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.

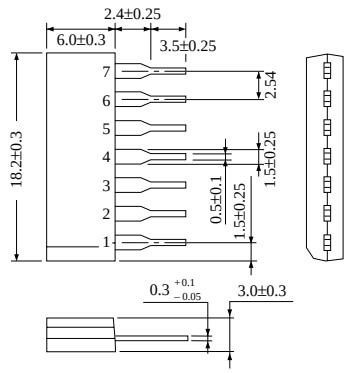
■ Features

- High inflow and outflow current : I_O=±15mA max
- Small variation of oscillations
- Long interval timer setting : max 1 week

■ Applications

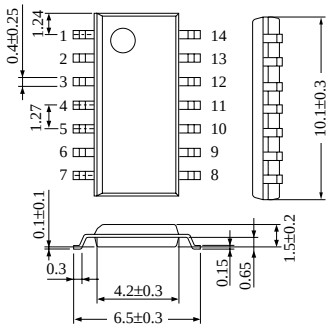
Timers, integrating timers, superlow frequency oscillators

AN6780 Unit : mm



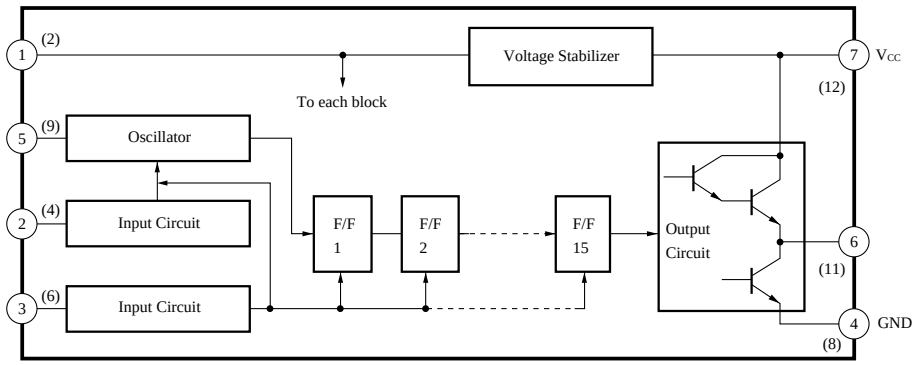
7-pin SIL Plastic Package (SIP007-P-0000)

AN6780S Unit : mm



14-pin PANAFLAT Plastic Package (SOP014-P-0225A)

■ Block Diagram



The pin numbers in ( ) are for the AN6780S.

■ 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

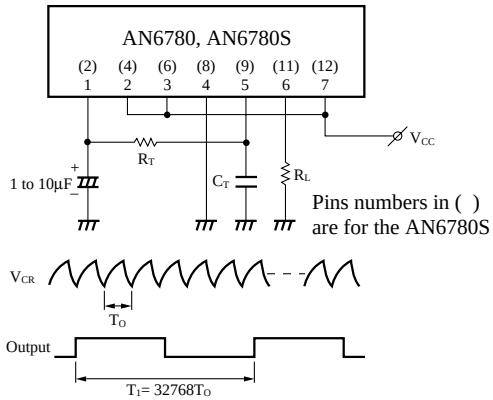
■ Pin Descriptions

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.

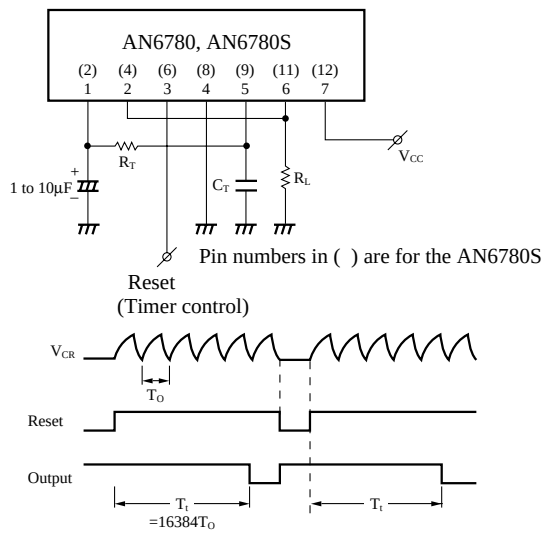
■ Application Circuit

1) Superlow frequency oscillator



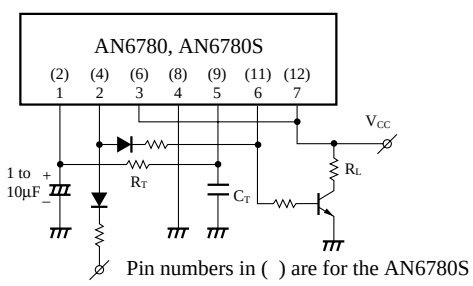
Oscillation interval $T_{O(S)} \simeq 0.69R_T\,(\Omega) \cdot C_T\,(F)$
Output interval $T_{I(S)} \simeq 22R_T\,(k\Omega) \cdot C_T\,(\mu F)$

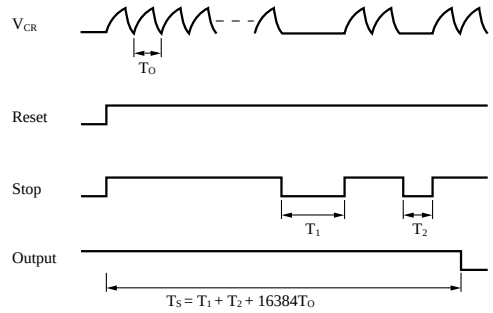
2) Timer



Timer interval $T_{t(S)} \simeq 11R_T\,(k\Omega) \cdot C_T\,(\mu F)$

3) Integrating timer





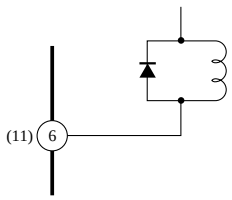
Integrating timer interval
$T_{S(S)} \simeq 11R_T\,(k\Omega) \cdot C_T\,(\mu F) + (T_1 + T_2 + \cdots)$

■ Supplementary Descriptions

• Precautions on Use

Obeserve 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 tanδ, whose resistance is 1kΩ to 1MΩ and timed capacity of 0.1μF.
3) The values obtained from the timer interval calcuation expression, etc. in Application Circuit change depending on accuracy of the timed capacity in the actual set, etc.
4) Attach a capacity (1 to 10μF) 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

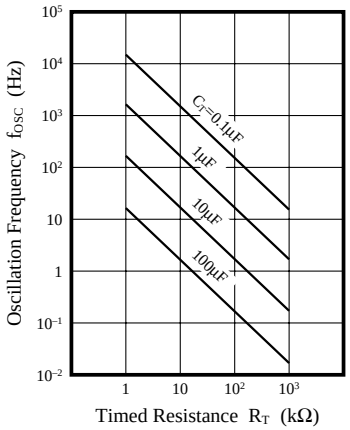
• Truth Table (Positive Logic)

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

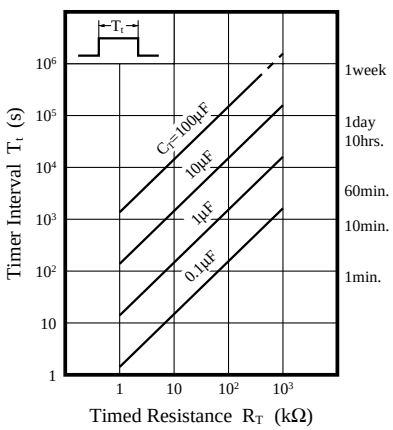
Note) *Either L or H will do. When the power is turned on, control proceeds to the mode 2 or mode 3 from the mode 1, depending on the reset/stop input state.

■ Characteristics Curve

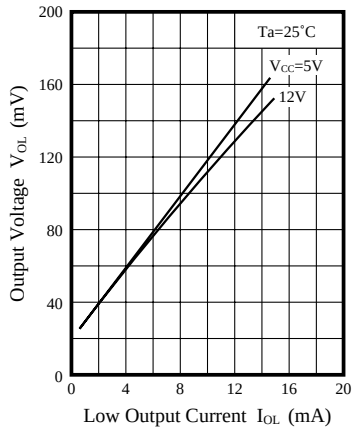
$f_{OSC} - R_T$



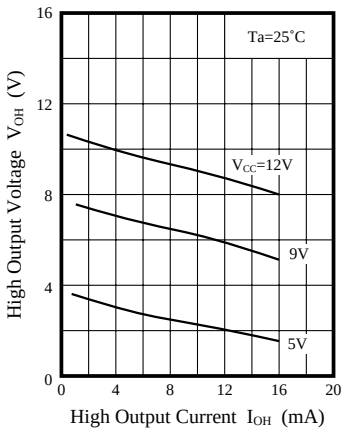
$T_t - R_T$



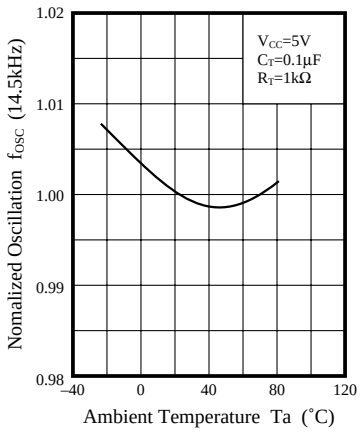
$V_{OL} - I_{OL}$



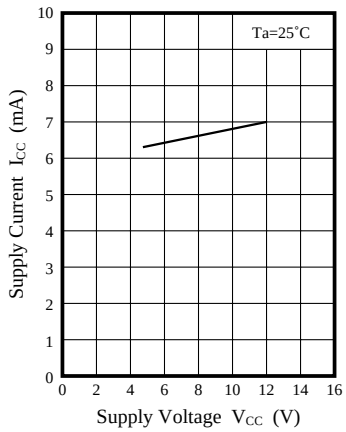
$V_{OH} - I_{OH}$



$f_{OSC} - Ta$



$I_{CC} - V_{CC}$



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