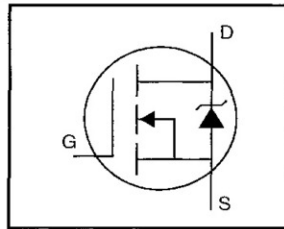


IRFPC50PbF

HEXFET® Power MOSFET

- Dynamic dv/dt Rating
- Repetitive Avalanche Rated
- Isolated Central Mounting Hole
- Fast Switching
- Ease of Paralleling
- Simple Drive Requirements
- Lead-Free

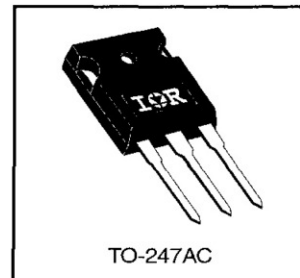


$V_{DSS} = 600V$
 $R_{DS(on)} = 0.60\Omega$
 $I_D = 11A$

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-247 package is preferred for commercial–industrial applications where higher power levels preclude the use of TO-220 devices. The TO-247 is similar but superior to the earlier TO-218 package because of its isolated mounting hole. It also provides greater creepage distance between pins to meet the requirements of most safety specifications.



Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10 V$	11	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10 V$	7.0	
I_{DM}	Pulsed Drain Current ①	44	
$P_D @ T_C = 25^\circ C$	Power Dissipation	180	W
	Linear Derating Factor	1.4	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy ②	920	mJ
I_{AR}	Avalanche Current ①	10	A
E_{AR}	Repetitive Avalanche Energy ①	18	mJ
dv/dt	Peak Diode Recovery dv/dt ③	3.0	V/ns
T_J T_{STG}	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
$R_{\theta JC}$	Junction-to-Case	—	—	0.65	°C/W
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	—	0.24	—	
$R_{\theta JA}$	Junction-to-Ambient	—	—	40	

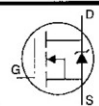
IRFPC50PbF

International
IR Rectifier

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

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	600	—	—	V	$V_{GS}=0V, I_D=250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.78	—	$V/^\circ\text{C}$	Reference to $25^\circ\text{C}, I_D=1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.60	Ω	$V_{GS}=10V, I_D=6.0A$ ④
$V_{GS(th)}$	Gate Threshold Voltage	2.0	—	4.0	V	$V_{DS}=V_{GS}, I_D=250\mu A$
g_{fs}	Forward Transconductance	5.7	—	—	S	$V_{DS}=100V, I_D=6.0A$ ④
I_{DSS}	Drain-to-Source Leakage Current	—	—	100	μA	$V_{DS}=600V, V_{GS}=0V$ $V_{DS}=480V, V_{GS}=0V, T_J=125^\circ\text{C}$
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	—	—	140	nC	$I_D=11A$ $V_{DS}=360V$ $V_{GS}=10V$ See Fig. 6 and 13 ④
Q_{gs}	Gate-to-Source Charge	—	—	20	nC	$V_{DD}=300V$ $I_D=11A$ $R_G=6.2\Omega$ $R_D=30\Omega$ See Figure 10 ④
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	—	69	nC	
$t_{d(on)}$	Turn-On Delay Time	—	18	—	ns	
t_r	Rise Time	—	37	—	ns	
$t_{d(off)}$	Turn-Off Delay Time	—	88	—	ns	Between lead, 6 mm (0.25in.) from package and center of die contact 
t_f	Fall Time	—	36	—	ns	
L_D	Internal Drain Inductance	—	5.0	—	nH	Between lead, 6 mm (0.25in.) from package and center of die contact 
L_S	Internal Source Inductance	—	13	—	nH	
C_{iss}	Input Capacitance	—	2700	—	pF	$V_{GS}=0V$
C_{oss}	Output Capacitance	—	300	—	pF	$V_{DS}=25V$
C_{riss}	Reverse Transfer Capacitance	—	61	—	pF	$f=1.0\text{MHz}$ See Figure 5

Source-Drain Ratings and Characteristics

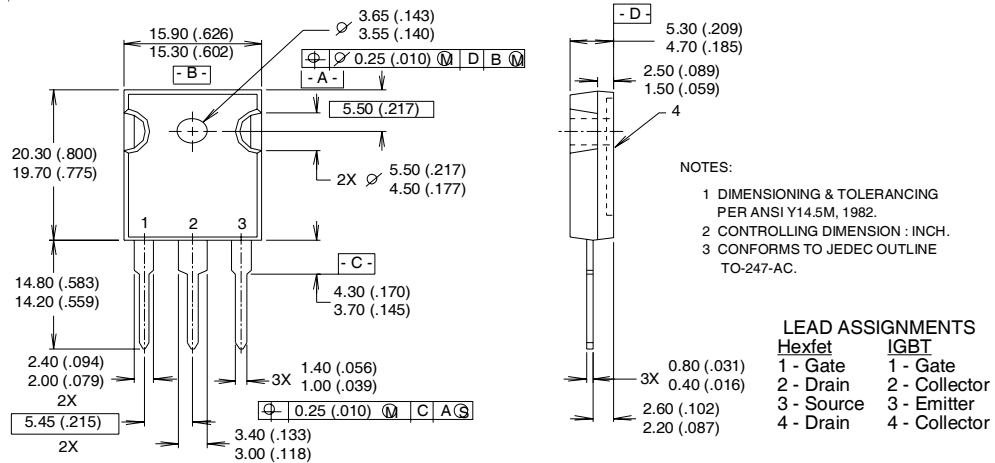
	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	—	—	11	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	44	A	
V_{SD}	Diode Forward Voltage	—	—	1.4	V	$T_J=25^\circ\text{C}, I_S=11A, V_{GS}=0V$ ④
t_{rr}	Reverse Recovery Time	—	550	830	ns	$T_J=25^\circ\text{C}, I_F=11A$
Q_{rr}	Reverse Recovery Charge	—	3.9	5.9	μC	$di/dt=100A/\mu\text{s}$ 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 $T_J=25^\circ\text{C}$, $L=13\text{mH}$, $R_G=25\Omega$, $I_{AS}=11A$ (See Figure 12)
- ③ $I_{SD}\leq 11A$, $di/dt\leq 100A/\mu\text{s}$, $V_{DD}\leq V_{(BR)DSS}$, $T_J\leq 150^\circ\text{C}$
- ④ Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.

TO-247AC Package Outline

Dimensions are shown in millimeters (inches)



TO-247AC Part Marking Information

EXAMPLE: THIS IS AN IRFPE30
 WITH ASSEMBLY
 LOT CODE 5657
 ASSEMBLED ON WW 35, 2000
 IN THE ASSEMBLY LINE "H"
Note: "P" in assembly line
 position indicates "Lead-Free"

