International
IOR Rectifier

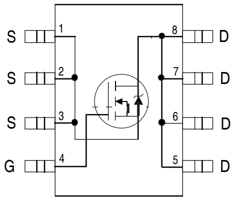
PD – 91746E

IRF7805

HEXFET® Chip-Set for DC-DC Converters

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

SO-8



Top View

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 IRF7805 offers maximum efficiency for mobile CPU core DC-DC converters.

Device Features

	IRF7805
V_{DS}	30V
$R_{DS(on)}$	11mΩ
Qg	31nC
Qsw	11.5nC
Qoss	36nC

Absolute Maximum Ratings

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

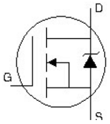
Thermal Resistance

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

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage⑥	30	—	—	V	V_{GS} = 0V, I_D = 250µA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance⑥	—	9.2	11	mΩ	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 = 250µA
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°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
Q_{gs1}	Pre-Vth Gate-to-Source Charge	—	3.7	—		V_{DS} = 16V
Q_{gs2}	Post-Vth Gate-to-Source Charge	—	1.4	—		I_D = 7.0A
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
t_r	Rise Time	—	20	—		I_D = 7.0A
$t_{d(off)}$	Turn-Off Delay Time	—	38	—		R_G= 2Ω
t_f	Fall Time	—	16	—		Resistive Load

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°C, I_S = 7.0A, V_{GS} = 0V
Q_{rr}	Reverse Recovery Charge ④	—	88	—	ns	di/dt = 700A/µs 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/µs (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 ≤ 300 µs; duty cycle ≤ 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

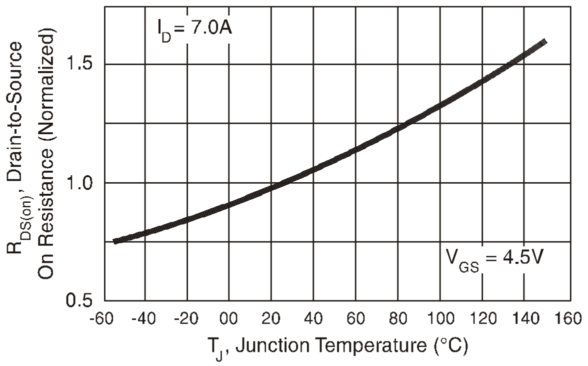


Fig 1. Normalized On-Resistance vs. Temperature

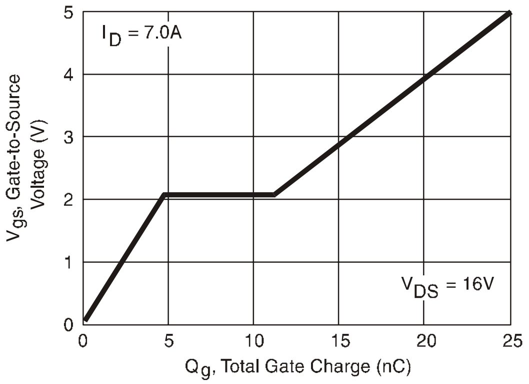


Fig 2. Typical Gate Charge vs. Gate-to-Source Voltage

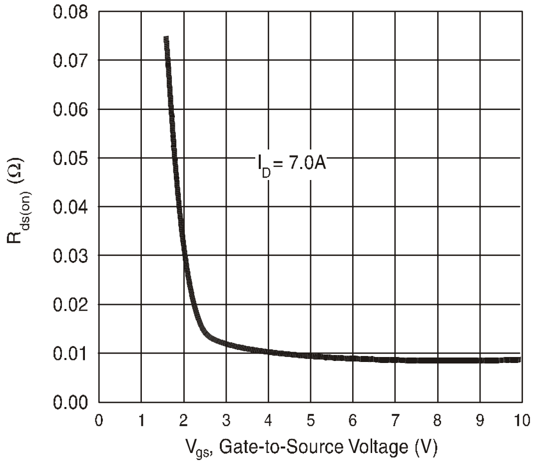


Fig 3. Typical Rds(on) vs. Gate-to-Source Voltage

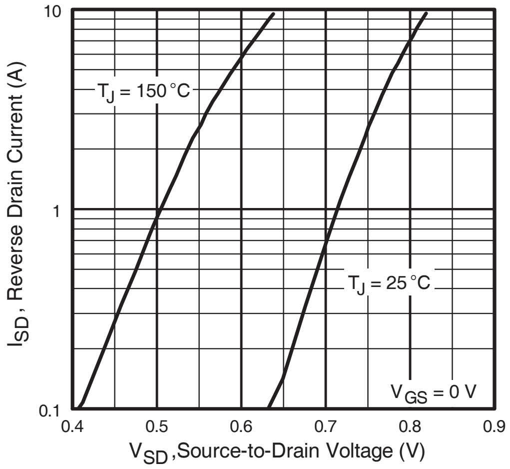
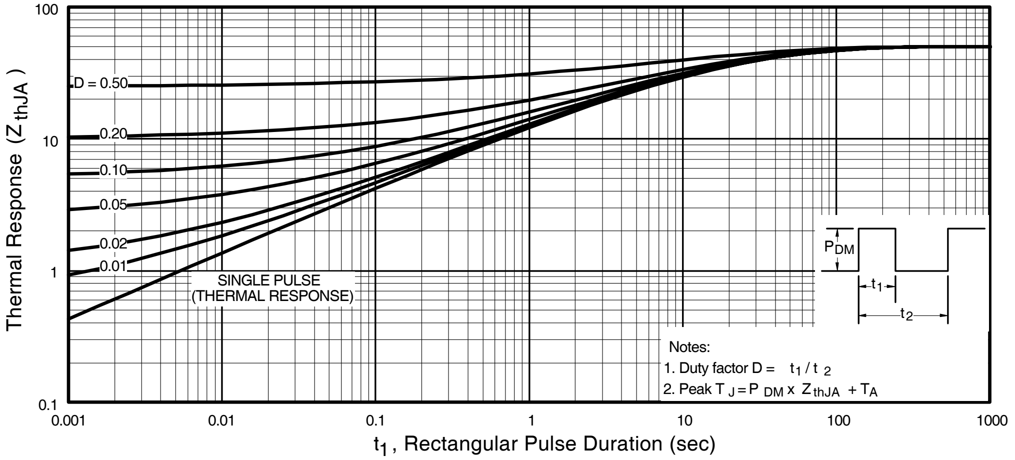


Fig 4. Typical Source-Drain Diode Forward Voltage

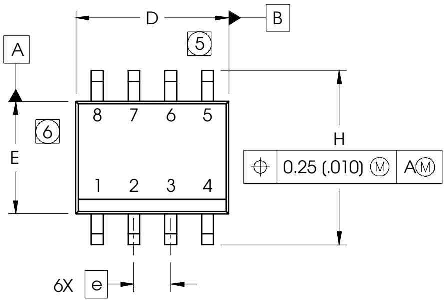


Notes:
1. Duty factor D = t_1 / t_2
2. Peak $T_J = P_{DM} \times Z_{thJA} + T_A$

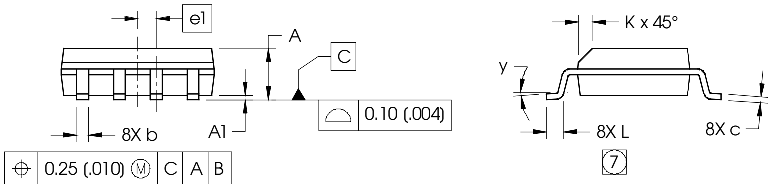
Figure 5. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

SO-8 Package Details

Dimensions are shown in milimeters (inches)



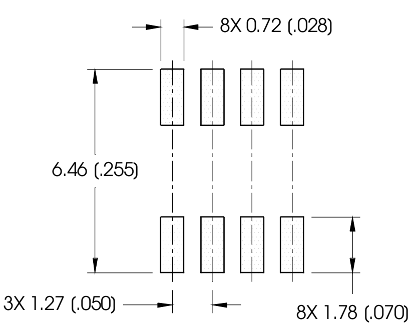
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e 1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40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



NOTES:

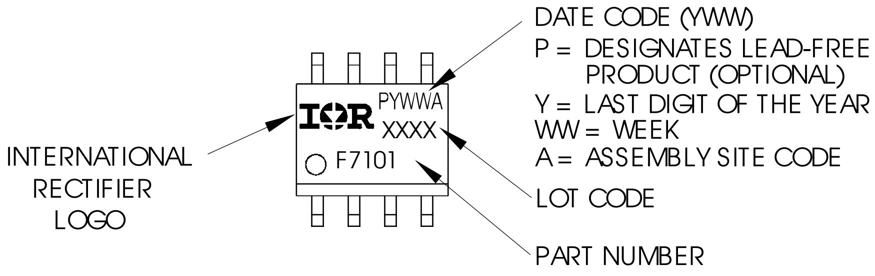
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 (.006).
6. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.25 (.010).
7. DIMENSION IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE.

FOOTPRINT

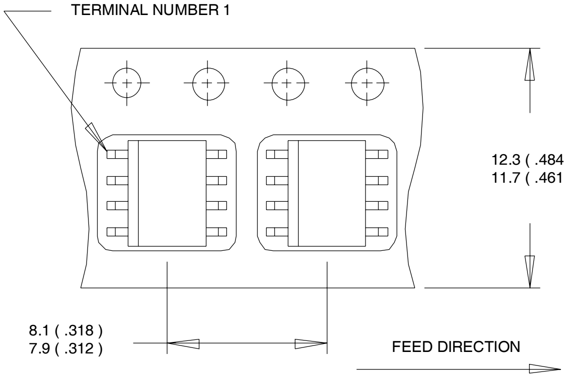


SO-8 Part Marking

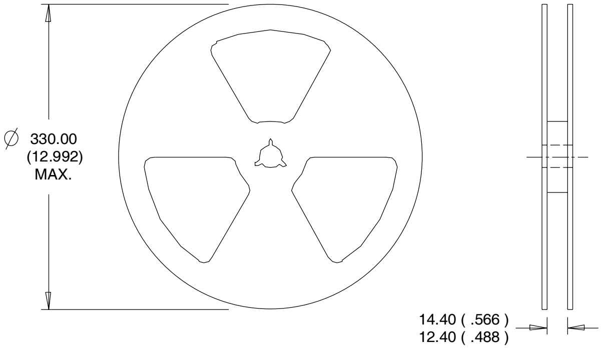
EXAMPLE: THIS IS AN IRF7101 (MOSFET)



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 :
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2. OUTLINE CONFORMS TO EIA-481 & EIA-541.

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