LF347, B
LF351
LF353

2

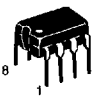
JFET Input Operational Amplifiers

FAMILY OF JFET OPERATIONAL AMPLIFIERS

These low cost JFET input operational amplifiers combine two state–of–the–art analog technologies on a single monolithic integrated circuit. Each internally compensated operational amplifier has well matched high voltage JFET input devices for low input offset voltage. The JFET technology provides wide bandwidths and fast slew rates with low input bias currents, input offset currents, and supply currents.

These devices are available in single, dual and quad operational amplifiers which are pin–compatible with the industry standard MC1741, MC1458, and the MC3403/LM324 bipolar devices.

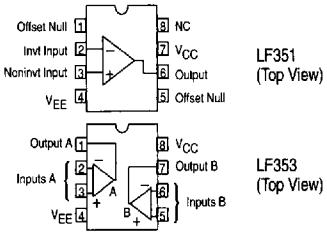
- Input Offset Voltage of 5.0 mV Max (LF347B)
- Low Input Bias Current: 50 pA
- Low Input Noise Voltage: 16 nV/$\sqrt{Hz}$
- Wide Gain Bandwidth: 4.0 MHz
- High Slew Rate: 13V/μs
- Low Supply Current: 1.8 mA per Amplifier
- High Input Impedance: 10^{12} Ω
- High Common Mode and Supply Voltage Rejection Ratios: 100 dB

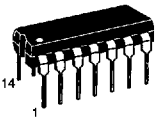


N SUFFIX
PLASTIC PACKAGE
CASE 626

D SUFFIX
PLASTIC PACKAGE
CASE 751
(SO–8)

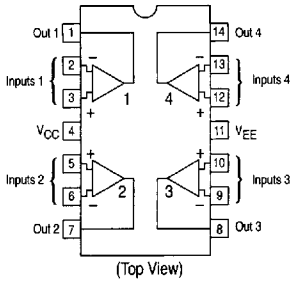
PIN CONNECTIONS





N SUFFIX
PLASTIC PACKAGE
CASE 646

PIN CONNECTIONS



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Supply Voltage	V_{CC} V_{EE}	+18 −18	V
Differential Input Voltage	V_{ID}	±30	V
Input Voltage Range (Note 1)	V_{IDR}	±15	V
Output Short Circuit Duration (Note 2)	t_{SC}	Continuous	
Power Dissipation at T_A = +25°C Derate above T_A =+25°C	P_D $1/\theta_{JA}$	900 10	mW mW/°C
Operating Ambient Temperature Range	T_A	0 to +70	°C
Operating Junction Temperature Range	T_J	115	°C
Storage Temperature Range	T_{stg}	− 65 to +150	°C

NOTES: 1. Unless otherwise specified, the absolute maximum negative input voltage is limited to the negative power supply.
2. Any amplifier output can be shorted to ground indefinitely. However, if more than one amplifier output is shorted simultaneously, maximum junction temperature rating may be exceeded.

ORDERING INFORMATION

Device	Function	Operating Temperature Range	Package
LF351D LF351N	Single Single	T_A = 0° to +70°C	SO–8 Plastic DIP
LF353D LF353N	Dual Dual		SO–8 Plastic DIP
LF347BN LF347N	Quad Quad		Plastic DIP Plastic DIP

ELECTRICAL CHARACTERISTICS (V_{CC} = +15 V_{EE} = –15 V, T_A = 25°C, unless otherwise noted.)

Characteristic	Symbol	LF347B			LF347, LF351, LF353			Unit
		Min	Typ	Max	Min	Typ	Max	
Input Offset Voltage (R_S ≤ 10 k, V_{CM} = 0)	V_{IO}							mV
T_A = +25°C		–	1.0	5.0	–	5.0	10	
0°C ≤ T_A ≤ +70°C		–	–	8.0	–	–	13	
Avg. Temperature Coefficient of Input Offset Voltage	$\Delta V_{IO}/\Delta T$							µV/°C
R_S ≤ 10 k, 0°C ≤ T_A ≤ +70°C		–	10	–	–	10	–	
Input Offset Current (V_{CM} = 0, Note 3)	I_{IO}							
T_A = +25°C		–	25	100	–	25	100	pA
0°C ≤ T_A ≤ +70°C		–	–	4.0	–	–	4.0	nA
Input Bias Current (V_{CM} = 0, Note 3)	I_{IB}							
T_A = +25°C		–	50	200	–	50	200	pA
0°C ≤ T_A ≤ +70°C		–	–	8.0	–	–	8.0	nA
Input Resistance	r_i	–	10^{12}	–	–	10^{12}	–	Ω
Common Mode Input Voltage Range	V_{ICR}	±11	+15 –12	–	±11	+15 –12	–	V
Large–Signal Voltage Gain (V_O = ±10 V, R_L = 2.0 k)	A_{VOL}							V/mV
T_A = +25°C		50	100	–	25	100	–	
0°C ≤ T_A ≤ +70°C		25	–	–	15	–	–	
Output Voltage Swing (R_L = 10 k)	V_O	±12	±14	–	±12	±14	–	V
Common Mode Rejection (R_S ≤ 10 k)	CMR	80	100	–	70	100	–	dB
Supply Voltage Rejection (R_S ≤ 10 k)	PSRR	80	100	–	70	100	–	dB
Supply Current	I_D							mA
LF347		–	7.2	11	–	7.2	11	
LF351		–	–	–	–	1.8	3.4	
LF353		–	–	–	–	3.6	6.5	
Short Circuit Current	I_{SC}	–	25	–	–	25	–	mA
Slew Rate (A_V = +1)	SR	–	13	–	–	13	–	V/µs
Gain–Bandwidth Product	BWp	–	4.0	–	–	4.0	–	MHz
Equivalent Input Noise Voltage (R_S = 100 Ω, f = 1000 Hz)	e_n	–	24	–	–	24	–	nV/√Hz
Equivalent Input Noise Current (f = 1000 Hz)	i_n	–	0.01	–	–	0.01	–	pA/√Hz
Channel Separation (LF347, LF353) 1.0 Hz ≤ f ≤ 20 kHz (Input Referred)	–	–	–120	–	–	–120	–	dB

For Typical Characteristic Performance Curves, refer to MC34001, 34002, 34004 data sheet.

NOTE: 3. Input bias currents of JFET input op amps approximately double for every 10°C rise in junction temperature. To maintain junction temperatures as close to ambient as is possible, pulse techniques are utilized during test.