

HEXFET® Power MOSFET

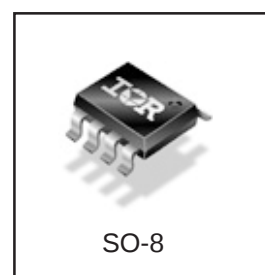
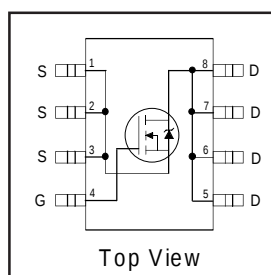
Applications

- High Frequency DC-DC Converters with Synchronous Rectification

V_{DSS}	$R_{DS(on)}$ max	I_D
30V	0.008 Ω	14A

Benefits

- Low Gate Impedance to Reduce Switching Losses
- Ultra-Low $R_{DS(on)}$ at 10V V_{GS}
- Fully Characterized Avalanche Voltage and Current



Absolute Maximum Ratings

	Parameter	Max.	Units
I_D @ $T_A = 25^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V	14	A
I_D @ $T_A = 70^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V	11	
I_{DM}	Pulsed Drain Current ①	110	
P_D @ $T_A = 25^\circ\text{C}$	Power Dissipation ②	2.5	W
P_D @ $T_A = 70^\circ\text{C}$	Power Dissipation	1.6	
	Linear Derating Factor	0.02	
V_{GS}	Gate-to-Source Voltage	± 30	V
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to + 150	$^\circ\text{C/W}$

Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JL}$	Junction-to-Drain Lead	—	TBD	$^\circ\text{C/W}$
$R_{\theta JA}$	Junction-to-Ambient ⑤	—	50	

Typical SMPS Topologies

- Telecom 48V Input Converters with Logic-Level Driven Synchronous Rectifiers

Notes ① through ⑤ are on page 4
www.irf.com

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	30	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.029	—	V/ $^\circ\text{C}$	Reference to 25°C , $I_D = 1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	0.006	0.008	Ω	$V_{GS} = 16V, I_D = 14A$ ④
		—	0.007	0.0095		$V_{GS} = 10V, I_D = 11A$ ④
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	20	μA	$V_{DS} = 24V, V_{GS} = 0V$
		—	—	100		$V_{DS} = 24V, V_{GS} = 0V, T_J = 125^\circ\text{C}$
I_{GSS}	Gate-to-Source Forward Leakage	—	—	200	nA	$V_{GS} = 24V$
	Gate-to-Source Reverse Leakage	—	—	-200		$V_{GS} = -24V$

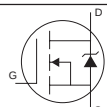
Dynamic @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
g_{fs}	Forward Transconductance	26	—	—	S	$V_{DS} = 25V, I_D = 13A$
Q_g	Total Gate Charge	—	40	—	nC	$I_D = 13A$
Q_{gs}	Gate-to-Source Charge	—	13	—		$V_{DS} = 16V$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	9.1	—		$V_{GS} = 10V$, ④
$t_{d(on)}$	Turn-On Delay Time	—	19	—	ns	$V_{DD} = 15V$
t_r	Rise Time	—	13	—		$I_D = 1.0A$
$t_{d(off)}$	Turn-Off Delay Time	—	39	—		$R_G = 6.2\Omega$
t_f	Fall Time	—	48	—		$V_{GS} = 10V$ ④
C_{iss}	Input Capacitance	—	2440	—	pF	$V_{GS} = 0V$
C_{oss}	Output Capacitance	—	870	—		$V_{DS} = 25V$
C_{rss}	Reverse Transfer Capacitance	—	83	—		$f = 1.0\text{MHz}$

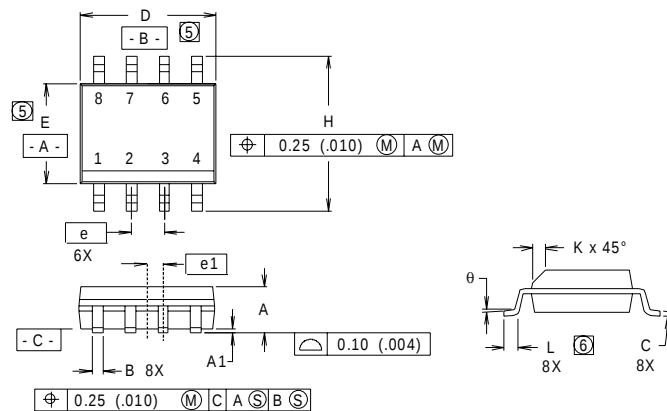
Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E_{AS}	Single Pulse Avalanche Energy②	—	320	mJ
I_{AR}	Avalanche Current①	—	13	A
E_{AR}	Repetitive Avalanche Energy①	—	0.25	mJ

Diode Characteristics

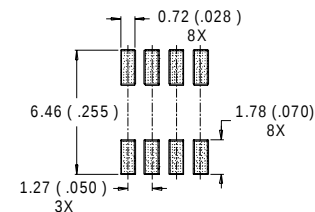
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	2.3	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	110		
V_{SD}	Diode Forward Voltage	—	TBD	1.3	V	$T_J = 25^\circ\text{C}, I_S = 11A, V_{GS} = 0V$ ④
		—	TBD	TBD		$T_J = 125^\circ\text{C}, I_S = 11A, V_{GS} = 0V$
t_{rr}	Reverse Recovery Time	—	58	—	ns	$T_J = 25^\circ\text{C}, I_F = 11A, V_R = 15V$
Q_{rr}	Reverse Recovery Charge	—	98	—	nC	$di/dt = 100A/\mu s$ ④
t_{rr}	Reverse Recovery Time	—	TBD	TBD	ns	$T_J = 125^\circ\text{C}, I_F = 11A, V_R = 15V$
Q_{rr}	Reverse Recovery Charge	—	TBD	TBD	nC	$di/dt = 100A/\mu s$ ④

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°

RECOMMENDED FOOTPRINT

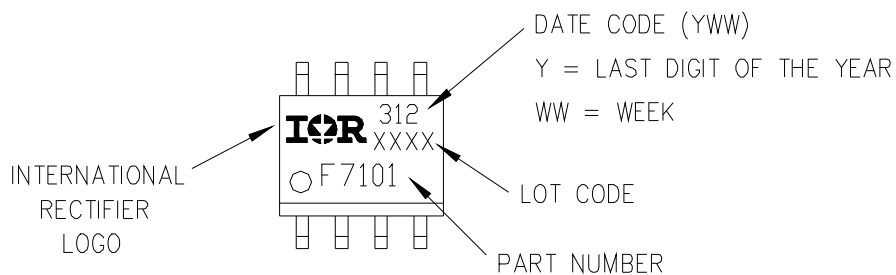


NOTES:

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..

SO-8 Part Marking

EXAMPLE: THIS IS AN IRF7101

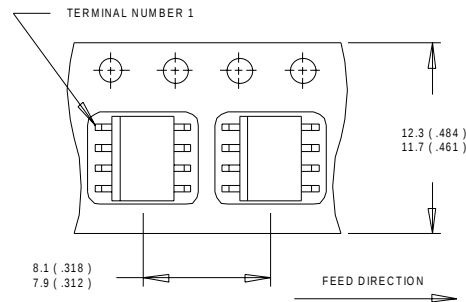


IRF7458

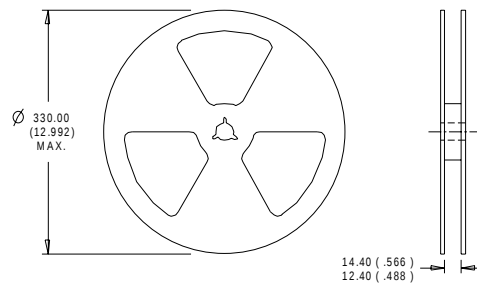
PROVISIONAL

International
IOR Rectifier

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 $T_J = 25^\circ\text{C}$, $L = 3.8\text{mH}$
 $R_G = 25\Omega$, $I_{AS} = 13\text{A}$.
- ③ $I_{SD} \leq 13\text{A}$, $di/dt \leq 100 \text{ A}/\mu\text{s}$, $V_{DD} \leq V_{(BR)DSS}$,
 $T_J \leq 150^\circ\text{C}$
- ④ Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.
- ⑤ When mounted on 1 inch square copper board, $t < 10 \text{ sec}$

International
IOR Rectifier

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
IR EUROPEAN REGIONAL CENTRE: 439/445 Godstone Rd, Whyteleafe, Surrey CR3 OBL, UK Tel: ++ 44 (0)20 8645 8000

IR CANADA: 15 Lincoln Court, Brampton, Ontario L6T3Z2, Tel: (905) 453 2200

IR GERMANY: Saalburgstrasse 157, 61350 Bad Homburg Tel: ++ 49 (0) 6172 96590

IR ITALY: Via Liguria 49, 10071 Borgaro, Torino Tel: ++ 39 011 451 0111

IR JAPAN: K&H Bldg., 2F, 30-4 Nishi-Ikebukuro 3-Chome, Toshima-Ku, Tokyo 171 Tel: 81 (0)3 3983 0086

IR SOUTHEAST ASIA: 1 Kim Seng Promenade, Great World City West Tower, 13-11, Singapore 237994 Tel: ++ 65 (0)838 4630

IR TAIWAN: 16 Fl. Suite D. 207, Sec. 2, Tun Haw South Road, Taipei, 10673 Tel: 886-(0)2 2377 9936

Data and specifications subject to change without notice. 4/00