Quad Programmable Bipolar JFET Operational Amplifier

GENERAL DESCRIPTION

The XR-096 monolithic circuit contains four independently programmable JFET operational amplifiers in a single IC package. Each of the four op amp sections on the chip has its own external bias terminal; thus its performance characteristics and power dissipation can be independently controlled, without effecting the other op amp sections on the chip. The respective bias-setting resisters, R_{SET}, connected to the programming terminals of the circuit allow one to trade-off power dissipation for slew-rate, without sacrificing the gain-bandwidth product of the circuit. These individual bias terminals can also be used to switch the op amp sections "on" and "off", and thus, multiplex between various op amp channels on the same chip.

FEATURES

Programmable Version of XR-084
Independent Programming of All Four Op Amps
Programmable for Micropower Operation
High-Impedance JFET Input Stage
Internal Frequency Compensation
Low Input Bias and Offset Currents

APPLICATIONS

Total Supply Current = 5.6 mA (I_{SET}/320 μA)
Slew-Rate = 13 V/μs (I_{SET}/320 μA)
I_{SET} = Current into set terminal

$$I_{SET} = \frac{V_{CC} - (V_{EE} - 0.6V)}{R_{SET}}$$

Note. I_{SET} must be $\leq$ 400μA

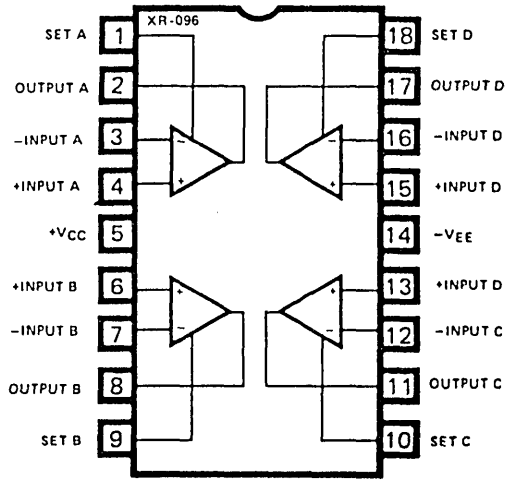
ABSOLUTE MAXIMUM RATINGS

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 mV/°C
Ceramic Package	750 mW
Derate Above T_A = +25°C	6.0 mW/°C
Storage Temperature Range	−65°C to +150°C

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.

FUNCTIONAL BLOCK DIAGRAM



ORDERING INFORMATION

Part Number	Package	Operating Temperature
XR-096N	Ceramic	−25°C to +85°C
XR-096P	Plastic	−25°C to +85°C
XR-096CN	Ceramic	0°C to +70°C
XR-096CP	Plastic	0°C to +70°C

SYSTEM DESCRIPTION

The XR-096 is a quad independently programmable JFET input operational amplifier featuring extremely high input resistance, low input bias and offset current, 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.

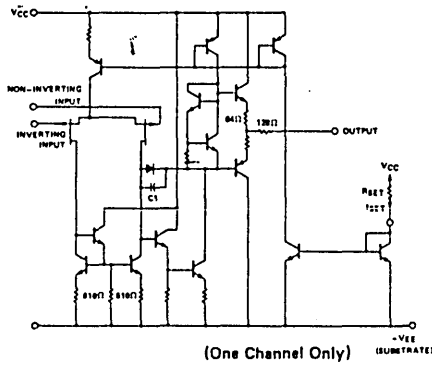
Each of the form amplifiers may be independently "programmed"-rebiased-by connecting a resistor from the bias adjust pin to the positive supply. Bias current may range up to 400 μA, thus affording the designer flexibility along the power consumption/speed curve.

XR-096

ELECTRICAL CHARACTERISTICS

T_A = 25°C, V_{CC} = ±15V, unless otherwise specified.
I_{SET} = 320 μA.

PARAMETERS	XR-096			XR-096C			UNITS	SYMBOL	CONDITIONS
	MIN	TYP	MAX	MIN	TYP	MAX			
Input Offset Voltage		3	6 9		5	15 20	mV mV	V_{OS} V_{OS}	R_S = 50Ω, T_A = 25°C R_S = 50Ω, T_A = Full Range
Offset Voltage Temp. Coef.		10			10		μV/°C	$\Delta V_{OS}/\Delta T$	R_S = 50Ω, T_A = Full Range
Input Bias Current		80	600 20		80	800 20	pA nA	I_B	T_A = 25°C T_A = Full Range
Input Offset Current		40	300 10		40	500 5	pA nA	I_{OS}	T_A = 25°C T_A = Full Range
Supply Current (per amplifier)		1.4	2.8		1.4	2.8	mA	I_{CC}	No Load, No Input Signal
Input Common Mode Range	±12			±10			V	V_{iCM}	
Voltage Gain	50 25	200		25 15	200		V/mV	A_{VOL}	R_L ≥ 2KΩ, V_O = ±10V T_A = 25°C T_A = Full Range
Max. Output Swing (peak-to-peak)	24 24	27		24 24	27		V	V_{OPP}	R_L ≥ 10 KΩ T_A = 25°C T_A = Full Range
Input Resistance		10^{12}			10^{12}		Ω	R_{in}	T_A = 25°C
Unity-Gain Bandwidth		3			3		MHz	BW	T_A = 25°C
Common-Mode Rejection	80	86		70	76		dB	CMRR	R_S ≤ 10 KΩ
Supply-Voltage Rejection	80	86		70	76		dB	PSRR	
Channel Separation		120			120		dB		A_V 100, Freq. = 1 kHz
Slew Rate		13			13		V/μS	dV_{out}/dt	A_V = 1, R_L = 2 KΩ C_L = 100 pF, V_1 = 10V
Rise Time Overshoot		0.1 10			0.1 10		μsec %	t_r t_o	A_V = 1, R_L = 2 KΩ C_L = 100 pF, V_1 = 20 mV
Equivalent Input Noise Voltage		18			18		nV/√Hz	e_n	R_S = 100Ω f = 1 kHz



(One Channel Only)

EQUIVALENT SCHEMATIC DIAGRAM