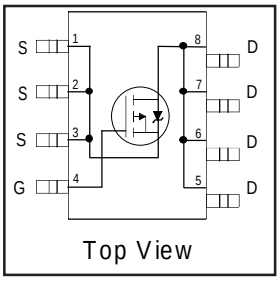
International
IOR Rectifier

PD- 91850C

IRF7220

HEXFET® Power MOSFET

- Ultra Low On-Resistance
- P-Channel MOSFET
- Surface Mount
- Available in Tape & Reel



Top View

V_{DSS} = -14V

$R_{DS(on)}$ = 0.012Ω

Description

These P-Channel MOSFETs from International Rectifier utilize advanced processing techniques to achieve the extremely low on-resistance per silicon area. This benefit provides the designer with an extremely efficient device for use in battery and load management applications.

The SO-8 has been modified through a customized leadframe for enhanced thermal characteristics and multiple-die capability making it ideal in a variety of power applications. With these improvements, multiple devices can be used in an application with dramatically reduced board space. The package is designed for vapor phase, infrared, or wave soldering techniques.


SO-8

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain- Source Voltage	-14	V
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ -4.5V	±11	A
I_D @ T_A= 70°C	Continuous Drain Current, V_{GS} @ -4.5V	±8.8	
I_{DM}	Pulsed Drain Current ①	±88	
P_D @T_A = 25°C	Power Dissipation	2.5	W
P_D @T_A = 70°C	Power Dissipation	1.6	
	Linear Derating Factor	0.02	W/°C
E_{AS}	Single Pulse Avalanche Energy④	110	mJ
V_{GS}	Gate-to-Source Voltage	± 12	V
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to + 150	°C

Thermal Resistance

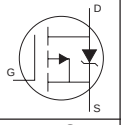
	Parameter	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient③	50	°C/W

7/16/99

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-14	—	—	V	V_{GS} = 0V, I_D = -5mA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	-0.006	—	V/°C	Reference to 25°C, I_D = -1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	.0082	0.012	Ω	V_{GS} = -4.5V, I_D = -11A ②
		—	.0125	0.020		V_{GS} = -2.5V, I_D = -8.8A ②
$V_{GS(th)}$	Gate Threshold Voltage	-0.60	—	—	V	V_{DS} = V_{GS}, I_D = -250µA
g_{fs}	Forward Transconductance	8.4	—	—	S	V_{DS} = -10V, I_D = -11A
I_{DSS}	Drain-to-Source Leakage Current	—	—	-5.0	µA	V_{DS} = -11.2V, V_{GS} = 0V
		—	—	-100		V_{DS} = -11.2V, V_{GS} = 0V, T_J = 70°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	—	84	125	nC	I_D = -11A
Q_{gs}	Gate-to-Source Charge	—	13	20		V_{DS} = -10V
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	37	55		V_{GS} = -5.0V ②
$t_{d(on)}$	Turn-On Delay Time	—	19	—	ns	V_{DD} = -10V
t_r	Rise Time	—	420	—		I_D = -11A
$t_{d(off)}$	Turn-Off Delay Time	—	140	—		R_G = 6.2Ω
t_f	Fall Time	—	1040	—		R_D = 0.91Ω ②
C_{iss}	Input Capacitance	—	8075	—	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	—	4400	—		V_{DS} = -10V
C_{rss}	Reverse Transfer Capacitance	—	4150	—		f = 1.0MHz

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	—	—	-88		
V_{SD}	Diode Forward Voltage	—	—	-1.2	V	T_J = 25°C, I_S = -2.5A, V_{GS} = 0V ②
t_{rr}	Reverse Recovery Time	—	160	240	ns	T_J = 25°C, I_F = -2.5A
Q_{rr}	Reverse RecoveryCharge	—	147	220	nC	di/dt = 100A/µs ②

Notes:

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

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

③ When mounted on 1 inch square copper board, t<10 sec

④ Starting T_J = 25°C, L = 1.8mH
R_G = 25Ω, I_{AS} = 11A. (See Figure 10)

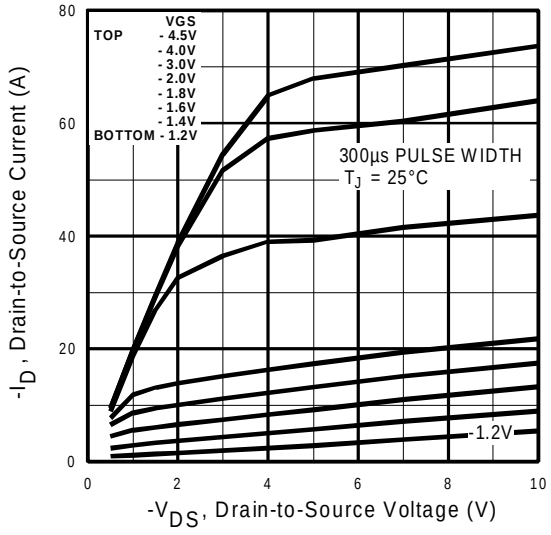


Fig 1. Typical Output Characteristics

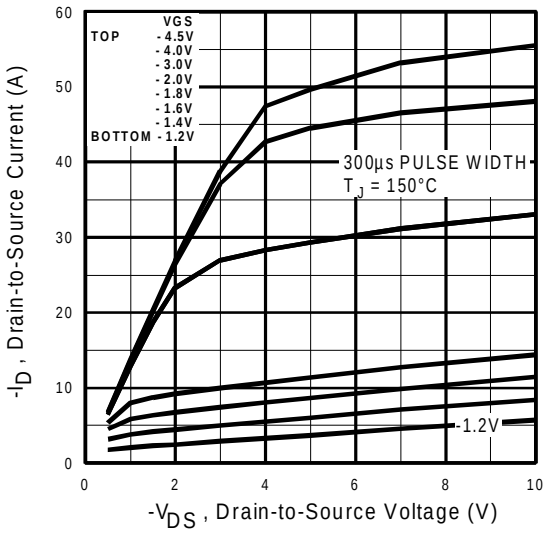


Fig 2. Typical Output Characteristics

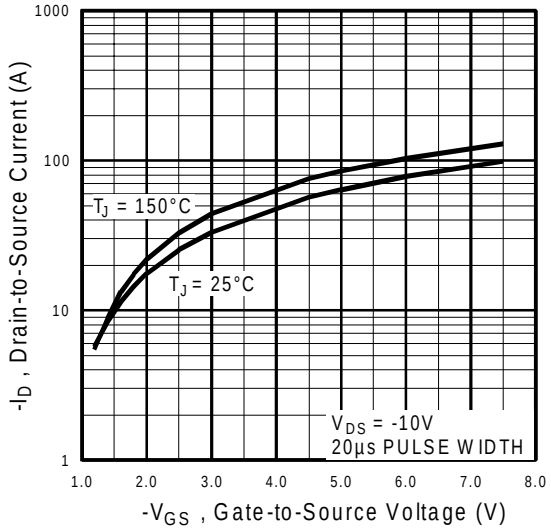


Fig 3. Typical Transfer Characteristics

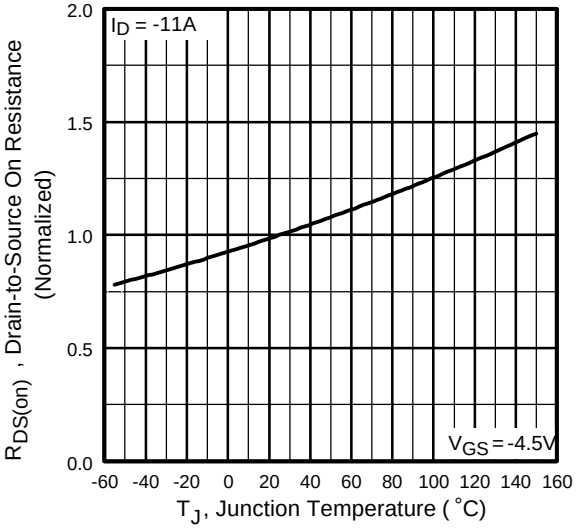


Fig 4. Normalized On-Resistance Vs. Temperature

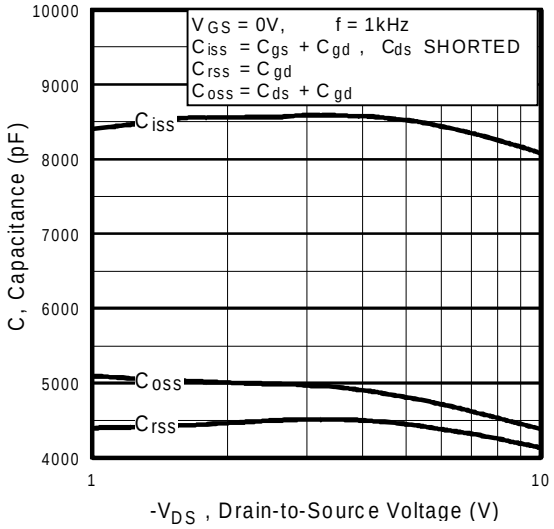


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

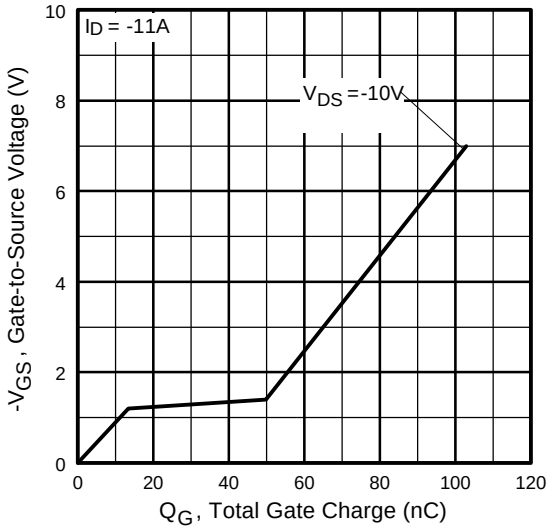


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

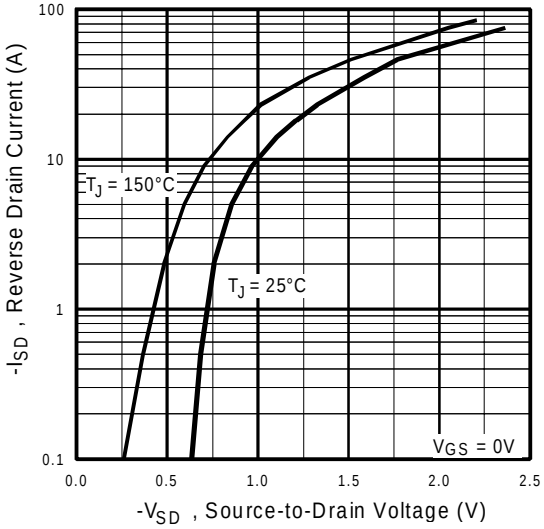


Fig 7. Typical Source-Drain Diode Forward Voltage

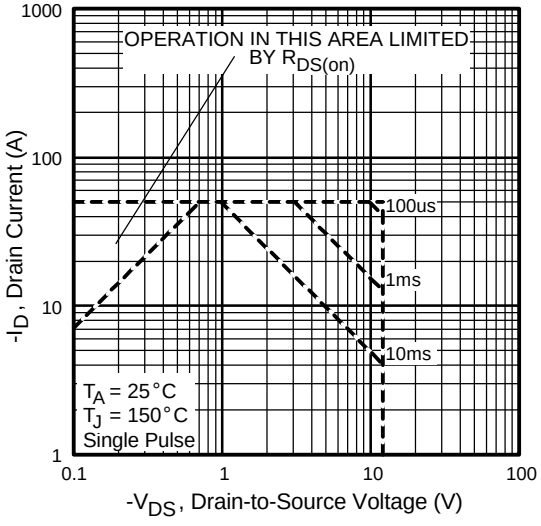


Fig 8. Maximum Safe Operating Area

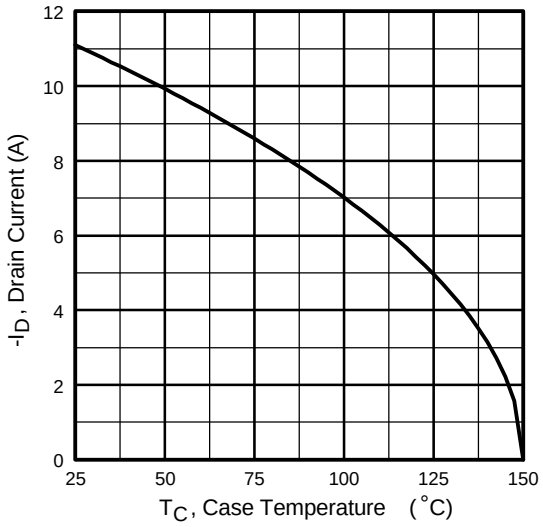


Fig 9. Maximum Drain Current Vs. Case Temperature

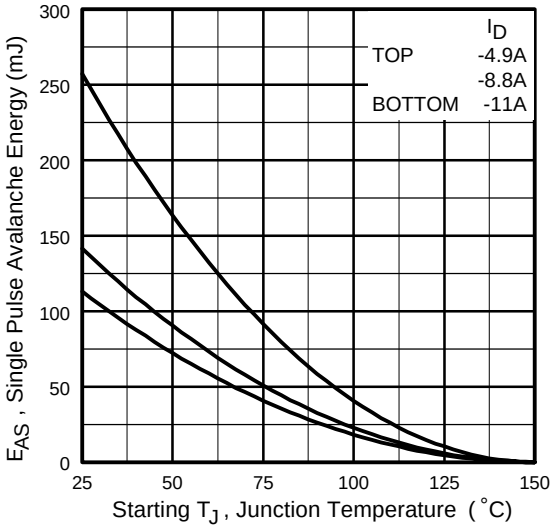


Fig 10. Maximum Avalanche Energy Vs. Drain Current

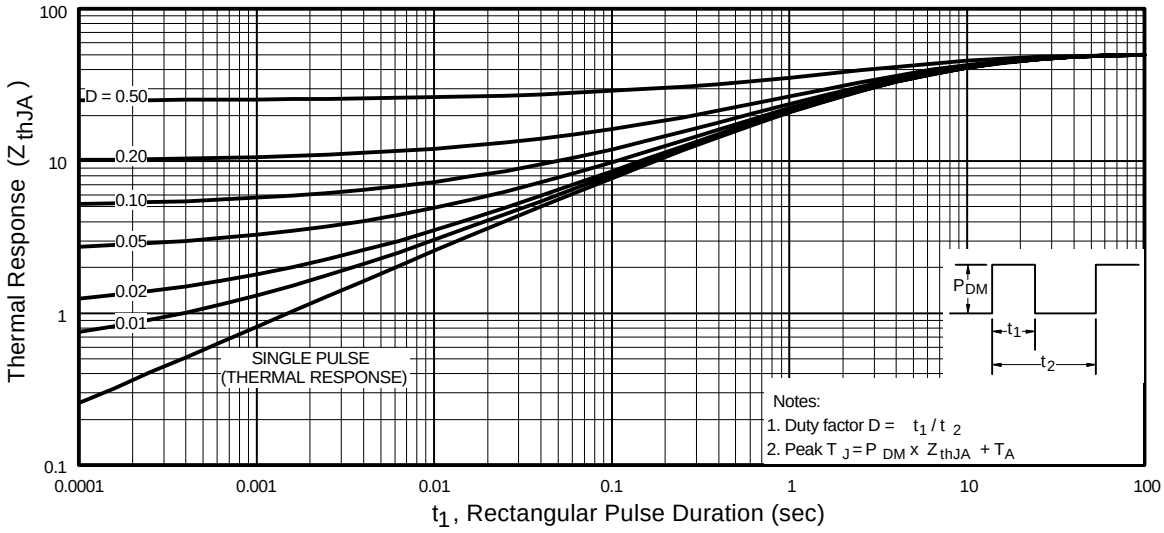
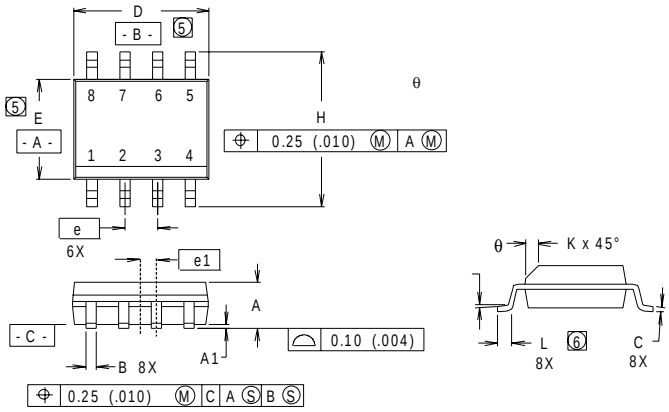


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

SO-8 Package Details

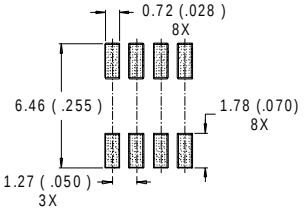


DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
B	.014	.018	0.36	0.46
C	.0075	.0098	0.19	0.25
D	.189	.196	4.80	4.98
E	.150	.157	3.81	3.99
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.011	.019	0.28	0.48
L	0.16	.050	0.41	1.27
θ	0°	8°	0°	8°

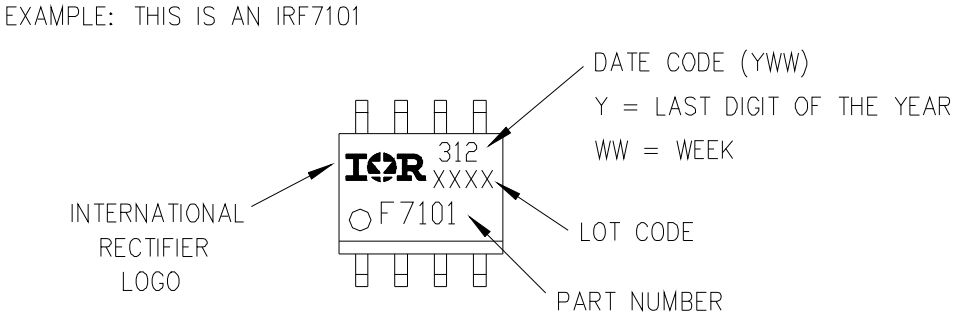
NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1982.
2. CONTROLLING DIMENSION : INCH.
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 0.25 (.006).
6. DIMENSIONS IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE..

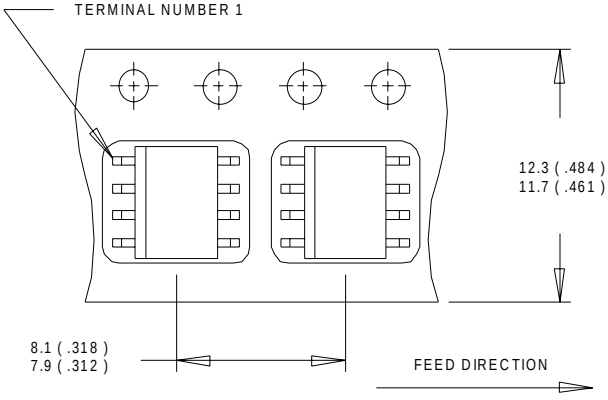
RECOMMENDED FOOTPRINT



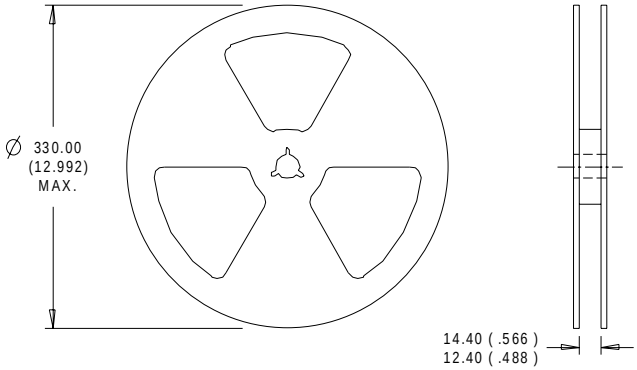
Part Marking



Tape and Reel
SO-8



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.

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