

CEM 3340 / CEM 3345

Electrical Characteristics

| $V_{CC} = +15V$ | $V_{EE} = \text{Internal Zener}$ | | $T_A = 20^\circ C$ | |
|--|----------------------------------|----------|--------------------|------------|
| Parameter | Min. | Typ. | Max. | Units |
| Frequency Control Range | 50K:1 | 500K:1 | — | |
| Exponential Scale Error, Untrimmed ¹ | — | 0.2 | 1 | % |
| Exponential Scale Error, Trimmed ¹ | — | 0.05 | 0.3 | % |
| Multiplier Gain Error ² | — | 0.0005 | 0.008 | %/ μA |
| Tempo Cancellation ³ | -150 | 0 | +150 | ppm |
| Oscillator Drift ⁴ | — | ± 50 | ± 200 | ppm |
| Triangle Buffer Input Current | — | 0.3 | 3 | nA |
| Triangle Waveform Upper Level | 4.85 | 5.0 | 5.15 | V |
| Triangle Waveform Lower Level | -15 | 0 | +15 | mV |
| Triangle Waveform Symmetry | 45 | 50 | 55 | % |
| Sawtooth Waveform Upper Level | 9.4 | 10.0 | 10.6 | V |
| Sawtooth Waveform Lower Level | -25 | 0 | +25 | mV |
| Triangle Output Sink Capability | 400 | 550 | 750 | μA |
| Sawtooth Output Sink Capability | 640 | 800 | 1000 | μA |
| Triangle & Sawtooth Output Impedance ⁵ | 65 | 100 | 150 | Ω |
| Pulse Output Source Capability at +10V | 2.8 | 3.5 | 4.6 | mA |
| Squarewave Output Levels ⁶ , CEM 3345 | -1.8,-0.4 | -1.3,0 | -0.8,+0.4 | V |
| PWM Input Pin Current ⁷ | .5 | 1.5 | 3.5 | μA |
| PWM Input Voltage for 0% Pulse Width | -15 | 0 | +15 | mV |
| PWM Input Voltage for 100% Pulse Width | 4.6 | 5.0 | 5.4 | V |
| Input Bias Current at Reference and Control Current Inputs | 80 | 200 | 400 | nA |
| Tempco of Input Bias Currents | -1000 | 0 | +1000 | ppm |
| Offset Voltage at Reference and Control Current Inputs | -5 | 0 | +5 | mV |
| Hard Sync Reference Voltage | -2.3 | -2.5 | -2.8 | V |
| Hard Sync Input Resistance | 5 | 6.3 | 7.9 | K Ω |
| Max Capacitor Charge/Discharge Current | 400 | 570 | 800 | μA |
| Positive Supply Current | 4 | 5 | 6.5 | mA |
| Positive Supply Voltage Range | +10 | | +18 | V |
| Negative Supply Voltage Range ⁸ | -4.5 | | -18 | V |

Note 1: This error represents the percentage difference in scale factors (volts per frequency ratio) of the exponential generator anywhere over the exponential generator current range of 50nA to 100 μA . Most of this error occurs at the range extremities.

Note 2: This error represents the percentage difference in multiplier gains at any two input currents, within the range of 20 μA to 180 μA , per μA difference between the two corresponding outputs.

Note 3: This spec represents the difference between the actual tempo of the multiplier output voltage (expressed relative to the maximum output excursions) and the tempo required to precisely cancel the tempo of the exponential scale factor (q/KT).

Note 4: The multiplier output is grounded.

Note 5: For exponential generator currents less than 10 μA ; above 10 μA , impedance drops to 1/3 this value as the highest current is approached.

Note 6: With respect to the hard sync input reference voltage.

Note 7: For PWM control inputs between -1 and +6 volts. This current is significantly greater for inputs outside of this range.

Note 8: Current limiting resistor required for negative supplies greater than -6 volts.

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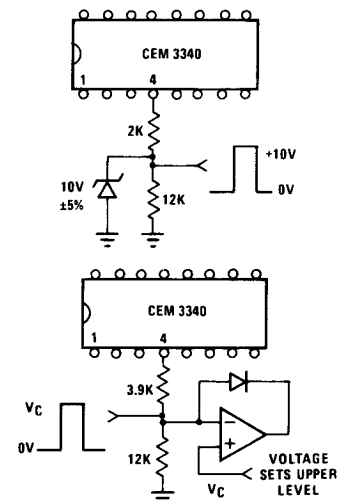


FIGURE 2: CLAMPING PULSE UPPER LEVEL

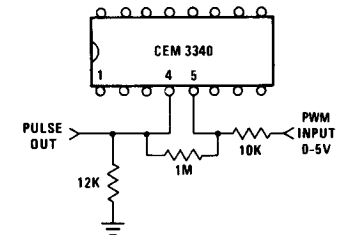


FIGURE 3: ADDING HYSTERESIS TO PULSE SHAPER.

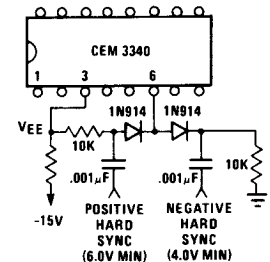


FIGURE 4: METHOD FOR SYNC ON RISING OR FALLING EDGE.

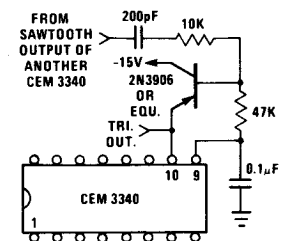


FIGURE 5: CONVENTIONAL HARD SYNC

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