

IRF7452PbF

SMPS MOSFET

HEXFET® Power MOSFET

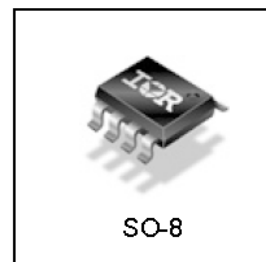
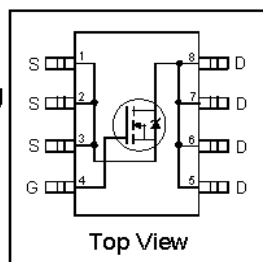
Applications

- High frequency DC-DC converters
- Lead-Free

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

Benefits

- Low Gate to Drain Charge to Reduce Switching Losses
- Fully Characterized Capacitance Including Effective C_{OSS} to Simplify Design. (See App. Note AN1001)
- Fully Characterized Avalanche Voltage and Current



Absolute Maximum Ratings

	Parameter	Max.	Units
I_D @ $T_A = 25^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V	4.5	A
I_D @ $T_A = 70^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V	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 ③	3.5	V/ns
T_J	Operating Junction and	-55 to + 150	°C
T_{STG}	Storage Temperature Range		
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	

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 ⑤ are on page 8

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

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

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
g_{fs}	Forward Transconductance	3.4	—	—	S	$V_{DS} = 50\text{V}$, $I_D = 2.7\text{A}$
Q_g	Total Gate Charge	—	33	50	nC	$I_D = 2.7\text{A}$
Q_{gs}	Gate-to-Source Charge	—	7.3	11		$V_{DS} = 80\text{V}$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	16	24	ns	$V_{DS} = 10\text{V}$, ④
$t_{d(on)}$	Turn-On Delay Time	—	9.5	—		$V_{DS} = 50\text{V}$
t_r	Rise Time	—	11	—	ns	$I_D = 2.7\text{A}$
$t_{d(off)}$	Turn-Off Delay Time	—	16	—		$R_{\theta} = 6.0^\circ\text{C/W}$
t_f	Fall Time	—	13	—	pF	$V_{DS} = 10\text{V}$ ①
C_{iss}	Input Capacitance	—	930	—		$V_{DS} = 0\text{V}$
C_{oss}	Output Capacitance	—	300	—	pF	$V_{DS} = 25\text{V}$
C_{rds}	Reverse Transfer Capacitance	—	84	—		$f = 1.0\text{MHz}$
C_{ds1}	Output Capacitance	—	1370	—		$V_{GS} = 0\text{V}$, $V_{DS} = 1.0\text{V}$, $f = 1.0\text{MHz}$
C_{ds2}	Output Capacitance	—	170	—		$V_{GS} = 0\text{V}$, $V_{DS} = 80\text{V}$, $f = 1.0\text{MHz}$
$C_{oss\text{ eff.}}$	Effective Output Capacitance	—	280	—		$V_{GS} = 0\text{V}$, $V_{DS} = 0\text{V}$ to 80V ②

Avalanche Characteristics

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

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient④	—	50	$^\circ\text{C/W}$

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_{SV}	Pulsed Source Current (Body Diode) ①	—	—	36		
V_{DF}	Diode Forward Voltage	—	—	1.3	V	$T_J = 25^\circ\text{C}$, $I_S = 2.7\text{A}$, $V_{GS} = 0\text{V}$ ②
t_r	Reverse Recovery Time	—	77	120	ns	$T_J = 25^\circ\text{C}$, $I_R = 2.7\text{A}$
Q_r	Reverse Recovery Charge	—	270	410	nC	$di/dt = 100\text{A}/\mu\text{s}$ ③

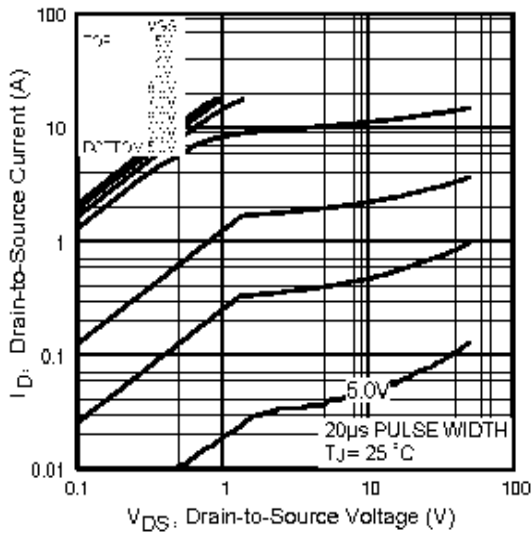


Fig 1. Typical Output Characteristics

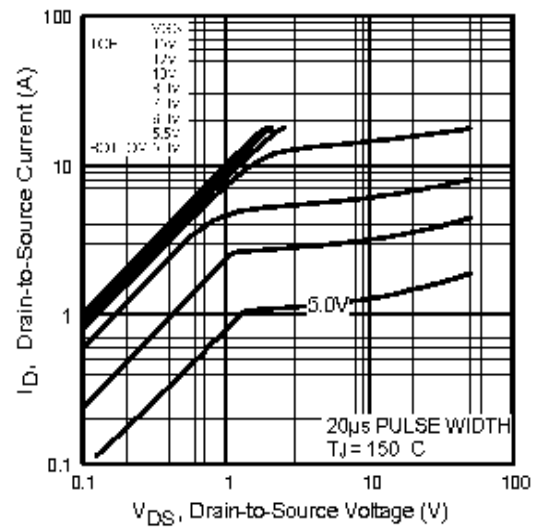


Fig 2. Typical Output Characteristics

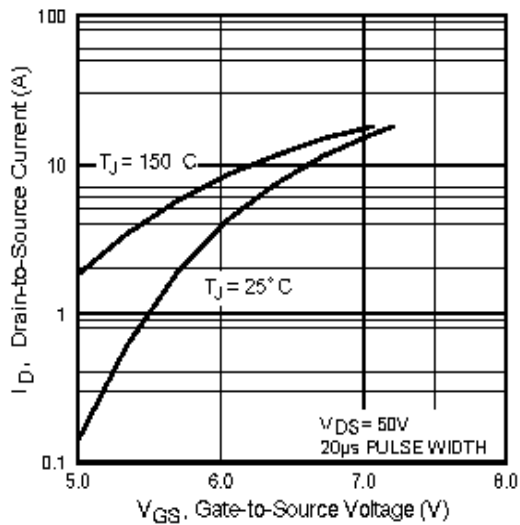


Fig 3. Typical Transfer Characteristics

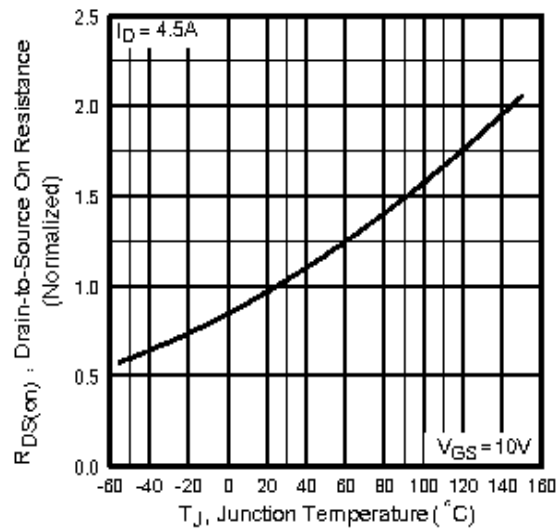


Fig 4. Normalized On-Resistance
Vs. Temperature

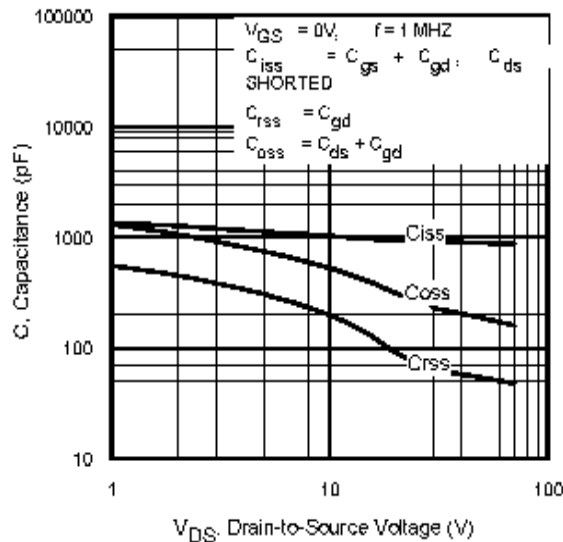


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

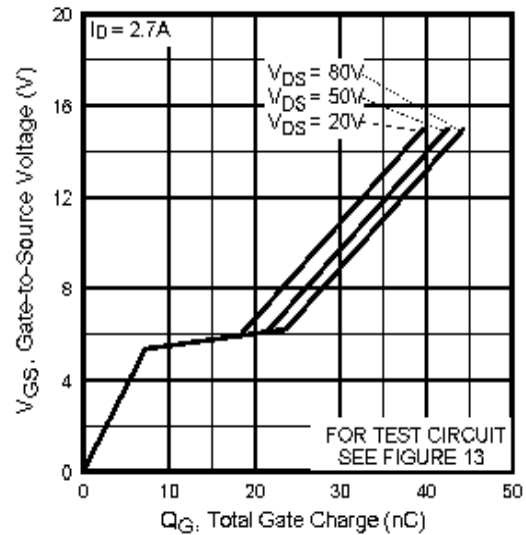


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

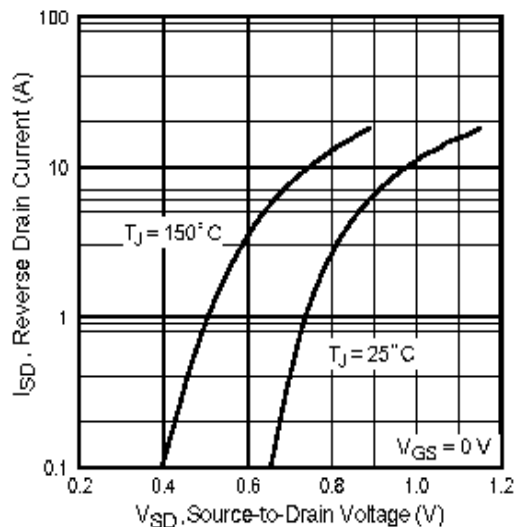


Fig 7. Typical Source-Drain Diode Forward Voltage

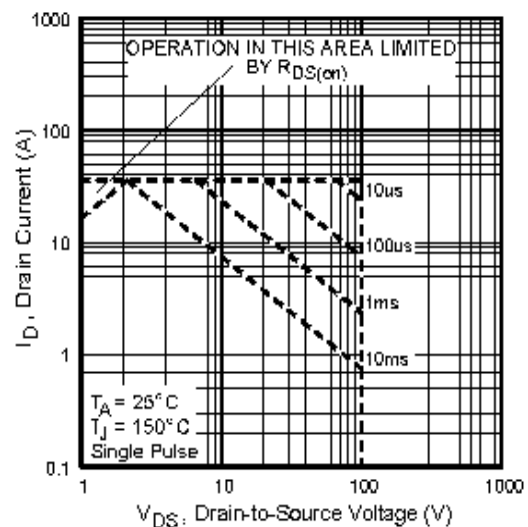


Fig 8. Maximum Safe Operating Area

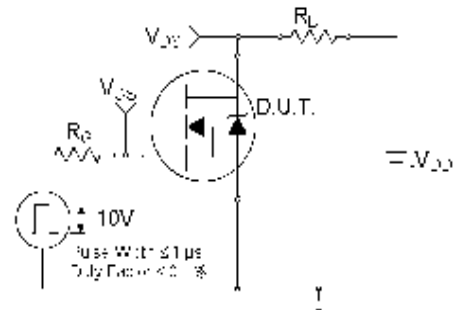
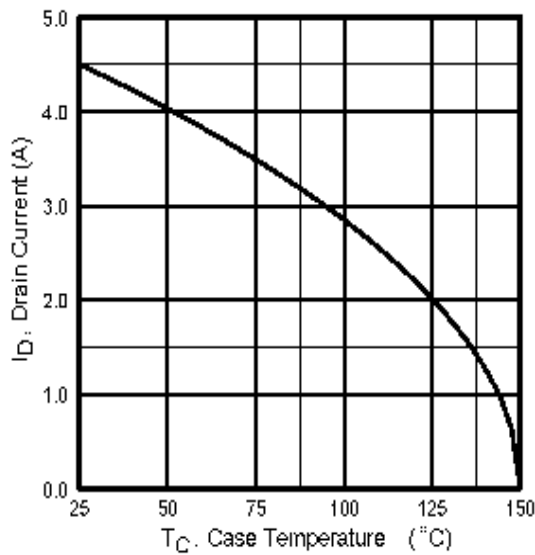


Fig 10a. Switching Time Test Circuit

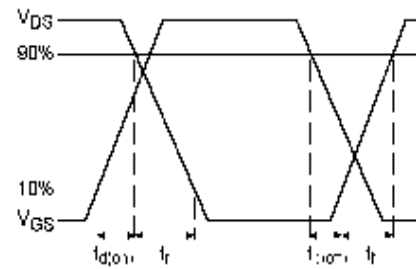


Fig 10b. Switching Time Waveforms

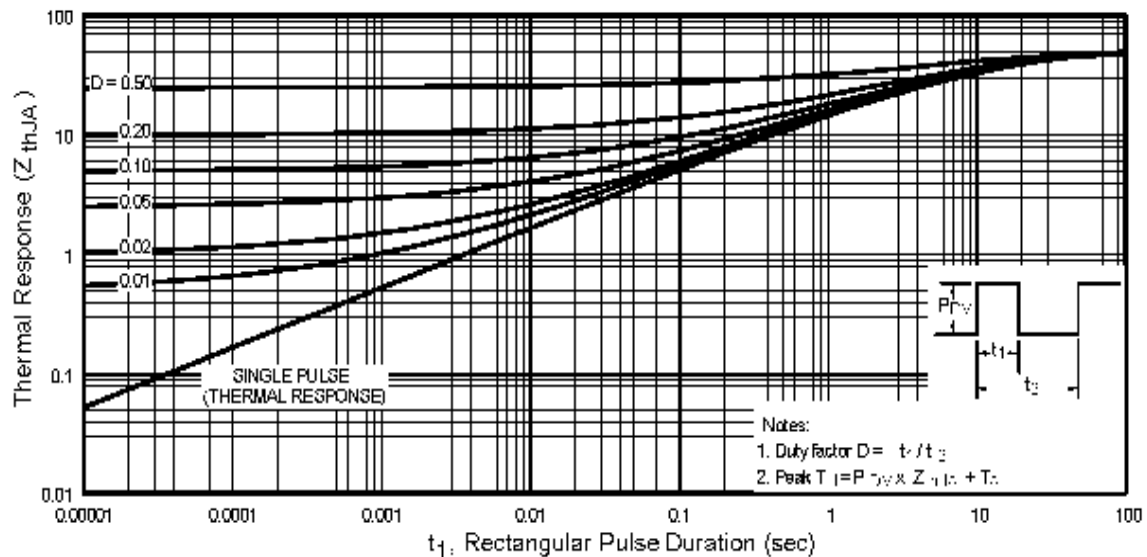


Fig 10. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient
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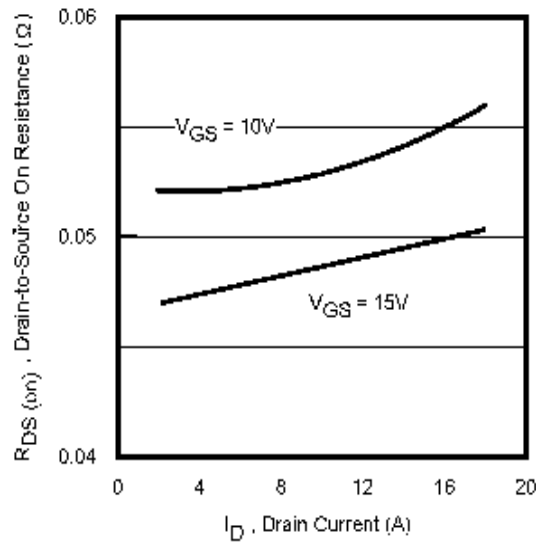


Fig 12. On-Resistance Vs. Drain Current

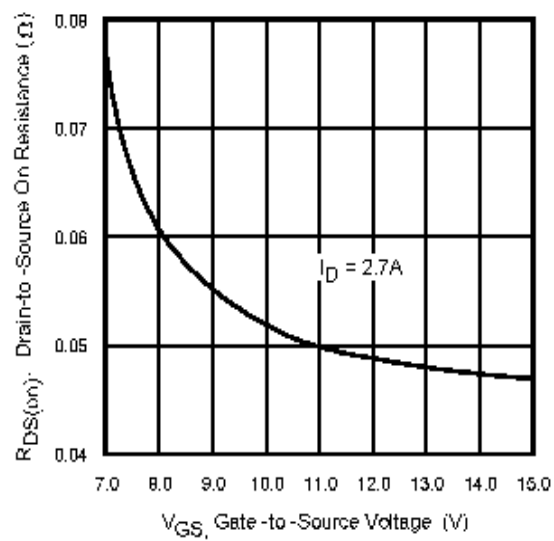


Fig 13. On-Resistance Vs. Gate Voltage

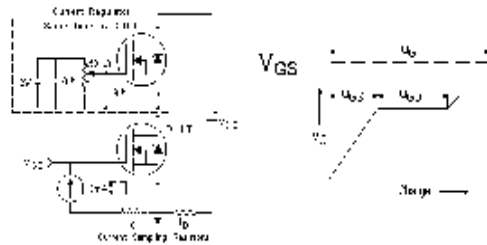


Fig 13a&b. Basic Gate Charge Test Circuit and Waveform

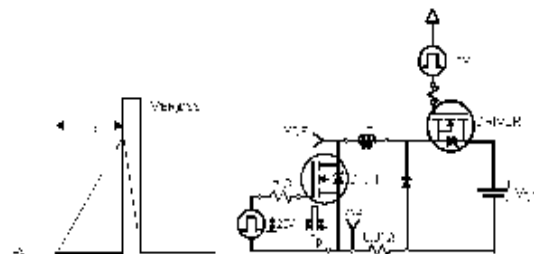


Fig 14a&b. Unclamped Inductive Test circuit and Waveforms

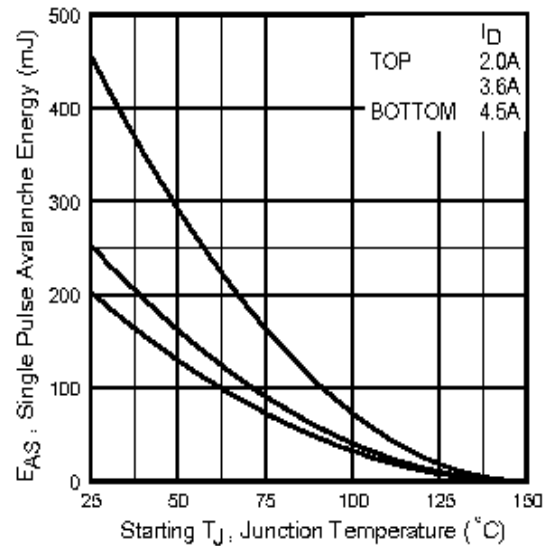
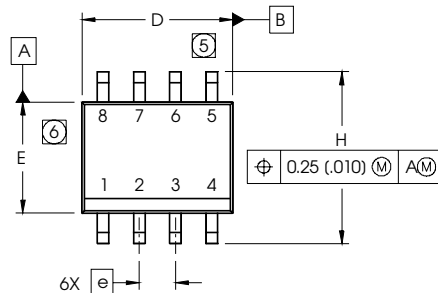


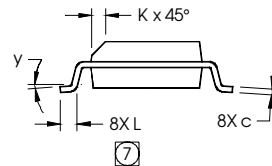
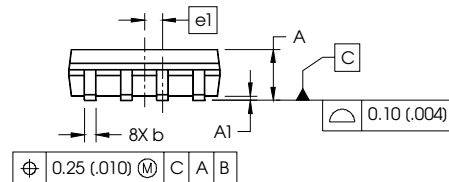
Fig 14c. Maximum Avalanche Energy Vs. Drain Current

SO-8 Package Outline

Dimensions are shown in millimeters (inches)



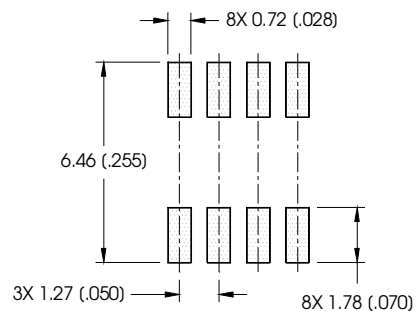
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40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



NOTES:

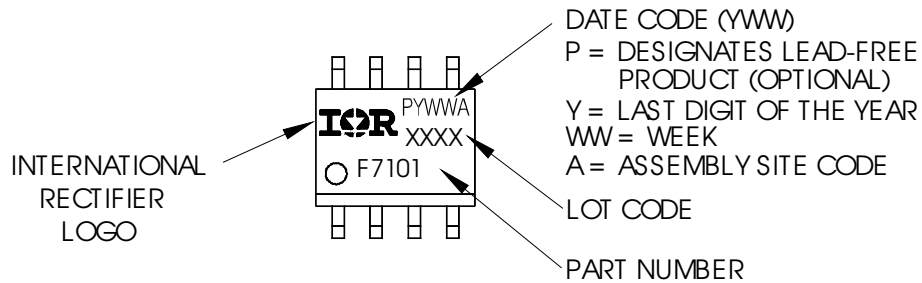
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA
- ⑤ DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 (.006).
- ⑥ DIMENSION DOES NOT INCLUDE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

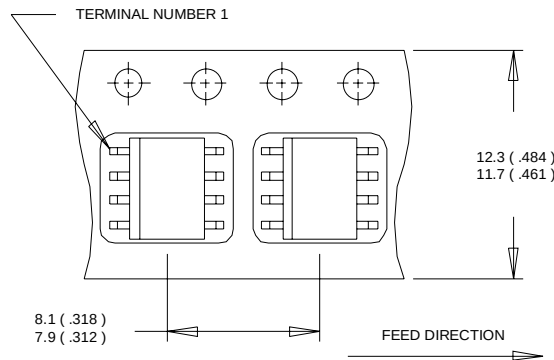


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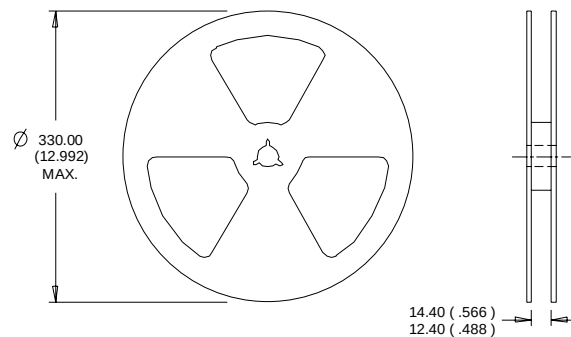
SO-8 Tape and Reel

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.

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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IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105

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