EXAR

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
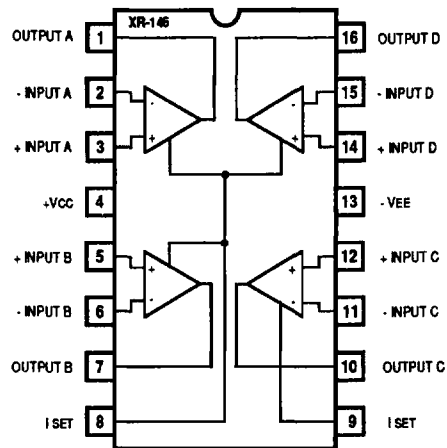Overload protection for input and output
Internal frequency compensation

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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XR-146

ELECTRICAL PERFORMANCE CHARACTERISTICS - XR-146

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