

# KA556

## Dual Timer

### Features

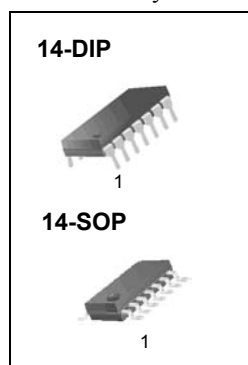
- Replaces two KA555 Timers
- Operates in Both Astable and Monos Table Modes
- High Output Current
- TTL Compatible
- Timing From Microsecond to Hours
- Adjustable Duty Cycle
- Temperature Stability of 0.005% Per °C

### Applications

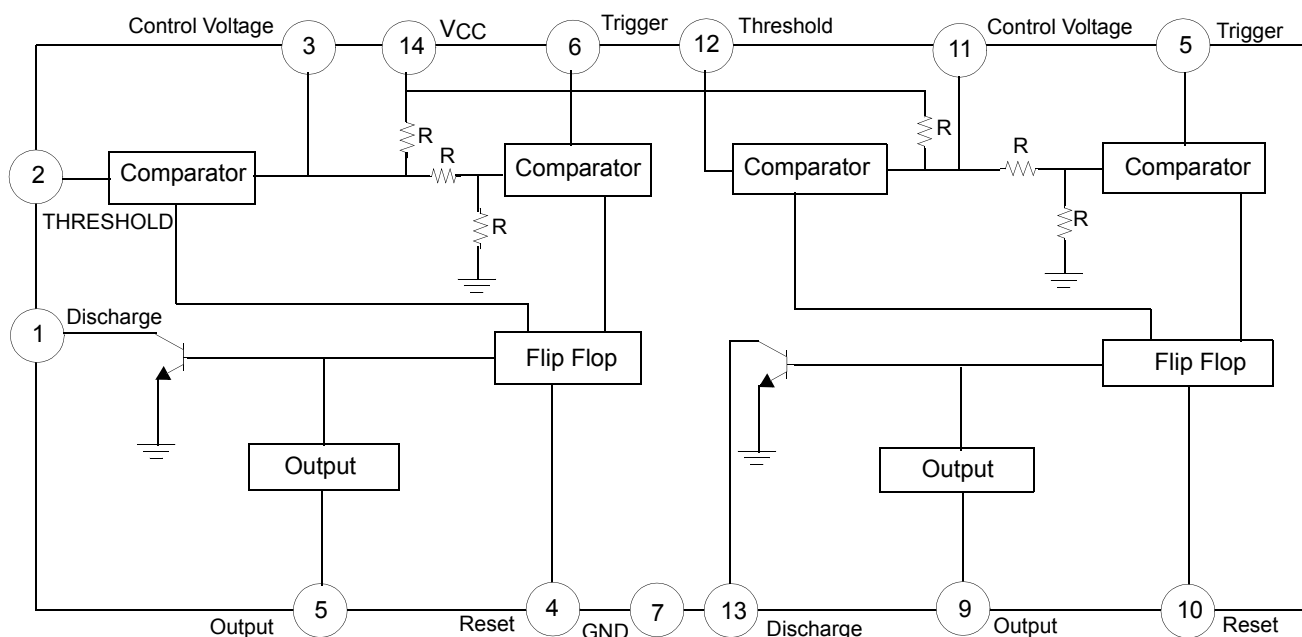
- Precision Timing
- Pulse Shaping
- Pulse Width Modulation
- Frequency Division
- Traffic Light Control
- Sequential Timing
- Pulse Generator
- Time Delay Generator
- Touch Tone Encoder
- Tone Burst Generator

### Description

The KA556 series dual monolithic timing circuits are a highly stable controller capable of producing accurate time delays or oscillation. The KA556 is a dual KA555. Timing is provided an external resistor and capacitor for each timing function. The two timers operate independently of each other, sharing only VCC and ground. The circuits may be triggered and reset on falling waveforms. The output structures may sink or source 200mA.



### Internal Block Diagram



**Absolute Maximum Ratings (TA = 25°C)**

| Parameter                                   | Symbol | Value               | Unit |
|---------------------------------------------|--------|---------------------|------|
| Supply Voltage                              | VCC    | 16                  | V    |
| Lead Temperature (Soldering 10sec)          | TLEAD  | 300                 | °C   |
| Power Dissipation                           | PD     | 600                 | mW   |
| Operating Temperature Range<br>KA556/KA556I | TOPR   | 0 ~ +70 / -40 ~ +85 | °C   |
| Storage Temperature Range                   | TSTG   | -65 ~ +150          | °C   |

## Electrical Characteristics

( $T_A = 25^\circ\text{C}$ ,  $V_{CC} = 5 \sim 15\text{V}$ , unless otherwise specified)

| Parameter                                                                                               | Symbol                                                   | Conditions                                                                                                                              | Min.  | Typ.                     | Max.                | Unit                              |
|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-------|--------------------------|---------------------|-----------------------------------|
| Supply Voltage                                                                                          | $V_{CC}$                                                 | -                                                                                                                                       | 4.5   | -                        | 16                  | V                                 |
| Supply Current *1(Two Timers)<br>(Low State)                                                            | $I_{CC}$                                                 | $V_{CC} = 5\text{V}$ , $R_L = \infty$<br>$V_{CC} = 15\text{V}$ , $R_L = \infty$                                                         | -     | 5<br>16                  | 12<br>30            | mA<br>mA                          |
| Timing Error *2(Monos Table)<br>Initial Accuracy<br>Drift with Temperature<br>Drift with Supply Voltage | ACCUR<br>$\Delta t/\Delta T$<br>$\Delta t/\Delta V_{CC}$ | $R_A = 2\text{k}\Omega$ to $100\text{k}\Omega$<br>$C = 0.1\mu\text{F}$<br>$T = 1.1\text{RC}$                                            | -     | 0.75<br>50<br>0.1        | -                   | %<br>ppm/ $^\circ\text{C}$<br>%/V |
| Control Voltage                                                                                         | $V_{CC}$                                                 | $V_{CC} = 15\text{V}$                                                                                                                   | 9.0   | 10.0                     | 11.0                | V                                 |
|                                                                                                         |                                                          | $V_{CC} = 5\text{V}$                                                                                                                    | 2.6   | 3.33                     | 4.0                 | V                                 |
| Threshold Voltage                                                                                       | $V_{TH}$                                                 | $V_{CC} = 15\text{V}$                                                                                                                   | 8.8   | 10.0                     | 11.2                | V                                 |
|                                                                                                         |                                                          | $V_{CC} = 5\text{V}$                                                                                                                    | 2.4   | 3.33                     | 4.2                 | V                                 |
| Threshold Current*3                                                                                     | $I_{TH}$                                                 | -                                                                                                                                       | -     | 30                       | 250                 | nA                                |
| Trigger Voltage                                                                                         | $V_{TR}$                                                 | $V_{CC} = 15\text{V}$                                                                                                                   | 4.5   | 5.0                      | 5.6                 | V                                 |
|                                                                                                         |                                                          | $V_{CC} = 5\text{V}$                                                                                                                    | 1.1   | 1.6                      | 2.2                 | V                                 |
| Trigger Current                                                                                         | $I_{TR}$                                                 | $V_{TR} = 0\text{V}$                                                                                                                    | -     | 0.01                     | 2.0                 | $\mu\text{A}$                     |
| Reset Voltage*5                                                                                         | $V_{RST}$                                                | -                                                                                                                                       | 0.4   | 0.6                      | 1.0                 | V                                 |
| Reset Current                                                                                           | $I_{RST}$                                                | -                                                                                                                                       | -     | 0.03                     | 0.6                 | mA                                |
| Low Output Voltage                                                                                      | $V_{OL}$                                                 | $V_{CC} = 15\text{V}$<br>$I_{SINK} = 10\text{mA}$<br>$I_{SINK} = 50\text{mA}$<br>$I_{SINK} = 100\text{mA}$<br>$I_{SINK} = 200\text{mA}$ | -     | 0.1<br>0.4<br>2.0<br>2.5 | 0.25<br>0.75<br>3.2 | V                                 |
|                                                                                                         |                                                          | $V_{CC} = 5\text{V}$<br>$I_{SINK} = 8\text{mA}$<br>$I_{SINK} = 5\text{mA}$                                                              |       | 0.25<br>0.15             | 0.35<br>0.25        | V                                 |
| High Output Voltage                                                                                     | $V_{OH}$                                                 | $V_{CC} = 15\text{V}$<br>$I_{SOURCE} = 200\text{mA}$<br>$I_{SOURCE} = 100\text{mA}$                                                     | 12.75 | 12.5<br>13.3             | -                   | V                                 |
|                                                                                                         |                                                          | $V_{CC} = 5\text{V}$<br>$I_{SOURCE} = 100\text{mA}$                                                                                     | 2.75  | 3.3                      | -                   | V                                 |
| Rise Time of Output                                                                                     | $t_R$                                                    | -                                                                                                                                       | -     | 100                      | 300                 | ns                                |
| Fall Time of Output                                                                                     | $t_F$                                                    | -                                                                                                                                       | -     | 100                      | 300                 | ns                                |
| Discharge Leakage Current                                                                               | $I_{LKG}$                                                | -                                                                                                                                       | -     | 10                       | 100                 | nA                                |
| Matching Characteristics*4<br>Initial Accuracy<br>Drift with Temperature<br>Drift with Supply Voltage   | ACCUR<br>$\Delta t/\Delta T$<br>$\Delta t/\Delta V_{CC}$ | -                                                                                                                                       | -     | 1.0<br>10<br>0.2         | 2.0<br>0.5          | %<br>ppm/ $^\circ\text{C}$<br>%/V |
| Timing Error (astable)*2<br>Initial Accuracy<br>Drift with Temperature<br>Drift with Supply Voltage     | ACCUR<br>$\Delta t/\Delta T$<br>$\Delta t/\Delta V_{CC}$ | $V_{CC} = 15\text{V}$<br>$R_A, R_B = 1\text{k}\Omega$ to $100\text{k}\Omega$<br>$C = 0.1\mu\text{F}$                                    | -     | 2.25<br>150<br>0.3       | -                   | %<br>ppm/ $^\circ\text{C}$<br>%/V |

### Notes:

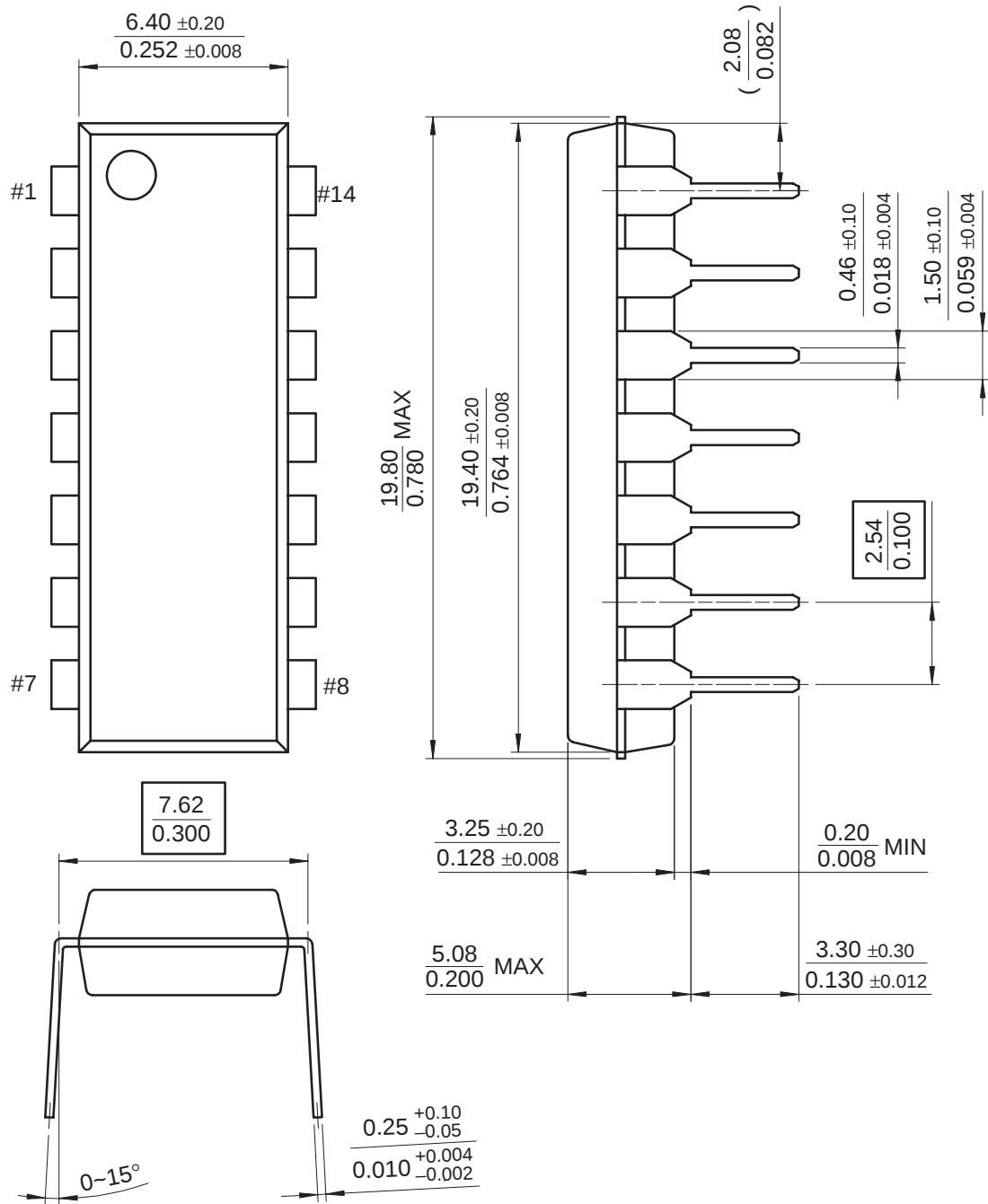
- Supply current when output is high is typically 1.0mA less at  $V_{CC} = 5\text{V}$
- Tested at  $V_{CC} = 5\text{V}$  and  $V_{CC} = 15\text{V}$
- This will determine the maximum value of  $R_A + R_B$  for 15V operation.  
The maximum total  $R = 20\text{M}\Omega$ , and for 5V operation the maximum total  $R = 6.6\text{M}\Omega$ .
- Matching characteristics refer to the difference between performance characteristics of each timer section in the monostable mode.
- As reset voltage lowers, timing is inhibited and then the output goes low.

Mechanical Dimensions

Package

Dimensions in millimeters

14-DIP





## Ordering Information

| Product Number | Package | Operating Temperature |
|----------------|---------|-----------------------|
| KA556          | 14-DIP  | 0 ~ +70°C             |
| KA556D         | 14-SOP  |                       |
| KA556I         | 14-DIP  | -40 ~ +85°C           |
| KA556ID        | 14-SOP  |                       |

### DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

### LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.