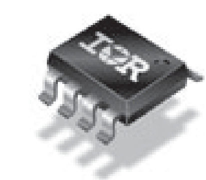
International
IOR Rectifier

PD - 94602

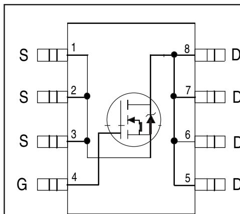
IRF7828

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



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 IRF7828 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 IRF7828 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

	IRF7828
$R_{DS(on)}$	9.5mΩ
Q_G	9.2nC
Q_{sw}	3.7nC
Q_{oss}	6.1nC

Absolute Maximum Ratings

Parameter		Symbol	IRF7828	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain or Source	T_A = 25°C	I_D	13.6	A
Current (V_{GS} ≥ 4.5V)	T_L = 70°C		11	
Pulsed Drain Current①		I_{DM}	100	
Power Dissipation	T_A = 25°C	P_D	2.5	W
	T_L = 70°C		1.6	
Junction & Storage Temperature Range		T_J, T_{STG}	–55 to 150	°C
Continuous Source Current (Body Diode)		I_S	3.1	A
Pulsed Source Current①		I_{SM}	100	

Thermal Resistance

Parameter		Max.	Units
Maximum Junction-to-Ambient③	$R_{\theta JA}$	50	°C/W
Maximum Junction-to-Lead	$R_{\theta JL}$	20	°C/W

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	$R_{DS(on)}$	–	9.5	12.5	mΩ	V_{GS} = 4.5V, I_D = 10A ②
Gate Threshold Voltage	$V_{GS(th)}$	1.0	–	–	V	V_{DS} = V_{GS}, I_D = 250µA
Drain-Source Leakage Current	I_{DSS}	–	–	1.0	µA	V_{DS} = 24V, V_{GS} = 0
		–	–	150		V_{DS} = 24V, V_{GS} = 0, Tj = 125°C
Gate-Source Leakage Current	I_{GSS}	–	–	±100	nA	V_{GS} = ±20V
Total Gate Chg Cont FET	Q_G	–	9.2	14	nC	V_{GS}= 5.0V, I_D=15A, V_{DS}=16V
Total Gate Chg Sync FET	Q_G	–	7.3	–		V_{GS} = 5V, V_{DS}< 100mV
Pre-Vth Gate-Source Charge	Q_{GS1}	–	2.5	–		V_{DS} = 15V, I_D = 10A
Post-Vth Gate-Source Charge	Q_{GS2}	–	0.8	–		
Gate to Drain Charge	Q_{GD}	–	2.9	–		
Switch Chg(Q_{gs2} + Q_{gd})	Q_{sw}	–	3.7	–		
Output Charge	Q_{oss}	–	6.1	–		V_{DS} = 10V, V_{GS} = 0
Gate Resistance	R_G	–	2.3	–	Ω	
Turn-on Delay Time	$t_{d (on)}$	–	6.3	–	ns	V_{DD} = 15V, I_D = 10A
Rise Time	t_r	–	2.7	–		V_{GS} = 4.5V
Turn-off Delay Time	$t_{d (off)}$	–	9.7	–		Clamped Inductive Load
Fall Time	t_f	–	7.3	–		
Input Capacitance	C_{iss}	–	1010	–	pF	V_{DS} = 15V, V_{GS} = 0
Output Capacitance	C_{oss}	–	360	–		
Reverse Transfer Capacitance	C_{rss}	–	110	–		

Source-Drain Rating & Characteristics

Parameter		Min	Typ	Max	Units	Conditions
Diode Forward Voltage*	V_{SD}	–	–	1.0	V	I_S = 10A ②, V_{GS} = 0V
Reverse Recovery Charge ④	Q_{rr}	–	13	–	nC	di/dt ~ 700A/µs V_{DS} = 16V, V_{GS} = 0V, I_S = 15A
Reverse Recovery Charge (with Parallel Schottky) ④	$Q_{rr(s)}$	–	13	–	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 = 10A.

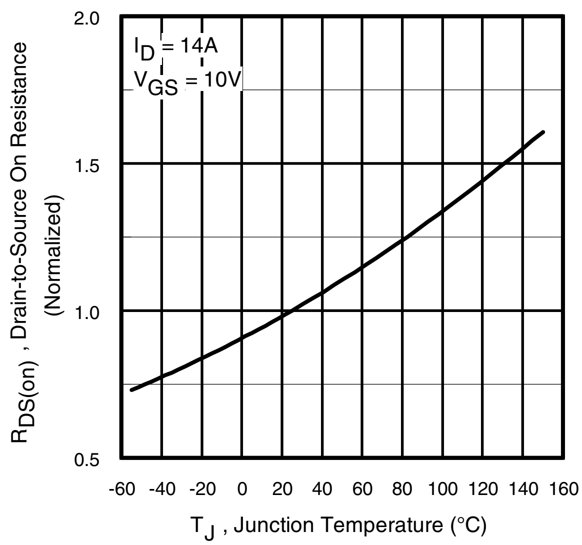


Fig 1. Normalized On-Resistance Vs. Temperature

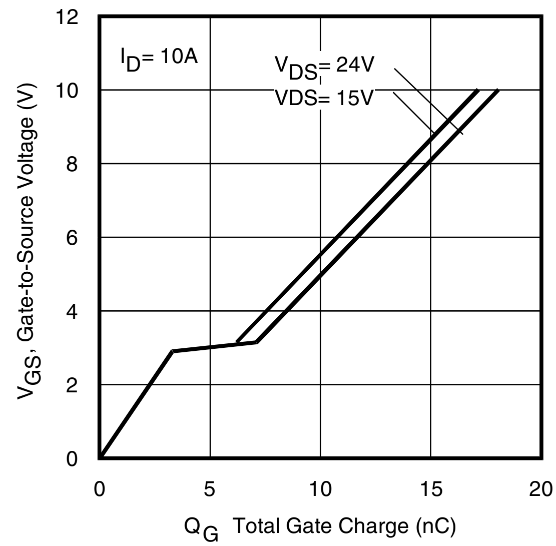


Fig 2. Typical Gate Charge Vs. Gate-to-Source Voltage

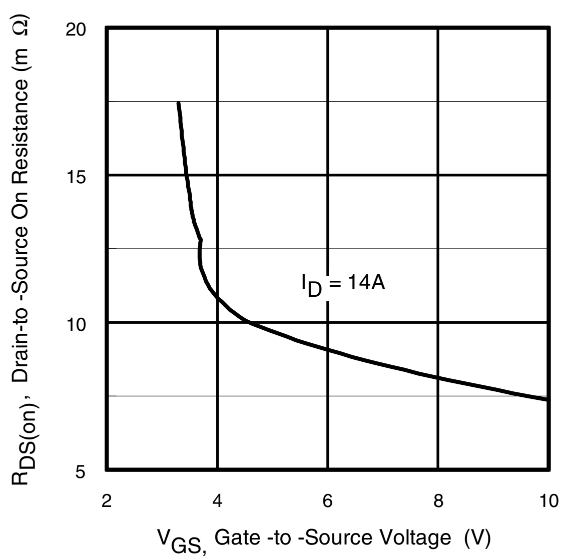


Fig 3. On-Resistance Vs. Gate Voltage

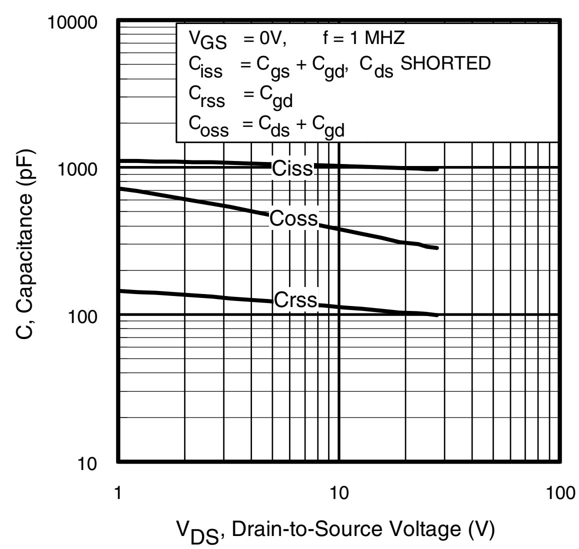


Fig 4. Typical Capacitance Vs. Drain-to-Source Voltage

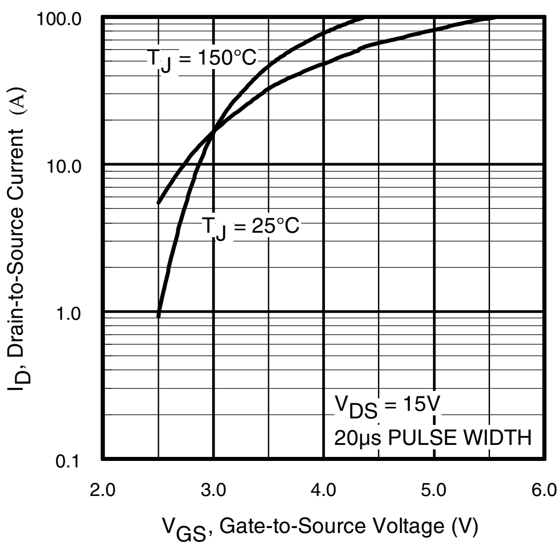


Fig 5. Typical Transfer Characteristics

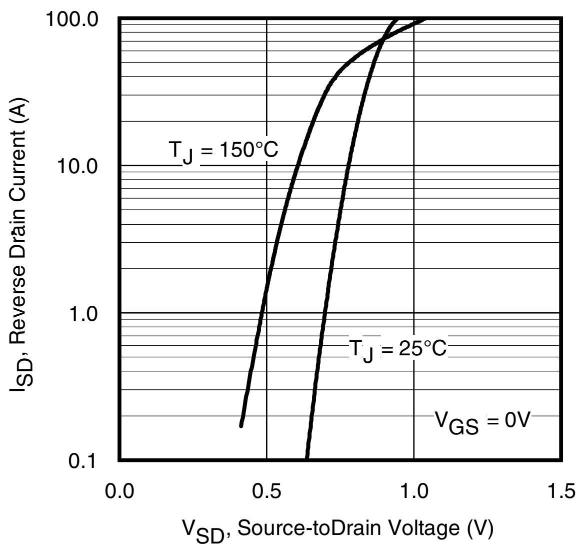


Fig 6. Typical Source-Drain Diode Forward Voltage

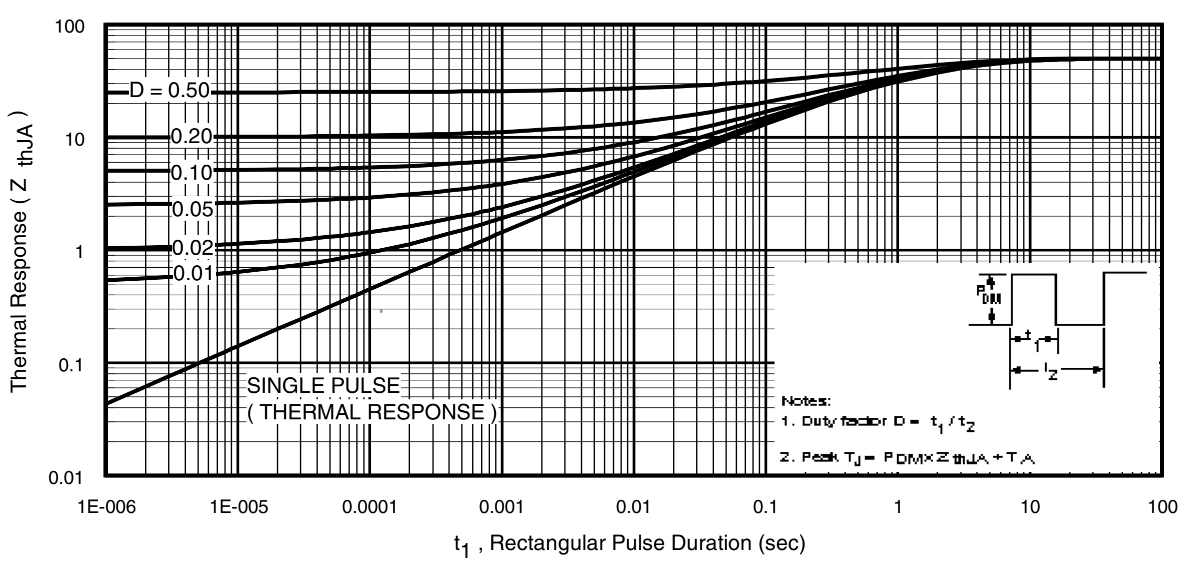
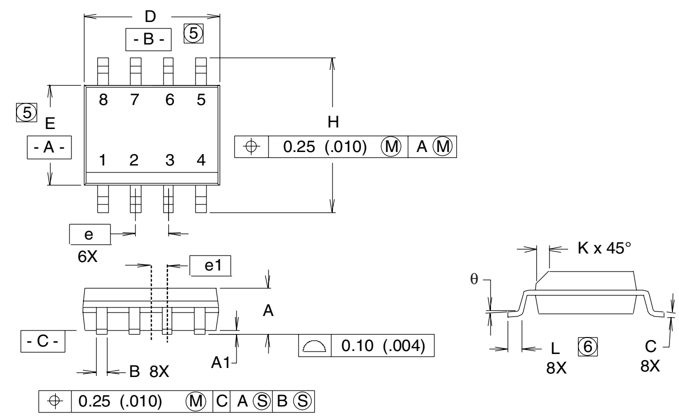


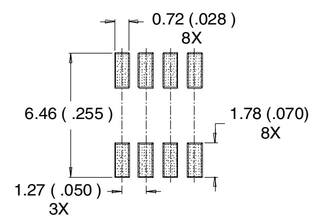
Fig 7. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

SO-8 Package Details



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
θ	0°	8°	0°	8°

RECOMMENDED FOOTPRINT



NOTES:

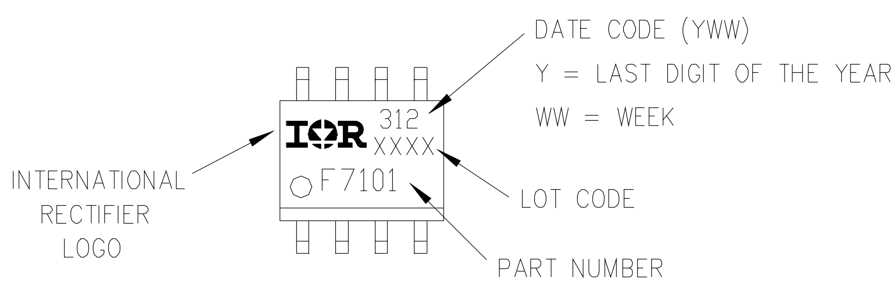
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1982.
2. CONTROLLING DIMENSION : INCH.
3. DIMENSIONS ARE SHOWN IN MILLIMETERS (INCHES).
4. OUTLINE CONFORMS TO JEDEC OUTLINE MS-012AA.

5 DIMENSION DOES NOT INCLUDE MOLD PROTRUSIONS MOLD PROTRUSIONS NOT TO EXCEED 0.25 (.006).

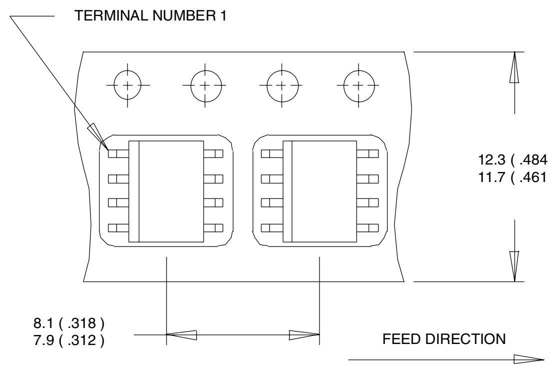
6 DIMENSIONS IS THE LENGTH OF LEAD FOR SOLDERING TO A SUBSTRATE..

SO-8 Part Marking

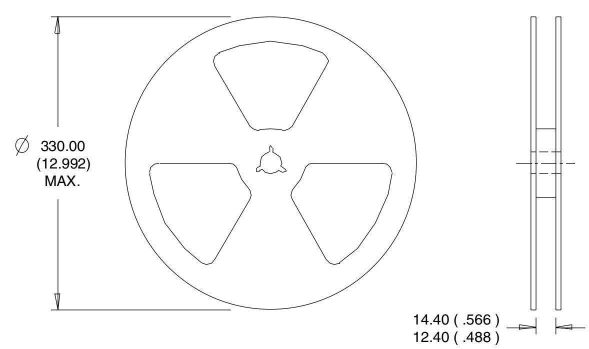
EXAMPLE: THIS IS AN IRF7101



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.
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 Industrial market.
Qualification Standards can be found on IR's Web site.

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