

AN6780, AN6780S

General Purpose Long Interval Timers

Overview

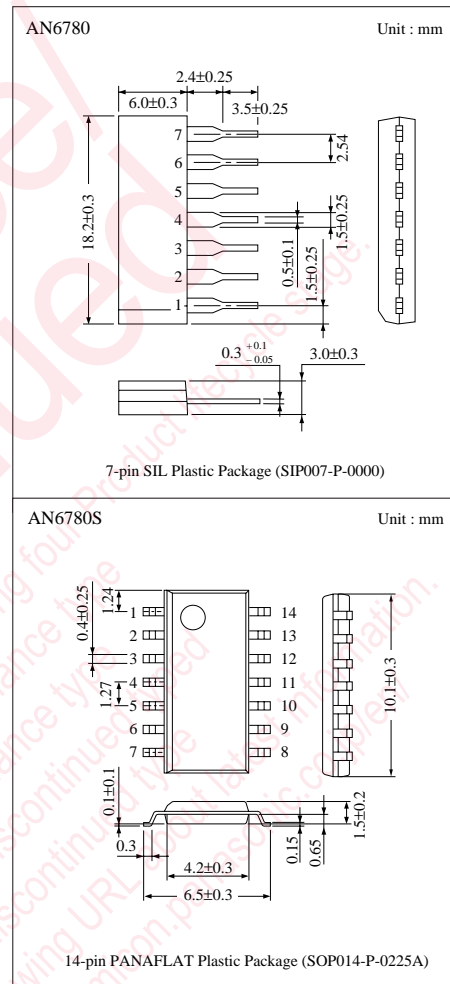
The AN6780 and AN6780S are ICs designed for general purpose long interval timers. They consists of an oscillator, frequency divider (flip-flop 15steps), output circuit, and power circuit. A cycle can be freely set with the external resistor (R_T) and capacity (C_T) of the oscillator.

Features

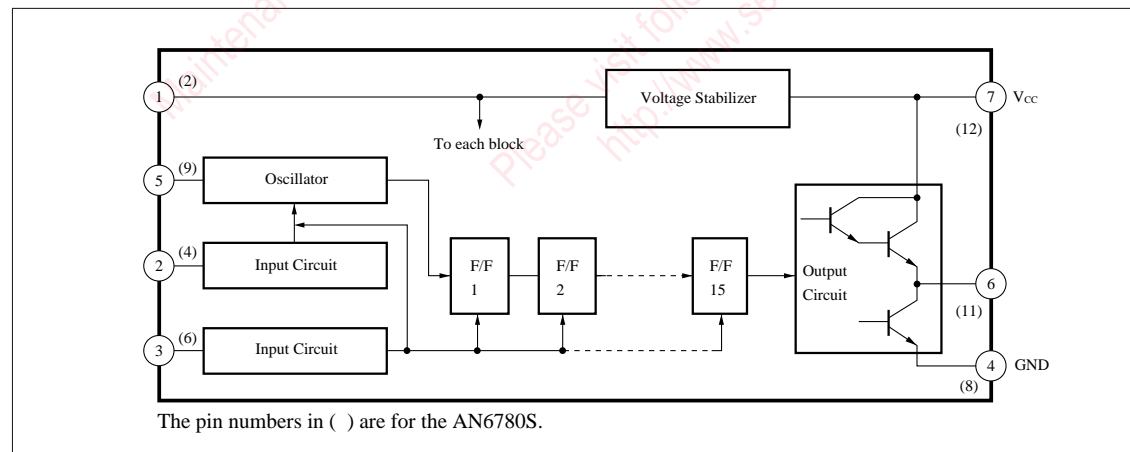
- High inflow and outflow current : $I_O = \pm 15\text{mA}$ max
- Small variation of oscillations
- Long interval timer setting : max 1 week

Applications

Timers, integrating timers, superlow frequency oscillators



Block Diagram



■ Absolute Maximum Ratings (Ta=25°C)

| Parameter | | Symbol | Rating | | Unit |
|-------------------|-------------------------------|------------------------------|--------------------|----|------|
| Voltage | Supply voltage | V _{CC} | 13 | | V |
| | Circuit voltage | V ₁₋₄ (2-8) | 0 | 4 | V |
| | | V _{2, 3-4} (4, 6-8) | 0 | 13 | V |
| | | V ₅₋₄ (9-8) | 0 | 4 | V |
| | | V ₆₋₄ (11-8) | V _{CC} *1 | | V |
| Current | Supply current | I _{CC} | 30 | | mA |
| | Circuit current | I ₆ (11) | -15 | 15 | mA |
| Power dissipation | | P _D | 360 | | mW |
| Temperature | Operating ambient temperature | T _{opr} | -20 to +75 | | °C |
| | Storage temperature | T _{stg} | -55 to +125 | | °C |

*1 When output is at “H”, the pin number are for the AN6780S

■ Recommended Operating Range (Ta=25°C)

| Parameter | Symbol | Range |
|--------------------------------|-----------------|-------------|
| Operating supply voltage range | V _{CC} | 4.5V to 12V |

■ Electrical Characteristics (Ta=25°C)

| Parameter | Symbol | Condition | min | typ | max | Unit |
|-----------------------------|----------------------------------|---|------|-----|------|------|
| Supply current | I _{CC} | V _{CC} =12V | 4 | 6.5 | 10 | mA |
| Oscillator charging current | I ₁ (I ₂) | V _{CC} =5V, R=10kΩ | 0.26 | 0.3 | 0.35 | mA |
| Input current high level | I _{IH} | V _{CC} =12V, V _{IH} =12V | — | — | 10 | μA |
| Input current low level | I _{IL} | V _{CC} =4.5V, V _{IL} =0V | — | — | 500 | μA |
| Output voltage high level | V _{OH1} | V _{CC} =5V, I _{OH} =-1mA | 3 | — | — | V |
| Output voltage high level | V _{OH2} | V _{CC} =9V, I _{OH} =-10mA | 5 | — | — | V |
| Output voltage low level | V _{OL1} | V _{CC} =5V, I _{OL} =10mA | — | — | 0.4 | V |
| Output voltage low level | V _{OL2} | V _{CC} =9V, I _{OL} =10mA | — | — | 0.4 | V |
| Input voltage high level | V _{IH} | | 2 | — | — | V |
| Input voltage low level | V _{IL} | | — | — | 0.8 | V |

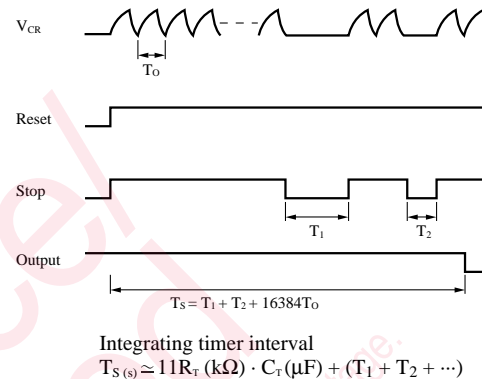
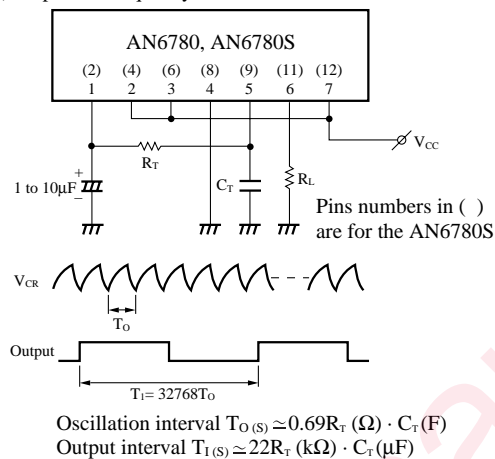
■ Pin Descriptions

| Pin No. | | Symbol | Description |
|---------|---------|-----------------|----------------------------------|
| AN6780 | AN6780S | | |
| 1 | 2 | V _S | Internal stabilized power supply |
| 2 | 4 | Stop | Oscillation stop input |
| 3 | 6 | Reset | Reset input |
| 4 | 8 | GND | Ground |
| 5 | 9 | CR | C.R. connection |
| 6 | 11 | Output | Output |
| 7 | 12 | V _{CC} | Supply voltage |

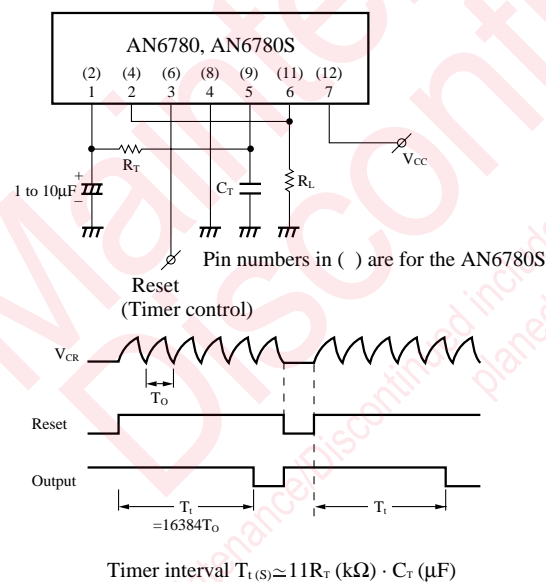
AN6780S : The Pins1, 3, 5, 7,10, 13 and 14 are non-contact.

■ Application Circuit

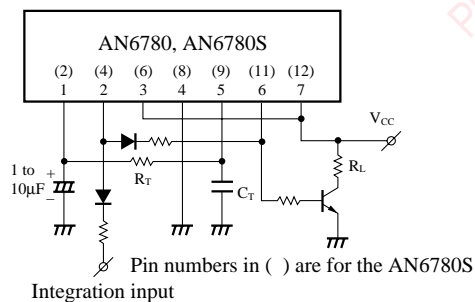
1) Superlow frequency oscillator



2) Timer



3) Integrating timer

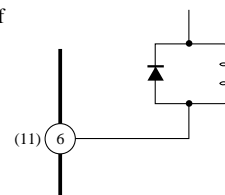


■ Supplementary Descriptions

• Precautions on Use

Observe the following in order to prevent destruction and reliability of the IC during its use.

- 1) For distribution of the oscillation frequency, take about 17% (IC alone) into account at the time of designing. When accuracy is requested, use a variable resistor as a timed resistor to make adjustment.
- 2) For the timed resistor, use a polyester capacitor with low $\tan\delta$, whose resistance is $1k\Omega$ to $1M\Omega$ and timed capacity of $0.1\mu F$.
- 3) The values obtained from the timer interval calculation expression, etc. in Application Circuit change depending on accuracy of the timed capacity in the actual set, etc.
- 4) Attach a capacity (1 to $10\mu F$) to the Pin1 (2) in order to protect the IC against noises and stabilize its operation.
- 5) During normal operation, when you turn on the power after extremely short period of power-off, note that auto reset may not be applied due to residual potential of external capacity.
- 6) Take a proper countermeasure noises in order to prevent malfunctioning from being caused by external noises. Particularly, when setting a long interval, pay attention to the external noises.
- 7) When a plunger or relay is connected to the output circuit, connect diodes to both ends of the coil in order to protect the IC against counter electromotive power generated after power-off



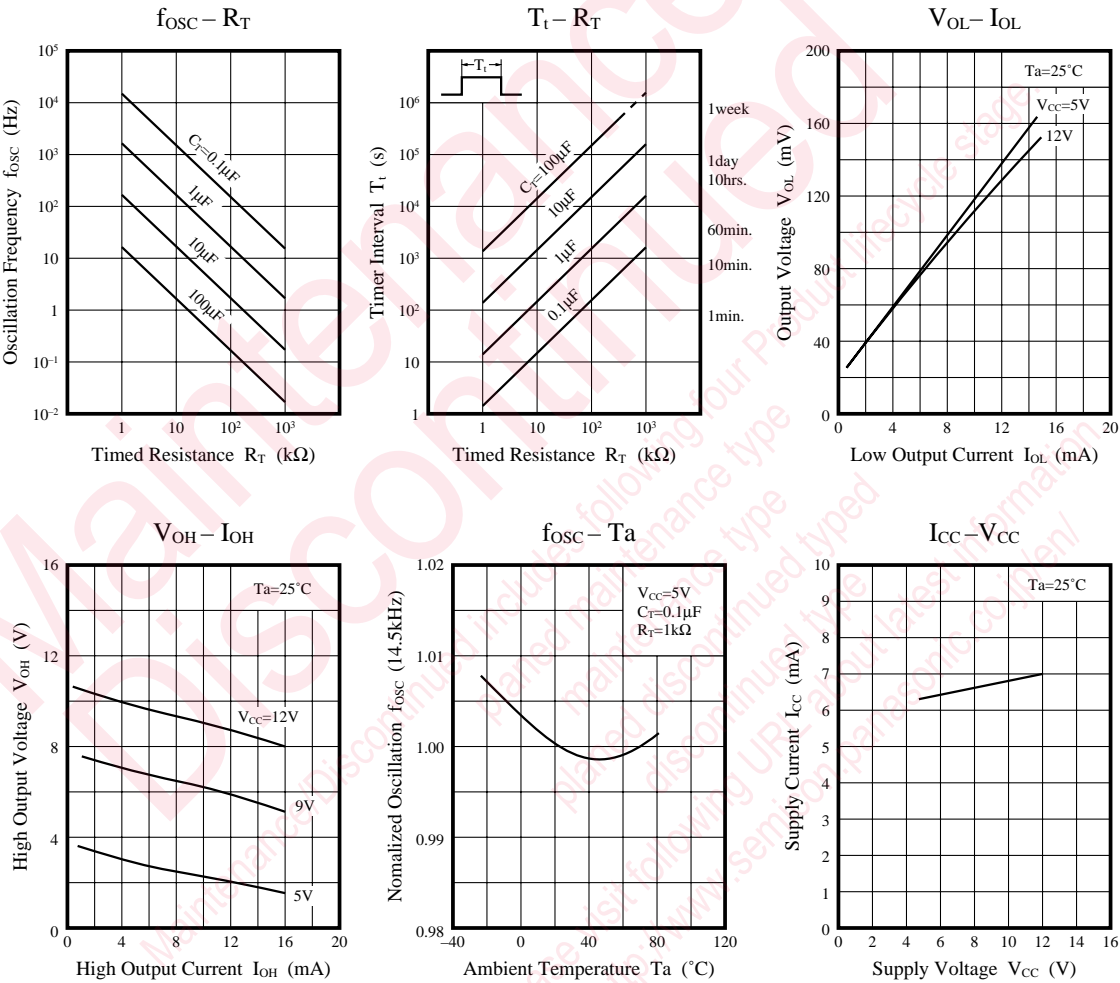
The pin numbers in () are for the AN6780S

• Truth Table (Positive Logic)

| Mode | Reset | Stop | Oscillator | Frequency divider | Output |
|------|-------|------|------------|-------------------------------|-------------------------------|
| 1 | L | * | Stop | Clear | H |
| 2 | H | H | Start | Counting | Counting |
| 3 | H | L | Stop | Stop Holds the previous state | Stop Holds the previous state |

Note) *Either L or H will do. When the power is turned on, control proceeds to the mode 2 or mode 3 from the mode 1, depending on the reset/stop input state.

■ Characteristics Curve



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