SA556F,N • SE556N,F • NE556F,N • SE556C,F,N

## FEATURES

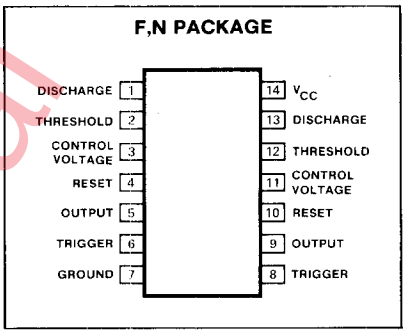
- Timing from microseconds to hours
- Replaces two 555 timers
- Operates in both astable and monostable modes
- High output current
- Adjustable duty cycle
- TTL compatible
- Temperature stability of 0.005% per °C
- SE566 MIL STD 883A, B, C available. N38510 (JAN planned, 38510 processing available).

## APPLICATIONS

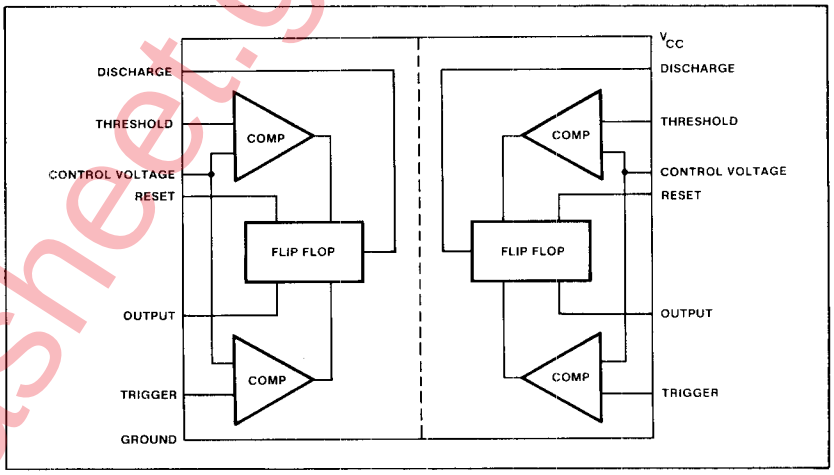
- Precision timing
- Sequential timing
- Pulse shaping
- Pulse generator
- Missing pulse detector
- Tone burst generator
- Pulse width modulation
- Time delay generator
- Frequency division
- Industrial controls
- Pulse position modulation
- Appliance timing
- Traffic light control
- Touch tone encoder

## PIN CONFIGURATION

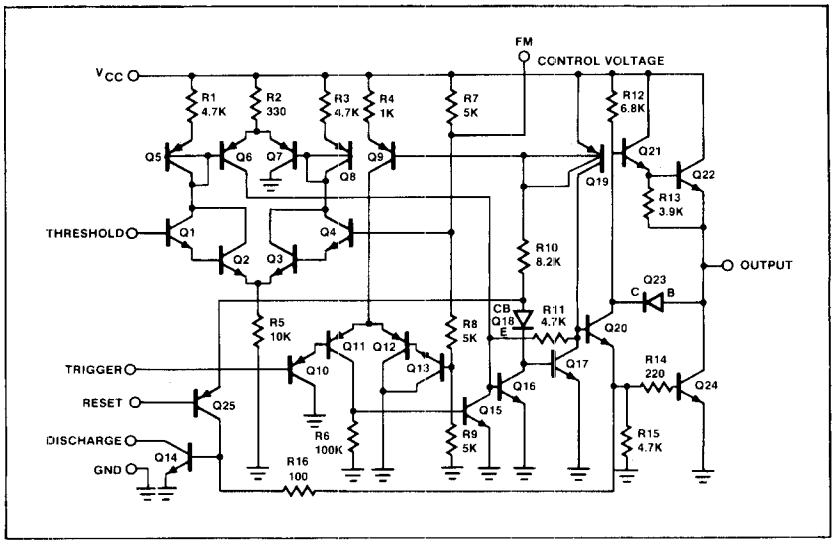
F,N PACKAGE




## BLOCK DIAGRAM




## EQUIVALENT SCHEMATIC (Shown for one circuit only)



## ABSOLUTE MAXIMUM RATINGS

| PARAMETER | RATING | UNIT |
|---|---|---|
| Supply voltage | | |
| SE556 | +18 | V |
| NE556, SE556C, SA556 | +16 | V |
| Power dissipation | 600 | mW |
| Operating temperature range | | |
| NE556 | 0 to +70 | °C |
| SA556 | -40 to +85 | °C |
| SE556, SE556C | -55 to +125 | °C |
| Storage temperature range | -65 to +150 | °C |
| Lead temperature (Soldering, 60 sec) | +300 | °C |

## ELECTRICAL CHARACTERISTICS

$T_A$ = 25°C, $V_{CC}$ = +5V to +15V unless otherwise specified.

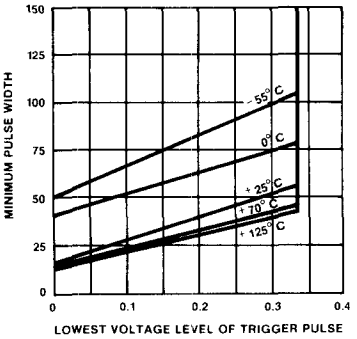
| PARAMETER | TEST CONDITIONS | SE556 | | | NE556/SE556C/SA556 | | | UNITS |
|---|---|---|---|---|---|---|---|---|
| | | Min | Typ | Max | Min | Typ | Max | |
| Supply voltage | | 4.5 | | 18 | 4.5 | | 16 | V |
| Supply current (low state)[1] | $V_{CC}$ = 5V $R_L$ = ∞ | | 6 | 10 | | 6 | 12 | mA |
| | $V_{CC}$ = 15V $R_L$ = ∞ | | 20 | 24 | | 20 | 30 | mA |
| Timing error (monostable) | $R_A$ = 2kΩ to 100kΩ | | | | | | | |
| Initial accuracy[2] | C = 0.1μF | | 0.5 | 1.5 | | 0.75 | 3.0 | % |
| Drift with temperature | | | 30 | 100 | | 50 | | ppm/°C |
| Drift with supply voltage | | | 0.05 | 0.2 | | 0.1 | 0.5 | %/V |
| Timing error (astable) | $R_A$, $R_B$ = 1kΩ to 100kΩ | | | | | | | |
| Initial accuracy[2] | C = 0.1μF | | 1.5 | | | 2.25 | | % |
| Drift with temperature | $V_{CC}$ = 15V | | 90 | | | 150 | | ppm/°C |
| Drift with supply voltage | | | 0.15 | | | 0.3 | | %/V |
| Control voltage level | $V_{CC}$ = 15V | 9.6 | 10.0 | 10.4 | 9.0 | 10.0 | 11.0 | V |
| | $V_{CC}$ = 5V | 2.9 | 3.33 | 3.8 | 2.6 | 3.33 | 4.0 | V |
| Threshold voltage | $V_{CC}$ = 15V | 9.4 | 10.0 | 10.6 | 8.8 | 10.0 | 11.2 | V |
| | $V_{CC}$ = 5V | 2.7 | 3.33 | 4.0 | 2.4 | 3.33 | 4.2 | V |
| Threshold current[3] | | | 30 | 250 | | 30 | 250 | nA |
| Trigger voltage | $V_{CC}$ = 15V | 4.8 | 5.0 | 5.2 | 4.5 | 5.0 | 5.6 | V |
| | $V_{CC}$ = 5V | 1.45 | 1.67 | 1.9 | 1.1 | 1.67 | 2.2 | V |
| Trigger current | $V_{TRIG}$ = 0V | | 0.5 | 0.9 | | 0.5 | 2.0 | μA |
| Reset voltage[5] | | 0.4 | 0.7 | 1.0 | 0.4 | 0.7 | 1.0 | V |
| Reset current | | | 0.1 | 0.4 | | 0.1 | 0.6 | mA |
| Reset current | $V_{RESET}$ = 0V | | 0.4 | 1.0 | | 0.4 | 1.5 | mA |
| *Output voltage (low)* | $V_{CC}$ = 15V | | | | | | | |
| | $I_{SINK}$ = 10mA | | 0.1 | 0.15 | | 0.1 | 0.25 | V |
| | $I_{SINK}$ = 50mA | | 0.4 | 0.5 | | 0.4 | 0.75 | V |
| | $I_{SINK}$ = 100mA | | 2.0 | 2.25 | | 2.0 | 3.2 | V |
| | $I_{SINK}$ = 200mA | | 2.5 | | | 2.5 | | V |
| | $V_{CC}$ = 5V | | | | | | | |
| | $I_{SINK}$ = 8mA | | 0.1 | 0.2 | | 0.25 | 0.3 | V |
| | $I_{SINK}$ = 5mA | | 0.05 | 0.15 | | 0.15 | 0.25 | V |
| *Output voltage (high)* | $V_{CC}$ = 15V | | | | | | | |
| | $I_{SOURCE}$ = 200mA | | 12.5 | | | 12.5 | | V |
| | $I_{SOURCE}$ = 100mA | 13.0 | 13.3 | | 12.75 | 13.3 | | V |
| | $V_{CC}$ = 5V | | | | | | | |
| | $I_{SOURCE}$ = 100mA | 3.0 | 3.3 | | 2.75 | 3.3 | | V |
| Rise time of output | | | 100 | 200 | | 100 | 300 | ns |
| Fall time of output | | | 100 | 200 | | 100 | 300 | ns |
| Discharge leakage current | | | 20 | 100 | | 20 | 100 | nA |
| Matching characteristics[4] | | | | | | | | |
| Initial accuracy[2] | | | 0.5 | 1.0 | | 1.0 | 2.0 | % |
| Drift with temperature | | | 10 | | | 10 | | ppm/°C |
| Drift with supply voltage | | | 0.1 | 0.2 | | 0.2 | 0.5 | %/V |

NOTES

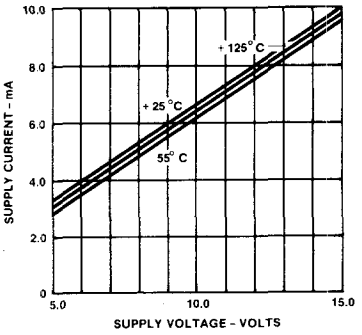
1. Supply current when output is high is typically 1.0mA less.
2. Tested at $V_{CC}$ = 5V and $V_{CC}$ = 15V.
3. This will determine the maximum value of $R_A + R_B$ For 15V operation, the maximum total R = 10 meg-ohms, and for 5V operation, the max. total R = 3.4 meg-ohms.
4. Matching charactristics refer to the difference between performance characteristics for each timer section in the monostable mode.
5. Specified with trigger input high.

## TYPICAL PERFORMANCE CHARACTERISTICS

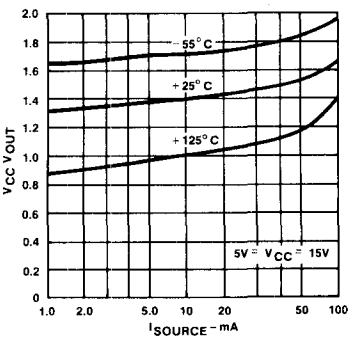
### MINIMUM PULSE WIDTH REQUIRED FOR TRIGGERING



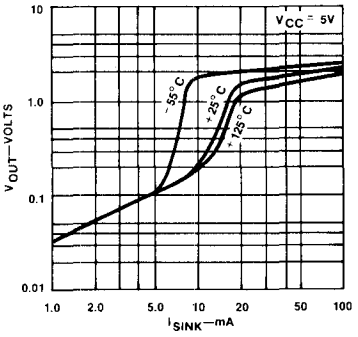

### SUPPLY CURRENT vs SUPPLY VOLTAGE



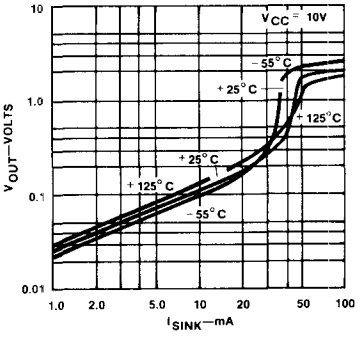

### HIGH OUTPUT VOLTAGE DROP vs OUTPUT SOURCE CURRENT



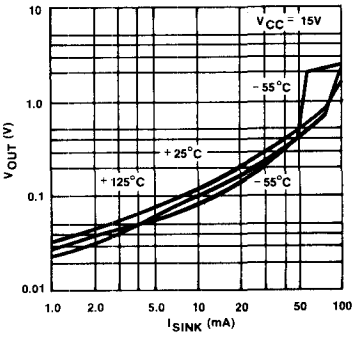

### LOW OUTPUT VOLTAGE vs OUTPUT SINK CURRENT



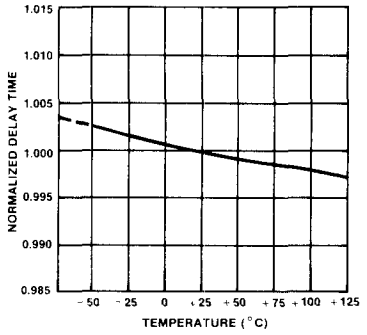

### LOW OUTPUT VOLTAGE vs OUTPUT SINK CURRENT



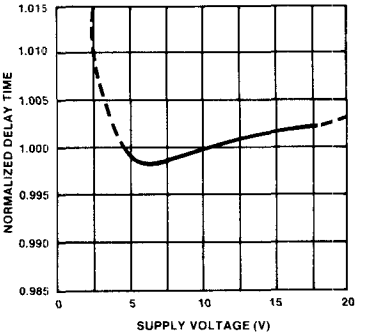

### LOW OUTPUT VOLTAGE vs OUTPUT SINK CURRENT




### DELAY TIME vs TEMPERATURE




### DELAY TIME vs SUPPLY VOLTAGE




### PROPAGATION DELAY vs VOLTAGE LEVEL OF TRIGGER PULSE