International
IOR Rectifier

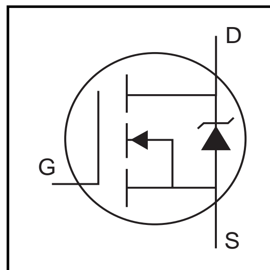
PRELIMINARY

PD 9.1696A

IRL3302

HEXFET® Power MOSFET

- Advanced Process Technology
- Optimized for 4.5V Gate Drive
- Ideal for CPU Core DC-DC Converters
- 150°C Operating Temperature
- Fast Switching



V_{DSS} = 20V

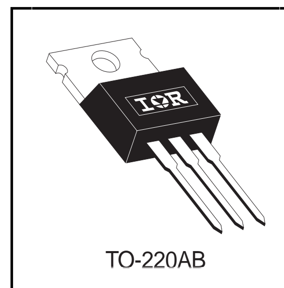
$R_{DS(on)}$ = 0.020Ω

I_D = 39A

Description

These HEXFET Power MOSFETs were designed specifically to meet the demands of CPU core DC-DC converters in the PC environment. Advanced processing techniques combined with an optimized gate oxide design results in a die sized specifically to offer maximum cost.

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} @ 4.5V	39	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 4.5V	25	
I_{DM}	Pulsed Drain Current ①	160	
P_D @T_C = 25°C	Power Dissipation	57	W
	Linear Derating Factor	0.45	W/°C
V_{GS}	Gate-to-Source Voltage	± 10	V
V_{GSM}	Gate-to-Source Voltage (Start Up Transient, tp = 100µs)	14	V
E_{AS}	Single Pulse Avalanche Energy②	130	mJ
I_{AR}	Avalanche Current①	23	A
E_{AR}	Repetitive Avalanche Energy①	5.7	mJ
dv/dt	Peak Diode Recovery dv/dt ③	5.0	V/ns
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
$R_{θJC}$	Junction-to-Case	——	2.2	°C/W
$R_{θCS}$	Case-to-Sink, Flat, Greased Surface	0.50	——	
$R_{θJA}$	Junction-to-Ambient	——	62	

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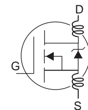
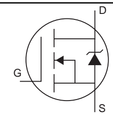
Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	20	—	—	V	V_{GS} = 0V, I_D = 250μA
$DV_{(BR)DSS}/DT_J$	Breakdown Voltage Temp. Coefficient	—	0.022	—	V/°C	Reference to 25°C, I_D = 1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.023	W	V_{GS} = 4.5V, I_D = 23A ④
		—	—	0.020		V_{GS} = 7.0V, I_D = 23A ④
$V_{GS(th)}$	Gate Threshold Voltage	0.70	—	—	V	V_{DS} = V_{GS}, I_D = 250μA
g_{fs}	Forward Transconductance	21	—	—	S	V_{DS} = 10V, I_D = 23A
I_{DSS}	Drain-to-Source Leakage Current	—	—	25	μA	V_{DS} = 20V, V_{GS} = 0V
		—	—	250		V_{DS} = 10V, V_{GS} = 0V, T_J = 150°C
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	V_{GS} = 10V
	Gate-to-Source Reverse Leakage	—	—	-100		V_{GS} = -10V
Q_g	Total Gate Charge	—	—	31	nC	I_D = 23A
Q_{gs}	Gate-to-Source Charge	—	—	5.7		V_{DS} = 16V
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	—	13		V_{GS} = 4.5V, See Fig. 6 ④
$t_{d(on)}$	Turn-On Delay Time	—	7.2	—	ns	V_{DD} = 10V
t_r	Rise Time	—	110	—		I_D = 23A
$t_{d(off)}$	Turn-Off Delay Time	—	41	—		R_G = 9.5W, V_{GS} = 4.5V
t_f	Fall Time	—	89	—		R_D = 2.4W, ④
L_D	Internal Drain Inductance	—	4.5	—	nH	Between lead, 6mm (0.25in.) 
L_S	Internal Source Inductance	—	7.5	—		from package and center of die contact
C_{iss}	Input Capacitance	—	1300	—	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	—	520	—		V_{DS} = 15V
C_{rss}	Reverse Transfer Capacitance	—	190	—		f = 1.0MHz, See Fig. 5

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	39	A	MOSFET symbol showing the 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	160		integral reverse p-n junction diode.
V_{SD}	Diode Forward Voltage	—	—	1.3	V	T_J = 25°C, I_S = 23A, V_{GS} = 0V ④
t_{rr}	Reverse Recovery Time	—	62	94	ns	T_J = 25°C, I_F = 23A
Q_{rr}	Reverse Recovery Charge	—	110	160	nC	di/dt = 100A/μs ④
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.

② Starting T_J = 25°C, L = 0.49mH R_G = 25W, I_{AS} = 23A.

③ I_{SD} £ 23A, di/dt £ 97A/μs, V_{DD} £ $V_{(BR)DSS}$, T_J £ 150°C

④ Pulse width £ 300μs; duty cycle £ 2%.

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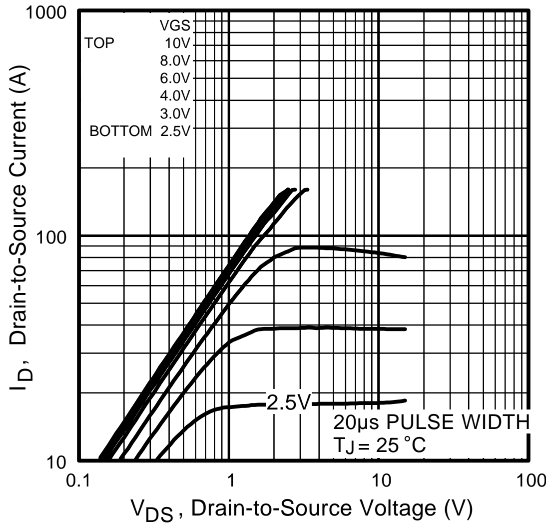

Fig 1. Typical Output Characteristics

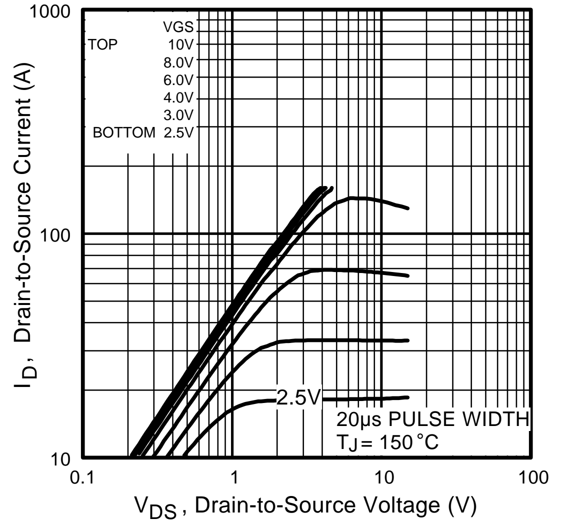

Fig 2. Typical Output Characteristics

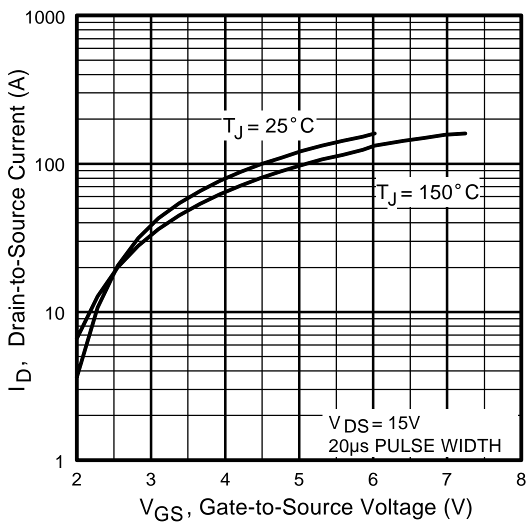

Fig 3. Typical Transfer Characteristics

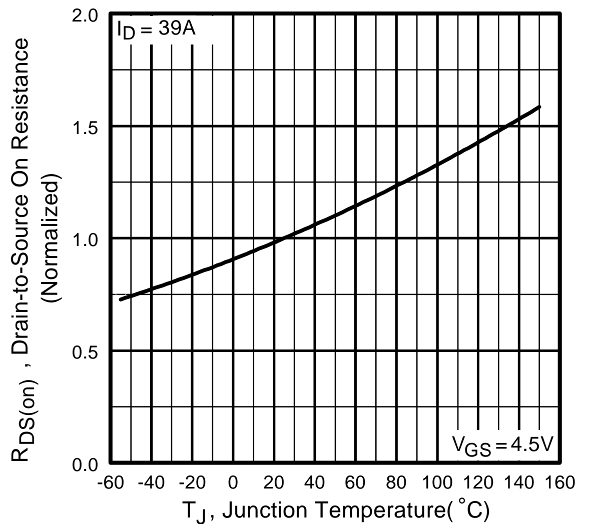

Fig 4. Normalized On-Resistance Vs. Temperature

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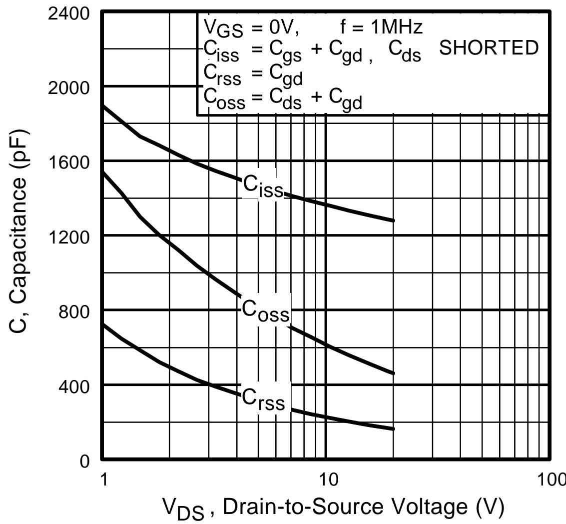

Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

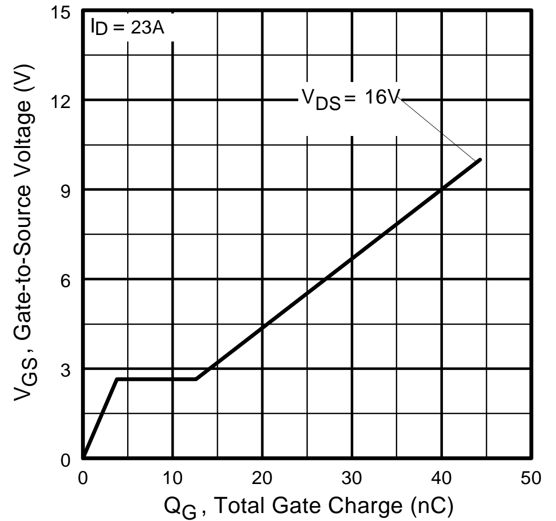

Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

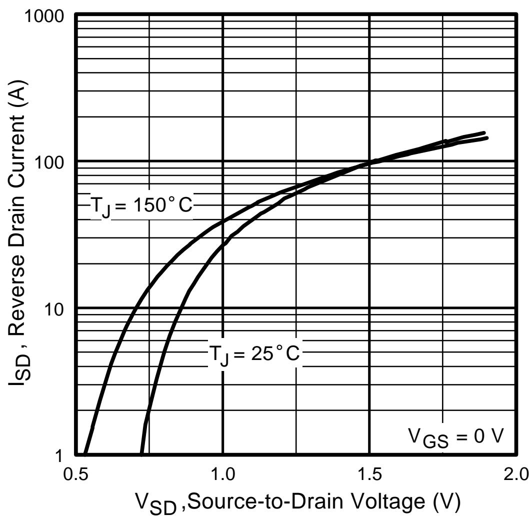

Fig 7. Typical Source-Drain Diode Forward Voltage

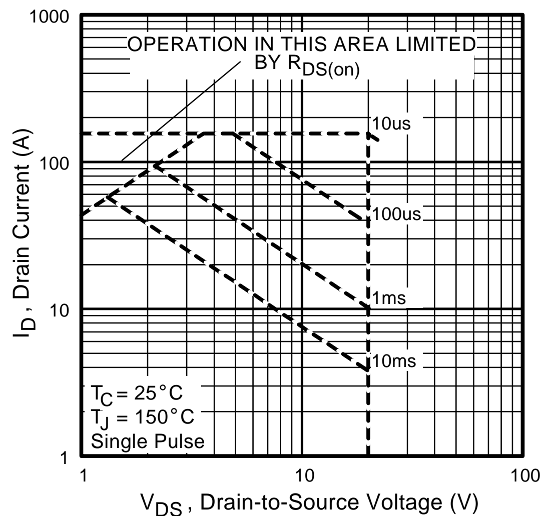

Fig 8. Maximum Safe Operating Area

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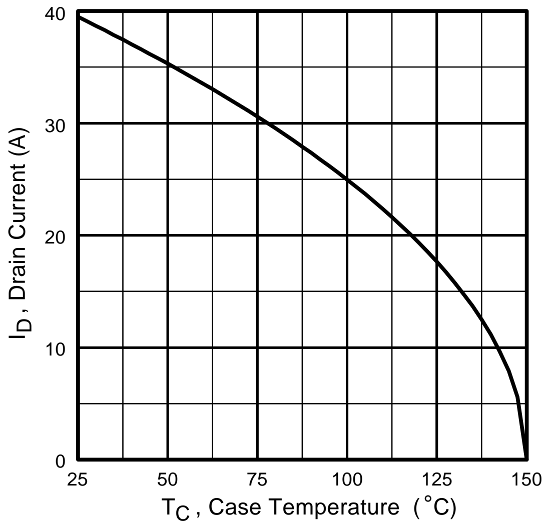

Fig 9. Maximum Drain Current Vs. Case Temperature

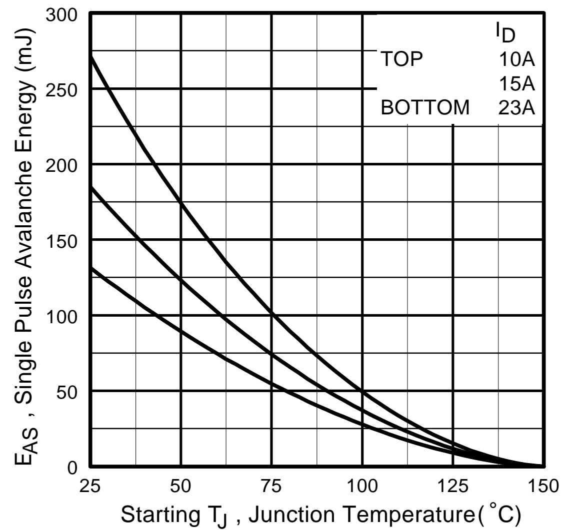

Fig 10. Maximum Avalanche Energy Vs. Drain Current

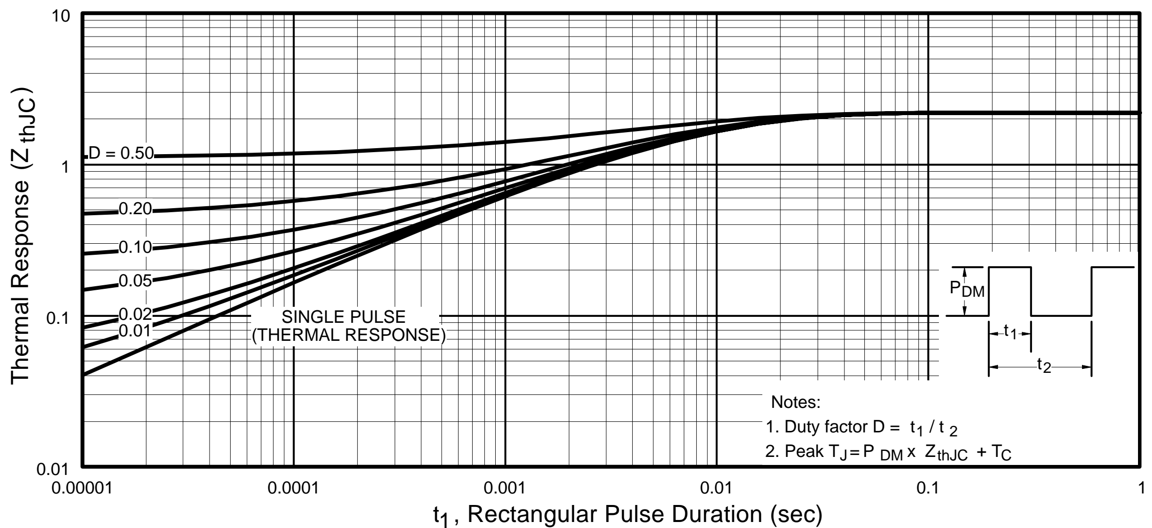

Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

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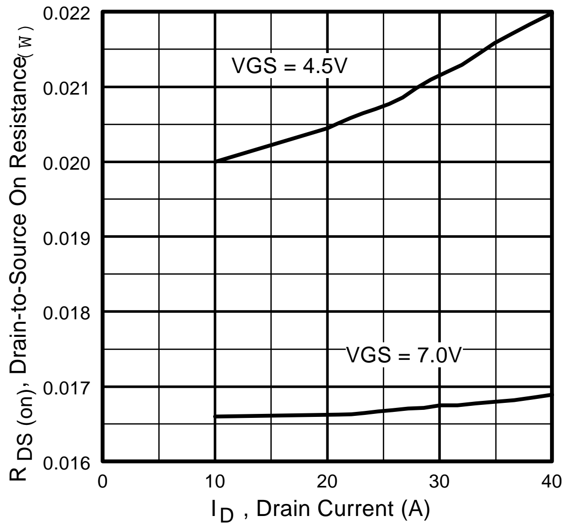

Fig 12. On-Resistance Vs. Drain Current

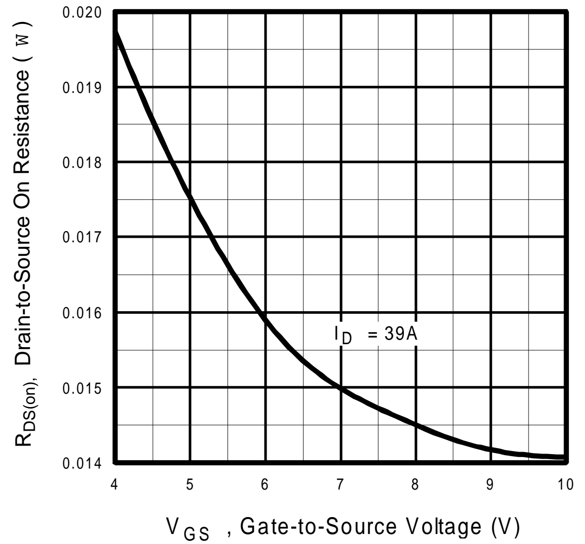

Fig 13. On-Resistance Vs. Gate Voltage

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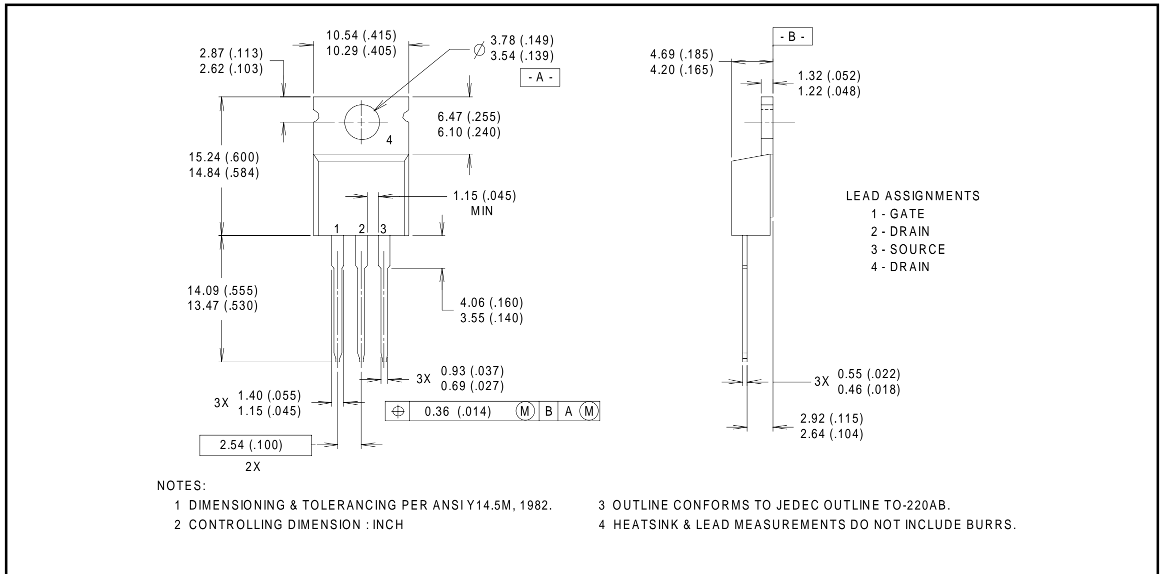
Package Outline

TO-220AB Outline

Dimensions are shown in millimeters (inches)

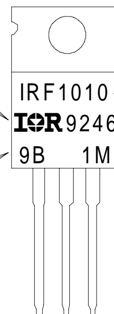


Part Marking Information

TO-220AB

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

INTERNATIONAL RECTIFIER LOGO



PART NUMBER

ASSEMBLY LOT CODE

DATE CODE (YYWW)
YY = YEAR
WW = WEEK

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单击下面可查看定价，库存，交付和生命周期等信息

>>Vishay(威世)

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