

SMPS MOSFET

IRFB61N15DPbF

HEXFET® Power MOSFET

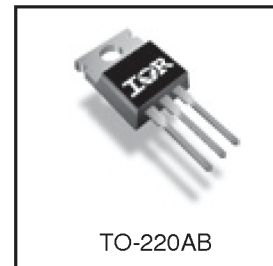
Applications

- High frequency DC-DC converters
- Motor Control
- Uninterruptible Power Supplies
- Lead-Free

V_{DSS}	R_{DS(on) max}	I_D
150V	0.032Ω	60A

Benefits

- Low Gate-to-Drain Charge to Reduce Switching Losses
- Fully Characterized Capacitance Including Effective C_{OSS} to Simplify Design, (See App. Note AN1001)
- Fully Characterized Avalanche Voltage and Current



Absolute Maximum Ratings

	Parameter	Max.	Units
I _D @ T _C = 25°C	Continuous Drain Current, V _{GS} @ 10V	60	A
I _D @ T _C = 100°C	Continuous Drain Current, V _{GS} @ 10V	42	
I _{DM}	Pulsed Drain Current ①	250	
P _D @ T _A = 25°C	Power Dissipation	2.4	W
P _D @ T _C = 25°C	Power Dissipation	330	W/°C
	Linear Derating Factor	2.2	
V _{GS}	Gate-to-Source Voltage	± 30	V
dv/dt	Peak Diode Recovery dv/dt ②	3.7	V/ns
T _J	Operating Junction and	-55 to + 175	°C
T _{STG}	Storage Temperature Range		
	Soldering Temperature, for 10 seconds	300 (1.6mm from case)	
	Mounting torque, 6-32 or M3 screw ③	10 lbf•in (1.1N•m)	

Thermal Resistance

	Parameter	Typ.	Max.	Units
R _{θJC}	Junction-to-Case	—	0.45	°C/W
R _{θCS}	Case-to-Sink, Flat, Greased Surface	0.50	—	
R _{θJA}	Junction-to-Ambient	—	62	

Notes ① through ③ are on page 8

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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	150	—	—	V	V _{GS} = 0V, I _D = 250μA
ΔV _{(BR)DSS} /ΔT _J	Breakdown Voltage Temp. Coefficient	—	0.18	—	V/°C	Reference to 25°C, I _D = 1mA
R _{DS(on)}	Static Drain-to-Source On-Resistance	—	—	0.032	Ω	V _{GS} = 10V, I _D = 36A ④
V _{GS(th)}	Gate Threshold Voltage	3.0	—	5.5	V	V _{DS} = V _{GS} , I _D = 250μA
I _{DSS}	Drain-to-Source Leakage Current	—	—	25	μA	V _{DS} = 150V, V _{GS} = 0V
		—	—	250		V _{DS} = 120V, V _{GS} = 0V, T _J = 150°C
I _{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	V _{DS} = 30V
	Gate-to-Source Reverse Leakage	—	—	-100		V _{GS} = -30V

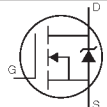
Dynamic @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
g _{fs}	Forward Transconductance	22	—	—	S	V _{DS} = 50V, I _D = 37A
Q _g	Total Gate Charge	—	95	140	nC	I _D = 37A
Q _{gs}	Gate-to-Source Charge	—	26	39		V _{DS} = 120V
Q _{gd}	Gate-to-Drain ("Miller") Charge	—	45	68		V _{GS} = 10V,
t _{d(on)}	Turn-On Delay Time	—	18	—	ns	V _{DD} = 75V
t _r	Rise Time	—	110	—		I _D = 37A
t _{d(off)}	Turn-Off Delay Time	—	28	—		R _G = 1.8Ω
t _f	Fall Time	—	51	—		V _{GS} = 10V ④
C _{iss}	Input Capacitance	—	3470	—	pF	V _{GS} = 0V
C _{oss}	Output Capacitance	—	690	—		V _{DS} = 25V
C _{rss}	Reverse Transfer Capacitance	—	150	—		f = 1.0MHz
C _{oss}	Output Capacitance	—	4600	—		V _{GS} = 0V, V _{DS} = 1.0V, f = 1.0MHz
C _{oss}	Output Capacitance	—	310	—		V _{GS} = 0V, V _{DS} = 120V, f = 1.0MHz
C _{oss eff.}	Effective Output Capacitance	—	580	—		V _{GS} = 0V, V _{DS} = 0V to 120V ⑤

Avalanche Characteristics

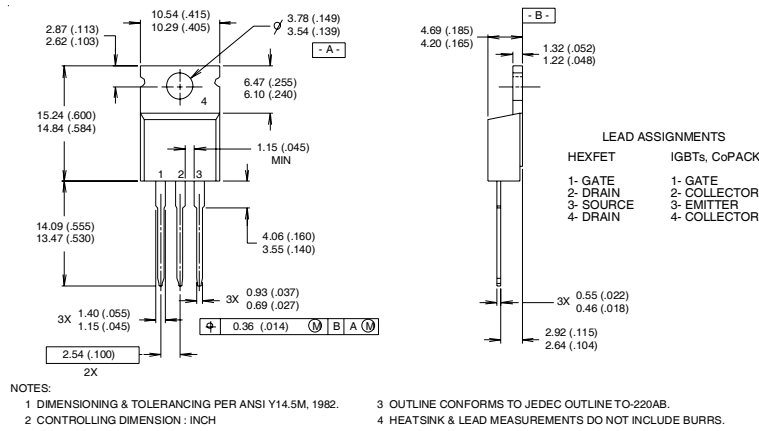
	Parameter	Typ.	Max.	Units
E _{AS}	Single Pulse Avalanche Energy②	—	520	mJ
I _{AR}	Avalanche Current①	—	37	A
E _{AR}	Repetitive Avalanche Energy①	—	33	mJ

Diode Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I _S	Continuous Source Current (Body Diode)	—	—	60	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I _{SM}	Pulsed Source Current (Body Diode) ①	—	—	250		
V _{SD}	Diode Forward Voltage	—	—	1.3	V	T _J = 25°C, I _S = 37A, V _{GS} = 0V ④
t _{rr}	Reverse Recovery Time	—	180	270	ns	T _J = 25°C, I _F = 37A
Q _{rr}	Reverse Recovery Charge	—	1340	2010	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)				

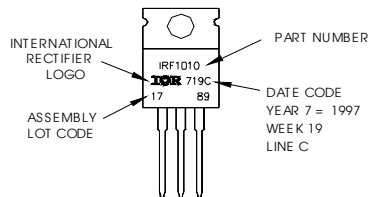
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TO-220AB Package Outline



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"



Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Starting $T_J = 25^\circ\text{C}$, $L = 0.98\text{mH}$
 $R_G = 25\Omega$, $I_{AS} = 37\text{A}$, $V_{GS} = 10\text{V}$
- ③ $I_{SD} \leq 37\text{A}$, $di/dt \leq 170\text{A}/\mu\text{s}$, $V_{DD} \leq V_{(BR)DSS}$,
 $T_J \leq 175^\circ\text{C}$
- ④ Pulse width $\leq 400\mu\text{s}$; 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}

Data and specifications subject to change without notice.
 This product has been designed and qualified for the Industrial market.