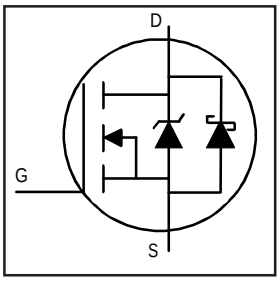
International
IOR Rectifier

PD-9.1558A

IRL3103D1S

FETKY™ MOSFET & SCHOTTKY RECTIFIER

- Co-packaged HEXFET® Power MOSFET and Schottky Diode
- Generation 5 Technology
- Logic Level Gate Drive
- Minimize Circuit Inductance
- Ideal For Synchronous Regulator Application



V_{DSS} = 30V

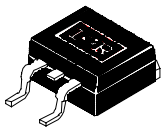
$R_{DS(on)}$ = 0.014Ω

I_D = 64A

Description

The FETKY family of co-packaged HEXFET power MOSFETs and Schottky Diodes offer the designer an innovative board space saving solution for switching regulator applications. A low on resistance Gen 5 MOSFET with a low forward voltage drop Schottky diode and minimized component interconnect inductance and resistance result in maximized converter efficiencies.

The D^2Pak is a surface mount power package capable of accommodating die sizes up to HEX-4. It provides the highest power capability and the lowest possible on-resistance in any existing surface mount package. The D^2Pak is suitable for high current applications because of its low internal connection resistance and can dissipate up to 2.0W in a typical surface mount application.



D^2Pak

Absolute Maximum Ratings

	Parameter	Max.	Units
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V③	64	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V③	45	
I_{DM}	Pulsed Drain Current ①③	220	
P_D @T_A = 25°C	Power Dissipation	3.1	W
P_D @T_C = 25°C	Power Dissipation	89	W
	Linear Derating Factor	0.56	W/°C
V_{GS}	Gate-to-Source Voltage	± 16	V
T_J	Operating Junction and	-55 to + 150	℃
T_{STG}	Storage Temperature Range		
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	

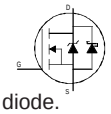
Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	——	1.4	°C/W
$R_{\theta JA}$	Junction-to-Ambient (PCB Mounted,steady-state)**	——	40	

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

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	30	—	—	V	V_{GS} = 0V, I_D = 250µA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.037	—	V/°C	Reference to 25°C, I_D = 1mA③
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.014	Ω	V_{GS} = 10V, I_D = 34A ②
		—	—	0.019		V_{GS} = 4.5V, I_D = 28A ②
$V_{GS(th)}$	Gate Threshold Voltage	1.0	—	—	V	V_{DS} = V_{GS}, I_D = 250µA
g_{fs}	Forward Transconductance	23	—	—	S	V_{DS} = 25V, I_D = 34A③
I_{DSS}	Drain-to-Source Leakage Current	—	—	0.10	mA	V_{DS} = 30V, V_{GS} = 0V
		—	—	22		V_{DS} = 24V, V_{GS} = 0V, T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	V_{GS} = 16V
	Gate-to-Source Reverse Leakage	—	—	-100		V_{GS} = -16V
Q_g	Total Gate Charge	—	—	43	nC	I_D = 32A
Q_{gs}	Gate-to-Source Charge	—	—	14		V_{DS} = 24V
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	—	23		V_{GS} = 4.5V, See Fig. 6 ②
$t_{d(on)}$	Turn-On Delay Time	—	9.0	—	ns	V_{DD} = 15V
t_r	Rise Time	—	210	—		I_D = 32A
$t_{d(off)}$	Turn-Off Delay Time	—	20	—		R_G = 3.4Ω, V_{GS} =4.5V
t_f	Fall Time	—	54	—		R_D = 0.43 Ω, ②③
L_S	Internal Source Inductance	—	7.5	—	nH	Between lead, and center of die contact
C_{iss}	Input Capacitance	—	1900	—		V_{GS} = 0V
C_{oss}	Output Capacitance	—	810	—		V_{DS} = 25V
C_{rss}	Reverse Transfer Capacitance	—	240	—		f = 1.0MHz, See Fig. 5
C_{iss}	Input Capacitance	—	3500	—		V_{GS} = 0V, V_{DS} = 0V

Body Diode & Schottky Diode Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_F (AV)	(Schottky)	—	—	2.0	A	MOSFET symbol showing the integral reverse p-n junction and Schottky diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	220		
V_{SD1}	Diode Forward Voltage	—	—	1.3	V	T_J = 25°C, I_S = 32A, V_{GS} = 0V ②
V_{SD2}	Diode Forward Voltage	—	—	0.50	V	T_J = 25°C, I_S = 1.0A, V_{GS} = 0V ②
t_{rr}	Reverse Recovery Time	—	51	77	ns	T_J = 25°C, I_F = 32A
Q_{rr}	Reverse Recovery Charge	—	49	73	nC	di/dt = 100A/µs ②
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L_S+L_D)				

Notes:

① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 10)

② Pulse width ≤ 300µs; duty cycle ≤ 2%.

③Uses IRL3103D1 data and test conditions

** When mounted on 1" square PCB (FR-4 or G-10 Material). For recommended footprint and soldering techniques refer to application note #AN-994.

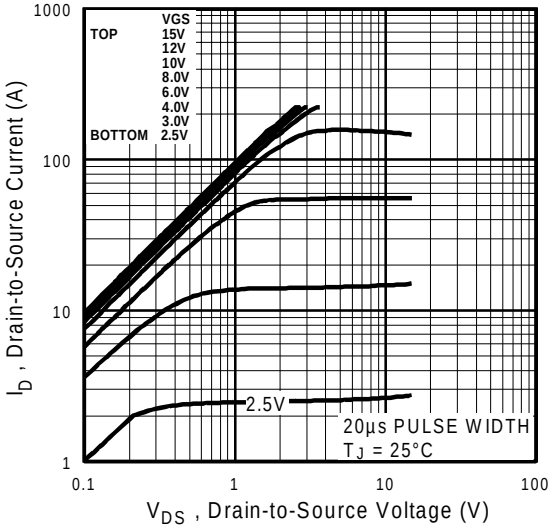


Fig 1. Typical Output Characteristics

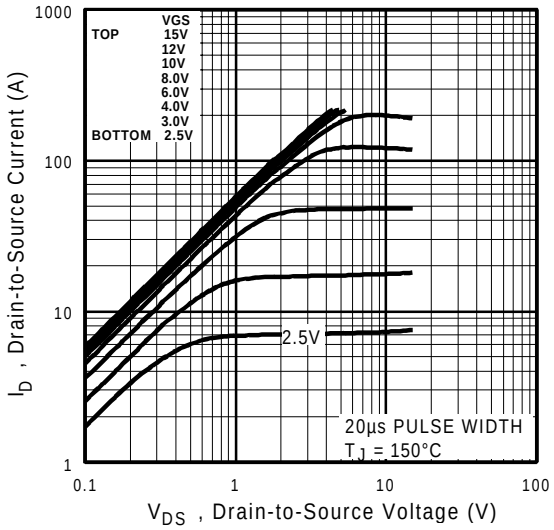


Fig 2. Typical Output Characteristics

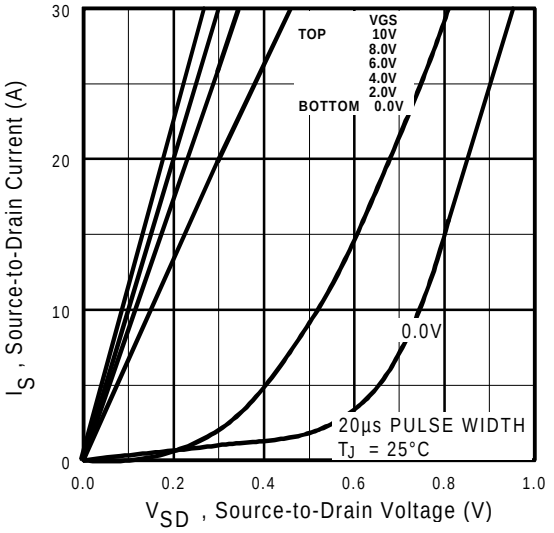


Fig 3. Typical Reverse Output Characteristics

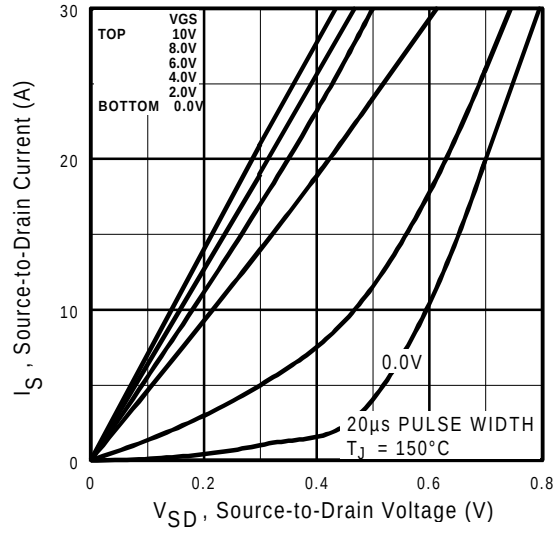


Fig 4. Typical Reverse Output Characteristics

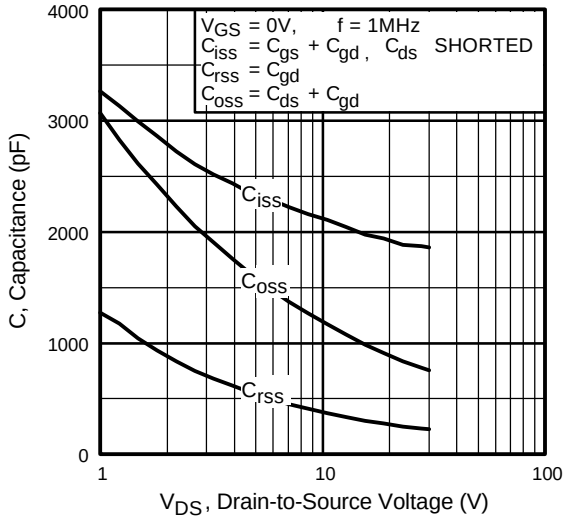


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

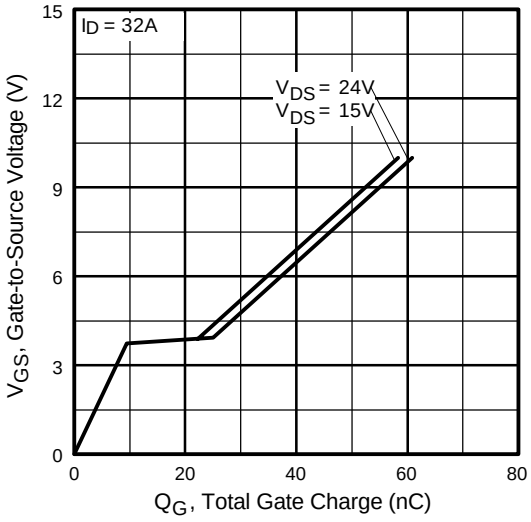


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

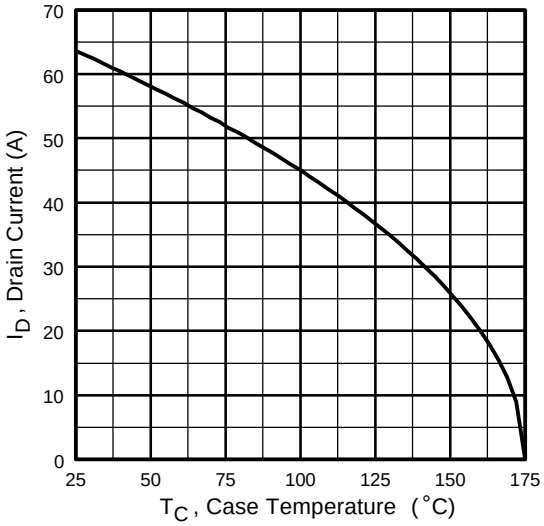


Fig 7. Maximum Drain Current Vs. Case Temperature

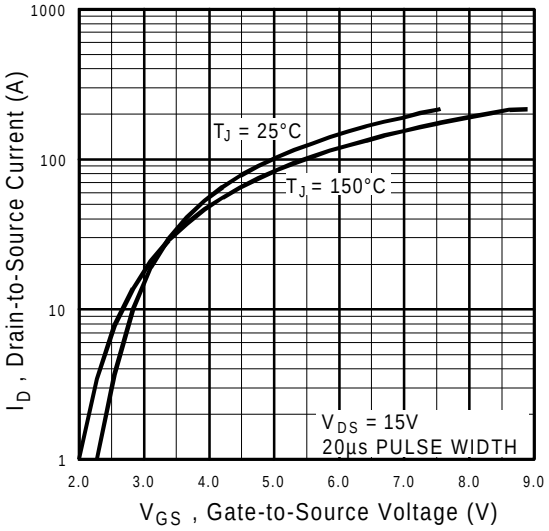


Fig 8. Typical Transfer Characteristics

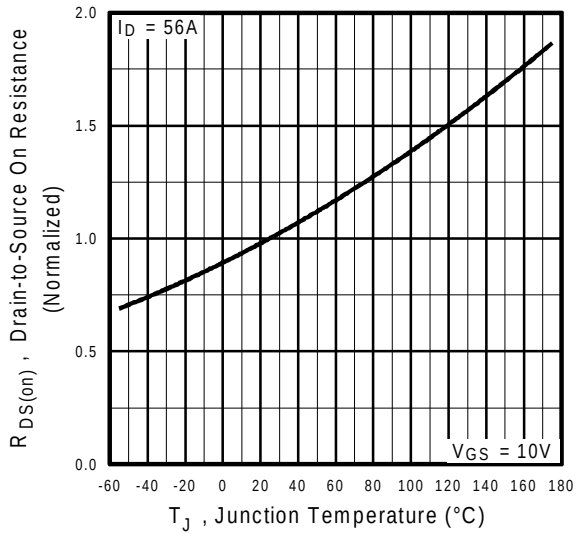


Fig 9. Normalized On-Resistance Vs. Temperature

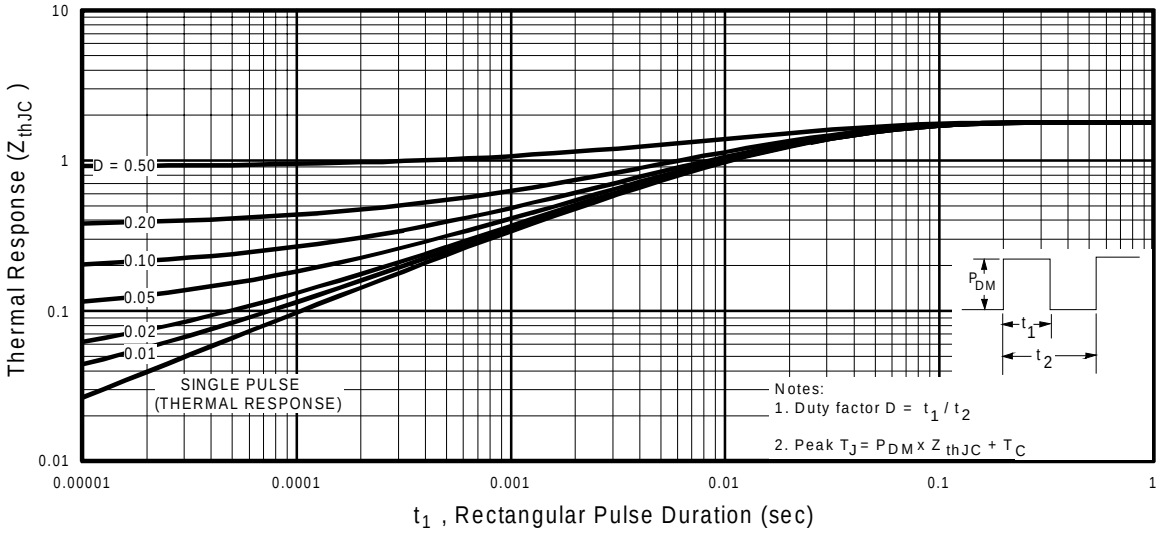
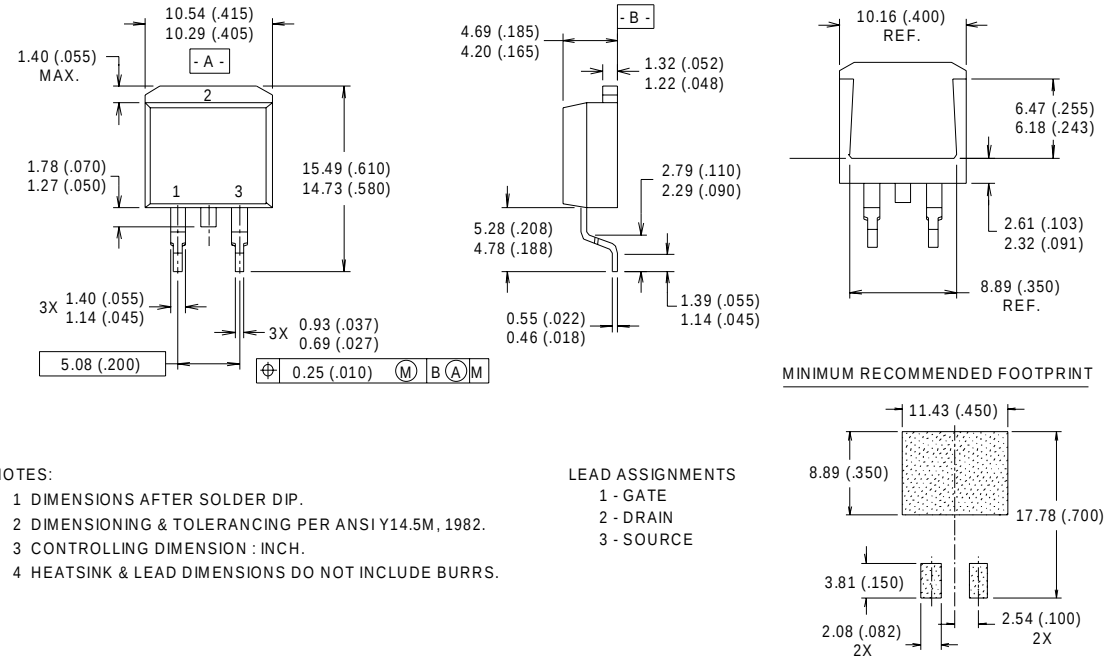


Fig 10. Maximum Effective Transient Thermal Impedance, Junction-to-Case

D²Pak Package Outline

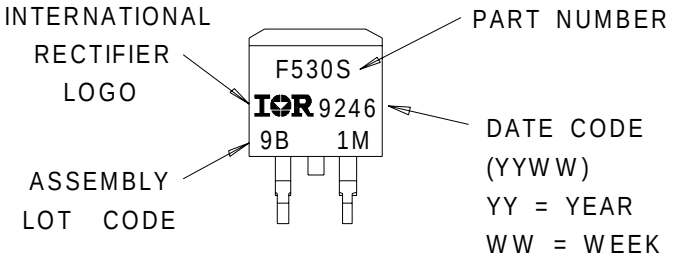


NOTES:
1 DIMENSIONS AFTER SOLDER DIP.
2 DIMENSIONING & TOLERANCING PER ANSI Y14.5M, 1982.
3 CONTROLLING DIMENSION : INCH.
4 HEATSINK & LEAD DIMENSIONS DO NOT INCLUDE BURRS.

LEAD ASSIGNMENTS
1 - GATE
2 - DRAIN
3 - SOURCE

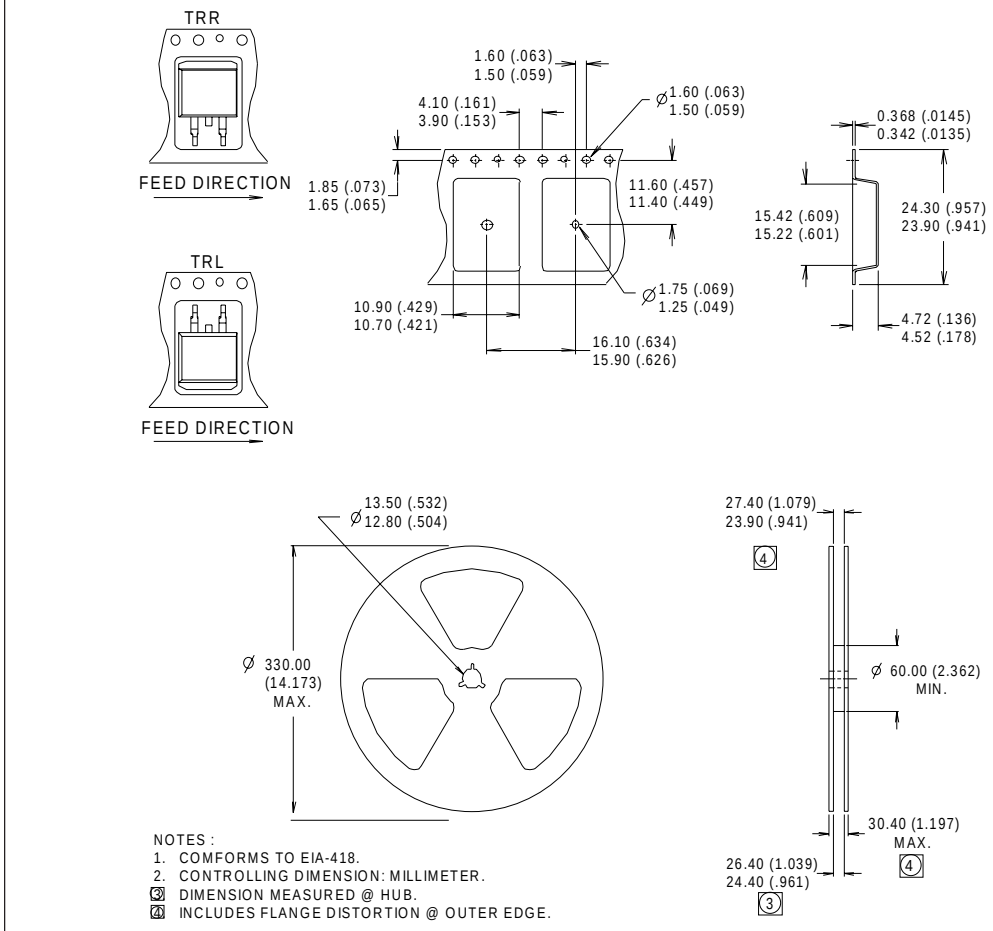
Part Marking Information

D²Pak



Tape & Reel Information

D^2Pak



NOTES :
1. COMFORMS TO EIA-418.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION MEASURED @ HUB.
4. INCLUDES FLANGE DISTORTION @ OUTER EDGE.

International
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