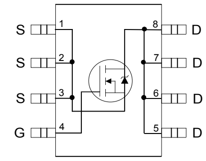
HEXFET® Chip-Set for DC-DC Converters

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



Top View

SO-8
IRF7805PbF

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.

Devices Features

	IRF7805PbF
V_{DSS}	**30V**
$R_{DS(on)}$	**11mΩ**
Qg	**31nC**
Q_{SW}	**11.5nC**
Q_{OSS}	**36nC**

G	D	S
Gate	Drain	Source

Base part number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
IRF7805PbF	SO-8	Tape and Reel	4000	IRF7805PbF

Symbol	Parameter	Max.	Units
V_{DS}	Drain-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	Maximum Power Dissipation ③	2.5	W
P_D @T_A = 70°C	Maximum 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

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JL}$	Junction-to-Drain Lead⑤	——	20	°C/W
$R_{\theta JA}$	Junction-to-Ambient ③	——	50	

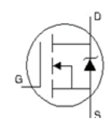
Static @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage ⑥	30	——	——	V	V_{GS} = 0V, I_D = 250μA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance ⑥	——	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

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
Q_g	Total Gate Charge ⑥	——	22	31	nC	V_{GS} = 5.0V V_{DS} = 16V I_D = 7.0A
Q_{gs1}	Pre -Vth Gate-to-Source Charge	——	3.7	——		
Q_{gs2}	Post-Vth Gate-to-Source Charge	——	1.4	——		
Q_{gd}	Gate-to-Drain Charge	——	6.8	——		
Q_{sw}	Switch Charge (Qgs2 + Qgd) ⑥	——	8.2	11.5		
Q_{oss}	Output Charge ⑥	——	30	36	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 ②
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 Voltage⑥	——	——	1.2	V	T_J = 25°C, I_S = 7.0A, V_{GS} = 0V
Q_{rr}	Reverse Recovery Charge ④	——	88	——	nC	di/dt = 700A/μs V_{DS} =16V, V_{GS}= 0V, I_S= 7.0A
Q_{rr}	Reverse Recovery Charge ④	——	55	——		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 ≤ 300μs; duty cycle ≤ 2%.
③ When mounted on 1" in 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.

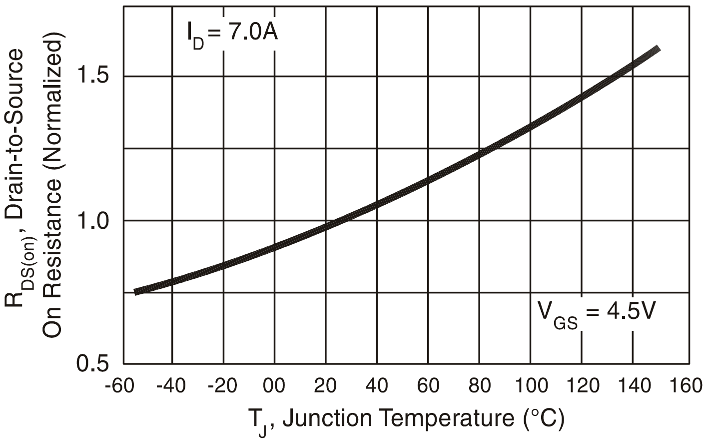


Fig. 1 Normalized On-Resistance vs. Temperature

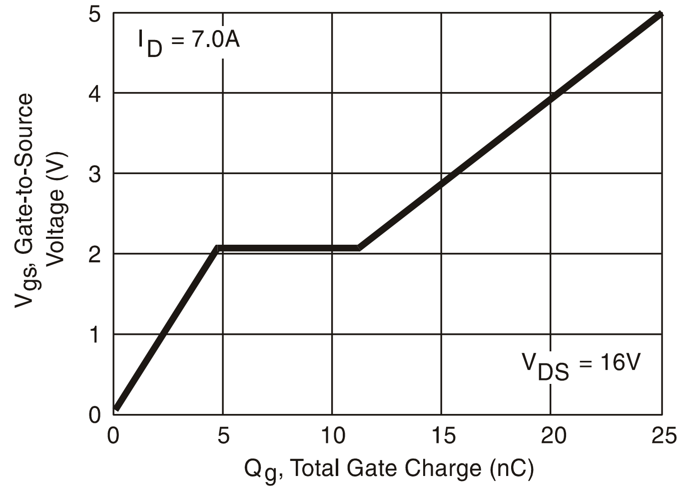


Fig. 2 Typical Gate Charge vs. Gate-to-Source Voltage

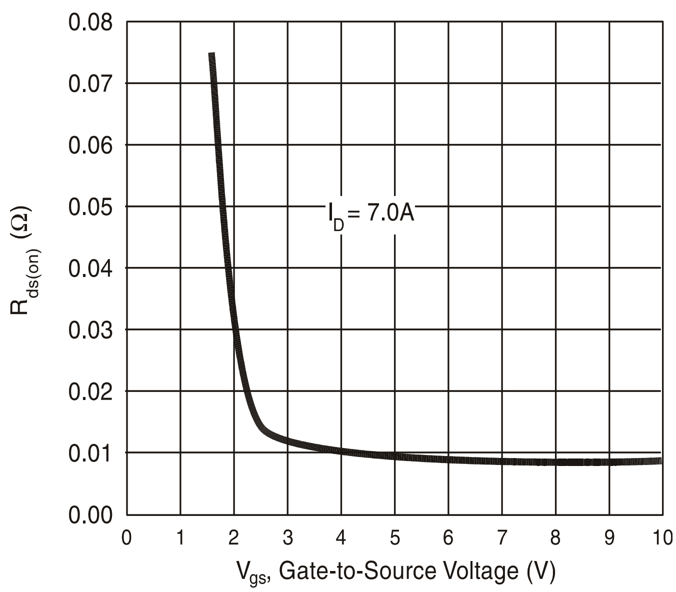


Fig. 3 Typical Rds(on) vs. Gate-to-Source Voltage

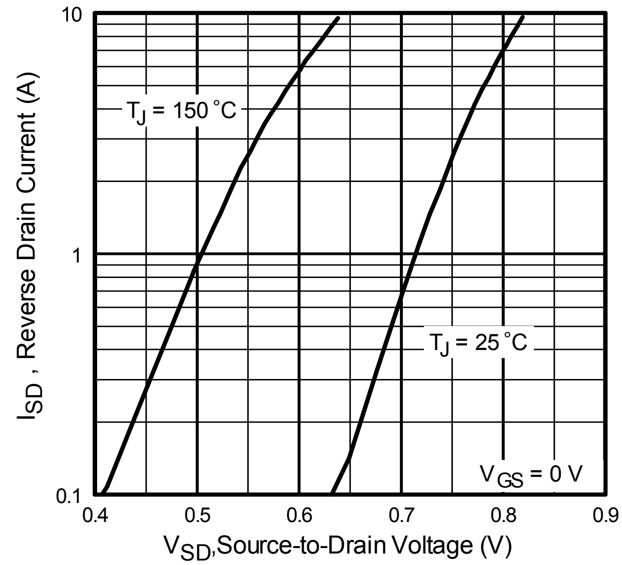


Fig. 4 Typical Source-Drain Diode Forward Voltage

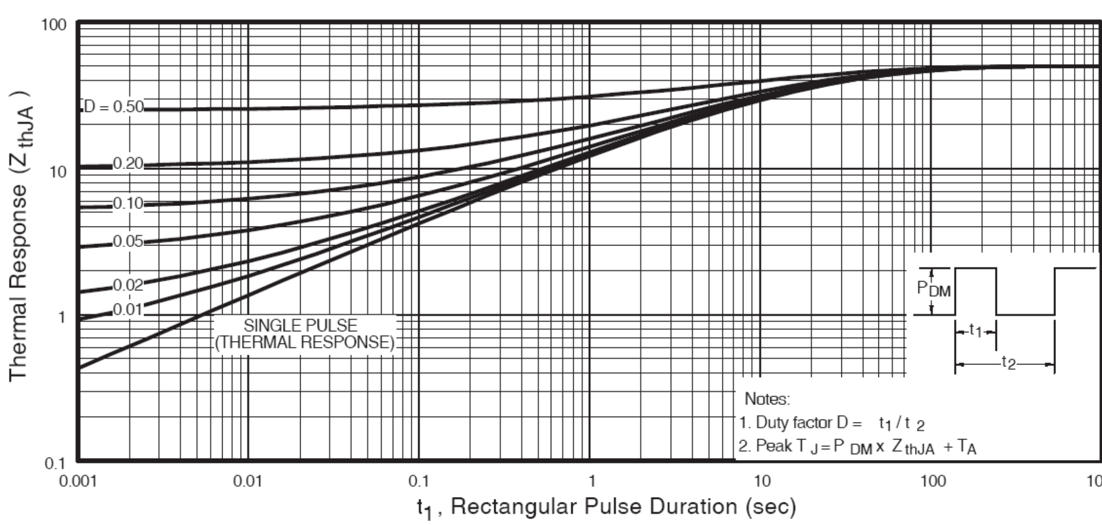
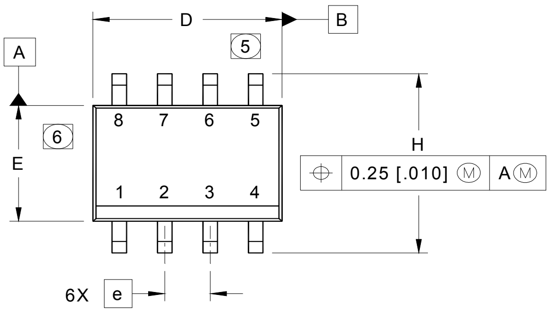
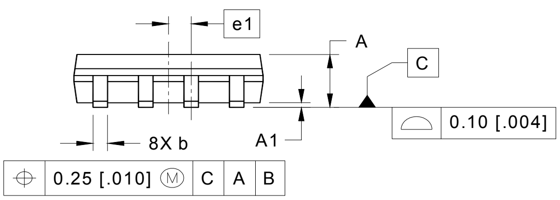


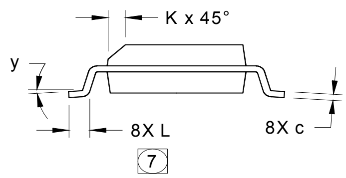
Fig 5. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

SO-8 Package Outline (Dimensions are shown in millimeters (inches))



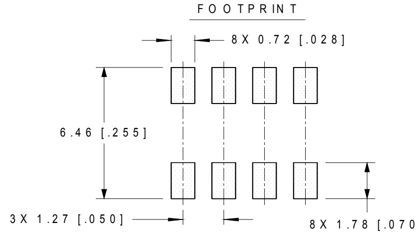
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e 1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40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





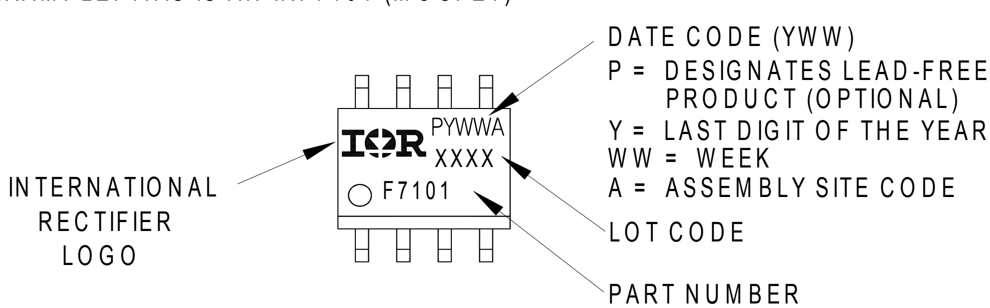
NOTES:
1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: MILLIMETER
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.
5. DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS. MOLD PROTRUSIONS NOT TO EXCEED 0.15 [.006].
6. DIMENSION DOES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

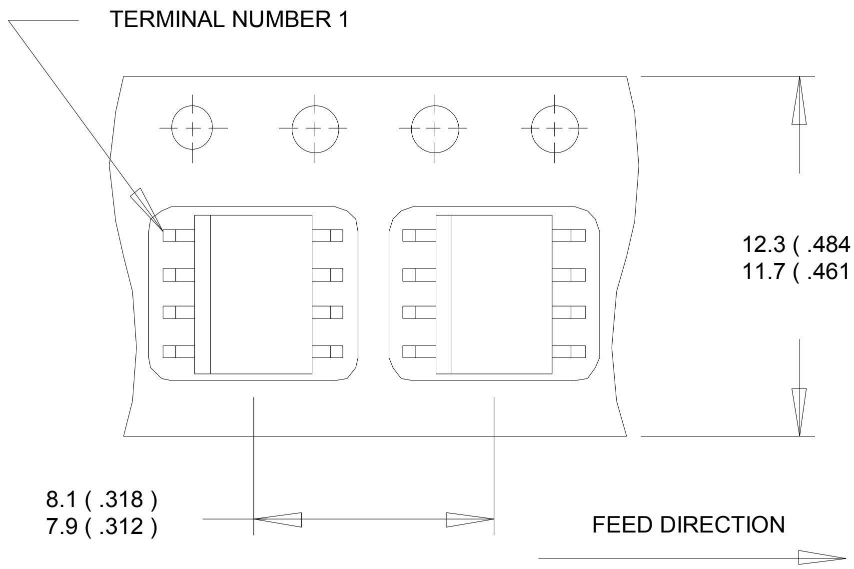


SO-8 Part Marking Information

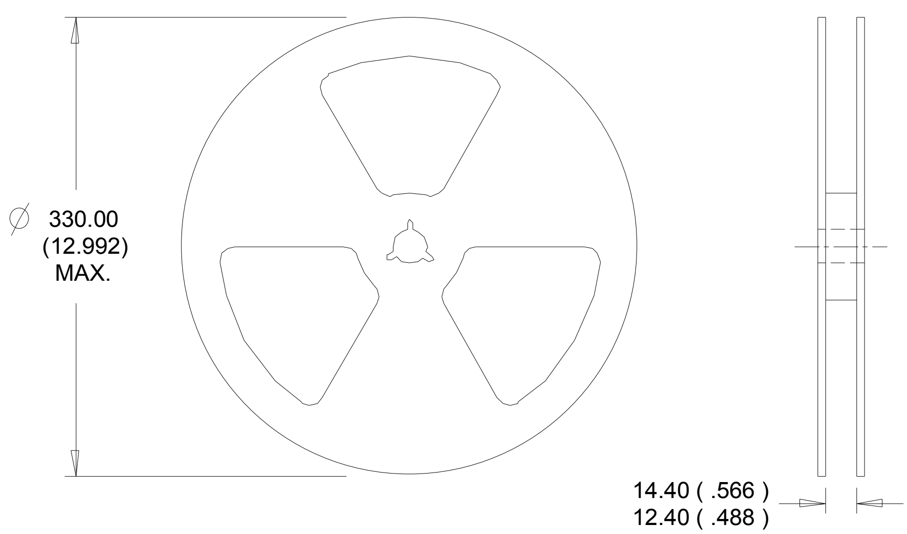
EXAMPLE: THIS IS AN IRF7101 (MOSFET)



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.

Qualification Information

Qualification Level	Consumer	
Moisture Sensitivity Level	SO-8	MSL1 (per JEDEC J-STD-020D)†
RoHS Compliant	Yes	

† Applicable version of JEDEC standard at the time of product release.

Revision History

Date	Comments
08/23/2016	• Changed datasheet with Infineon logo - all pages. • Corrected typo Qoss from typ/max "3.0nC/3.6nC" to "30nC/36nC" on page 2. • Added disclaimer on last page.

Edition 2016-04-19
Published by
Infineon Technologies AG
81726 Munich, Germany

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Document reference
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