

IRF7805PbF

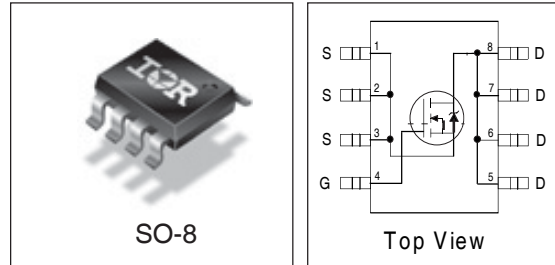
HEXFET® Chip-Set for DC-DC Converters

- N Channel Application Specific MOSFETs
- Ideal for Mobile DC-DC Converters
- Low Conduction Losses
- Low Switching Losses
- Lead-Free

Description

This new device employs advanced HEXFET Power MOSFET technology to achieve an unprecedented balance of on-resistance and gate charge. The reduced conduction and switching losses make this device ideal for high efficiency DC-DC Converters that power the latest generation of mobile microprocessors.

The IRF7805PbF offers maximum efficiency for mobile CPU core DC-DC converters.



Device Features

	IRF7805PbF
V_{DS}	30V
$R_{DS(on)}$	11m Ω
Q_g	31nC
Q_{sw}	11.5nC
Q_{oss}	36nC

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain-to-Source Voltage	30	V
V_{GS}	Gate-to-Source Voltage	± 12	
$I_D @ T_A = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$ ③	13	A
$I_D @ T_A = 70^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$ ③	10	
I_{DM}	Pulsed Drain Current ①	100	
$P_D @ T_A = 25^\circ\text{C}$	Power Dissipation ③	2.5	W
$P_D @ T_A = 70^\circ\text{C}$	Power Dissipation ③	1.6	
	Linear Derating Factor	0.02	W/ $^\circ\text{C}$
T_J	Operating Junction and	-55 to + 150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range		

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JL}$	Junction-to-Drain Lead ⑤	—	20	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Junction-to-Ambient ③⑤	—	50	

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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 ^⑥	30	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance ^⑥	—	9.2	11	m Ω	$V_{GS} = 4.5V, I_D = 7.0A$ ^②
$V_{GS(th)}$	Gate Threshold Voltage ^⑥	1.0	—	3.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
I_{DSS}	Drain-to-Source Leakage Current	—	—	70	μA	$V_{DS} = 30V, V_{GS} = 0V$
		—	—	10		$V_{DS} = 24V, V_{GS} = 0V$
		—	—	150		$V_{DS} = 24V, V_{GS} = 0V, T_J = 100^\circ\text{C}$
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 ^⑥	—	22	31	nC	$V_{GS} = 5.0V$ $V_{DS} = 16V$ $I_D = 7.0A$
Q_{gs1}	Pre-V _{th} Gate-to-Source Charge	—	3.7	—		
Q_{gs2}	Post-V _{th} Gate-to-Source Charge	—	1.4	—		
Q_{gd}	Gate-to-Drain Charge	—	6.8	—		
Q_{sw}	Switch Charge ($Q_{gs2} + Q_{gd}$) ^⑥	—	8.2	11.5		
Q_{oss}	Output Charge ^⑥	—	3.0	3.6	nC	$V_{DS} = 16V, V_{GS} = 0V$
R_G	Gate Resistance	0.5	—	1.7	Ω	
$t_{d(on)}$	Turn-On Delay Time	—	16	—	ns	$V_{DD} = 16V, V_{GS} = 4.5V$ ^③ $I_D = 7.0A$ $R_G = 2\Omega$ Resistive Load
t_r	Rise Time	—	20	—		
$t_{d(off)}$	Turn-Off Delay Time	—	38	—		
t_f	Fall Time	—	16	—		

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode) ^①	—	—	2.5	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode)	—	—	106		
V_{SD}	Diode Forward Voltage ^⑥	—	—	1.2	V	$T_J = 25^\circ\text{C}, I_S = 7.0A, V_{GS} = 0V$
Q_{rr}	Reverse Recovery Charge ^④	—	88	—	nC	$di/dt = 700A/\mu s$ $V_{DS} = 16V, V_{GS} = 0V, I_S = 7.0A$
$Q_{rr(s)}$	Reverse Recovery Charge (with Parallel Schottky) ^④	—	55	—	nC	$di/dt = 700A/\mu s$ (with 10BQ040) $V_{DS} = 16V, V_{GS} = 0V, I_S = 7.0A$

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Pulse width $\leq 300 \mu s$; duty cycle $\leq 2\%$.
- ③ When mounted on 1 inch square copper board, $t < 10$ sec.
- ④ Typ = measured - Q_{oss}
- ⑤ R_{θ} is measured at T_J of approximately 90°C .
- ⑥ Devices are 100% tested to these parameters.

Typical Characteristics

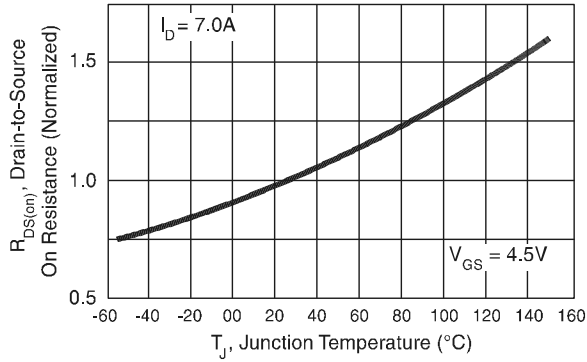


Fig 1. Normalized On-Resistance vs. Temperature

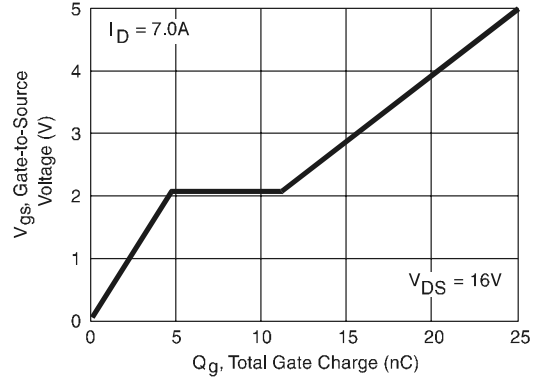


Fig 2. Typical Gate Charge vs. Gate-to-Source Voltage

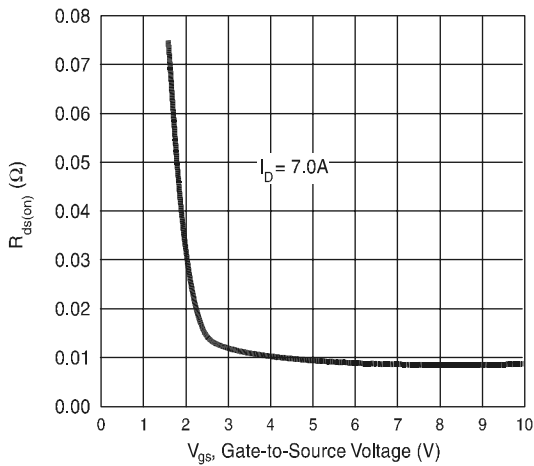


Fig 3. Typical $R_{DS(on)}$ vs. Gate-to-Source Voltage

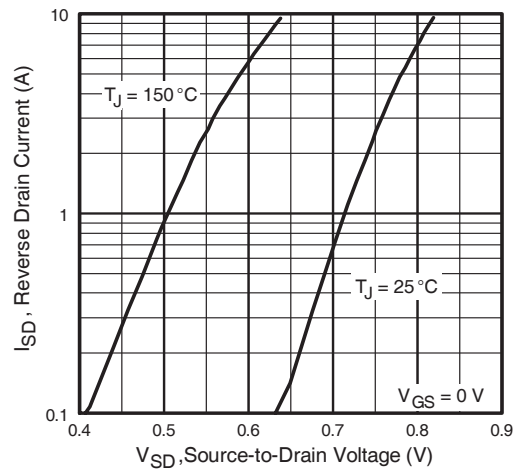


Fig 4. Typical Source-Drain Diode Forward Voltage

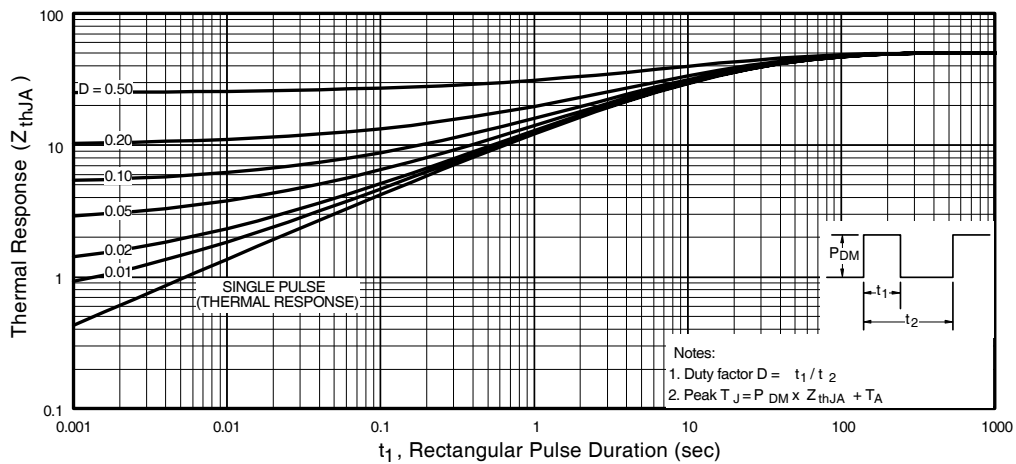
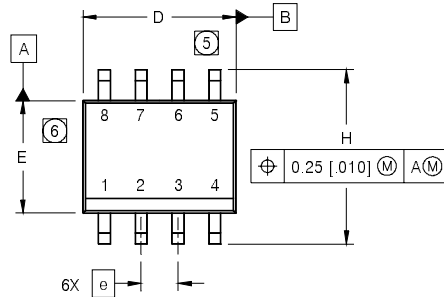


Figure 5. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

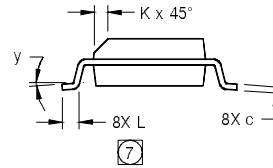
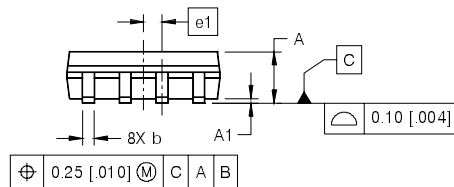
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SO-8 Package Details

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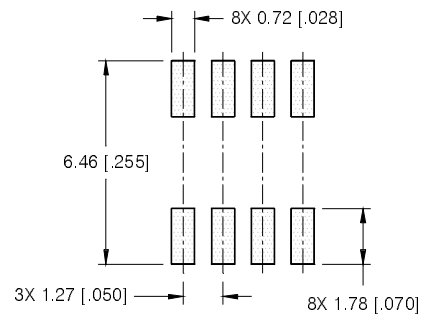
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40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



NOTES:

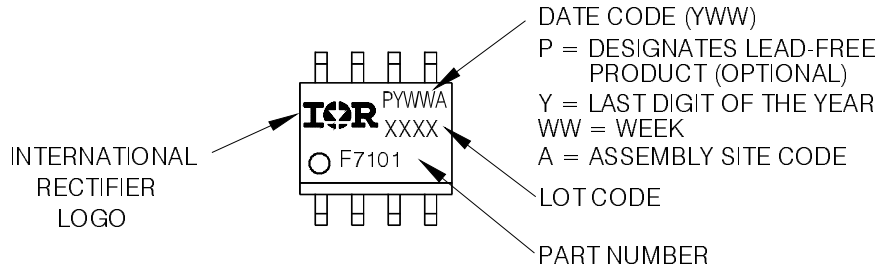
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 [0.006].
6. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 [0.010].
7. DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.

FOOTPRINT



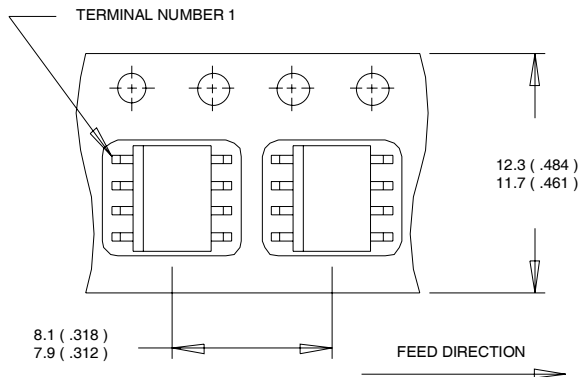
SO-8 Part Marking

EXAMPLE: THIS IS AN IRF7101 (MOSFET)

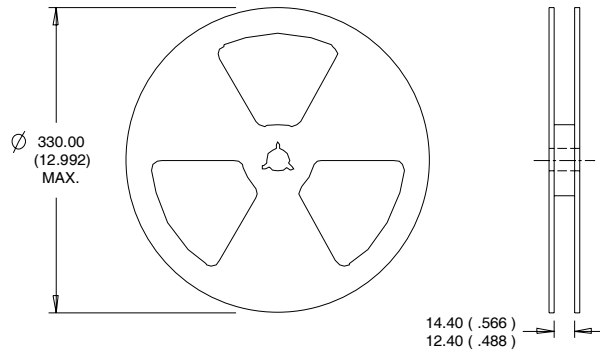


Note: For the most current drawing please refer to IR website at <http://www.irf.com/package/>

SO-8 Tape and Reel



- 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.
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