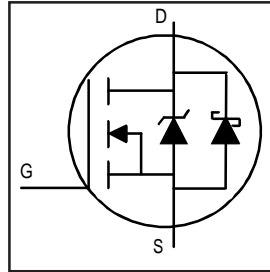


- Copackaged HEXFET® Power MOSFET and Schottky Diode
- Generation 5 Technology
- Logic Level Gate Drive
- Minimize Circuit Inductance
- Ideal For Synchronous Regulator Application

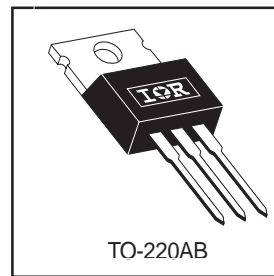


$V_{DSS} = 30V$
$R_{DS(on)} = 0.014\Omega$
$I_D = 54A$

### 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.



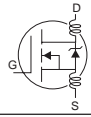
### Absolute Maximum Ratings

	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	$\pm 16$	V
$T_J$	Operating Junction and	-55 to + 150	
$T_{STG}$	Storage Temperature Range		
	Soldering Temperature, for 10 seconds	300 (1.6mm from case )	°C
	Mounting torque, 6-32 or M3 srew	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	

## MOSFET Electrical Characteristics @ T<sub>J</sub> = 25°C (unless otherwise specified)

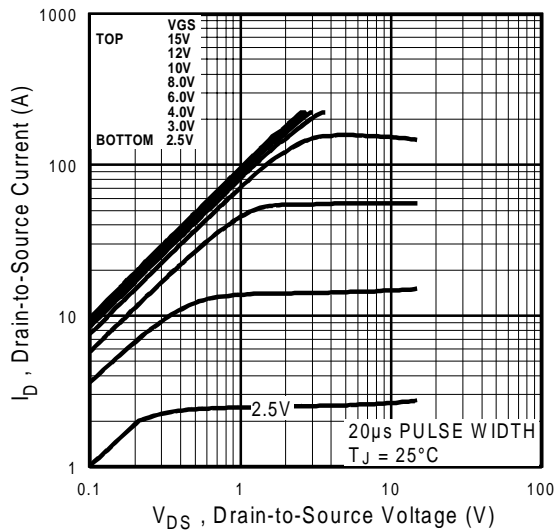
	Parameter	Min.	Typ.	Max.	Units	Conditions
V <sub>(BR)DSS</sub>	Drain-to-Source Breakdown Voltage	30	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
ΔV <sub>(BR)DSS</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temp. Coefficient	—	0.037	—	V/°C	Reference to 25°C, I <sub>D</sub> = 1mA <sup>③</sup>
R <sub>DS(on)</sub>	Static Drain-to-Source On-Resistance	—	—	0.014	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 32A <sup>②</sup>
		—	—	0.019		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 27A <sup>②</sup>
V <sub>GS(th)</sub>	Gate Threshold Voltage	1.0	—	—	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
g <sub>fs</sub>	Forward Transconductance	23	—	—	S	V <sub>DS</sub> = 25V, I <sub>D</sub> = 34A <sup>③</sup>
I <sub>DSS</sub>	Drain-to-Source Leakage Current	—	—	0.25	mA	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V
		—	—	35		V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 125°C
I <sub>GSS</sub>	Gate-to-Source Forward Leakage	—	—	100	nA	V <sub>GS</sub> = 16V
	Gate-to-Source Reverse Leakage	—	—	-100		V <sub>GS</sub> = -16V
Q <sub>g</sub>	Total Gate Charge	—	—	44	nC	I <sub>D</sub> = 32A
Q <sub>gs</sub>	Gate-to-Source Charge	—	—	14		V <sub>DS</sub> = 24V
Q <sub>gd</sub>	Gate-to-Drain ("Miller") Charge	—	—	24		V <sub>GS</sub> = 4.5V, See Fig. 6 <sup>②</sup>
t <sub>d(on)</sub>	Turn-On Delay Time	—	9.0	—	ns	V <sub>DD</sub> = 15V
t <sub>r</sub>	Rise Time	—	210	—		I <sub>D</sub> = 34A
t <sub>d(off)</sub>	Turn-Off Delay Time	—	20	—		R <sub>G</sub> = 3.4Ω, V <sub>GS</sub> = 4.5V
t <sub>f</sub>	Fall Time	—	54	—		R <sub>D</sub> = 0.43 Ω, <sup>②</sup> <sup>③</sup>
L <sub>D</sub>	Internal Drain Inductance	—	4.5	—	nH	Between lead, 6mm (0.25in.) from package and center of die contact
L <sub>S</sub>	Internal Source Inductance	—	7.5	—		
C <sub>iss</sub>	Input Capacitance	—	2300	—	pF	V <sub>GS</sub> = 0V
C <sub>oss</sub>	Output Capacitance	—	1100	—		V <sub>DS</sub> = 25V
C <sub>rss</sub>	Reverse Transfer Capacitance	—	310	—		f = 1.0MHz, See Fig. 5
C <sub>iss</sub>	Input Capacitance	—	3500	—		V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V

## Body Diode & Schottky Diode Ratings and Characteristics

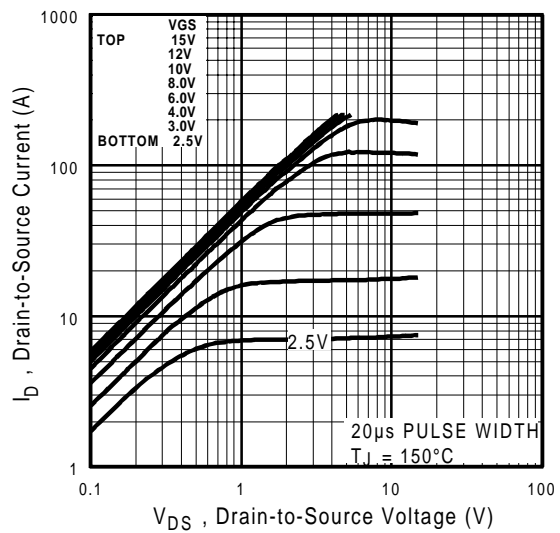
	Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>F</sub> (AV)	( Schottky)	—	—	5.0	A	MOSFET symbol showing the integral reverse p-n junction and Schottky diode.
I <sub>SM</sub>	Pulsed Source Current (Body Diode) <sup>①</sup>	—	—	220		
V <sub>SD1</sub>	Diode Forward Voltage	—	—	1.3	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = 32A, V <sub>GS</sub> = 0V <sup>②</sup>
V <sub>SD2</sub>	Diode Forward Voltage	—	—	0.6	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = 3.0A, V <sub>GS</sub> = 0V <sup>②</sup>
t <sub>rr</sub>	Reverse Recovery Time	—	51	77	ns	T <sub>J</sub> = 25°C, I <sub>F</sub> = 32A
Q <sub>rr</sub>	Reverse Recovery Charge	—	47	71	nC	di/dt = 100A/μs <sup>②</sup>
t <sub>on</sub>	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L <sub>S</sub> +L <sub>D</sub> )				

### Notes:

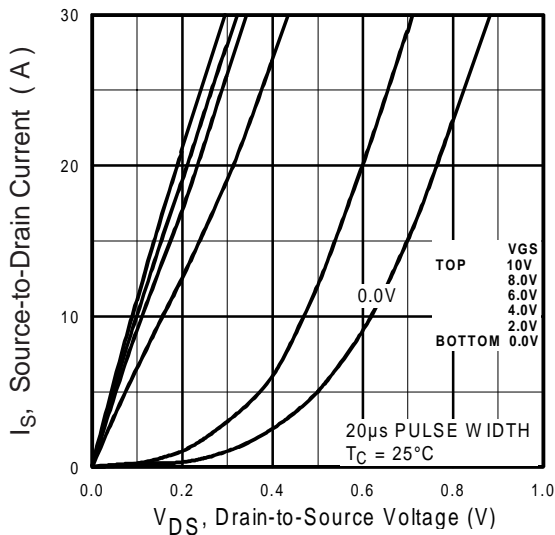
- ① Repetitive rating; pulse width limited by max. junction temperature. ( See fig. 10 )
- ② Pulse width ≤ 300μs; duty cycle ≤ 2%.
- ③ Uses IRL3103 data and test conditions



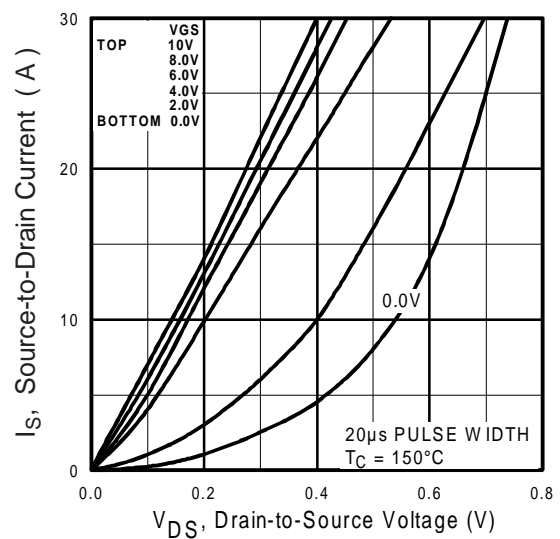
**Fig 1.** Typical Output Characteristics



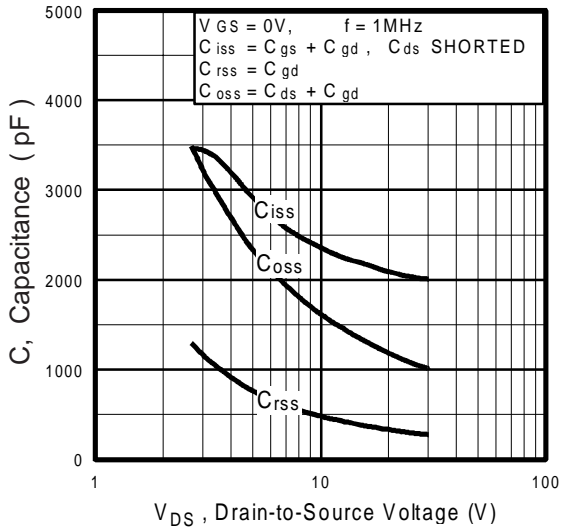
**Fig 2.** Typical Output Characteristics



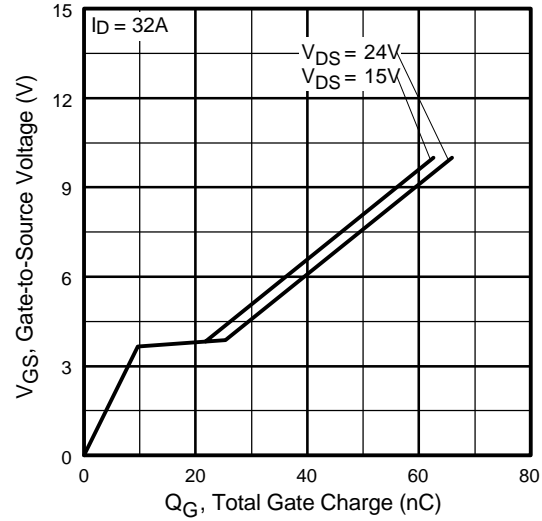
**Fig 3.** Typical Reverse Output Characteristics



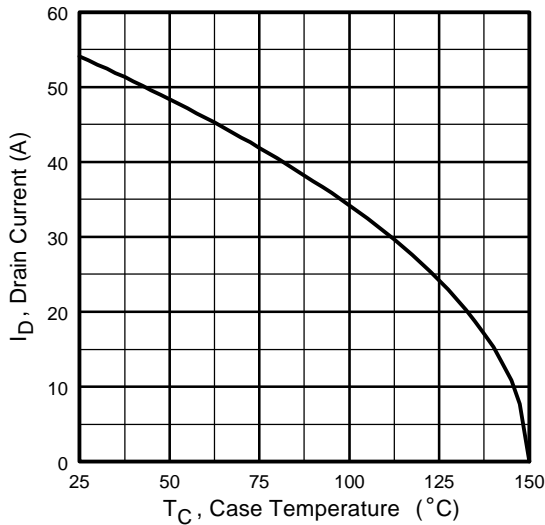
**Fig 4.** Typical Reverse Output Characteristics



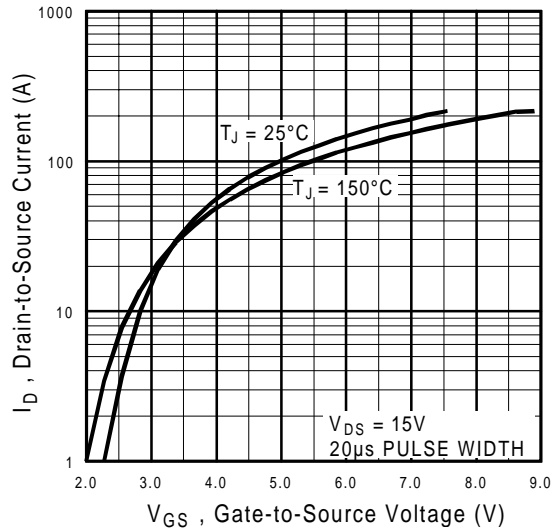
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



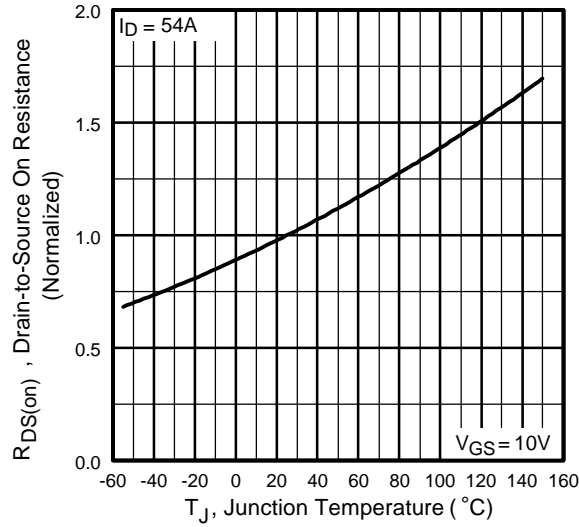
**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage



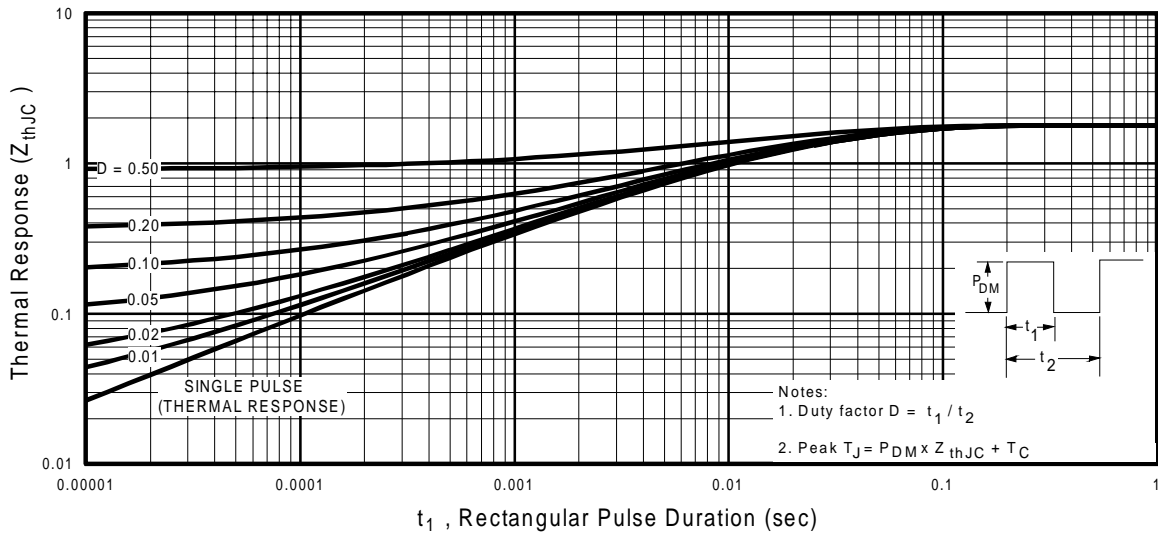
**Fig 7.** Maximum Drain Current Vs. Case Temperature



**Fig 8.** Typical Transfer Characteristics



**Fig 9.** Normalized On-Resistance Vs. Temperature



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

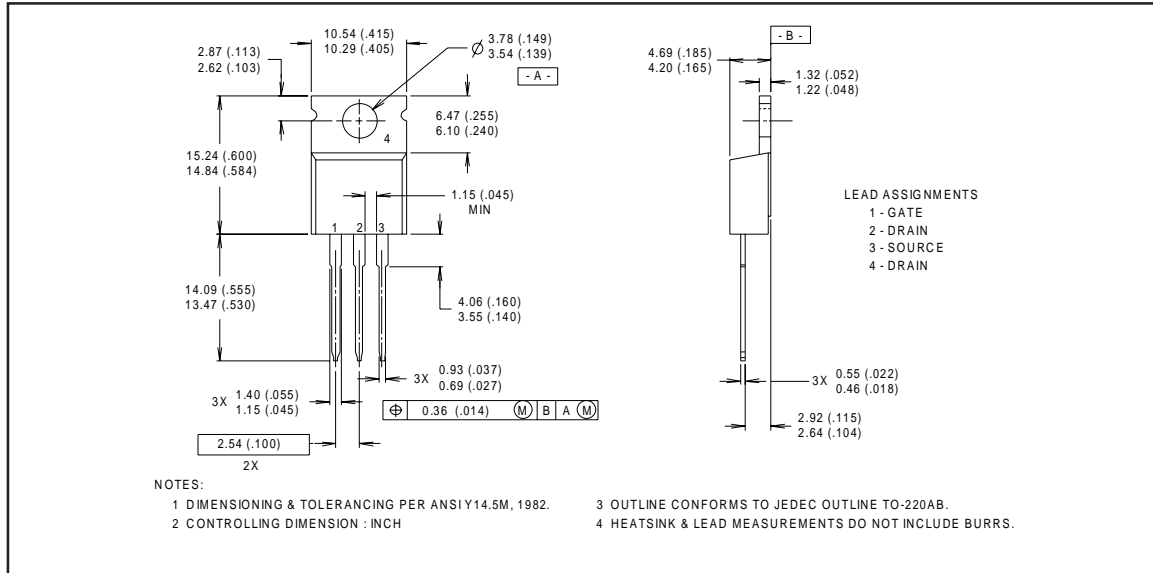
# IRL3103D2

International  
**IR** Rectifier

## Package Outline

### TO-220AB Outline

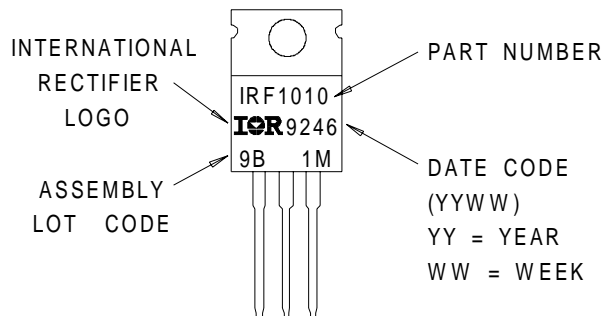
Dimensions are shown in millimeters (inches)



## Part Marking Information

### TO-220AB

EXAMPLE : THIS IS AN IRF1010  
WITH ASSEMBLY  
LOT CODE 9B1M



International  
**IR** Rectifier

**WORLD HEADQUARTERS:** 233 Kansas St., El Segundo, California 90245, Tel: (310) 322 3331  
**EUROPEAN HEADQUARTERS:** Hurst Green, Oxted, Surrey RH8 9BB, UK Tel: ++ 44 1883 732020

**IR CANADA:** 7321 Victoria Park Ave., Suite 201, Markham, Ontario L3R 2Z8, Tel: (905) 475 1897

**IR GERMANY:** Saalburgstrasse 157, 61350 Bad Homburg Tel: ++ 49 6172 96590

**IR ITALY:** Via Liguria 49, 10071 Borgaro, Torino Tel: ++ 39 11 451 0111

**IR FAR EAST:** K&H Bldg., 2F, 30-4 Nishi-Ikebukuro 3-Chome, Toshima-Ku, Tokyo Japan 171 Tel: 81 3 3983 0086

**IR SOUTHEAST ASIA:** 315 Outram Road, #10-02 Tan Boon Liat Building, Singapore 0316 Tel: 65 221 8371

<http://www.irf.com/> Data and specifications subject to change without notice. 6/97

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