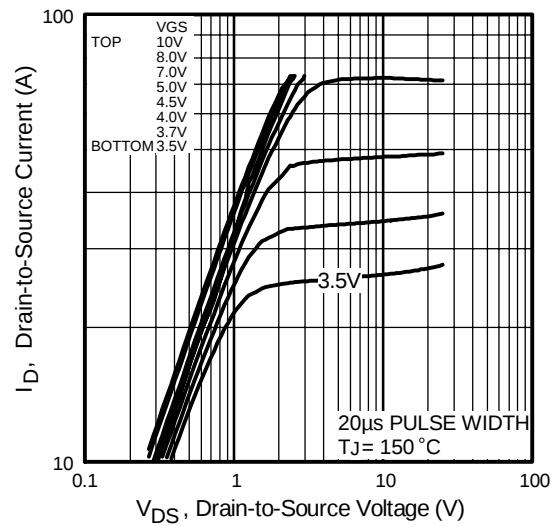
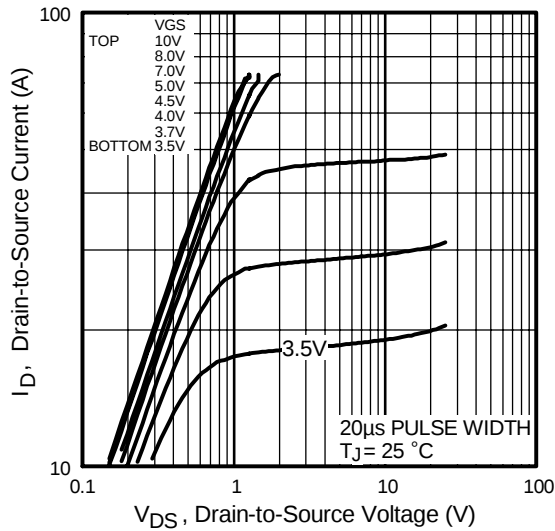
Symbol	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy②	—	210	mJ
I_{AR}	Avalanche Current①	—	7.2	A

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	—	—	73		
V_{SD}	Diode Forward Voltage	—	0.80	1.3	V	$T_J = 25^\circ\text{C}, I_S = 7.2A, V_{GS} = 0V$ ③
		—	0.65	—		$T_J = 125^\circ\text{C}, I_S = 7.2A, V_{GS} = 0V$ ③
t_{rr}	Reverse Recovery Time	—	47	71	ns	$T_J = 25^\circ\text{C}, I_F = 7.2A, V_R = 15V$
Q_{rr}	Reverse Recovery Charge	—	91	140	nC	$di/dt = 100A/\mu s$ ③
t_{rr}	Reverse Recovery Time	—	77	120	ns	$T_J = 125^\circ\text{C}, I_F = 7.2A, V_R = 20V$
Q_{rr}	Reverse Recovery Charge	—	150	230	nC	$di/dt = 100A/\mu s$ ③

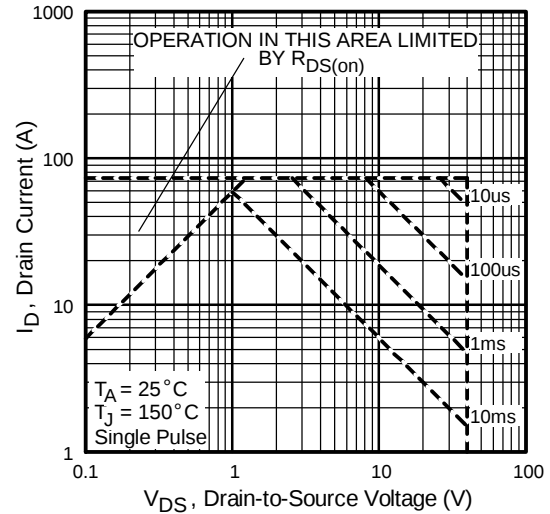
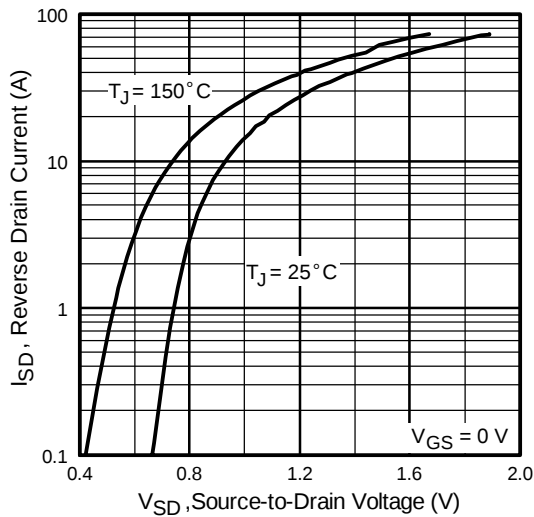
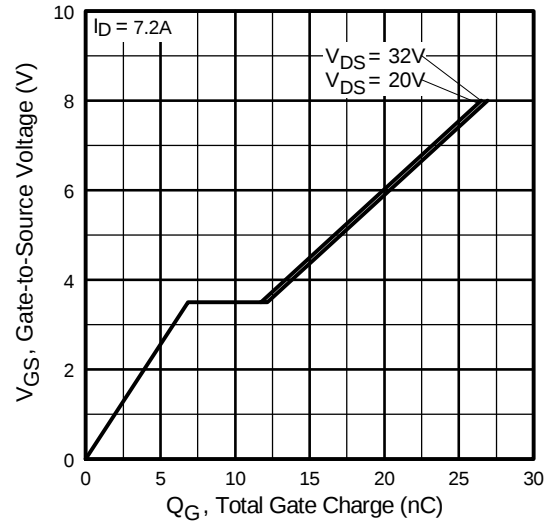
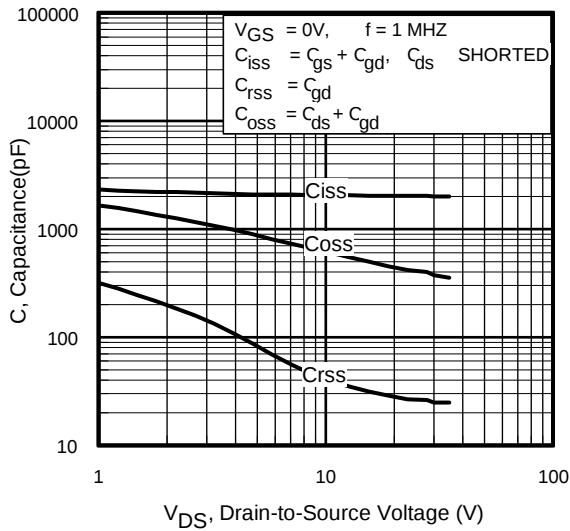
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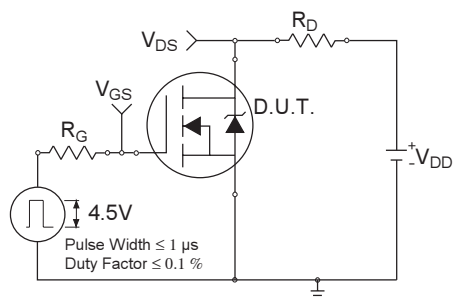
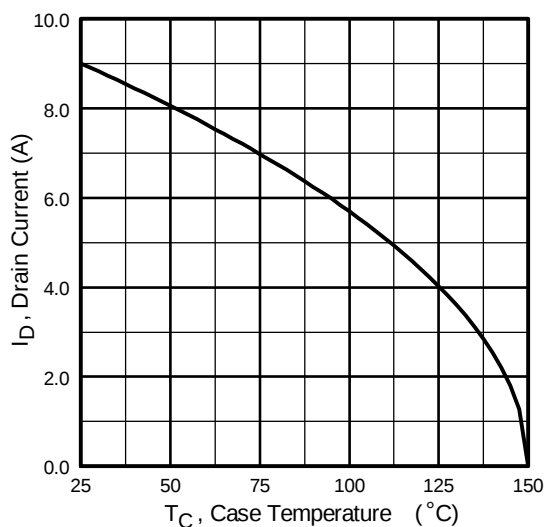


Fig 10a. Switching Time Test Circuit

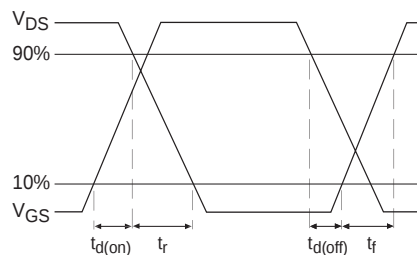


Fig 10b. Switching Time Waveforms

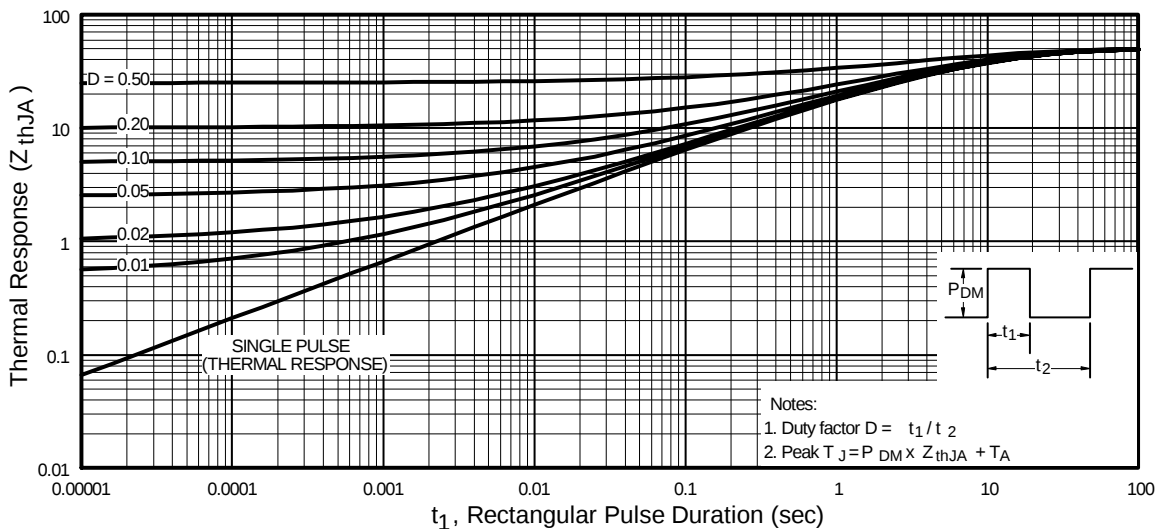


Fig 10. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

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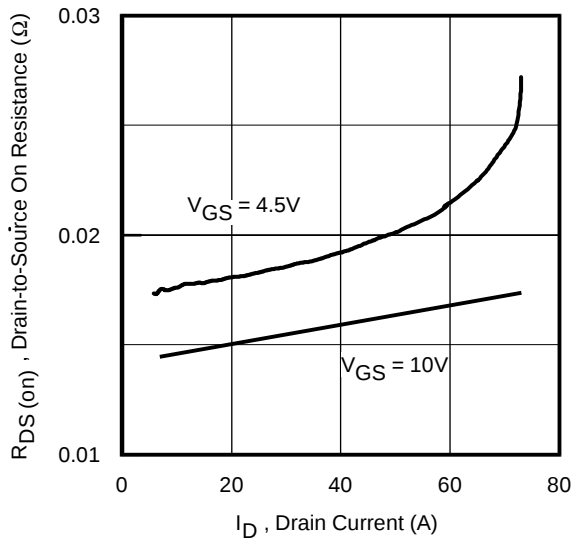


Fig 12. On-Resistance Vs. Drain Current

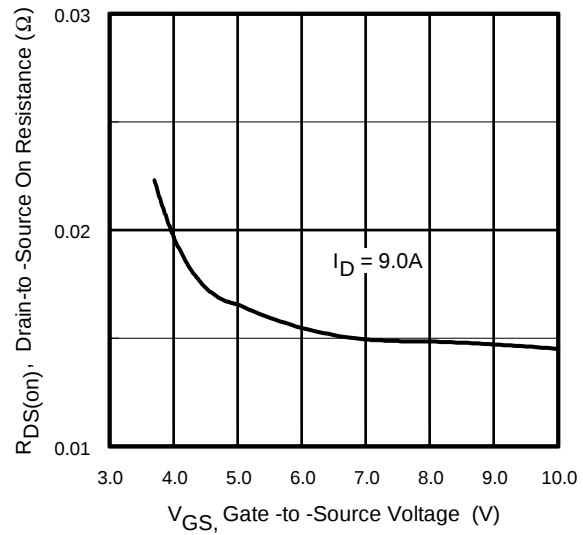


Fig 13. On-Resistance Vs. Gate Voltage

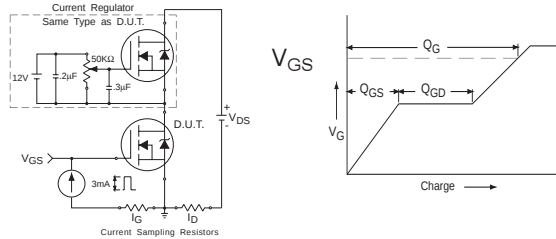


Fig 13a&b. Basic Gate Charge Test Circuit and Waveform

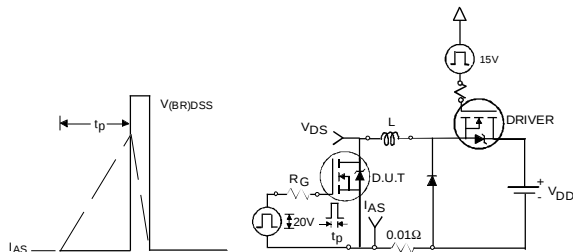


Fig 14a&b. Unclamped Inductive Test circuit and Waveforms

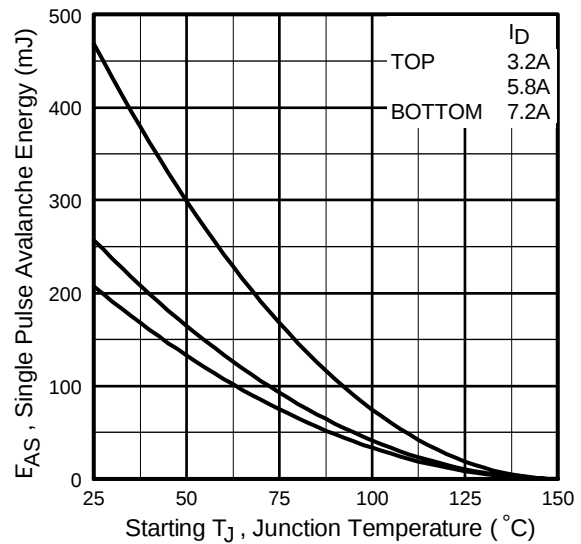


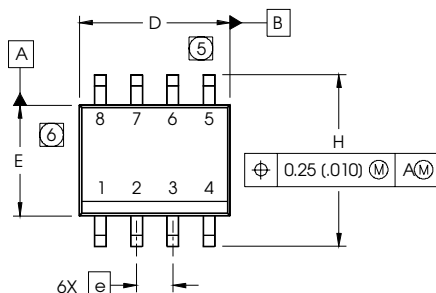
Fig 14c. Maximum Avalanche Energy Vs. Drain Current

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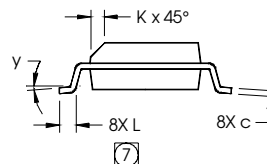
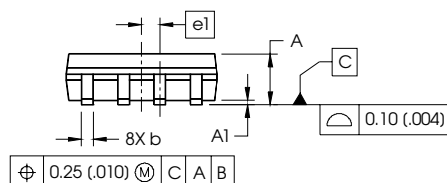
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SO-8 Package Outline

Dimensions are shown in millimeters (inches)

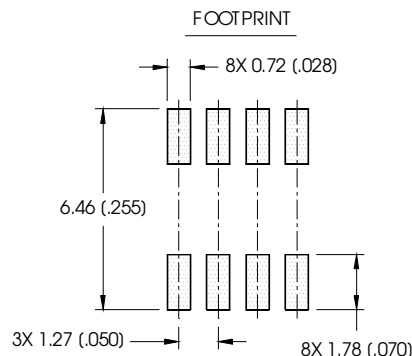


DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40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



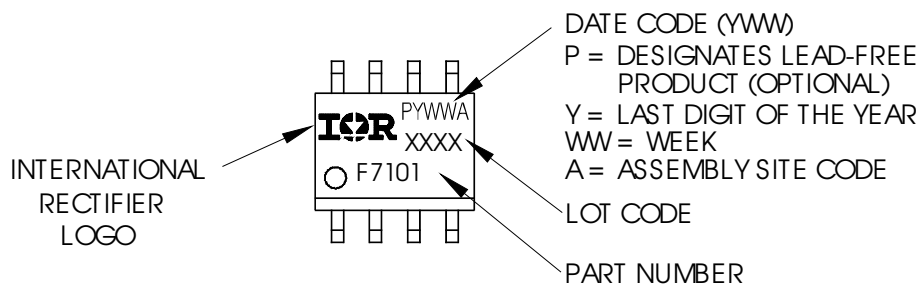
NOTES:

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.



SO-8 Part Marking

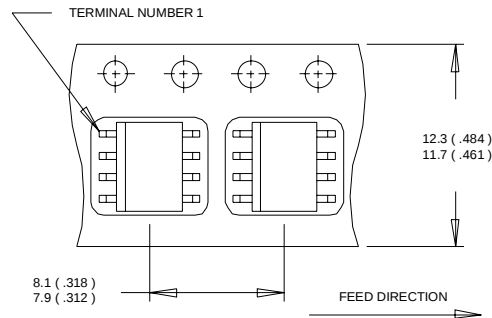
EXAMPLE: THIS IS AN IRF7101 (MOSFET)



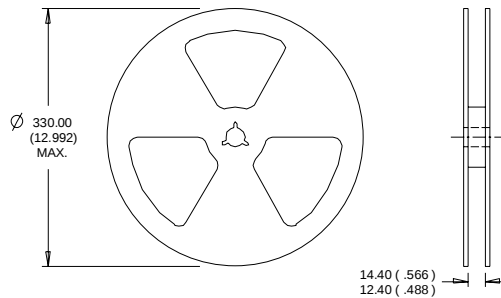
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SO-8 Tape and Reel

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- 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 $T_J = 25^\circ\text{C}$, $L = 8.1\text{mH}$
 $R_G = 25\Omega$, $I_{AS} = 7.2\text{A}$.
- ③ Pulse width $\leq 400\mu\text{s}$; duty cycle $\leq 2\%$.
- 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 Consumer market.
Qualifications Standards can be found on IR's Web site.

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