

IRFIB7N50APbF

HEXFET® Power MOSFET

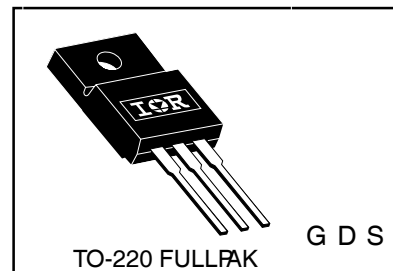
Applications

- Switch Mode Power Supply (SMPS)
- Uninterruptable Power Supply
- High speed power switching
- High Voltage Isolation = 2.5KVRMS⑦
- Lead-Free

V _{DSS}	R _{ds(on)} max	I _D
500V	0.52Ω	6.6A

Benefits

- Low Gate Charge Q_g results in Simple Drive Requirement
- Improved Gate, Avalanche and dynamic dv/dt Ruggedness
- Fully Characterized Capacitance and Avalanche Voltage and Current
- Effective Coss specified (See AN 1001)



Absolute Maximum Ratings

	Parameter	Max.	Units
I _D @ T _C = 25°C	Continuous Drain Current, V _{GS} @ 10V	6.6	A
I _D @ T _C = 100°C	Continuous Drain Current, V _{GS} @ 10V	4.2	
I _{DM}	Pulsed Drain Current ①②	44	
P _D @ T _C = 25°C	Power Dissipation	60	W
	Linear Derating Factor	0.48	W/°C
V _{GS}	Gate-to-Source Voltage	± 30	V
dv/dt	Peak Diode Recovery dv/dt ③④	6.9	V/ns
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)	

Applicable Off Line SMPS Topologies:

- Two Transistor Forward
- Half & Full Bridge Convertors
- Power Factor Correction Boost

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International
IR Rectifier

Static @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
V _{(BR)DSS}	Drain-to-Source Breakdown Voltage	500	—	—	V	V _{GS} = 0V, I _D = 250μA
ΔV _{(BR)DSS/ΔT_J}	Breakdown Voltage Temp. Coefficient	—	0.61	—	V/°C	Reference to 25°C, I _D = 1mA⑥
R _{DS(on)}	Static Drain-to-Source On-Resistance	—	—	0.52	Ω	V _{GS} = 10V, I _D = 4.0A ④
V _{GS(th)}	Gate Threshold Voltage	2.0	—	4.0	V	V _{DS} = V _{GS} , I _D = 250μA
I _{DSS}	Drain-to-Source Leakage Current	—	—	25	μA	V _{DS} = 500V, V _{GS} = 0V
		—	—	250		V _{DS} = 400V, V _{GS} = 0V, T _J = 125°C
I _{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	V _{GS} = 30V
	Gate-to-Source Reverse Leakage	—	—	-100		V _{GS} = -30V

Dynamic @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
g _{fs}	Forward Transconductance	6.1	—	—	S	V _{DS} = 50V, I _D = 6.6A⑥
Q _g	Total Gate Charge	—	—	52	nC	I _D = 11A
Q _{gs}	Gate-to-Source Charge	—	—	13		V _{DS} = 400V
Q _{gd}	Gate-to-Drain ("Miller") Charge	—	—	18		V _{GS} = 10V, See Fig. 6 and 13 ④⑥
t _{d(on)}	Turn-On Delay Time	—	14	—	ns	V _{DD} = 250V
t _r	Rise Time	—	35	—		I _D = 11A
t _{d(off)}	Turn-Off Delay Time	—	32	—		R _G = 9.1Ω
t _f	Fall Time	—	28	—		R _D = 22Ω, See Fig. 10 ④⑥
C _{iss}	Input Capacitance	—	1423	—	pF	V _{GS} = 0V
C _{oss}	Output Capacitance	—	208	—		V _{DS} = 25V
C _{rss}	Reverse Transfer Capacitance	—	8.1	—		f = 1.0MHz, See Fig. 5⑥
C _{oss}	Output Capacitance⑥	—	2000	—		V _{GS} = 0V, V _{DS} = 1.0V, f = 1.0MHz
C _{oss}	Output Capacitance⑥	—	55	—		V _{GS} = 0V, V _{DS} = 400V, f = 1.0MHz
C _{oss eff.}	Effective Output Capacitance	—	97	—		V _{GS} = 0V, V _{DS} = 0V to 400V ⑤⑥

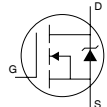
Avalanche Characteristics

	Parameter	Typ.	Max.	Units
E _{AS}	Single Pulse Avalanche Energy②⑥	—	275	mJ
I _{AR}	Avalanche Current①⑥	—	11	A
E _{AR}	Repetitive Avalanche Energy①	—	6.0	mJ

Thermal Resistance

	Parameter	Typ.	Max.	Units
R _{θJC}	Junction-to-Case	—	2.1	°C/W
R _{θJA}	Junction-to-Ambient	—	65	

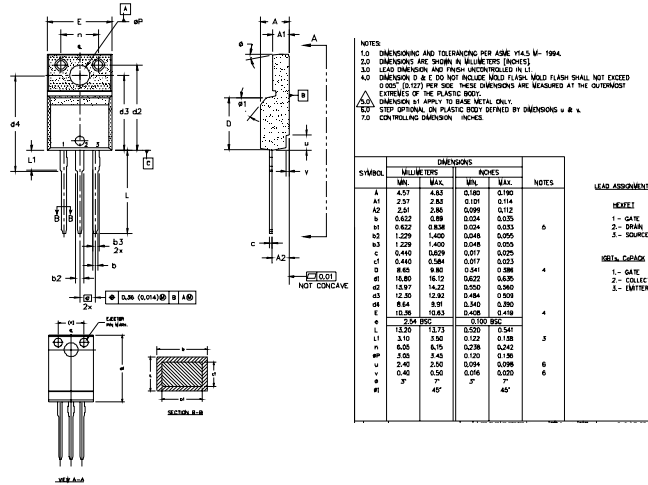
Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I _S	Continuous Source Current (Body Diode)	—	—	6.6	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I _{SM}	Pulsed Source Current (Body Diode) ①⑥	—	—	44		
V _{SD}	Diode Forward Voltage	—	—	1.5	V	T _J = 25°C, I _S = 11A, V _{GS} = 0V ④
t _{rr}	Reverse Recovery Time	—	510	770	ns	T _J = 25°C, I _F = 11A
Q _{rr}	Reverse Recovery Charge	—	3.4	5.1	μC	di/dt = 100A/μs ④⑥
t _{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L _S +L _D)				

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TO-220 Full-Pak Package Outline

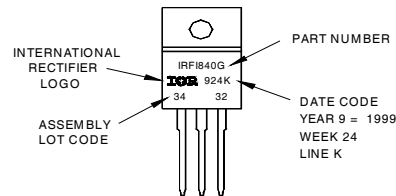
Dimensions are shown in millimeters (inches)



TO-220 Full-Pak Part Marking Information

EXAMPLE: THIS IS AN IRF1840G
WITH ASSEMBLY
LOT CODE 3432
ASSEMBLED ON WW 24 1999
IN THE ASSEMBLY LINE "K"

Note: "P" in assembly line position indicates "Lead-Free"



Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)
- ② Starting $T_J = 25^\circ\text{C}$, $L = 4.5\text{mH}$
 $R_G = 25\Omega$, $I_{AS} = 11\text{A}$. (See Figure 12)
- ③ $I_{SD} \leq 11\text{A}$, $di/dt \leq 140\text{A}/\mu\text{s}$, $V_{DD} \leq V_{(BR)DSS}$,
 $T_J \leq 150^\circ\text{C}$
- ④ Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.
- ⑤ C_{OSS} eff. is a fixed capacitance that gives the same charging time as C_{OSS} while V_{DS} is rising from 0 to 80% V_{DSS}
- ⑥ Uses IRFB11N50A data and test conditions
- ⑦ $t = 60\text{s}$, $f = 60\text{Hz}$