

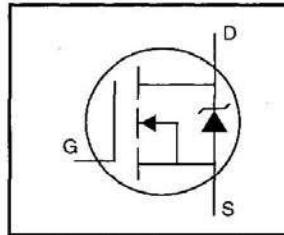
International IR Rectifier

PD - 94901

IRFP460PbF

HEXFET® Power MOSFET

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

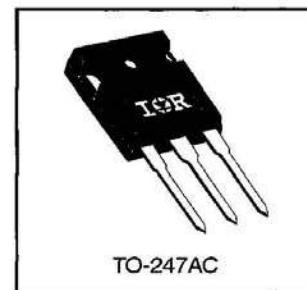


$V_{DSS} = 500V$
$R_{DS(on)} = 0.27\Omega$
$I_D = 20A$

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
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10 V$	20	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10 V$	13	
I_{DM}	Pulsed Drain Current ①	80	W
$P_D @ T_C = 25^\circ C$	Power Dissipation	280	
	Linear Derating Factor	2.2	$W/W^\circ C$
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy ②	960	mJ
I_{AR}	Avalanche Current ①	20	A
E_{AR}	Repetitive Avalanche Energy ①	28	mJ
dv/dt	Peak Diode Recovery dv/dt ③	3.5	V/ns
T_J	Operating Junction and	-55 to +150	$^\circ C$
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_{JC}	Junction-to-Case	—	—	0.45	$^\circ C/W$
R_{CS}	Case-to-Sink, Flat, Greased Surface	—	0.24	—	
R_{JA}	Junction-to-Ambient	—	—	40	

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

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$V_{(\text{BR})\text{DSS}}$	Drain-to-Source Breakdown Voltage	500	—	—	V	$V_{GS}=0\text{V}$, $I_D=250\mu\text{A}$
$\Delta V_{(\text{BR})\text{DSS}/\Delta T_J}$	Breakdown Voltage Temp. Coefficient	—	0.63	—	V°C	Reference to 25°C , $I_D=1\text{mA}$
$R_{DS(\text{on})}$	Static Drain-to-Source On-Resistance	—	—	0.27	Ω	$V_{GS}=10\text{V}$, $I_D=12\text{A}$ ④
$V_{GS(\text{th})}$	Gate Threshold Voltage	2.0	—	4.0	V	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$
g_{fs}	Forward Transconductance	13	—	—	S	$V_{DS}=50\text{V}$, $I_D=12\text{A}$ ④
I_{DSS}	Drain-to-Source Leakage Current	—	—	25	μA	$V_{DS}=500\text{V}$, $V_{GS}=0\text{V}$
		—	—	250		$V_{DS}=400\text{V}$, $V_{GS}=0\text{V}$, $T_J=125^\circ\text{C}$
I_{GS}	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS}=20\text{V}$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS}=-20\text{V}$
Q_g	Total Gate Charge	—	—	210	nC	$I_D=20\text{A}$
Q_{gs}	Gate-to-Source Charge	—	—	29		$V_{DS}=400\text{V}$
Q_{gd}	Gate-to-Drain ("Miller") Charge	—	—	110	nC	$V_{GS}=10\text{V}$ See Fig. 6 and 13 ④
$t_{d(on)}$	Turn-On Delay Time	—	18	—		$V_{DD}=250\text{V}$
t_r	Rise Time	—	59	—	ns	$I_D=20\text{A}$
$t_{d(off)}$	Turn-Off Delay Time	—	110	—		$R_G=4.3\Omega$
t_f	Fall Time	—	58	—		$R_D=13\Omega$ 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	—	4200	—	pF	$V_{GS}=0\text{V}$
C_{oss}	Output Capacitance	—	870	—		$V_{DS}=25\text{V}$
C_{rss}	Reverse Transfer Capacitance	—	350	—	$\text{f}=1.0\text{MHz}$	See Figure 5

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
I_S	Continuous Source Current (Body Diode)	—	—	20	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	80		
V_{SD}	Diode Forward Voltage	—	—	1.8	V	$T_J=25^\circ\text{C}$, $I_S=20\text{A}$, $V_{GS}=0\text{V}$ ④
t_{rr}	Reverse Recovery Time	—	570	860	ns	$T_J=25^\circ\text{C}$, $I=20\text{A}$
Q_{rr}	Reverse Recovery Charge	—	5.7	8.6	μC	$dI/dt=100\text{A}/\mu\text{s}$ 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)

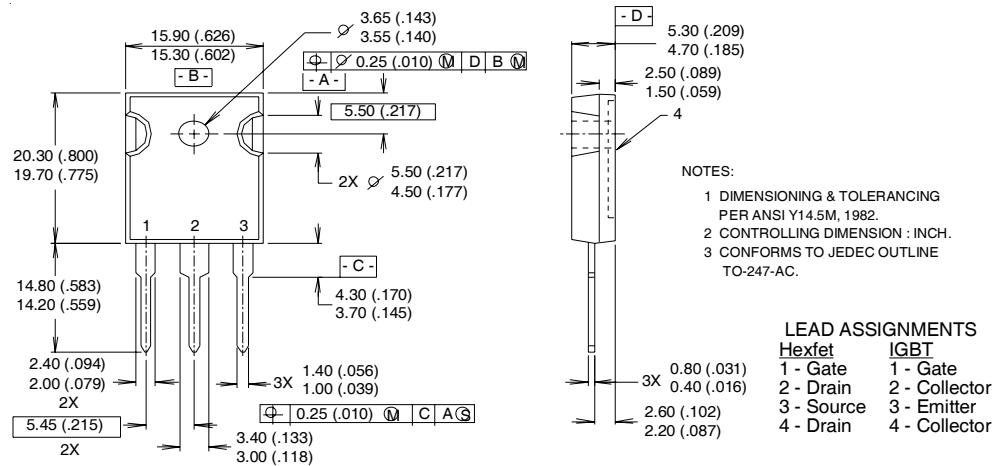
③ $I_{SD}\leq 20\text{A}$, $di/dt\leq 160\text{A}/\mu\text{s}$, $V_{DD}\leq V_{(\text{BR})\text{DSS}}$, $T_J\leq 150^\circ\text{C}$

② $V_{DD}=50\text{V}$, starting $T_J=25^\circ\text{C}$, $L=4.3\text{mH}$
 $R_G=25\Omega$, $I_{AS}=20\text{A}$ (See Figure 12)

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

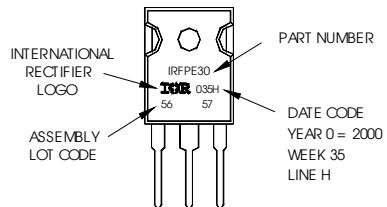
TO-247AC Package Outline

Dimensions are shown in millimeters (inches)



TO-247AC Part Marking Information

EXAMPLE: THIS IS AN IRFP460
WITH ASSEMBLY
LOT CODE 5657
ASSEMBLED ON WW35, 2000
IN THE ASSEMBLY LINE "H"
Note: "P" in assembly line
position indicates "Lead-Free"



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