DATA SHEET

Part No.	AN6783S
Package Code No.	SOP008-P-0225G

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Contents

AN6783S

IC for long interval timer

■ Overview

AN6783S is an IC designed for a long interval timer. It is oscillated by using the external resistor and capacitor, and the oscillation frequency divided by a 15-stage F.F. is provided as the output.

It is frequency divider type, so that a long interval timer can be constructed by using a capacitor with small capacitance.

■ Features

- Oscillation frequency dispersion of IC itself is small (±5%)
- Oscillation frequency can be checked by 1/2 f_{OSC} monitor pin
- Wide operating supply voltage range (3.2 V to 18 V)
- Small consumption current (3 mA typ.)

■ Applications

- Timer

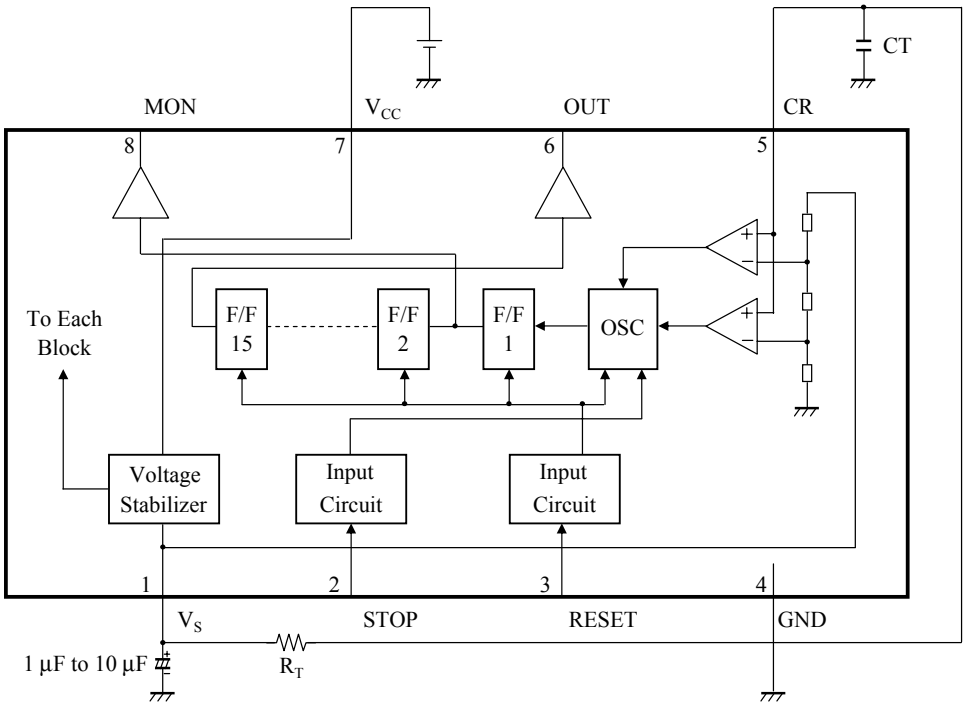
■ Package

- 8 pin Plastic Small Outline Package (SO Type)

■ Type

- Silicon Monolithic Bipolar IC

■ Block Diagram



■ Pin Descriptions

Pin No.	Pin name	Type	Description
1	V_S	Output	Reference voltage
2	STOP	Input	Oscillation stop input
3	RESET	Input	Reset input
4	GND	Ground	GND
5	CR	—	C, R connection
6	OUT	Output	Output
7	V_{CC}	Power supply	Supply voltage
8	MON	Output	Monitor pin

■ Absolute Maximum Ranges

A No.	Parameter	Symbol	Rating	Unit	Note
1	Supply voltage	V_{CC}	20	V	*1
2	Supply current	I_{CC}	7	mA	—
3	Power dissipation	P_D	122	mW	*2
4	Operating ambient temperature	T_{opr}	−35 to +85	°C	*3
5	Storage temperature	T_{stg}	−55 to +125	°C	*3
6	STOP pin voltage	V_{STOP}	0 to 18	V	*4
7	RESET pin voltage	V_{RESET}	0 to 18	V	*4
8	CR pin voltage	V_{CR}	0 to 3	V	*4
9	OUT pin current	I_{OUT}	−15 to +15	mA	*4

Note) *1 : The values under the condition not exceeding the above absolute maximum ratings and the power dissipation.

*2 : The power dissipation shown is the value at T_a = 85°C for the independent (unmounted) IC package.
When using this IC, refer to the • P_D-T_a diagram in the ■ Technical Data and use under the condition not exceeding the allowable value.

*3 : Except for the power dissipation, operating ambient temperature, and storage temperature, all ratings are for T_a = 25°C.

*4 : Do not apply external currents or voltages to any pin not specifically mentioned.
For the circuit currents, "+" denotes current flowing into the IC, and "−" denotes current flowing out of the IC.

■ Operating supply voltage range

Parameter	Symbol	Rating	Unit	Note
Supply voltage range	V_{CC}	3.2 to 18.0	V	—

Note) The values under the condition not exceeding the above absolute maximum ratings and the power dissipation.

■ Electrical Characteristics

Note) T_a = 25°C±2°C unless otherwise specified.

B No.	Parameter	Symbol	Conditions	Limits			Unit	Note
				Min	Typ	Max		
1	Quiescent supply current	I_{CC}	V_{CC} = 5 V	2.0	4.0	5.0	mA	—
2	Internal reference voltage	V_S	V_{CC} = 5 V, I_S = –3 mA	2.40	2.55	2.70	V	—
3	High-level input current	I_{IH}	V_{CC} = 18 V, V_{IH} = 18 V	—	—	10	µA	—
4	Low-level input current	I_{IL}	V_{CC} = 18 V, V_{IL} = 0 V	–100	—	—	µA	—
5	High-level OUT pin voltage	V_{OH}	V_{CC} = 18 V, I_{OH} = –10 mA	14.0	16.0	18.0	V	—
6	Low-level OUT pin voltage	V_{OL}	V_{CC} = 3.2 V, I_{OL} = 10 mA	—	—	0.4	V	—
7	High-level MON pin voltage	V_{MH}	V_{CC} = 18 V	17.8	—	18.0	V	—
8	Low-level MON pin voltage	V_{ML}	V_{CC} = 3.2 V	—	—	0.4	V	—
9	Oscillation frequency precision	f_{OSC}	V_{CC} = 5 V, R_T = 1 kΩ C_T = 0.1 µF	9.0	9.5	10.0	kHz	—
10	Oscillation frequency fluctuation with supply voltage	Δf_V	V_{CC} = 3.2 V to 5 V or 5 V to 18 V	–5.0	—	+5.0	%	—
11	High-level input voltage	V_{IH}	V_{CC} = 5 V	2.0	—	—	V	—
12	Low-level input voltage	V_{IL}	V_{CC} = 5 V	—	—	0.8	V	—

■ Electrical Characteristics (Reference values for design)

Note) The data show the changing amount within T_a = –30°C to +85°C when the values at T_a = 25°C is taken as the reference.
The characteristics listed below are reference values for design of the IC and are not guaranteed by inspection.
If a problem does occur related to these characteristics, Matsushita will respond in good faith to user concerns.

B No.	Parameter	Symbol	Conditions	Reference values			Unit	Note
				Min	Typ	Max		
13	Oscillation frequency temperature dependency	Δfr	V_{CC} = 5 V, R_T = 1 kΩ C_T = 0.1 µF	–5.0	—	+5.0	%	—

■ Technical Data

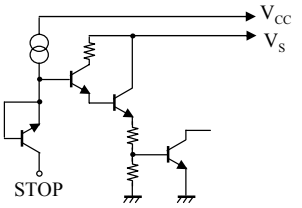
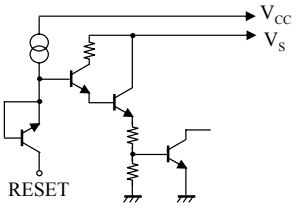
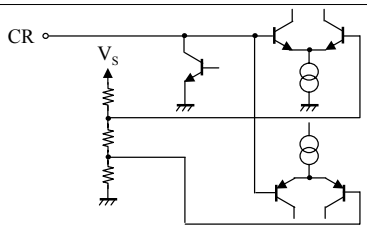
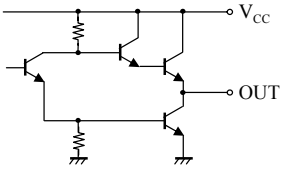
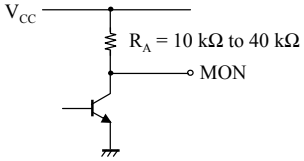
• Truth Table

Mode	V_{RESET}	V_{STOP}	Oscillation (V_{CR})	Frequency division (Count)	V_{OUT}	V_{MON}
Reset	Low	—	Stop (High)	Cleared	High	High
Stop	High	Low	Stop (High)	Stop Holds the previous state	Stop Holds the previous state	Stop Holds the previous state
Operation	High	High	Oscillation	Counting	1/32768-frequency division pulse output	1/2-frequency division pulse output

■ Technical Data (continued)

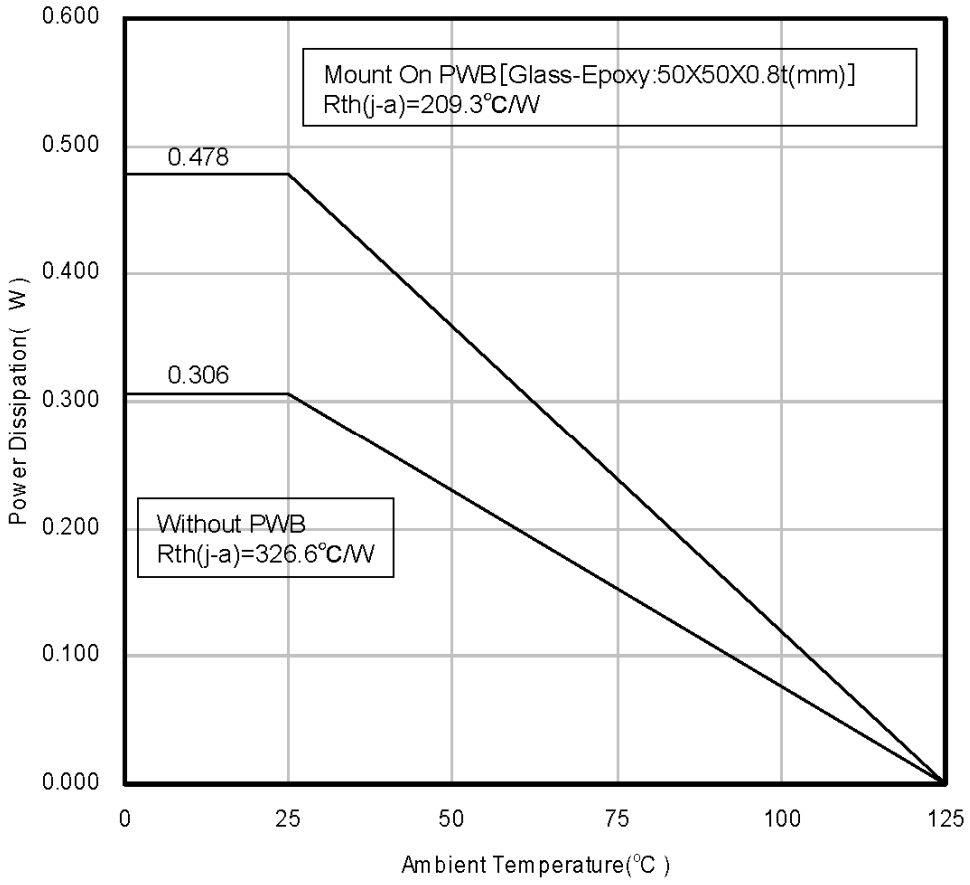
- I/O block circuit diagram and pin function descriptions

Note) The characteristics listed below are reference values derived from the design of the IC and are not guaranteed.

Pin No.	DC voltage	Internal circuit	Description
1	2.55 V	—	Stabilized power supply output pin. Reference voltage source for oscillation circuit.
2	—		Oscillation stop input pin. Only the oscillation circuit stops when this pin becomes low-level. (F.F. is not cleared) When not used, the pin should be open or connected to V_{CC}.
3	—		Reset input pin. F.F. is reset when the pin becomes low-level and is set to the default state. When not used, the pin should be open or connected to V_{CC}. The reset is applied by rising VCC from a voltage below 0.8 V (power-on reset function).
4	0 V	—	GND pin
5	0.7 V to 1.8 V		C, R connection pin. The oscillation frequency is determined by an external resistor and capacitor. When applying a pulse to this pin from the outside, the voltage should be within the range of 0 V to 3 V.
6	High-level V_{CC} – 1.4 V Low-level < 0.4 V		Output pin. The frequency which is 1/32768 of the oscillation frequency is outputted. Should be used with the output current within the range of –10 mA to +10 mA.
7	—	—	Supply voltage pin
8	High-level V_{CC} Low-level < 0.4 V		Oscillation frequency monitor pin The output is given from the first stage of F.F. and the frequency which is 1/2 of oscillation frequency f_{OSC} is outputted. If not used, the pin should be open. This pin is provided for connecting probe such as oscilloscope. Use with the output current of 100 µA or less.

■ Technical Data (continued)

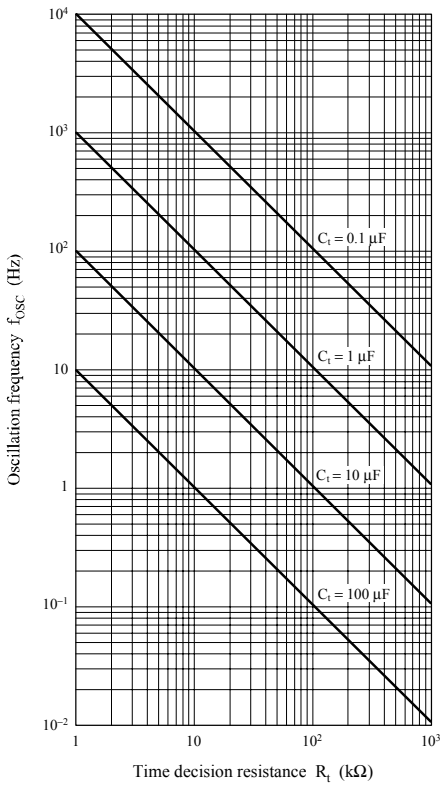
• P_D — T_a diagram



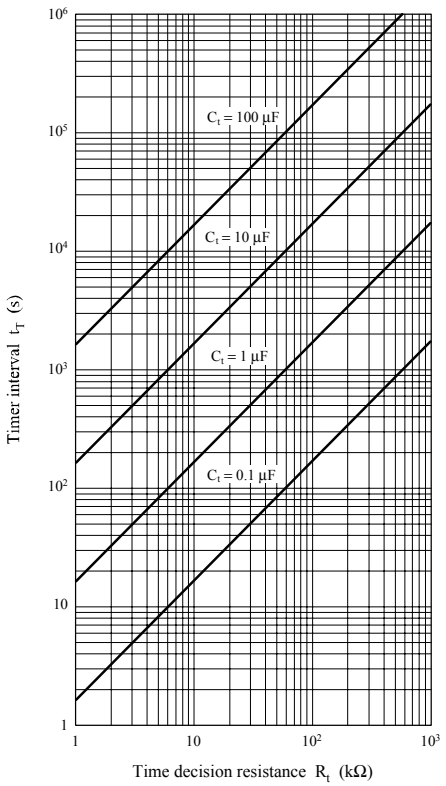
■ Technical Data (continued)

• Main Characteristics

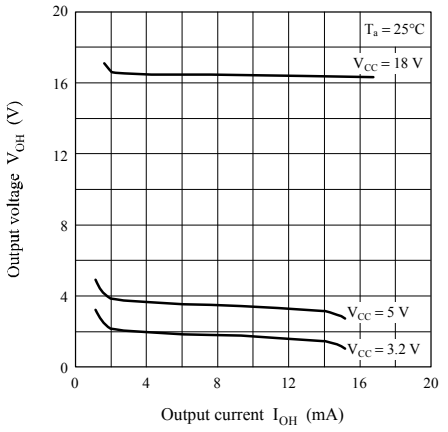
f_{OSC} — R_t



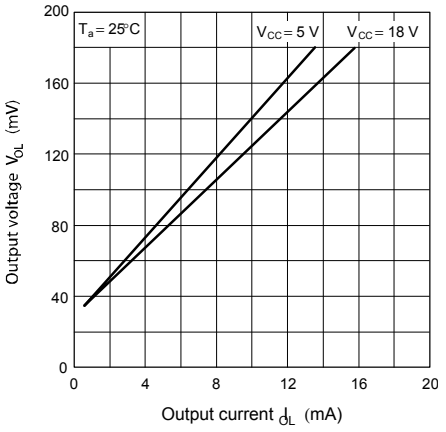
t_T — R_t



V_{OH} — I_{OH}



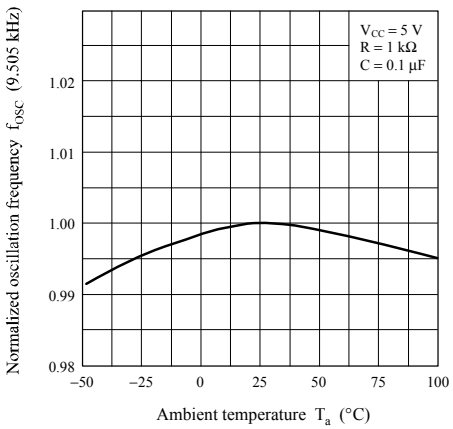
V_{OL} — I_{OL}



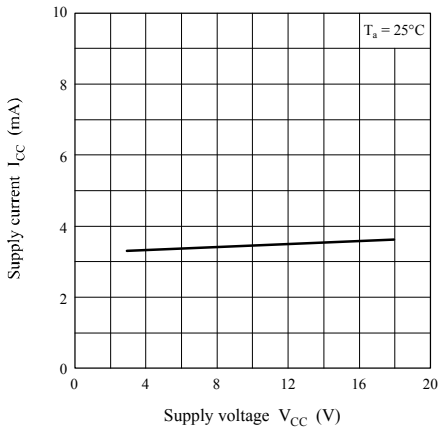
■ Technical Data (continued)

- Main Characteristics (continued)

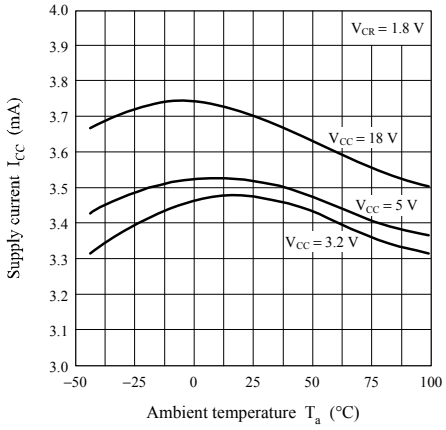
f_{OSC} — T_a



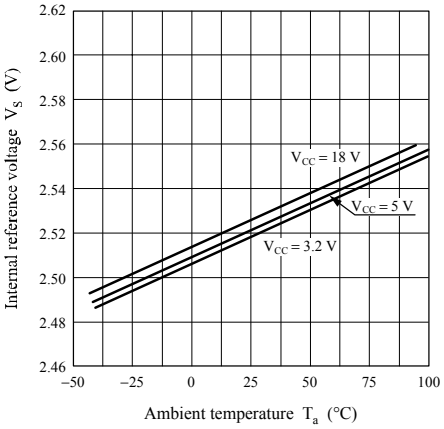
I_{CC} — V_{CC}



I_{CC} — T_a



V_S — T_a



■ Usage Notes

Pay attention to the followings in order to prevent the destruction during the use and to increase the reliability.

1. In the application circuit example, the calculated value by the theoretical equation for timer interval calculation and such matter of the above into consideration.
   Also, the proportional constant "α" depends on the kinds and characteristics of the time interval and time interval capacitor.
   Make a final confirmation with the finished products.
   In the case when a high precision is required, adjust the value by using a variable resistor as the time interval resistor.

2. Use a time interval resistor in the range of 1kΩ to 1MΩ, and a time interval capacitor in the range of 0.1 µF to 100 µF which is polyester or tantalum electronic capacitor with a small tanδ value. ($1/2f_{OSC}$ can be checked by MON pin)

3. Connect a capacitor (1 µF to 10 µF) to the V_S pin in order to protect the IC from an external noise and to stabilize its operation.

4. If turning on power again after an extremely short-time supply off state during the normal operation, be careful that there may be a case that the automatic reset (power-on reset) fails due to residual potential of the external capacitance.

5. Take measures against noise in order to prevent malfunction caused by external noise. Particularly, when setting a long interval, pay attention to the external noises.

6. 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.

7. Do not short circuit the V_S pin with V_{CC} pin in order to avoid malfunction.

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