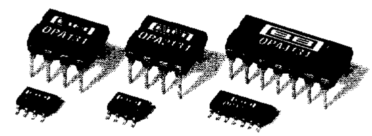
BURR - BROWN®



OPA134
OPA2134
OPA4134

www.burr-brown.com/databook/OPA134.html

SoundPlus™ High Performance AUDIO OPERATIONAL AMPLIFIERS

FEATURES

- SUPERIOR SOUND QUALITY
- ULTRA LOW DISTORTION: 0.00008%
- LOW NOISE: 8nV/√Hz
- TRUE FET-INPUT: I_B = 5pA
- HIGH SPEED:
  SLEW RATE: 20V/μs
  BANDWIDTH: 8MHz
- HIGH OPEN-LOOP GAIN: 120dB (600Ω)
- WIDE SUPPLY RANGE: ±2.5V to ±18V
- SINGLE, DUAL, AND QUAD VERSIONS

APPLICATIONS

- PROFESSIONAL AUDIO AND MUSIC
- LINE DRIVERS
- LINE RECEIVERS
- MULTIMEDIA AUDIO
- ACTIVE FILTERS
- PREAMPLIFIERS
- INTEGRATORS
- CROSSOVER NETWORKS

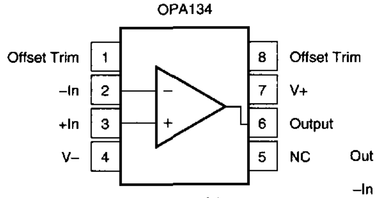
DESCRIPTION

The OPA134 series are ultra-low distortion, low noise operational amplifiers fully specified for audio applications. A true FET input stage was incorporated to provide superior sound quality and speed for exceptional audio performance. This in combination with high output drive capability and excellent dc performance allows use in a wide variety of demanding applications. In addition, the OPA134's wide output swing, to within 1V of the rails, allows increased headroom making it ideal for use in any audio circuit.

OPA134 op amps are easy to use and free from phase inversion and overload problems often found in common FET-input op amps. They can be operated from ±2.5V to ±18V power supplies. Input cascode circuitry provides excellent common-mode rejection and maintains low input bias current over its wide input voltage range, minimizing distortion. OPA134 series op amps are unity-gain stable and provide excellent dynamic behavior over a wide range of load conditions, including high load capacitance. The dual and quad versions feature completely independent circuitry for lowest crosstalk and freedom from interaction, even when overdriven or overloaded.

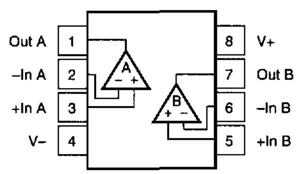
Single and dual versions are available in 8-pin DIP and SO-8 surface-mount packages in standard configurations. The quad is available in 14-pin DIP and SO-14 surface mount packages. All are specified for –40°C to +85°C operation. A SPICE macromodel is available for design analysis.

OPA134



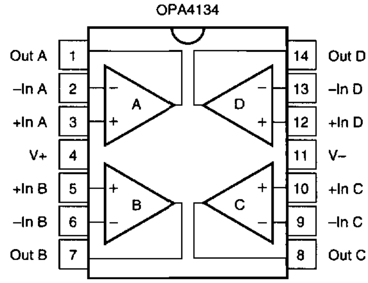
8-Pin DIP, SO-8

OPA2134



8-Pin DIP, SO-8

OPA4134



14-Pin DIP
SO-14

International Airport Industrial Park • Mailing Address: PO Box 11400, Tucson, AZ 85734 • Street Address: 6730 S. Tucson Blvd., Tucson, AZ 85706 • Tel: (520) 746-1111 • Twx: 910-952-1111
Internet: http://www.burr-brown.com/ • FAXLine: (800) 548-6133 (US/Canada Only) • Cable: BBRCORP • Telex: 066-6491 • FAX: (520) 889-1510 • Immediate Product Info: (800) 548-6132

SPECIFICATIONS

At T_A = +25°C, V_S = ±15V, unless otherwise noted.

PARAMETER	CONDITION	OPA134PA, UA OPA2134PA, UA OPA4134PA, UA MIN	TYP	MAX	UNITS
AUDIO PERFORMANCE					
Total Harmonic Distortion + Noise	G = 1, f = 1kHz, V_O = 3Vrms				
	R_L = 2kΩ		0.00008		%
	R_L = 600Ω		0.00015		%
Intermodulation Distortion	G = 1, f = 1kHz, V_O = 1Vp-p		−98		dB
Headroom(1)	THD < 0.01%, R_L = 2kΩ, V_S = ±18V		23.6		dBu
FREQUENCY RESPONSE					
Gain-Bandwidth Product			8		MHz
Slew Rate(2)		±15	±20		V/µs
Full Power Bandwidth			1.3		MHz
Settling Time 0.1%	G = 1, 10V Step, C_L = 100pF		0.7		µs
0.01%	G = 1, 10V Step, C_L = 100pF		1		µs
Overload Recovery Time	(V_{IN}) • (Gain) = V_S		0.5		µs
NOISE					
Input Voltage Noise					
Noise Voltage, f = 20Hz to 20kHz			1.2		µVrms
Noise Density, f = 1kHz			8		nV/√Hz
Current Noise Density, f = 1kHz			3		fA/√Hz
OFFSET VOLTAGE					
Input Offset Voltage			±0.5	±2	mV
	T_A = −40°C to +85°C		±1	±3(3)	mV
vs Temperature	T_A = −40°C to +85°C		±2		µV/°C
vs Power Supply (PSRR)	V_S = ±2.5V to ±18V	90	106		dB
Channel Separation (Dual, Quad)	dc, R_L = 2kΩ		135		dB
	f = 20kHz, R_L = 2kΩ		130		dB
INPUT BIAS CURRENT					
Input Bias Current(4)	V_{CM} =0V		+5	±100	pA
vs Temperature(3)			See Typical Curve	±5	nA
Input Offset Current(4)	V_{CM} =0V		±2	±50	pA
INPUT VOLTAGE RANGE					
Common-Mode Voltage Range		(V−)+2.5	±13	(V+)−2.5	V
Common-Mode Rejection	V_{CM} = −12.5V to +12.5V	86	100		dB
	T_A = −40°C to +85°C		90		dB
INPUT IMPEDANCE					
Differential			10^{13} ∥ 2		Ω ∥ pF
Common-Mode	V_{CM} = −12.5V to +12.5V		10^{13} ∥ 5		Ω ∥ pF
OPEN-LOOP GAIN					
Open-Loop Voltage Gain	R_L = 10kΩ, V_O = −14.5V to +13.8V	104	120		dB
	R_L = 2kΩ, V_O = −13.8V to +13.5V	104	120		dB
	R_L = 600Ω, V_O = −12.8V to +12.5V	104	120		dB
OUTPUT					
Voltage Output	R_L = 10kΩ	(V−)+0.5		(V+)−1.2	V
	R_L = 2kΩ	(V−)+1.2		(V+)−1.5	V
	R_L = 600Ω	(V−)+2.2		(V+)−2.5	V
Output Current			±35		mA
Output Impedance, Closed-Loop(5)	f = 10kHz		0.01		Ω
Open-Loop	f = 10kHz		10		Ω
Short-Circuit Current			±40		mA
Capacitive Load Drive (Stable Operation)			See Typical Curve		
POWER SUPPLY					
Specified Operating Voltage			±15		V
Operating Voltage Range		±2.5		±18	V
Quiescent Current (per amplifier)	I_O = 0		4	5	mA
TEMPERATURE RANGE					
Specified Range		−40		+85	°C
Operating Range		−55		+125	°C
Storage		−55		+125	°C
Thermal Resistance, θ_{JA}					
8-Pin DIP			100		°C/W
SO-8 Surface-Mount			150		°C/W
14-Pin DIP			80		°C/W
SO-14 Surface-Mount			110		°C/W

NOTES: (1) dBu = 20*log (Vrms/0.7746) where Vrms is the maximum output voltage for which THD+Noise is less than 0.01%. See THD+Noise text. (2) Guaranteed by design. (3) Guaranteed by wafer-level test to 95% confidence level. (4) High-speed test at T_J = 25°C. (5) See "Closed-Loop Output Impedance vs Frequency" typical curve.

ABSOLUTE MAXIMUM RATINGS[1]

Supply Voltage, V+ to V–	36V
Input Voltage	(V–) –0.7V to (V+) +0.7V
Output Short-Circuit[2]	Continuous
Operating Temperature	–40°C to +125°C
Storage Temperature	–55°C to +125°C
Junction Temperature	150°C
Lead Temperature (soldering, 10s)	300°C

NOTES: (1) Stresses above these ratings may cause permanent damage. (2) Short-circuit to ground, one amplifier per package.

PACKAGE/ORDERING INFORMATION

PRODUCT	PACKAGE	PACKAGE DRAWING NUMBER[1]	TEMPERATURE RANGE
Single			
OPA134PA	8-Pin Plastic DIP	006	–40°C to +85°C
OPA134UA	SO-8 Surface-Mount	182	–40°C to +85°C
Dual			
OPA2134PA	8-Pin Plastic DIP	006	–40°C to +85°C
OPA2134UA	SO-8 Surface-Mount	182	–40°C to +85°C
Quad			
OPA4134PA	14-Pin Plastic DIP	010	–40°C to +85°C
OPA4134UA	SO-14 Surface-Mount	235	–40°C to +85°C

NOTE: (1) For detailed drawing and dimension table, please see end of data sheet, or Appendix C of Burr-Brown IC Data Book.

ELECTROSTATIC DISCHARGE SENSITIVITY

This integrated circuit can be damaged by ESD. Burr-Brown recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.