

### Features

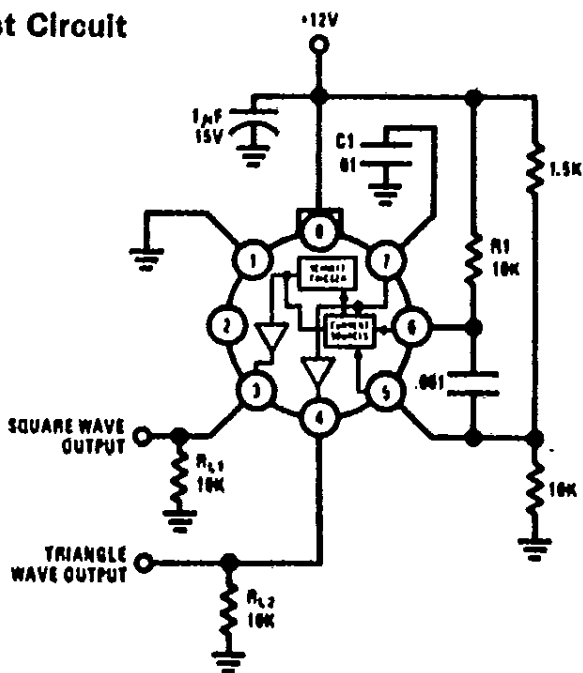
- Wide supply voltage ranges: 10 to 24 volts
- Very linear modulation characteristics
- High temperature stability
- Excellent supply voltage rejection
- 10 to 1 frequency range with fixed capacitor
- Frequency programmable by means of current, voltage, resistor or capacitor

The ECG994/ECG994M are general purpose voltage controlled oscillators which may be used to generate square and triangular waves, the frequency of which is a very linear function of a control voltage. The frequency is also a function of an external resistor and capacitor. Typical applications include FM modulation, FSK, signal generation, tone generation and function generation.

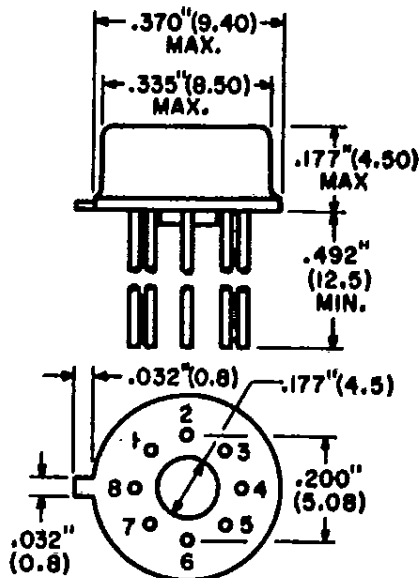
### Absolute Maximum Ratings

Power Supply Voltage	..... 26V
Power Dissipation (Note 1)	..... 300mW
Operating Temperature Range	..... 0°C to +70°C
Lead Temperature (Soldering, 10 seconds)	.... 300°C

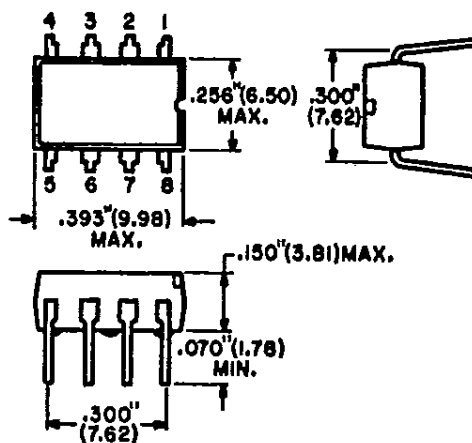
### AC Test Circuit



### ECG994



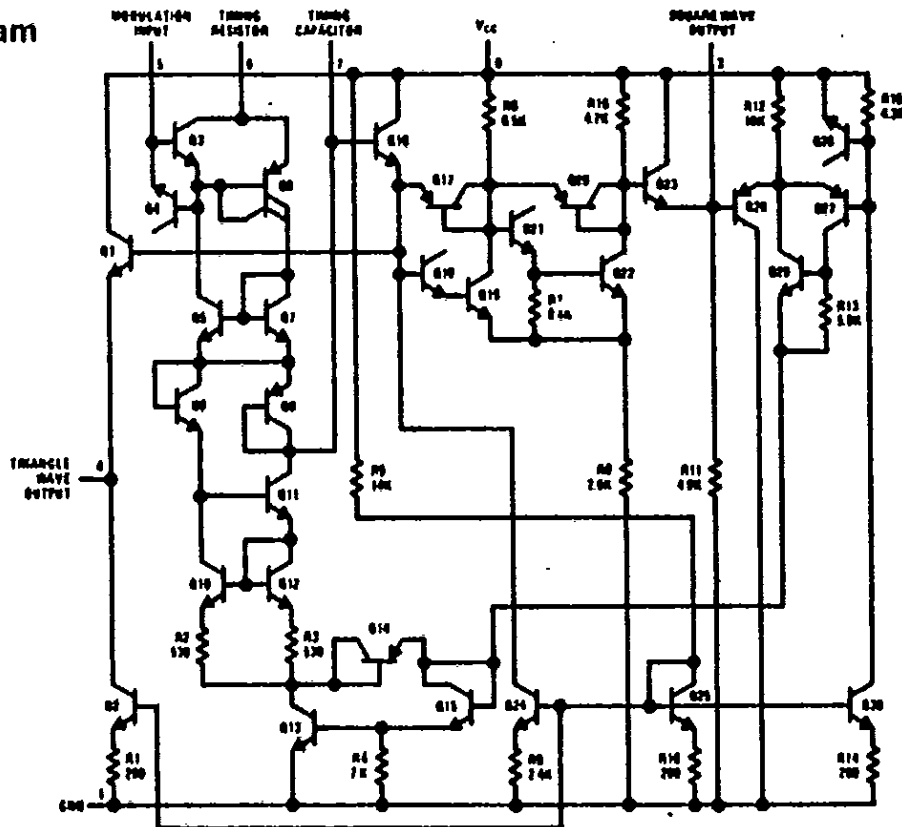
### ECG994M



### Pin Connections

- 1—Ground
- 2—N.C.
- 3—Square Wave Output
- 4—Triangle Wave Output
- 5—Modulation Input
- 6—Timing Resistor
- 7—Timing Capacitor
- 8—V<sub>CC</sub>

## Schematic Diagram

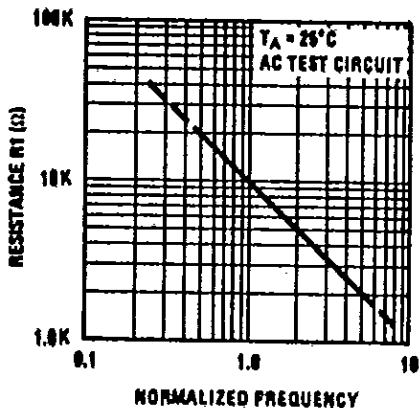
Electrical Characteristics ( $V_{CC} = 12V$ ,  $T_A = 25^\circ C$ , AC Test Circuit)

Parameter	Conditions	Min	Typ	Max	Units
Maximum Operating Frequency	$R_O = 2k$ $C_O = 2.7pF$		1		MHz
Input Voltage Range Pin 5		$3/4V_{CC}$		$V_{CC}$	
Average Temperature Coefficient of Operating Frequency			200		ppm/ $^\circ C$
Supply Voltage Rejection	10 – 20V		0.1	2	%/V
Input Impedance Pin 5		0.5	1		$M\Omega$
VCO Sensitivity	For Pin 5, From 8 – 10V, $f_0 = 10kHz$	6.0	6.6	7.2	kHz/V
FM Distortion	$\pm 10\%$ Deviation		0.2	1.5	%
Maximum Sweep Rate		500	1		MHz
Sweep Range			10:1		
Output Impedance Pin 3 Pin 4			50 50		$\Omega$ $\Omega$
Square Wave Output Level	$R_{L1} = 10k$	5.0	5.4		Vp-p
Triangle Wave Output Level	$R_{L2} = 10k$	2.0	2.4		Vp-p
Square Wave Duty Cycle		40	50	60	%
Square Wave Rise Time			20		ns
Square Wave Fall Time			50		ns
Triangle Wave Linearity	+1V Segment at $1/2 V_{CC}$		0.5	1	%

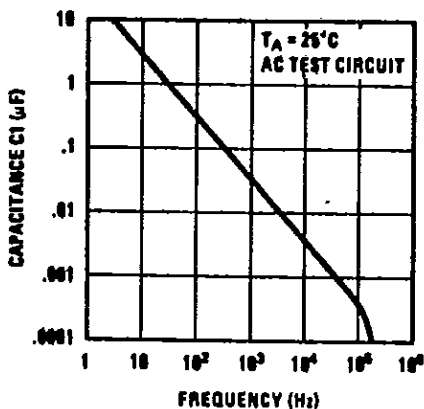
**Note 1:** The maximum junction temperature of ECG994 is  $100^\circ C$ . For operating at elevated junction temperatures, ECG994M must be derated based on a thermal resistance of  $150^\circ C/W$ . The thermal resistance of ECG994M is  $100^\circ C/W$ .

# Typical Performance Characteristics

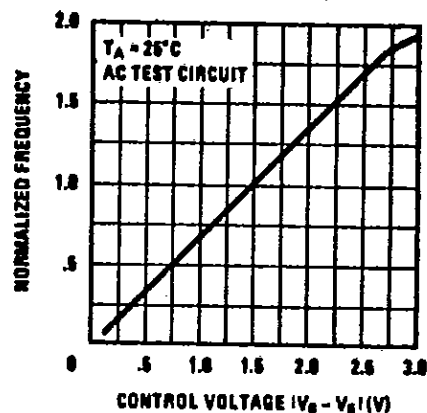
Operating Frequency as a Function of Timing Resistor



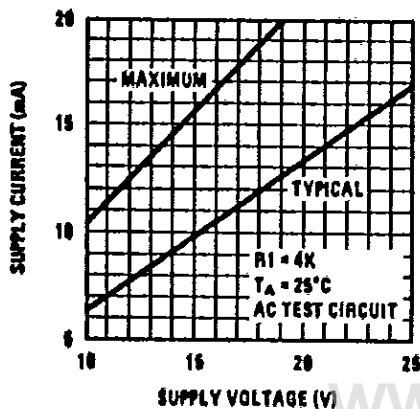
Operating Frequency as a Function of Timing Capacitor



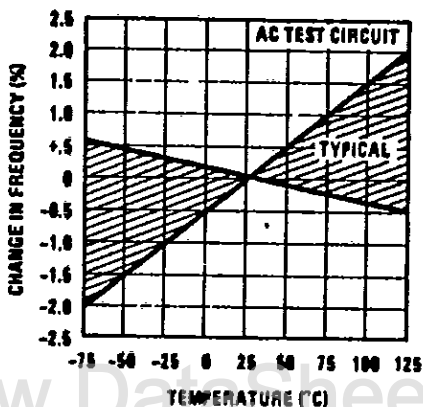
Normalized Frequency as a Function of Control Voltage



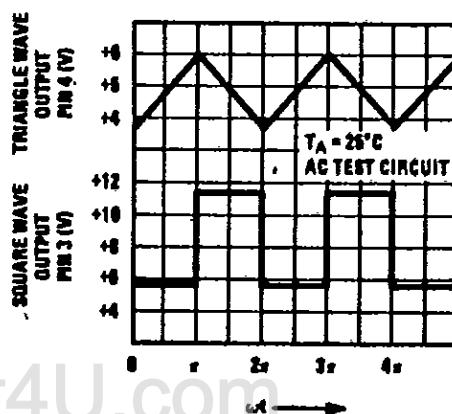
Power Supply Current



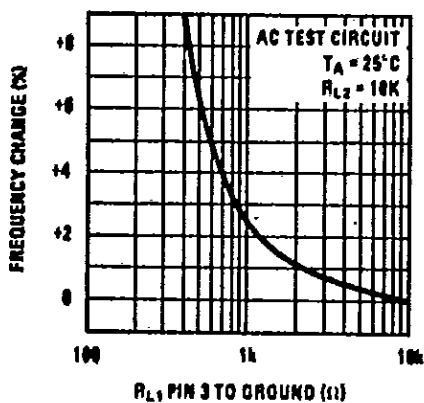
Temperature Stability



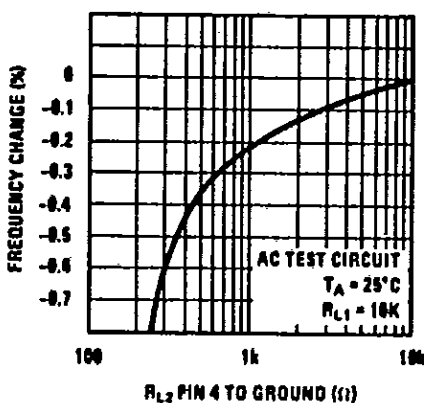
VCO Waveforms



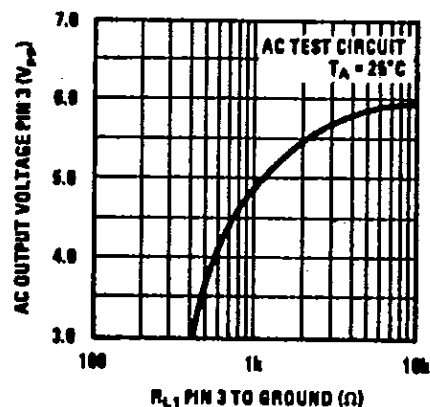
Frequency Stability vs Load Resistance (Square Wave Output)



Frequency Stability vs Load Impedance (Triangle Output)



Square Wave Output Characteristics



Triangle Wave Output Characteristics

