Quad Bipolar JFET Operational Amplifier

GENERAL DESCRIPTION

The XR-084 quad bipolar JFET operational amplifier is designed to offer higher performance than conventional bipolar quad op amps. Each of the four op amps on the chip is closely matched in performance characteristics, and each amplifier features high slew rate, low input bias and offset currents, and low offset voltage drift with temperature. The XR-084 JFET input quad op amp is fabricated using ion-implanted bipolar JFET technology which combines well-matched JFETs and high-performance bipolar transistors on the same monolithic integrated circuit.

FEATURES

Direct Replacement for TL084
Same Pin Configuration as XR-3403, LM324
High-Impedance JFET Input Stage
Internal Frequency Compensation
Low Power Consumption
Wide Common-Mode and Differential Voltage Ranges
Low Input Bias and Offset Currents
Output Short Circuit Protection
Latch-Up-Free Operation
High Slew Rate . . . 13 V/μS, Typical

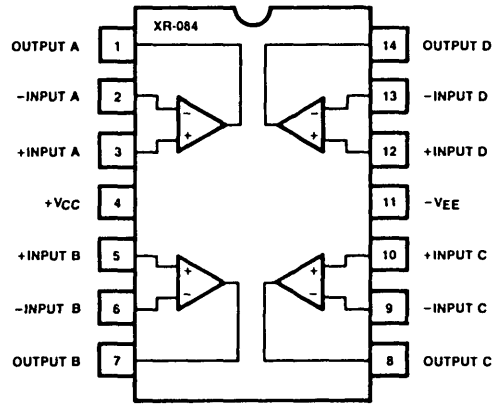
APPLICATIONS

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	±18V
Differential Input Voltage	±30V
Input Voltage Range (Note 1)	±15V
Output Short Circuit Duration (Note 2)	Indefinite
Package Power Dissipation:	
Plastic Package	625 mW
Derate Above T_A = +25°C	5.0 mW/°C
Ceramic Package	750 mW
Derate Above T_A = +25°C	6.0 mW/°C
Storage Temperature Range	−65°C to +150°C

FUNCTIONAL BLOCK DIAGRAM



ORDERING INFORMATION

Part Number	Package	Operating Temperature
XR-084M	Ceramic	−55°C to +125°C
XR-084N	Ceramic	−25°C to + 85°C
XR-084P	Plastic	−25°C to + 85°C
XR-084CN	Ceramic	0°C to + 70°C
XR-084CP	Plastic	0°C to + 70°C

SYSTEM DESCRIPTION

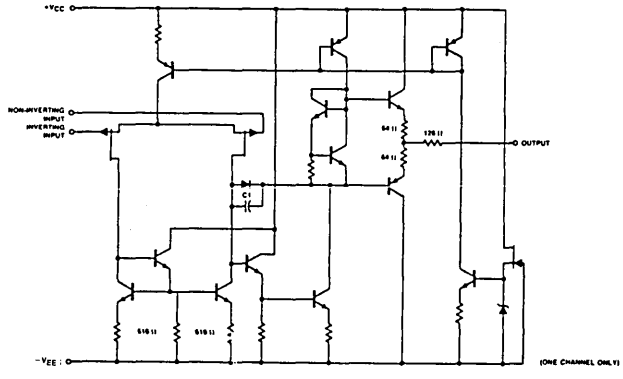
The XR-084 is a quad JFET input operational amplifier featuring extremely high input resistance, low input bias and offset currents, large common mode voltage range, and large output swing range. Unity gain bandwidth is 3 MHz and slew rate is 13V/μS. The devices are unity gain compensated.

XR-084

ELECTRICAL CHARACTERISTICS T_A = 25°C, V_{CC} = ±15, unless otherwise specified.

		XR-084M			XR-084			XR-084C				
SYMBOL	**PARAMETERS**	**MIN**	**TYP**	**MAX**	**MIN**	**TYP**	**MAX**	**MIN**	**TYP**	**MAX**	**UNIT**	**CONDITIONS**
V_{OS} V_{OS}	Input Offset Voltage		3	6 9		3	6 9		5	15 20	mV mV	R_S = 50Ω R_S = 50Ω, T_A = Full Range
$\Delta V_{OS}/\Delta T$	Offset Voltage Temp. Coef.		10			10			10		µV/°C	R_S = 50Ω, T_A = Full Range
I_B	Input Bias Current		30	200		30	200		30	400	pA	
I_B	Input Bias Current Over Temp.			50			20			20	nA	T_A = Full Range
I_{OS}	Input Offset Current		5	100		5	100		5	200	pA	
	Input Offset Current Over Temp.			20			10			5	nA	T_A = Full Range
I_{CC}	Supply Current (per amplifier)		1.4	2.8		1.4	2.8		1.4	2.8	mA	No Load, No Input Signal
V_{ICM}	Input Common Mode Range	±12			±12			±10			V	
A_{VOL}	Voltage Gain	50 25	200		50 25	200		25 15	200		V/mV	R_L ≥ 2 kΩ, V_O = ±10V T_A = Full Range
V_{OPP}	Max. Output Swing (peak-to-peak)	24 24	27		24 24	27		24 24	27		V	R_L ≥ 10 kΩ T_A = Full Range
R_{IN}	Input Resistance		10^{12}			10^{12}			10^{12}		Ω	
BW	Unity-Gain Bandwidth		3			3			3		MHz	
CMRR	Common-Mode Rejection	80	86		80	86		70	76		dB	R_S ≤ 10 kΩ
PSRR	Supply-Voltage Rejection	80	86		80	86		70	76		dB	
	Channel Separation		120			120			120		dB	A_V = 100, Freq. = 1 kHz
DV_{OUT}/DT	Slew Rate		13			13			13		V/µS	A_V = 1, R_L = 2 kΩ C_L = 100 pF, V_1 = 10V
T_R T_O	Rise Time Overshoot		0.1 10			0.1 10			0.1 10		µsec %	A_V = 1, R_L = 2 kΩ C_L = 100 pF, V_1 = 20 mV
E_N	Equivalent Input Noise Voltage		20			20			20		nV/√Hz	R_S = 100Ω f = 1 kHz

Note 1: For Supply Voltage less than ±15V, the absolute maximum input voltage is equal to the supply voltage.
Note 2: The output may be shorted to ground or to either supply. Temperature and/or supply voltages must be limited to ensure that the dissipation rating is not exceeded.



EQUIVALENT SCHEMATIC DIAGRAM