

Voltage Controlled Oscillator

BA7082F

The BA7082F is an analog voltage controlled oscillator (VCO) developed for PLL oscillator circuits for CD-ROM drives, and for other products requiring internal reference oscillator circuits. The BA7082F contains not only a VCO, but also the other function blocks required by CD-ROM drives : a 1/2 frequency divider, sensitivity adjuster amplifier and three sensitivity switches. The high maximum oscillation frequency of 60MHz and superior temperature characteristics and power supply variation combine to make this a high-precision, highly stable oscillator circuit.

●Applications

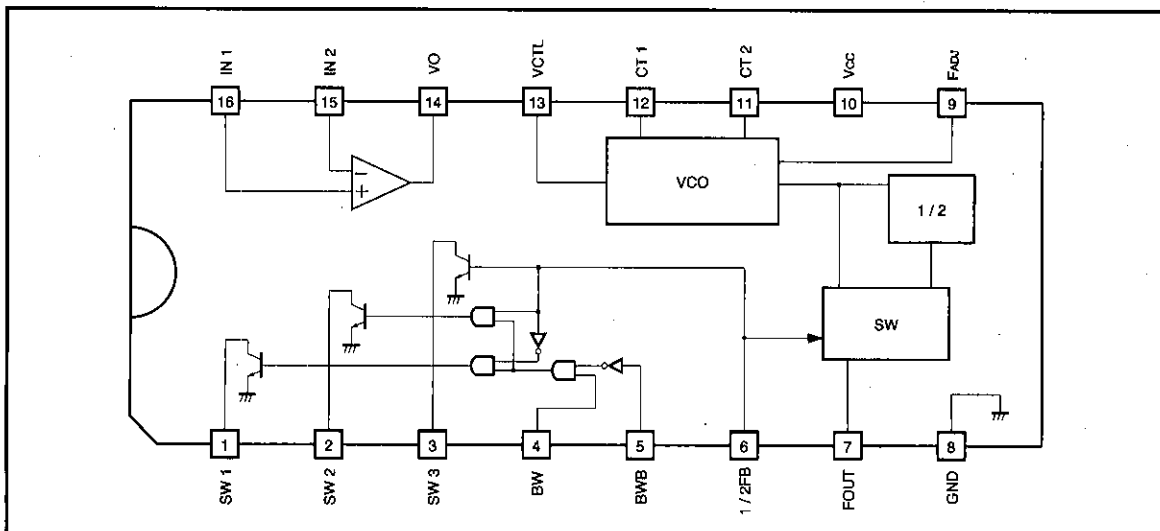
PLL oscillator circuit for CD-ROM drive

Any other applications requiring an internal reference oscillator circuit

●Features

- 1) Center frequency can be set with an external constant.
- 2) Internal sensitivity adjuster amplifier makes it possible to set the frequency control sensitivity with an external constant.
- 3) Internal 1/2 frequency divider for switchable output.
- 4) f_0 adjuster pin.
- 5) Three internal control sensitivity switches.

●Block diagram



● Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage	V _{CC Max.}	7.0	V
Power dissipation	P _d	500*	mW
Operating temperature	T _{opr}	-20~70	°C
Storage temperature	T _{stg}	-55~125	°C

* When mounted to a 50 × 50 × 1.6 mm glass epoxy board.
Reduced by 5 mW for each increase in Ta of 1°C over 25°C.

● Recommended operating conditions (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Recommended power supply	V _{CC}	4.5	—	5.5	V

Ⓞ Not designed for radiation resistance.


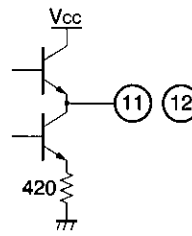
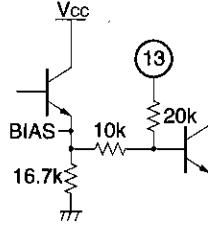
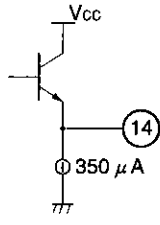
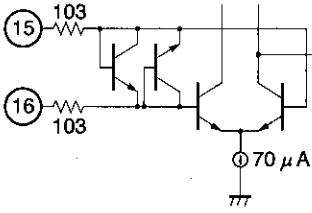
VCO for CD-ROM

For CDs/CD-ROMs

● Pin descriptions

Pin No.	Pin name	IN	OUT	Standard potential	Internal equivalent circuit	Function
1	SW1		○	L 0.1V		Collector-open output Logic output pin for control sensitivity adjustment
2	SW2			OPEN 5V		
3	SW3					
4	BW	○		-		Logic input pin for control sensitivity adjustment [0~2V] "L" [3~5V] "H"
5	BWB					
6	1/2FB					Logic input pin for control sensitivity adjustment Switching pin for 1/2 frequency divider Slew at HIGH, output to 1/2 frequency divider at LOW [0~2V] "L" [3~5V] "H"
7	FOUT		○	3.6V		VCO output pin

● Pin descriptions

Pin No.	Pin name	IN	OUT	Standard potential	Internal equivalent circuit	Function
8	GND	—	—	0V	GND	GND pin
9	F _{ADJ}	—	—	2.5V		to adjustment pin Current and to adjusted with attached resistor (R _{ADJ}). A low value for R _{ADJ} raises the oscillation frequency. (However, R _{ADJ} must be set higher than 22 kΩ.)
10	V _{CC}	—	—	5.0V	V _{CC}	V _{CC} pin
11	CT2	—	—	1.9V		VCO oscillation capacitor pin Attach a capacitor between CT1 and CT2. A low value for the capacitor raises the oscillation frequency.
12	CT1	—	—			
13	VCTL	○	—	2.5V		VCO control pin Normally shorted along with VO (pin 14).
14	VO	—	○	2.5V		Sensitivity adjustment amplifier output pin Adjust the gain with an external constant.
15	IN2	○	—	2.5V		Sensitivity adjustment amplifier input pin IN1: Forward input IN2: Reverse input
16	IN1					

VCO for CD-ROM

For CDs/CD-ROMs

●Electrical characteristics (unless otherwise noted, Ta=25°C, Vcc=5V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Circuit current	I _{CC}	9	14.5	20	mA	No load
OP-AMP. output, D range	V _D	2.0	3.4	—	V _{P-P}	f _{IN} = 100 kHz, tertiary component = -35 dB
VCO control voltage	V _{CTL}	1.5	2.5	3.5	V	
Control sensitivity	G _{fCTL}	1.1	1.55	2.0	MHz / V	f _o = 17 MHz
V _{CTL} input impedance	Z _{I-CTL}	20	33	45	kΩ	
Adjustment sensitivity	G _{fADJ}	4.8	6.4	8.0	MHz / 20kΩ	R _{ADJ} =27kΩ ~47kΩ C _T =33pF
Free-running frequency	f _o	14.4	18	21.6	MHz	R _{ADJ} = 33 kΩ, C _T = 33 pF, socket
Maximum oscillation frequency	f _{max}	60	—	—	MHz	R _{ADJ} =22kΩ C _T =5pF
Frequency power supply variation	Δf _v	—	0.7	5.0	% / V	V _{CTL} = 1/2 V _{CC} when V _{CC} = 5±0.5 V, f = 17 MHz
Oscillation output	V _{OUT}	0.7	1.1	1.5	V _{P-P}	Load = 5.1 kΩ output
Input voltage, HIGH	V _{IH}	3.0	—	—	V	BW, BWB, 1 / 2FB
Input voltage, LOW	V _{IL}	—	—	2.0	V	BW, BWB, 1 / 2FB
Input current, HIGH	I _{IH}	—	0	3	μA	BW, BWB, 1 / 2FB
Leak current, LOW	I _{IL}	—	1	5	μA	BW, BWB, 1 / 2FB
Output voltage, LOW	V _{OL}	—	—	0.5	V	I _o = 1 mA, SW1, SW2, SW3

●Logic truth table

Input			Output		
4pin BW	5pin BWB	6pin 1 / 2FB	1pin SW1	2pin SW2	3pin SW3
0	0	0	—	—	—
0	0	1	—	—	L
0	1	0	—	—	—
0	1	1	—	—	L
1	0	0	L	—	—
1	0	1	—	L	L
1	1	0	—	—	—
1	1	1	—	—	L

Note:
 Input 1: HIGH
 Input 0: LOW
 Output L: ON
 Output -: OPEN

● Application example

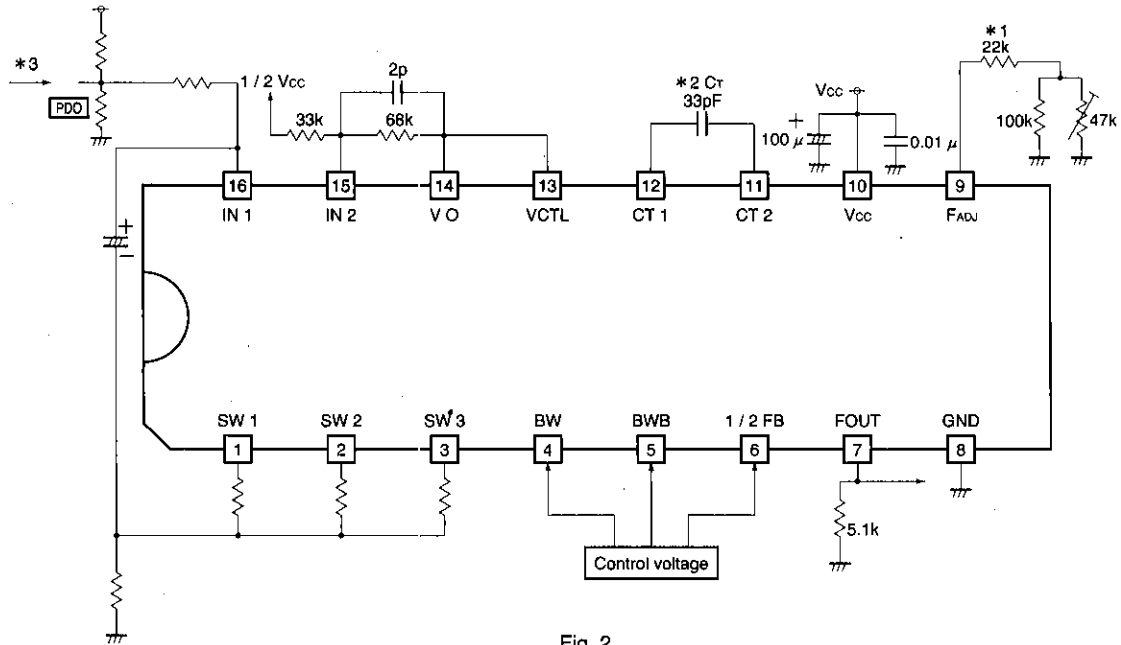


Fig. 2

Notes:

- *1. R_{ADJ} must always remain below 22 kΩ.
- *2. Adjust by altering the board.
- *3. The input AC amplitude must not exceed 1 V_{p-p}.

●Electrical characteristic curves

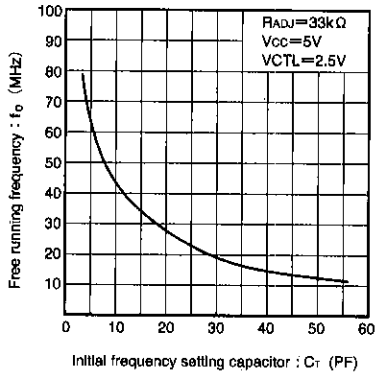


Fig. 3 Frequency setting capacitor characteristics

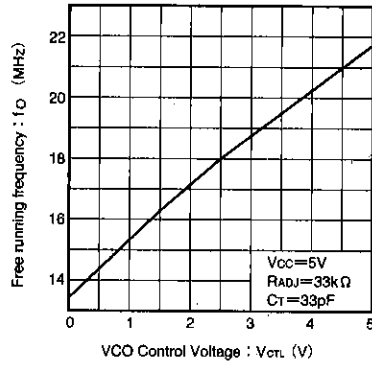
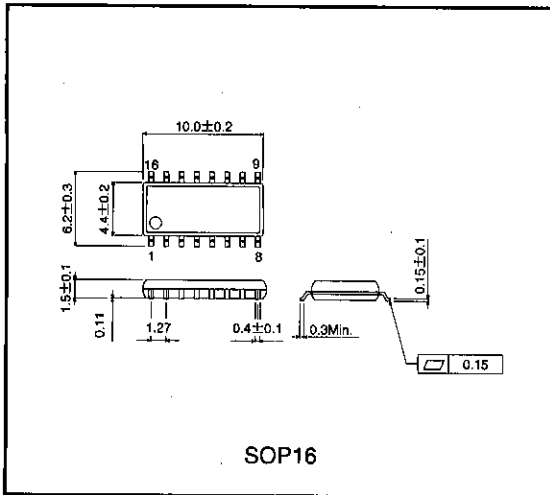


Fig. 4 Frequency vs. control voltage characteristics

●External dimensions (Units: mm)



VCO for CD-ROM

For CDs/CD-ROMs

Notes

- The contents described in this catalogue are correct as of March 1997.
- No unauthorized transmission or reproduction of this book, either in whole or in part, is permitted.
- The contents of this book are subject to change without notice. Always verify before use that the contents are the latest specifications. If, by any chance, a defect should arise in the equipment as a result of use without verification of the specifications, ROHM CO., LTD., can bear no responsibility whatsoever.
- Application circuit diagrams and circuit constants contained in this data book are shown as examples of standard use and operation. When designing for mass production, please pay careful attention to peripheral conditions.
- Any and all data, including, but not limited to application circuit diagrams, information, and various data, described in this catalogue are intended only as illustrations of such devices and not as the specifications for such devices. ROHM CO., LTD., disclaims any warranty that any use of such device shall be free from infringement of any third party's intellectual property rights or other proprietary rights, and further, assumes absolutely no liability in the event of any such infringement, or arising from or connected with or related to the use of such devices.
- Upon the sale of any such devices; other than for the buyer's right to use such devices itself, resell or otherwise dispose of the same; no express or implied right or license to practice or commercially exploit any intellectual property rights or other proprietary rights owned or controlled by ROHM CO., LTD., is granted to any such buyer.
- The products in this manual are manufactured with silicon as the main material.
- The products in this manual are not of radiation resistant design.

The products listed in this catalogue are designed to be used with ordinary electronic equipment or devices (such as audio-visual equipment, office-automation equipment, communications devices, electrical appliances, and electronic toys). Should you intend to use these products with equipment or devices which require an extremely high level of reliability and the malfunction of which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers, or other safety devices) please be sure to consult with our sales representatives in advance.

- Notes when exporting
 - It is essential to obtain export permission when exporting any of the above products when it falls under the category of strategic material (or labor) as determined by foreign exchange or foreign trade control laws.
 - Please be sure to consult with our sales representatives to ascertain whether any product is classified as a strategic material.