

LM566C Voltage Controlled Oscillator

General Description

The LM566CN is a general purpose voltage controlled oscillator 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.

The LM566CN is specified for operation over the 0°C to +70°C temperature range.

Features

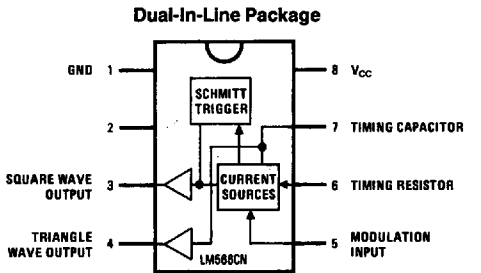
- Wide supply voltage range: 10V to 24V
- Very linear modulation characteristics

- 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

Applications

- FM modulation
- Signal generation
- Function generation
- Frequency shift keying
- Tone generation

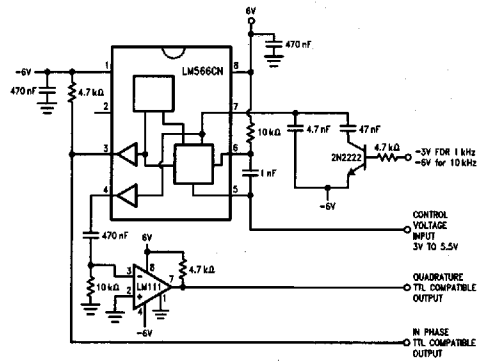
Connection Diagram



TL/H/7854-2

Typical Application

1 kHz and 10 kHz TTL Compatible Voltage Controlled Oscillator



TL/H/7854-3

Absolute Maximum Ratings

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Power Supply Voltage	26V
Power Dissipation (Note 1)	1000 mW
Operating Temperature Range, LM566CN	0°C to +70°C
Lead Temperature (Soldering, 10 sec.)	+260°C

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

Parameter	Conditions	LM566C			Units
		Min	Typ	Max	
Maximum Operating Frequency	$R_O = 2k$ $C_O = 2.7$ pF	0.5	1		MHz
VCO Free-Running Frequency	$C_O = 1.5$ nF $R_O = 20k$ $f_O = 10$ kHz	-30	0	+30	%
Input Voltage Range Pin 5		$\frac{3}{4} V_{CC}$		V_{CC}	
Average Temperature Coefficient of Operating Frequency			200		ppm/°C
Supply Voltage Rejection	10-20V		0.1	2	%/V
Input Impedance Pin 5		0.5	1		M Ω
VCO Sensitivity	For Pin 5, From 8-10V, $f_O = 10$ kHz	6.0	6.6	7.2	kHz/V
FM Distortion	$\pm 10\%$ Deviation		0.2	1.5	%
Maximum Sweep Rate			1		MHz
Sweep Range			10:1		
Output Impedance Pin 3			50		Ω
Pin 4			50		Ω
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 $\frac{1}{2} V_{CC}$		0.5		%

Note 1: The maximum junction temperature of the LM566CN is 150°C. For operation at elevated junction temperatures, maximum power dissipation must be derated based on a thermal resistance of 115°C/W, junction to ambient.

Applications Information

The LM566CN may be operated from either a single supply as shown in this test circuit, or from a split (\pm) power supply. When operating from a split supply, the square wave output (pin 3) is TTL compatible (2 mA current sink) with the addition of a 4.7 k Ω resistor from pin 3 to ground.

A 0.001 μ F capacitor is connected between pins 5 and 6 to prevent parasitic oscillations that may occur during VCO switching.

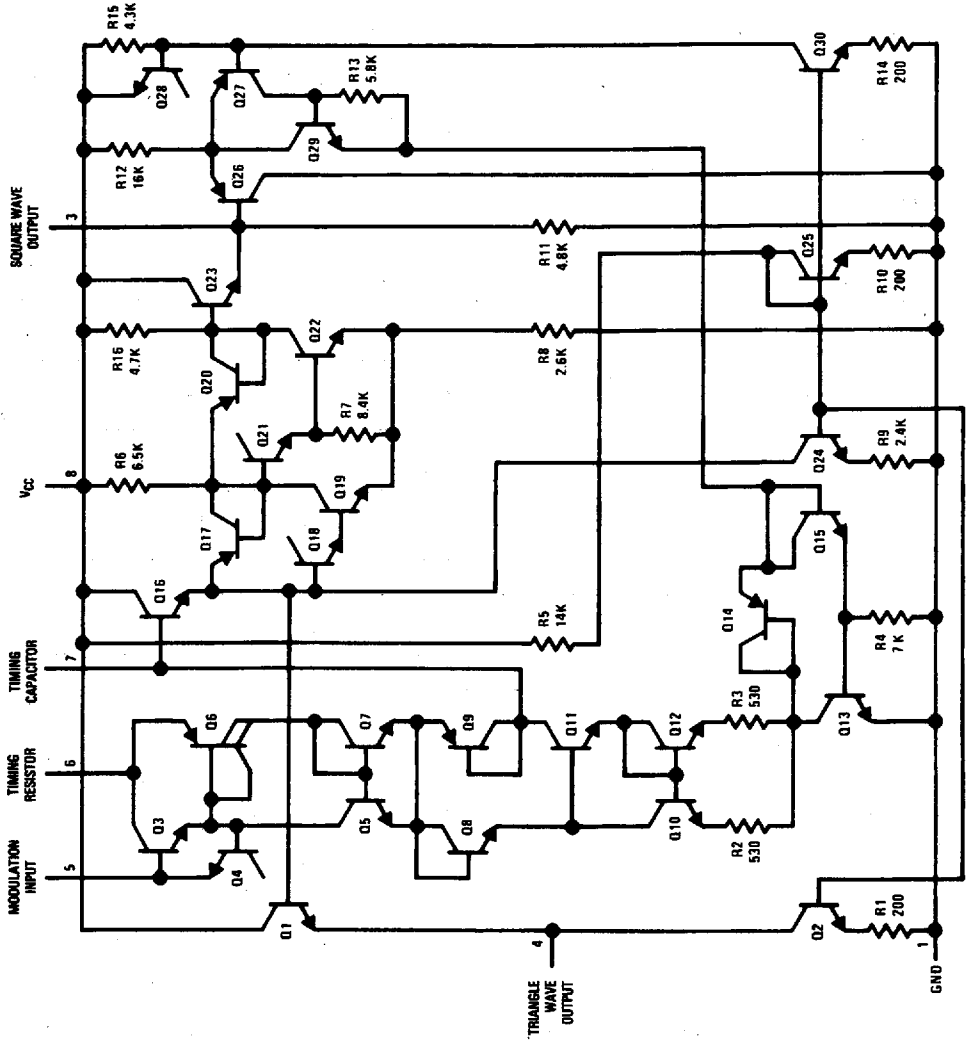
$$f_O = \frac{2.4(V^+ - V_S)}{R_O C_O V^+}$$

where

$$2K < R_O < 20K$$

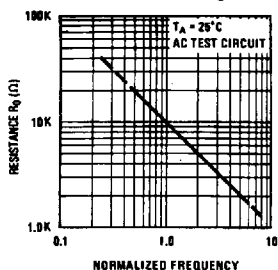
and V_S is voltage between pin 5 and pin 1.

Schematic Diagram

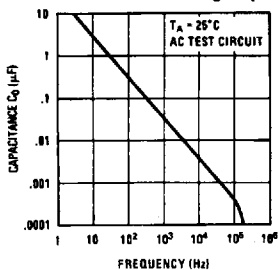


Typical Performance Characteristics

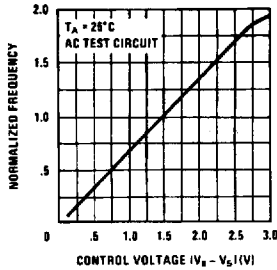
Operating Frequency as a Function of Timing Resistor



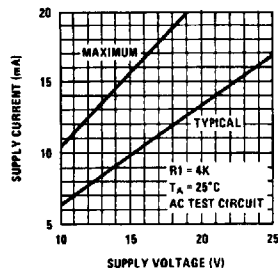
Operating Frequency as a Function of Timing Capacitor



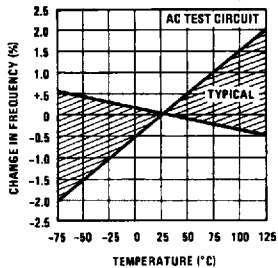
Normalized Frequency as a Function of Control Voltage



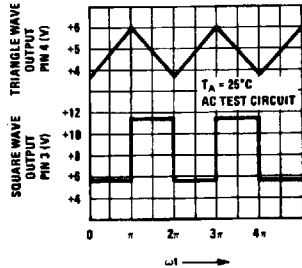
Power Supply Current



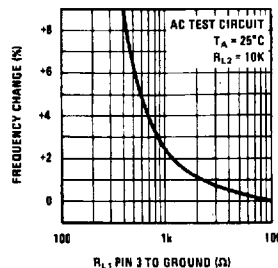
Temperature Stability



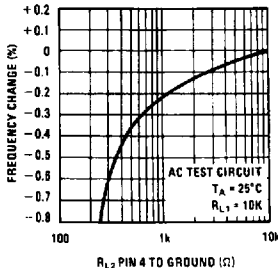
VCO Waveforms



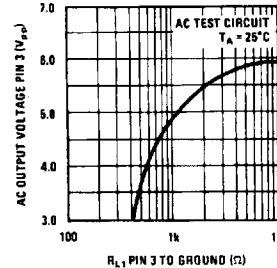
Frequency Stability vs Load Resistance (Square Wave Output)



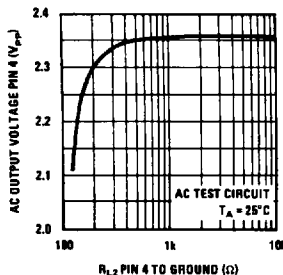
Frequency Stability vs Load Impedance (Triangle Output)



Square Wave Output Characteristics

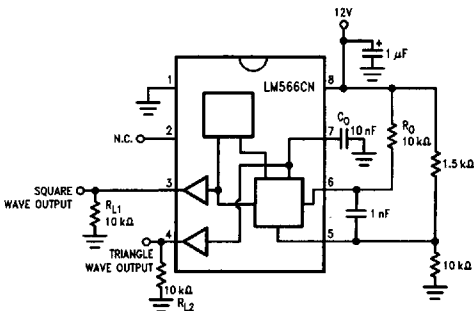


Triangle Wave Output Characteristics



TL/H/7854-4

AC Test Circuit



TL/H/7854-5

TL/H/7854-6