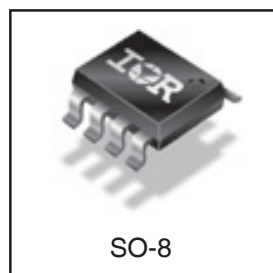
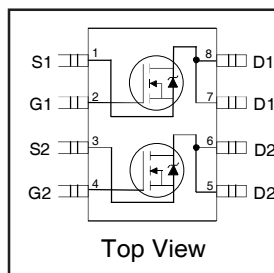


HEXFET® Power MOSFET

V_{DS}	20	V
$R_{DS(on) \max}$ (@ $V_{GS} = 4.5V$)	30	m Ω
$R_{DS(on) \max}$ (@ $V_{GS} = 2.5V$)	45	
Q_g (typical)	13	nC
I_D (@ $T_A = 25^\circ C$)	7.0	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	
IRF7331PbF-1	SO-8	Tape and Reel	4000	IRF7331TRPbF-1

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain- Source Voltage	20	V
I_D @ $T_A = 25^\circ C$	Continuous Drain Current, V_{GS} @ 4.5V	7.0	A
I_D @ $T_A = 70^\circ C$	Continuous Drain Current, V_{GS} @ 4.5V	5.5	
I_{DM}	Pulsed Drain Current ①	28	
P_D @ $T_A = 25^\circ C$	Power Dissipation ③	2.0	W
P_D @ $T_A = 70^\circ C$	Power Dissipation③	1.3	
	Linear Derating Factor	16	
V_{GS}	Gate-to-Source Voltage	± 12	V
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to + 150	$^\circ C$

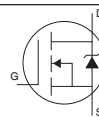
Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JL}$	Junction-to-Drain Lead	—	42	$^\circ C/W$
$R_{\theta JA}$	Junction-to-Ambient ③	—	62.5	

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	20	—	—	V	$V_{GS} = 0V$, $I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.013	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = 1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	30	$m\Omega$	$V_{GS} = 4.5V$, $I_D = 7.0A$ ②
		—	—	45		$V_{GS} = 2.5V$, $I_D = 5.6A$ ②
$V_{GS(th)}$	Gate Threshold Voltage	0.6	—	1.2	V	$V_{DS} = V_{GS}$, $I_D = 250\mu A$
g_{fs}	Forward Transconductance	14	—	—	S	$V_{DS} = 10V$, $I_D = 7.0A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	1.0	μA	$V_{DS} = 16V$, $V_{GS} = 0V$
		—	—	25		$V_{DS} = 16V$, $V_{GS} = 0V$, $T_J = 70^\circ\text{C}$
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	—	13	20	nC	$I_D = 7.0A$
Q_{gs}	Gate-to-Source Charge	—	3.7	—		$V_{DS} = 10V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	2.1	—		$V_{GS} = 4.5V$
$t_{d(on)}$	Turn-On Delay Time	—	7.6	—	ns	$V_{DD} = 10V$ ②
t_r	Rise Time	—	22	—		$I_D = 1.0A$
$t_{d(off)}$	Turn-Off Delay Time	—	110	—		$R_G = 53\Omega$
t_f	Fall Time	—	50	—		$V_{GS} = 4.5V$
C_{iss}	Input Capacitance	—	1340	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	170	—		$V_{DS} = 16V$
C_{rss}	Reverse Transfer Capacitance	—	120	—		$f = 1.0MHz$

Source-Drain Ratings and Characteristics

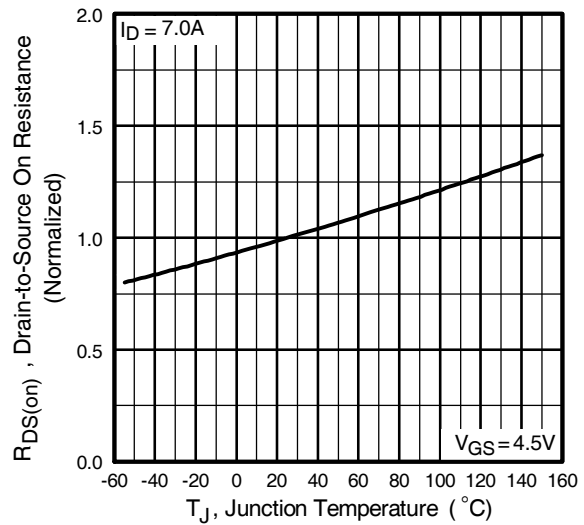
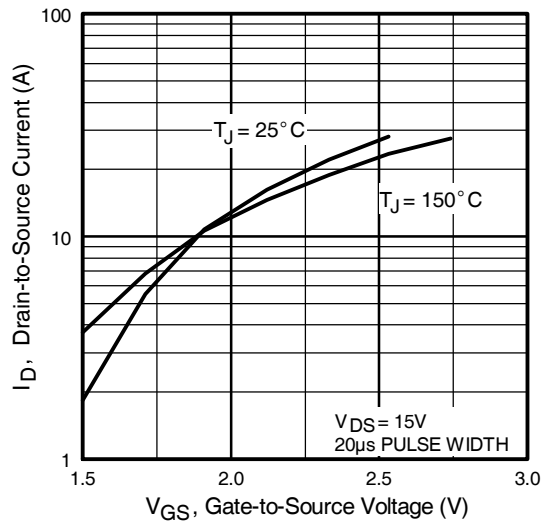
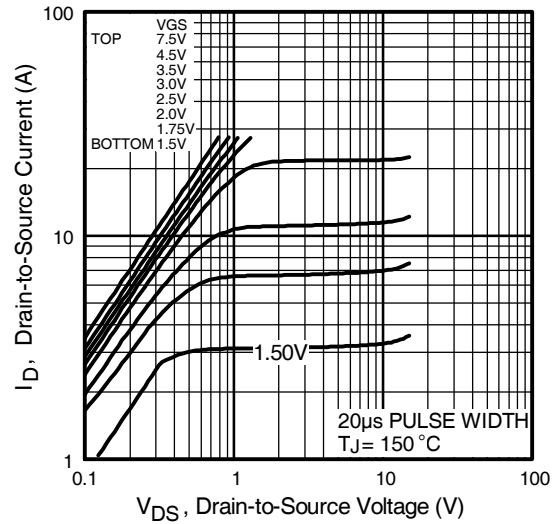
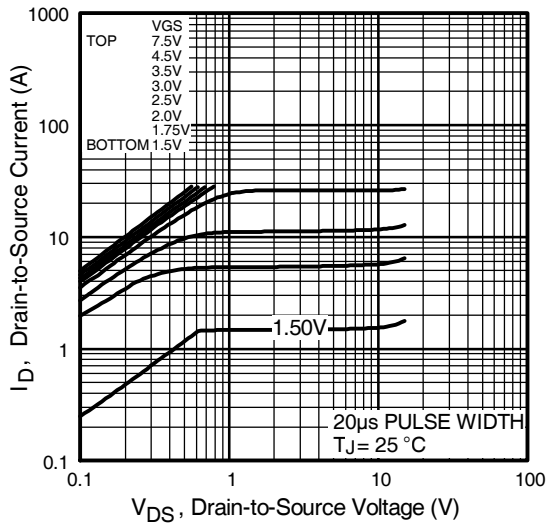
	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	2.0	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	28		
V_{SD}	Diode Forward Voltage	—	—	1.2	V	$T_J = 25^\circ\text{C}$, $I_S = 2.0A$, $V_{GS} = 0V$ ②
t_{rr}	Reverse Recovery Time	—	31	47	ns	$T_J = 25^\circ\text{C}$, $I_F = 2.0A$
Q_{rr}	Reverse Recovery Charge	—	15	23	nC	$di/dt = 100A/\mu s$ ②

Notes:

① Repetitive rating; pulse width limited by max. junction temperature.

③ Surface mounted on 1 in square Cu board

② Pulse width $\leq 400\mu s$; duty cycle $\leq 2\%$.



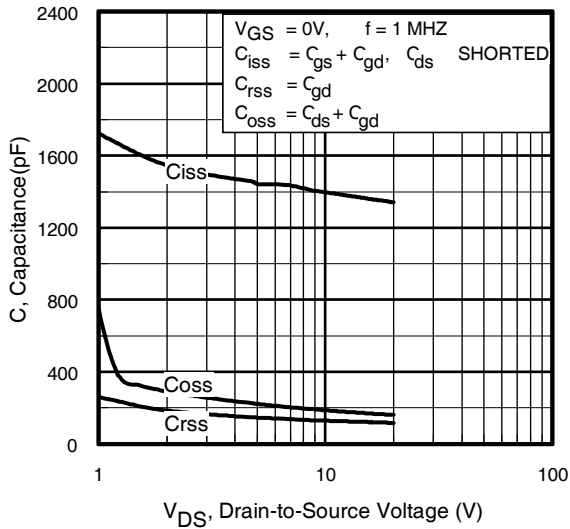


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

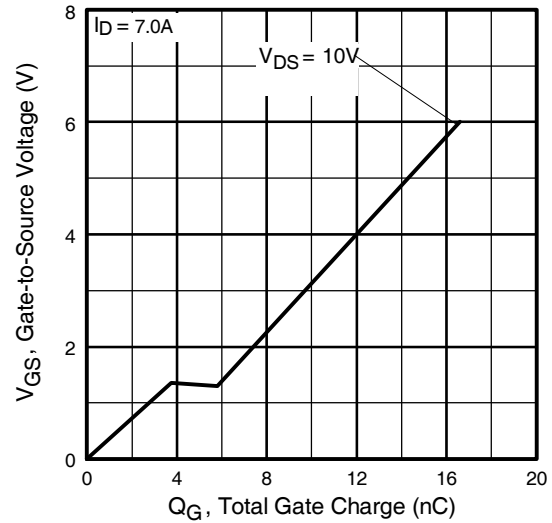


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

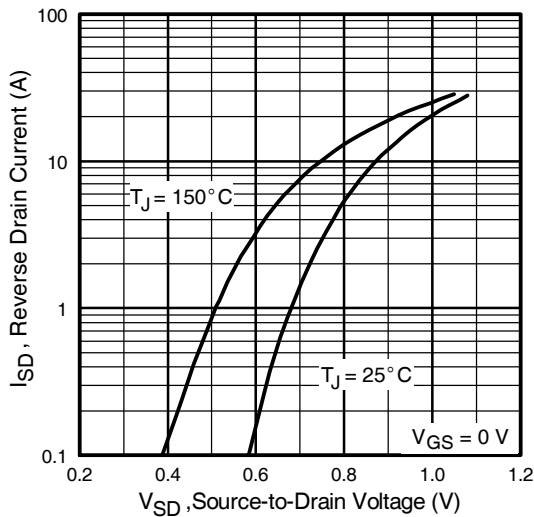


Fig 7. Typical Source-Drain Diode Forward Voltage

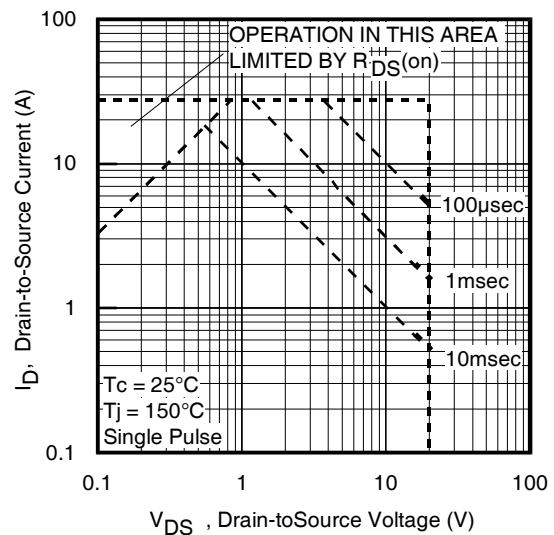


Fig 8. Maximum Safe Operating Area

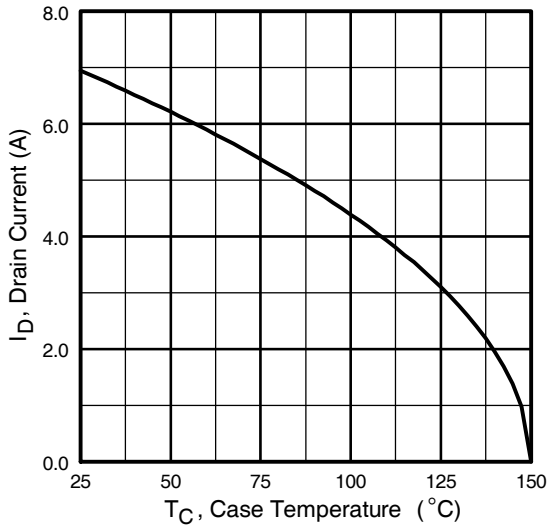


Fig 9. Maximum Drain Current Vs. Case Temperature

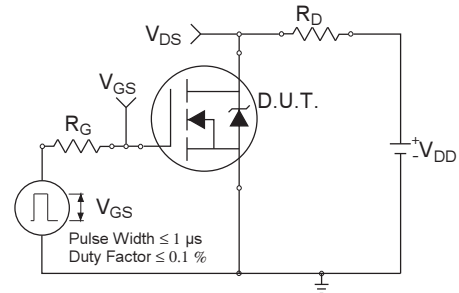


Fig 10a. Switching Time Test Circuit

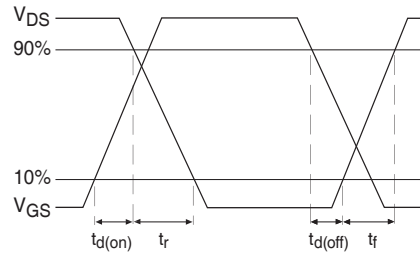


Fig 10b. Switching Time Waveforms

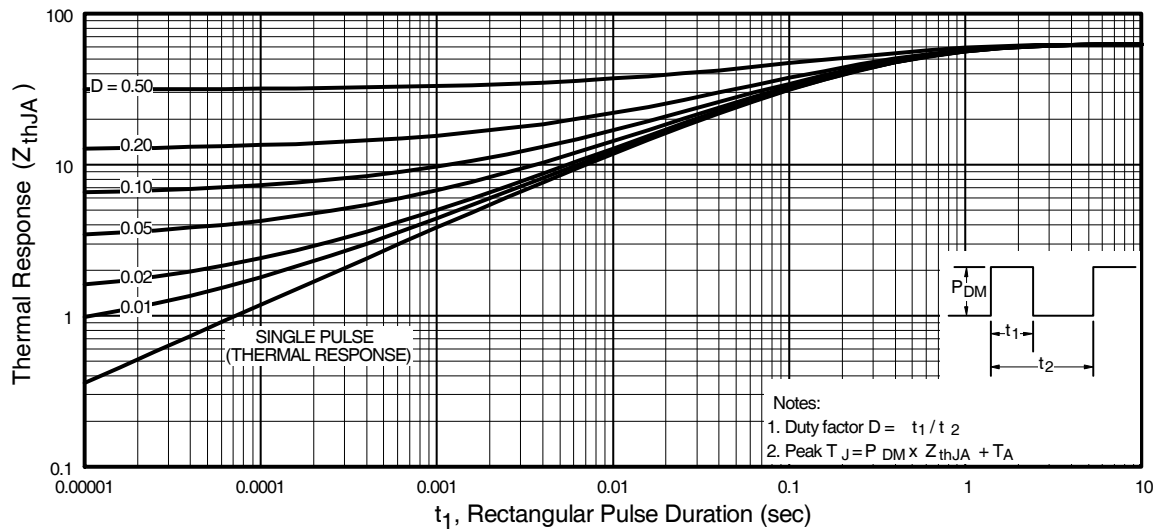


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

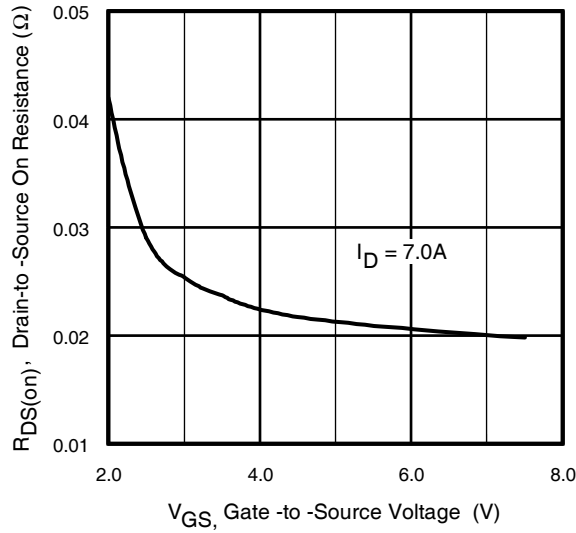


Fig 12. Typical On-Resistance Vs. Gate Voltage

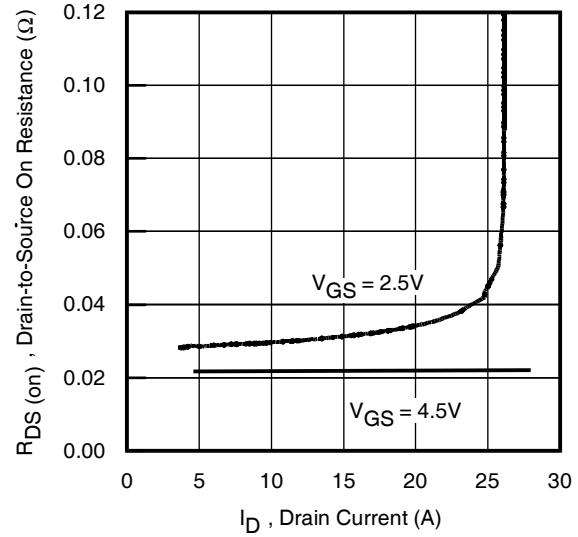


Fig 13. Typical On-Resistance Vs. Drain Current

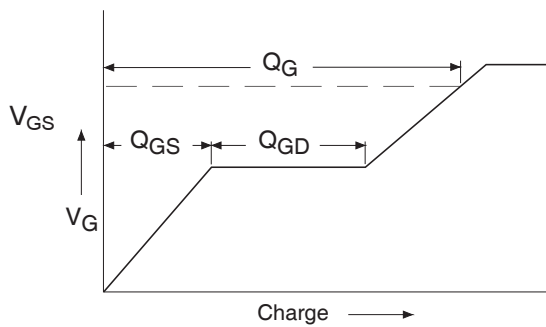


Fig 14a. Basic Gate Charge Waveform

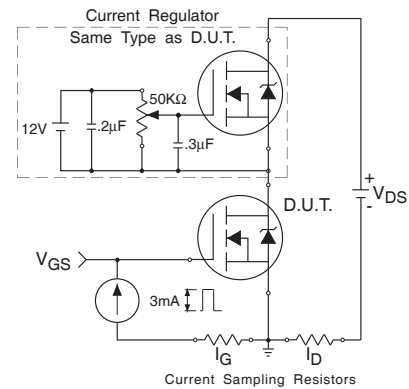


Fig 14b. Gate Charge Test Circuit

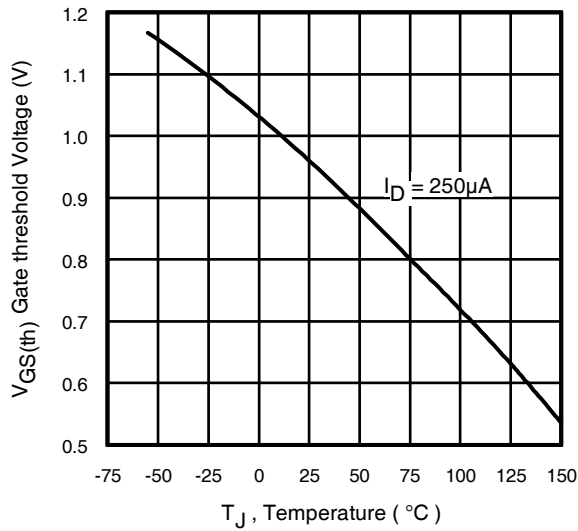


Fig 15. Typical $V_{GS(th)}$ Vs. Junction Temperature

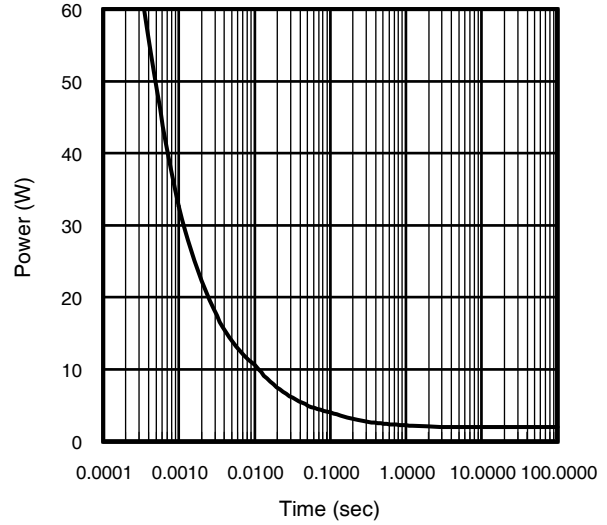
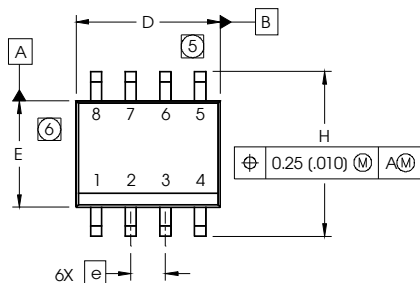


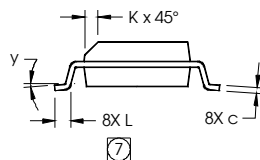
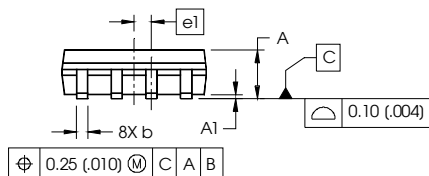
Fig 16. Typical Power Vs. Time

SO-8 Package Outline (MOSFET & Fetky)

Dimensions are shown in millimeters (inches)



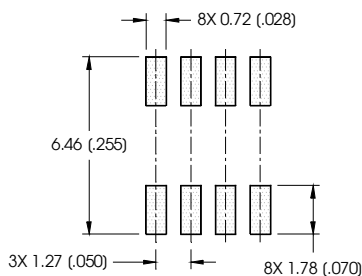
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050	BASIC	1.27	BASIC
e1	.025	BASIC	0.635	BASIC
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40	1.27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



NOTES:

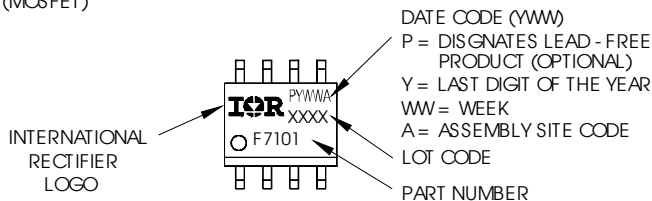
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 (.006).
6. DIMENSION DOES NOT INCLUDE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

FOOTPRINT



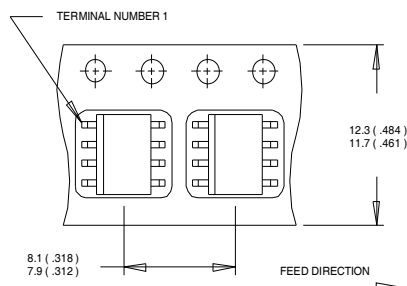
SO-8 Part Marking Information

EXAMPLE: THIS IS AN IRF7101 (MOSFET)

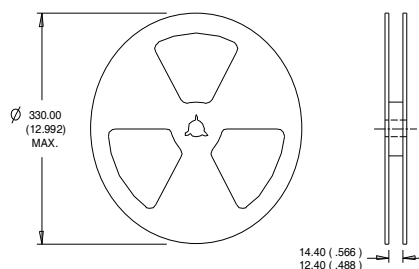


Note: For the most current drawing please refer to IR website at: <http://www.irf.com/package/>

SO-8 Tape and Reel


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

Revision History

Date	Comments
10/16/2014	- Corrected part number from "IRF7331PbF-1" to "IRF7331TRPbF-1" -all pages - Removed the "IRF7331PbF-1" bulk part number from ordering information on page1

International
 Rectifier

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To contact International Rectifier, please visit <http://www.irf.com/whoto-call/>