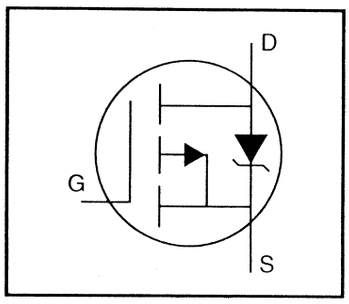
International
IOR Rectifier

PD-9.648A

IRF9Z34

HEXFET® Power MOSFET

- Dynamic dv/dt Rating
- Repetitive Avalanche Rated
- P-Channel
- 175°C Operating Temperature
- Fast Switching
- Ease of Paralleling
- Simple Drive Requirements



V_{DSS} = -60V

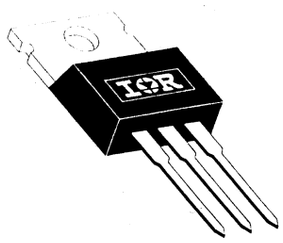
$R_{DS(on)}$ = 0.14Ω

I_D = -18A

Description

Third Generation HEXFETs from International Rectifier provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

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

DATA SHEET

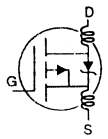
Absolute Maximum Ratings

	Parameter	Max.	Units
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ -10 V	-18	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ -10 V	-13	
I_{DM}	Pulsed Drain Current ①	-72	
P_D @ T_C = 25°C	Power Dissipation	88	W
	Linear Derating Factor	0.59	W/°C
V_{GS}	Gate-to-Source Voltage	±20	V
E_{AS}	Single Pulse Avalanche Energy ②	370	mJ
I_{AR}	Avalanche Current ①	-18	A
E_{AR}	Repetitive Avalanche Energy ①	8.8	mJ
dv/dt	Peak Diode Recovery dv/dt ③	-4.5	V/ns
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +175	°C
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	
	Mounting Torque, 6-32 or M3 screw	10 lbf•in (1.1 N•m)	

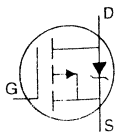
Thermal Resistance

	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case	—	—	1.7	°C/W
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	—	0.50	—	
$R_{\theta JA}$	Junction-to-Ambient	—	—	62	

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

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-60	—	—	V	V_{GS}=0V, I_D=-250μA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	-0.060	—	V/°C	Reference to 25°C, I_D=-1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.14	Ω	V_{GS}=-10V, I_D=-11A ④
$V_{GS(th)}$	Gate Threshold Voltage	-2.0	—	-4.0	V	V_{DS}=V_{GS}, I_D=-250μA
g_{fs}	Forward Transconductance	5.9	—	—	S	V_{DS}=-25V, I_D=-11A ④
I_{DSS}	Drain-to-Source Leakage Current	—	—	-100	μA	V_{DS}=-60V, V_{GS}=0V
		—	—	-500		V_{DS}=-48V, V_{GS}=0V, T_J=150°C
I_{GSS}	Gate-to-Source Forward Leakage	—	—	-100	nA	V_{GS}=-20V
	Gate-to-Source Reverse Leakage	—	—	100		V_{GS}=20V
Q_g	Total Gate Charge	—	—	34	nC	I_D=-18A
Q_{gs}	Gate-to-Source Charge	—	—	9.9		V_{DS}=-48V
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	—	16		V_{GS}=-10V See Fig. 6 and 13 ④
$t_{d(on)}$	Turn-On Delay Time	—	18	—	ns	V_{DD}=-30V
t_r	Rise Time	—	120	—		I_D=-18A
$t_{d(off)}$	Turn-Off Delay Time	—	20	—		R_G=12Ω
t_f	Fall Time	—	58	—		R_D=1.5Ω See Figure 10 ④
L_D	Internal Drain Inductance	—	4.5	—	nH	Between lead, 6 mm (0.25in.) from package and center of die contact 
L_S	Internal Source Inductance	—	7.5	—		
C_{iss}	Input Capacitance	—	1100	—	pF	V_{GS}=0V
C_{oss}	Output Capacitance	—	620	—		V_{DS}=-25V
C_{rss}	Reverse Transfer Capacitance	—	100	—		f=1.0MHz See Figure 5

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-18	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	-72		
V_{SD}	Diode Forward Voltage	—	—	-6.3	V	T_J=25°C, I_S=-18A, V_{GS}=0V ④
t_{rr}	Reverse Recovery Time	—	100	200	ns	T_J=25°C, I_F=-18A
Q_{rr}	Reverse Recovery Charge	—	0.28	0.52	μC	di/dt=100A/μs ④
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is neglegible (turn-on is dominated by L_S+L_D)				

Notes:

① Repetitive rating; pulse width limited by max. junction temperature (See Figure 11)

② V_{DD}=-25V, starting T_J=25°C, L=1.3mH R_G=25Ω, I_{AS}=-18A (See Figure 12)

③ I_{SD}≤-18A, di/dt≤170A/μs, V_{DD}≤$V_{(BR)DSS}$, T_J≤175°C

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