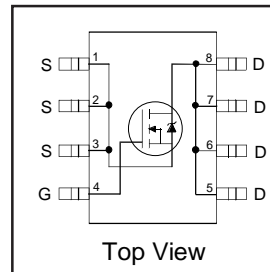


# IRF7805

HEXFET® Power MOSFET

- Low On-Resistance
- Low Gate Charge
- N-Channel MOSFET
- Ideal for mobile processor DC-DC converters
- Surface Mount
- 100% R<sub>G</sub> Tested

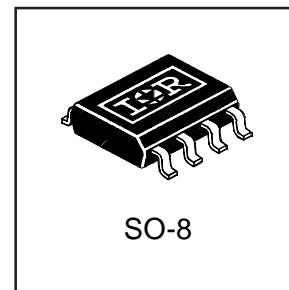


$V_{DSS} = 30V$
$R_{DS(on)} = 0.009\Omega$

## Description

This advanced technology HEXFET Power MOSFET achieves an unprecedented balance in on-resistance and gate charge. The reduced conduction and switching loss of these devices make them ideal for high efficiency DC-DC converters that power the latest generation of mobile microprocessors.

The SO-8 has been modified through a customized leadframe for enhanced thermal characteristics and multiple-die capability making it ideal in a variety of power applications. With these improvements, multiple devices can be used in an application with dramatically reduced board space. The package is designed for vapor phase, infra red, or wave soldering techniques. Power dissipation of greater than 0.8W is possible in a typical PCB mount application.



## Absolute Maximum Ratings

Symbol	Parameter	Max	Units
$V_{DS}$	Drain-Source Voltage	30	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	13	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	10	
$I_{DM}$	Pulsed Drain Current ①	100	
$P_D @ T_c = 25^\circ C$	Power Dissipation	2.5	W
$P_D @ T_c = 70^\circ C$	Power Dissipation	1.6	
	Linear Derating Factor	0.02	
$V_{GS}$	Gate-to-Source Voltage	$\pm 12$	V
$V_{GSM}$	Gate-to-Source Voltage Single Pluse $t_p < 10\mu s$	16	V
$dv/dt$	Peak Diode Recovery $dv/dt$ ②	5.0	V/ns
$T_J$	Operating Junction and	-55 to + 150	$^\circ C$
$T_{STG}$	Storage Temperature Range		

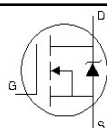
## Thermal Resistance

Symbol	Parameter	Typ	Max	Units
$R_{\theta JL}$	Junction-to-Drain Lead ③	—	20	$^\circ C/W$
$R_{\theta JA}$	Junction-to-Ambient ④ ⑤	—	50	

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

Symbol	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 $25^\circ\text{C}$ , $I_D = 1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.009	m $\Omega$	$V_{GS} = 10V, I_D = 13A$ ③
		—	—	0.012		$V_{GS} = 4.5V, I_D = 11A$ ③
$V_{GS(th)}$	Gate Threshold Voltage	1.0	—	3.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
$g_{fs}$	Forward Transconductance	38	—	—	S	$V_{DS} = 10V, I_D = 13A$
$I_{DSS}$	Drain-to-Source Leakage Current	—	—	50	$\mu A$	$V_{DS} = 30V, V_{GS} = 0V$
		—	—	1.0		$V_{DS} = 24V, V_{GS} = 0V$
		—	—	25		$V_{DS} = 24V, V_{GS} = 0V, T_J = 55^\circ\text{C}$
$I_{GSS}$	Gate-to-Source Forward Leakage	—	—	-100	nA	$V_{GS} = 12V$
	Gate-to-Source Reverse Leakage	—	—	100		$V_{GS} = -12V$
$Q_g$	Total Gate Charge	—	27	41	nC	$I_D = 13A$
$Q_{gs}$	Gate-to-Source Charge	—	5.4	8.0		$V_{DS} = 24V$
$Q_{gd}$	Gate-to-Drain ("Miller") Charge	—	8.6	13		$V_{GS} = 4.5V$ , See Fig. 9 ③
$R_G$	Gate Resistance	0.5	—	1.7	$\Omega$	
$t_{d(on)}$	Turn-On Delay Time	—	11	—	ns	$V_{DD} = 15V$
$t_r$	Rise Time	—	10	—		$I_D = 13A$
$t_{d(off)}$	Turn-Off Delay Time	—	83	—		$R_G = 6.2\ \Omega$
$t_f$	Fall Time	—	43	—		$R_G = 15\ \Omega$ ③
$C_{iss}$	Input Capacitance	—	2500	—	pF	$V_{GS} = 0V$
$C_{oss}$	Output Capacitance	—	870	—		$V_{DS} = 25V$
$C_{riss}$	Reverse Transfer Capacitance	—	73	—		$f = 1.0\text{MHz}$ , See Fig. 8

## Source-Drain Ratings and Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	2.5	A	MOSFET symbol showing the integral reverse p-n junction diode. 
$I_{SM}$	Pulsed Source Current (Body Diode) ①	—	—	100		
$V_{SD}$	Diode Forward Voltage	—	—	1.2	V	$T_J = 25^\circ\text{C}, I_S = 13A, V_{GS} = 0V$ ③
$t_{rr}$	Reverse Recovery Time	—	92	140	ns	$T_J = 25^\circ\text{C}, I_F = 13A$
$Q_{rr}$	Reverse Recovery Charge	—	150	230	nC	$di/dt = 100A/\mu s$ ③

### Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ②  $I_{SD} \leq 13A, di/dt \leq 110A/\mu s, V_{DD} \leq V_{(BR)DSS}, T_J \leq 150^\circ\text{C}$
- ③ Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$ .
- ④ When mounted on 1 inch square copper board,  $t < 10$  sec
- ⑤  $R_{\theta}$  is measured at  $T_J$  approximately at  $90^\circ\text{C}$

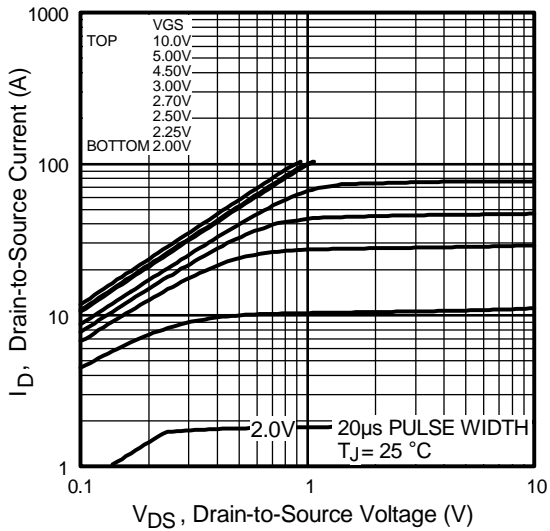


Fig 1. Typical Output Characteristics

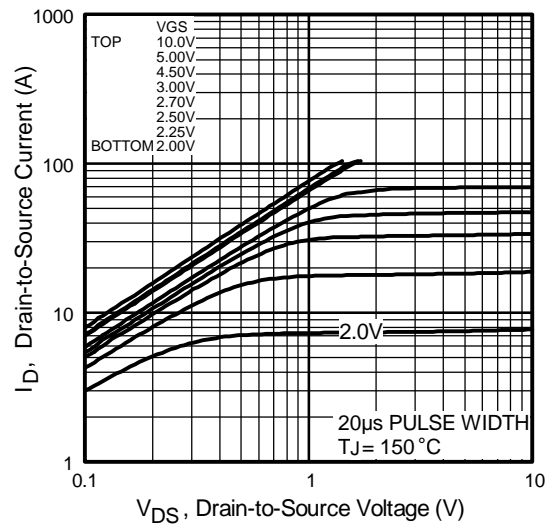


Fig 2. Typical Output Characteristics

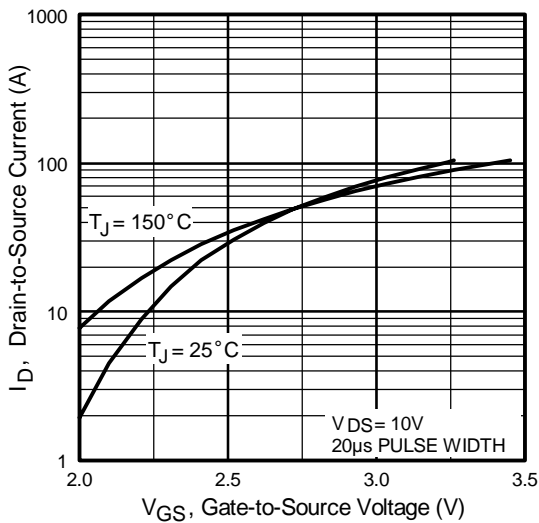


Fig 3. Typical Transfer Characteristics

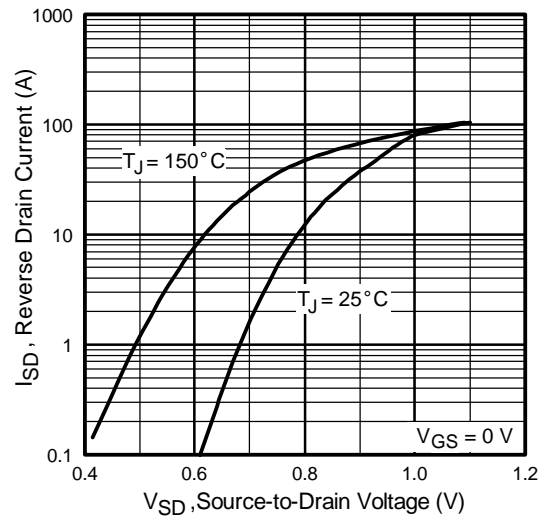
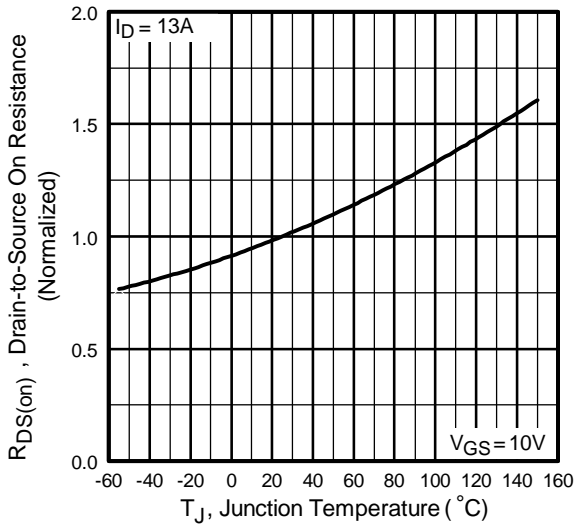
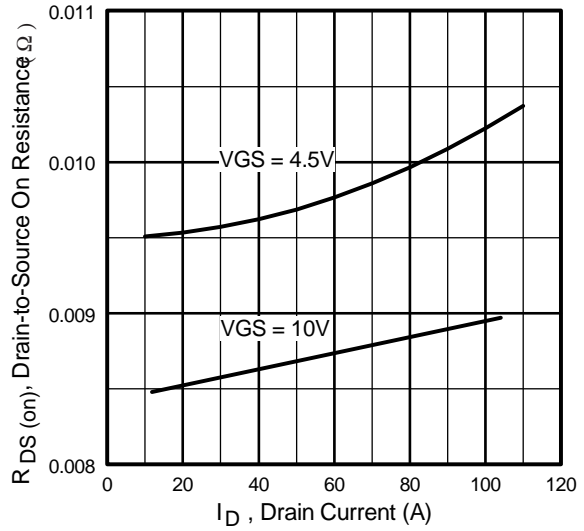


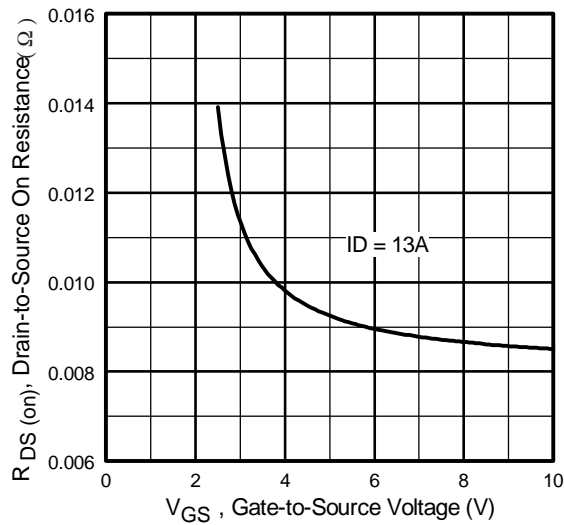
Fig 4. Typical Source-Drain Diode Forward Voltage



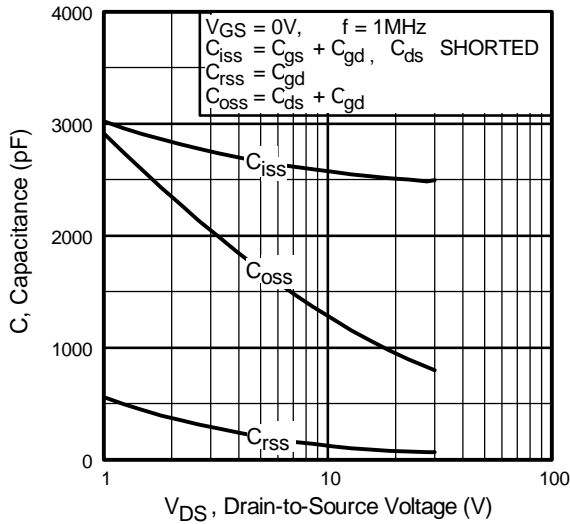
**Fig 5.** Normalized On-Resistance Vs. Temperature



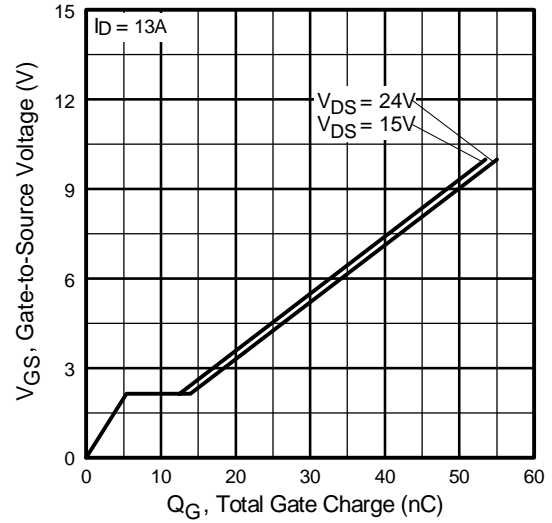
**Fig 6.** On-Resistance Vs. Drain Current



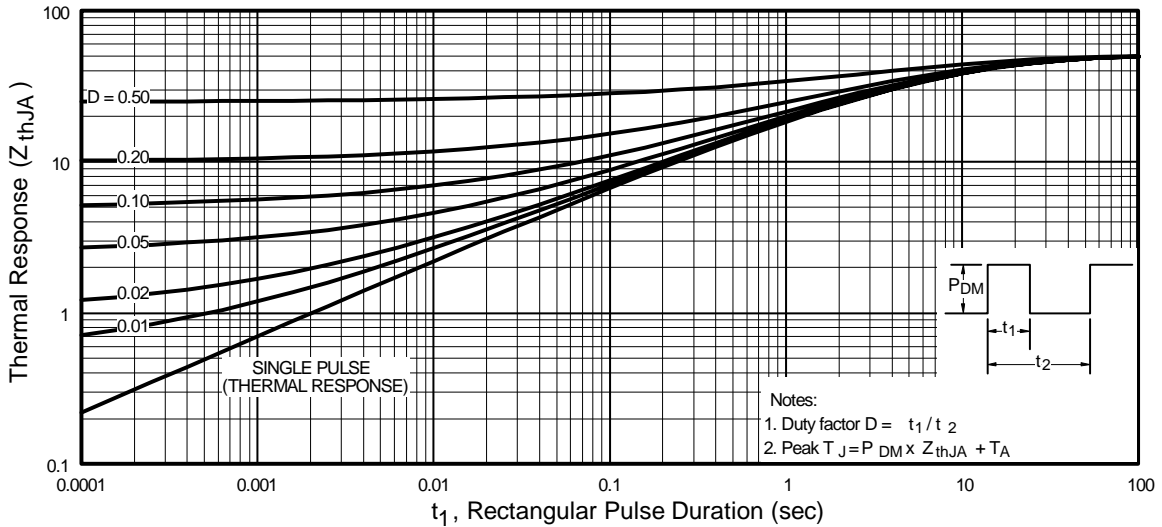
**Fig 7.** On-Resistance Vs. Gate Voltage



**Fig 8.** Typical Capacitance Vs. Drain-to-Source Voltage



**Fig 9.** Typical Gate Charge Vs. Gate-to-Source Voltage

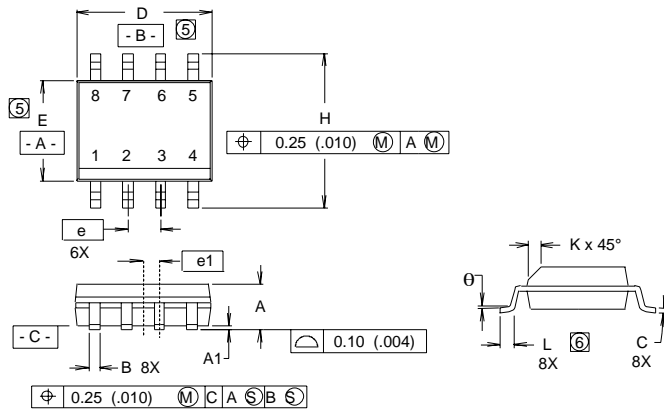


**Fig 10.** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

# IRF7805

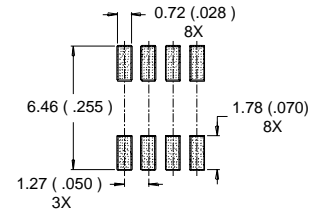
## Package Outline

### SO8 Outline



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
theta	0°	8°	0°	8°

#### RECOMMENDED FOOTPRINT



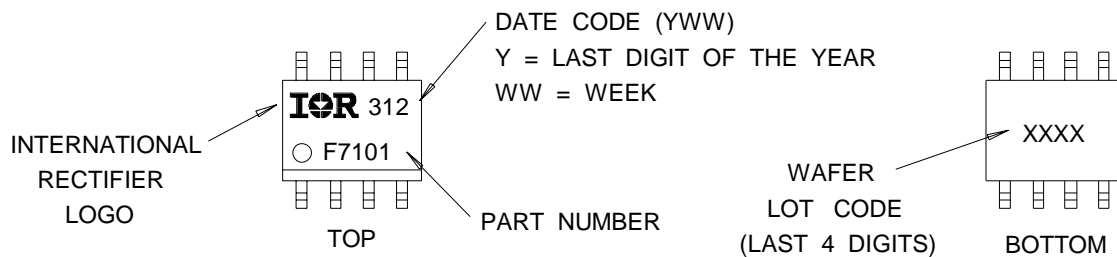
#### NOTES:

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..

## Part Marking Information

### SO8

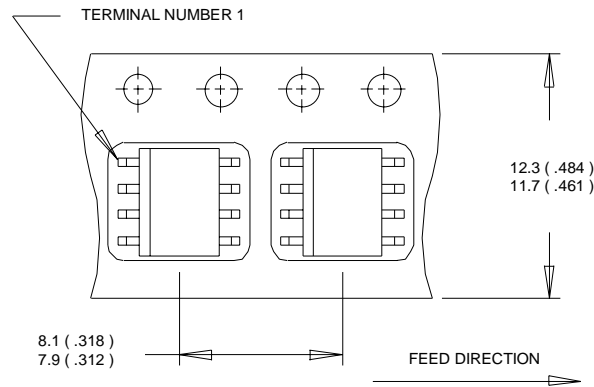
EXAMPLE : THIS IS AN IRF7101



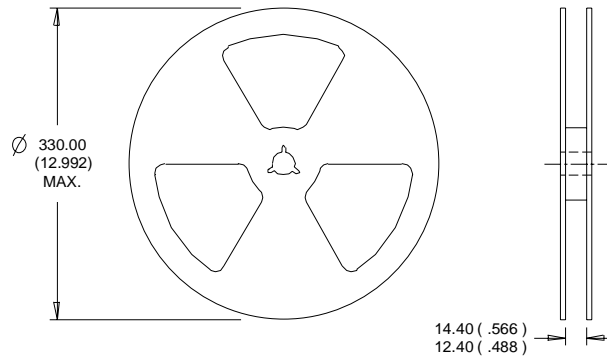
**Tape & Reel Information**

**S08**

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.