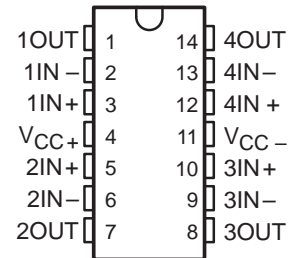


# LF347, LF347B JFET-INPUT QUAD OPERATIONAL AMPLIFIERS

SLOS013B – MARCH 1987 – REVISED AUGUST 1994

- Low Input Bias Current . . . 50 pA Typ
- Low Input Noise Current  
0.01 pA/ $\sqrt{\text{Hz}}$  Typ
- Low Total Harmonic Distortion
- Low Supply Current . . . 8 mA Typ
- Gain Bandwidth . . . 3 MHz Typ
- High Slew Rate . . . 13 V/ $\mu\text{s}$  Typ
- Pin Compatible With the LM348

D OR N PACKAGE  
(TOP VIEW)



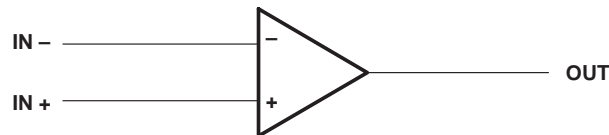
## description

These devices are low-cost, high-speed, JFET-input operational amplifiers. They require low supply current yet maintain a large gain-bandwidth product and a fast slew rate. In addition, their matched high-voltage JFET inputs provide very low input bias and offset current.

The LF347 and LF347B can be used in applications such as high-speed integrators, digital-to-analog converters, sample-and-hold circuits, and many other circuits.

The LF347 and LF347B are characterized for operation from 0°C to 70°C.

## symbol (each amplifier)



AVAILABLE OPTIONS

T <sub>A</sub>	V <sub>IO</sub> max AT 25°C	PACKAGE	
		SMALL OUTLINE (D)	PLASTIC DIP (N)
0°C to 70°C	10 mV	LF347D	LF347N
	5 mV	LF347BD	LF347BN

The D packages are available taped and reeled. Add R suffix to the device type (e.g., LF347DR).

## absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, V <sub>CC</sub> +	18 V
Supply voltage, V <sub>CC</sub> -	-18 V
Differential input voltage, V <sub>ID</sub>	±30 V
Input voltage, V <sub>I</sub> (see Note 1)	±15 V
Duration of output short circuit	unlimited
Continuous total power dissipation	See Dissipation Rating Table
Operating temperature range	0°C to 70°C
Storage temperature range	-65°C to 150°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds	260°C

NOTE 1: Unless otherwise specified, the absolute maximum negative input voltage is equal to the negative power supply voltage.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.



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**LF347, LF347B**  
**JFET-INPUT**  
**QUAD OPERATIONAL AMPLIFIERS**

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**DISSIPATION RATING TABLE**

PACKAGE	T <sub>A</sub> ≤ 25°C POWER RATING	DERATING FACTOR	DERATE ABOVE T <sub>A</sub>	T <sub>A</sub> = 70°C POWER RATING
D	608 mW	7.6 mW/°C	61°C	608 mW
N	680 mW	N/A	N/A	680 mW

**recommended operating conditions**

	MIN	MAX	UNIT
Supply voltage, V <sub>CC</sub> +	3.5	18	V
Supply voltage, V <sub>CC</sub> –	–3.5	–18	V

**electrical characteristics over operating free-air temperature range, V<sub>CC±</sub> = ±15 V (unless otherwise specified)**

PARAMETER	TEST CONDITIONS	T <sub>A</sub> †	LF347			LF347B			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
V <sub>IO</sub> Input offset voltage	V <sub>IC</sub> = 0, R <sub>S</sub> = 10 kΩ	25°C		5	10		3	5	mV
		Full range			13			7	
α <sub>VIO</sub> Average temperature coefficient of input offset voltage	V <sub>IC</sub> = 0, R <sub>S</sub> = 10 kΩ			18			18		μV/°C
I <sub>IO</sub> Input offset current‡	V <sub>IC</sub> = 0	25°C		25	100		25	100	pA
		70°C			4			4	nA
I <sub>IB</sub> Input bias current‡	V <sub>IC</sub> = 0	25°C		50	200		50	200	pA
		70°C			8			8	nA
V <sub>ICR</sub> Common-mode input voltage range			±11	–12 to 15		±11	–12 to 15		V
V <sub>OM</sub> Maximum peak output voltage swing	R <sub>L</sub> = 10 kΩ		±12	±13.5		±12	±13.5		V
A <sub>VD</sub> Large-signal differential voltage	V <sub>O</sub> = ±10 V, R <sub>L</sub> = 2 kΩ	25°C	25	100		50	100		V/mV
		Full range	15			25			
r <sub>i</sub> Input resistance	T <sub>A</sub> = 25°C			10 <sup>12</sup>			10 <sup>12</sup>		Ω
CMRR Common-mode rejection ratio	R <sub>S</sub> ≤ 2 kΩ		70	100		80	100		dB
k <sub>SVR</sub> Supply-voltage rejection ratio	See Note 2		70	100		80	100		dB
I <sub>CC</sub> Supply current				8	11		8	11	mA

† Full range is 0°C to 70°C.

‡ Input bias currents of a FET-input operational amplifier are normal junction reverse currents, which are temperature sensitive. Pulse techniques must be used that will maintain the junction temperatures as close to the ambient temperature as possible.

NOTE 2: Supply-voltage rejection ratio is measured for both supply magnitudes increasing or decreasing simultaneously.

**operating characteristics, V<sub>CC±</sub> = ±15 V**

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
V <sub>O1</sub> /V <sub>O2</sub> Crosstalk attenuation	f = 1 kHz		120		dB
SR Slew rate		8	13		V/μs
B <sub>1</sub> Unity-gain bandwidth			3		MHz
V <sub>n</sub> Equivalent input noise voltage	f = 1 kHz, R <sub>S</sub> = 20 Ω		18		nV/√Hz
I <sub>n</sub> Equivalent input noise current	f = 1 kHz		0.01		pA/√Hz



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