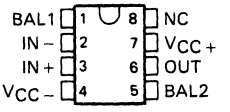
D2997, MARCH 1987

- **Low Input Bias Current**
  Typically 50 pA
- **Low Input Noise Voltage**
  Typically 18 nV/$\sqrt{Hz}$
- **Low Input Noise Current**
  Typically 0.01 pA/$\sqrt{Hz}$
- **Low Supply Current . . . Typically 1.8 mA**
- **High Input Impedance**
  Typically 10^{12} Ω
- **Low Total Harmonic Distortion**
- **Internally Trimmed Offset Voltage**
  Typically 10 mV
- **High Slew Rate . . . Typically 13 V/μs**
- **Wide Gain Bandwidth . . . Typically 3 MHz**
- **Pin Compatible with Standard 741**

P, D, OR JG PACKAGE
(TOP VIEW)



NC – No internal connection

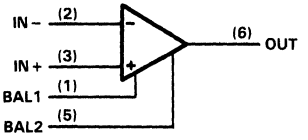
description

This device is a low-cost, high-speed, JFET-input operational amplifier with an internally trimmed input offset voltage. It requires low supply current yet maintains a large gain-bandwidth product and a fast slew rate. In addition, the matched high-voltage JFET input provides very low input bias and offset currents. It uses the same offset voltage adjustment circuits as the 741.

The LF351 can be used in applications such as high-speed integrators, digital-to-analog converters, sample-and-hold circuits, and many other circuits.

The LF351 is characterized for operation from 0°C to 70°C.

symbol (each amplifier)



AVAILABLE OPTIONS

SYMBOLIZATION		OPERATING TEMPERATURE RANGE	V_{IO} MAX at 25°C
DEVICE	PACKAGE SUFFIX		
LF351	D,JG,P	−0°C to 70°C	10 mV

The D packages are available taped and reeled. Add the suffix R to the device type when ordering. (ie., LF351DR)

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

Supply voltage, V_{CC+} . . . . . 18 V
Supply voltage, V_{CC-} . . . . . −18 V
Differential input voltage, V_{ID} . . . . . ±30 V
Input voltage (see Note 1) . . . . . ±15 V
Duration of output short circuit . . . . . Unlimited
Continuous total power dissipation . . . . . 500 mW
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 60 seconds, JG package . . . . . 300°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds, D or P package . . . . . 260°C

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

electrical characteristics over operating free-air temperature range, V_{CC+} = 15 V, V_{CC-} = −15 V (unless otherwise specified)

PARAMETER		TEST CONDITIONS		MIN	TYP	MAX	UNIT
V_{IO}	Input offset voltage	V_{IC} = 0, R_S = 10 kΩ	T_A = 25°C		5	10	mV
			Full range			13	
α_{VIO}	Average temperature coefficient of input offset voltage	V_{IC} = 0, R_S = 10 kΩ			10		μV/°C
I_{IO}	Input offset current†	V_{IC} = 0	T_J = 25°C		25	100	pA
			T_J = 70°C			4	nA
I_{IB}	Input bias current†	V_{IC} = 0	T_J = 25°C		50	200	pA
			T_J = 70°C			8	nA
V_{ICR}	Common-mode input voltage range			±11	−12 to 15		V
V_{OM}	Maximum peak output voltage swing	R_L = 10 kΩ		±12	±13.5		V
A_{VD}	Large-signal differential voltage	V_O = ±10 V, R_L = 2 kΩ	T_A = 25°C	25	200		V/mV
			Full range	15	200		
r_i	Input resistance	T_J = 25°C			10^{12}		Ω
CMRR	Common-mode rejection ratio	R_S ≤ 10 kΩ		70	100		dB
k_{SVR}	Supply voltage rejection ratio	See Note 2		70	100		dB
I_{CC}	Supply current				1.8	3.4	mA

operating characteristics, V_{CC+} = 15 V, V_{CC-} = −15 V, T_A = 25°C

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
SR	Slew rate		8	13		V/μs
B_1	Unity-gain bandwidth			3		MHz
V_n	Equivalent input noise voltage	f = 1 kHz, R_S = 100 Ω		18		$nV/\sqrt{Hz}$
I_n	Equivalent input noise current	f = 1 kHz		0.01		$pA/\sqrt{Hz}$

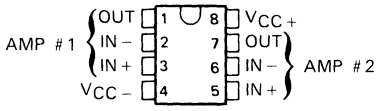
† Input bias currents of a FET-input operational amplifier are normal junction reverse currents, which are temperature sensitive. Pulse techniques must be used that will maintain the junction temperatures as close to the ambient temperature as possible.

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

D2997, MARCH 1987—REVISED MAY 1988

- **Low Input Bias Current**
  Typically 50 pA
- **Low Input Noise Current**
  Typically 0.01 pA/$\sqrt{\text{Hz}}$
- **Low Input Noise Voltage**
  Typically 18 nV/$\sqrt{\text{Hz}}$
- **Low Supply Current . . . Typically 3.6 mA**
- **High Input Impedance**
  Typically 10^{12} Ω
- **Internally Trimmed Offset Voltage**
- **Wide Gain Bandwidth . . . Typically 3 MHz**
- **High Slew Rate . . . Typically 13 V/μs**

D, JG, OR P PACKAGE
(TOP VIEW)



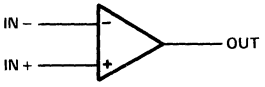
description

This device is a low-cost, high-speed, JFET-input operational amplifier with very low input offset voltage. It requires low supply current yet maintains a large gain-bandwidth product and a fast slew rate. In addition, the matched high-voltage JFET input provides very low input bias and offset currents.

The LF353 can be used in applications such as high-speed integrators, digital-to-analog converters, sample-and-hold circuits, and many other circuits.

The LF353 is characterized for operation from 0°C to 70°C.

symbol (each amplifier)



AVAILABLE OPTIONS

SYMBOLIZATION		OPERATING TEMPERATURE RANGE	V_{IO} MAX at 25°C
DEVICE	PACKAGE SUFFIX		
LF353	D,JG,P	0°C to 70°C	10 mV

The D packages are available taped and reeled. Add the suffix R to the device type when ordering. (i.e. LP353DR)

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

Supply voltage, V_{CC+} . . . . . 18 V
Supply voltage, V_{CC-} . . . . . −18 V
Differential input voltage, V_{ID} . . . . . ±30 V
Input voltage (see Note 1) . . . . . ±15 V
Duration of output short circuit . . . . . Unlimited
Continuous total power dissipation . . . . . 500 mW
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 60 seconds, JG package . . . . . 300°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds, D or P package . . . . . 260°C

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

electrical characteristics over operating free-air temperature range, V_{CC+} = 15 V, V_{CC-} = −15 V (unless otherwise specified)

PARAMETER		TEST CONDITIONS		MIN	TYP	MAX	UNIT
V_{IO}	Input offset voltage	V_{IC} = 0, R_S = 10 kΩ	T_A = 25°C		5	10	mV
			Full range			13	
α_{VIO}	Average temperature coefficient of input offset voltage	V_{IC} = 0, R_S = 10 kΩ			10		μV/°C
I_{IO}	Input offset current†	V_{IC} = 0	T_J = 25°C		25	100	pA
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			Full range	15			
r_i	Input resistance	T_J = 25°C			10^{12}		Ω
CMRR	Common-mode rejection ratio	R_S ≤ 10 kΩ		70	100		dB
k_{SVR}	Supply voltage rejection ratio	See Note 2		70	100		dB
I_{CC}	Supply current				3.6	6.5	mA

operating characteristics, V_{CC+} = 15 V, V_{CC-} = −15 V, T_A = 25°C

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
V_{O1}/V_{O2}	Crosstalk attenuation	f = 1 kHz		120		dB
SR	Slew rate		8	13		V/μs
B_1	Unity-gain bandwidth			3		MHz
V_n	Equivalent input noise voltage	f = 1 kHz, R_S = 100 Ω		18		$nV/\sqrt{Hz}$
I_n	Equivalent input noise current	f = 1 kHz		0.01		$pA/\sqrt{Hz}$

† 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.

TEXAS INSTRUMENTS
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