

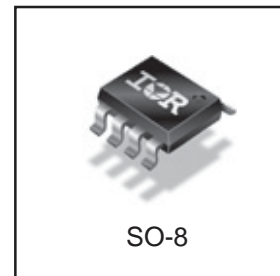
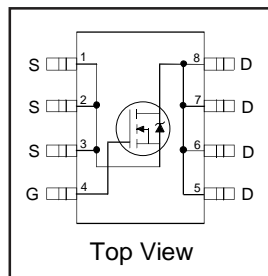
Applications

- High Frequency Synchronous Buck Converters for Computers and Communications
- Lead-Free

V _{DS}	R _{DS(on)} max (mΩ)	I _D
30V	8.5@V _{GS} = 10V	14A
	10@V _{GS} = 4.5V	11A

Benefits

- Ultra-Low Gate Impedance
- Very Low R_{DS(on)}
- Fully Characterized Avalanche Voltage and Current
- Low Charge Ratio to Eliminate False Turn On in High Frequency Circuits



Absolute Maximum Ratings

Symbol	Parameter	Max.	Units
V _{DS}	Drain-Source Voltage	30	V
V _{GS}	Gate-to-Source Voltage	± 20	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 Current ^①	110	
P _D @ T _A = 25°C	Maximum Power Dissipation ^④	2.5	W
P _D @ T _A = 70°C	Maximum Power Dissipation ^④	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 ^④	—	50	

Notes ① through ④ are on page 8
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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
ΔV _{(BR)DSS} /ΔT _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	—	6.5	8.5	mΩ	V _{GS} = 10V, I _D = 14A ③
		—	7.7	10		V _{GS} = 4.5V, I _D = 11A ③
V _{GS(th)}	Gate Threshold Voltage	1.0	—	2.5	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} = 16V
	Gate-to-Source Reverse Leakage	—	—	-200		V _{GS} = -16V

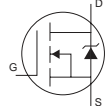
Dynamic @ T_J = 25°C (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
g _{fs}	Forward Transconductance	35	—	—	S	V _{DS} = 15V, I _D = 11A
Q _g	Total Gate Charge	—	25	38	nC	I _D = 11A
Q _{gs}	Gate-to-Source Charge	—	6.5	—		V _{DS} = 15V
Q _{gd}	Gate-to-Drain ("Miller") Charge	—	8.2	—		V _{GS} = 4.5V
Q _{oss}	Output Gate Charge	—	30	—		V _{GS} = 0V, V _{DS} = 15V
t _{d(on)}	Turn-On Delay Time	—	12	—	ns	V _{DD} = 15V
t _r	Rise Time	—	9.8	—		I _D = 11A
t _{d(off)}	Turn-Off Delay Time	—	19	—		R _G = 1.8Ω
t _f	Fall Time	—	5.9	—		V _{GS} = 4.5V ③
C _{iss}	Input Capacitance	—	2710	—	pF	V _{GS} = 0V
C _{oss}	Output Capacitance	—	1120	—		V _{DS} = 15V
C _{rss}	Reverse Transfer Capacitance	—	100	—		f = 1.0MHz

Avalanche Characteristics

Symbol	Parameter	Typ.	Max.	Units
E _{AS}	Single Pulse Avalanche Energy②	—	500	mJ
I _{AR}	Avalanche Current①	—	8.2	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	—	—	110		
V _{SD}	Diode Forward Voltage	—	0.80	1.3	V	T _J = 25°C, I _S = 11A, V _{GS} = 0V ③
		—	0.65	—		T _J = 125°C, I _S = 11A, V _{GS} = 0V ③
t _{rr}	Reverse Recovery Time	—	91	140	ns	T _J = 25°C, I _F = 11A, V _R = 15V
Q _{rr}	Reverse Recovery Charge	—	130	200		di/dt = 100A/μs ③
t _{rr}	Reverse Recovery Time	—	90	140	ns	T _J = 125°C, I _F = 11A, V _R = 15V
Q _{rr}	Reverse Recovery Charge	—	140	210		di/dt = 100A/μs ③

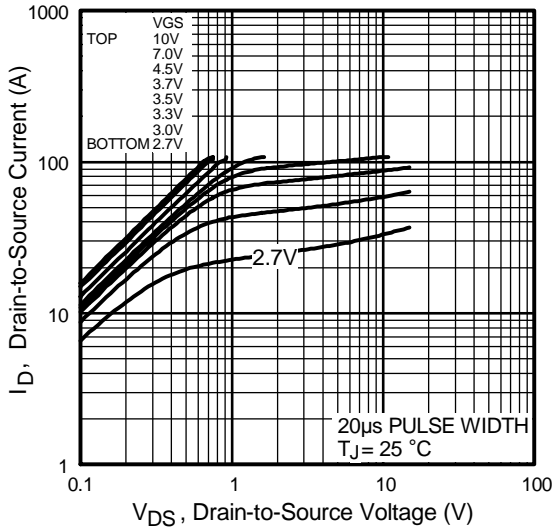


Fig 1. Typical Output Characteristics

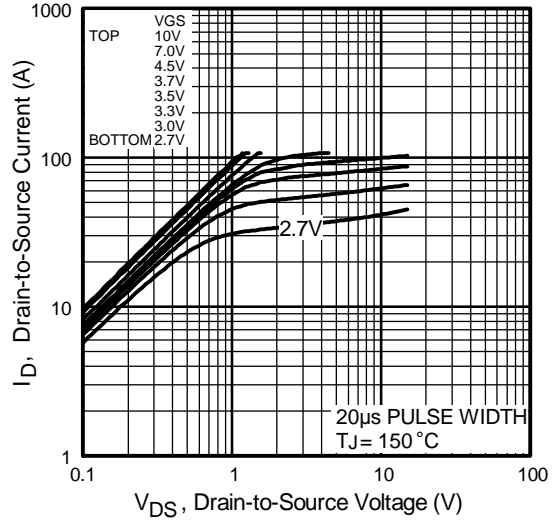


Fig 2. Typical Output Characteristics

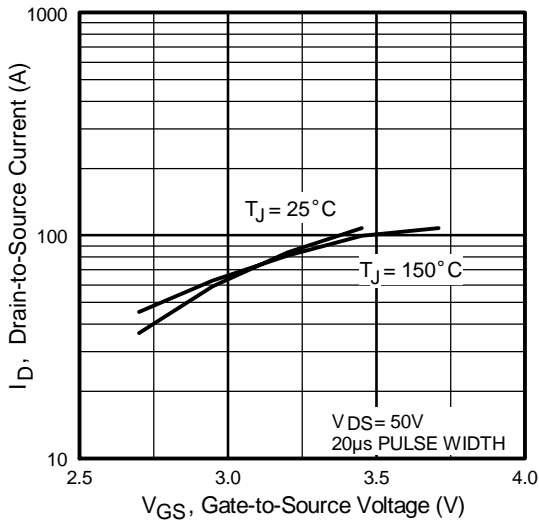


Fig 3. Typical Transfer Characteristics

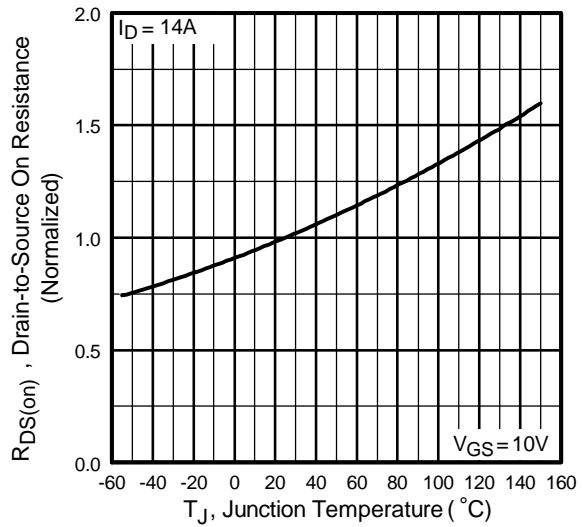


Fig 4. Normalized On-Resistance Vs. Temperature

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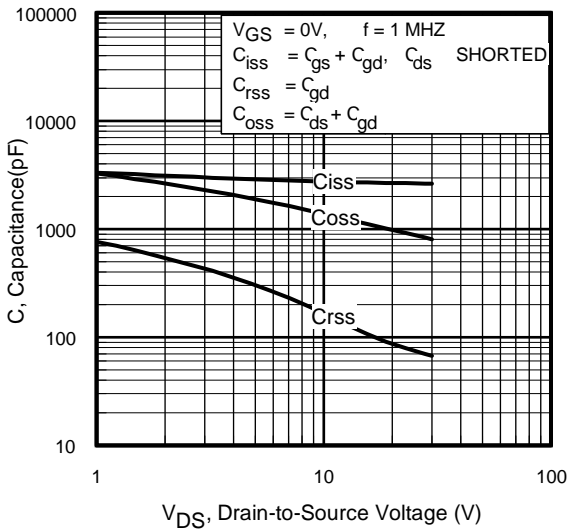


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

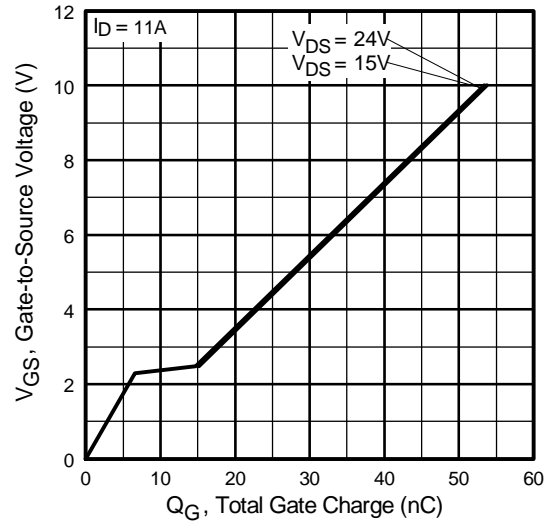


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

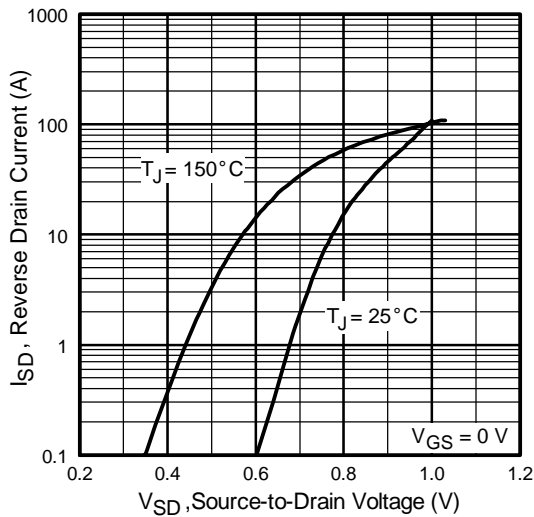


Fig 7. Typical Source-Drain Diode Forward Voltage

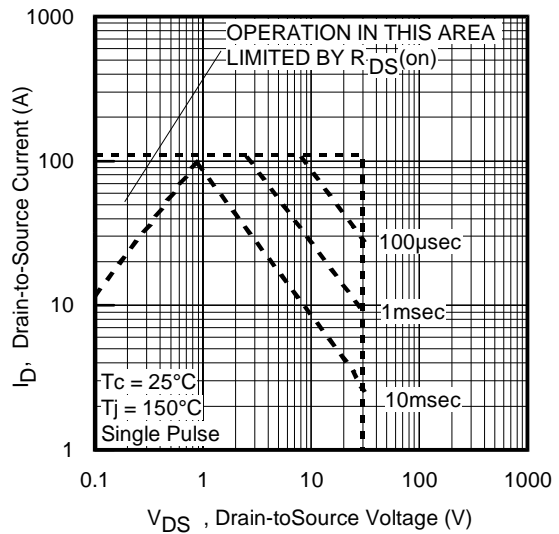


Fig 8. Maximum Safe Operating Area

Fig 6. On-Resistance Vs. Drain Current

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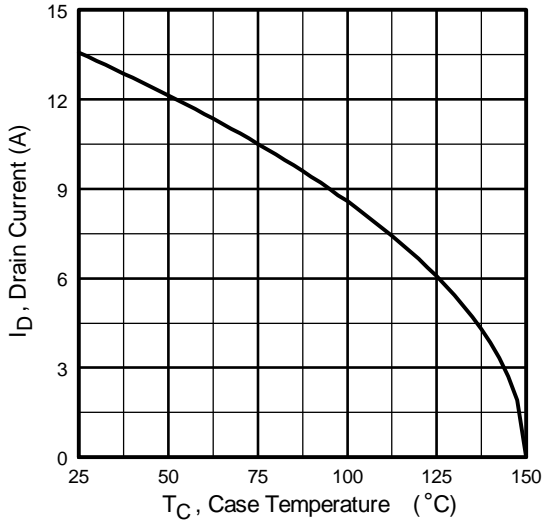


Fig 9. Maximum Drain Current Vs. Ambient Temperature

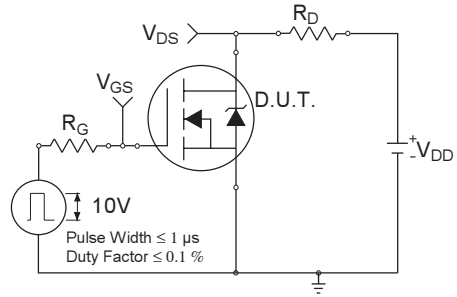


Fig 10a. Switching Time Test Circuit

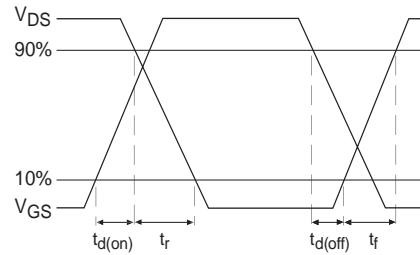


Fig 10b. Switching Time Waveforms

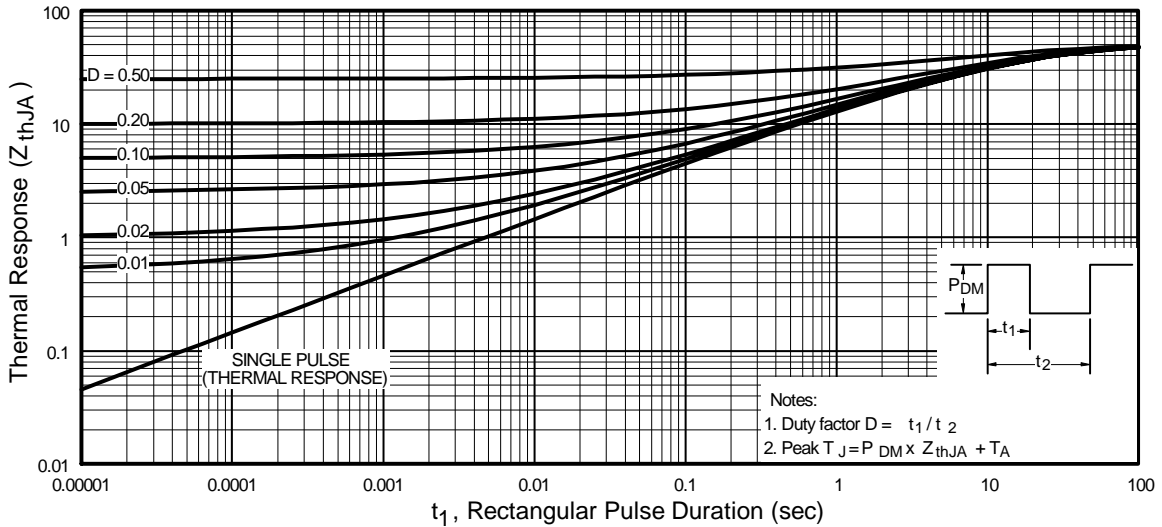


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

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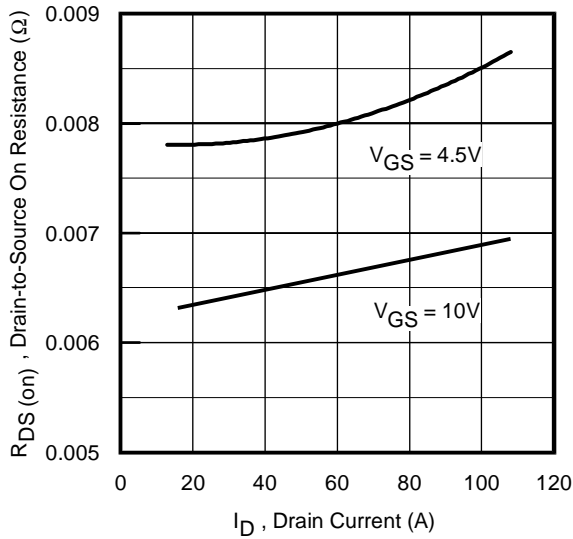


Fig 12. On-Resistance Vs. Drain Current

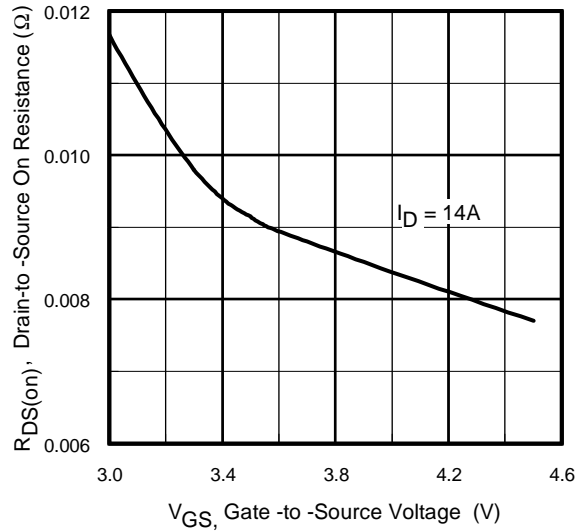


Fig 13. On-Resistance Vs. Gate Voltage

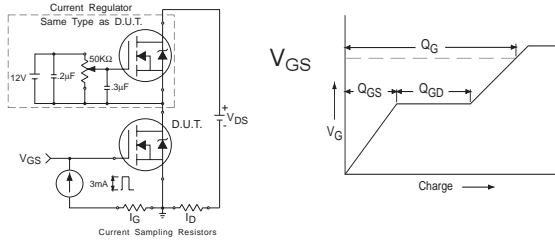


Fig 14a&b. Basic Gate Charge Test Circuit and Waveform

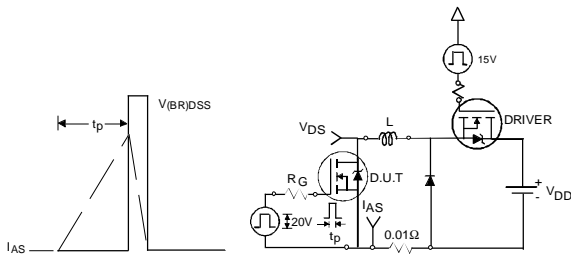


Fig 15a&b. Unclamped Inductive Test circuit and Waveforms

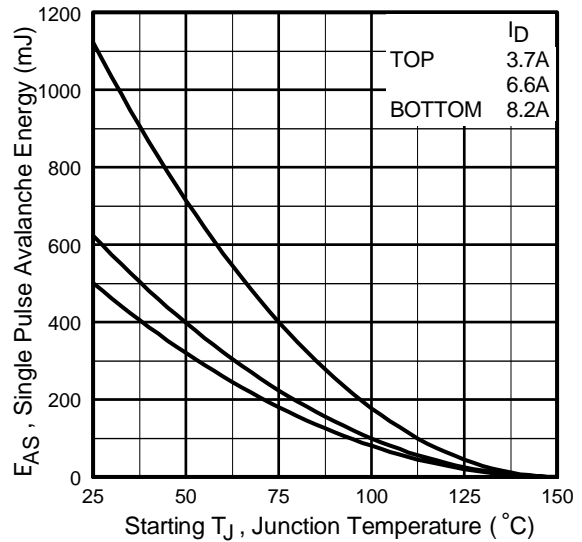
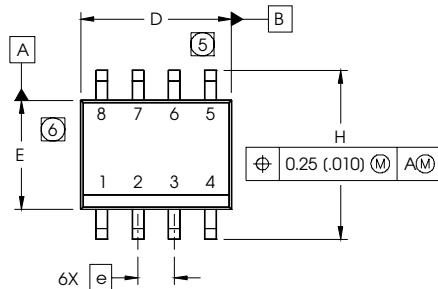


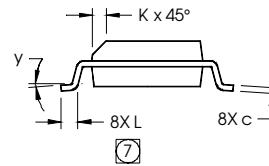
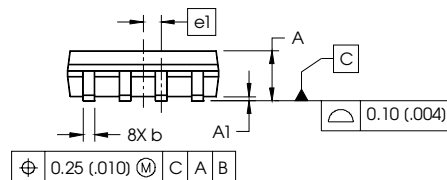
Fig 15c. Maximum Avalanche Energy Vs. Drain Current

SO-8 Package Outline

Dimensions are shown in millimeters (inches)



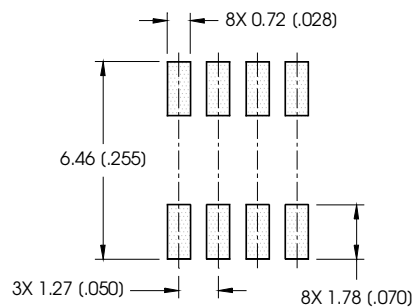
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40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



NOTES:

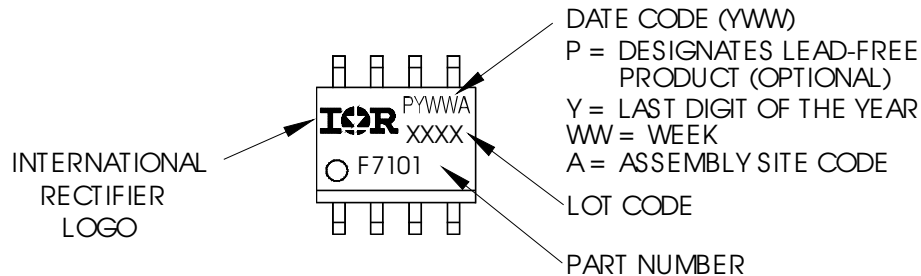
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA
- ⑤ DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 (.006).
- ⑥ DIMENSION DOES NOT INCLUDE 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

EXAMPLE: THIS IS AN IRF7101 (MOSFET)

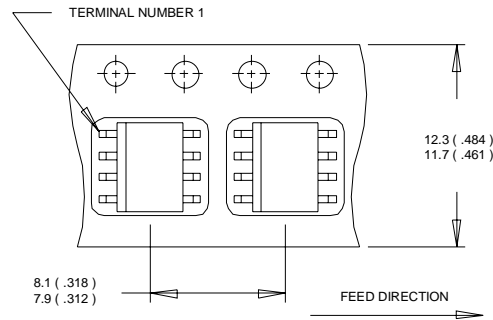


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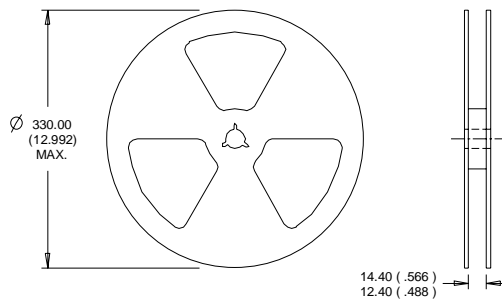
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SO-8 Tape and Reel

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.

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Starting $T_J = 25^\circ\text{C}$, $L = 15\text{mH}$
 $R_G = 25\Omega$, $I_{AS} = 8.2\text{A}$.
- 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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