

IRF7831PbF

HEXFET® Power MOSFET

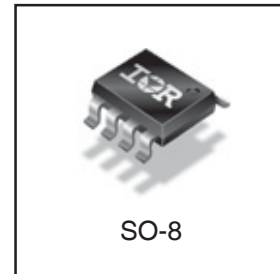
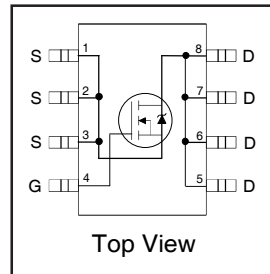
Applications

- High Frequency Point-of-Load Synchronous Buck Converter for Applications in Networking & Computing Systems.

V_{DS}	$R_{DS(on)}$ max	Q_g (typ.)
30V	$3.6m\Omega @ V_{GS} = 10V$	40nC

Benefits

- Very Low $R_{DS(on)}$ at 4.5V V_{GS}
- Ultra-Low Gate Impedance
- Fully Characterized Avalanche Voltage and Current
- 100% Tested for R_G
- Lead-Free



Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain-to-Source Voltage	30	V
V_{GS}	Gate-to-Source Voltage	± 12	
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	21	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	17	
I_{DM}	Pulsed Drain Current ①	170	
$P_D @ T_A = 25^\circ C$	Power Dissipation ④	2.5	W
$P_D @ T_A = 70^\circ C$	Power Dissipation ④	1.6	
	Linear Derating Factor	0.02	W/°C
T_J	Operating Junction and	-55 to + 150	°C
T_{STG}	Storage Temperature Range		

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JL}$	Junction-to-Drain Lead	—	20	°C/W
$R_{\theta JA}$	Junction-to-Ambient ④	—	50	

Notes ① through ④ are on page 10

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	30	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta BV_{DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.025	—	V/°C	Reference to $25^\circ\text{C}, I_D = 1mA$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	2.5	3.1	3.6	mΩ	$V_{GS} = 10V, I_D = 20A$ ③
		3.0	3.7	4.4		$V_{GS} = 4.5V, I_D = 16A$ ③
$V_{GS(th)}$	Gate Threshold Voltage	1.35	—	2.35	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
$\Delta V_{GS(th)}$	Gate Threshold Voltage Coefficient	—	- 5.7	—	mV/°C	
I_{DSS}	Drain-to-Source Leakage Current	—	—	1.0	μA	$V_{DS} = 24V, V_{GS} = 0V$
		—	—	150		$V_{DS} = 24V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 12V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS} = -12V$
g_{fs}	Forward Transconductance	97	—	—	S	$V_{DS} = 15V, I_D = 16A$
Q_g	Total Gate Charge	—	40	60	nC	$V_{DS} = 15V$ $V_{GS} = 4.5V$ $I_D = 16A$ See Fig. 16
Q_{gs1}	Pre-Vth Gate-to-Source Charge	—	12	—		
Q_{gs2}	Post-Vth Gate-to-Source Charge	—	3.1	—		
Q_{gd}	Gate-to-Drain Charge	—	11	—		
Q_{godr}	Gate Charge Overdrive	—	14	—		
Q_{sw}	Switch Charge ($Q_{gs2} + Q_{gd}$)	—	14	—		
Q_{oss}	Output Charge	—	22	—	nC	$V_{DS} = 16V, V_{GS} = 0V$
R_G	Gate Resistance	—	1.4	2.5	Ω	
$t_{d(on)}$	Turn-On Delay Time	—	18	—	ns	$V_{DD} = 15V, V_{GS} = 4.5V$ ③ $I_D = 16A$ Clamped Inductive Load
t_r	Rise Time	—	10	—		
$t_{d(off)}$	Turn-Off Delay Time	—	17	—		
t_f	Fall Time	—	5.3	—		
C_{iss}	Input Capacitance	—	6240	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	980	—		$V_{DS} = 15V$
C_{rss}	Reverse Transfer Capacitance	—	390	—		$f = 1.0MHz$

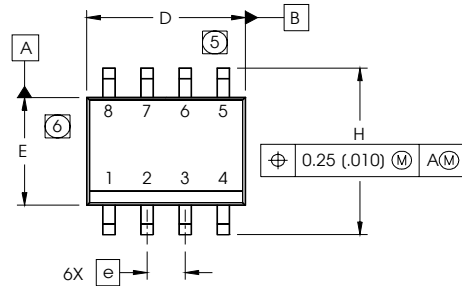
Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy ②	—	100	mJ
I_{AR}	Avalanche Current ①	—	16	A

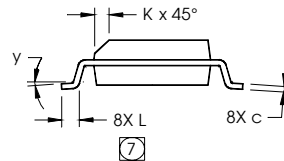
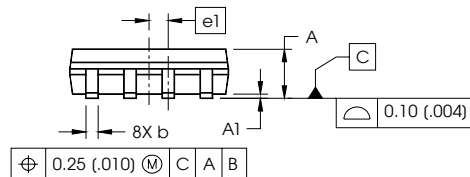
Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	2.5	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	170		
V_{SD}	Diode Forward Voltage	—	—	1.2	V	$T_J = 25^\circ\text{C}, I_S = 16A, V_{GS} = 0V$ ③
t_{rr}	Reverse Recovery Time	—	42	62	ns	$T_J = 25^\circ\text{C}, I_F = 16A, V_{DD} = 25V$
Q_{rr}	Reverse Recovery Charge	—	31	47	nC	$di/dt = 100A/\mu s$ ③
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L_S+L_D)				

SO-8 Package Outline



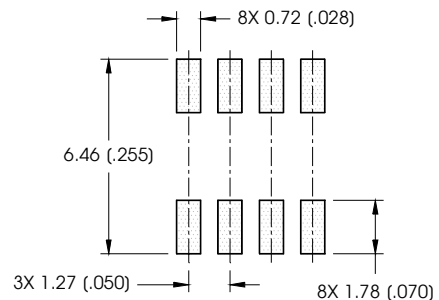
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40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



NOTES:

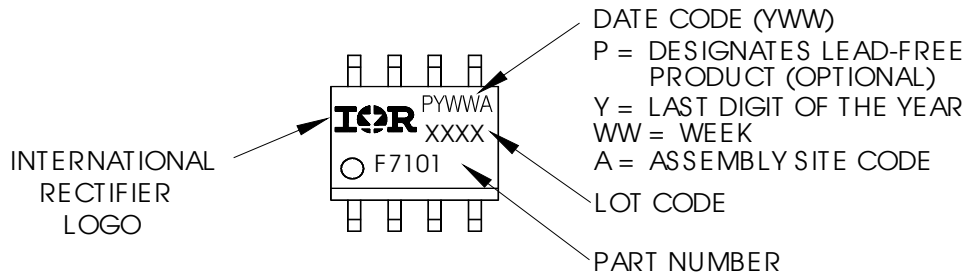
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
- ⑤ DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 (.006).
- ⑥ DIMENSION DOES NOT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

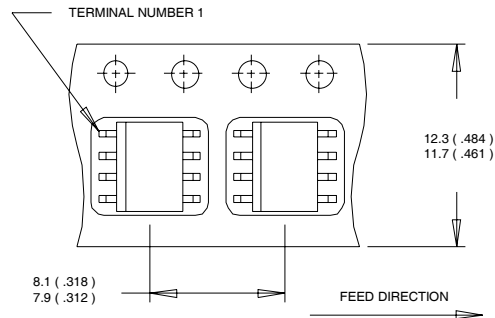
EXAMPLE: THIS IS AN IRF7101 (MOSFET)



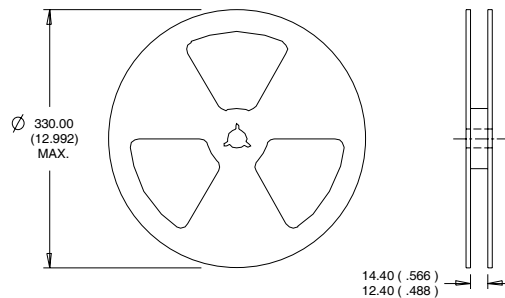
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SO-8 Tape and Reel



- 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 $T_J = 25^\circ\text{C}$, $L = 0.76\text{mH}$
 $R_G = 25\Omega$, $I_{AS} = 16\text{A}$.
- 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.

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