LINEAR RAMP

When the pullup resistor, R_A, in the monostable circuit is replaced by a constant current source, a linear ramp is generated. Figure 17 shows a circuit configuration that will perform this function.

Figure 17.

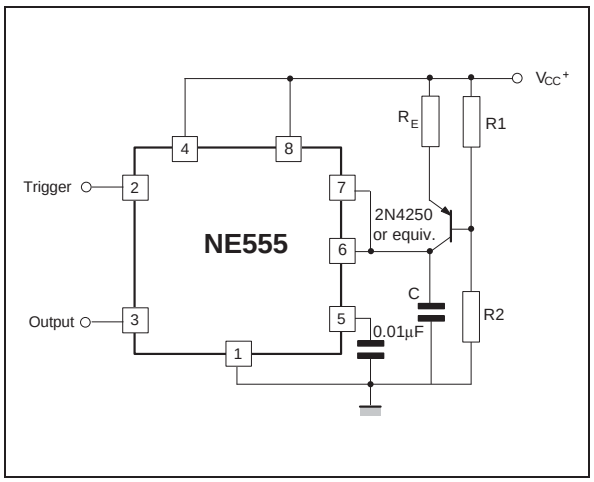
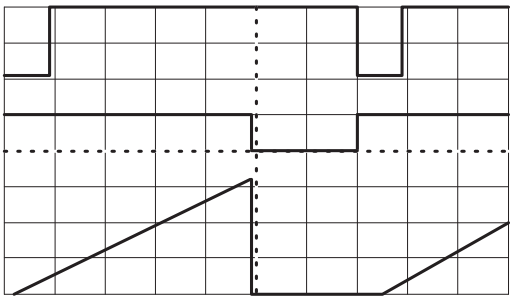


Figure 18 shows waveforms generator by the linear ramp.

The time interval is given by :

$$T = \frac{(2/3\ V_{CC}\ R_E\ (R_{1+}\ R_{2)}\ C}{R_1\ V_{CC} - V_{BE}\ (R_{1+}\ R_{2)}} \quad V_{BE} = 0.6V$$

Figure 18 : Linear Ramp.



V_{CC} = 5V
Time = 20µs/DIV
R_1 = 47kΩ
R_2 = 100kΩ
R_E = 2.7kΩ
C = 0.01µF

Top trace : input 3V/DIV
Middle trace : output 5V/DIV
Bottom trace : output 5V/DIV
Bottom trace : capacitor voltage 1V/DIV

50% DUTY CYCLE OSCILLATOR

For a 50% duty cycle the resistors R_A and R_E may be connected as in figure 19. The time preriod for the output high is the same as previous,

$t_1 = 0.693\ R_A\ C$.

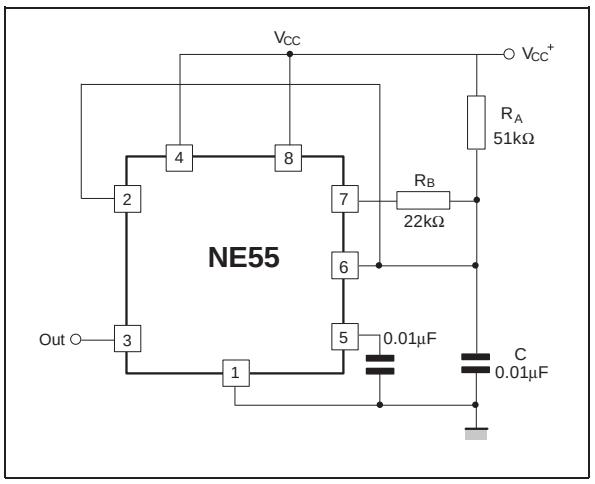
For the output low it is t_2 =

$$[(R_A R_B)/(R_A + R_B)]\ CLn\left[\frac{R_B - 2R_A}{2R_B - R_A}\right]$$

Thus the frequency of oscillation is $f = \frac{1}{t_1 + t_2}$

Note that this circuit will not oscillate if R_B is greater

Figure 19 : 50% Duty Cycle Oscillator.



than 1/2 R_A because the junction of R_A and R_B cannot bring pin 2 down to 1/3 V_{CC} and trigger the lower comparator.

ADDITIONAL INFORMATION

Adequate power supply bypassing is necessary to protect associated circuitry. Minimum recommended is 0.1µF in parallel with 1µF electrolytic.