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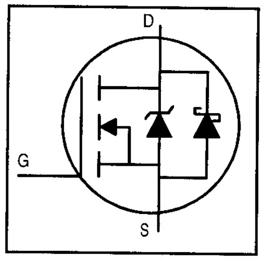
International
IOR Rectifier

IRL3103D1PbF

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

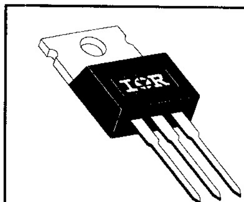
$R_{DS(on)}$ = 0.014Ω

I_D = 64A

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.



TO-220AB

Absolute Maximum Ratings

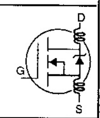
	Parameter	Max.	Units
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V③	64	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V③	45	
I_{DM}	Pulsed Drain Current ①③	220	
P_D @T_A = 25°C	Power Dissipation	2.0	W
P_D @T_C = 25°C	Power Dissipation	89	W
	Linear Derating Factor	0.56	W/°C
V_{GS}	Gate-to-Source Voltage	± 16	V
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	°C
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	
	Mounting torque, 6-32 or M3 srew	10 lbf•in (1.1N•m)	

Thermal Resistance

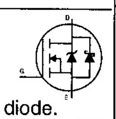
	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	1.4	°C/W
$R_{\theta JA}$	Junction-to-Ambient	—	62	

1/12/04

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 = 1mA④
$R_{DS(on)}$	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 = 32A③
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_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	——	1900	——	pF	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%.

③ Uses IRL3103 data and test conditions

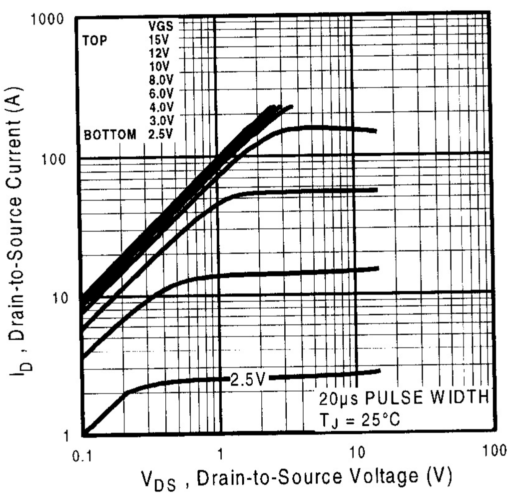


Fig 1. Typical Output Characteristics

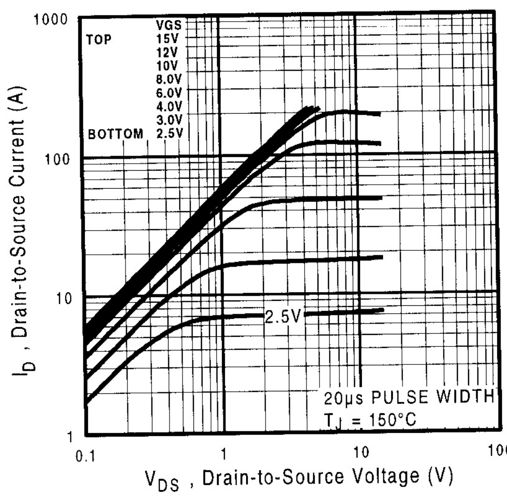


Fig 2. Typical Output Characteristics

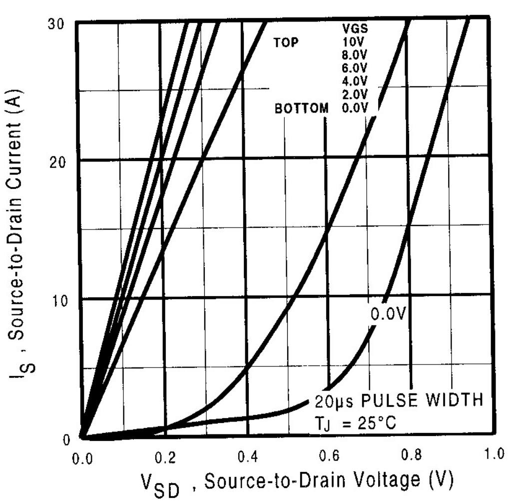


Fig 3. Typical Reverse Output Characteristics

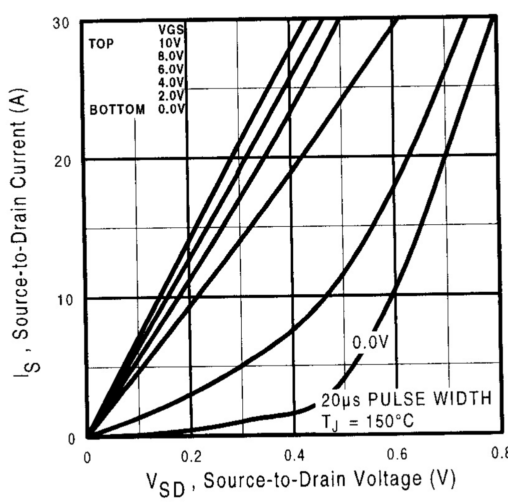


Fig 4. Typical Reverse Output Characteristics

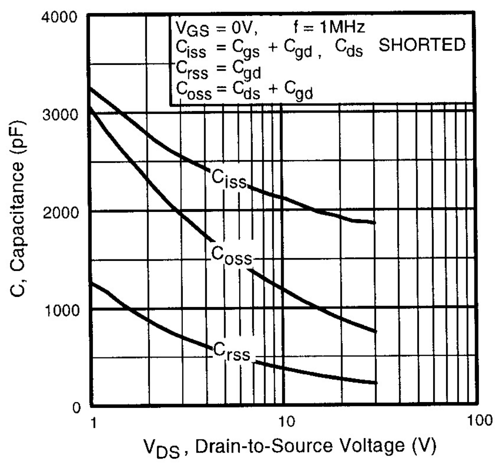


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

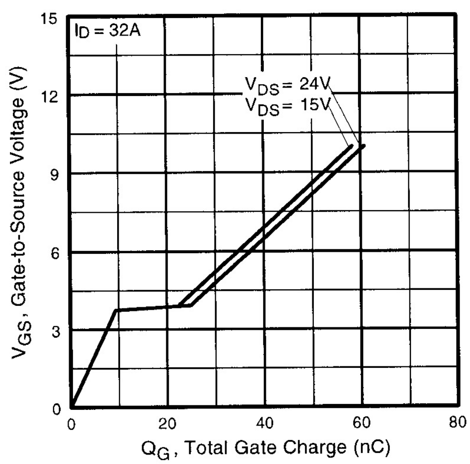


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

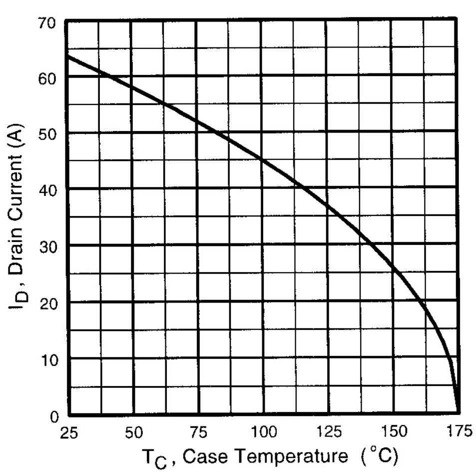


Fig 7. Maximum Drain Current Vs. Case Temperature

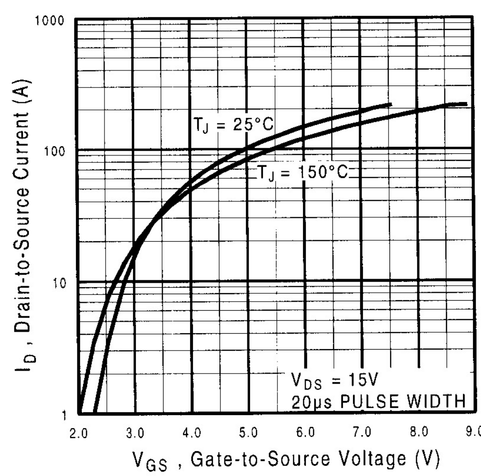


Fig 8. Typical Transfer Characteristics

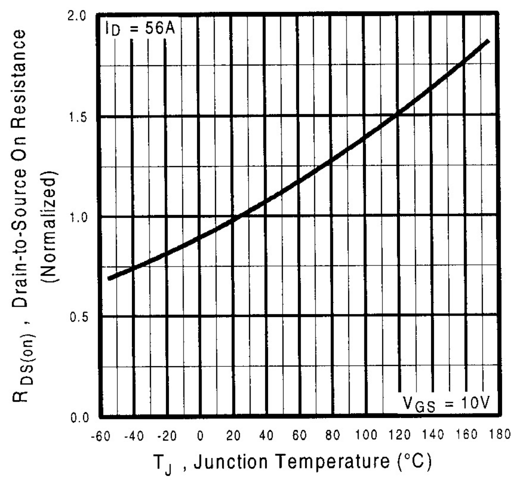


Fig 9. Normalized On-Resistance Vs. Temperature

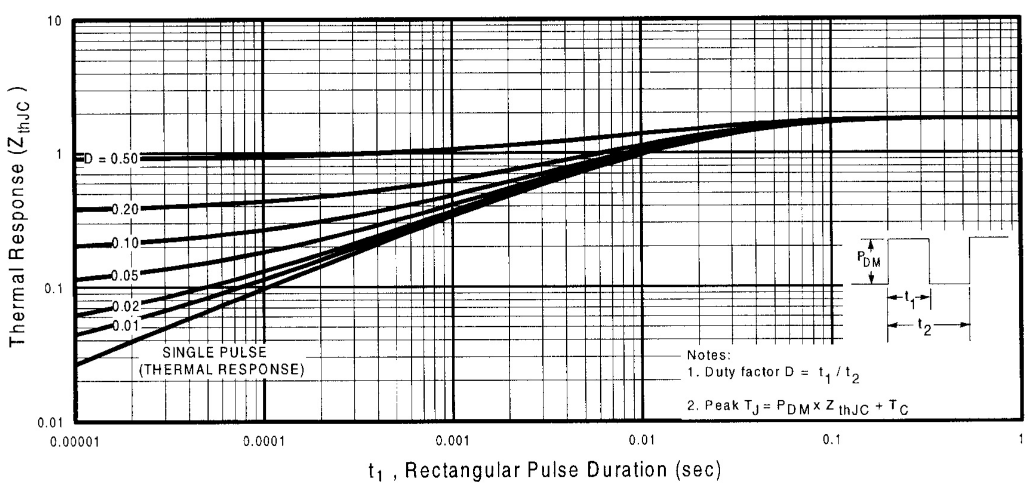
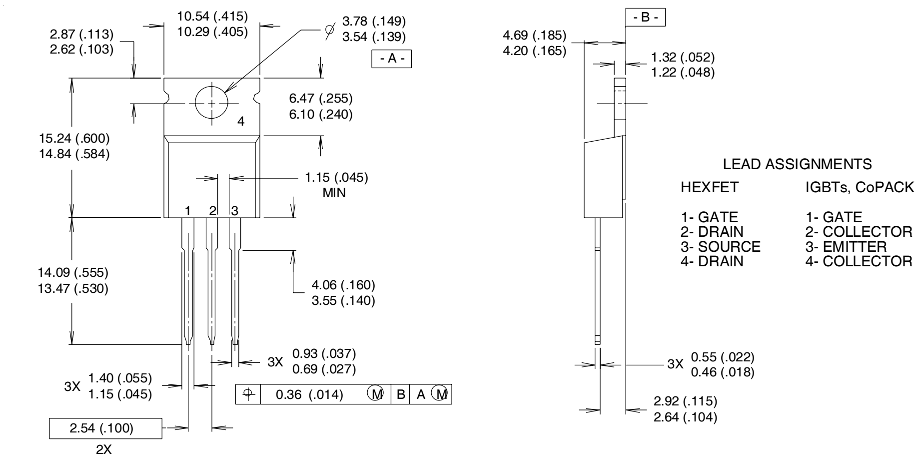


Fig 10. Maximum Effective Transient Thermal Impedance, Junction-to-Case

TO-220AB Package Outline

Dimensions are shown in millimeters (inches)



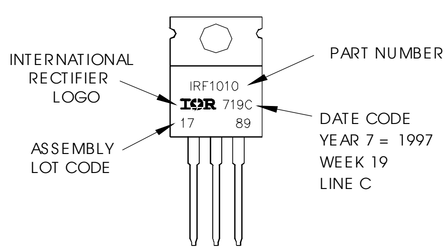
NOTES:

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.

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