μA739

DUAL LOW NOISE AUDIO PREAMPLIFIER/OPERATIONAL AMPLIFIER

FAIRCHILD LINEAR INTEGRATED CIRCUITS

GENERAL DESCRIPTION – The μA739 consists of two identical monolithic Operational Amplifiers using the Fairchild Planar* epitaxial process. These low noise, high gain amplifiers exhibit extremely stable operating characteristics over a wide range of supply voltages and temperatures. The device is intended for a variety of applications requiring two high performance operational amplifiers.

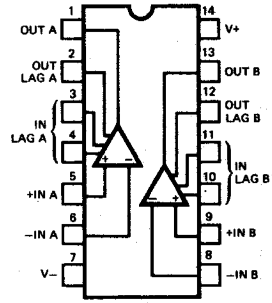
- **SINGLE OR DUAL SUPPLY OPERATION**
- **LOW NOISE FIGURE, 2.0 dB**
- **HIGH GAIN, 20,000 V/V**
- **LARGE COMMON MODE RANGE, ±11 V**
- **EXCELLENT GAIN STABILITY VS. SUPPLY VOLTAGE**
- **NO LATCH-UP**
- **OUTPUT SHORT CIRCUIT PROTECTED**

ABSOLUTE MAXIMUM RATINGS

Supply Voltage	±18 V
Internal Power Dissipation (Note 1)	670 mW
Differential Input Voltage	±5 V
Input Voltage (Note 2)	±15 V
Storage Temperature Range	
Hermetic	−65°C to +150°C
Molded	−55°C to +125°C
Operating Temperature Range	0°C to +70°C
Lead Temperature	
Hermetic DIP (Soldering, 60 s)	300°C
Molded DIP (Soldering, 10 s)	260°C
Output Short-Circuit Duration, T_A = 25°C (Note 3)	30 seconds

CONNECTION DIAGRAM
14-LEAD DIP
(TOP VIEW)

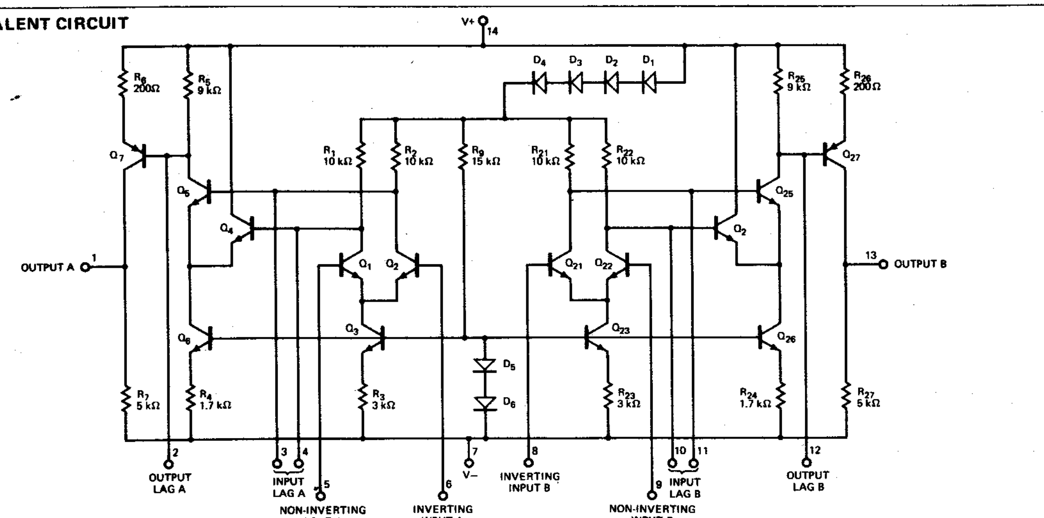
PACKAGE OUTLINES 6A 9A
PACKAGE CODES D P



ORDER INFORMATION

TYPE	PART NO.
μA739C	μA739DC
μA739C	μA739PC

EQUIVALENT CIRCUIT



Notes on following page

*Planar is a patented Fairchild process.

µA739C

ELECTRICAL CHARACTERISTICS ($V_S = \pm15V$, $R_L = 50\,k\Omega$ to Pin 7, $T_A = 25^\circ C$ unless otherwise specified)

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Input Offset Voltage	$R_S \leq 200\Omega$		1.0	6.0	mV
Input Offset Current			50	1000	nA
Input Bias Current			300	2000	nA
Input Resistance		37	150		kΩ
Large Signal Voltage Gain	$V_{OUT} = \pm5.0V$	6500	20,000		V/V
Positive Output Voltage Swing		+12	+13		V
Negative Output Voltage Swing		−14	−15		V
Output Resistance	f = 1.0kHz		5.0		kΩ
Input Voltage Range		±10	±11		V
Common Mode Rejection Ratio	$R_S \leq 10k\Omega$	70	90		dB
Supply Voltage Rejection Ratio	$R_S \leq 10k\Omega$		50		µV/V
Power Consumption	$V_{OUT} = 0$		270	420	mW
Supply Current	$V_{OUT} = 0$		9.0	14	mA
Broadband Noise Figure	$R_S = 5.0k\Omega$, BW = 10Hz to 10kHz		2.0		dB
Turn On Delay (See Figure 1)	Open Loop, $V_{IN} = \pm20mV$		0.2		µs
Turn Off Delay (See Figure 1)	Open Loop, $V_{IN} = \pm20mV$		0.3		µs
Slew Rate (unity gain) (See Figure 2)	$C_1 = 0.1\mu F$, $R_1 = 4.7\Omega$		1.0		V/µs
Channel Separation (See Figure 3)	$R_S \leq 10k\Omega$, f = 10kHz		140		dB
The following specifications apply for $V_S = \pm4.0V$, $T_A = 25^\circ C$					
Input Offset Voltage	$R_S \leq 200\Omega$		1.0	6.0	mV
Input Offset Current			50	1000	nA
Input Bias Current			300		nA
Supply Current	$V_{OUT} = 0$		2.5		mA
Power Consumption	$V_{OUT} = 0$		20		mW
Large Signal Voltage Gain	$V_{OUT} = \pm1.0V$	2500	15,000		V/V
Positive Output Voltage Swing		+2.5	+2.8		V
Negative Output Voltage Swing		−3.6	−4.0		V

NOTES:

1. Rating applies at ambient temperature below 70°C.
2. For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.
3. Short circuit may be to ground or either supply.

PULSE RESPONSE WAVEFORMS

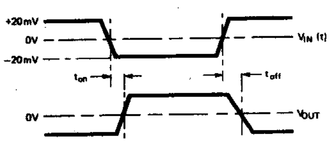


Fig. 1

FREQUENCY RESPONSE TEST CIRCUIT

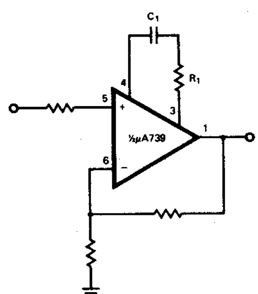


Fig. 2

CHANNEL SEPARATION TEST CIRCUIT

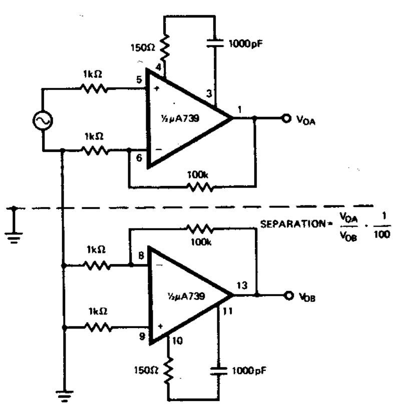
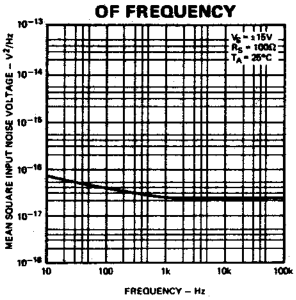


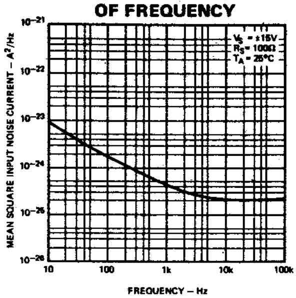
Fig. 3

TYPICAL PERFORMANCE CURVES FOR μA739C

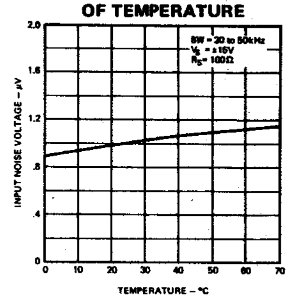
INPUT NOISE VOLTAGE AS A FUNCTION OF FREQUENCY



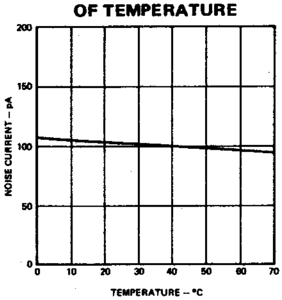
INPUT NOISE CURRENT AS A FUNCTION OF FREQUENCY



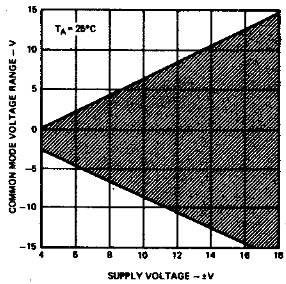
WIDE BAND INPUT NOISE VOLTAGE AS A FUNCTION OF TEMPERATURE



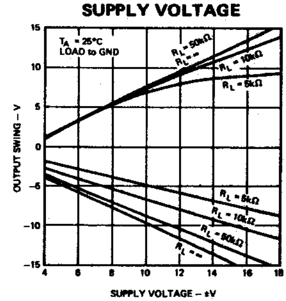
WIDE BAND INPUT NOISE CURRENT AS A FUNCTION OF TEMPERATURE



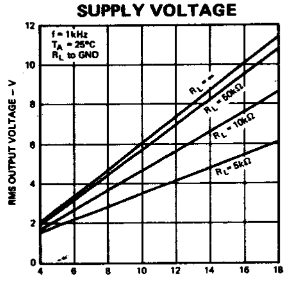
COMMON MODE RANGE AS A FUNCTION OF SUPPLY VOLTAGE



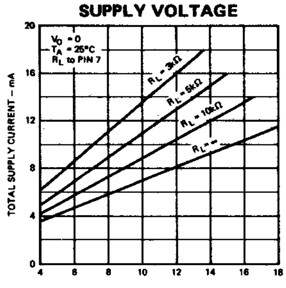
TYPICAL OUTPUT VOLTAGE AS A FUNCTION OF SUPPLY VOLTAGE



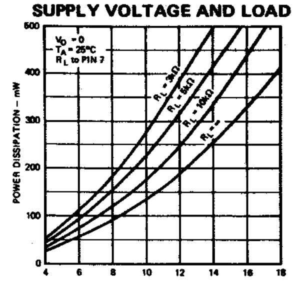
OUTPUT CAPABILITY AS A FUNCTION OF SUPPLY VOLTAGE



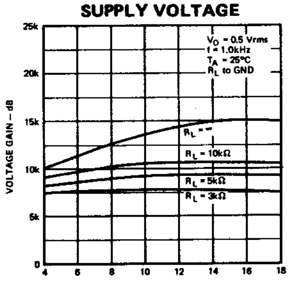
TOTAL SUPPLY CURRENT AS A FUNCTION OF SUPPLY VOLTAGE



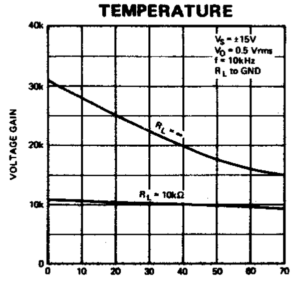
TOTAL POWER DISSIPATION AS A FUNCTION OF SUPPLY VOLTAGE AND LOAD



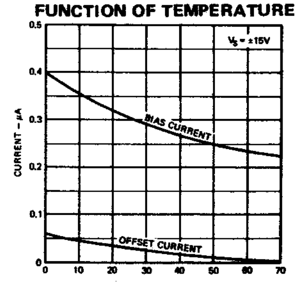
OPEN LOOP VOLTAGE GAIN AS A FUNCTION OF SUPPLY VOLTAGE



OPEN LOOP GAIN AS A FUNCTION OF TEMPERATURE

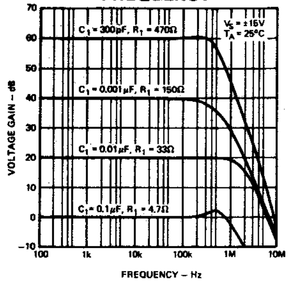


INPUT OFFSET CURRENT AND BIAS CURRENT AS FUNCTION OF TEMPERATURE

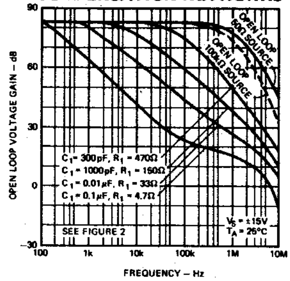


TYPICAL PERFORMANCE CURVES FOR μA739C

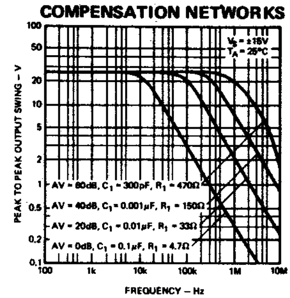
CLOSED LOOP GAIN AS A FUNCTION OF FREQUENCY



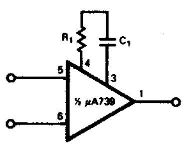
OPEN LOOP FREQUENCY RESPONSE USING RECOMMENDED COMPENSATION NETWORKS



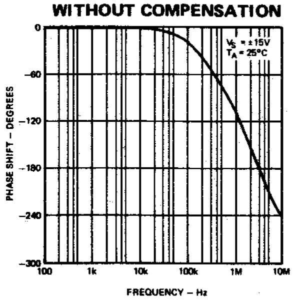
OUTPUT VOLTAGE SWING AS A FUNCTION OF FREQUENCY FOR VARIOUS COMPENSATION NETWORKS



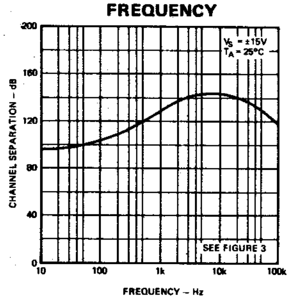
FREQUENCY COMPENSATION NETWORK



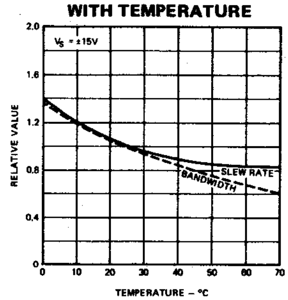
OPEN LOOP PHASE SHIFT WITHOUT COMPENSATION



CHANNEL SEPARATION AS A FUNCTION OF FREQUENCY

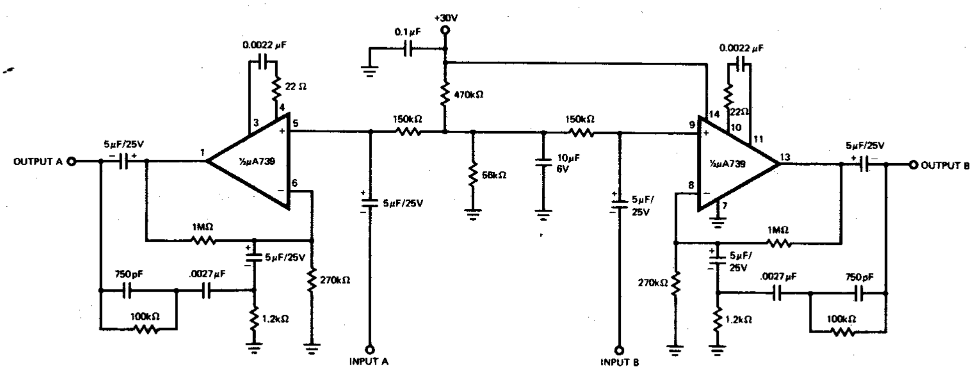


CHANGE OF AC CHARACTERISTICS WITH TEMPERATURE



TYPICAL APPLICATION

STEREO PHONO PREAMPLIFIER – RIAA EQUALIZED



TYPICAL PERFORMANCE

Gain 40dB at 1kHz, RIAA equalized
Input overload point, 80mV rms
Noise level, 2μV referred to input
Signal to noise ratio, 74dB below 10mV
Channel separation @ 1kHz, 80dB