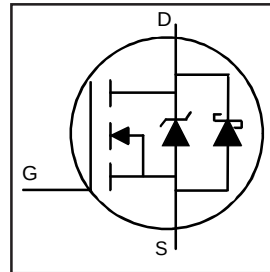


IRL3103D2PbF

FETKY™ MOSFET & SCHOTTKY RECTIFIER

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



$$V_{DSS} = 30V$$

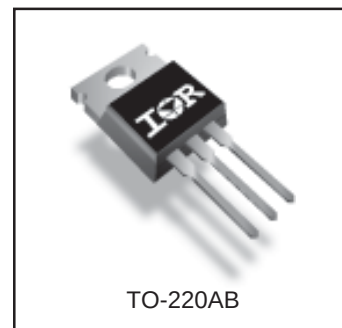
$$R_{DS(on)} = 0.014\Omega$$

$$I_D = 54A$$

Description

The FETKY family of copackaged 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 TO-220 package is universally preferred for all commercial-industrial applications at power dissipation levels to approximately 50 watts. The low thermal resistance and low package cost of the TO-220 contribute to its wide acceptance throughout the industry.



Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	54	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	34	
I_{DM}	Pulsed Drain Current ①	220	
$P_D @ T_A = 25^\circ C$	Power Dissipation	2.0	W
$P_D @ T_C = 25^\circ C$	Power Dissipation	70	W
	Linear Derating Factor	0.56	W/°C
V_{GS}	Gate-to-Source Voltage	± 16	V
T_J	Operating Junction and	-55 to + 150	°C
T_{STG}	Storage Temperature Range		
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	
	Mounting torque, 6-32 or M3 screw	10 lbf•in (1.1N•m)	

Thermal Resistance

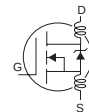
	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	1.8	°C/W
$R_{\theta JA}$	Junction-to-Ambient	—	62	

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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
ΔV _{(BR)DSS} /ΔT _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 0.019	Ω	V _{GS} = 10V, I _D = 32A ② V _{GS} = 4.5V, I _D = 27A 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	—	—	0.25 35	mA	V _{DS} = 30V, V _{GS} = 0V 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	nA	V _{GS} = -16V
Q _g	Total Gate Charge	—	—	44	nC	I _D = 32A
Q _{gs}	Gate-to-Source Charge	—	—	14	nC	V _{DS} = 24V
Q _{gd}	Gate-to-Drain ("Miller") Charge	—	—	24	nC	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 = 34A
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, ② ③
L _D	Internal Drain Inductance	—	4.5	—	nH	Between lead, 6mm (0.25in.) from package and center of die contact
L _S	Internal Source Inductance	—	7.5	—		
C _{iss}	Input Capacitance	—	2300	—	pF	V _{GS} = 0V
C _{oss}	Output Capacitance	—	1100	—		V _{DS} = 25V
C _{rss}	Reverse Transfer Capacitance	—	310	—		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)	—	—	5.0	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	—	—	0.6	V	T _J = 25°C, I _S = 3.0A, V _{GS} = 0V ②
t _{rr}	Reverse Recovery Time	—	51	77	ns	T _J = 25°C, I _F = 32A
Q _{rr}	Reverse Recovery Charge	—	47	71	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%.
- ③ Uses IRL3103 data and test conditions

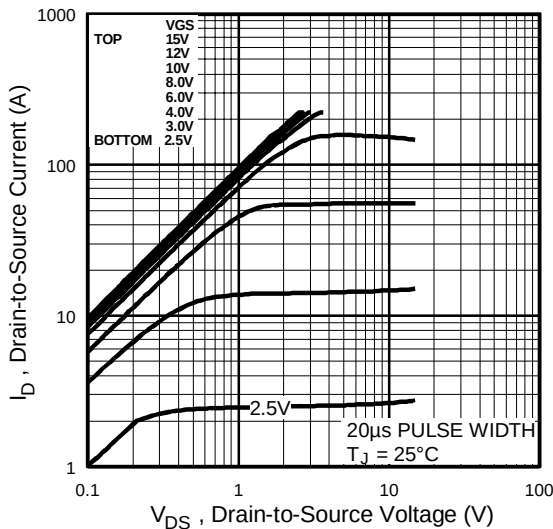


Fig 1. Typical Output Characteristics

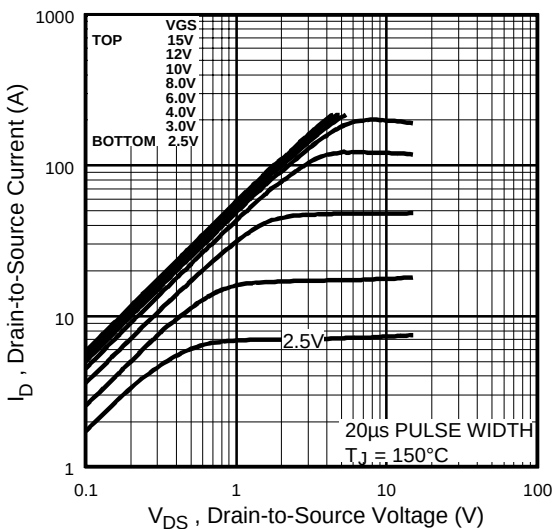


Fig 2. Typical Output Characteristics

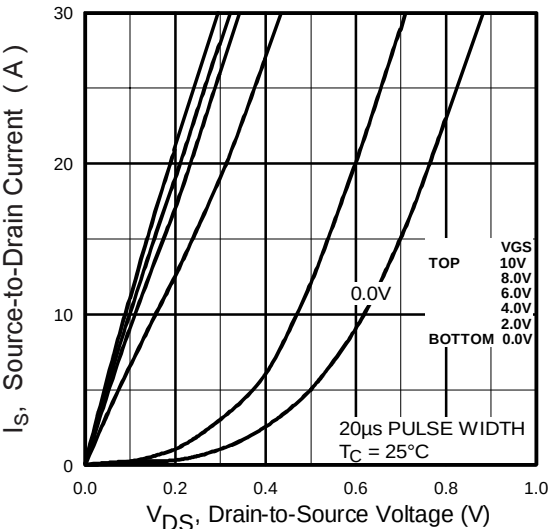


Fig 3. Typical Reverse Output Characteristics

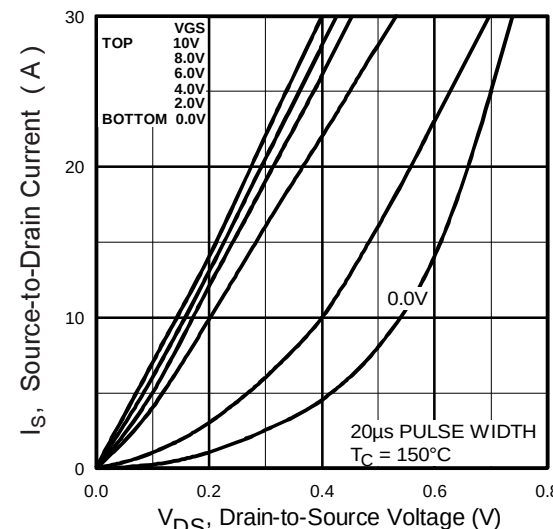


Fig 4. Typical Reverse Output Characteristics

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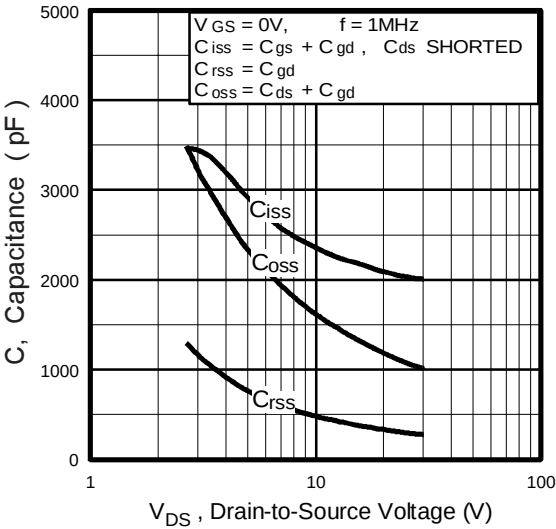


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

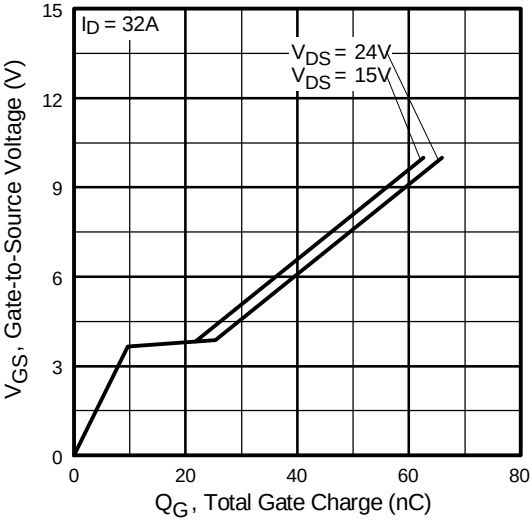


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

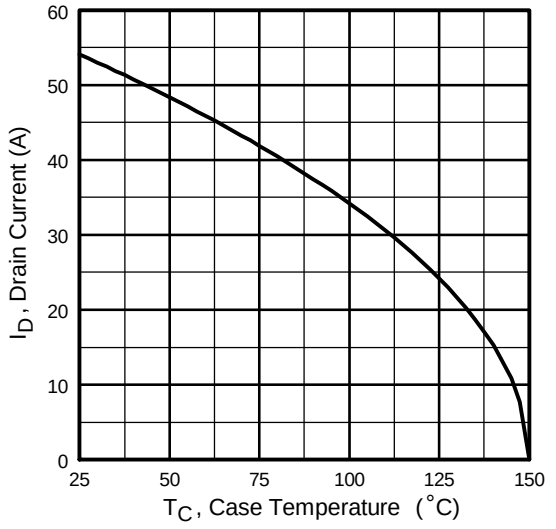


Fig 7. Maximum Drain Current Vs. Case Temperature

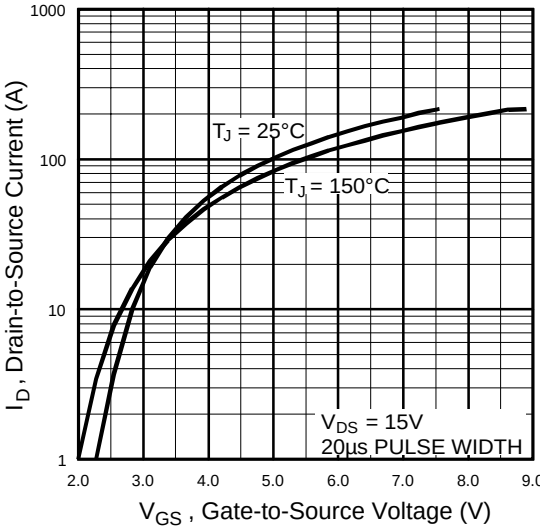


Fig 8. Typical Transfer Characteristics

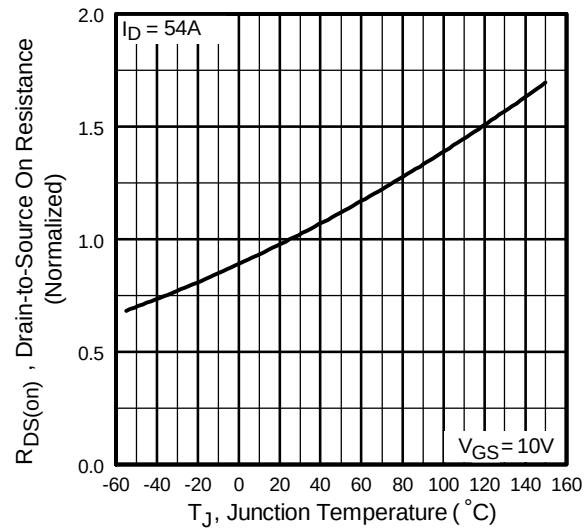


Fig 9. Normalized On-Resistance
Vs. Temperature

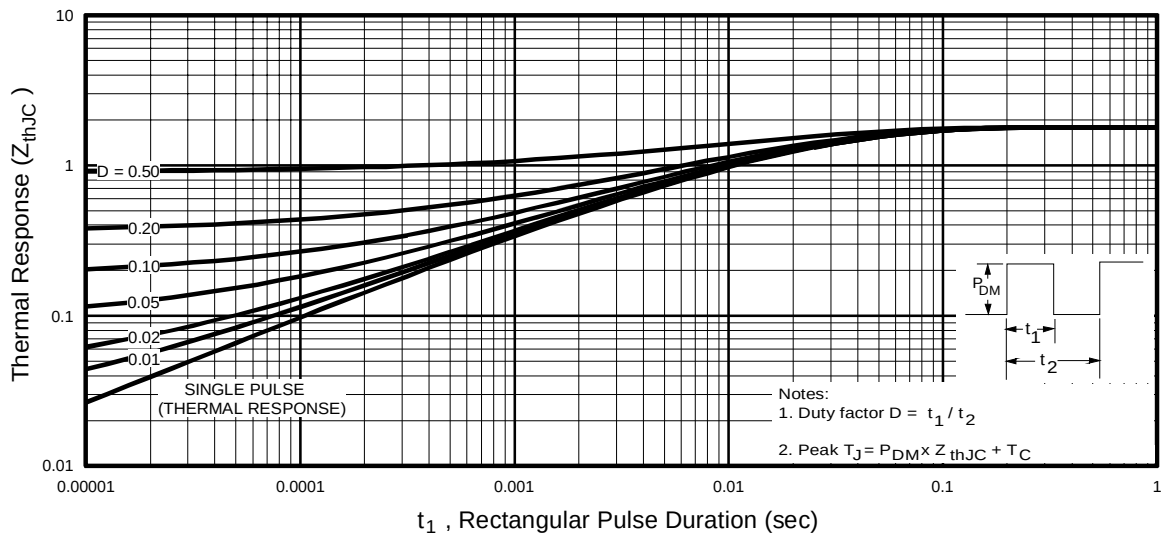


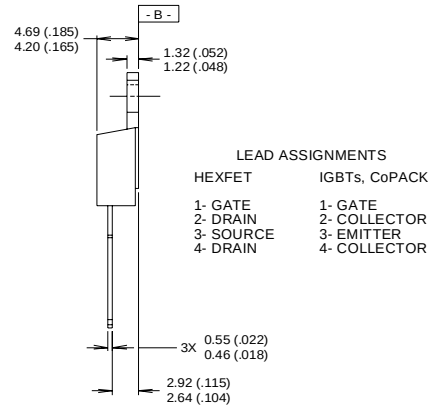
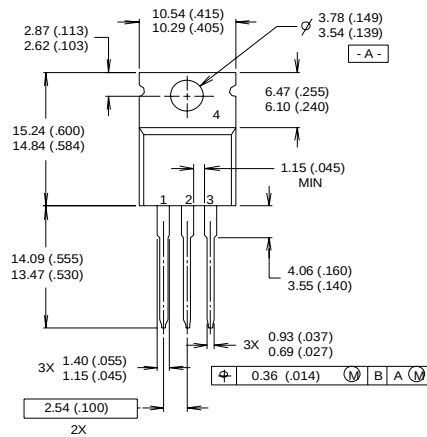
Fig 10. Maximum Effective Transient Thermal Impedance, Junction-to-Case

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TO-220AB Package Outline

Dimensions are shown in millimeters (inches)



NOTES:

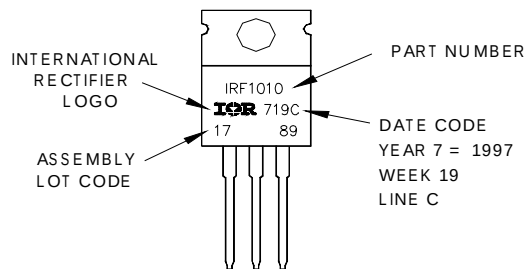
- 1 DIMENSIONING & TOLERANCING PER ANSI Y14.5M, 1982.
- 2 CONTROLLING DIMENSION : INCH

3 OUTLINE CONFORMS TO JEDEC OUTLINE TO-220AB.

4 HEATSINK & LEAD MEASUREMENTS DO NOT INCLUDE BURRS.

TO-220AB Part Marking Information

EXAMPLE: THIS IS AN IRF1010
LOT CODE 1789
ASSEMBLED ON WW 19, 1997
IN THE ASSEMBLY LINE "C"
Note: "P" in assembly line
position indicates "Lead-Free"



Data and specifications subject to change without notice.

International
IR Rectifier

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105

TAC Fax: (310) 252-7903

Visit us at www.irf.com for sales contact information. 06/04

Note: For the most current drawings please refer to the IR website at:
<http://www.irf.com/package/>