

HA16802PS, HA16804PS, HA16805PS/F Series

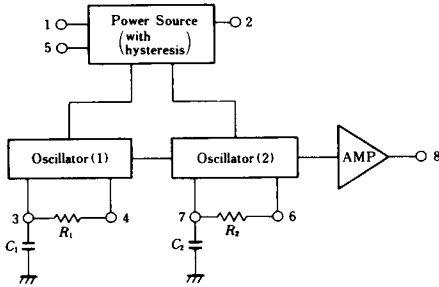
■ DESCRIPTION

The HA16802, HA16804 and HA16805 are tone ring monolithic IC's for telephone. These IC's have a built-in regulator power supply and occur electronic sound by directly driving external magnetic speaker or piezo-electric buzzer when call signal is detected. The HA16802, HA16804 and HA16805 each have different additional functions and control the functions by control terminal. (Type number: HD16805F)

■ FEATURES

- Output frequency is variable.
- Low power dissipation.
- As it has a regulator power source with hysteresis, it can prevent a resonance which occurs in case of parallel connection (branch) of telephone.
- 2 levels of supply initiation voltage can be selected (HA16802PS).
- Supply initiation voltage is variable. (HA16804PS)
- Oscillation can be inhibited. (HA16804PS)
- Supply initiation current is variable. (HA16805PS/F)

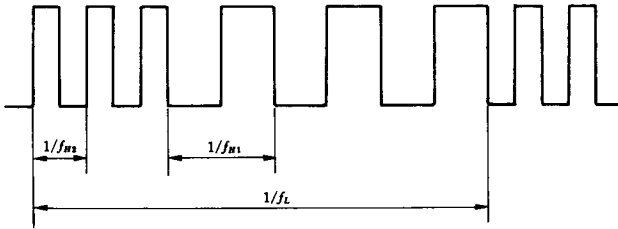
■ BLOCK DIAGRAM



Note: R_1 , R_2 , C_1 , C_2
are external parts

- Oscillator (1) operated at about 10 Hz (f_L) and modulates the frequency of Oscillator (2) at this cycle.
- Oscillator (2) operated at a high frequency and has two oscillation frequency: f_{H1} , f_{H2} by Oscillator (1).

$$f_L = 1/1.25 R_1 C_1 \quad f_{H1} = 1/1.35 R_2 C_2 \quad f_{H2} = 1.24 f_{H1} \text{ [Hz]}$$



HA16802PS/HA16804PS/
HA16805PS



(DP-8)

HA16805F



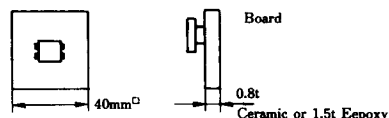
(FP-8D)

HA16802PS, HA16804PS, HA16805PS/F Series

■ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

Item	Symbol	Rating	Unit
Supply Voltage	V_S	40	V
Output Current	I_O	12	mA
Power Dissipation	P_T	625 (390)	mW*
Operating Temperature Range	T_{opr}	-20 to $+70$	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-55 to $+125$	$^\circ\text{C}$

* P_T for HA16805F is 390 mW, the other 625 mW.
For HA16805F value at $T_a \leq 70^\circ\text{C}$, when T_a is more than 70°C , 7.14 mW/ $^\circ\text{C}$ derating shall be performed. (Condition glass epoxy with 30% metallization density)



■ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

●HA16802PS

Item	Symbol	Condition	min.	typ.	max.	Unit	Remarks
Supply Initiation Voltage	V_{si}	The contents within () are the value at the time of changing (Trigger in=GND)	17 (21)	19 (23)	21 (25)	V	Selectable
Supply Initiation Current	I_{si}		0.6	1.2	2.5	mA	
Sustaining Voltage	V_{sus}		9	11	—	V	
Sustaining Current	I_{sus}	$V_S = 15\text{V}$	0.5	1.0	2.0	mA	
Output "H" Voltage	V_{OH}	$V_S = 24\text{V}$, $I_{OH} = -10\text{mA}$	20	21.5	22.5	V	
Output "L" Voltage	V_{OL}	$V_S = 24\text{V}$, $I_{OL} = 10\text{mA}$	0	1.0	2.0	V	
Output Frequency	f_L	$C_1 = 0.47\mu\text{F}$, $R_1 = 160\text{k}\Omega$	9.3	10.4	11.5	Hz	
	f_{H1}	$C_2 = 6800\text{pF}$	495	—	606	Hz	
	f_{H2}	$R_2 = 200\text{k}\Omega$	610	—	752	Hz	

●HA16804PS

Item	Symbol	Condition	min.	typ.	max.	Unit
Supply Initiation Voltage	V_{si}		17	19	21	V
Supply Initiation Current	I_{si}		1.5	3.1	6.2	mA
Sustaining Voltage	V_{sus}		9	11	—	V
Sustaining Current	I_{sus}	$V_S = 15\text{V}$	0.5	1.0	2.0	mA
Output "H" Voltage	V_{OH}	$V_S = 24\text{V}$, $I_{OH} = -10\text{mA}$	20	21.5	22.5	V
Output "L" Voltage	V_{OL}	$V_S = 24\text{V}$, $I_{OL} = 10\text{mA}$	0	1.0	2.0	V
Output Frequency	f_L	$C_1 = 0.47\mu\text{F}$, $R_1 = 160\text{k}\Omega$	9.3	10.4	11.5	Hz
	f_{H1}	$C_2 = 6800\text{pF}$	495	—	606	Hz
	f_{H2}	$R_2 = 200\text{k}\Omega$	610	—	752	Hz

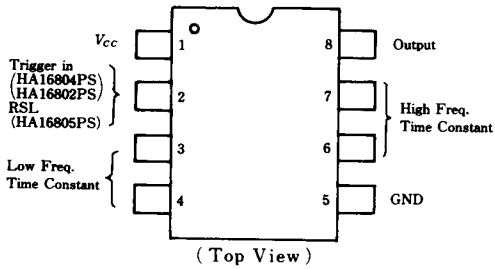
●HA16805PS/F

Item	Symbol	Condition	min.	typ.	max.	Unit
Supply Initiation Voltage	V_{si}	Connect with $R_{SL} = 20\text{k}\Omega$	26	28	30	V
Supply Initiation Current	I_{si}		0.7	1.5	3.0	mA
Sustaining Voltage	V_{sus}		9	11	—	V
Sustaining Current	I_{sus}	$V_S = 15\text{V}$, Connect with $R_{SL} = 20\text{k}\Omega$	0.5	1.0	2.0	mA
Output "H" Voltage	V_{OH}	$V_S = 36\text{V}$, $I_{OH} = -10\text{mA}$	32	—	36	V
Output "L" Voltage	V_{OL}	$V_S = 36\text{V}$, $I_{OL} = 10\text{mA}$	0	1.0	2.0	V
Output Frequency	f_L	$C_1 = 0.47\mu\text{F}$, $R_1 = 160\text{k}\Omega$	9.3	10.4	11.5	Hz
	f_{H1}	$C_2 = 6800\text{pF}$	495	—	606	Hz
	f_{H2}	$R_2 = 200\text{k}\Omega$	610	—	752	Hz

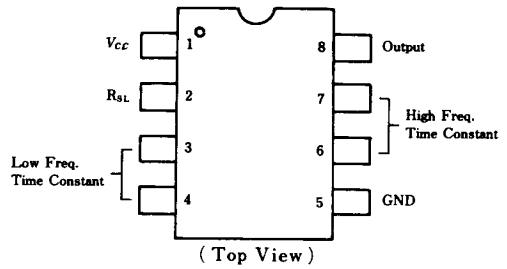
HA16802PS, HA16804PS, HA16805PS/F Series

■PIN ARRANGEMENT

● HA16802PS, HA16804PS, HA16805PS



● HA16805F



■PIN FUNCTION

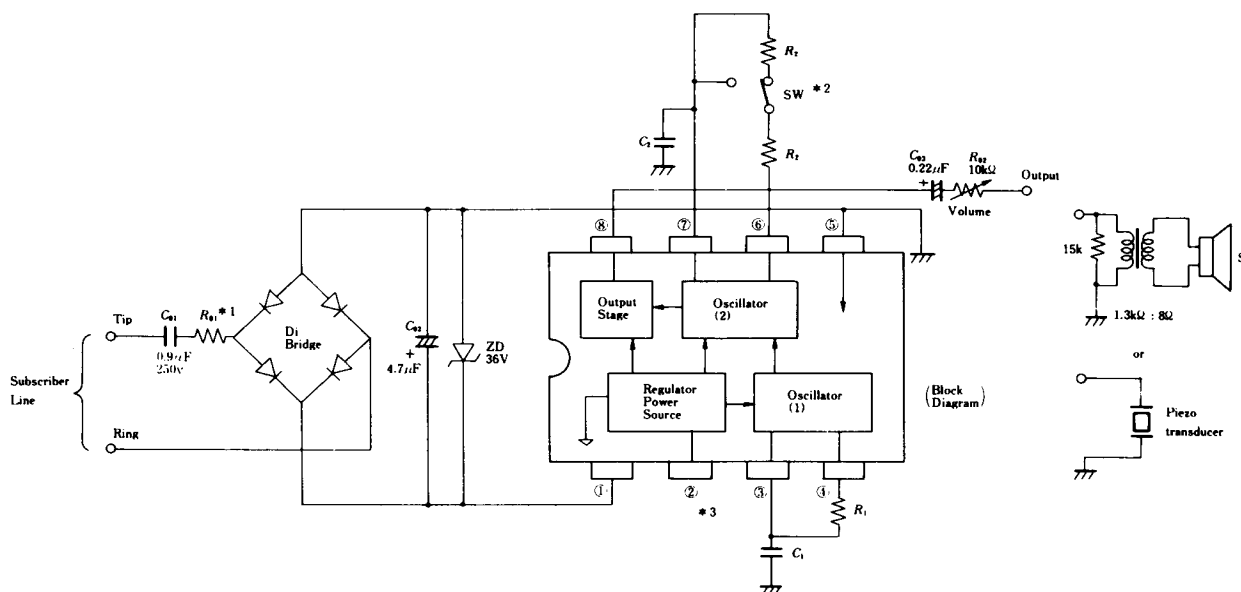
Pin No.	Pin Name	Function	
1	Vcc	Positive Power Supply	
2	TRIGGER IN	HA16802PS	Shown below
		HA16804PS	
	R _{SL}	HA16805PS/F	
3	LOW FREQ. TIME	Low Frequency Time Constant Setting	
4	CONSTANT		
5	GND	Negative Power Supply	
6	HIGH FREQ. TIME	High Frequency Time Constant Setting	
7	CONSTANT		
8	OUTPUT	Tone Output	

HA16802PS, HA16804PS, HA16805PS/F Series

TRIGGER IN TERMINAL } ② Pin Function Description

Type Name	Function	Description									
HA16802PS	Supply Initiation Voltage Variable (Vsi)		<table><tr><th>② Pin Condition</th><th>Vsi</th></tr><tr><td>Open (Sel : OFF)</td><td>19V typ.</td></tr><tr><td>GND (Sw1 : ON)</td><td>23V typ.</td></tr></table>	② Pin Condition	Vsi	Open (Sel : OFF)	19V typ.	GND (Sw1 : ON)	23V typ.		
② Pin Condition	Vsi										
Open (Sel : OFF)	19V typ.										
GND (Sw1 : ON)	23V typ.										
HA16804PS	Supply Initiation Voltage Variable		<table><tr><th>RSL</th><th>Vsi</th></tr><tr><td>Open</td><td>19V typ.</td></tr><tr><td>1MΩ</td><td>17V typ.</td></tr><tr><td>500kΩ</td><td>15V typ.</td></tr></table>	RSL	Vsi	Open	19V typ.	1MΩ	17V typ.	500kΩ	15V typ.
RSL	Vsi										
Open	19V typ.										
1MΩ	17V typ.										
500kΩ	15V typ.										
HA16805PS/F	Supply Initiation Current Variable (Isi)		<table><tr><th>RSL</th><th>Isi</th></tr><tr><td>6.3k</td><td>3.2mA typ.</td></tr><tr><td>13k</td><td>2mA typ.</td></tr><tr><td>20k</td><td>1.2mA typ.</td></tr></table>	RSL	Isi	6.3k	3.2mA typ.	13k	2mA typ.	20k	1.2mA typ.
RSL	Isi										
6.3k	3.2mA typ.										
13k	2mA typ.										
20k	1.2mA typ.										

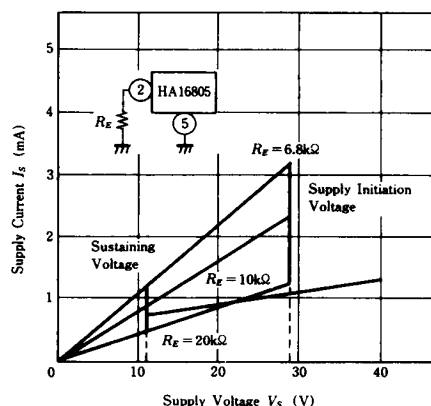
APPLICATION



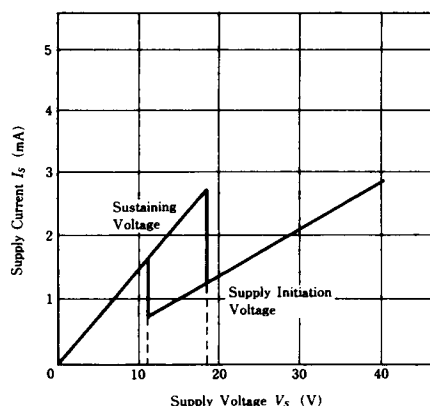
Note *1 HA16802PS, HA16805PS/F→10kΩ
HA16804PS→2kΩ
*2 Possible timbre adjustment by changing the resistance value of R₂
*3 Additional function control terminal

Tone Ringer Application Circuit Example

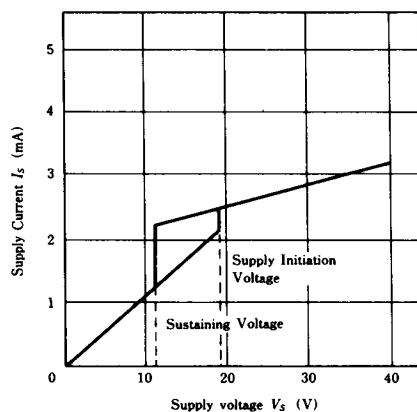
HA16805 Supply Voltage vs. Supply Current Characteristic.



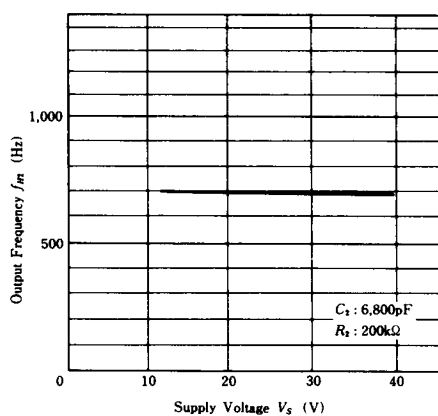
HA16804 (at Pin 2 Open) Supply Voltage vs. Supply Current Characteristic



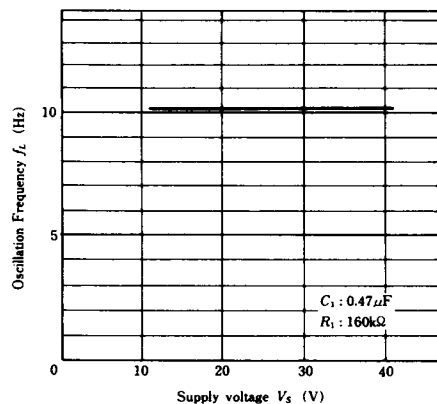
HA16802 (at Pin 2 Open) Supply Voltage vs. Supply Current Characteristic



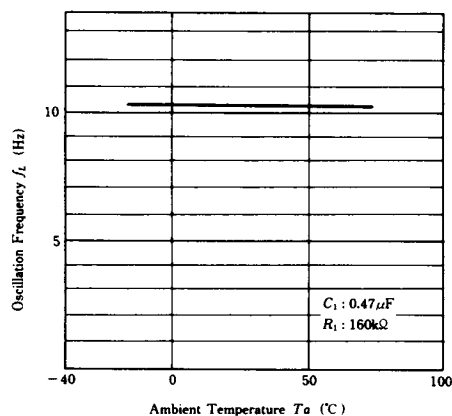
Output Frequency vs. Supply Voltage Characteristic



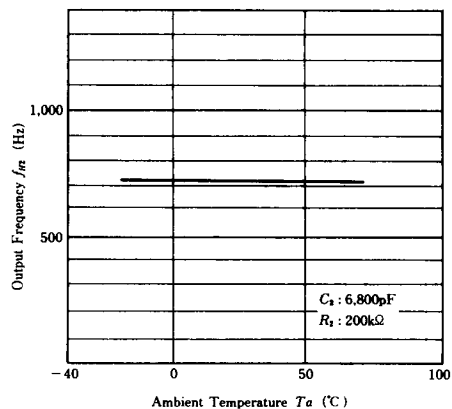
Oscillation Frequency vs. Supply Voltage Characteristic



Oscillation Frequency vs. Ambient Temperature Characteristic



Output Frequency vs. Ambient Temperature Characteristic



Supply Initiation Voltage vs. Ambient Temperature Characteristic

