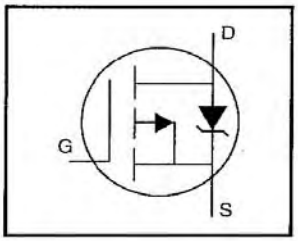
International
IOR Rectifier

PD - 95057

IRFP9240PbF

HEXFET® Power MOSFET

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



V_{DSS} = -200V

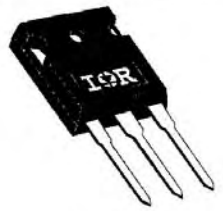
$R_{DS(on)}$ = 0.50Ω

I_D = -12A

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.



TO-247AC

Absolute Maximum Ratings

	Parameter	Max.	Units
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ -10 V	-12	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ -10 V	-7.5	
I_{DM}	Pulsed Drain Current ①	-48	
P_D @ T_C = 25°C	Power Dissipation	150	W
	Linear Derating Factor	1.2	W/°C
V_{GS}	Gate-to-Source Voltage	±20	V
E_{AS}	Single Pulse Avalanche Energy ②	790	mJ
I_{AR}	Avalanche Current ①	-12	A
E_{AR}	Repetitive Avalanche Energy ①	15	mJ
dv/dt	Peak Diode Recovery dv/dt ③	-5.0	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	—	—	0.83	°C/W
$R_{\theta CS}$	Case-to-Sink, Flat, Greased Surface	—	0.24	—	
$R_{\theta JA}$	Junction-to-Ambient	—	—	40	

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

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-200	—	—	V	V_{GS}=0V, I_D=-250μA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	-0.20	—	V/°C	Reference to 25°C, I_D=-1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.50	Ω	V_{GS}=-10V, I_D=-7.2A ④
$V_{GS(th)}$	Gate Threshold Voltage	-2.0	—	-4.0	V	V_{DS}=V_{GS}, I_D=-250μA
g_{fs}	Forward Transconductance	4.2	—	—	S	V_{DS}=-50V, I_D=-7.2A ④
I_{DSS}	Drain-to-Source Leakage Current	—	—	-100	μA	V_{DS}=-200V, V_{GS}=0V
		—	—	-500		V_{DS}=-160V, 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		V_{GS}=20V
Q_g	Total Gate Charge	—	—	44	nC	I_D=-11A
Q_{gs}	Gate-to-Source Charge	—	—	7.1		V_{DS}=-160V
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	—	27		V_{GS}=-10V See Fig. 6 and 13 ④
$t_{d(on)}$	Turn-On Delay Time	—	14	—	ns	V_{DD}=-100V
t_r	Rise Time	—	43	—		I_D=-11A
$t_{d(off)}$	Turn-Off Delay Time	—	39	—		R_G=9.1Ω
t_f	Fall Time	—	38	—		R_D=8.6Ω See Figure 10 ④
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	—		
C_{iss}	Input Capacitance	—	1200	—	pF	V_{GS}=0V
C_{oss}	Output Capacitance	—	370	—		V_{DS}=-25V
C_{rss}	Reverse Transfer Capacitance	—	81	—		f=1.0MHz See Figure 5

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-12	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	-48		
V_{SD}	Diode Forward Voltage	—	—	-5.0	V	T_J=25°C, I_S=-12A, V_{GS}=0V ④
t_{rr}	Reverse Recovery Time	—	250	300	ns	T_J=25°C, I_F=-11A
Q_{rr}	Reverse Recovery Charge	—	2.9	3.6	μC	di/dt=100A/μs ④
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is neglegible (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=8.2mH R_G=25Ω, I_{AS}=-12A (See Figure 12)

③ I_{SD}≤-12A, di/dt≤150A/μs, V_{DD}≤$V_{(BR)DSS}$, T_J≤150°C

④ Pulse width ≤ 300 μs; duty cycle ≤2%.

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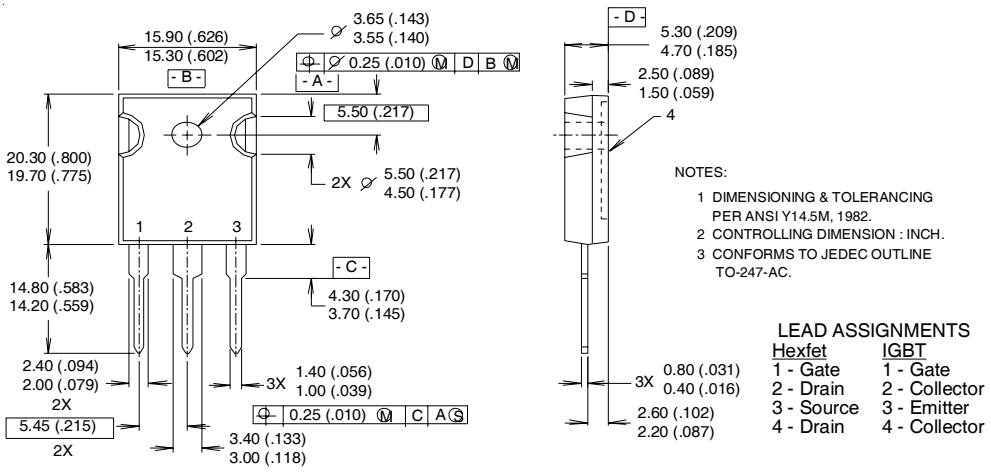
TO-247AC Package Outline

Dimensions are shown in millimeters (inches)



NOTES:

1 DIMENSIONING & TOLERANCING PER ANSI Y14.5M, 1982.
2 CONTROLLING DIMENSION : INCH.
3 CONFORMS TO JEDEC OUTLINE TO-247-AC.

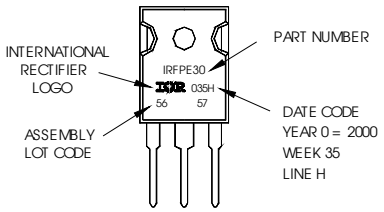
LEAD ASSIGNMENTS

Hexfet	IGBT
1 - Gate	1 - Gate
2 - Drain	2 - Collector
3 - Source	3 - Emitter
4 - Drain	4 - Collector

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"



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