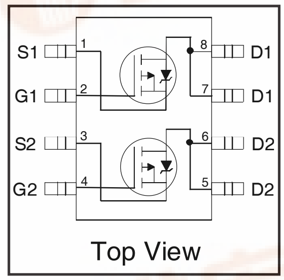
PD - 96126

International
IOR Rectifier

IRF7316QPbF

HEXFET® Power MOSFET

- Advanced Process Technology
- Ultra Low On-Resistance
- Dual P- Channel MOSFET
- Surface Mount
- Available in Tape & Reel
- 150°C Operating Temperature
- Automotive [Q101] Qualified
- Lead-Free



V_{DSS} = -30V

$R_{DS(on)}$ = 0.058Ω

Description

Specifically designed for Automotive applications, these HEXFET® Power MOSFET's in a Dual SO-8 package utilize the lastest processing techniques to achieve extremely low on-resistance per silicon area. Additional features of these Automotive qualified 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 Automotive applications and a wide variety of other applications.

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

SO-8

Absolute Maximum Ratings (T_A = 25°C Unless Otherwise Noted)

		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	-30	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current⑤	T_A = 25°C	I_D	-4.9	A
	T_A = 70°C		-3.9	
Pulsed Drain Current		I_{DM}	-30	
Continuous Source Current (Diode Conduction)		I_S	-2.5	
Maximum Power Dissipation ⑤	T_A = 25°C	P_D	2.0	W
	T_A = 70°C		1.3	
Single Pulse Avalanche Energy		E_{AS}	140	mJ
Avalanche Current		I_{AR}	-2.8	A
Repetitive Avalanche Energy		E_{AR}	0.20	mJ
Peak Diode Recovery dv/dt ③		dv/dt	-5.0	V/ ns
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to + 150	°C

Thermal Resistance Ratings

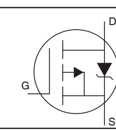
Parameter	Symbol	Limit	Units
Maximum Junction-to-Ambient⑤	$R_{\theta JA}$	62.5	°C/W

08/29/07

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-30	–––	–––	V	V_{GS} = 0V, I_D = -250µA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	–––	0.022	–––	V/°C	Reference to 25°C, I_D = -1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	–––	0.042	0.058	Ω	V_{GS} = -10V, I_D = -4.9A ④
		–––	0.076	0.098		V_{GS} = -4.5V, I_D = -3.6A ④
$V_{GS(th)}$	Gate Threshold Voltage	-1.0	–––	–––	V	V_{DS} = V_{GS}, I_D = -250µA
g_{fs}	Forward Transconductance	–––	7.7	–––	S	V_{DS} = -15V, I_D = -4.9A
I_{DSS}	Drain-to-Source Leakage Current	–––	–––	-1.0	µA	V_{DS} = -24V, V_{GS} = 0V
		–––	–––	-25		V_{DS} = -24V, V_{GS} = 0V, T_J = 55°C
I_{GSS}	Gate-to-Source Forward Leakage	–––	–––	100	nA	V_{GS} = -20V
	Gate-to-Source Reverse Leakage	–––	–––	-100		V_{GS} = 20V
Q_g	Total Gate Charge	–––	23	34	nC	I_D = -4.9A
Q_{gs}	Gate-to-Source Charge	–––	3.8	5.7		V_{DS} = -15V
Q_{gd}	Gate-to-Drain ("Miller") Charge	–––	5.9	8.9		V_{GS} = -10V, See Fig. 10 ④
$t_{d(on)}$	Turn-On Delay Time	–––	13	19	ns	V_{DD} = -15V
t_r	Rise Time	–––	13	20		I_D = -1.0A
$t_{d(off)}$	Turn-Off Delay Time	–––	34	51		R_G = 6.0Ω
t_f	Fall Time	–––	32	48		R_D = 15Ω ④
C_{iss}	Input Capacitance	–––	710	–––	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	–––	380	–––		V_{DS} = -25V
C_{rss}	Reverse Transfer Capacitance	–––	180	–––		ƒ = 1.0MHz, See Fig. 5

Source-Drain Ratings and 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	–––	–––	-30		
V_{SD}	Diode Forward Voltage	–––	-0.78	-1.0	V	T_J = 25°C, I_S = -1.7A, V_{GS} = 0V ③
t_{rr}	Reverse Recovery Time	–––	44	66	ns	T_J = 25°C, I_F = -1.7A
Q_{rr}	Reverse RecoveryCharge	–––	42	63	nC	di/dt = 100A/µs ③

Notes:

① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)

② Starting T_J = 25°C, L = 35mH R_G = 25Ω, I_{AS} = -2.8A.

⑤ Surface mounted on FR-4 board, t ≤ 10sec.

③ I_{SD} ≤ -2.8A, di/dt ≤ 150A/µs, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ 150°C

④ Pulse width ≤ 300µs; duty cycle ≤ 2%.

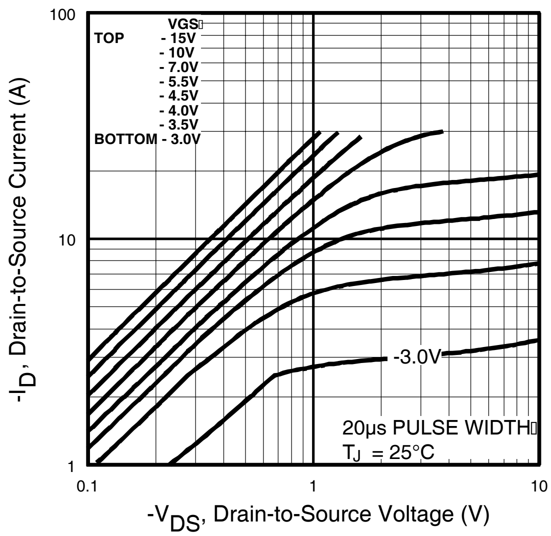


Fig 1. Typical Output Characteristics

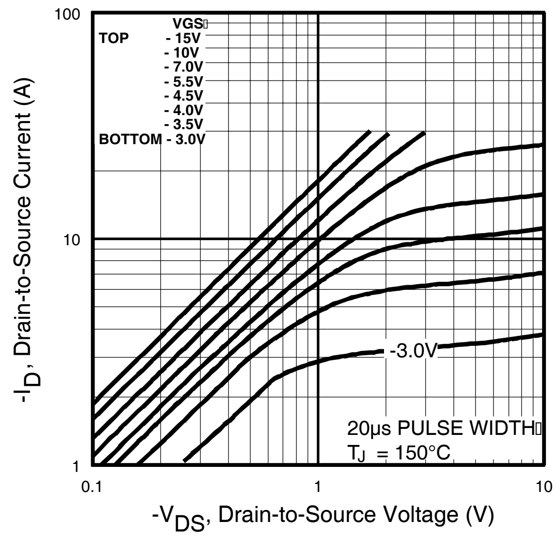


Fig 2. Typical Output Characteristics

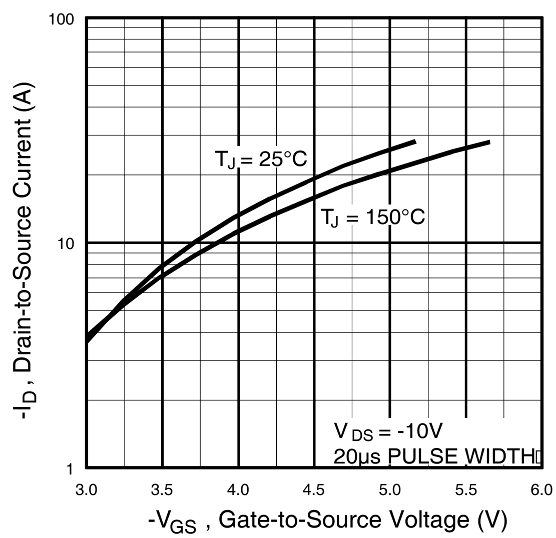


Fig 3. Typical Transfer Characteristics

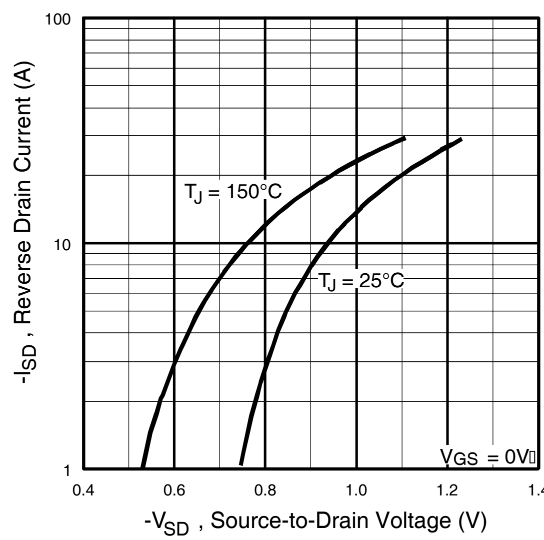


Fig 4. Typical Source-Drain Diode Forward Voltage

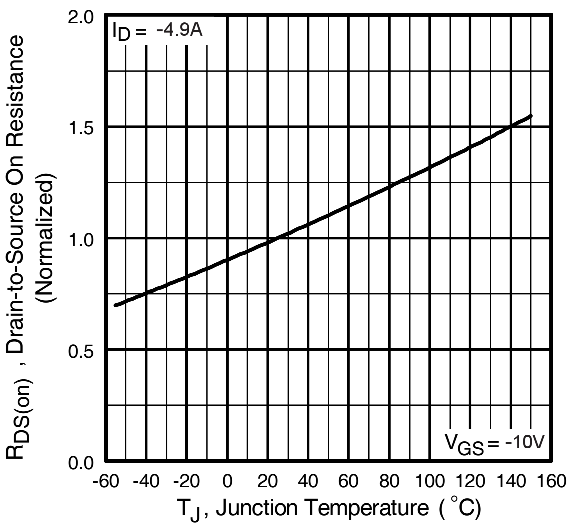


Fig 5. Normalized On-Resistance Vs. Temperature

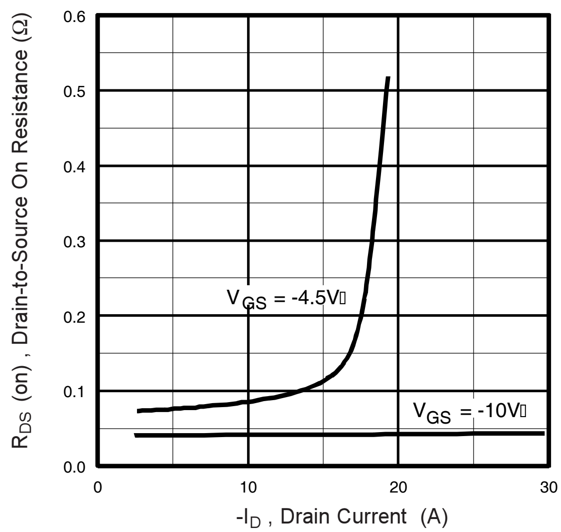


Fig 6. Typical On-Resistance Vs. Drain Current

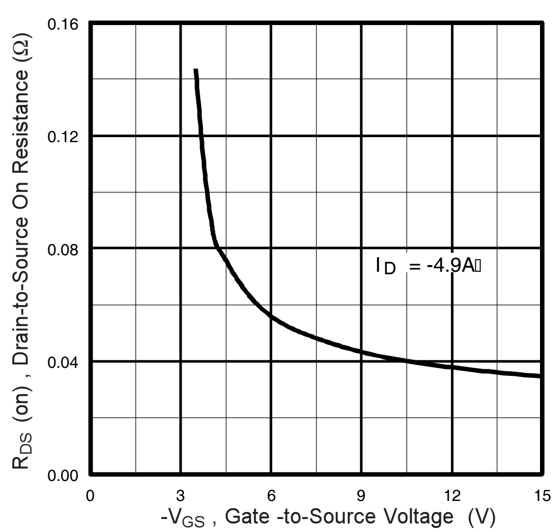


Fig 7. Typical On-Resistance Vs. Gate Voltage

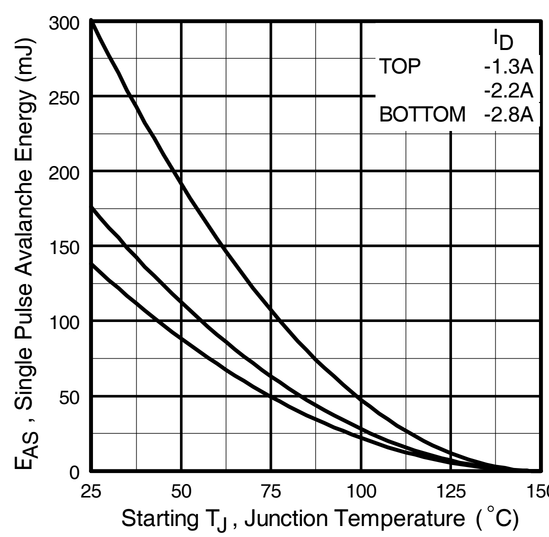


Fig 8. Maximum Avalanche Energy Vs. Drain Current

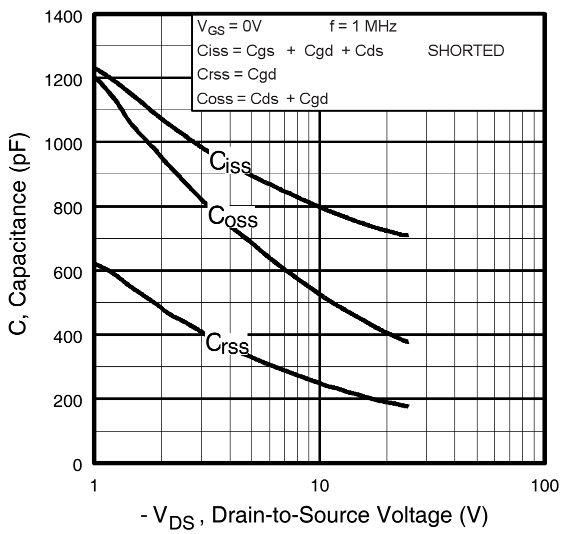


Fig 9. Typical Capacitance Vs. Drain-to-Source Voltage

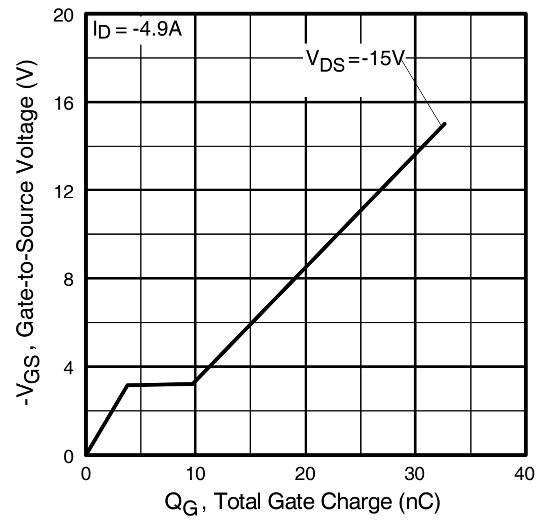


Fig 10. Typical Gate Charge Vs. Gate-to-Source Voltage

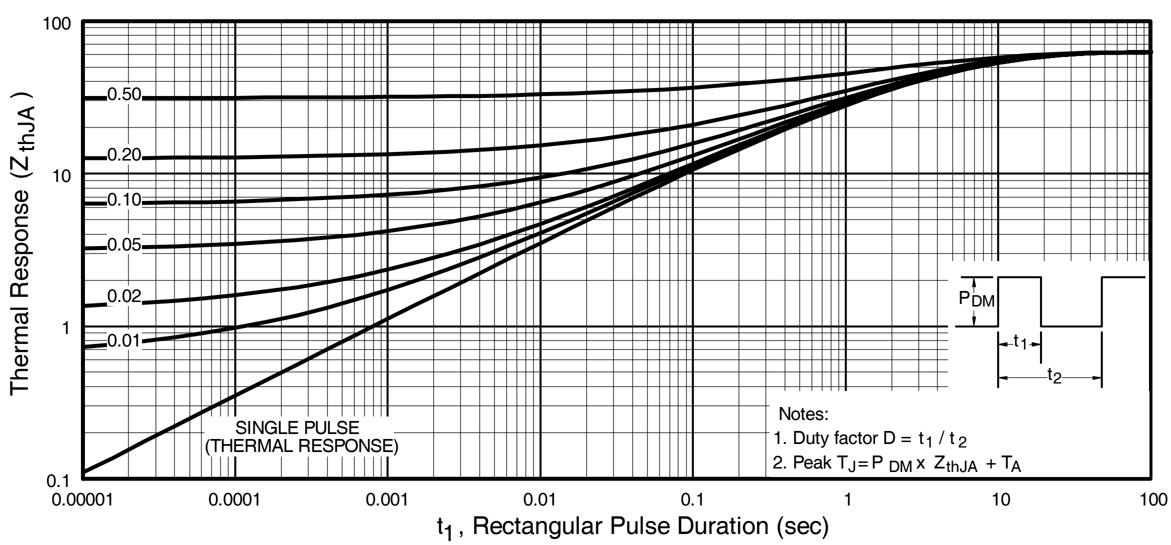
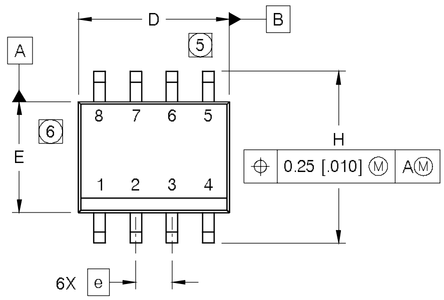


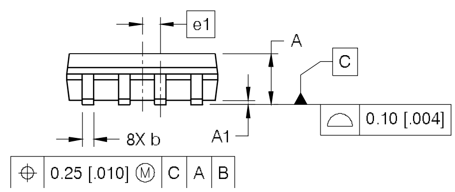
Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

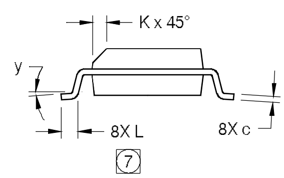
SO-8 Package Outline

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	
e 1	.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°

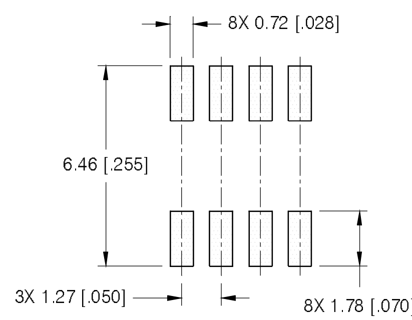




NOTES:

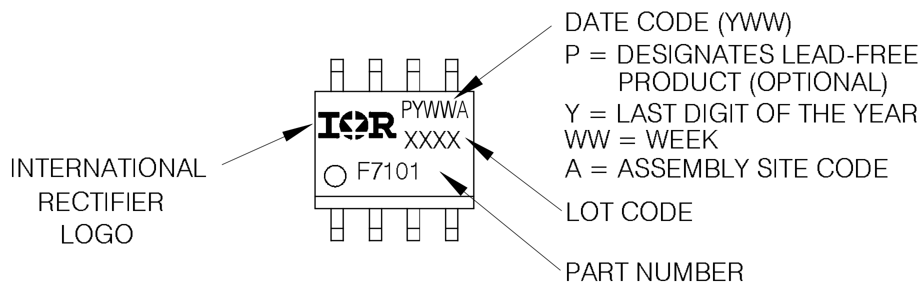
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 [.006].
6. DIMENSION DOES NOT INCLUDE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

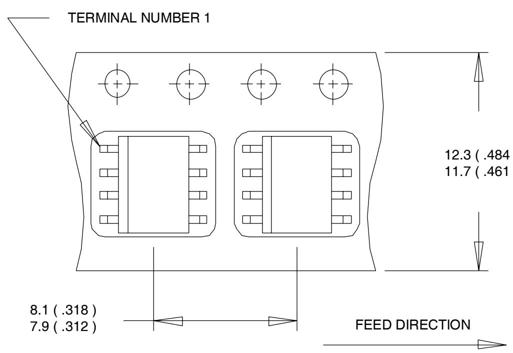
EXAMPLE: THIS IS AN IRF7101 (MOSFET)



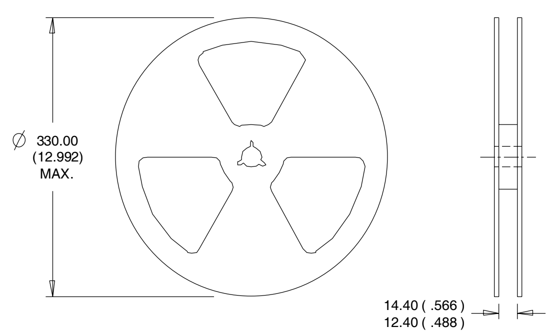
Note: For the most current drawing please refer to IR website at: http://www.irf.com/package/

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/

Data and specifications subject to change without notice.
This product has been designed and qualified for the Automotive [Q101] market.
Qualification Standards can be found on IR's Web site.

International Rectifier

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