



## LF353

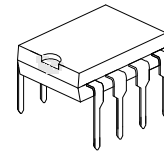
## LINEAR INTEGRATED CIRCUIT

### WIDE-BANDWIDTH JFET-INPUT DUAL OPERATIONAL AMPLIFIER

#### DESCRIPTION

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



DIP-8

#### FEATURES

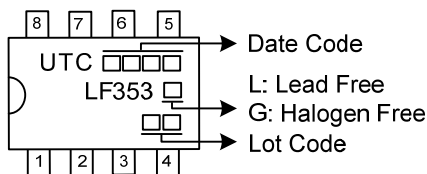
- \* Supply Voltage:  $\pm 3.5 \sim \pm 18V$
- \* Supply Current/Amplifier: 3.4mA (Max)
- \* Input Offset Voltage: 10mV (Max)
- \* Slew Rate: 9.5V/ $\mu s$  (Typ.)

#### ORDERING INFORMATION

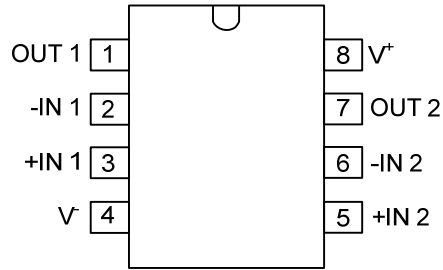
Ordering Number		Package	Packing
Lead Free	Halogen Free		
LF353L-D08-T	LF353G-D08-T	DIP-8	Tube

<p>LF353G-D08-T</p> <ul style="list-style-type: none"> <li>(1) Packing Type</li> <li>(2) Package Type</li> <li>(3) Green Package</li> </ul>	<ul style="list-style-type: none"> <li>(1) T: Tube</li> <li>(2) D08: DIP-8</li> <li>(3) G: Halogen Free and Lead Free, L: Lead Free</li> </ul>
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#### MARKING



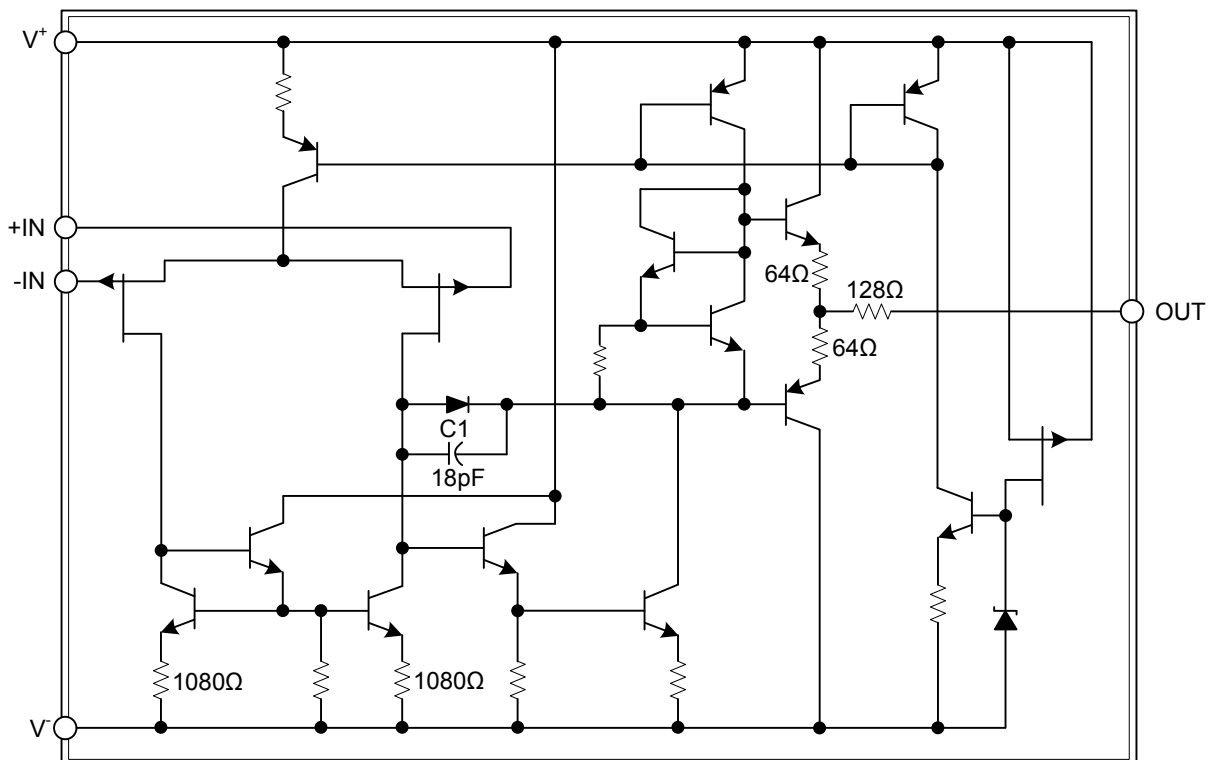
### PIN CONFIGURATION



### PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	OUT 1	Output of 1 AMP
2	-IN 1	Inverting Input of 1 AMP
3	+IN 1	Non-inverting input of 1 AMP
4	V <sup>-</sup>	Negative power supply
5	+IN 2	Non-inverting input of 2 AMP
6	-IN 2	Inverting input of 2 AMP
7	OUT 2	Output of 2 AMP
8	V <sup>+</sup>	Positive power supply

### BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sup>±</sup>	±18	V
Differential Input Voltage (Note 1)	V <sub>ID</sub>	Supply Voltage	V
Junction Temperature	T <sub>J</sub>	+150	°C
Storage Temperature	T <sub>STG</sub>	-65 ~ +150	°C

- Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.  
 2. Unless otherwise specified, the absolute maximum negative input voltage is equal to the negative power supply voltage.

■ RECOMMENDED OPERATING CONDITIONS (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Supply Voltage	V <sup>+</sup>	3.5		18	V
	V <sup>-</sup>	-3.5		-18	V
Operating Free-Air Temperature	T <sub>OPR</sub>	-40		+125	°C

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ <sub>JA</sub>	90	°C/W

■ ELECTRICAL CHARACTERISTICS (V<sup>±</sup> = ±15V, T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Current/Amplifier	I <sub>Q</sub>			2.2	3.4	mA
Power Supply Rejection Ratio	PSRR	(Note 2)	70	100		dB
Input Offset Voltage	V <sub>OS</sub>	V <sub>IC</sub> =0, R <sub>S</sub> =10kΩ		3	10	mV
Input Offset Voltage Drift	ΔV <sub>OS</sub> /ΔT	V <sub>IC</sub> =0, R <sub>S</sub> =10kΩ		17		μV/°C
Input Bias Current (Note 1)	I <sub>B</sub>	V <sub>IC</sub> =0		70		pA
Input Offset Current (Note 1)	I <sub>OS</sub>	V <sub>IC</sub> =0		35		pA
Common-Mode Voltage Range	V <sub>CM</sub>		-11		11	V
Common-Mode Rejection Ratio	CMRR	R <sub>S</sub> ≤ 10kΩ	70	100		dB
Large Signal Voltage Gain	A <sub>V</sub>	V <sub>O</sub> =±10V, R <sub>L</sub> =2kΩ	80	100		dB
Output Voltage	V <sub>O</sub>	R <sub>L</sub> =10kΩ	V <sub>OH</sub>	12	13.8	V
			V <sub>OL</sub>		-13.1	-12
Slew Rate	SR			9.5		V/μs
Gain-Bandwidth Product	GBW			2.5		MHz
Crosstalk Attenuation	V <sub>O1</sub> / V <sub>O2</sub>	f = 1kHz		100		dB
Input-Referred Voltage Noise	e <sub>n</sub>	R <sub>S</sub> = 20Ω, f = 1kHz		18		nV/√Hz
Input-Referred Current Noise	i <sub>n</sub>	f = 1kHz		0.01		pA/√Hz

- Notes: 1. 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.  
 2. Supply-voltage rejection ratio is measured for both supply magnitudes increasing or decreasing simultaneously.

■ PARAMETER MEASUREMENT INFORMATION

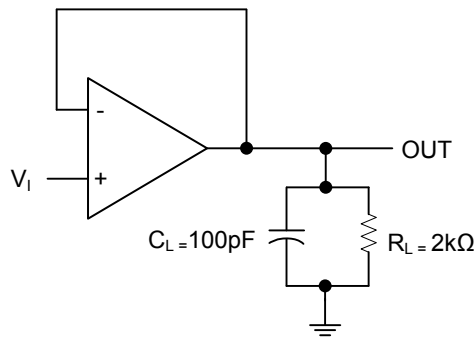


Figure 1. Unity-Gain Amplifier

■ TYPICAL APPLICATION CIRCUIT

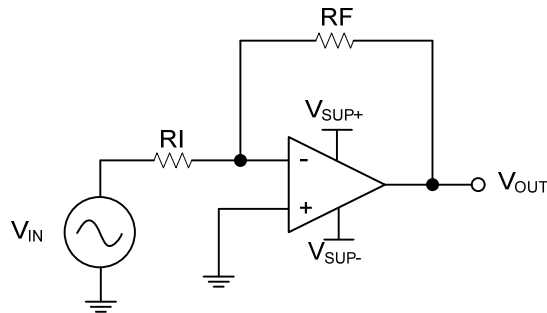
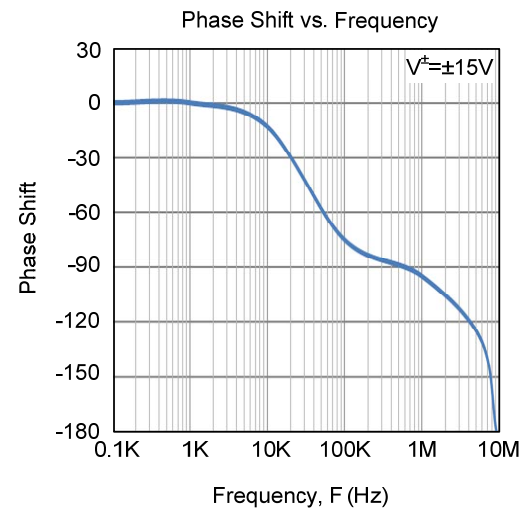
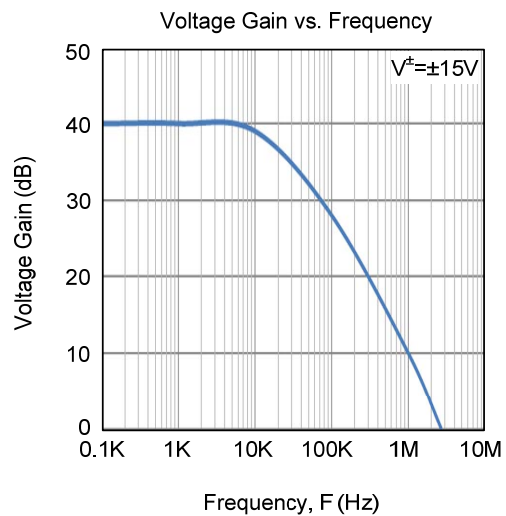
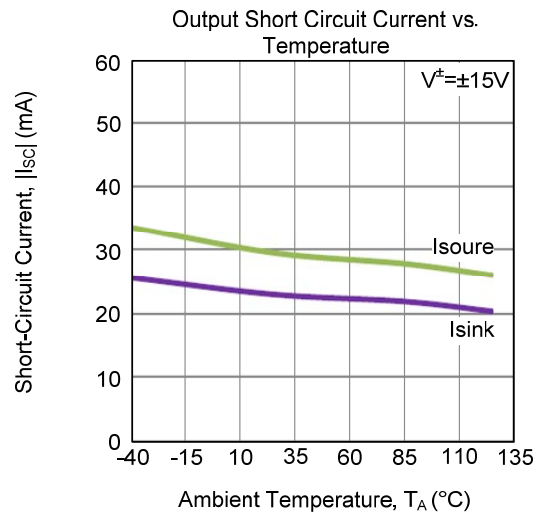
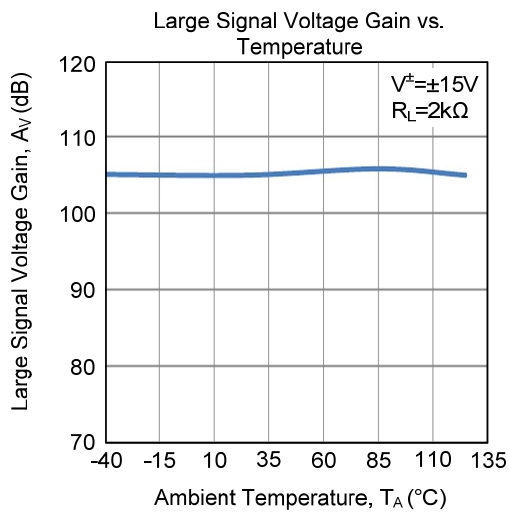
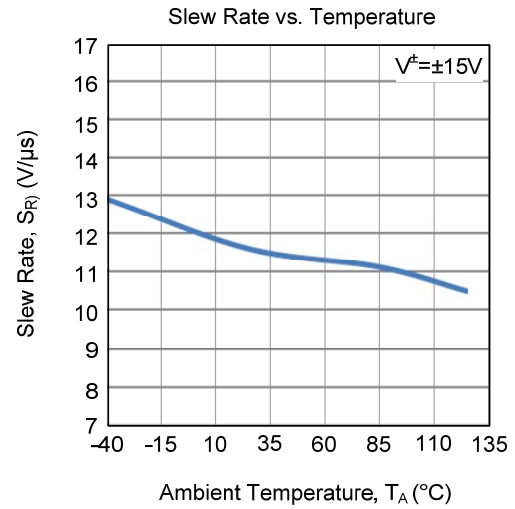
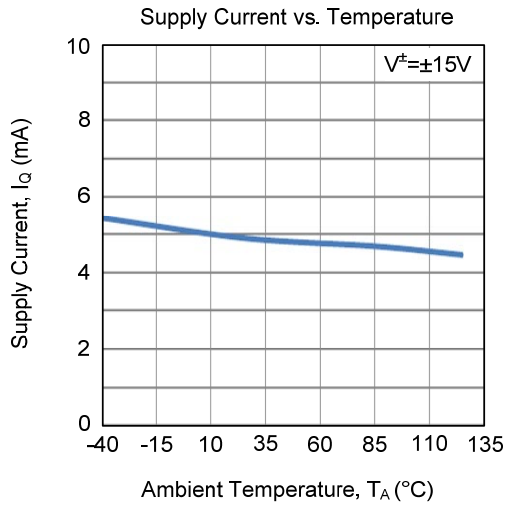


Figure 2. Inverting Amplifier

## ■ TYPICAL CHARACTERISTICS



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