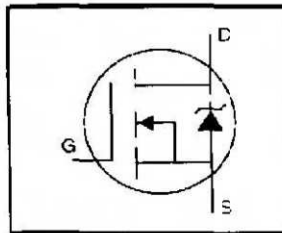


IRFBC40LCPbF

HEXFET® Power MOSFET

- Ultra Low Gate Charge
- Reduced Gate Drive Requirement
- Enhanced 30V V_{GS} Rating
- Reduced C_{iss}, C_{oss}, C_{rss}
- Extremely High Frequency Operation
- Repetitive Avalanche Rated
- Lead-Free

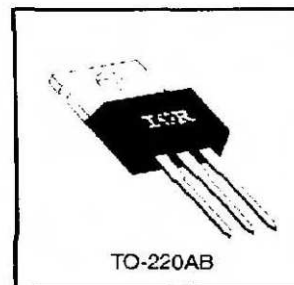


$V_{DSS} = 600V$
$R_{DS(on)} = 1.2\Omega$
$I_D = 6.2A$

Description

This new series of Low Charge HEXFETs achieve significantly lower gate charge over conventional MOSFETs. Utilizing the new LCDMOS technology, the device improvements are achieved without added product cost, allowing for reduced gate drive requirements and total system savings. In addition, reduced switching losses and improved efficiency are achievable in a variety of high frequency applications. Frequencies of a few MHz at high current are possible using the new Low Charge MOSFETs.

These device improvements combined with the proven ruggedness and reliability that are characteristic of HEXFETs offer the designer a new standard in power transistors for switching applications.



Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, V _{GS} @ 10 V	6.2	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, V _{GS} @ 10 V	3.9	
I_{DM}	Pulsed Drain Current ①	25	
$P_D @ T_C = 25^\circ C$	Power Dissipation	125	W
	Linear Derating Factor	1.0	W/°C
V _{GS}	Gate-to-Source Voltage	±30	V
E _{AS}	Single Pulse Avalanche Energy ②	530	mJ
I _{AR}	Avalanche Current ①	6.2	A
E _{AR}	Repetitive Avalanche Energy ③	13	mJ
dv/dt	Peak Diode Recovery dv/dt ④	3.0	V/ns
T _J	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 screw	10 lbf·in (1.1 N·m)	

Thermal Resistance

	Parameter	Min.	Typ.	Max.	Units
R _{θJC}	Junction-to-Case	—	—	1.0	°C/W
R _{θCS}	Case-to-Sink, Flat, Greased Surface	—	0.50	—	
R _{θJA}	Junction-to-Ambient	—	—	62	

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International
IR Rectifier

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

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
V _{(BR)DSS}	Drain-to-Source Breakdown Voltage	600	—	—	V	V _{GS} =0V, I _D =250μA
ΔV _{(BR)DSS/ΔT_J}	Breakdown Voltage Temp. Coefficient	—	0.70	—	V/°C	Reference to 25°C, I _D =1mA
R _{DS(on)}	Static Drain-to-Source On-Resistance	—	—	1.2	Ω	V _{GS} =10V, I _D =3.7A ④
V _{GS(th)}	Gate Threshold Voltage	2.0	—	4.0	V	V _{DS} =V _{GS} , I _D =250μA
g _{fs}	Forward Transconductance	3.7	—	—	S	V _{DS} =100V, I _D =3.7A ④
I _{DSS}	Drain-to-Source Leakage Current	—	—	100	μA	V _{DS} =600V, V _{GS} =0V
		—	—	500	μA	V _{DS} =480V, V _{GS} =0V, T _J =125°C
I _{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	V _{GS} =20V
	Gate-to-Source Reverse Leakage	—	—	-100	nA	V _{GS} =-20V
Q _g	Total Gate Charge	—	—	39	nC	I _C =6.2A
Q _{gs}	Gate-to-Source Charge	—	—	10	nC	V _{DS} =360V
Q _{gd}	Gate-to-Drain ("Miller") Charge	—	—	19	nC	V _{GS} =10V See Fig. 6 and 13 ④
t _{d(on)}	Turn-On Delay Time	—	12	—	ns	V _{DD} =30CV
t _r	Rise Time	—	20	—	ns	I _D =6.2A
t _{d(off)}	Turn-Off Delay Time	—	27	—	ns	R _G =9.1Ω
t _f	Fall Time	—	17	—	ns	R _D =47Ω 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	—	nH	
C _{iss}	Input Capacitance	—	1100	—	pF	V _{GS} =0V
C _{oss}	Output Capacitance	—	140	—	pF	V _{DS} =25V
C _{rss}	Reverse Transfer Capacitance	—	15	—	pF	f=10MHz See Figure 5

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I _S	Continuous Source Current (Body Diode)	—	—	6.2	A	MOSFET symbol showing the integral reverse p-n junction diode.
I _{SM}	Pulsed Source Current (Body Diode) ①	—	—	25	A	
V _{SD}	Diode Forward Voltage	—	—	1.5	V	T _J =25°C, I _S =6.2A, V _{GS} =0V ④
t _{rr}	Reverse Recovery Time	—	440	680	ns	T _J =25°C, I _F =6.2A
Q _{rr}	Reverse Recovery Charge	—	2.1	3.2	μC	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:

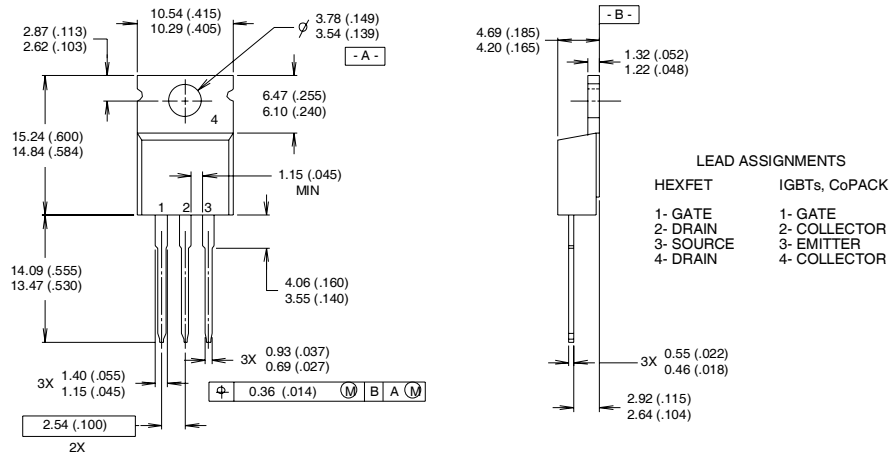
- ① Repetitive rating; pulse width limited by max. junction temperature (See Figure 11)
- ② V_{DD}=50V, starting T_J=25°C, L=25mH, R_G=25Ω, I_{AS}=6.2A (See Figure 12)
- ③ I_{SD}≤6.2A, dI/dt≤80A/μs, V_{DD}≤V_{(BR)DSS}, T_J≤150°C
- ④ Pulse width ≤ 300 μs; duty cycle ≤2%

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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"

