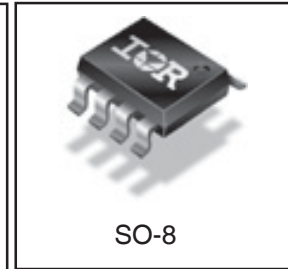
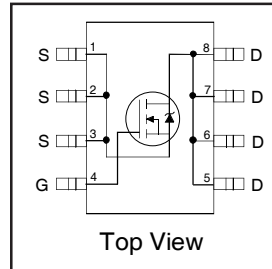


HEXFET® Power MOSFET

V_{DS}	20	V
$R_{DS(on) max}$ (@ $V_{GS} = 4.5V$)	0.022	Ω
Q_g	48	nC
I_D (@ $T_A = 25^\circ C$)	8.7	A



Features

Industry-standard pinout SO-8 Package
Compatible with Existing Surface Mount Techniques
RoHS Compliant, Halogen-Free
MSL1, Industrial qualification



Benefits

Multi-Vendor Compatibility
Easier Manufacturing
Environmentally Friendlier
Increased Reliability

Base Part Number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
IRF7401PbF-1	SO-8	Tube/Bulk	95	IRF7401PbF-1
		Tape and Reel	4000	IRF7401TRPbF-1

Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_A = 25^\circ C$	10 Sec. Pulsed Drain Current, $V_{GS} @ 4.5V$	10	A
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 4.5V$	8.7	
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 4.5V$	7.0	
I_{DM}	Pulsed Drain Current ①	35	
$P_D @ T_A = 25^\circ C$	Power Dissipation	2.5	W
	Linear Derating Factor	0.02	W/°C
V_{GS}	Gate-to-Source Voltage	± 12	V
dv/dt	Peak Diode Recovery dv/dt ②	5.0	V/ns
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to + 150	°C

Thermal Resistance Ratings

	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient ③	—	50	°C/W

Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

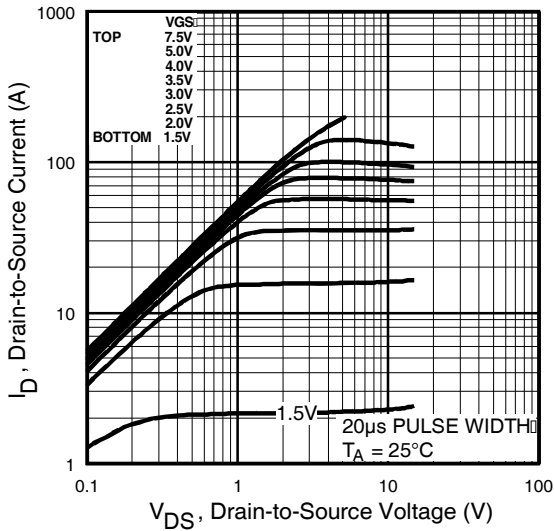
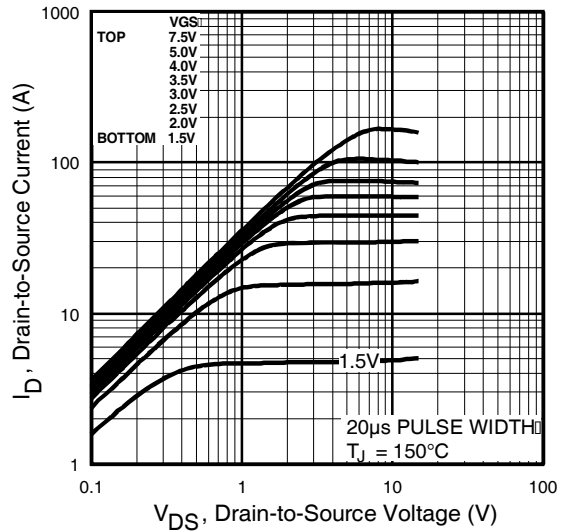
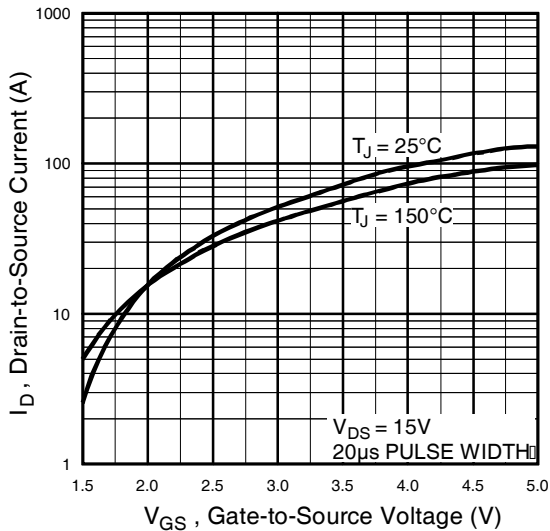
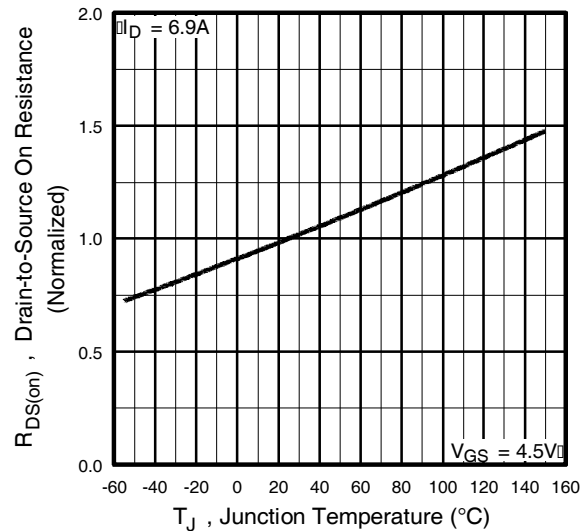
	Parameter	Min.	Typ.	Max.	Units	Conditions
V _{(BR)DSS}	Drain-to-Source Breakdown Voltage	20	—	—	V	V _{GS} = 0V, I _D = 250μA
ΔV _{(BR)DSS/ΔT_J}	Breakdown Voltage Temp. Coefficient	—	0.044	—	V/°C	Reference to 25°C, I _D = 1mA
R _{DS(ON)}	Static Drain-to-Source On-Resistance	—	—	0.022	Ω	V _{GS} = 4.5V, I _D = 4.1A ③
		—	—	0.030		V _{GS} = 2.7V, I _D = 3.5A ③
V _{GS(th)}	Gate Threshold Voltage	0.70	—	—	V	V _{DS} = V _{GS} , I _D = 250μA
g _{fs}	Forward Transconductance	11	—	—	S	V _{DS} = 15V, I _D = 4.1A
I _{DSS}	Drain-to-Source Leakage Current	—	—	1.0	μA	V _{DS} = 16V, V _{GS} = 0V
		—	—	25		V _{DS} = 16V, V _{GS} = 0V, T _J = 125 °C
I _{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	V _{GS} = 12V
	Gate-to-Source Reverse Leakage	—	—	-100		V _{GS} = -12V
Q _g	Total Gate Charge	—	—	48	nC	I _D = 4.1A
Q _{gs}	Gate-to-Source Charge	—	—	5.1		V _{DS} = 16V
Q _{gd}	Gate-to-Drain ("Miller") Charge	—	—	20		V _{GS} = 4.5V, See Fig. 6 and 12 ③
t _{d(on)}	Turn-On Delay Time	—	13	—	ns	V _{DD} = 10V
t _r	Rise Time	—	72	—		I _D = 4.1A
t _{d(off)}	Turn-Off Delay Time	—	65	—		R _G = 6.0Ω
t _f	Fall Time	—	92	—		R _D = 2.4Ω, See Fig. 10 ③
L _D	Internal Drain Inductance	—	2.5	—	nH	Between lead tip and center of die contact
L _S	Internal Source Inductance	—	4.0	—		
C _{iss}	Input Capacitance	—	1600	—	pF	V _{GS} = 0V
C _{oss}	Output Capacitance	—	690	—		V _{DS} = 15V
C _{rss}	Reverse Transfer Capacitance	—	310	—		f = 1.0MHz, See Fig. 5

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I _S	Continuous Source Current (Body Diode)	—	—	3.1	A	MOSFET symbol showing the integral reverse p-n junction diode.
I _{SM}	Pulsed Source Current (Body Diode) ①	—	—	35		
V _{SD}	Diode Forward Voltage	—	—	1.0	V	T _J = 25°C, I _S = 2.0A, V _{GS} = 0V ③
t _{rr}	Reverse Recovery Time	—	39	59	ns	T _J = 25°C, I _F = 4.1A
Q _{rr}	Reverse Recovery Charge	—	42	63	nC	di/dt = 100A/μs ③
t _{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L _S +L _D)				

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)
- ② I_{SD} ≤ 4.1A, di/dt ≤ 100A/μs, V_{DD} ≤ V_{(BR)DSS}, T_J ≤ 150°C
- ③ Pulse width ≤ 300μs; duty cycle ≤ 2%.
- ④ Surface mounted on FR-4 board, t ≤ 10sec.


Fig 1. Typical Output Characteristics

Fig 2. Typical Output Characteristics

Fig 3. Typical Transfer Characteristics

Fig 4. Normalized On-Resistance Vs. Temperature

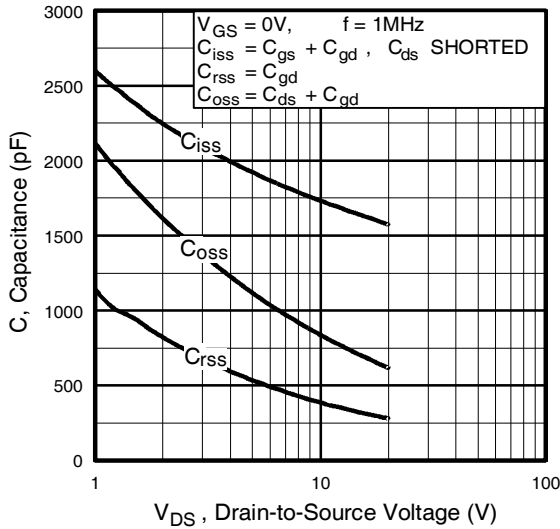


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

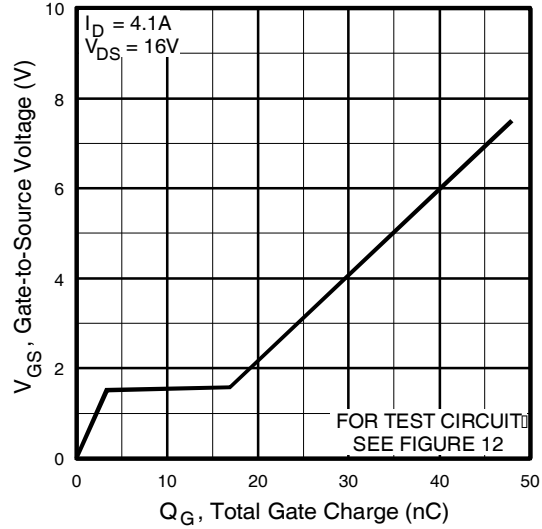


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

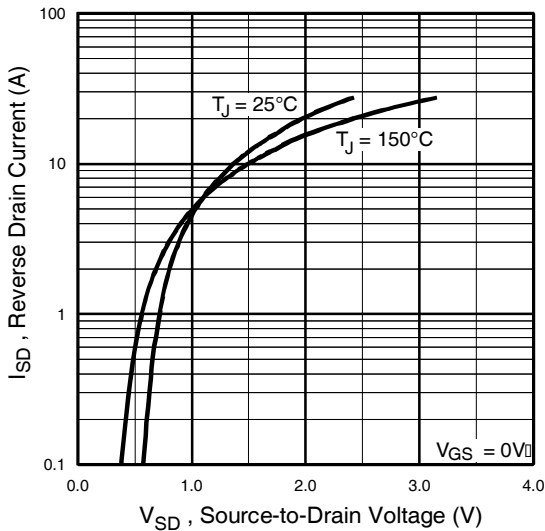


Fig 7. Typical Source-Drain Diode Forward Voltage

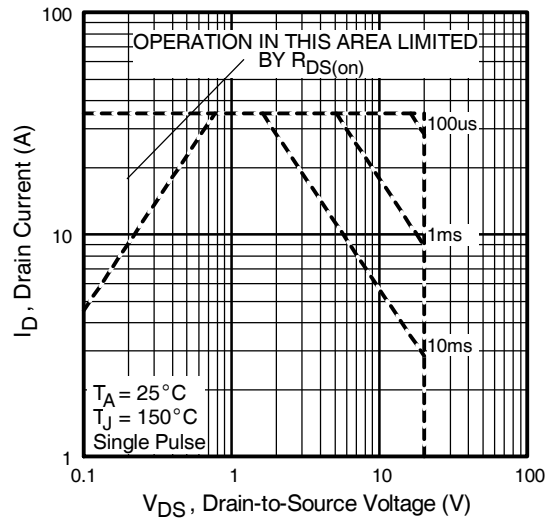


Fig 8. Maximum Safe Operating Area

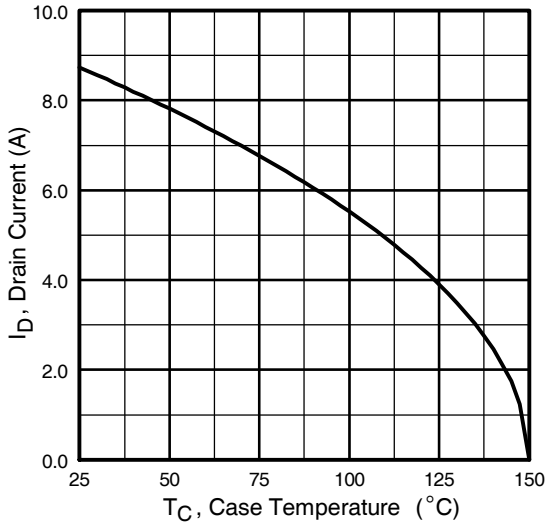


Fig 9. Maximum Drain Current Vs. Ambient Temperature

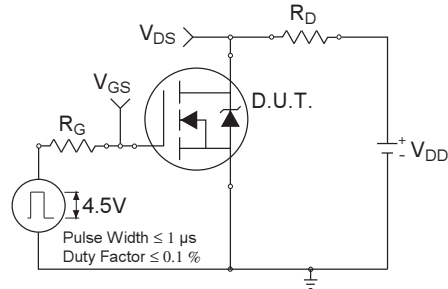


Fig 10a. Switching Time Test Circuit

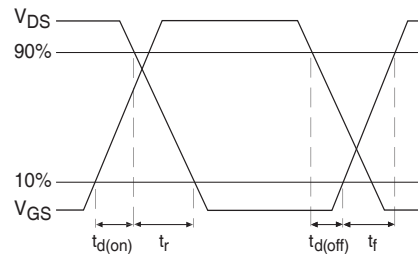


Fig 10b. Switching Time Waveforms

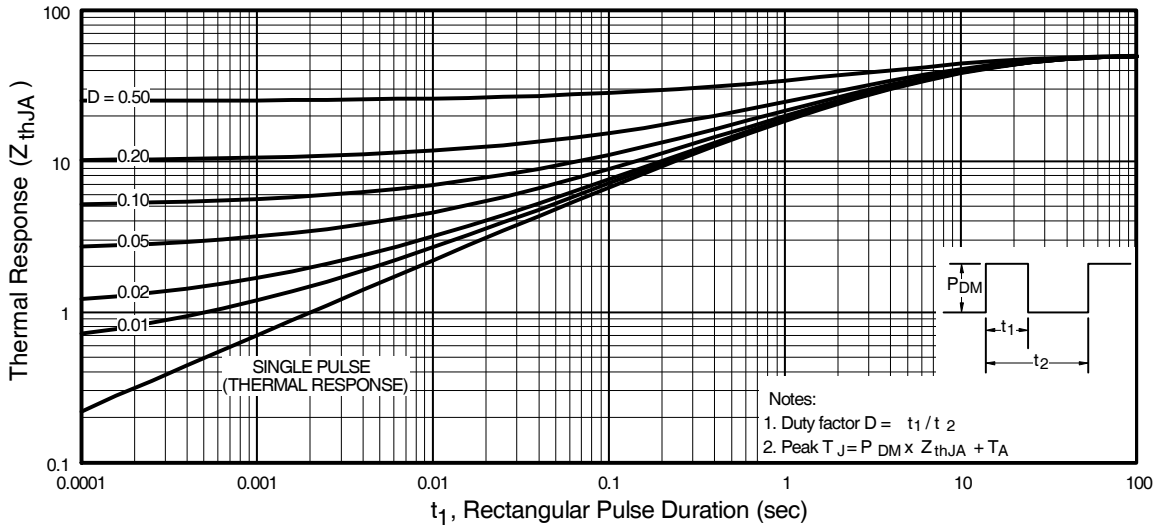


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

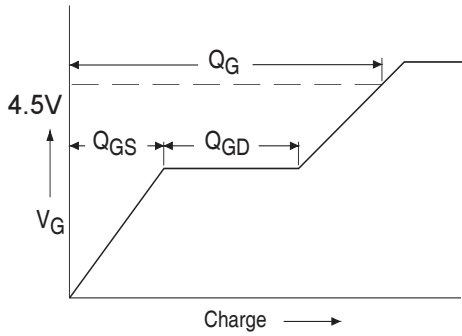


Fig 12a. Basic Gate Charge Waveform

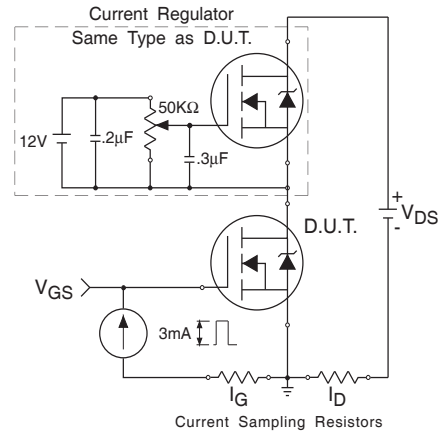
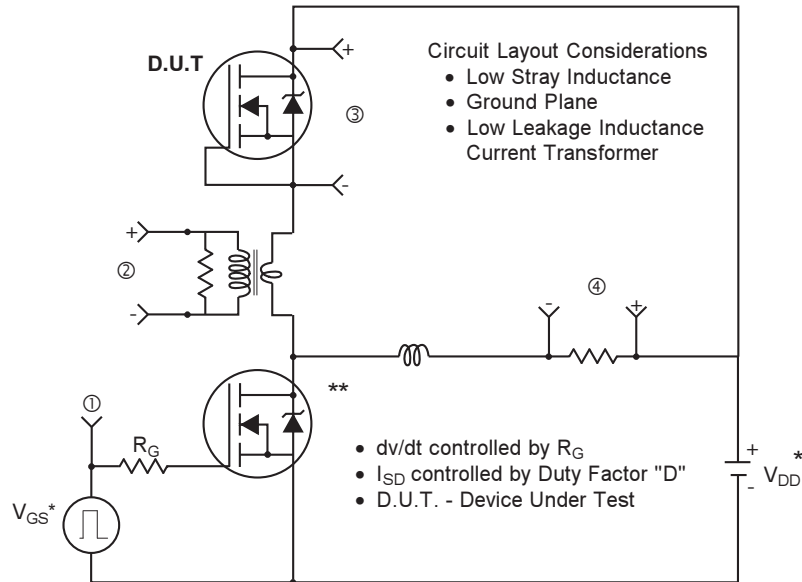
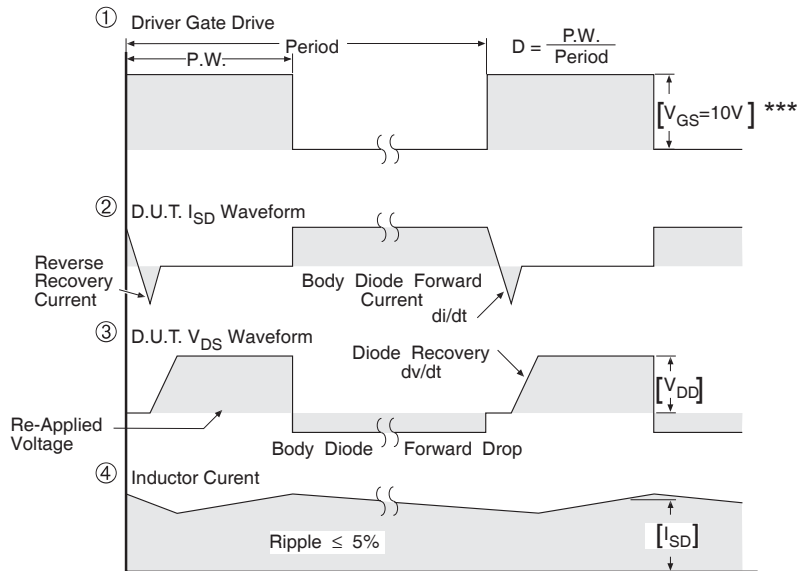


Fig 12b. Gate Charge Test Circuit

Peak Diode Recovery dv/dt Test Circuit


* Reverse Polarity for P-Channel

** Use P-Channel Driver for P-Channel Measurements

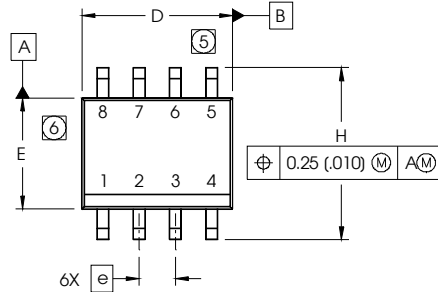


*** $V_{GS} = 5.0V$ for Logic Level and $3V$ Drive Devices

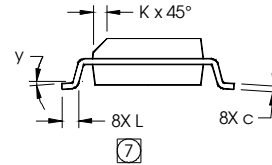
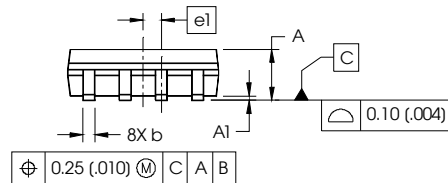
Fig 13. For N-Channel HEXFETS

SO-8 Package Outline

Dimensions are shown in millimeters (inches)



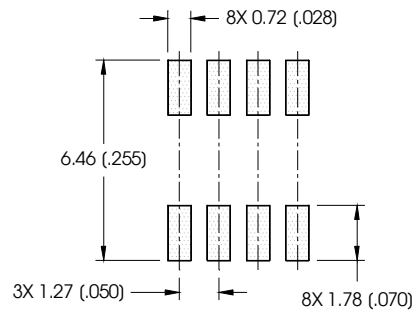
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40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



NOTES:

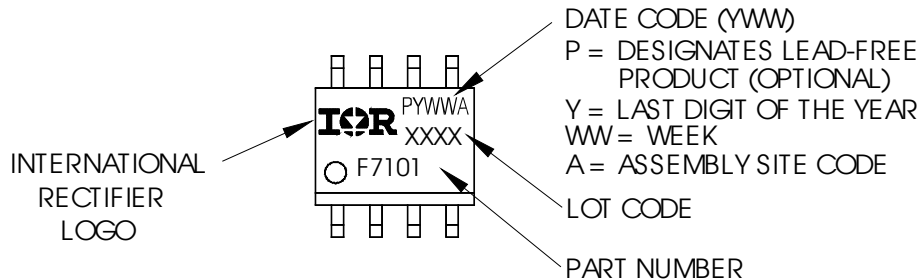
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
- ⑤ DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 (.006).
- ⑥ DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 (.010).
- ⑦ DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.

FOOTPRINT

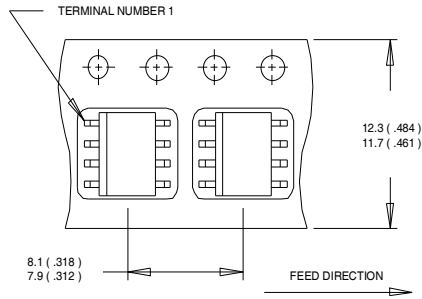


SO-8 Part Marking

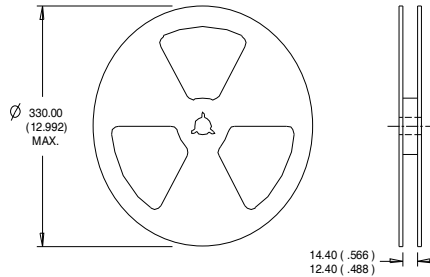
EXAMPLE: THIS IS AN IRF7101 (MOSFET)



Note: For the most current drawing please refer to IR website at: <http://www.irf.com/package/>

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.

Note: For the most current drawing please refer to IR website at: <http://www.irf.com/package/>

Qualification information[†]

Qualification level	Industrial (per JEDEC JESD47F ^{††} guidelines)	
Moisture Sensitivity Level	SO-8	MSL1 (per JEDEC J-STD-020D ^{††})
RoHS compliant	Yes	

[†] Qualification standards can be found at International Rectifier's web site: <http://www.irf.com/product-info/reliability>

^{††} Applicable version of JEDEC standard at the time of product release