AN5767K

Synchronizing signal processing IC

■ Overview

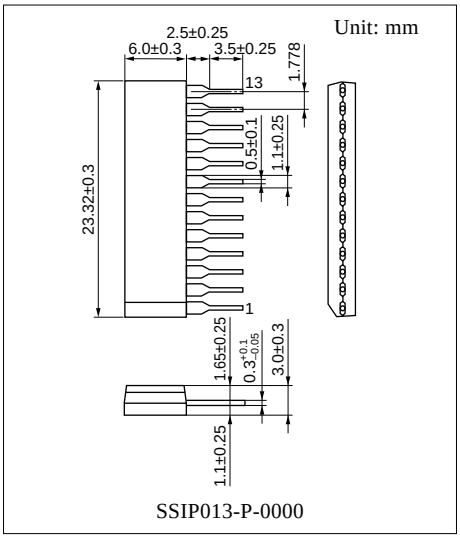
The AN5767K is a synchronizing signal processing IC with built-in frequency divider circuit for horizontal and vertical synchronizing signal. Input signal is outputted after being devided by two.

■ Features

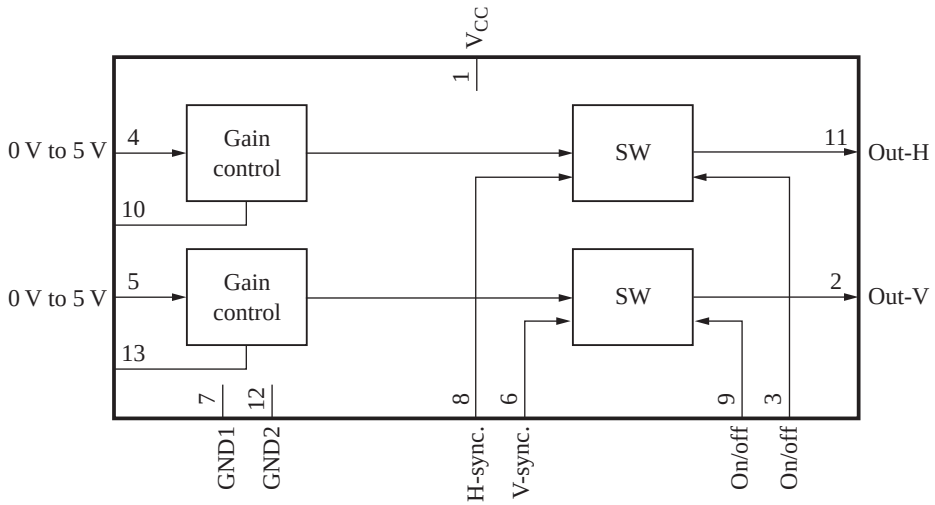
- Built-in dividing-by-two circuit for horizontal synchronizing signal
- Built-in dividing-by-two circuit for vertical synchronizing signal
- On/off switch function of dividing output
- Gain control function of dividing output

■ Applications

- CRT monitors



■ Block Diagram



■ Pin Descriptions

Pin No.	Description	Pin No.	Description
1	Power supply 12 V(V_{CC})	8	H-sync. input
2	Freq.-divided output1 output	9	Freq.-divided output1 on/off
3	Freq.-divided output2 on/off	10	Freq.-divided output2 control resistor
4	Freq.-divided output2 control input	11	Freq.-divided output2 output
5	Freq.-divided output1 control input	12	GND2
6	V-sync. input	13	Freq.-divided output1 control resistor
7	GND1		

■ Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC}	13.5	V
Supply current	I_{CC}	25	mA
Power dissipation *2	P_D	337.5	mW
Operating ambient temperature *1	T_{opr}	–25 to +75	°C
Storage temperature *1	T_{stg}	–55 to +150	°C

Note) ∗1: Except for the operating ambient temperature, and storage temperature, all ratings are for T_a = 25°C.

∗2: The power dissipation shown is for the IC package in free air at T_a = 75°C.

■ Recommended Operating Range

Parameter	Symbol	Range	Unit
Supply voltage	V_{CC}	10.8 to 13.2	V

■ Electrical Characteristics at T_a = 25°C

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Circuit current	I_{CC}	V_{CC} = 12 V	4.8	5.9	7.2	mA
Circuit voltage 1	$V_{10(1)}$	V_{CC} = 12 V, V_4 = 0 V	– 0.1	0.0	+0.1	V
Circuit voltage 2	$V_{10(2)}$	V_{CC} = 12 V, V_4 = 5 V	4.60	4.85	5.10	V
Circuit voltage 3	$V_{13(1)}$	V_{CC} = 12 V, V_5 = 0 V	– 0.1	0.0	+0.1	V
Circuit voltage 4	$V_{13(2)}$	V_{CC} = 12 V, V_5 = 5 V	4.60	4.85	5.10	V
Freq.-divided output2 output current 1	$I_{11(1)}$	V_{CC} = 12 V, V_3 = 5 V, V_4 = 5 V, R = 120 kΩ	30	40	50	µA
Freq.-divided output2 output current 2	$I_{11(2)}$	V_{CC} = 12 V, V_3 = 0 V, V_4 = 5 V	–5	0	+5	µA
Freq.-divided output2 output current 3	$I_{11(3)}$	V_{CC} = 12 V, V_3 = 5 V, V_4 = 0 V	–5	0	+5	µA
Freq.-divided output1 output current 1	$I_{2(1)}$	V_{CC} = 12 V, V_5 = 5 V, V_9 = 5 V, R = 20 kΩ	–3.0	–2.5	–2.0	mA
Freq.-divided output1 output current 2	$I_{2(2)}$	V_{CC} = 12 V, V_5 = 5 V, V_9 = 0 V	– 0.05	0	+0.05	mA
Freq.-divided output1 output current 3	$I_{2(3)}$	V_{CC} = 12 V, V_5 = 0 V, V_9 = 5 V	– 0.05	0	+0.05	mA

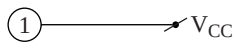
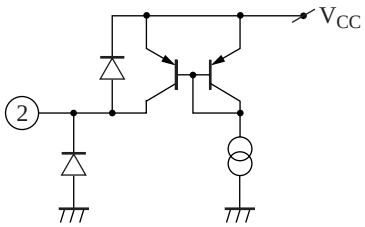
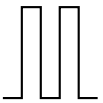
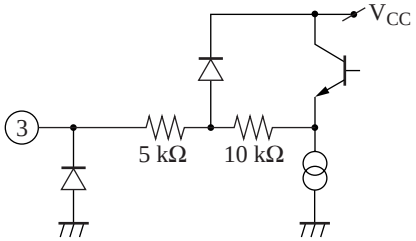
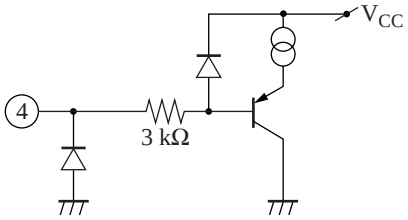
■ Electrical Characteristics at T_a = 25°C (continued)

• Design reference data

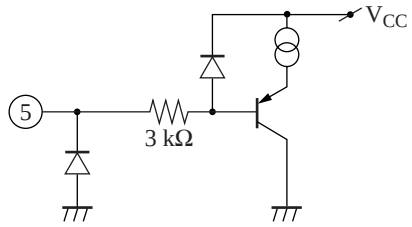
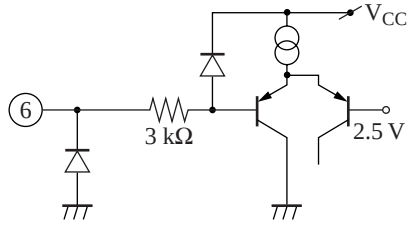
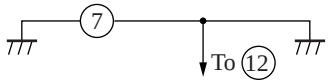
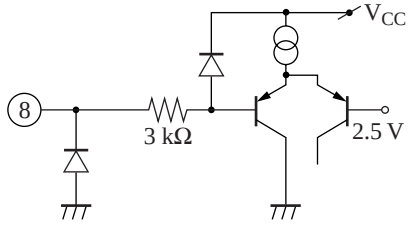
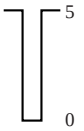
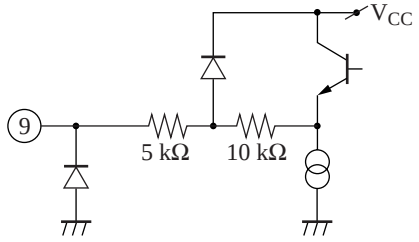
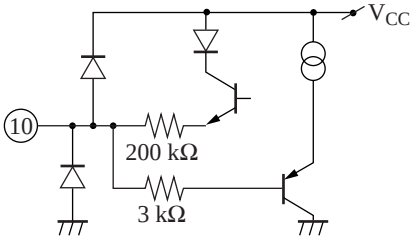
Note) The characteristics listed below are theoretical values based on the IC design and are not guaranteed.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
V-sync. dividing operation	f_{V2}	Pin 2 output frequency at pulse input to pin 6	—	$f_{V2} = 1/2f_{V6}$	—	Hz
H-sync. dividing operation	f_{H11}	Pin 11 output frequency at pulse input to pin 8	—	$f_{H11} = 1/2f_{H8}$	—	Hz
H-sync. dividing operation polarity between field	f_{H11P}	Pin 11 output frequency at pulse input to pin 6	—	$f_{H11} = 1/2f_{V6}$	—	Hz
V-sync. input	V_{VS}	Threshold value	—	2.5	—	V
H-sync. input	V_{HS}	Threshold value	—	2.5	—	V
V-sync. input	f_{VIN}	Operating frequency	30	—	200	Hz
H-sync. input	f_{HIN}	Operating frequency	15	—	150	kHz

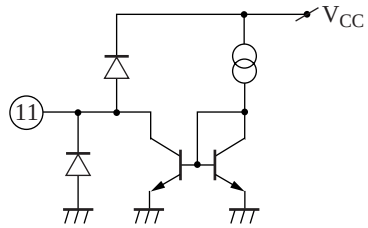
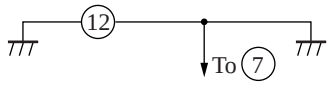
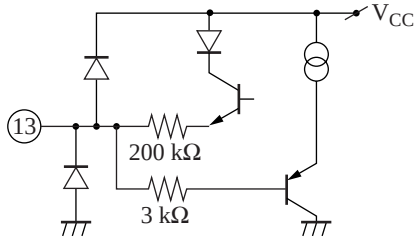
■ Terminal Equivalent Circuits

Pin No.	Equivalent circuit	Description	DC voltage (V)
1		Power supply 12 V (V_{CC}): Supply pin Apply DC 12 V.	12
2		Freq.-divided output1: Freq.-divided output of V-sync. Outputted with current	
3		Freq.-divided output2 on/off: On/off changeover pin for freq.-divided output2 Off at 0 V.	
4		Freq.-divided output2 control input: Control input pin for freq.-divided output2 Apply DC 0 V to 5 V.	0 to 5

■ Terminal Equivalent Circuits (continued)

Pin No.	Equivalent circuit	Description	DC voltage (V)
5		Freq.-divided output1 control input: Control input pin for freq.-divided output1 Apply DC 0 V to 5 V.	0 to 5
6		V-sync. input: Input pin for V-sync. Input negative polarity pulse.	
7		GND1: Ground pin	0
8		H-sync. input: Input pin for H-sync. Possible to input with both polarities, but phase will be delayed by a pulse width if pulse is inputted with positive polarity.	
9		Freq.-divided output1 on/off: On/off changeover pin for freq.-divided output1. Off at 0 V.	
10		Control resistor for freq.-divided output2: Resistor pin to determine freq.-divided output2 output current. Connect the resistor (recommended 120 kΩ) from this pin to GND.	0 to 5

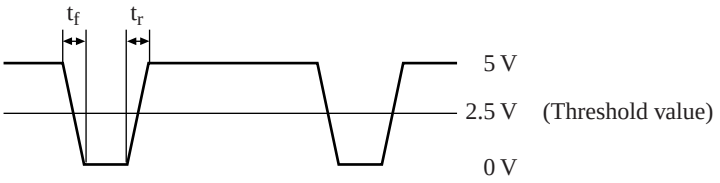
■ Terminal Equivalent Circuits (continued)

Pin No.	Equivalent circuit	Description	DC voltage (V)
11		Freq.-divided output2: Freq.-divided output of H-sync.. Outputted with current.	
12		GND2: Ground pin	0
13		Freq.-divided output1 control input: Resistor pin to determine freq.-divided output1 output current. Connect the resistor (recommended 20 kΩ) between this pin and GND.	0 to 5

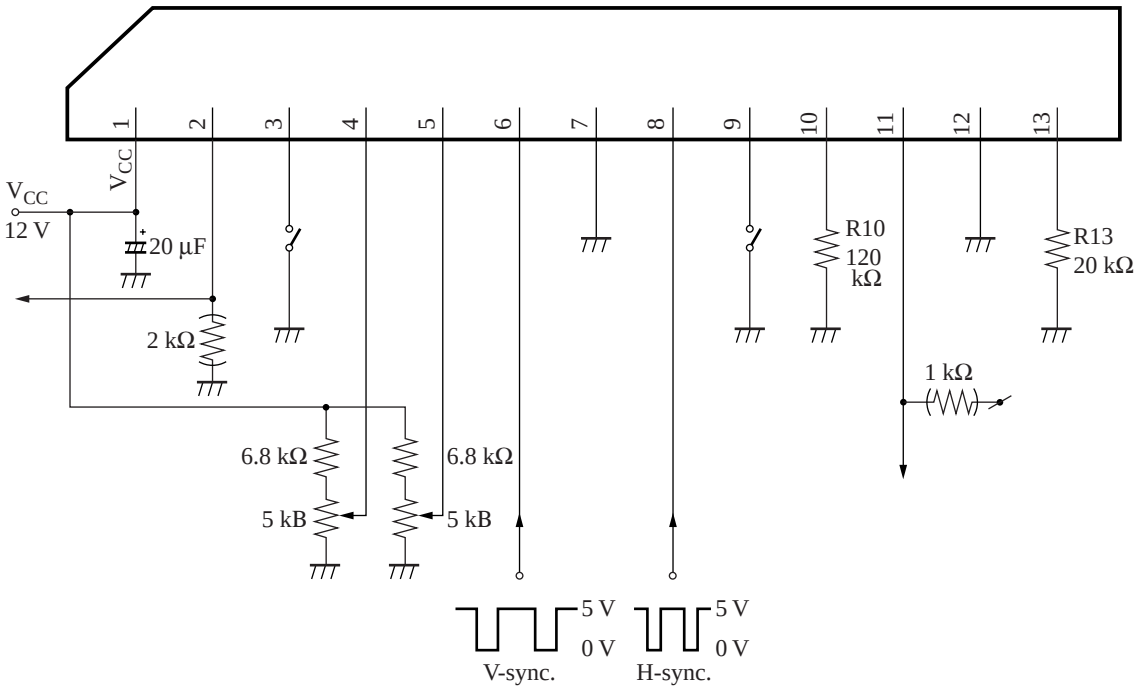
■ Usage Notes

ECL is used for flip-flop circuit.

Use the condition of $t_r \leq 10$ µs and $t_f \leq 10$ µs for H-sync. and V-sync. respectively.



■ Application Circuit Example



1. Recommended application conditions

Parameter	Symbol	Range	Unit
Freq.-divided output2 control input	V_{4-7}	0 to 6	V
Freq.-divided output1 control input	V_{5-7}	0 to 6	V
H-sync. input	V_{8-7}	0 to 6	V
V-sync. input	V_{6-7}	0 to 6	V
Freq.-divided output2 output current	I_{11}	0 to 1	mA
Freq.-divided output1 output current	I_2	–10 to 0	mA
Recommended resistance	R10	20k to 200k	Ω
Recommended resistance	R13	10k to 200k	Ω

2. Freq.-divided output2 on/off

At V_3 = 0 V ← 12 V Pin 11 output

At V_3 = open ← 12 V Pin 11 output

3. Freq.-divided output1 on/off

At V_9 = 0 V ← 0 V Pin 2 output

At V_9 = open ← 0 V Pin 2 output

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