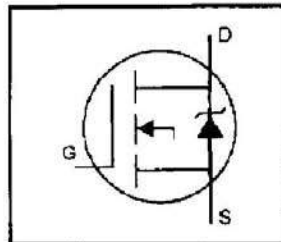


IRF840LCPbF

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

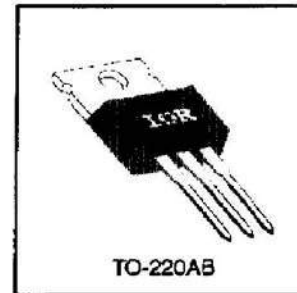


$V_{DSS} = 500V$
$R_{DS(on)} = 0.85\Omega$
$I_D = 8.0A$

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	8.0	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, V _{GS} @ 10 V	5.1	
I_{DM}	Pulsed Drain Current	28	
$P_D @ T_C = 25^\circ C$	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	510	mJ
I _{AR}	Avalanche Current	8.0	A
E _{AR}	Repetitive Avalanche Energy	13	mJ
dv/dt	Peak Diode Recovery dv/dt	3.5	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 (1.1 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	

Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

Parameter	Min.	Typ.	Max.	Units	Test Conditions
$V_{(BR)DSS}$	500	—	—	V	$V_{GS}=0V, I_D=250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	—	0.63	—	V/°C	Reference to $25^\circ\text{C}, I_D=1\text{mA}$
$R_{DS(on)}$	—	—	0.85	Ω	$V_{GS}=10V, I_D=4.8A$ ①
$V_{GS(th)}$	2.0	—	4.0	V	$V_{DS}=V_{GS}, I_D=250\mu A$
g_{fs}	4.0	—	—	S	$V_{DS}=50V, I_D=4.8A$ ②
I_{DSS}	—	—	25	μA	$V_{DS}=500V, V_{GS}=0V$
	—	—	250	μA	$V_{DS}=400V, V_{GS}=0V, T_J=125^\circ\text{C}$
I_{GSS}	—	—	100	nA	$V_{GS}=20V$
	—	—	-100	nA	$V_{GS}=-20V$
Q_g	—	—	39	nC	$I_D=8.0A$
Q_{gs}	—	—	10	nC	$V_{DS}=400V$
Q_{gd}	—	—	19	nC	$V_{GS}=10V$ See Fig. 5 and 13 ③
$t_{(on)}$	—	12	—	ns	$V_{DD}=250V$
t_r	—	25	—	ns	$I_D=8.0A$
$t_{(off)}$	—	27	—	ns	$R_G=9.1\Omega$
t_f	—	19	—	ns	$R_D=30\Omega$ See Figure 10 ④
L_D	—	4.5	—	nH	Between lead, 6 mm (0.25in.) from package and center of die contact
L_S	—	7.5	—	nH	
C_{iss}	—	1100	—	pF	$V_{GS}=0V$
C_{oss}	—	170	—	pF	$V_{DS}=25V$
C_{rss}	—	18	—	pF	$f=1.0\text{MHz}$ See Figure 5

Source-Drain Ratings and Characteristics

Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	—	—	8.0	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	—	—	28	A	
V_{SD}	—	—	2.0	V	$T_J=25^\circ\text{C}, I_S=8.0A, V_{GS}=0V$ ①
t_{rr}	—	490	740	ns	$T_J=25^\circ\text{C}, I_F=8.0A$
Q_{rr}	—	3.0	4.5	μC	$di/dt=100A/\mu s$ ②
t_{on}	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 $T_J=25^\circ\text{C}$, $L=14\text{mH}$, $R_G=25\Omega$, $I_{AS}=8.0A$ (See Figure 12)

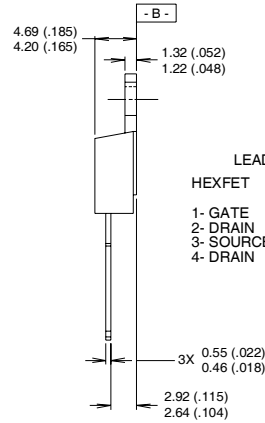
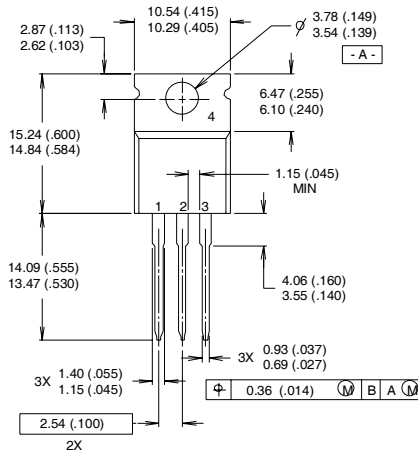
③ $I_{SDS}=8.0A$, $di/dts=100A/\mu s$, $V_{DD}\leq V_{(BR)DSS}$, $T_J\leq 150^\circ\text{C}$

④ Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.

IRF840LCPbF

TO-220AB Package Outline

Dimensions are shown in millimeters (inches)



LEAD ASSIGNMENTS	
HEXFET	IGBTs, CoPACK
1- GATE	1- GATE
2- DRAIN	2- COLLECTOR
3- SOURCE	3- EMITTER
4- DRAIN	4- COLLECTOR

- 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"

