

**DESCRIPTION**

The SE/NE 566 Function Generator is a voltage controlled oscillator of exceptional 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 (up to 24 volts) (single or dual)**
- **High linearity of modulation**
- **Highly stable center frequency (200 ppm/°C typical)**
- **Highly linear triangle wave output**
- **Frequency programming by means of a resistor or capacitor, voltage or current**
- **Frequency adjustable over 10 to 1 range with same capacitor**

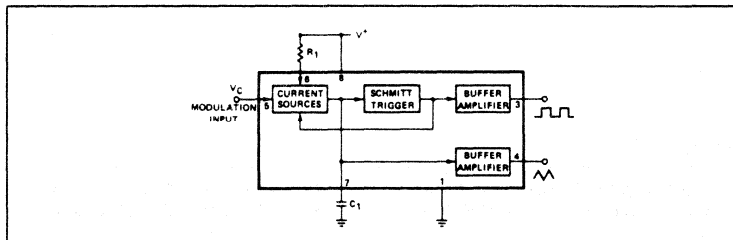
**APPLICATIONS**

- **Tone generators**
- **Frequency shift keying**
- **FM modulators**
- **Clock generators**
- **Signal generators**
- **Function generators**

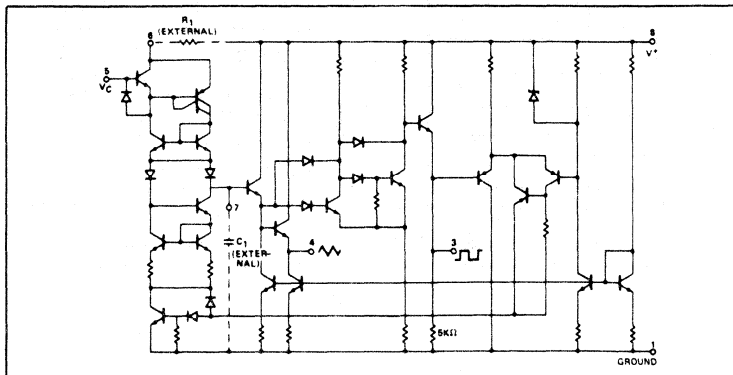
**ABSOLUTE MAXIMUM RATINGS**

PARAMETER	RATING	UNIT
Maximum operating voltage	26	V
Input voltage	3	V <sub>p-p</sub>
Storage temperature	-65 to +150	°C
Operating temperature range		
NE566	0 to +70	°C
SE566	-55 to +125	°C
Power dissipation	300	mW

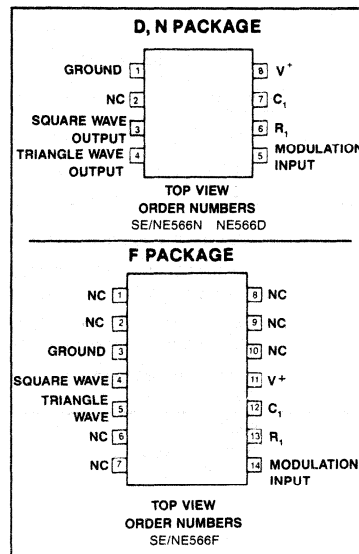
**BLOCK DIAGRAM**



**EQUIVALENT SCHEMATIC**



**PIN CONFIGURATIONS**



# FUNCTION GENERATOR

SE/NE566

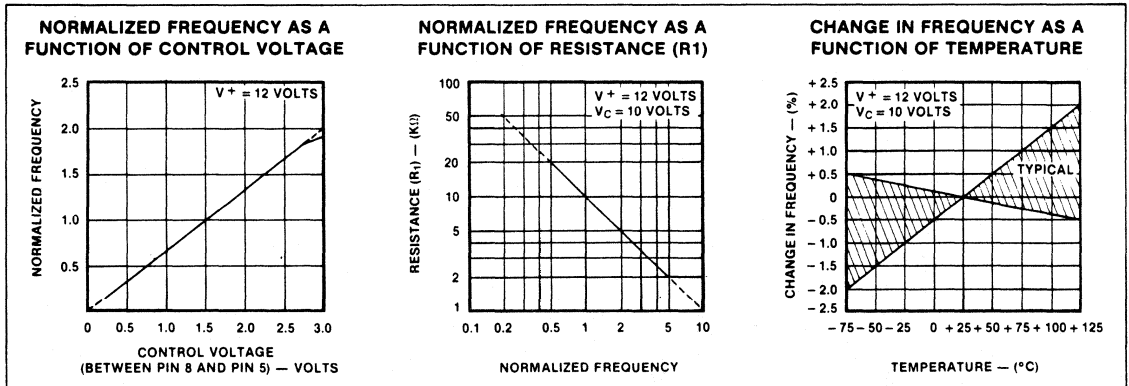
## ELECTRICAL CHARACTERISTICS $T_A = 25^\circ\text{C}$ ; $V_{CC} = \pm 8\text{V}$ unless otherwise specified.

PARAMETER	SE566			NE566			UNIT
	Min	Typ	Max	Min	Typ	Max	
<b>GENERAL</b>							
Operating temperature range	-55		125	0		70	$^\circ\text{C}$
Operating supply voltage	$\pm 6$		$\pm 12$	$\pm 6$		$\pm 12$	V
Operating supply current		7	12.5		7	12.5	mA
<b>VCO<sup>1</sup></b>							
Maximum operating frequency		1			1		MHz
Frequency drift with temperature		200			300		ppm/ $^\circ\text{C}$
Frequency drift with supply voltage		.1	1		.2	2	%/V
Control terminal input impedance <sup>2</sup>		1			1		M $\Omega$
FM distortion ( $\pm 10\%$ deviation)		0.2	0.75		0.4	1.5	%
Maximum sweep rate		1			1		MHz
Sweep range		10:1			10:1		
<b>OUTPUT</b>							
Triangle wave output							
Impedance		50			50		$\Omega$
Voltage	1.9	2.4		1.9	2.4		V <sub>pp</sub>
Linearity		0.2			0.5		%
Square wave input							
Impedance		50			50		$\Omega$
Voltage	5	5.4		5	5.4		V <sub>pp</sub>
Duty Cycle	45	50	55	40	50	60	%
Rise time		20			20		ns
Fall Time		50			50		ns

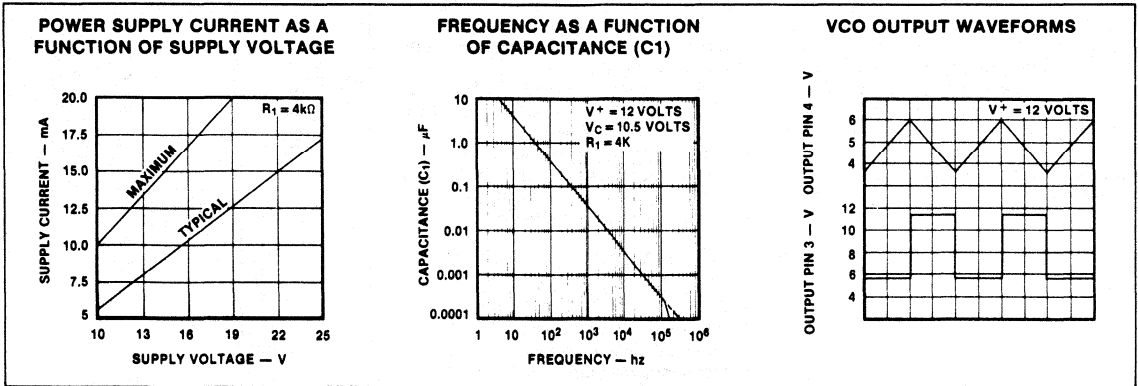
**NOTES**

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

## TYPICAL PERFORMANCE CHARACTERISTICS



TYPICAL PERFORMANCE CHARACTERISTICS (Cont'd)



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 1MHz. 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

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

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

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

and  $R_1$  should be in the range  $2k\Omega < R_1 < 20k\Omega$ .

A small capacitor (typically  $0.001\mu\text{f}$ ) should be connected between pins 5 and 6 to eliminate possible oscillation in the control current source.

If the VCO is to be used to drive standard

logic circuitry, it may be desirable to use a dual supply 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<sup>2</sup>L gates, which require a current sink of more than 1mA, it is usually necessary to connect a  $5k\Omega$  resistor between pin 3 and negative supply. This increases the current sinking capability to 2mA. The third type of interface shown uses a saturated transistor between the 566 and the logic circuitry. This scheme is used primarily for T<sup>2</sup>L circuitry which requires a fast fall time (<50ns) and a large current sinking capability.

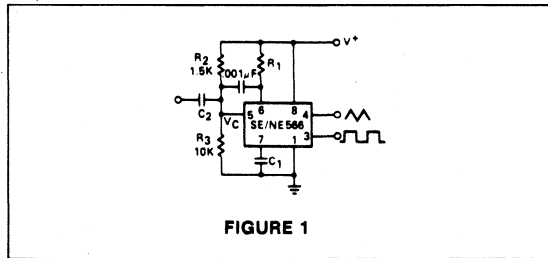


FIGURE 1

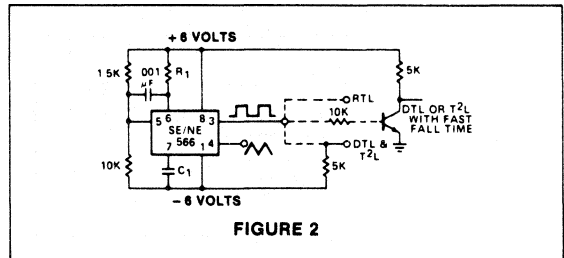


FIGURE 2

\*For additional information, consult the Applications Section.