

IRF7452QPbF

HEXFET® Power MOSFET

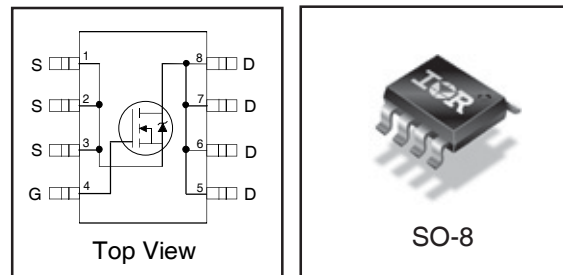
- Advanced Process Technology
- Ultra Low On-Resistance
- N Channel MOSFET
- Surface Mount
- Available in Tape & Reel
- 150°C Operating Temperature
- Lead-Free

V_{DSS}	$R_{DS(on) \max}$	I_D
100V	0.060Ω	4.5A

Description

These HEXFET® Power MOSFET's in SO-8 package utilize the latest processing techniques to achieve extremely low on-resistance per silicon area. Additional features of these HEXFET Power MOSFET's are a 150°C junction operating temperature, fast switching speed and improved repetitive avalanche rating. These benefits combine to make this design an extremely efficient and reliable device for use in a wide variety of applications.

The efficient SO-8 package provides enhanced thermal characteristics making it ideal in a variety of power applications. This surface mount SO-8 can dramatically reduce board space and is also available in Tape & Reel.



Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_A = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	4.5	A
$I_D @ T_A = 70^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	3.6	
I_{DM}	Pulsed Drain Current ①	36	
$P_D @ T_A = 25^\circ\text{C}$	Power Dissipation	2.5	W
	Linear Derating Factor	0.02	W/°C
V_{GS}	Gate-to-Source Voltage	± 30	V
dv/dt	Peak Diode Recovery dv/dt ②	3.5	V/ns
T_J	Operating Junction and	-55 to + 150	°C
T_{STG}	Storage Temperature Range		
	Soldering Temperature, for 10 seconds		

Typical SMPS Topologies

- Telecom 48V input DC-DC with Half Bridge Primary or Datacom 28V input with Passive Reset Forward Converter Primary

Notes ① through ⑥ 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	100	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.11	—	V/°C	Reference to $25^\circ\text{C}, I_D = 1\text{mA}$ ⑥
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.060	Ω	$V_{GS} = 10V, I_D = 2.7A$ ④
$V_{GS(th)}$	Gate Threshold Voltage	3.0	—	5.5	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	25	μA	$V_{DS} = 100V, V_{GS} = 0V$
		—	—	250		$V_{DS} = 80V, V_{GS} = 0V, T_J = 150^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 24V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS} = -24V$

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
g_{fs}	Forward Transconductance	3.4	—	—	S	$V_{DS} = 50V, I_D = 2.7A$
Q_g	Total Gate Charge	—	33	50	nC	$I_D = 2.7A$
Q_{gs}	Gate-to-Source Charge	—	7.3	11		$V_{DS} = 80V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	16	24		$V_{GS} = 10V, \text{④}$
$t_{d(on)}$	Turn-On Delay Time	—	9.5	—	ns	$V_{DD} = 50V$
t_r	Rise Time	—	11	—		$I_D = 2.7A$
$t_{d(off)}$	Turn-Off Delay Time	—	16	—		$R_G = 6.0\Omega$
t_f	Fall Time	—	13	—		$V_{GS} = 10V, \text{④}$
C_{iss}	Input Capacitance	—	930	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	300	—		$V_{DS} = 25V$
C_{rss}	Reverse Transfer Capacitance	—	84	—		$f = 1.0\text{MHz}$
C_{oss}	Output Capacitance	—	1370	—		$V_{GS} = 0V, V_{DS} = 1.0V, f = 1.0\text{MHz}$
C_{oss}	Output Capacitance	—	170	—		$V_{GS} = 0V, V_{DS} = 80V, f = 1.0\text{MHz}$
$C_{oss\ eff.}$	Effective Output Capacitance	—	280	—		$V_{GS} = 0V, V_{DS} = 0V \text{ to } 80V \text{ ⑤}$

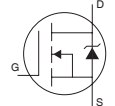
Avalanche Characteristics

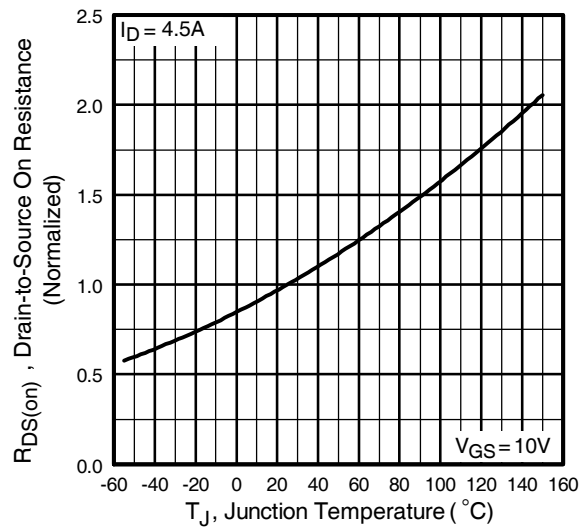
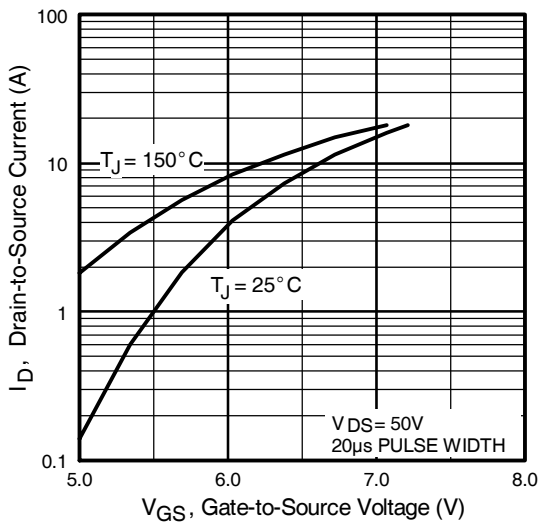
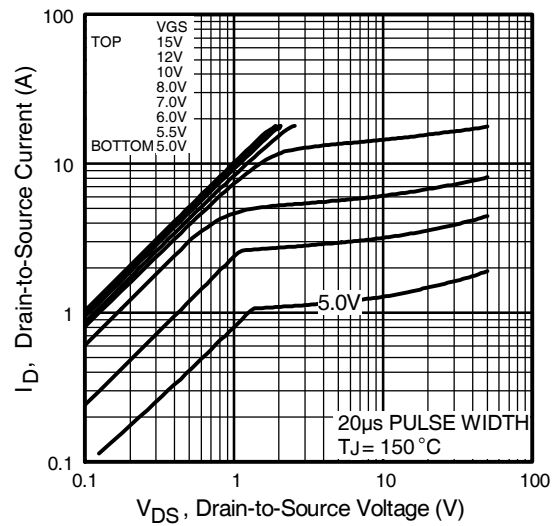
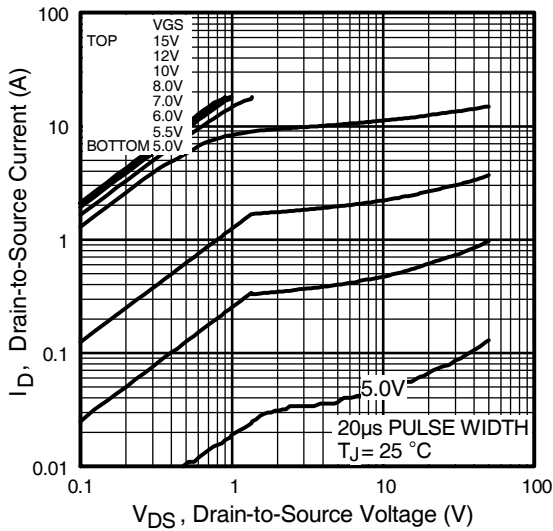
	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy②	—	200	mJ
I_{AR}	Avalanche Current①	—	4.5	A
E_{AR}	Repetitive Avalanche Energy①	—	0.25	mJ

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient⑥	—	50	°C/W

Diode Characteristics

	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	—	—	36		
V_{SD}	Diode Forward Voltage	—	—	1.3	V	$T_J = 25^\circ\text{C}, I_S = 2.7A, V_{GS} = 0V$ ④
t_{rr}	Reverse Recovery Time	—	77	120	ns	$T_J = 25^\circ\text{C}, I_F = 2.7A$
Q_{rr}	Reverse Recovery Charge	—	270	410	nC	$di/dt = 100A/\mu s$ ④



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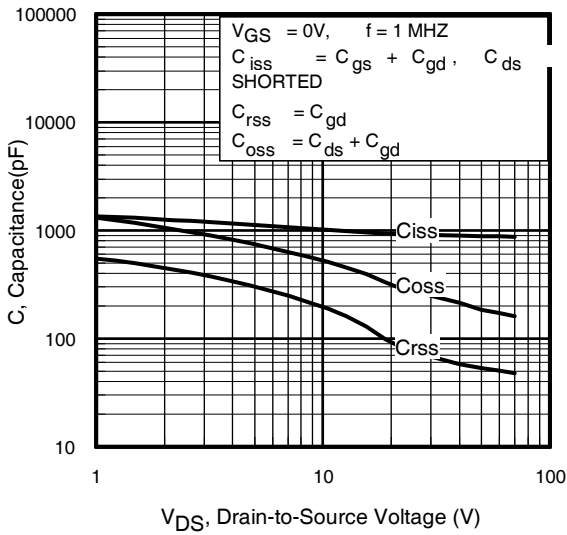


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

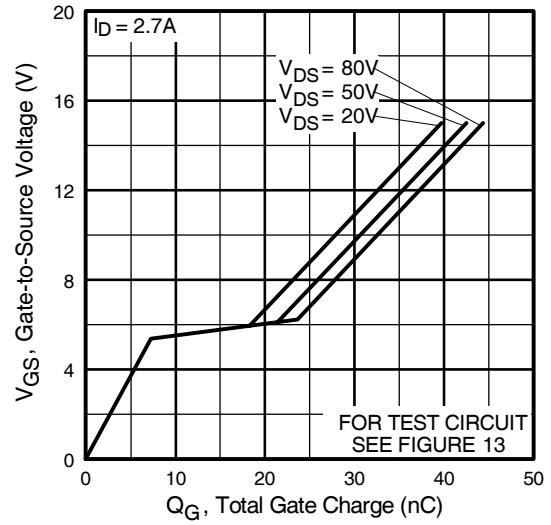


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

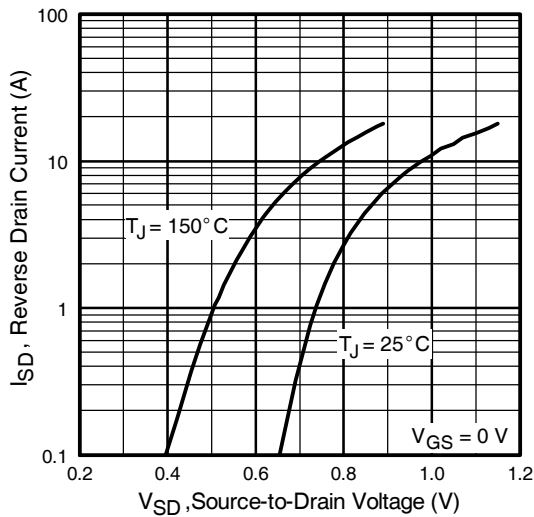


Fig 7. Typical Source-Drain Diode Forward Voltage

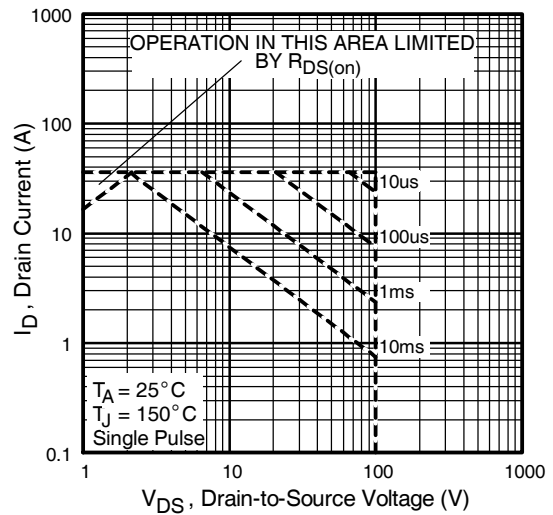


Fig 8. Maximum Safe Operating Area

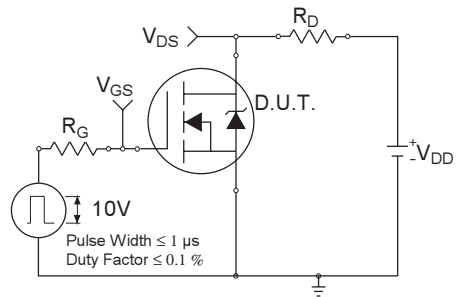
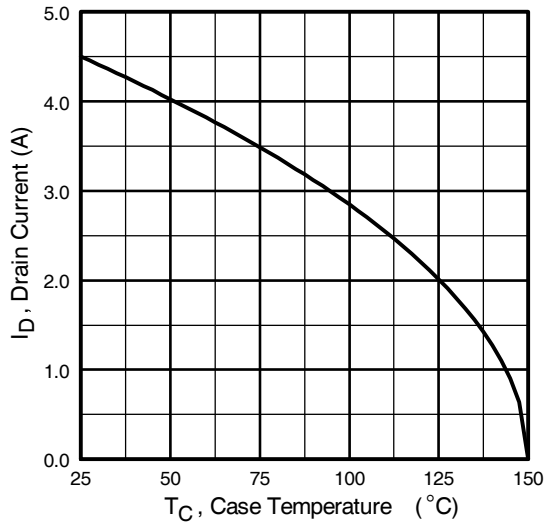


Fig 10a. Switching Time Test Circuit

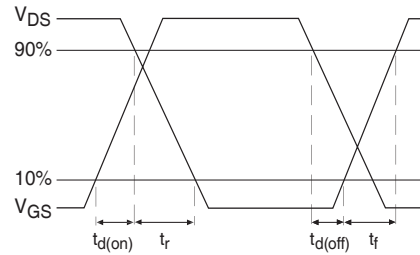


Fig 10b. Switching Time Waveforms

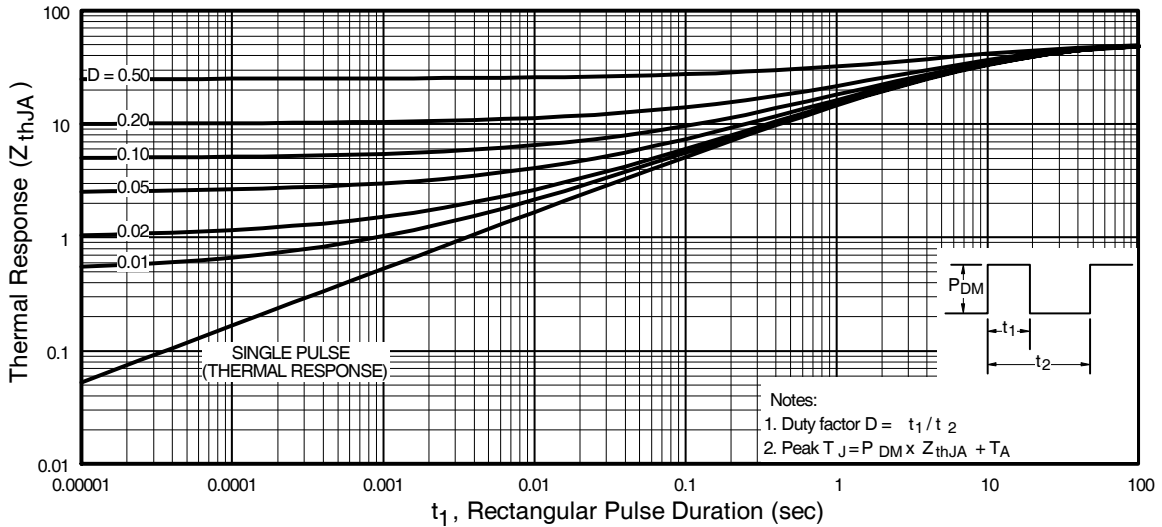


Fig 10. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

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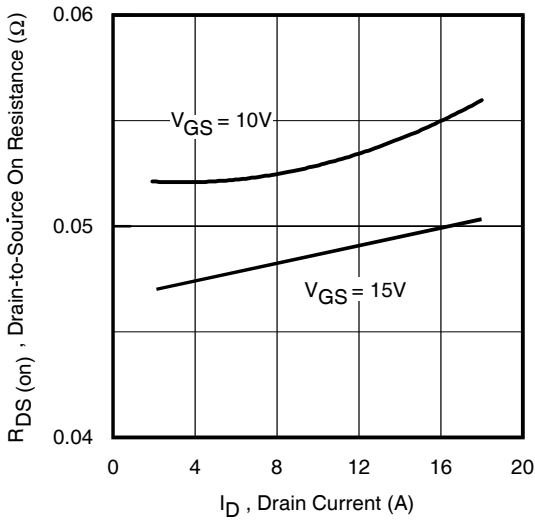


Fig 12. On-Resistance Vs. Drain Current

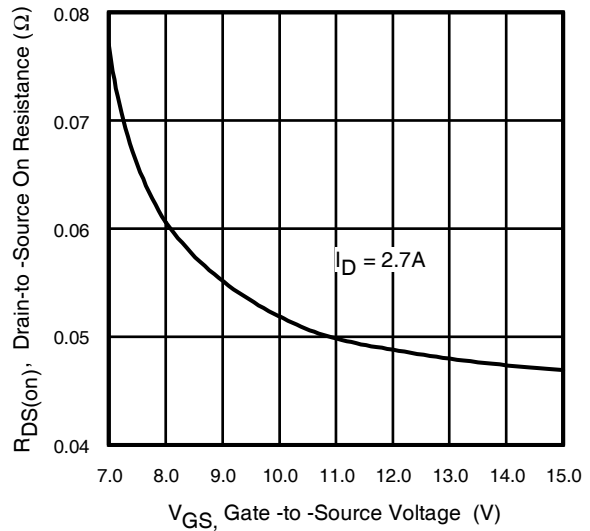


Fig 13. On-Resistance Vs. Gate Voltage

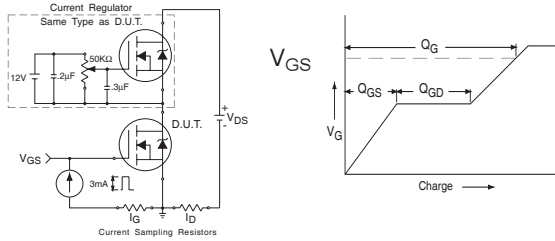


Fig 13a&b. Basic Gate Charge Test Circuit and Waveform

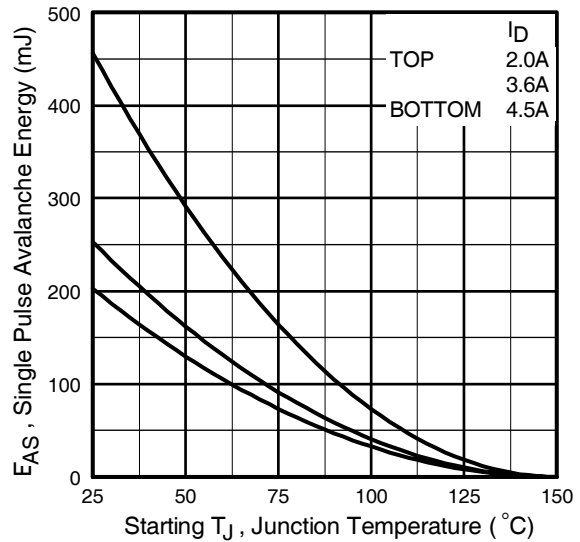


Fig 14c. Maximum Avalanche Energy Vs. Drain Current

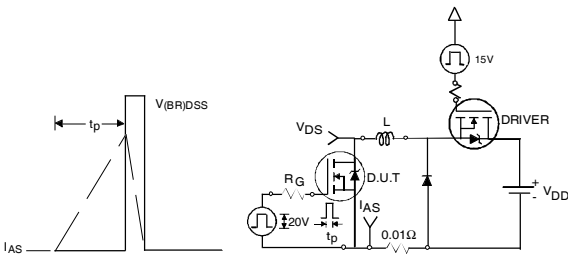
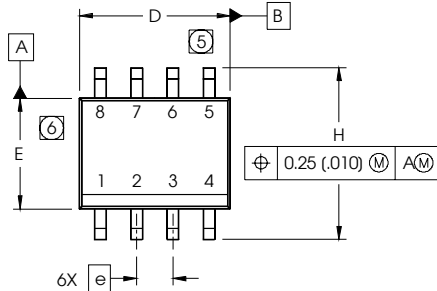


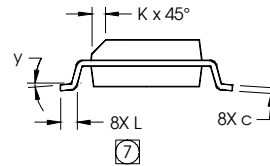
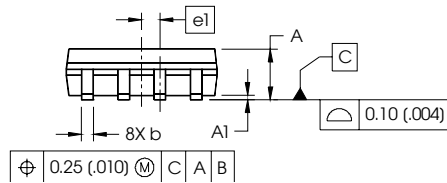
Fig 14a&b. Unclamped Inductive Test circuit and Waveforms

SO-8 Package Outline

Dimensions are shown in millimeters (inches)



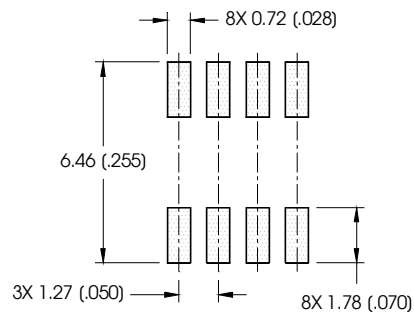
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40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



NOTES:

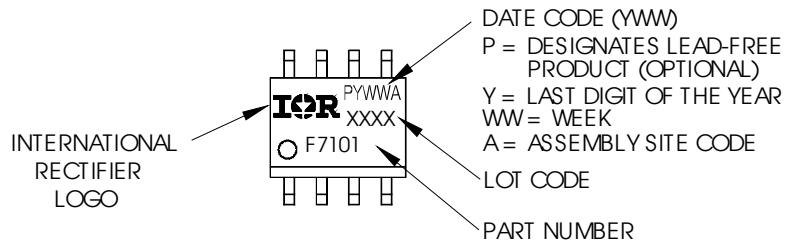
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 (.006).
6. DIMENSION DOES NOT INCLUDE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



Notes:

1. For an Automotive Qualified version of this part please see <http://www.irf.com/product-info/auto/>
2. For the most current drawing please refer to IR website at <http://www.irf.com/package/>

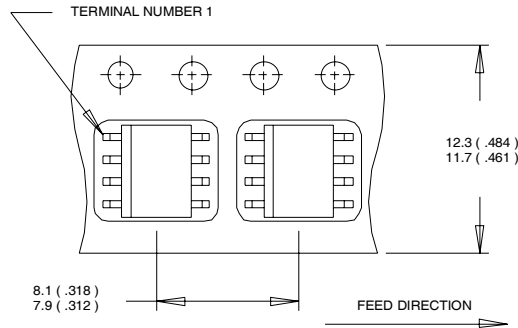
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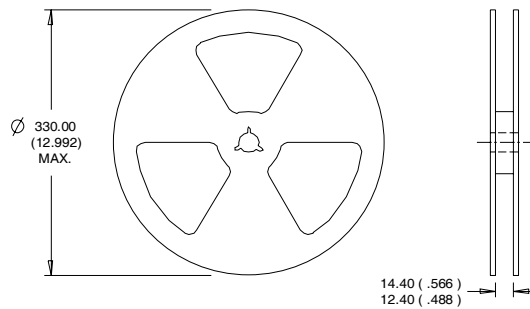
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SO-8 Tape and Reel

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 $T_J = 25^\circ\text{C}$, $L = 20\text{mH}$
 $R_G = 25\Omega$, $I_{AS} = 4.5\text{A}$.
- ③ Pulse width $\leq 400\mu\text{s}$; duty cycle $\leq 2\%$.
- ④ When mounted on 1 inch square copper board, $t < 10\text{ sec}$

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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