

IRF7904PbF

HEXFET® Power MOSFET

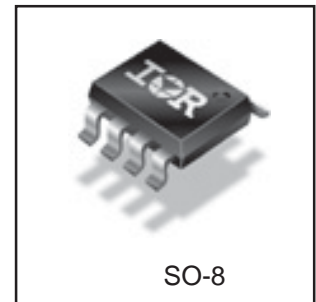
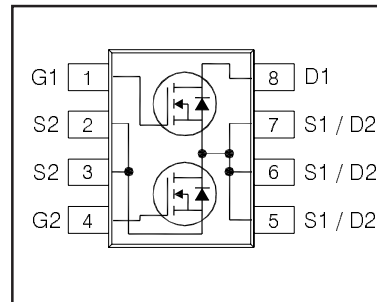
Applications

- Dual SO-8 MOSFET for POL Converters in Notebook Computers, Servers, Graphics Cards, Game Consoles and Set-Top Box

V_{DSS}	$R_{DS(on)}$ max	I_D
30V	Q1 16.2m Ω @ $V_{GS} = 10V$	7.6A
	Q2 10.8m Ω @ $V_{GS} = 10V$	11A

Benefits

- Very Low $R_{DS(on)}$ at 4.5V V_{GS}
- Low Gate Charge
- Fully Characterized Avalanche Voltage and Current
- 20V V_{GS} Max. Gate Rating
- Improved Body Diode Reverse Recovery
- 100% Tested for R_G
- Lead-Free



Absolute Maximum Ratings

	Parameter	Q1 Max.	Q2 Max.	Units
V_{DS}	Drain-to-Source Voltage	30		V
V_{GS}	Gate-to-Source Voltage	± 20		
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	7.6	11	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	6.1	8.9	
I_{DM}	Pulsed Drain Current ①	61	89	
$P_D @ T_A = 25^\circ C$	Power Dissipation	1.4	2.0	W
$P_D @ T_A = 70^\circ C$	Power Dissipation	0.9	1.3	
	Linear Derating Factor	0.011	0.016	W/ $^\circ C$
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150		$^\circ C$

Thermal Resistance

	Parameter	Q1 Max.	Q2 Max.	Units
$R_{\theta JL}$	Junction-to-Drain Lead ⑤	20	20	$^\circ C/W$
$R_{\theta JA}$	Junction-to-Ambient ④ ⑤	90	62.5	


Static @ T_J = 25°C (unless otherwise specified)

	Parameter		Min.	Typ.	Max.	Units	Conditions
BV _{DSS}	Drain-to-Source Breakdown Voltage	Q1&Q2	30	—	—	V	V _{GS} = 0V, I _D = 250μA
ΔBV _{DSS} /ΔT _J	Breakdown Voltage Temp. Coefficient	Q1	—	0.024	—	V/°C	Reference to 25°C, I _D = 1mA
		Q2	—	0.024	—		
R _{DS(on)}	Static Drain-to-Source On-Resistance	Q1	—	11.4	16.2	mΩ	V _{GS} = 10V, I _D = 7.6A ③
			—	14.5	20.5		V _{GS} = 4.5V, I _D = 6.1A ③
		Q2	—	8.6	10.8		V _{GS} = 10V, I _D = 11A ③
			—	10	13		V _{GS} = 4.5V, I _D = 8.8A ③
V _{GS(th)}	Gate Threshold Voltage	Q1&Q2	1.35	—	2.25	V	Q1: V _{DS} = V _{GS} , I _D = 25μA Q2: V _{DS} = V _{GS} , I _D = 50μA
ΔV _{GS(th)} /ΔT _J	Gate Threshold Voltage Coefficient	Q1	—	-5.0	—	mV/°C	
		Q2	—	-5.0	—		
I _{DSS}	Drain-to-Source Leakage Current	Q1&Q2	—	—	1.0	μA	V _{DS} = 24V, V _{GS} = 0V
		Q1&Q2	—	—	150		V _{DS} = 24V, V _{GS} = 0V, T _J = 125°C
I _{GSS}	Gate-to-Source Forward Leakage	Q1&Q2	—	—	100	nA	V _{GS} = 20V
	Gate-to-Source Reverse Leakage	Q1&Q2	—	—	-100		V _{GS} = -20V
g _{fs}	Forward Transconductance	Q1	17	—	—	S	V _{DS} = 15V, I _D = 6.1A
		Q2	23	—	—		V _{DS} = 15V, I _D = 8.8A
Q _g	Total Gate Charge	Q1	—	7.5	11	nC	Q1 V _{DS} = 15V V _{GS} = 4.5V, I _D = 6.1A Q2 V _{DS} = 15V V _{GS} = 4.5V, I _D = 8.8A
Q _{qs1}	Pre-V _{th} Gate-to-Source Charge	Q1	—	2.2	—		
		Q2	—	3.7	—		
Q _{qs2}	Post-V _{th} Gate-to-Source Charge	Q1	—	0.6	—		
		Q2	—	1.1	—		
Q _{gd}	Gate-to-Drain Charge	Q1	—	2.5	—		
		Q2	—	4.8	—		
Q _{qodr}	Gate Charge Overdrive	Q1	—	2.2	—		
		Q2	—	4.4	—		
Q _{sw}	Switch Charge (Q _{qs2} + Q _{gd})	Q1	—	3.1	—		
		Q2	—	5.9	—		
Q _{oss}	Output Charge	Q1	—	4.5	—	nC	V _{DS} = 16V, V _{GS} = 0V
		Q2	—	9.1	—		
R _G	Gate Resistance	Q1	—	3.2	4.8	Ω	
		Q2	—	2.9	4.4		
t _{d(on)}	Turn-On Delay Time	Q1	—	6.9	—	ns	Q1 V _{DD} = 15V, V _{GS} = 4.5V I _D = 6.1A Q2 V _{DD} = 15V, V _{GS} = 4.5V I _D = 8.8A Clamped Inductive Load
		Q2	—	7.8	—		
t _r	Rise Time	Q1	—	7.3	—		
		Q2	—	10	—		
t _{d(off)}	Turn-Off Delay Time	Q1	—	10	—		
		Q2	—	15	—		
t _f	Fall Time	Q1	—	3.2	—		
		Q2	—	4.6	—		
C _{iss}	Input Capacitance	Q1	—	910	—	pF	V _{GS} = 0V V _{DS} = 15V f = 1.0MHz
		Q2	—	1780	—		
C _{oss}	Output Capacitance	Q1	—	190	—		
		Q2	—	390	—		
C _{rss}	Reverse Transfer Capacitance	Q1	—	94	—		
		Q2	—	180	—		

Avalanche Characteristics

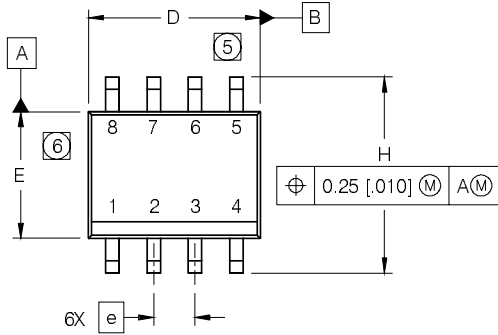
	Parameter	Typ.	Q1 Max.	Q2 Max.	Units
E _{AS}	Single Pulse Avalanche Energy ②	—	140	250	mJ
I _{AR}	Avalanche Current ②	—	6.1	8.8	A

Diode Characteristics

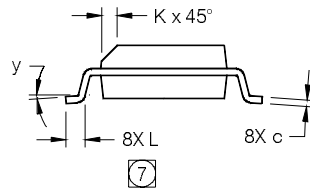
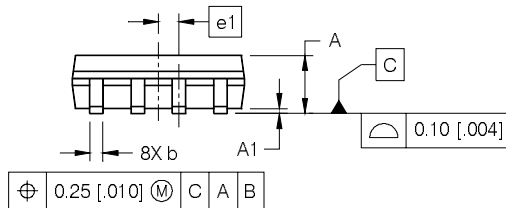
	Parameter		Min.	Typ.	Max.	Units	Conditions	
I _S	Continuous Source Current (Body Diode)	Q1	—	—	1.8	A	MOSFET symbol showing the integral reverse p-n junction diode. 	
		Q2	—	—	2.5			
I _{SM}	Pulsed Source Current (Body Diode) ①	Q1	—	—	61	A		
		Q2	—	—	88			
V _{SD}	Diode Forward Voltage	Q1	—	—	1.0	V		T _J = 25°C, I _S = 6.1A, V _{GS} = 0V ③
		Q2	—	—	1.0			T _J = 25°C, I _S = 8.8A, V _{GS} = 0V ③
t _{rr}	Reverse Recovery Time	Q1	—	11	17	ns		Q1 T _J = 25°C, I _F = 6.1A, V _{DD} = 15V, di/dt = 100A/μs ③
		Q2	—	16	24			
Q _{rr}	Reverse Recovery Charge	Q1	—	2.6	3.9	nC	Q2 T _J = 25°C, I _F = 8.8A, V _{DD} = 15V, di/dt = 100A/μs ③	
		Q2	—	6.9	10			

SO-8 Package Outline

Dimensions are shown in millimeters (inches)



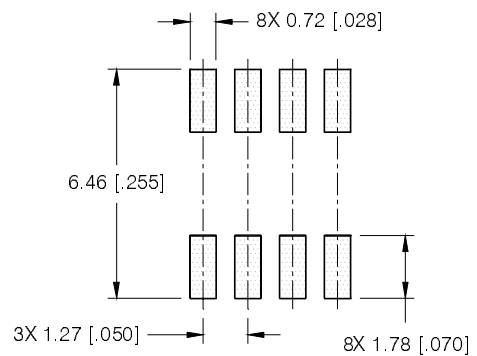
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e 1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40	1.27
y	0°	8°	0°	8°



NOTES:

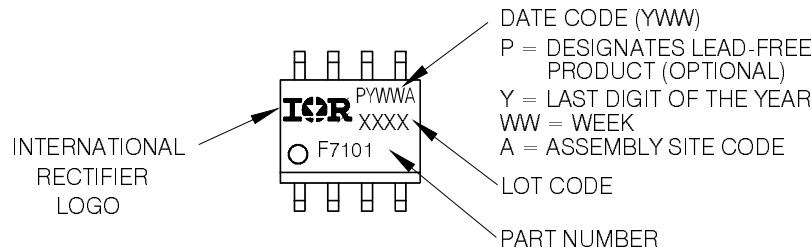
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 [.006].
6. DIMENSION DOES NOT INCLUDE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

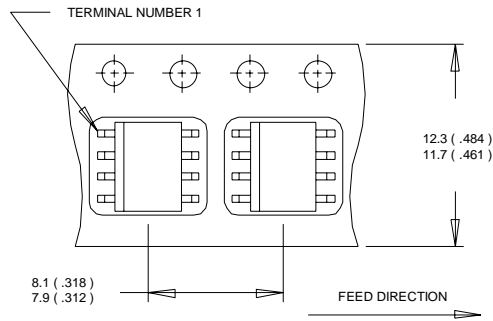
EXAMPLE: THIS IS AN IRF7101 (MOSFET)



IRF7904PbF

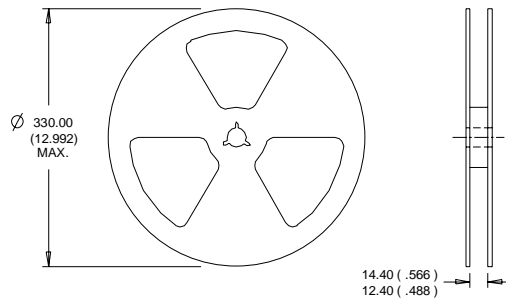
SO-8 Tape and Reel

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.

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Starting $T_J = 25^\circ\text{C}$, Q1: $L = 7.7\text{mH}$
 $R_G = 25\Omega$, $I_{AS} = 6.1\text{A}$; Q2: $L = 6.5\text{mH}$
 $R_G = 25\Omega$, $I_{AS} = 8.8\text{A}$.
- ③ Pulse width $\leq 400\mu\text{s}$; duty cycle $\leq 2\%$.
- ④ When mounted on 1 inch square copper board.
- ⑤ R_θ is measured at T_J approximately 90°C .

Data and specifications subject to change without notice.
This product has been designed and qualified for the Consumer market.