Quad Programmable Bipolar JFET Operational Amplifiers

GENERAL DESCRIPTION

The XR-094 and XR-095 bipolar JFET input quad programmable operational amplifiers consist of four independent, high gain, internally compensated amplifiers. Two external resistors (R_{SET}) allow the user to program supply current, slew-rate, and input noise without the usual sacrifice of gain bandwidth product. For example, the user can trade-off slew-rate for supply current or optimize the noise figure for a given source impedance. Except for the two programming pins at the end of the package, the XR-094 and XR-095 pin-out is the same as the popular 324, 3403, 124, 148 and 4741 operational amplifiers.

In the case of the XR-094, three of the op amps on the chip share a common programming pin; and the fourth op amp is programmed separately. In the case of the XR-095, each pair of op amps share a common programming pin.

FEATURES

Same Pin Configuration as LM-346
High-Impedance FET 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
High Slew-Rate . . . 13 V/μs, Typical
Programmable Electrical Characteristics

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

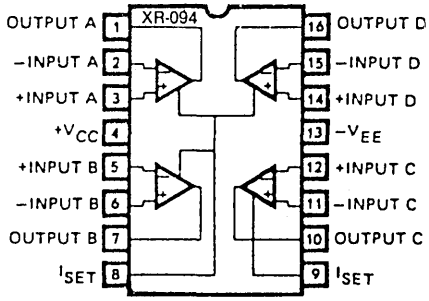
$$I_{SET} = \frac{V_{CC} - (V_{EE} - 0.6V)}{R_{SET}}$$

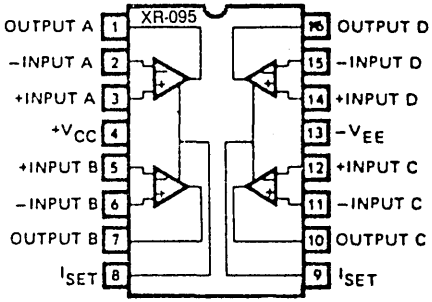
Note. I_{SET} must be $\leq$ 400μA

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

FUNCTIONAL BLOCK DIAGRAMS





ABSOLUTE MAXIMUM RATINGS (Continued)

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.

ORDERING INFORMATION

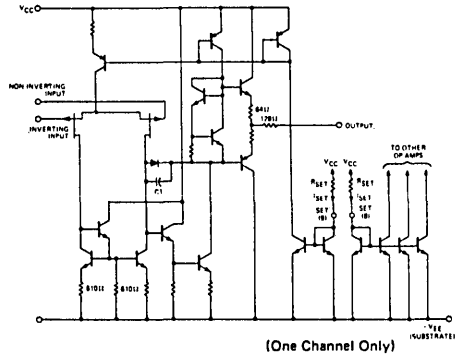
Part Number	Package	Operating Temperature
XR-094/XR-095N	Ceramic	−25°C to +85°C
XR-094/XR-095P	Plastic	−25°C to +85°C
XR-094/XR-095CN	Ceramic	0°C to +70°C
XR-094/XR-095CP	Plastic	0°C to +70°C

XR-094/095

ELECTRICAL CHARACTERISTICS

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

PARAMETERS	XR-094/095			XR-094/095C			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