

AN6783, AN6783S, AN6784

Long Interval Timer IC

Overview

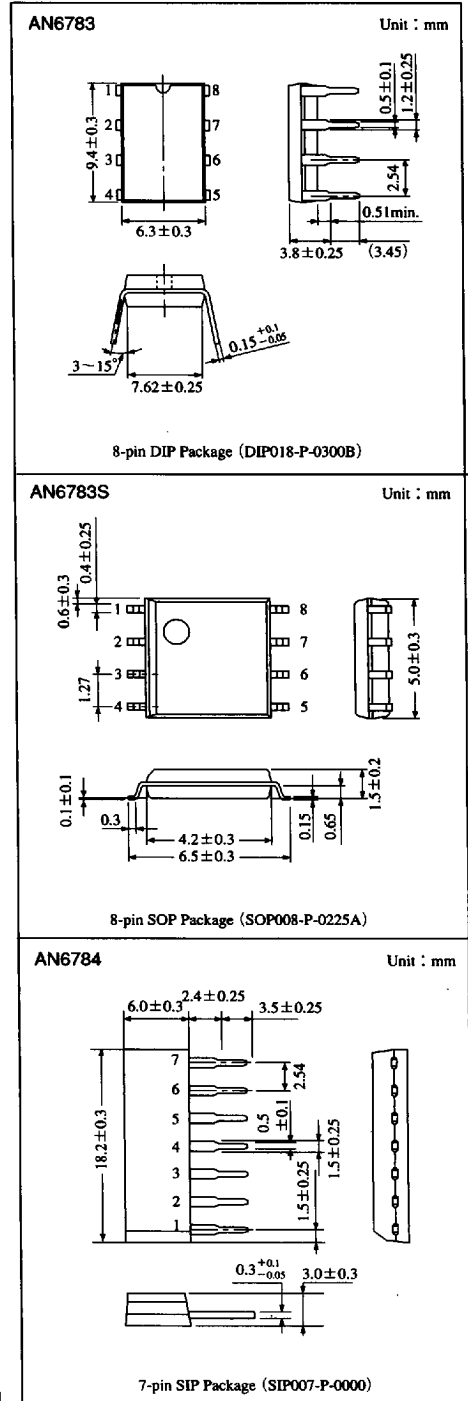
The AN6783, AN6783S and AN6784 are ICs designed for long interval timers. They make oscillation by using the external resistor and capacitor and divide the oscillation frequency (F.F. steps) for output.

Since it is frequency divider type, it can construct the long interval timer by using the capacitor with small capacitance.

Three types are available according to the set mounting forms : Surface mounting package, single in-line package and dual in-line package.

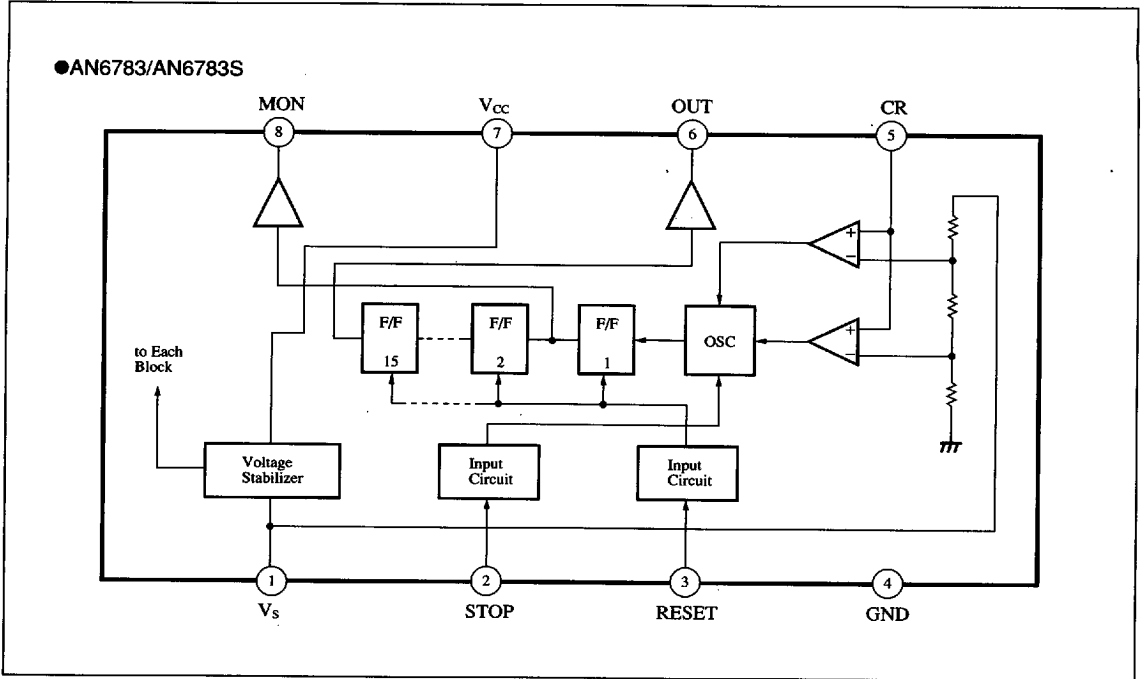
Features

- Small oscillation frequency dispersion of IC. ($\pm 5\%$)
- Oscillation frequency able to be checked by 1/2 fosc monitor terminal (No monitor terminals for AN6784)
- Wide operating supply voltage range (3.2 to 18V)
- Small consumption current (3mA, typ.)
- Three types of package available according to mounting forms



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■ Block Diagram



■ Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Rating		Unit
Supply voltage	V _{cc}	20		V
Supply current	I _{cc}	20		mA
Output current	I _o	-15	+15	mA
Power dissipation	P _D *	AN6783S	361	mW
		AN6783	500	
		AN6784	874	
		AN6785	658	
Operating ambient temperature	T _{opr}	-35 to +85		°C
Storage temperature	T _{sig}	AN6783/4/5	-55 to +150	°C
		AN6783S	-55 to +125	

* P_D of IC without heat sink V_{cc}=18V allowed for printed board SM

■ Recommended Operating Range (Ta=25°C)

Parameter	Symbol	Range
Operating supply voltage	V _{cc}	3.2V to 18V

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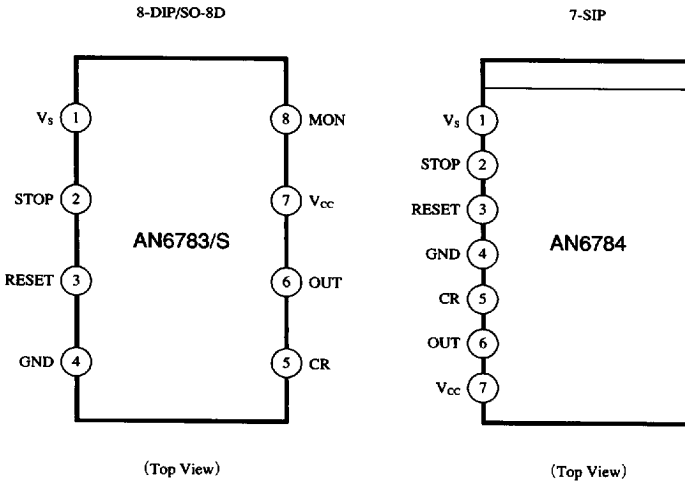
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■ Electrical Characteristics (Ta=25°C)

Parameter	Symbol	Condition	min	typ	max	Unit
Static supply current	I _{CC}	V _{CC} =5V	2	3	4	mA
Internal reference voltage	V _S	V _{CC} =5V, I _S =-3mA	2.4	2.55	2.7	V
Input current high level	I _{IH}	V _{CC} =18V, V _{IH} =18V	—	—	10	μA
Input current low level	I _{IL}	V _{CC} =18V, V _{IL} =0V	-100	—	—	μA
OUT terminal voltage high level	V _{OH}	V _{CC} =18V, I _{OH} =-10mA	14	16	18	V
OUT terminal voltage low level	V _{OL}	V _{CC} =18V, I _{OL} =10mA	—	—	0.4	V
MONITOR terminal voltage high level	V _{MH}	V _{CC} =18V	17.8	—	18	V
MONITOR terminal voltage low level	V _{ML}	V _{CC} =3.2V	—	—	0.4	V
Oscillation frequency accuracy	f _{CR}	V _{CC} =5V, R _i =1kΩ, C _t =0.1μF	9	9.5	10	kHz
Oscillation frequency fluctuation with supply voltage	Δf _V	V _{CC} =5V センターで3.2V~18V	-5	—	-5	%
Input voltage high level	V _{IH}	V _{CC} =5V	2	—	—	V
Input voltage low level	V _{IL}	V _{CC} =5V	—	—	0.8	V
Oscillation frequency drift with temperature *	Δf _T	V _{CC} =5V, R _i =1kΩ, C _t =0.1μF	-5	—	+5	%

* It indicates the variance within the range from Ta = -35°C to +85°C. The value indicated is a design reference value but not guaranteed one.

■ Pin Arrangements



■ Pin Descriptions

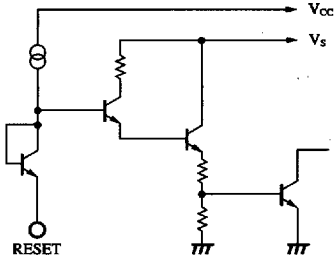
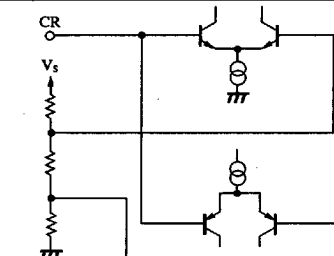
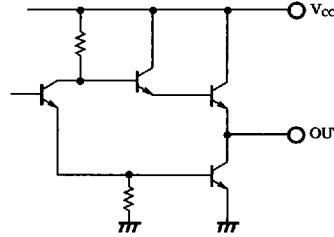
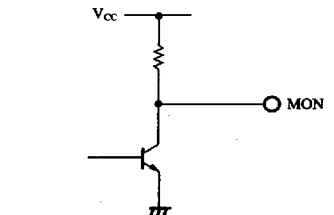
Pin No.	Symbol	I/O	DC voltage	Pin description	Equivalent circuit
1 ①	V _S	O	2.55V	It is an output terminal for stabilized power supply. It is the reference voltage source for oscillation circuit.	<p>The equivalent circuit shows a feedback loop for a voltage regulator. Pin 1 (Vs) is the output, and pin 2 (STOP) is the input. The circuit includes a feedback network with resistors and a transistor, connected to Vcc and ground.</p>
2 ②	STOP	I	2.8V	It is an input terminal for oscillation stop. Only the oscillation circuit is stopped. (F.F. is not cleared.) When it is not used, open it or connect it with V _{CC} .	

Note) Pin numbers 1 to 8 in the above left figure are for the AN6783/AN6783S and pin numbers ① to ⑦ in the above right figure are for the AN6784.

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■ Pin Descriptions (cont.)

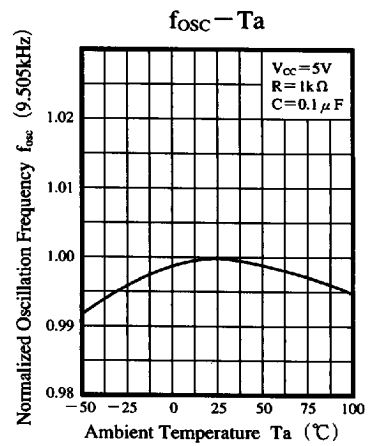
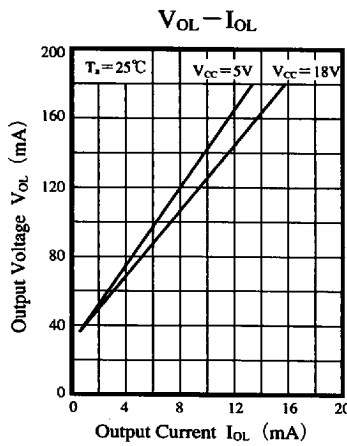
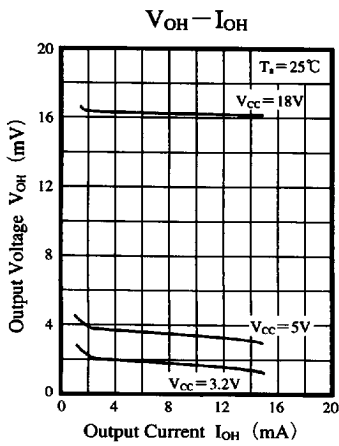
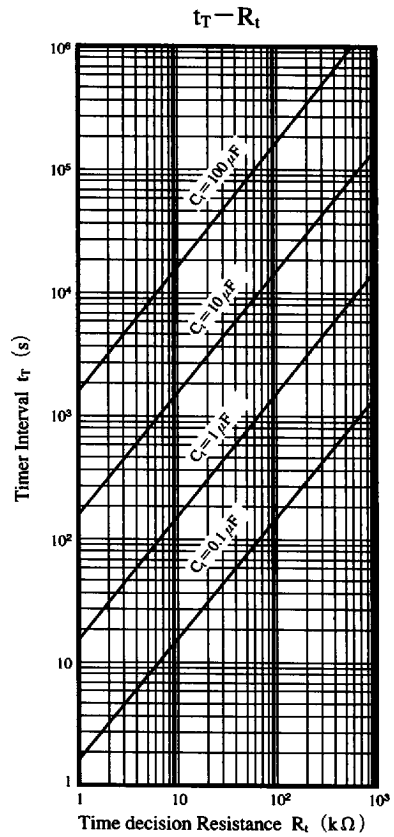
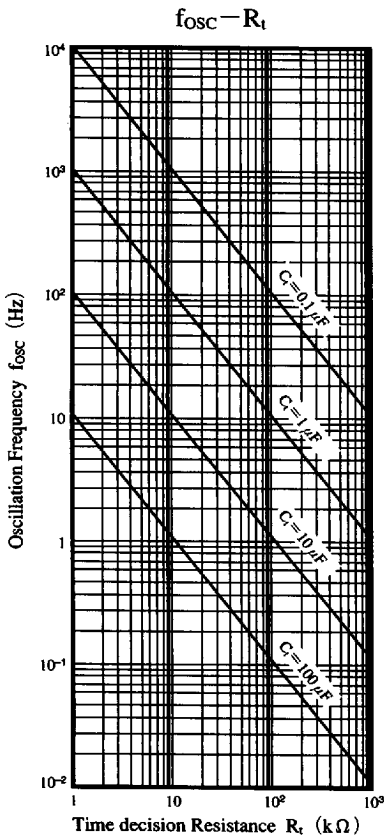
Pin No.	Symbol	I/O	DC voltage	Terminal description	Equivalent circuit
3 ③	RESET	I	2.8V	It is a reset input terminal. By setting it to "L" level, the F.F. is reset for the initial condition. When it is not used, open it or connect it with V _{CC} . It can be reset at power-on, however, rise it from the value under V _{CC} , 0.8V.	
4 ④	GND	O	0V	GND Terminal	—
5 ⑤	CR	—	0.7~1.8V	It is an oscillation terminal. The oscillation frequency is determined by the external resistor and capacitor. When pulses are applied onto this terminal from outside, set the voltage in the range from 0 to 1.8V.	
6 ⑥	OUT	I/O	"H" Level V _{CC} -1.4V "L" Level 0.4V	It is an output terminal. It outputs the frequency: $\text{Oscillation frequency} \times \frac{1}{32768}$. Set the output current in the range of ±10mA.	
7 ⑦	V _{CC}	I	—	It is a supply voltage terminal.	—
8 ⑧	MON	O	"H" Level V _{CC} "L" Level 0.4V	It is an oscillation frequency monitor terminal. Output is from the first step of F.F. and the frequency is 1/2 f _{osc} . When it is not used, open it. This terminal is used to connect the probe such as of oscilloscope. Set the output current under 100 μA.	

Note) Pin numbers 1 to 8 are for the AN6783/AN6783S, and Pin numbers ① to ⑦ are for the AN6784.

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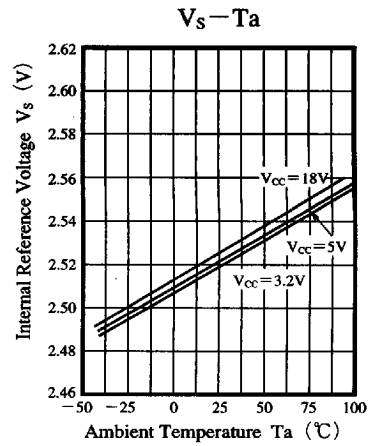
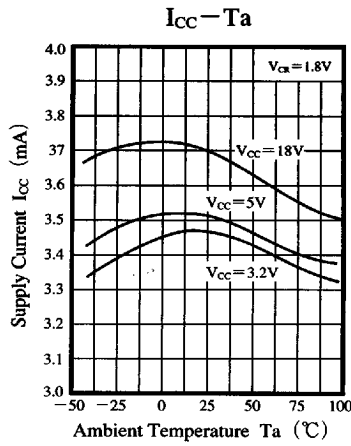
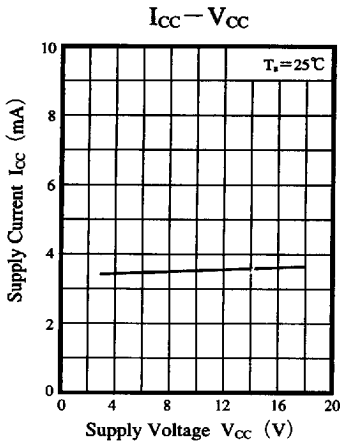
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■ Characteristics Curve



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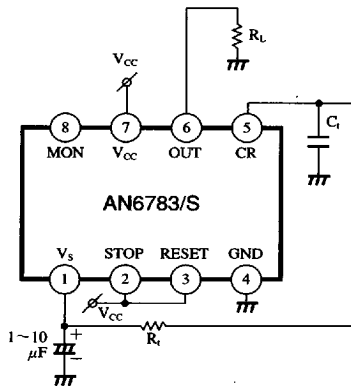
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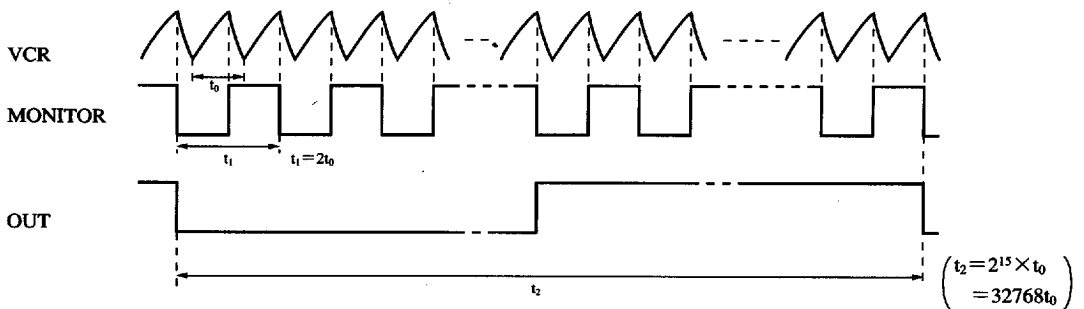
■ Application Circuit of AN6783/S

The AN6783/S can be used for accumulation timer which employs the stop terminal or long interval timer. It can be also used as a super low frequency oscillator.

(1) Super low frequency oscillation circuit



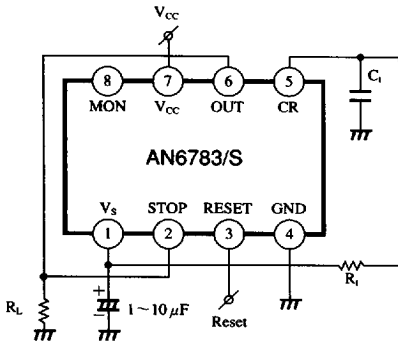
- Oscillation cycle
 t_0 (S) $\approx 0.947R_1$ (Ω) $\cdot C_1$ (F)
- Output cycle
 t_2 (S) $\approx t_0 \times 32768$
 $\approx 31.03R_1$ (k Ω) $\cdot C_1$ (μF)



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(2) Timer

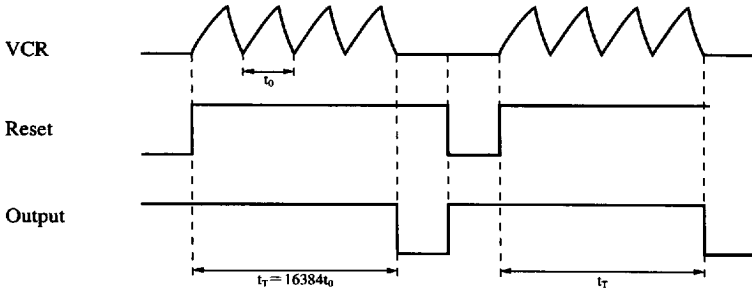


· Timer interval

$$tT = 16384t_0$$

$$= 16384 \times 0.947R_t (\Omega) \cdot G(F)$$

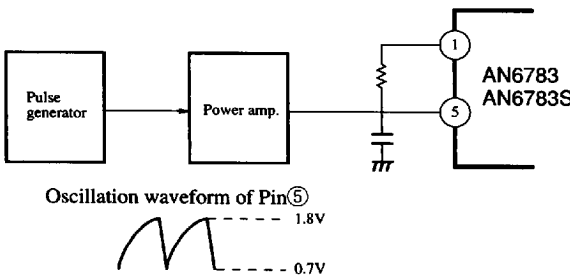
$$\approx 15.52R_t (k\Omega) \cdot C_1 (\mu F)$$



Note) The AN6784 can be also applied as the above, when the terminal functions are matched.

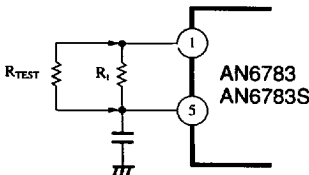
■ Operation Confirmation Method of AN6783/S Application Set Within Short Time

(1)



Frequency higher than that of oscillation at C, R is inputted to Pin ⑤ to shorten the timer interval. At this time, since capacitor of large capacitance is attached to the Pin ⑤, the power amp. with output of totem pole type should be used (not required if the output of pulse generator is large enough). However, arrangement should be made so that the input waveform could not exceed 1.8V.

(2)



Only for test, connect R_{TEST} with R_t in parallel, setting the resistance value small, and the oscillation frequency increases, thus timer interval can be shortened.

■ Precautions on Use

The above calculations for oscillation frequency, output cycle and timer interval are provided only for reference and should be modified according to the types of external parts used. Review with parts actually when you use this IC.

