# **Precision Waveform Generator**

## **GENERAL DESCRIPTION**

查询XR-8038AP供应商

**EXAR** 

The XR-8038A is a precision waveform generator IC capable of producing sine, square, triangular, sawtooth, and pulse waveforms, with a minimum number of external components and adjustments. The 8038A allows the elimination of the external distortion adjusting resistor which greatly improves the temperature drift of distortion, as well as lowering external parts count. Its operating frequency can be selected over eight decades of frequency, from 0.001Hz to 200KHz, by the choice of external R-C components. The frequency of oscillation is highly stable over a wide range of temperature and supply voltage changes. Both full frequency sweeping as well as smaller frequency variations (FM) can be accomplished with an external control voltage. Each of the three basic waveform outputs, (i.e., sine, triangle and square) are simultaneously available from independent output terminals.

The XR-8038A monolithic waveform generator uses advanced processing technology and Schottky-barrier diodes to enhance its frequency performance. It can be readily interfaced with a monolithic phase-detector circuit, such as the XR-2228 to form stable phase-locked circuits.

## FEATURES

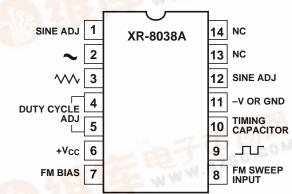
Low Frequency Drift 50ppm/°C, Typical Simultaneous Sine, Triangle, and Square Wave Outputs Low Sine Wave Distortion — THD ~ 1% High FM and Triangle Linearity Wide Frequency Range 0.001Hz to 200KHz Variable Duty Cycle 2% to 98% Low Distortion Variation with Temperature

### APPLICATIONS

Precision Waveform Generation Sweep and FM Generation Tone Generation Instrumentation and Test Equipment Design Precision PLL Design

#### ABSOLUTE MAXIMUM RATINGS

#### PIN ASSIGNMENT



专业PCB打样工厂

,24小时加急出货

XR-8038A

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### **ORDERING INFORMATION**

Part Number	Package	Operating Temperature
XR-8038AM	Ceramic	–55°C to +125°C
XR-8038AN	Ceramic	0°C to +70°C
XR-8038AP	Plastic	0°C to +70°C
XR-8038ACN	Ceramic	0°C to +70°C
XR-8038ACP	Plastic	0°C to +70°C

#### SYSTEM DESCRIPTION

The XR-8038A precision waveform generator produces highly stable and sweepable square, triangle, and sine waves across eight frequency decades. The XR-8038A is an advanced version of the XR-8038, with improved sine distortion temperature drift. The device time base employs resistors and a capacitor for frequency and duty cycle determination. The generator contains dual comparators, a flip-flop driving a switch, current sources, buffers, and a sine wave convertor. Three identical frequency outputs are simultaneously available. Supply voltage can range from 10V to 30V, or  $\pm$ 5V to  $\pm$ 15V with dual supplies.

Unadjusted sine wave distortion is typically less than 0.7% with the sine wave distortion adjust pin (Pin 1) open. Distortion levels may be improved by including a  $100k\Omega$  potentiometer between the supplies, with the wiper connected to Pin 1.

Small frequency deviation (FM) is accomplished by applying modulation voltage to Pins 7 and 8; large frequency deviation (sweeping) is accomplished by applying voltage to Pin 8 only. Sweep range is typically 1000:1.

The square wave output is an open collector transistor; output amplitude swing closely approaches the supply voltage. Triangle output amplitude is typically 1/3 of the supply, and sine wave output reaches 0.22 of the supply voltage.

# **XR-8038A**

#### **ELECTRICAL CHARACTERISTICS**

**Test Conditions:**  $V_S = \pm 5V$  to  $\pm 15V$ ,  $T_A = 25^{\circ}C$ ,  $R_L = 1M\Omega$ ,  $R_A = R_B = 10k\Omega$ ,  $C_1 = 3300$  pF,  $S_1$  closed, unless otherwise specified.

	8038AM/8038A		8038AC					
PARAMETERS	MIN	TYP	MAX	MIN	TYP	MAX	UNITS	CONDITIONS
GENERAL CHARACTERISTICS			LI					1
Supply Voltage, V <sub>S</sub>								
Single Supply	10		30	10		30	V	
Dual Supplies	±5		±15	±5		±15	V	
Supply Current		12	15		12	20	mA	$V_{S} = \pm 10V$ (Note 1)
FREQUENCY CHARACTERISTICS (Me	easured	at Pin 9	)					1
Range of Adjustment								
Max. Operating Frequency	200			200			KHz	$R_A = R_B$ , = 1.5k $\Omega$ , $C_1$ = 680pF $R_L$ = 10K
Lowest Practical Frequency		0.001			0.001		Hz	$R_A^- = R_B^- = 1M\Omega$ , $C_1 = 500\mu F$ (Low Leakage Capacitor)
Max. Sweep Frequency of FM Input		100			100		kHz	
FM Sweep Range		1000:1			1000:1			S <sub>1</sub> Open (Notes 2 & 3)
FM Linearity 10:1 Ratio		0.1			0.2		%	S <sub>1</sub> Open (Note 3)
Range of Timing Resistors	0.5		1000	0.5		1000	kΩ	Values of R <sub>A</sub> and R <sub>B</sub>
Temperature Stability								
XR-8038AM		50		_	-	—	ppm/°C	$T_A = -55^{\circ}C$ to +125°C
XR-8038A		50	100		50		100	T 000 / 7000
XR-8038AC		0.05			50		ppm/°C	$T_A = 0^{\circ}C$ to +70°C
Power Supply Stability		0.05			0.05		%/V	(Note 4)
OUTPUT CHARACTERISTICS								
Square-Wave								Measured at Pin 9
Amplitude (Peak-to-Peak)	0.9	0.98		0.9	0.98		x V <sub>SPLY</sub>	$R_{L} = 100 k\Omega$
Saturation Voltage		0.2	0.4		0.2	0.5	V	I <sub>sink</sub> = 2mA
Rise Time		100			100		nsec	$R_L = 4.7 k\Omega$
Fall Time		40			40		nsec	$R_L = 4.7 k\Omega$
Duty Cycle Adjustment	2		98	2		98	%	
Triangle/Sawtooth/Ramp								Measured at Pin 3.
Amplitude (Peak-to-Peak)	0.3	0.33		0.3	0.33		x V <sub>SPLY</sub>	$R_{L} = 100 k\Omega$
Linearity		0.05			0.1		%	
Output Impedance		200			200		Ω	I <sub>OUT</sub> = 5mA
Sine-Wave Amplitude (Peak-to-Peak)	0.2	0.22		0.2	0.22		x V <sub>SPLY</sub>	$R_L = 100 k\Omega$
Distortion		0.7	1.5		0.8	3	%	$R_{L} = 1M\Omega$ (Notes 5, 6 & 7)
Unadjusted		0.5			0.5		%	$R_{L}^{-} = 1M\Omega$ (Notes 5, 6 & 7)
Adjusted		0.5			0.3		%	
ΔΤΗD/ΔΤ								

Note 1: Currents through R<sub>A</sub> and R<sub>B</sub> not included.

Note 2:  $V_{\text{SUPPLY}} = 20V$ .

Note 3: Apply sweep voltage at Pin 8.

 $V_{CC} - (1/3~V_{SUPPLY} - 2) \leq V_{PIN~8} \leq V_{CC}$ 

 $V_{SUPPLY}$  = Total Supply Voltage across the IC Note 4:  $10V \le V_S \le 30V$  or  $\pm 5V \le V_S \le 15V$ .

Note 5: Pin 12 open circuited (No.  $82k\Omega$  resistor as standard 8038).

Note 6: Triangle duty cycle set at 50%, use  $R_A$  and  $R_B$ .

Note 7: As R<sub>L</sub> is decreased distortion will increase, R<sub>L</sub> min  $\approx$  50k $\Omega$ .

# Notes

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