Programmable Quad Operational Amplifiers

GENERAL DESCRIPTION

The XR-146 family of quad operational amplifiers contain four independent high-gain, low-power, programmable op-amps on a monolithic chip. The use of external bias setting resistors permit the user to program gain-bandwidth product, supply current, input bias current, input offset current, input noise and the slew rate.

The basic XR-146 family of circuits offer partitioned programming of the internal op-amps where one setting resistor is used to set the bias levels in the three op-amps, and a second bias setting is used for the remaining op-amp.

FEATURES

Programmable
Micropower operation
Low noise
Wide power supply range
Class AB output
Ideal pin out for biquad active filters
Overload protection for input and output
Internal frequency compensation

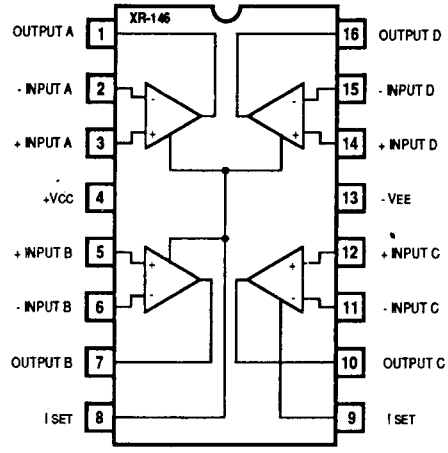
APPLICATIONS

Total Supply Current = 1.4 mA (I_{SET}/10 μA)
Gain Bandwidth Product = 1 MHz (I_{SET}/10 μA)
Slew Rate = 0.4V/μs (I_{SET}/10 μA)
Input Bias Current ~= 50 nA (I_{SET}/10 μA)

I_{SET} = Current into pin 8, pin 9 (see schematic)

$$I_{SET} = \frac{V^+ - V^- - 0.6V}{R_{SET}}$$

FUNCTIONAL BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Supply Voltage	
XR-146	±22V
Differential Input Voltage	
XR-146	±30V
Common Mode Input Voltage	
XR-146	±15V
Power Dissipation	
XR-146	900 mW
Output Short Circuit Duration	
XR-146	Indefinite
Maximum Junction Temperature	
XR146	+150°C
Storage Temperature Range	
XR-146	–65°C to + 150°C

Rev-A

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ELECTRICAL PERFORMANCE CHARACTERISTICS - XR-146

TEST	SYMBOL	CONDITIONS	TEMPERATURE	MIN	LIMITS MAX	UNIT	GROUP A SUBGROUP
Supply Current	I_{CC}	Vs =±15V	T_A = +25°C		2.00	mA	1
		I_{SET} = 10µA	-55°C≤T_A≤+125°C		2.00	mA	2,3
Supply Current	I_{CC}	Vs = ±22V	T_A = +25°C		4.00	mA	1
		I_{SET} = 10µA					
Input Offset Voltage	Vos	Vs=±15V, Rs=50Ω	T_A = +25°C		5.00	mV	1
		I_{SET} = 10µA	-55°C≤T_A≤+125°C		6.00	mV	2,3
Input Bias Current	Ib	Vs=±15V, Rs=10KΩ	T_A = +25°C		100	nA	1
		I_{SET} = 10µA	-55°C≤T_A≤ + 125°C		100	nA	2,3
Input Offset Current	Ios	Vs=±15V, Rs=100KΩ	T_A = +25°C		20	nA	1
		I_{SET} = 10µA	-55°C≤T_A≤ +125°C		25	nA	2,3
Power Supply Rejection Ratio	PSRR	Rs = 10KΩ	T_A = +25°C		100	uV/V	1
		±10V≤ Vs≤ ±15V	-55°C≤T_A≤+125°C	76		dB	2,3
Common Mode Rejection Ratio	CMRR	VCM = ±13.5V	T_A = +25°C	80		dB	1
		Vs=±15V, RL=10KΩ	-55°C≤T_A≤+125°C	70		dB	2,3
Large Signal Voltage Gain	AVO	Vo=±10V, Rs =50Ω	T_A = +25°C	100		V/mV	4
		Vs=±15V, R_L=10KΩ Vo=±10V Vs=±15V, RL=10KΩ	-55°C≤T_A≤+125°C	50		V/mV	5,6
Output Voltage - Swing	Vo	RL = 10KΩ	T_A = +25°C	±12		V	4
		Vs=±15V, Rs =125Ω Vs=±15V, RL=10KΩ	-55°C≤T_A≤+125°C	±12		V	5,6
Short Circuit Current	Isc	Vs=±15V, Rs=50Ω	T_A = +25°C	5	30	mA	1
Supply Current	Icc	Vs=±15V, I_{SET}=1µA	T_A = +25°C		250	µA	1
Input Offset Voltage	Vos	Rs = 50Ω, Vs=±15V I_{SET} = 1µA	T_A = +25°C		5.00	mV	1
Input Bias Current	Ib	Rs=10 KΩ, Vs=±15V I_{SET} = 1µA	T_A = +25°C		20	nA	1
Input Offset Voltage	Vos	Rs=50Ω, Vs=±15V I_{SET} = 10µA	T_A = +25°C		5.00	mV	1
Common Mode Rejection Ratio	CMRR	Rs = 50Ω, Vs = 1.5V VCM = ±0.7V	T_A = +25°C	60		dB	1
Output Voltage - Swing	Vo	RL=10KΩ, Rs=50Ω Vs=±1.5V,I_{SET}=10µA	T_A = +25°C	10.6		V	4

EXAR

XR-1488/1489A

Quad Line Driver/Receiver

GENERAL DESCRIPTION

The XR-1488 is a monolithic quad line driver designed to interface data terminal equipment with data communications equipment in conformance with the specifications of EIA Standard No. RS232C. This extremely versatile integrated circuit can be used to perform a wide range of applications. Features such as output current limiting, independent positive and negative power supply driving elements, and compatibility with all DTL and TTL logic families greatly enhance the versatility of the circuit.

The XR-1489A is a monolithic quad line receiver designed to interface data terminal equipment with data communications equipment. the XR-1489A quad receiver along with its companion circuit, the XR-1488 quad driver, provide a complete interface system between DTL or TTL logic levels and the RS232C defined voltage and impedance levels.

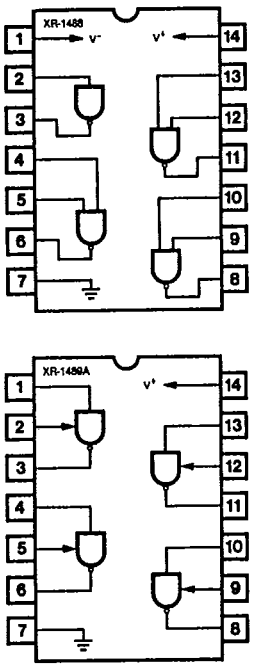
ABSOLUTE MAXIMUM RATINGS

Power Supply	
XR-1488	±15 Vdc
XR-1489A	+10 Vdc
Power Dissipation	
Ceramic Package	1000 mW
Derate above +25°C	6.7 mW/°C
Plastic Package	650 mW/°C
Derate above +25°C	5 mW/°C

ORDERING INFORMATION

Part Number	Package	Operating Temperature
XR-1488N	Ceramic	0°C to +70°C
XR-1488P	Plastic	0°C to +70°C
XR-1489AN	Ceramic	0°C to +70°C
XR-1489AP	Plastic	0°C to +70°C

FUNCTIONAL BLOCK DIAGRAMS



SYSTEM DESCRIPTION

The XR-1488 and XR-1489A are a matched set of quad line drivers and line receivers designed for interfacing between TTL/DTL and RS232C data communication lines.

The XR-1488 contains four independent split supply line drivers, each with a ±10 mA current limited output. For RS232C applications, the slew rate can be reduced to the 30 V/μS limit by shunting the output to ground with a 410 pF capacitor. The XR-1489A contains four independent line receivers, designed for interfacing RS232C to TTL/DTL. Each receiver features independently programmable switching thresholds with hysteresis, and input protection to ±30 V. The output can typically source 3 mA and sink 20 mA.