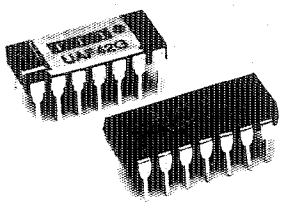
BURR-BROWN®



UAF42

ADVANCE INFORMATION
SUBJECT TO CHANGE

UNIVERSAL ACTIVE FILTER

FEATURES

- VERSATILE FUNCTION
  LOW-PASS, HIGH-PASS
  BAND-PASS, BAND-REJECT
- SIMPLE DESIGN PROCEDURE
- ACCURATE FREQUENCY AND Q
  INCLUDES ON-CHIP 1000pF ±0.5%
  CAPACITORS

APPLICATIONS

- TEST EQUIPMENT
- COMMUNICATIONS EQUIPMENT
- MEDICAL INSTRUMENTATION
- DATA ACQUISITION SYSTEMS
- MONOLITHIC REPLACEMENT FOR UAF41

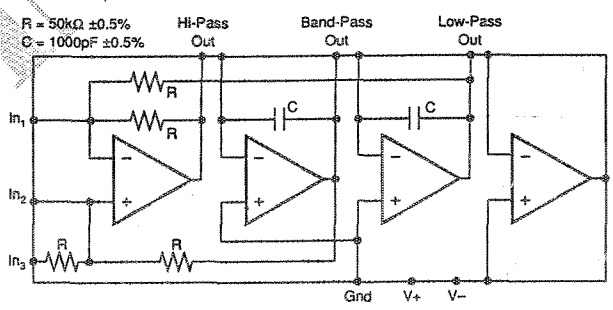
DESCRIPTION

The UAF42 is a universal active filter which can be configured for a wide range of low-pass, high-pass, and band-pass filters. It uses a classical state-variable analog architecture with an inverting amplifier and two integrators. The integrators include on-chip 1000pF capacitors trimmed to 0.5%. This solves one of the most difficult problems of active filter design—obtaining tight tolerance, low-loss capacitors.

Simple design procedures allow easy implementation of many filter types such as Butterworth, Bessel, Chebyshev and Gaussian. A fourth, uncommitted FET-input op amp (identical to the other three) can be used to form additional stages, or for special filter types such as band-reject and elliptic.

The classical topology of the UAF42 forms a continuous filter, free from the anomalies and switching noise associated with switched-capacitor filter types.

The UAF42 is available in a 14-pin plastic DIP and side-brazed ceramic packages, specified for the –25°C to +85°C temperature range.



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PDS-1070

SPECIFICATIONS

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

PARAMETER	CONDITION	UAF42AP, AG MIN	TYP	MAX	UNITS
FILTER PERFORMANCE					
Frequency Range			0 to 100		kHz
Frequency Accuracy				1	%
vs Temperature			0.01		%/C
Maximum Q			500		—
Maximum (Q • Frequency) Product			500		kHz
Q vs Temperature	$(f_o \cdot Q) < 10^4$		0.01		%/°C
	$(f_o \cdot Q) < 10^5$		0.025		%/°C
Q Repeatability	$(f_o \cdot Q) < 10^5$		10		%
Offset Voltage, Low-Pass Output				±5	mV
Resistor Accuracy			0.5		%
OFFSET VOLTAGE[1]					
Input Offset Voltage			±0.5	±5	mV
vs Temperature			±3		µV/°C
vs Power Supply	V_S = ±6 to ±18V	80	96		dB
INPUT BIAS CURRENT[1]					
Input Bias Current	V_{CM} = 0V		10	50	pA
Input Offset Current	V_{CM} = 0V		5		pA
NOISE[1]					
Input Voltage Noise					
Noise Density: f = 10Hz			50		nV/√Hz
f = 10kHz			18		nV/√Hz
Voltage Noise: BW = 0.1 to 10Hz			2		µVp-p
Input Bias Current Noise					
Noise Density: f = 10kHz			2		fA/√Hz
INPUT VOLTAGE RANGE[1]					
Common-Mode Input Range			±11.5		V
Common-Mode Rejection	V_{CM} = ±10V	80	96		dB
INPUT IMPEDANCE[1]					
Differential			10^{13} || 2		Ω || pF
Common-Mode			10^{13} || 6		Ω || pF
OPEN-LOOP GAIN[1]					
Open-loop Voltage Gain	V_O = ±10V, R_L = 2kΩ	90	120		dB
FREQUENCY RESPONSE[1]					
Slew Rate			10		V/µs
Gain-Bandwidth Product	G = +1		4		MHz
Total Harmonic Distortion	G = +1, f = 1kHz		0.0004		%
OUTPUT[1]					
Voltage Output	R_L = 2kΩ	±11	±11.5		V
Short Circuit Current			±25		mA
POWER SUPPLY					
Specified Operating Voltage			±15		V
Operating Voltage Range		±6		±18	V
Current			±6	±7	mA
TEMPERATURE RANGE					
Specification					
AP, AG		–25		+85	°C
Operating, AG		–55		+125	°C
Storage					
AP		–40		+125	°C
AG		–60		+150	°C
Thermal Resistance, θ_{J-A}			100		°C/W

NOTES: (1) Specifications apply to uncommitted op amp, A4. The three op amps forming the filter are identical to A4 and are tested as a complete filter.