Quad Operational Amplifier

GENERAL DESCRIPTION

The XR-4741 is an array of four independent internally-compensated operational amplifiers on a single silicon chip, each similar to the popular 741. Each amplifier offers performance equal to or better than the 741 type in all respects. It has high slew rate, superior bandwidth, and low noise, which makes it excellent for audio amplifiers or active filter applications.

FEATURES

Short-Circuit Protection
Internal Frequency Compensation
No Latch-Up
Wide Common-Mode and Differential Voltage Ranges
Matched Gain-Bandwidth

High Slew Rate	1.6V/μS(Typ)
Unity Gain-Bandwidth	3.5 MHz(Typ)
Low Noise Voltage	9 nV$\sqrt{Hz}$
Input Offset Current	60 nA(Typ)
Input Offset Voltage	.5 mV(Typ)
Supply Range	±2V to ±20V

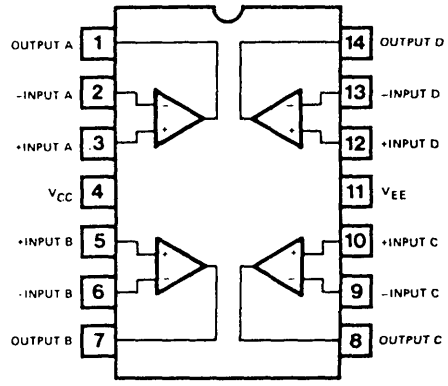
APPLICATIONS

Buffer Amplifiers
Summing/Differencing Amplifiers
Instrumentation Amplifiers
Active Filters
Signal Processing
Sample and Differencing
I to V Converters
Integrators
Simulated Components
Analog Computers

ABSOLUTE MAXIMUM RATINGS

Supply Voltage	
XR-4741	±20
Common Mode	
Voltage	V_{EE} to V_{CC}
Output Short-Circuit Duration	Indefinite
Differential Input Voltage	±30V
Internal Power Dissipation	
Ceramic Package:	880 mW
Derate above T_A = +25°C	5.8 mW/°C
Plastic Package:	625 mW
Derate above T_A = +25°C	5 mW/°C
Storage Temperature Range:	−65°C to +150°C

FUNCTIONAL BLOCK DIAGRAM



ORDERING INFORMATION

Part Number	Package	Operating Temperature
XR-4741M	Ceramic	−55°C to +125°C
XR-4741CN	Ceramic	0°C to +70°C
XR-4741CP	Plastic	0°C to +70°C

SYSTEM DESCRIPTION

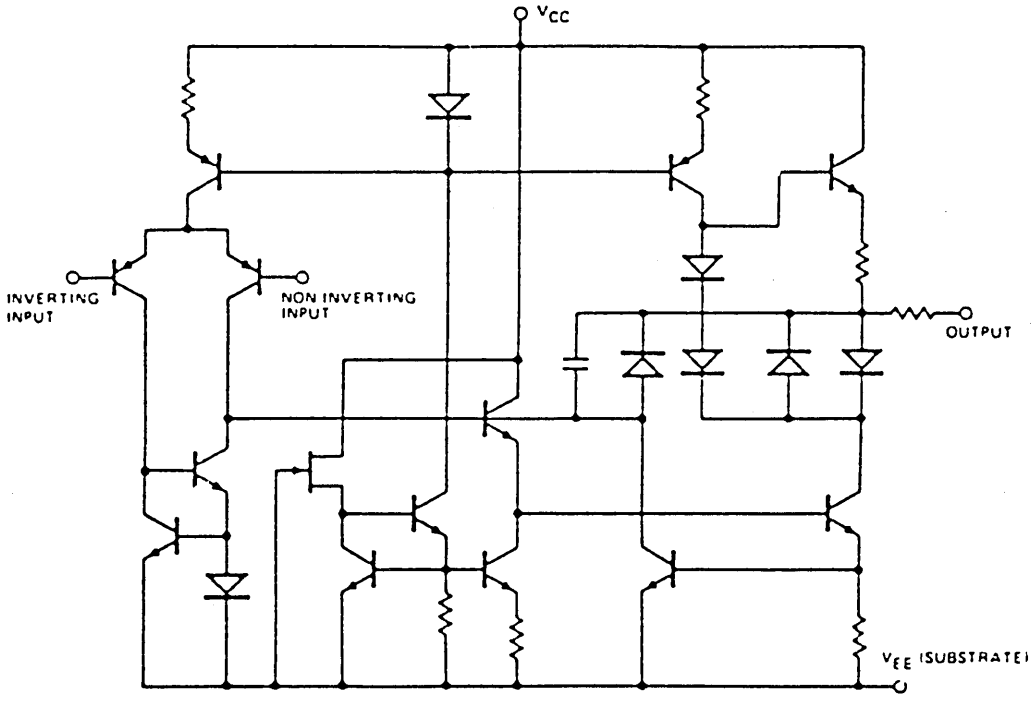
The XR-4741 is a quad independently programmable operational amplifier featuring improved performance over industry standard devices such as the 741. Amplifier bias currents can be "programmed" by a single resistor to Pin 8. Bias currents can range from less than 1 μA to over 75 μA, thus affording the designer flexibility along the device speed/power consumption trade off curve.

XR-4741

ELECTRICAL CHARACTERISTICS

Test Conditions: T_A = +25°C, V_S = ±15 V unless otherwise specified.

PARAMETERS	XR-4741M			XR-4741C			UNITS	SYMBOLS	CONDITIONS
	MIN	TYP	MAX	MIN	TYP	MAX			
Input Offset Voltage		0.5	3.0		1.0	5.0	mV	$\|V_{io}\|$	$R_S \leq 10$ KΩ
Input Offset Current		10	30		10	50	nA	$\|I_{io}\|$	
Input Bias Current		60	200		60	300	nA	$\|I_b\|$	
Differential Input Resistance		5			5		MΩ	R_{in}	
Input Noise Voltage (f = 1 kHz)		9			9		nV/√Hz		
Large Signal Voltage Gain	50	100		25	50		V/mV	A_{VOL}	$R_L \geq 2$ KΩ $V_{out} = \pm 10$V
Output Voltage Swing	±12 ±10	±13.7 ±12.5		±12 ±10	±13.7 ±12.5		V V	V_{out} V_{out}	$R_L \geq 10$ KΩ $R_L \geq 2$ KΩ
Full Power Bandwidth		25			25		kHz		
Output Resistance		300			300		Ω		
Input Voltage Range	±12	±13.5		±12	±13.5		V	V_{iCM}	
Common Mode Rejection Ratio	80	100		80	100		dB	CMRR	$R_S \leq 10$ KΩ
Supply Voltage Rejection Ratio		10	100		10	100	μV/V	PSRR	$R_S \leq 10$ KΩ
Power Consumption			150			210	mW	P_i	
Transient Response (unity gain)									$V_{in} = 20$ mV $R_L = 2$ KΩ
Risetime		.07			.07		μs	t_r	$C_L \leq 100$ pF
Overshoot		20			20		%	t_o	
Unit Gain Bandwidth		3.5			3.5		MHz	BW	
Slew Rate (unity gain)		1.6			1.6		V/μs	dV_{out}/dt	$R_L \geq 2$ KΩ
Channel Separation (open loop)		120			120		dB		f = 10 KHz $R_S = 1$ KΩ
(Gain of 100)		105			105		dB		f = 10 KHz $R_S = 1$ KΩ
The following specifications apply for $-55°C \leq T_A \leq +125°C$ for XR-4741M; $0°C \leq T_A \leq +70°C$ for XR-4741C									
Input Offset Voltage		4.0	5.0		5.0	6.5	mV	$\|V_{io}\|$	$R_S \leq 10$ KΩ
Input Offset Current			75			100	nA	$\|I_{io}\|$	
Input Bias Current			325			400	nA	I_b	
Input Voltage Range	±12			±12			V		
Common Mode Rejection Ratio	74			74			db		
Large-Signal Voltage Gain	25			15			V/mV	A_{VOL}	$R_L \geq 2$ KΩ $V_{out} = \pm 10$V
Output Voltage Swing	±10	±12.5		±10	±12.5		V	V_{out}	$R_L = 2$ KΩ
	±12.0	±13.7		±12	±13.7				$R_L \geq 10$ KΩ $V_S = \pm 15$V
Power Consumption			150			150	mW	P_i	T_A = High
			200			200	mW	P_i	T_A = Low
Supply Voltage Rejection Ratio		100	μV/V		100	μV/V			
Output Short-Circuit Current	±5	±15		±5	±15		mA	I_{SC}	



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EQUIVALENT SCHEMATIC DIAGRAM