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BA7048N

VCR auto tracking interface

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

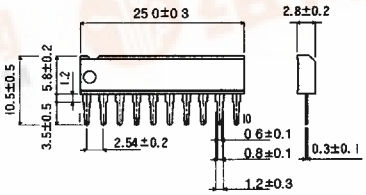
- available in SIP10 package
- various filters can be constructed using the inverted input pin and the built-in switch
- low voltage, typically 5 V
- low power consumption

Applications

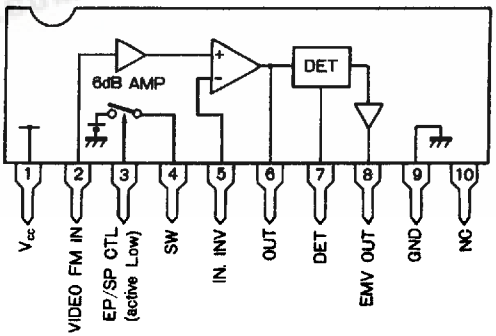
- video cassette recorders (VHS format)

Dimensions (Units : mm)

BA7048N (SIP10)



Block diagram



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Absolute maximum ratings (T_a = 25°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/°C for each degree above 25°C.
Operating temperature	T_{opr}	–25 ~ +70	°C	
Storage temperature	T_{stg}	–55 ~ +125	°C	

Recommended operating conditions (T_a = 25°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°C, V_{CC} = 5.0 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 MHz, V_{IN} = 0.5 V_{pk-pk}
6 dB amplifier frequency characteristic	f_6	–0.5	+1.0	+2.5	dB	f = 7.0 MHz/1.0 MHz, V_{IN} = 0.5 V_{pk-pk}
Detection characteristic 1	V_7		0.25	0.30	V	V_{IN} = 0.0 V_{pk-pk}
Detection characteristic 2	V_{7-I}	0.90	1.20	1.40	V	f = 7.0 MHz, V_{IN} = 1.0 V_{pk-pk}
Output amplifier characteristic 1	V_{80-LI}	1.50	1.75	2.00	V	V_{IN} = 1.0 V
Output amplifier characteristic 2	V_{80-HI}	4.70	4.90	5.00	V	V_{IN} = 3.0 V
SW impedance ON	Z_{4ON}		50	90	Ω	f = 1.0 MHz, V_{IN} = 0.5 V_{pk-pk}
SW impedance OFF	Z_{4OFF}	20	100		kΩ	f = 1.0 MHz, V_{IN} = 0.5 V_{pk-pk}
Overall characteristic	V_{8D-0}	1.00	1.55	2.10	V	f = 1.0 MHz, V_{IN} = 0.5 V_{pk-pk}
Switching voltage	V_{th}	1.00	2.00	3.00	V	

Test circuit

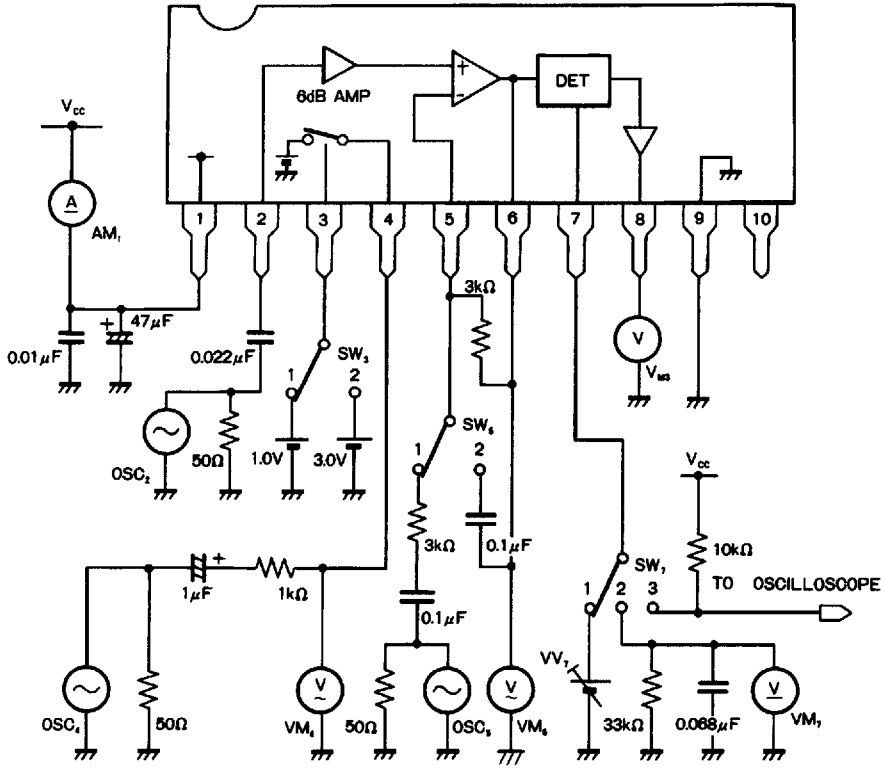
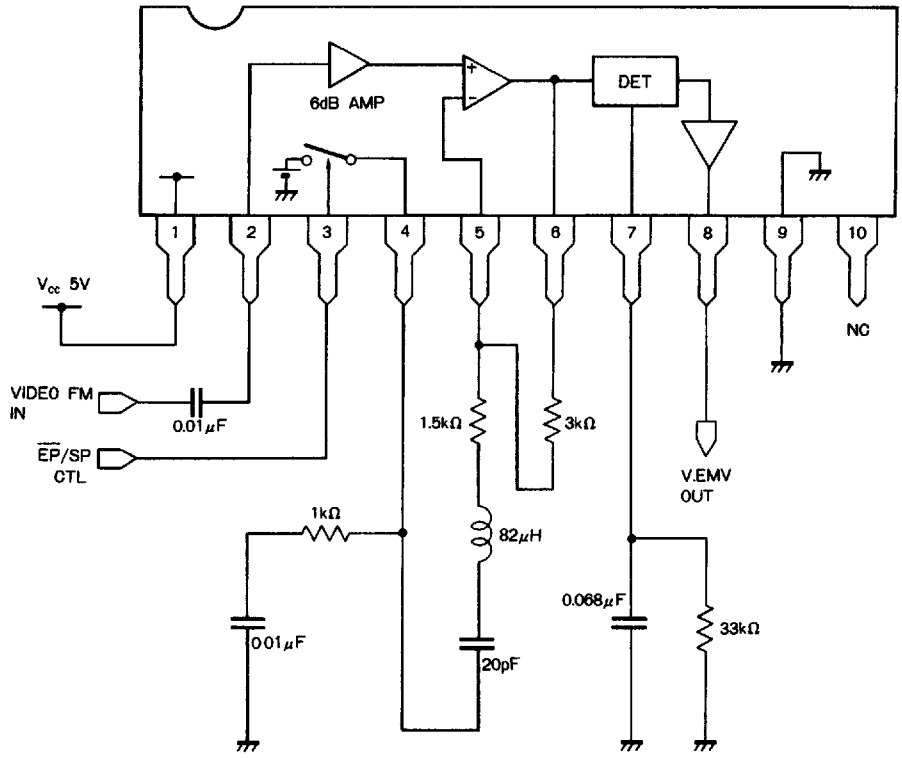


Figure 1 Application example



Electrical characteristic curves

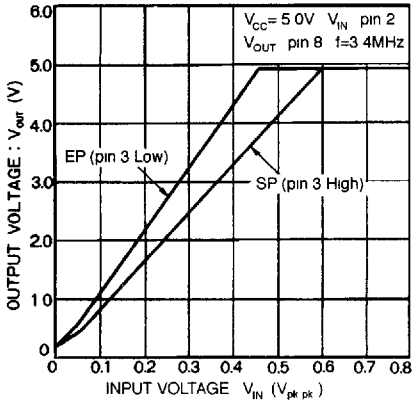


Figure 2

BA7046
BA7046F

Video synchronization signal separator, with AFC

The BA7046 and BA7046F are used to separate synchronizing signals from video signals. The IC outputs a horizontal synchronous signal (HD), a vertical synchronous signal (VD), and a composite synchronous signal (Sync out).

In addition, the IC guarantees the HD-VD phase difference for on-screen displays (OSD).

Features

- available in DIP8 and SOP8 packages
- built in AFC circuit
- guaranteed HD-VD phase difference
- low power consumption (typically 21 mW)
- possible to use a horizontal free-run frequency that does not require adjustment

Applications

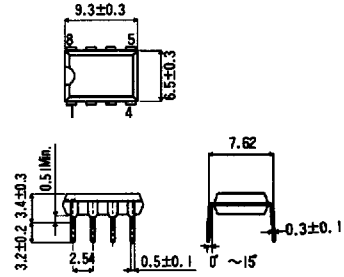
- video cassette recorders
- televisions

Pin description

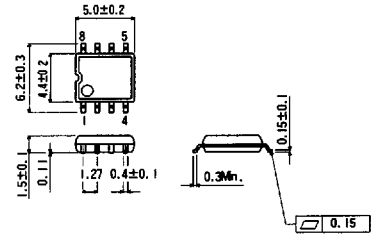
Pin no.	Function
1	Horizontal signal oscillator resistor
2	HD output
3	SYNC output (open collector)
4	VD output
5	Ground
6	Video input
7	Power supply
8	Phase comparator output

Dimensions (Units : mm)

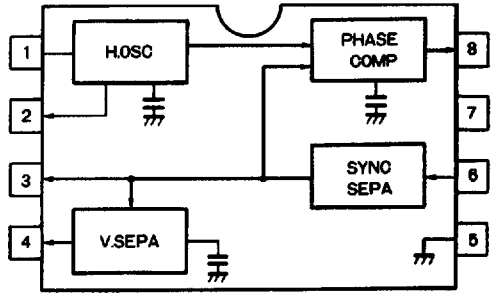
BA7046 (DIP8)



BA7046F (SOP8)



Block diagram



Absolute maximum ratings (T_a = 25°C)

Parameter		Symbol	Limits	Unit	Conditions
Power supply		V_{CC}	8.0	V	
Power dissipation	BA7046	P_d	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°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°C, V_{CC} = 5.0 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	$V_{syn\text{-}min}$		0.08	0.15	$V_{pk\text{-}pk}$	Input when Pin 6 terminated with a 75 Ω resistor
Pulse voltage low	$V_{P\text{-}L}$		0.1	0.3	V	Pin 2, 4
Pulse voltage high	$V_{P\text{-}H}$	4.7	4.9		V	Pin 2, 4
Horizontal free-run frequency	$f_{h\text{-}O}$	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

Test circuit

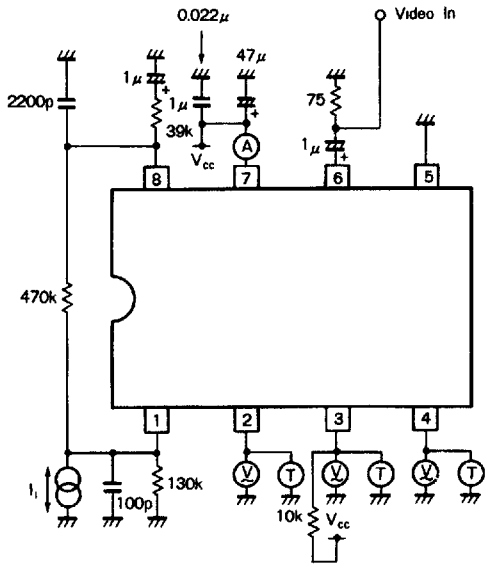
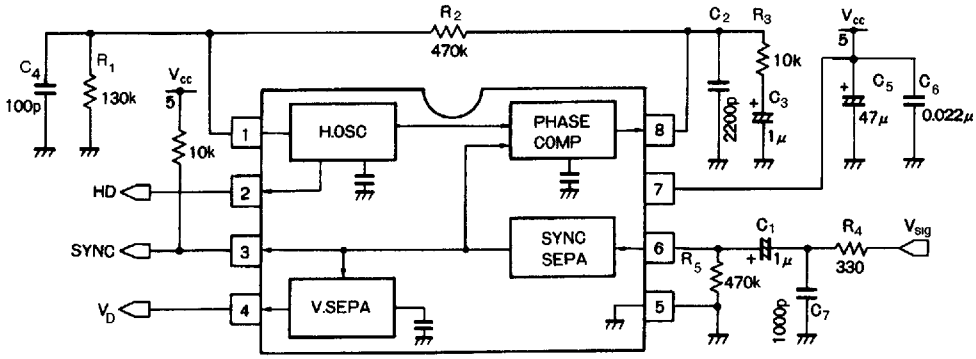
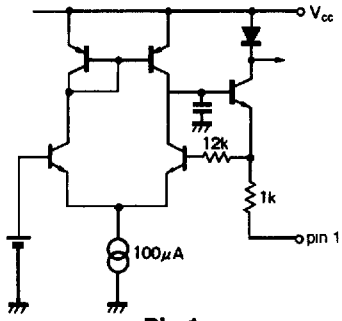


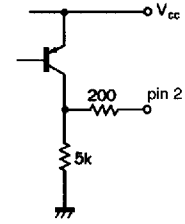
Figure 1 Application example



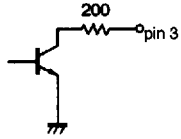
Input and output equivalent circuits



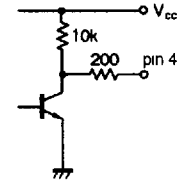
Pin 1



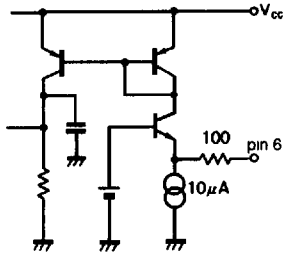
Pin 2



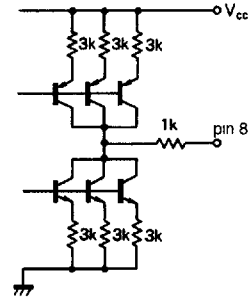
Pin 3



Pin 4

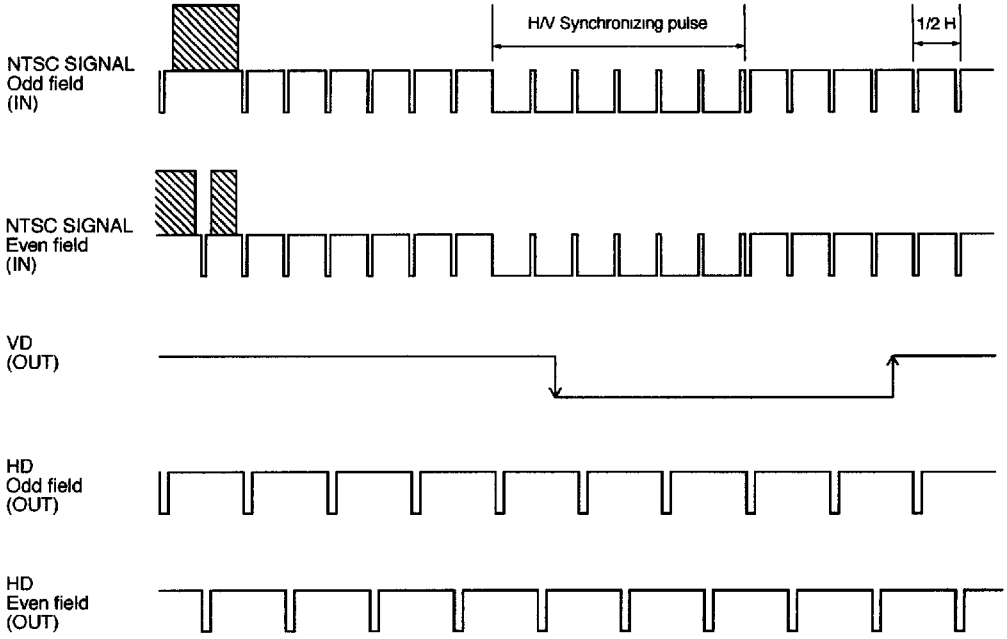


Pin 6



Pin 8

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:

$$f_{H-0} = \frac{2.05E6}{R_1}(\text{kHz})$$

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 ±2% and a temperature coefficient of less than ±100 ppm.

Electrical characteristic curves

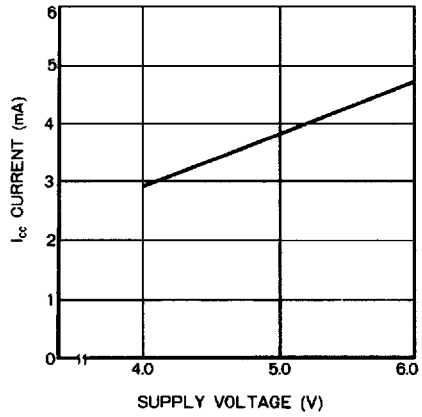


Figure 3

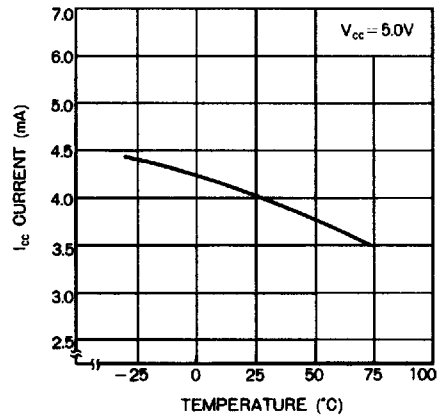


Figure 4

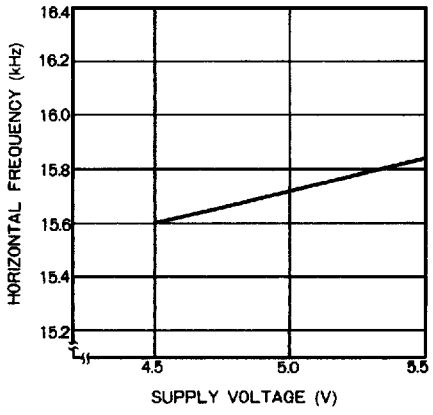


Figure 5

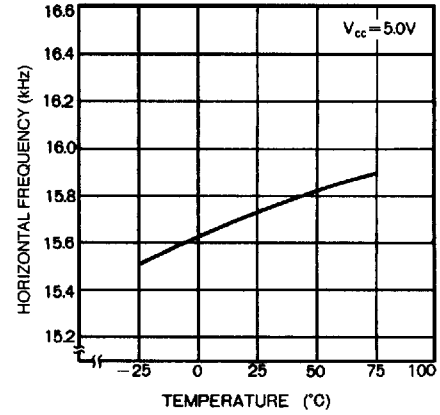


Figure 6

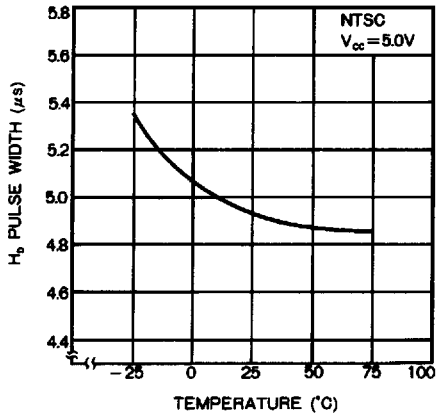


Figure 7

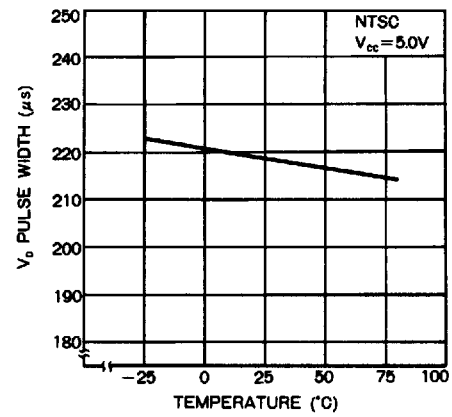


Figure 8

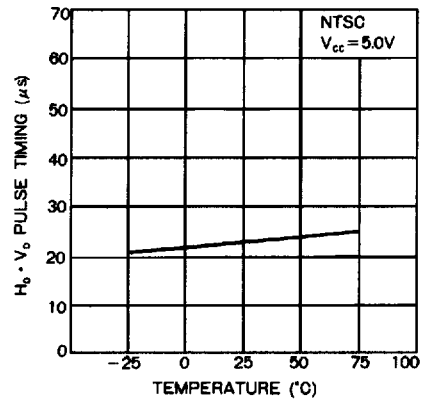


Figure 9

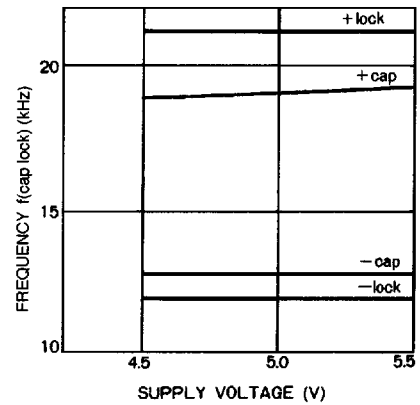


Figure 10

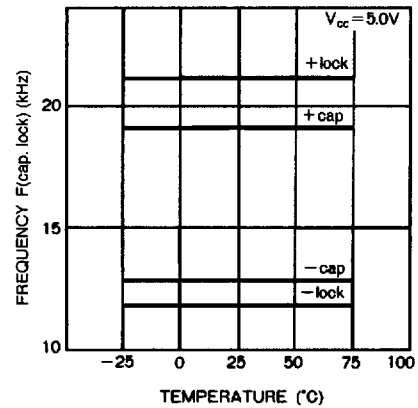


Figure 11

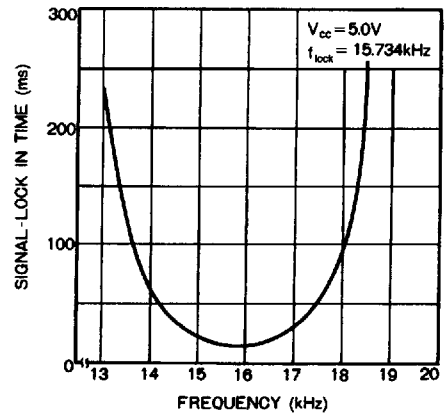


Figure 12

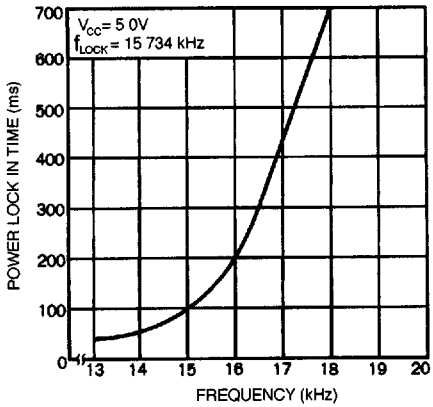

V_{CC}= 5.0V
f_{LOCK}= 15.734 kHz
POWER LOCK IN TIME (ms)
700
600
500
400
300
200
100
0
13
14
15
16
17
18
19
20
FREQUENCY (kHz)

Figure 13