

# IRFP340PbF

HEXFET® Power MOSFET

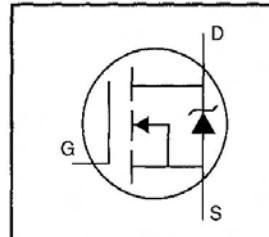
- Dynamic dv/dt Rating
- Repetitive Avalanche Rated
- Isolated Central Mounting Hole
- Fast Switching
- Ease of Paralleling
- Simple Drive Requirements

- Lead-Free

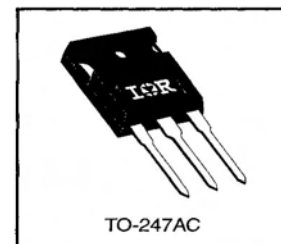
### Description

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.



$V_{DSS} = 400V$   
 $R_{DS(on)} = 0.55\Omega$   
 $I_D = 11A$



### 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, $V_{GS} @ 10 V$	6.9	
$I_{DM}$	Pulsed Drain Current ①	44	
$P_D @ T_C = 25^\circ C$	Power Dissipation	150	W
	Linear Derating Factor	1.2	W/°C
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$E_{AS}$	Single Pulse Avalanche Energy ②	480	mJ
$I_{AR}$	Avalanche Current ①	11	A
$E_{AR}$	Repetitive Avalanche Energy ①	15	mJ
dv/dt	Peak Diode Recovery dv/dt ③	4.0	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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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	400	—	—	V	$V_{GS}=0V, I_D=250\mu A$
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	—	0.49	—	V/ $^\circ\text{C}$	Reference to $25^\circ\text{C}, I_D=1\text{mA}$
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	—	—	0.55	$\Omega$	$V_{GS}=10V, I_D=6.6A$ 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	7.7	—	—	S	$V_{DS}=50V, I_D=6.6A$ ④
$I_{DSS}$	Drain-to-Source Leakage Current	—	—	25	$\mu A$	$V_{DS}=400V, V_{GS}=0V$
		—	—	250		$V_{DS}=320V, V_{GS}=0V, T_J=125^\circ\text{C}$
$I_{GSS}$	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS}=20V$
	Gate-to-Source Reverse Leakage	—	—	-100		$V_{GS}=-20V$
$Q_g$	Total Gate Charge	—	—	62	nC	$I_D=10A$
$Q_{gs}$	Gate-to-Source Charge	—	—	10		$V_{DS}=320V$
$Q_{gd}$	Gate-to-Drain ("Miller") Charge	—	—	30		$V_{GS}=10V$ See Fig. 6 and 13 ④
$t_{d(on)}$	Turn-On Delay Time	—	14	—	ns	$V_{DD}=200V$
$t_r$	Rise Time	—	27	—		$I_D=10A$
$t_{d(off)}$	Turn-Off Delay Time	—	50	—		$R_G=9.1\Omega$
$t_f$	Fall Time	—	24	—		$R_D=20\Omega$ 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	—	1400	—	pF	$V_{GS}=0V$
$C_{oss}$	Output Capacitance	—	400	—		$V_{DS}=25V$
$C_{rss}$	Reverse Transfer Capacitance	—	130	—		$f=1.0\text{MHz}$ See Figure 5

## Source-Drain Ratings and Characteristics

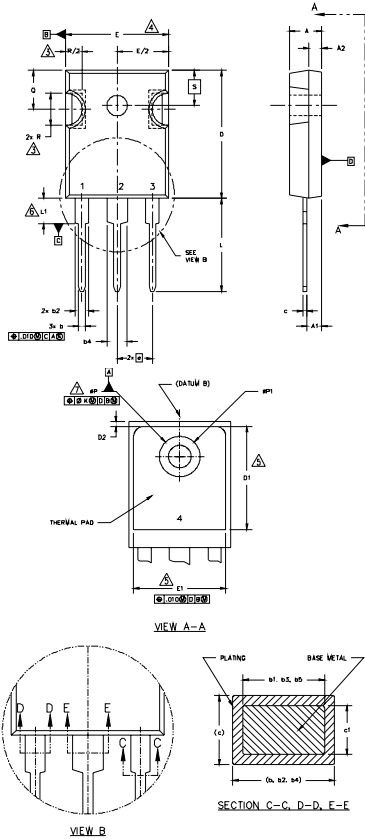
	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	11	A	MOSFET symbol showing the integral reverse p-n junction diode.
$I_{SM}$	Pulsed Source Current (Body Diode) ①	—	—	44		
$V_{SD}$	Diode Forward Voltage	—	—	2.0	V	$T_J=25^\circ\text{C}, I_S=11A, V_{GS}=0V$ ④
$t_{rr}$	Reverse Recovery Time	—	330	660	ns	$T_J=25^\circ\text{C}, I_F=10A$
$Q_{rr}$	Reverse Recovery Charge	—	2.5	5.9	$\mu C$	$di/dt=100A/\mu s$ 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  $T_J=25^\circ\text{C}$ ,  $L=6.9\text{mH}$ ,  $R_G=25\Omega$ ,  $I_{AS}=11A$  (See Figure 12)
- ③  $I_{SD}\leq 11A$ ,  $di/dt\leq 120A/\mu s$ ,  $V_{DD}\leq V_{(BR)DSS}$ ,  $T_J\leq 150^\circ\text{C}$
- ④ Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$ .

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TO-247AC Package Outline Dimensions are shown in millimeters (inches)



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M 1994.
  2. DIMENSIONS ARE SHOWN IN INCHES [MILLIMETERS]
  3. CONTOUR OF SLOT OPTIONAL.
  4. DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED .005" (0.127) PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
  5. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS D1 & E1.
  6. LEAD FINISH UNCONTROLLED IN L1.
  7.  $\phi P$  TO HAVE A MAXIMUM DRAFT ANGLE OF 1.5° TO THE TOP OF THE PART WITH A MAXIMUM HOLE DIAMETER OF .154" [3.91].
  8. OUTLINE CONFORMS TO JEDEC OUTLINE TO-247 WITH THE EXCEPTION OF DIMENSION c.

SYMBOL	DIMENSIONS				NOTES	LEAD ASSIGNMENTS
	INCHES		MILLIMETERS			
	MIN.	MAX.	MIN.	MAX.		
A	.183	.209	4.65	5.31		
A1	.087	.102	2.21	2.59		
A2	.059	.098	1.50	2.49		
b	.039	.055	0.99	1.40		HEXFET
b1	.039	.053	0.99	1.35		1.- GATE
b2	.065	.094	1.65	2.39		2.- DRAIN
b3	.065	.092	1.65	2.37		3.- SOURCE
b4	.102	.135	2.59	3.43		4.- DRAIN
b5	.102	.133	2.59	3.38		
c	.015	.034	0.38	0.86		
c1	.015	.030	0.38	0.76		
D	.776	.815	19.71	20.70	4	IGBTs, CoPACK
D1	.515	—	13.08	—	5	1.- GATE
D2	.020	.030	0.51	0.76		2.- COLLECTOR
E	.602	.625	15.29	15.87	4	3.- EMITTER
E1	.540	—	15.72	—		4.- COLLECTOR
e	.215 BSC		5.46 BSC			
ek	.010		2.54			DIODES
L	.559	.634	14.20	16.10		1.- ANODE/OPEN
L1	.146	.169	3.71	4.29		2.- CATHODE
N	3		7.62 BSC			3.- ANODE
$\phi P$	.140	.144	3.56	3.66		
$\phi P1$	—	.275	—	6.98		
Q	.209	.224	5.31	5.69		
R	.178	.216	4.52	5.49		
S	.217 BSC		5.51 BSC			

## TO-247AC Part Marking Information

EXAMPLE: THIS IS AN IRFPE30  
WITH ASSEMBLY  
LOT CODE 5657  
ASSEMBLED ON WW35, 2000  
IN THE ASSEMBLY LINE "H"  
**Note:** "P" in assembly line  
position indicates "Lead-Free"

