International
IOR Rectifier

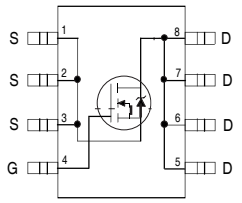
PD - 95024

IRF7822PbF

HEXFET® Power MOSFET for DC-DC Converters

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

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 it ideal for high efficiency DC-DC converters that power the latest generation of microprocessors.

The IRF7822 has been optimized for all parameters that are critical in synchronous buck converters including $R_{DS(on)}$, gate charge and Cdv/dt-induced turn-on immunity. The IRF7822 offers particulary low $R_{DS(on)}$ and high Cdv/dt immunity for synchronous FET applications.

The package is designed for vapor phase, infra-red, convection, or wave soldering techniques. Power dissipation of greater than 3W is possible in a typical PCB mount application.

DEVICE CHARACTERISTICS⑤

	IRF7822
$R_{DS(on)}$	5.0mΩ
Q_G	44nC
Q_{sw}	12nC
Q_{oss}	27nC

Absolute Maximum Ratings

Parameter		Symbol	IRF7822	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±12	
Continuous Drain or Source	T_A = 25°C	I_D	18	A
Current ($V_{GS} \geq 4.5V$)	T_A = 70°C		13	
Pulsed Drain Current①		I_{DM}	150	
Power Dissipation	T_A = 25°C	P_D	3.1	W
	T_A = 70°C		3.0	
Junction & Storage Temperature Range		T_J, T_{STG}	–55 to 150	°C
Continuous Source Current (Body Diode)		I_S	3.8	A
Pulsed Source Current①		I_{SM}	150	

Thermal Resistance

Parameter		Max.	Units
Maximum Junction-to-Ambient③	$R_{\theta JA}$	40	°C/W
Maximum Junction-to-Lead	$R_{\theta JL}$	20	°C/W

9/30/04

Electrical Characteristics

Parameter		Min	Typ	Max	Units	Conditions
Drain-to-Source Breakdown Voltage	BV_{DSS}	30	–	–	V	V_{GS} = 0V, I_D = 250µA
Static Drain-Source on Resistance	$R_{DS(on)}$		5.0	6.5	mΩ	V_{GS} = 4.5V, I_D = 15A②
Gate Threshold Voltage	$V_{GS(th)}$	1.0			V	V_{DS} = V_{GS}, I_D = 250µA
Drain-Source Leakage Current	I_{DSS}			30	µA	V_{DS} = 24V, V_{GS} = 0
				150		V_{DS} = 24V, V_{GS} = 0, Tj = 100°C
Gate-Source Leakage Current	I_{GSS}			±100	nA	V_{GS} = ±12V
Total Gate Chg Cont FET	Q_G		44	60	nC	V_{GS}=5.0V, I_D=15A, V_{DS}=16V
Total Gate Chg Sync FET	Q_G		38			V_{GS} = 5.0V, V_{DS}< 100mV
Pre-Vth Gate-Source Charge	Q_{GS1}		13			V_{DS} = 16V, I_D = 15A
Post-Vth Gate-Source Charge	Q_{GS2}		3.0			
Gate to Drain Charge	Q_{GD}		9.0			
Switch Chg(Q_{gs2} + Q_{gd})	Q_{sw}		12			
Output Charge	Q_{oss}		27			V_{DS} = 16V, V_{GS} = 0
Gate Resistance	R_G		1.5		Ω	
Turn-on Delay Time	$t_{d\ (on)}$		15		ns	V_{DD} = 16V, I_D = 15A
Rise Time	t_r		5.5			V_{GS} = 5.0V
Turn-off Delay Time	$t_{d\ (off)}$		22			Clamped Inductive Load
Fall Time	t_f		12			
Input Capacitance	C_{iss}	–	5500	–	pF	V_{DS} = 16V, V_{GS} = 0
Output Capacitance	C_{oss}	–	1000	–		
Reverse Transfer Capacitance	C_{rss}	–	300	–		

Source-Drain Rating & Characteristics

Parameter		Min	Typ	Max	Units	Conditions
Diode Forward Voltage*	V_{SD}			1.0	V	I_S = 15A②, V_{GS} = 0V
Reverse Recovery Charge④	Q_{rr}		120		nC	di/dt ~ 700A/µs V_{DS} = 16V, V_{GS} = 0V, I_S = 15A
Reverse Recovery Charge (with Parallel Schottky)④	$Q_{rr(s)}$		108		nC	di/dt = 700A/µs (with 10BQ040) V_{DS} = 16V, V_{GS} = 0V, I_S = 15A

Notes:
① Repetitive rating; pulse width limited by max. junction temperature.
② Pulse width ≤ 400 µs; duty cycle ≤ 2%.
③ When mounted on 1 inch square copper board
④ Typ = measured - Q_{oss}
⑤ Typical values of R_{DS}(on) measured at V_{GS} = 4.5V, Q_G, Q_{SW} and Q_{OSS} measured at V_{GS} = 5.0V, I_F = 15A.

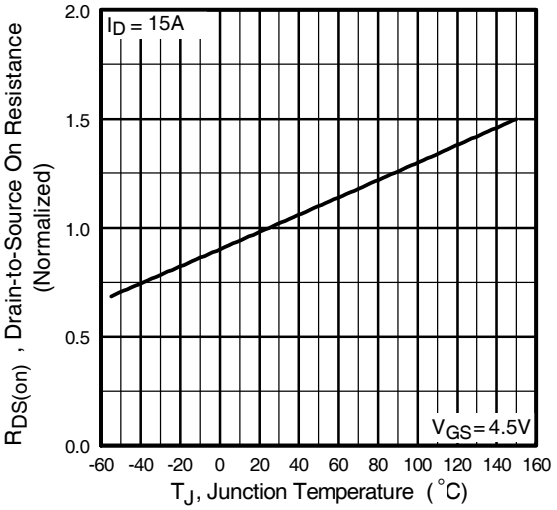


Fig 1. Normalized On-Resistance Vs. Temperature

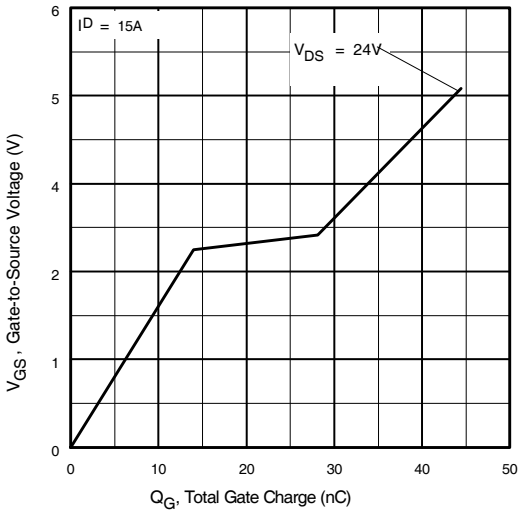


Fig 2. Typical Gate Charge Vs. Gate-to-Source Voltage

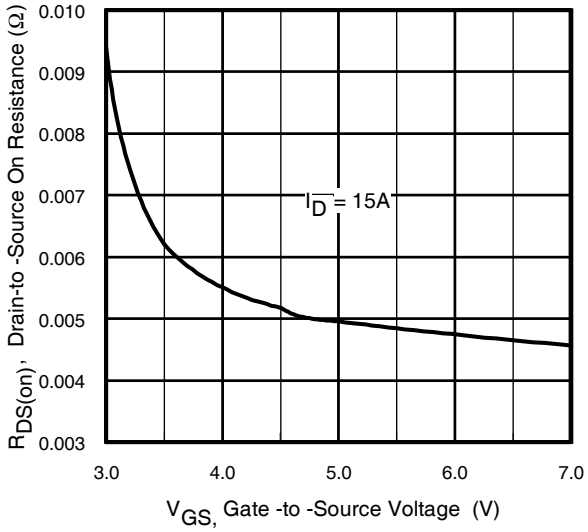


Fig 3. On-Resistance Vs. Gate Voltage

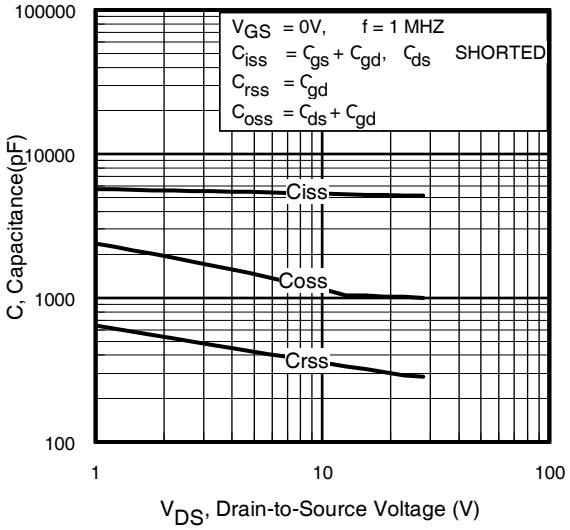


Fig 4. Typical Capacitance Vs. Drain-to-Source Voltage

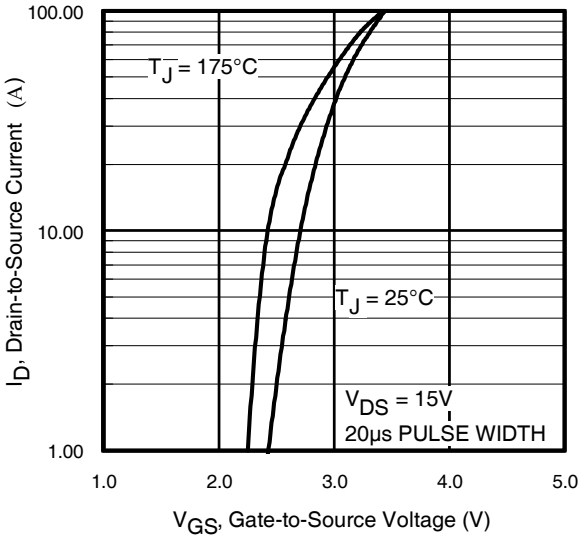


Fig 5. Typical Transfer Characteristics

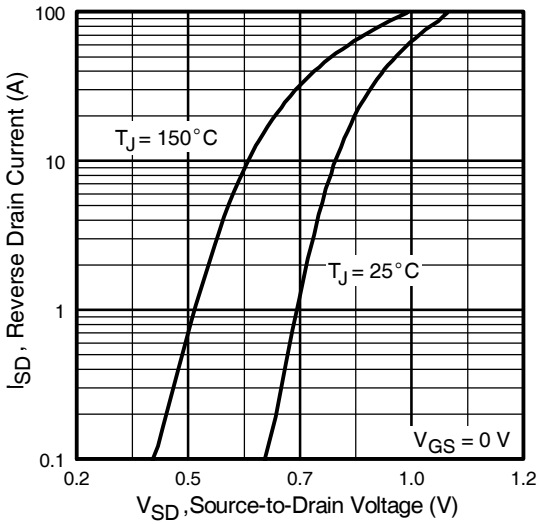


Fig 6. Typical Source-Drain Diode Forward Voltage

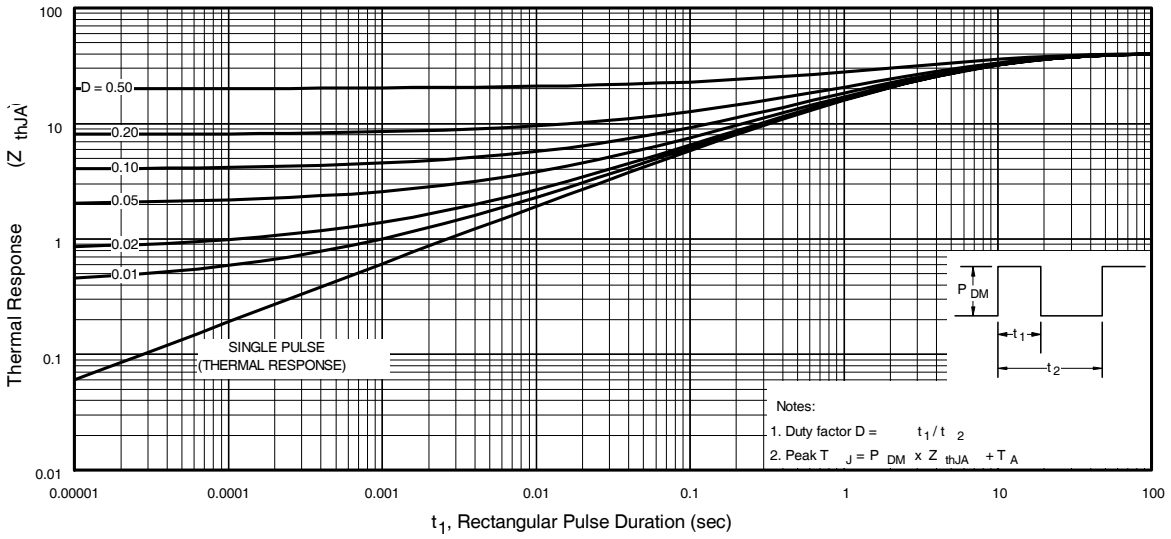
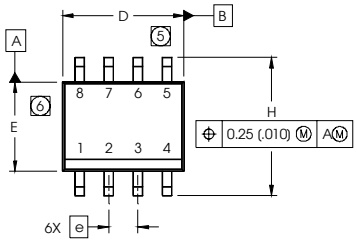
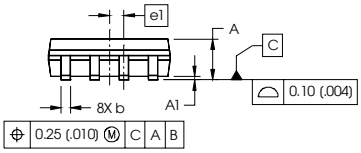


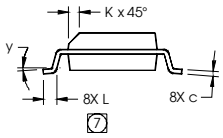
Figure 7. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

SO-8 Package Outline

Dimensions are shown in milimeters (inches)



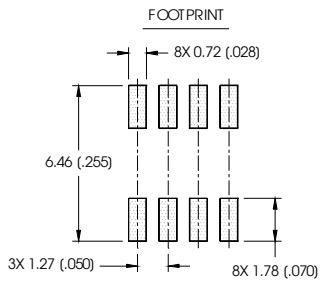




DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.0532	.0688	1.35	1.75
A1	.0040	.0098	0.10	0.25
b	.013	.020	0.33	0.51
c	.0075	.0098	0.19	0.25
D	.189	.1968	4.80	5.00
E	.1497	.1574	3.80	4.00
e	.050 BASIC		1.27 BASIC	
e1	.025 BASIC		0.635 BASIC	
H	.2284	.2440	5.80	6.20
K	.0099	.0196	0.25	0.50
L	.016	.050	0.40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

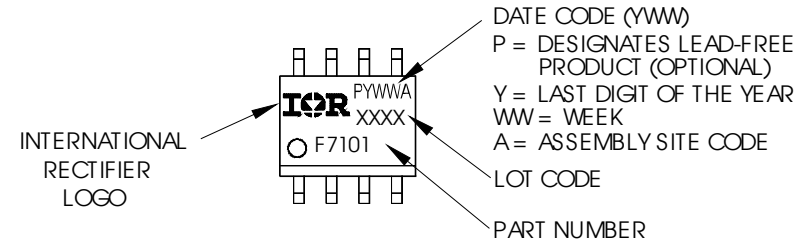
NOTES:

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 (.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.



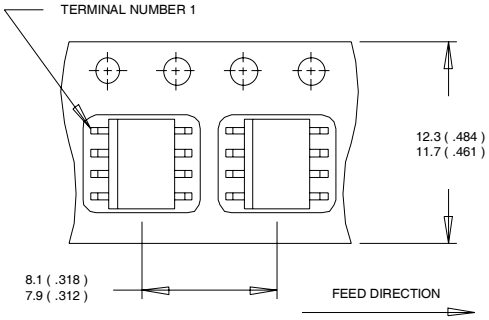
SO-8 Part Marking Information (Lead-Free)

EXAMPLE: THIS IS AN IRF7101 (MOSFET)

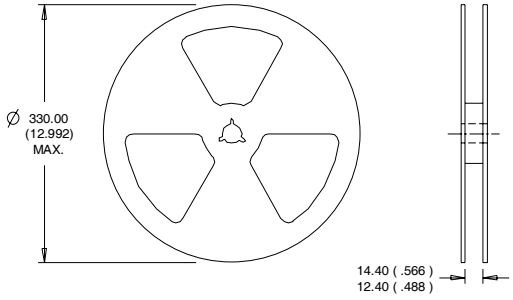


SO-8 Tape and Reel

Dimensions are shown in milimeters (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.

Data and specifications subject to change without notice.
This product has been designed and qualified for the Consumer market.
Qualification Standards can be found on IR's Web site.

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