

The BA7048N is an auto tracking microcomputer interface device for VCRs.

Using the audio or video FM signal, the IC generates a peak detection output for the FM signal.

The IC consists of a peak detection circuit, FM input amplifier, and an output amplifier.

Features

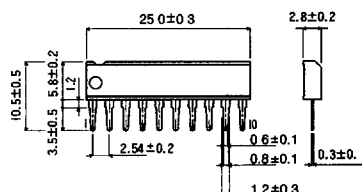
- available in SIP10 package
- various filters can be constructed using the inverted input pin and the built-in switch
- low voltage, typically 5 V
- low power consumption

Applications

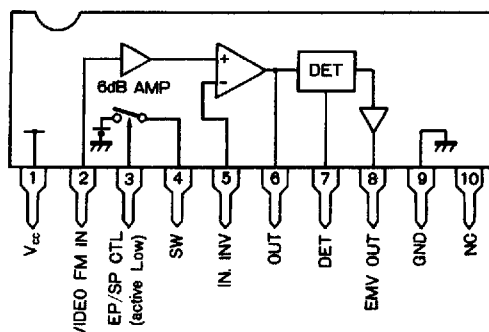
- video cassette recorders (VHS format)

Dimensions (Units : mm)

BA7048N (SIP10)



Block diagram



Absolute maximum ratings ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Limits	Unit	Conditions
Power supply	V_{CC}	8.0	V	
Power dissipation	P_d	850	mW	Reduce power by 8.5 mW/ $^\circ\text{C}$ for each degree above 25°C .
Operating temperature	T_{opr}	$-25 \sim +70$	$^\circ\text{C}$	
Storage temperature	T_{stg}	$-55 \sim +125$	$^\circ\text{C}$	

Recommended operating conditions ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Min	Typical	Max	Units
Power supply	V_{CC}	4.5	5.0	5.5	V

Electrical characteristics (unless otherwise noted, $T_a = 25^\circ\text{C}$, $V_{CC} = 5.0\text{ V}$)

Parameter	Symbol	Min	Typical	Max	Unit	Conditions
Supply current	I_{CC}	3.5	5.5	7.5	mA	
6 dB amplifier voltage gain	G_6	3.5	6.0	8.0	dB	$f = 1.0\text{ MHz}$, $V_{IN} = 0.5\text{ V}_{pk-pk}$
6 dB amplifier frequency characteristic	f_6	-0.5	+1.0	+2.5	dB	$f = 7.0\text{ MHz}/1.0\text{ MHz}$, $V_{IN} = 0.5\text{ V}_{pk-pk}$
Detection characteristic 1	V_7		0.25	0.30	V	$V_{IN} = 0.0\text{ V}_{pk-pk}$
Detection characteristic 2	V_{7-L}	0.90	1.20	1.40	V	$f = 7.0\text{ MHz}$, $V_{IN} = 1.0\text{ V}_{pk-pk}$
Output amplifier characteristic 1	V_{80-LI}	1.50	1.75	2.00	V	$V_{IN} = 1.0\text{ V}$
Output amplifier characteristic 2	V_{80-HI}	4.70	4.90	5.00	V	$V_{IN} = 3.0\text{ V}$
SW impedance ON	Z_{4ON}		50	90	Ω	$f = 1.0\text{ MHz}$, $V_{IN} = 0.5\text{ V}_{pk-pk}$
SW impedance OFF	Z_{4OFF}	20	100		k Ω	$f = 1.0\text{ MHz}$, $V_{IN} = 0.5\text{ V}_{pk-pk}$
Overall characteristic	V_{8D-0}	1.00	1.55	2.10	V	$f = 1.0\text{ MHz}$, $V_{IN} = 0.5\text{ V}_{pk-pk}$
Switching voltage	V_{th}	1.00	2.00	3.00	V	

BA7048N VCR auto tracking interface

Test circuit

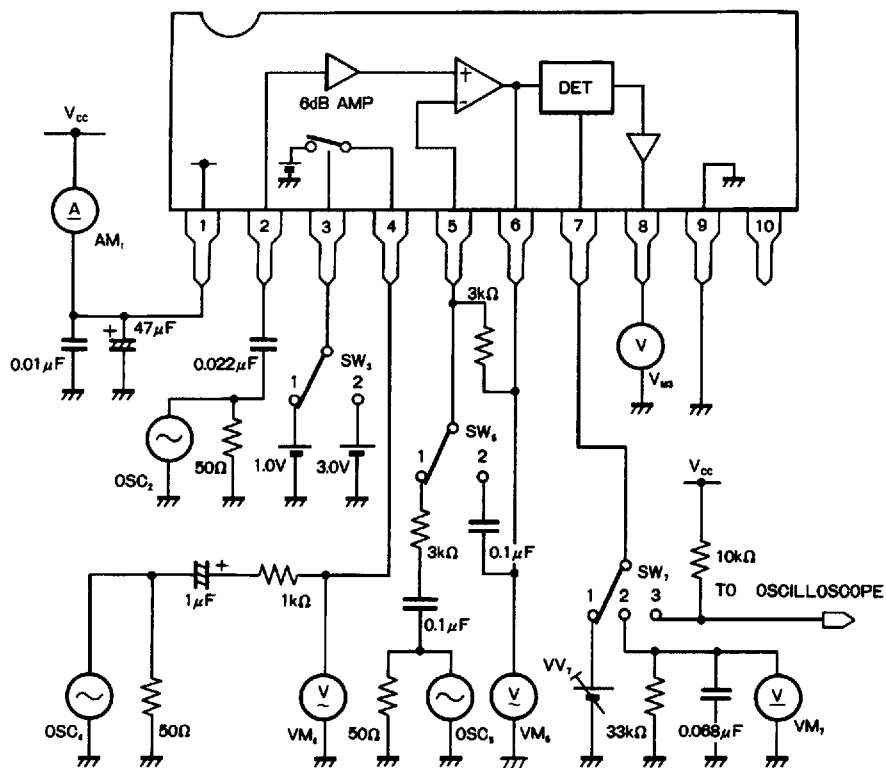
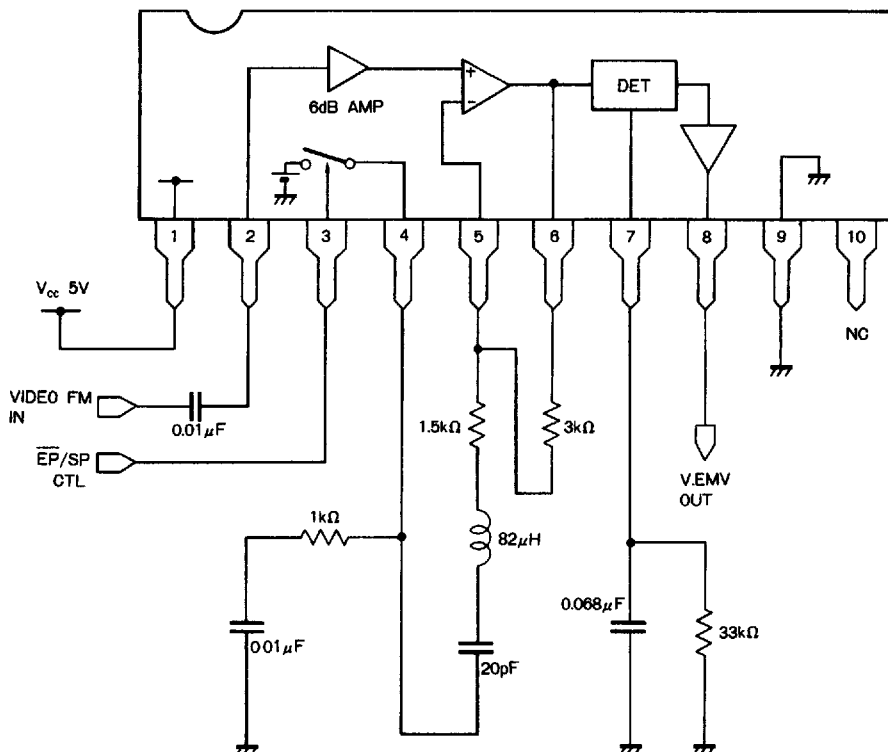
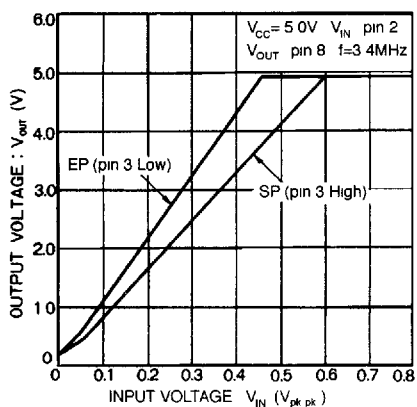


Figure 1 Application example**Electrical characteristic curves****Figure 2**

Absolute maximum ratings ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Limits	Unit	Conditions
Power supply	V_{CC}	8.0	V	
Power dissipation	BA7046	500	mW	Reduce power by 5.0 mW/°C for each degree above 25°C.
	BA7046F	350		Reduce power by 3.5 mW/°C for each degree above 25°C.
Operating temperature	T_{opr}	-20 ~ +75	°C	
Storage temperature	T_{stg}	-55 ~ +125	°C	

Recommended operating conditions ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Min	Typical	Max	Units
Power supply	V_{CC}	4.5	5.0	5.5	V

Electrical characteristics (unless otherwise noted, $T_a = 25^\circ\text{C}$, $V_{CC} = 5.0\text{ V}$)

Parameter	Symbol	Min	Typical	Max	Unit	Conditions
Supply current	I_Q	2.0	4.1	6.2	mA	Pin 3 open
Minimum sync separation voltage	$V_{\text{syn-min}}$		0.08	0.15	$V_{\text{pk-pk}}$	Input when Pin 6 terminated with a 75 Ω resistor
Pulse voltage low	V_{P-L}		0.1	0.3	V	Pin 2, 4
Pulse voltage high	V_{P-H}	4.7	4.9		V	Pin 2, 4
Horizontal free-run frequency	f_{h-O}	13.9	15.7	17.5	kHz	With no input signal, I_1 is open
Capture voltage	Δf_{CAP}	± 2.1	± 2.9		kHz	
Lock-in-phase	t_{HPH}	-1.0	0	+1.0	μs	Pin 2 falling to pin 6 falling
H_D , V_D phase difference	t_{HVD}	17.0	23.5	30.0	μs	Pin 4 falling to pin 2 rising
H_D pulse width	t_{HD}	4.6	5.1	5.6	μs	Pin 2 falling to pin 2 rising
V_D pulse width	t_{VD}	190	230	270	μs	Pin 4 falling to pin 4 rising

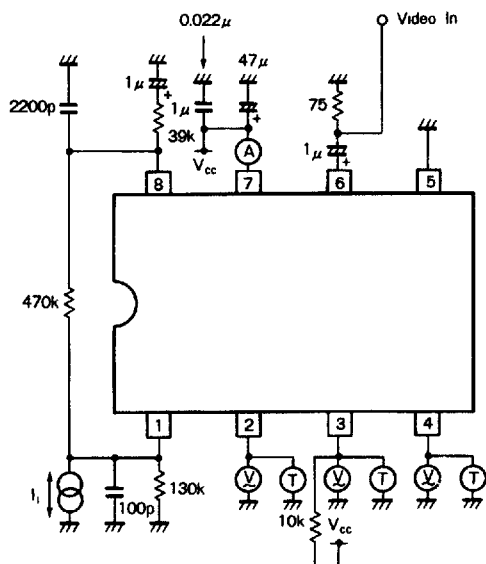
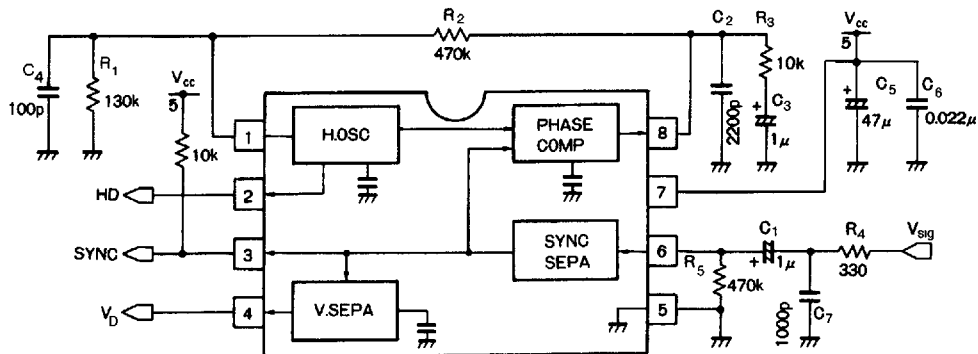


Figure 1 Application example



Input and output equivalent circuits

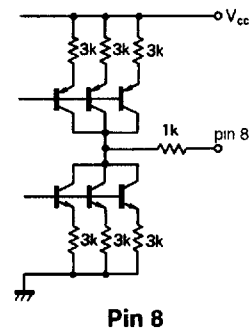
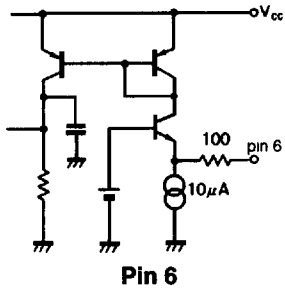
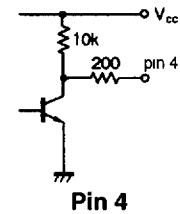
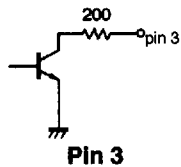
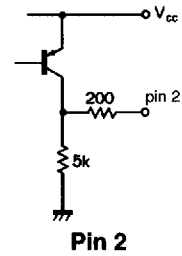
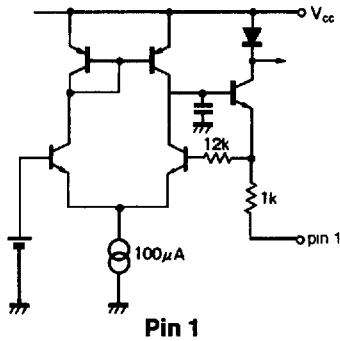
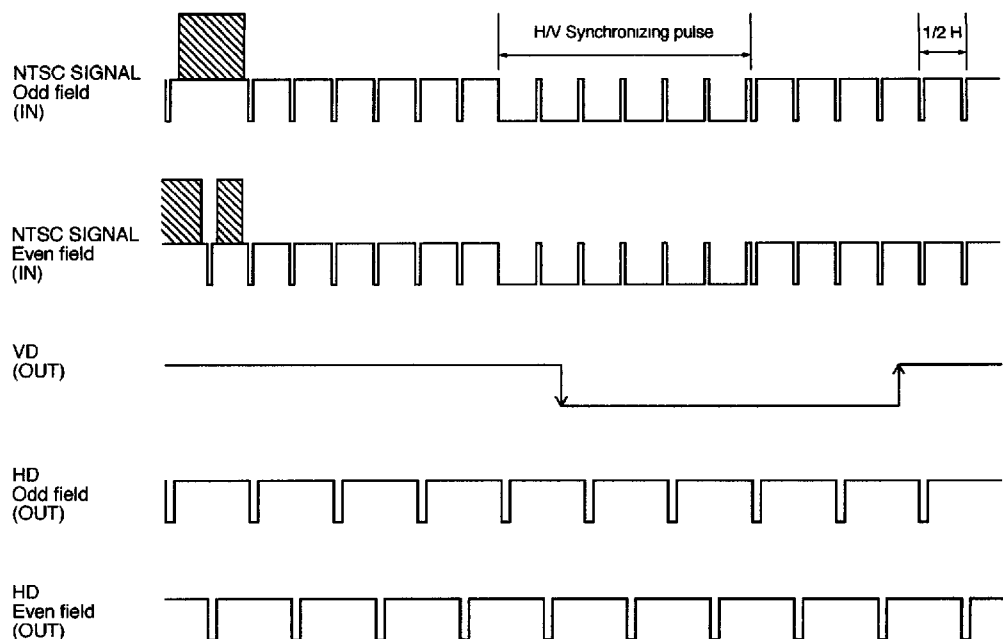


Figure 2 Timing chart



Circuit operation

Sync separation circuit

This circuit detects the external capacitor charge and discharge currents to perform sync separation.

Horizontal oscillation circuit

When a video signal is input, this is synchronized with H sync through PLL operation. The horizontal free-run frequency is determined by the external resistor, R_L , as follows:

$$f_{H-0} = \frac{2.05E6}{R_L} (\text{kHz})$$

Vertical sync separation circuit

When a video signal is input, sync separation is performed over the vertical sync pulse interval.

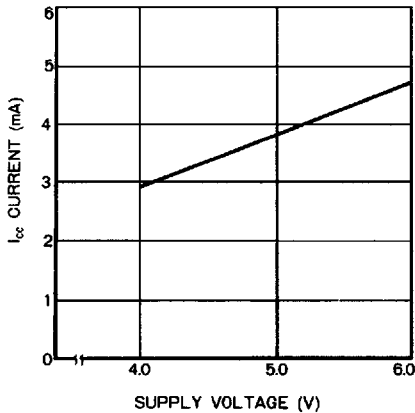
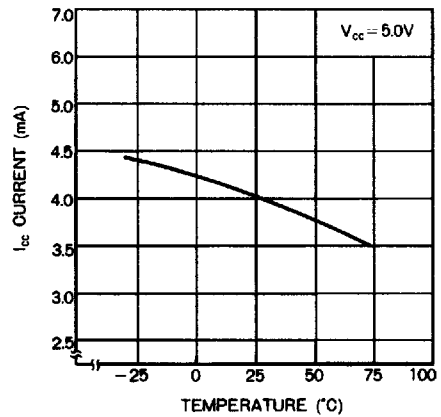
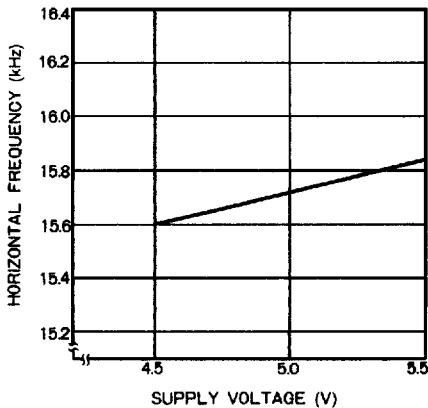
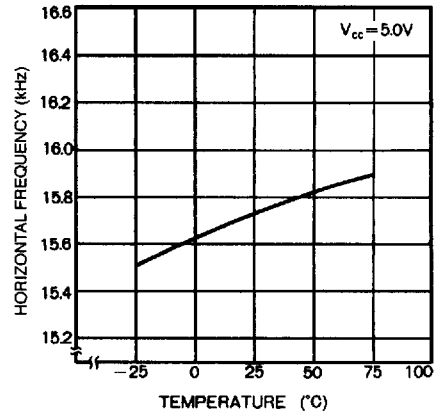
Precautions for use

The ground connections should be as thick as possible.

Power supply noise should be suppressed as far as possible.

External components

The resistance R_1 should have a tolerance of $\pm 2\%$ and a temperature coefficient of less than ± 100 ppm.

Electrical characteristic curves**Figure 3****Figure 4****Figure 5****Figure 6**

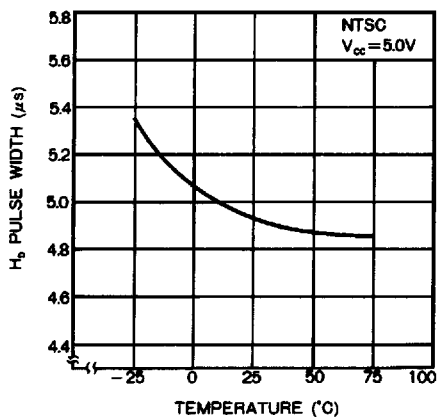


Figure 7

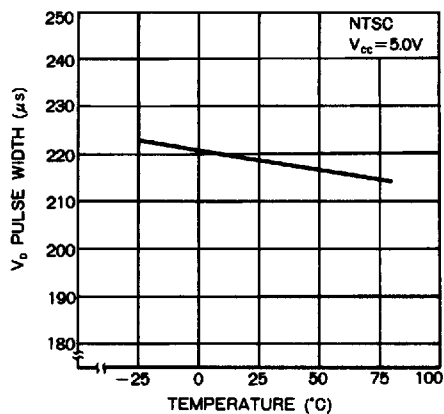


Figure 8

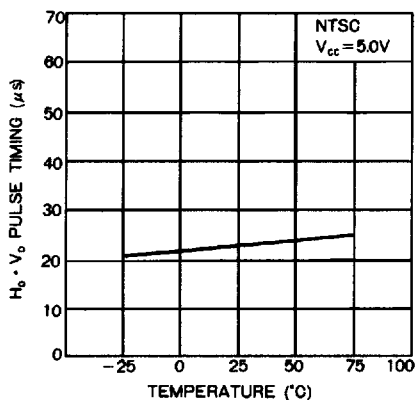


Figure 9

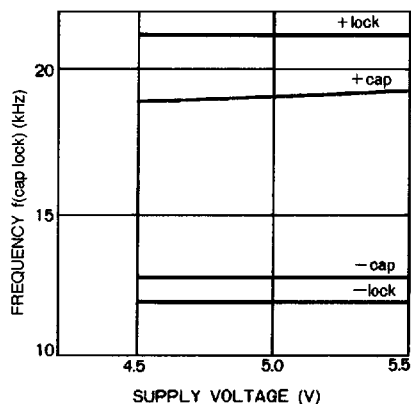


Figure 10

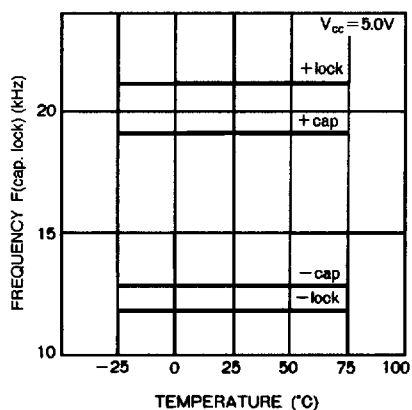


Figure 11

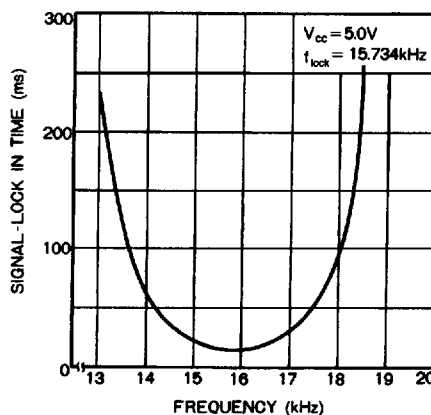
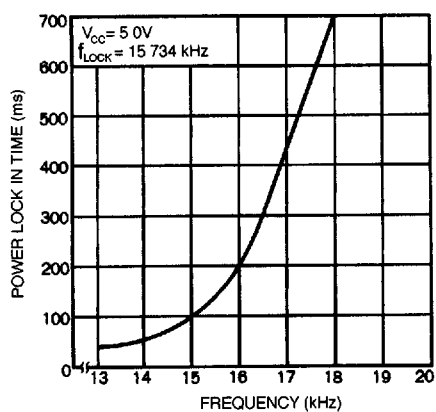


Figure 12

**Figure 13**