Raytheon

Low Noise Dual Operational Amplifier

RC4739

Features

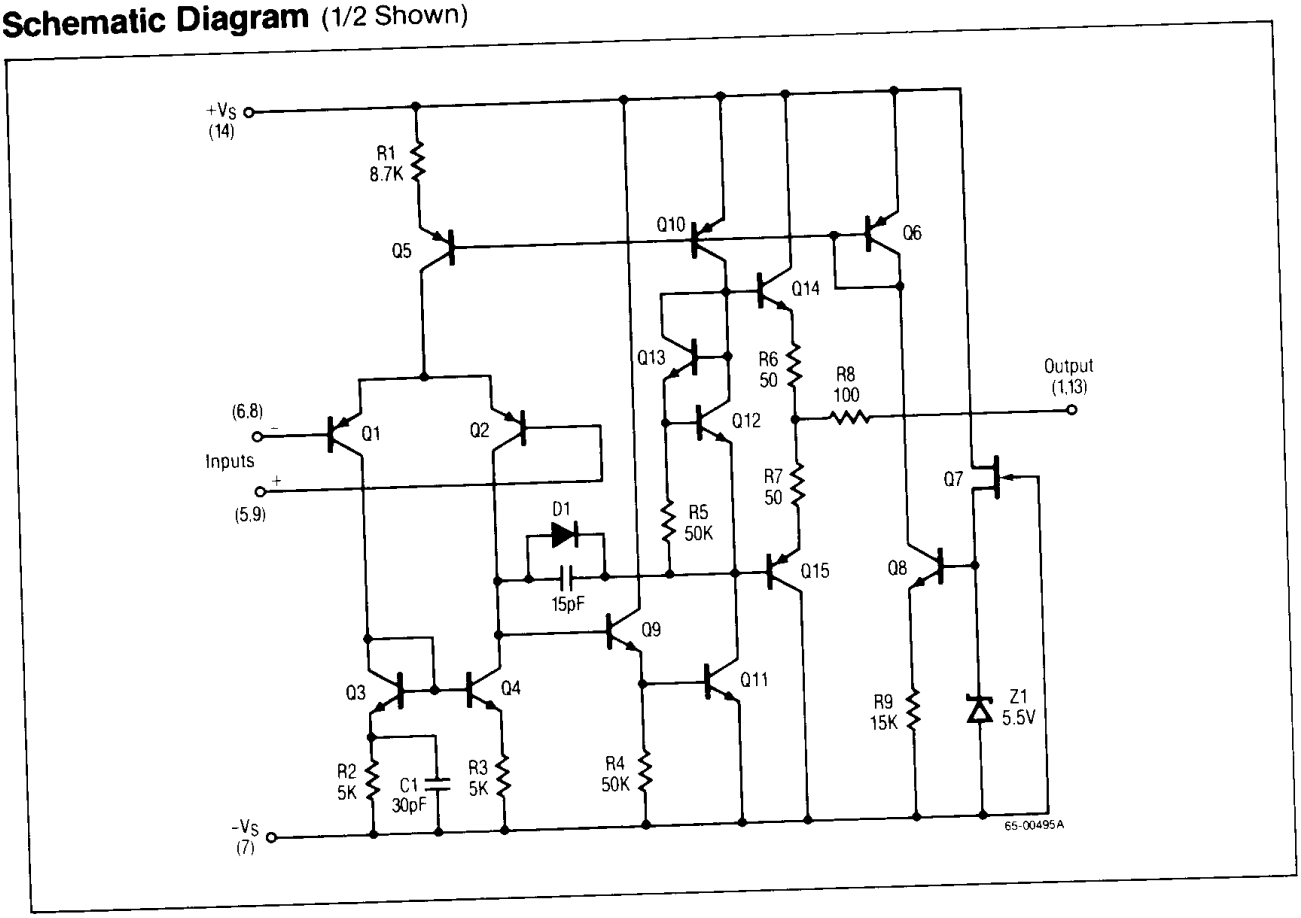
- Internally compensated replacement for μA739 and MC1303
- Signal-to-noise ratio — 76dB (RIAA 10mV ref.)
- Channel separation — 125dB
- Unity gain bandwidth — 3MHz
- Output short-circuit protected
- <0.05% distortion into 2kΩ load
- 10nV/$\sqrt{Hz}$ noise at 100Hz

Description

The RC4739 low noise dual operational amplifier is fabricated on a single silicon chip using the planar epitaxial process. It was designed primarily for preamplifiers in consumer and industrial signal processing equipment. The device is pin compatible with the μA739 and MC1303, however, compensation is internal. This permits a lowered external parts count and simplified application.

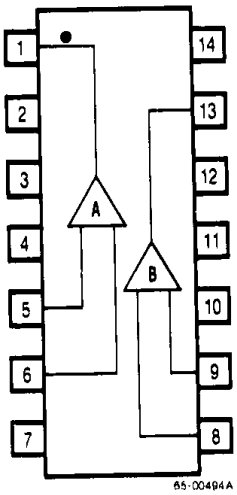
The RC4739 is available in molded dual in-line 14-pin package and operates over the commercial temperature range from 0° C to +70° C.

Schematic Diagram (1/2 Shown)



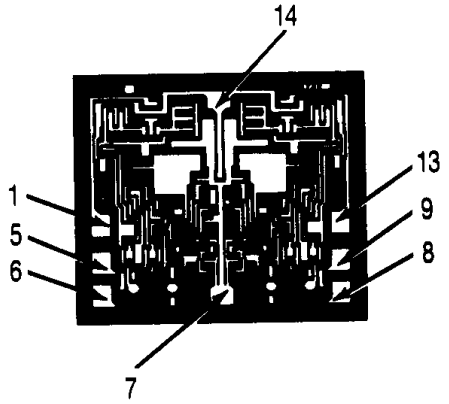
Connection Information

14-Lead
Dual In-Line Package
(Top View)



Pin	Function
1	A Output
2	NC
3	NC
4	NC
5	+A Input
6	-A Input
7	$-V_S$
8	-B Input
9	+B Input
10	NC
11	NC
12	NC
13	B Output
14	$+V_S$

Mask Pattern



Die Size: 52 x 61 mils
Min. Pad Dimensions: 4 x 4 mils

Absolute Maximum Ratings

Supply Voltage ..... ±18V
Input Voltage[1] ..... ±15V
Differential Input Voltage 30V
Output Short Circuit Duration[2] ..... Indefinite
Storage Temperature Range ..... -65°C to +150°C
Operating Temperature Range ..... 0°C to +70°C
Lead Soldering Temperature (60 Sec) ..... +300°C

Notes: 1. For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.
2. Short circuit may be to ground, typically 45mA.

Thermal Characteristics

	14-Lead Plastic DIP
Max. Junction Temp.	125°C
Max. P_D T_A < 50°C	468mW
Therm. Res. θ_{JC}	—
Therm. Res. θ_{JA}	160°C/W
For T_A > 50°C Derate at	6.25mW per °C

Ordering Information

Part Number	Package	Operating Temperature Range
RC4739DB	Plastic	0°C to +70°C

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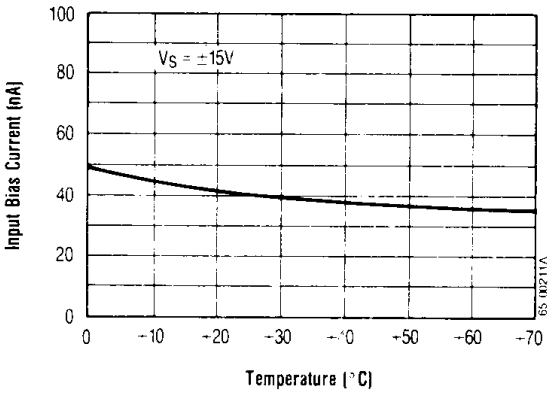
Electrical Characteristics (V_S = +15V and T_A = +25° C)

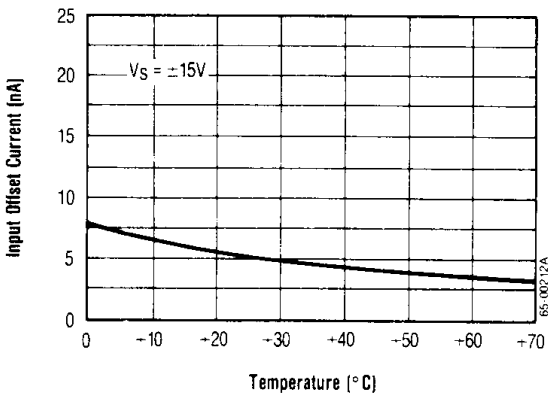
Parameters	Test Conditions	Min	Typ	Max	Units
Input Offset Voltage	$R_S \leq 10k\Omega$		2.0	6.0	mV
Input Offset Current			5.0	200	nA
Input Bias Current			40	500	nA
Input Resistance (Differential Mode)		0.3	5.0		MΩ
Large Signal Voltage Gain	$R_L \geq 2k\Omega$, $V_{OUT} = \pm 10V$	20	300		V/mV
Output Voltage Swing	$R_L \geq 10k\Omega$	±12	±14		V
	$R_L \geq 2k\Omega$	±10	±13		
Input Voltage Range		±12	±14		V
Common Mode Rejection Ratio	$R_S \leq 10k\Omega$	70	100		dB
Power Supply Rejection Ratio	$R_S \leq 10k\Omega$	76	100		dB
Power Consumption			105	170	mW
Transient Response Rise Time	V_{IN} = 20mV, R_L = 2kΩ		0.15		μS
Overshoot	$C_L \leq 100pF$		10		%
Slew Rate	$R_L \geq 2k\Omega$		1.0		V/μS
Input Voltage Noise	B_W = 10-30kHz, R_S = 1kΩ		2.5		μV_{RMS}
Channel Separation	f = 1.0kHz, A_V = 40dB, R_S = 1kΩ		125		dB
The following specification applies for 0° C ≤ T_A ≤ +70° C unless otherwise specified. V_S = ±15V					
Input Offset Voltage	$R_S \leq 10k\Omega$		3.0	7.5	mV
Input Offset Current			7.0	300	nA
Input Bias Current			50	800	nA
Large Signal Voltage Gain	$R_L \geq 2k\Omega$, $V_{OUT} = \pm 10V$	15	200		V/mV
Output Voltage Swing	$R_L \geq 2k\Omega$, $V_S = \pm 15V$	±10	±13		V
Power Consumption	T_S = +70° C		100	150	mW
	T_A = 0° C		110	220	mW

Typical Performance Characteristics

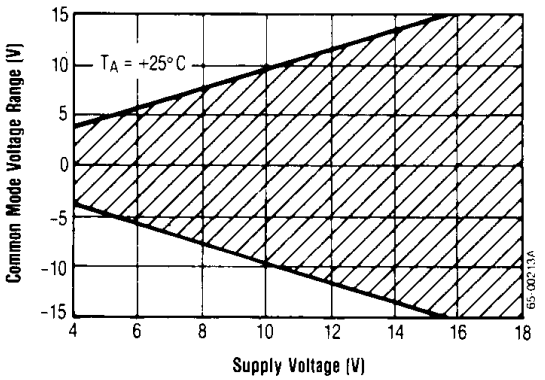
Input Bias Current as a Function of Ambient Temperature



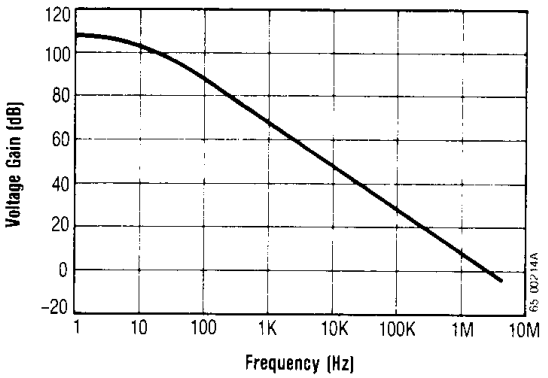
Input Offset Current as a Function of Ambient Temperature



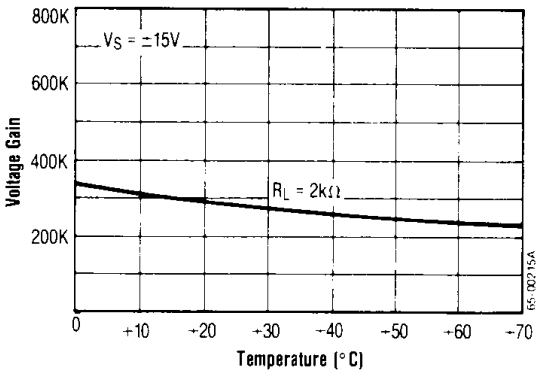
Common Mode Range as a Function of Supply Voltage



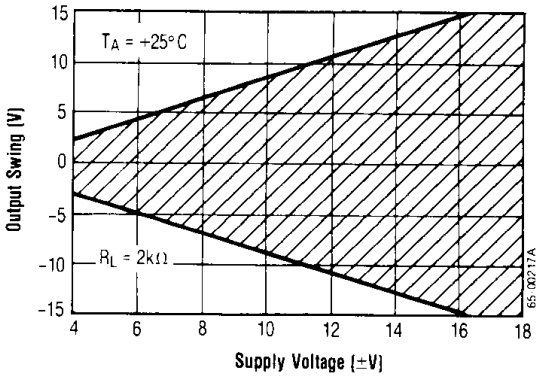
Open Loop Voltage Gain as a Function of Frequency



Open Loop Gain as a Function of Temperature

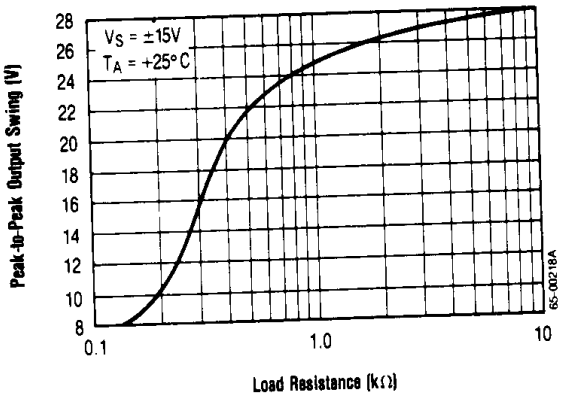


Typical Output Voltage as a Function of Supply Voltage

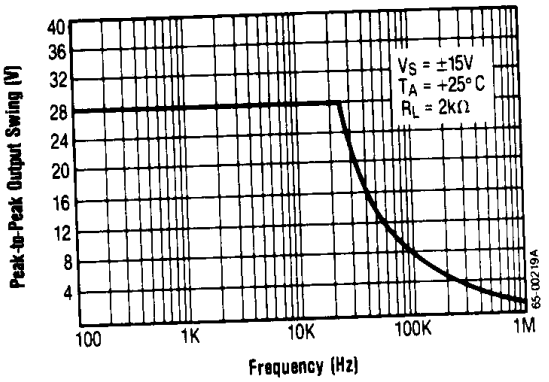


Typical Performance Characteristics (Continued)

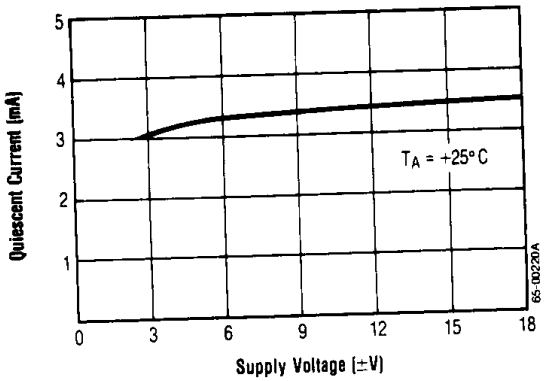
Output Voltage Swing as a Function of Load Resistance



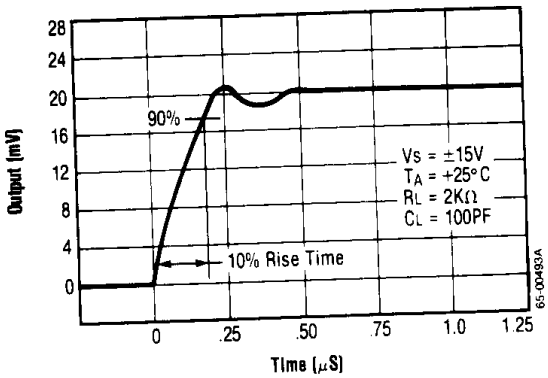
Output Voltage Swing as a Function of Frequency



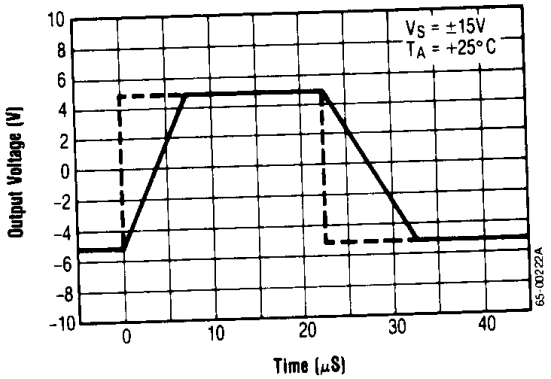
Quiescent Current as a Function of Supply Voltage



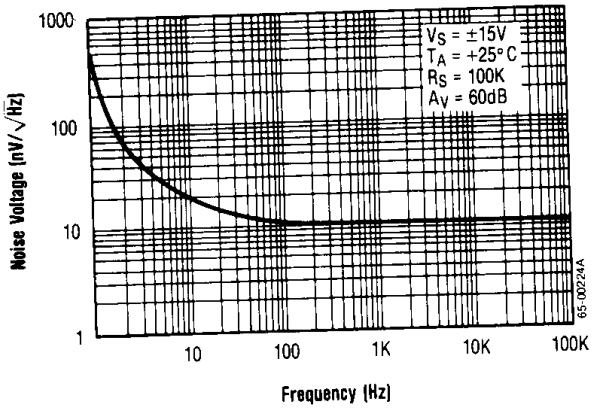
Transient Response



Voltage Follower Large Signal Pulse Response

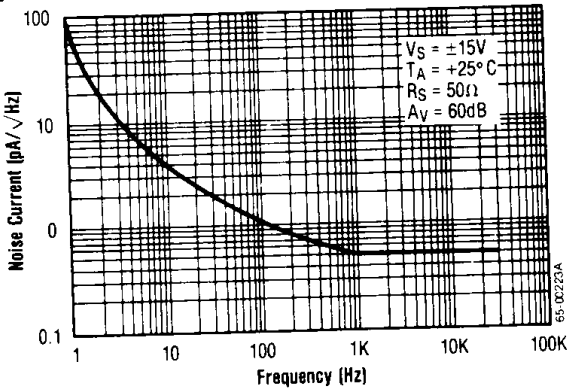


Input Noise Voltage as a Function of Frequency

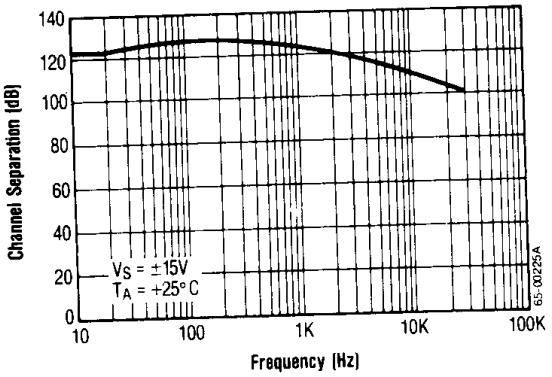


Typical Performance Characteristics (Continued)

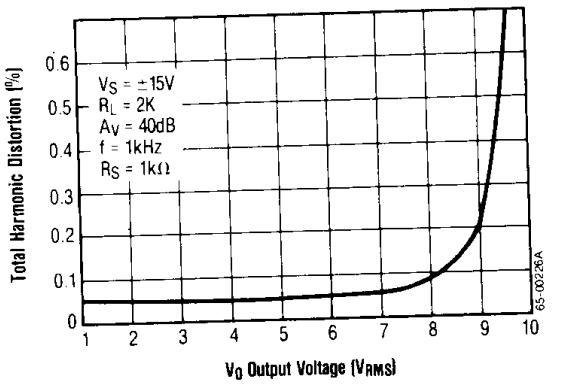
Input Noise Current as a Function of Frequency



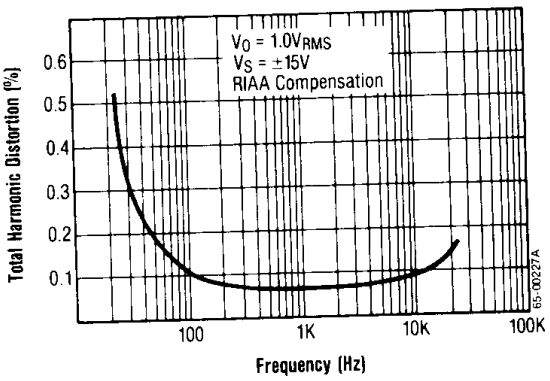
Channel Separation



Total Harmonic Distortion vs. Output Voltage



Distortion vs. Frequency



Typical Applications

Stereo Tone Control