DESCRIPTION

The SE/NE 566 Function Generator is a voltage controlled oscillator of exceptional stability and linearity with buffered square wave and triangle wave outputs. The frequency of oscillation is determined by an external resistor and capacitor and the voltage applied to the control terminal. The oscillator can be programmed over a ten to one frequency range by proper selection of an external resistance and modulated over a ten to one range by the control voltage, with exceptional linearity.

FEATURES

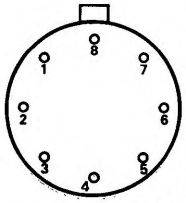
- WIDE RANGE OF OPERATING VOLTAGE (10 to 24 volts)
- VERY HIGH LINEARITY OF MODULATION
- EXTREME STABILITY OF FREQUENCY (100 ppm/°C typical)
- HIGHLY LINEAR TRIANGLE WAVE OUTPUT
- HIGH ACCURACY SQUARE WAVE OUTPUT
- FREQUENCY PROGRAMMING BY MEANS OF A RESISTOR, CAPACITOR, VOLTAGE OR CURRENT
- FREQUENCY ADJUSTABLE OVER 10 TO 1 RANGE WITH SAME CAPACITOR

APPLICATIONS

TONE GENERATORS
FREQUENCY SHIFT KEYING
FM MODULATORS
CLOCK GENERATORS
SIGNAL GENERATORS
FUNCTION GENERATORS

PIN CONFIGURATION (Top View)

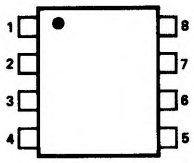
T PACKAGE



1 Ground
2 NC
3 Square Wave Output
4 Triangle Wave Output
5 Modulation Input
6 R_1
7 C_1
8 V+

ORDER PART NOS. SE566T/NE566T

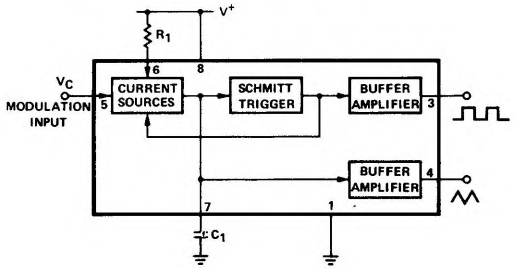
V PACKAGE



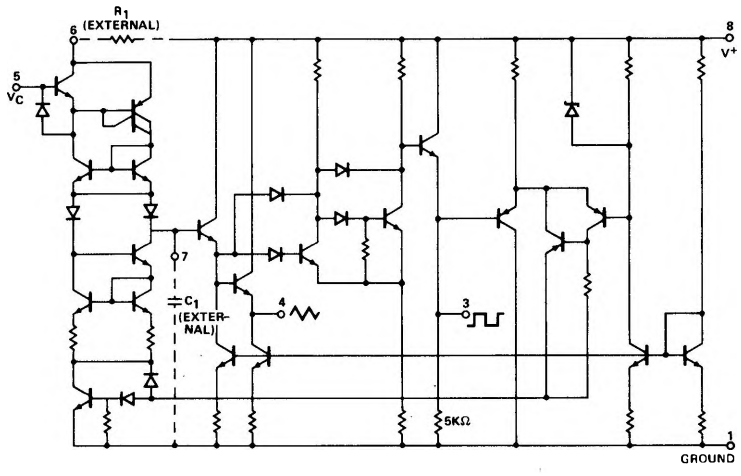
1 Ground
2 NC
3 Square Wave Output
4 Triangle Wave Output
5 Modulation Input
6 R_1
7 C_1
8 V+

ORDER PART NO. NE566V

BLOCK DIAGRAM



EQUIVALENT CIRCUIT



ABSOLUTE MAXIMUM RATINGS (Limiting values above which serviceability may be impaired)

Maximum Operating Voltage	26V
Storage Temperature	−65°C to 150° C
Power Dissipation	300mW

ELECTRICAL CHARACTERISTICS (25°C, 12 Volts, unless otherwise stated)

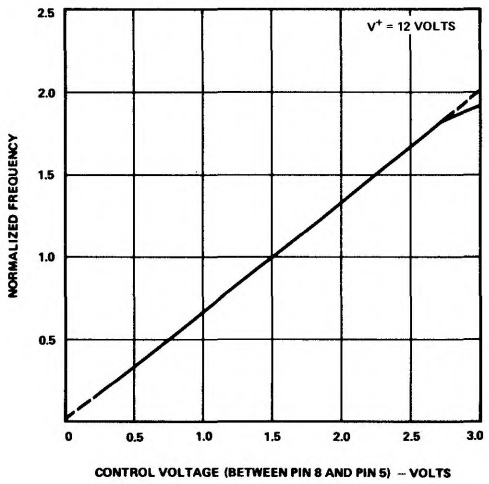
CHARACTERISTICS	SE566			NE566			UNITS
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
GENERAL							
Operating Temperature Range	-55		125	0		70	°C
Operating Supply Voltage			24			24	Volts
Operating Supply Current		7	12.5		7	12.5	mA
VCO (Note 1)							
Maximum Operating Frequency		1			1		MHz
Frequency Drift with Temperature		100			200		ppm/°C
Frequency Drift with Supply Voltage		1			2		%/volt
Control Terminal Input Impedance (Note 2)		1			1		MΩ
FM Distortion (±10% Deviation)		0.2	0.75		0.2	1.5	%
Maximum Sweep Rate		1			1		MHz
Sweep Range		10:1			10:1		
OUTPUT							
Triangle Wave Output -							
Impedance		50			50		Ω
Voltage	2	2.4		2	2.4		Volts pp
Linearity		0.2			0.5		%
Square Wave Output -							
Impedance		50			50		Ω
Voltage	5	5.4		5	5.4		Volts pp
Duty Cycle	45	50	55	40	50	60	%
Rise Time		20			20		nsec
Fall Time		50			50		nsec

NOTES:

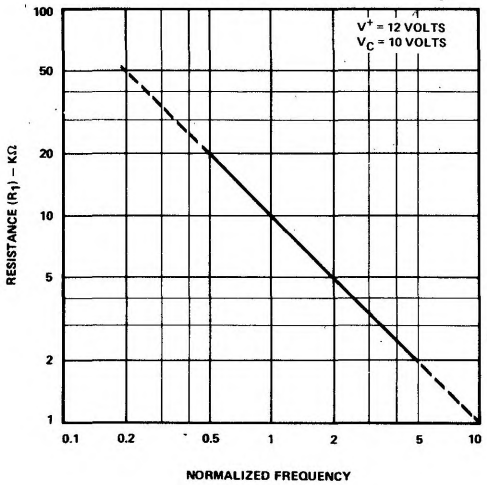
1. The external resistance for frequency adjustment (R_1) must have a value between 2KΩ and 20KΩ.
2. The bias voltage (Vc) applied to the control terminal (pin 5) should be in the range $3/4\ V^+ \leq V_C \leq V^+$.

TYPICAL PERFORMANCE CHARACTERISTICS

NORMALIZED FREQUENCY AS A FUNCTION OF CONTROL VOLTAGE

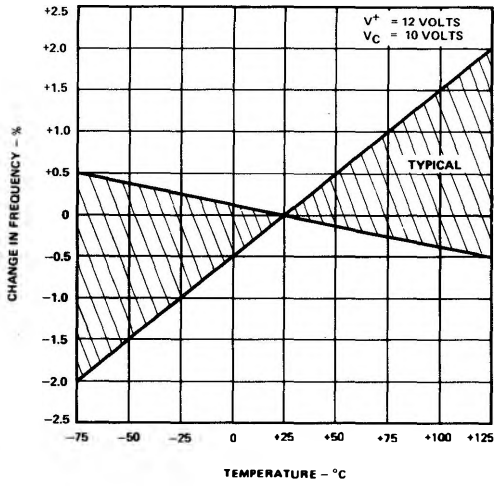


NORMALIZED FREQUENCY AS A FUNCTION OF RESISTANCE (R_1)

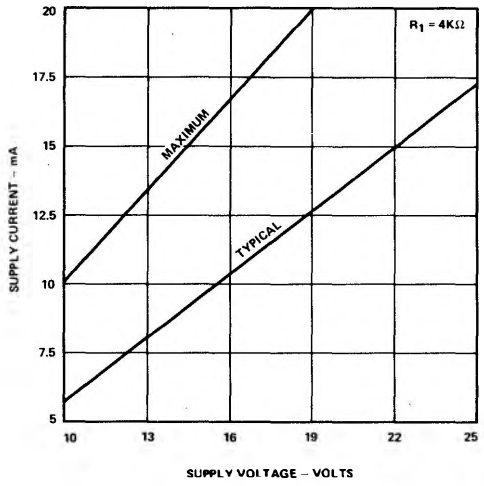


TYPICAL PERFORMANCE CHARACTERISTICS (Cont'd)

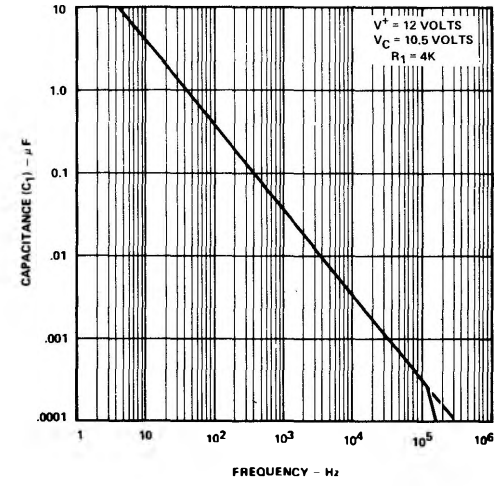
CHANGE IN FREQUENCY AS A FUNCTION OF TEMPERATURE



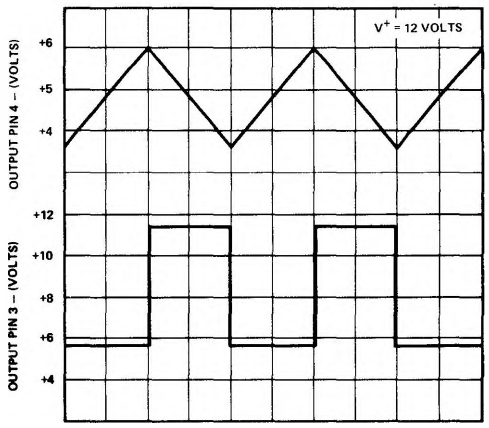
POWER SUPPLY CURRENT AS A FUNCTION OF SUPPLY VOLTAGE



FREQUENCY AS A FUNCTION OF CAPACITANCE (C_1)



VCO OUTPUT WAVEFORMS



OPERATING INSTRUCTIONS

The SE/NE 566 Function Generator is a general purpose voltage controlled oscillator designed for highly linear frequency modulation. The circuit provides simultaneous square wave and triangle wave outputs at frequencies up to 1 MHz. A typical connection diagram is shown in Figure 1. The control terminal (pin 5) must be biased externally with a voltage (V_C) in the range

$$3/4\ V^+ \leqslant V_C \leqslant V^+$$

where V_{CC} is the total supply voltage. In Figure 1, the control voltage is set by the voltage divider formed with R_2 and R_3. The modulating signal is then ac coupled with the capacitor C_2. The modulating signal can be direct coupled as well, if the appropriate dc bias voltage is applied to the control terminal. The frequency is given approximately by

$$f_o \simeq \frac{2(V^+ - V_C)}{R_1 C_1 V^+}$$

and R_1 should be in the range $2K < R_1 < 20K\Omega$.
A small capacitor (typically $0.001\mu f$) should be connected between pins 5 and 6 to eliminate possible oscillation in the control current source.

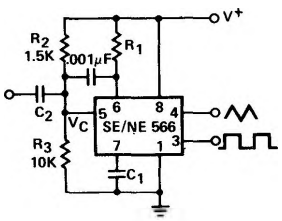


FIGURE 1

OPERATING INSTRUCTIONS (Cont'd)

If the VCO is to be used to drive standard logic circuitry, it may be desirable to use a dual supply of ±5 volts as shown in Figure 2. In this case the square wave output has the proper dc levels for logic circuitry. RTL can be driven directly from pin 3. For DTL or T^2L gates, which require a current sink of more than 1 mA, it is usually necessary to connect a 5KΩ resistor between pin 3 and negative supply. This increases the current sinking capability to 2 mA. The third type of interface shown uses a saturated transistor. between the 566 and the logic circuitry. This scheme is used primarily for T^2L circuitry which requires a fast fall time (< 50 nsec) and a large current sinking capability.

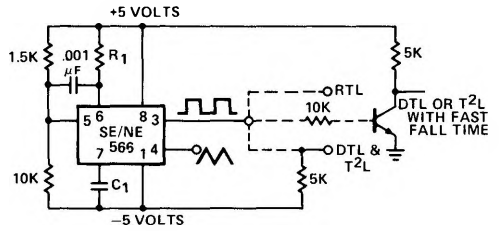


FIGURE 2