

HA16802PS, HA16804PS, HA16805PS/F Series

HITACHI/ (LINEAR DEVICES) 68E D

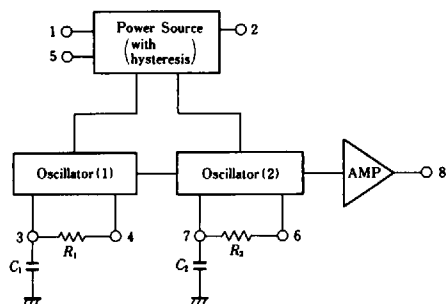
DESCRIPTION

The HA16802, HA16804 and HA16805 are tone ringer 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

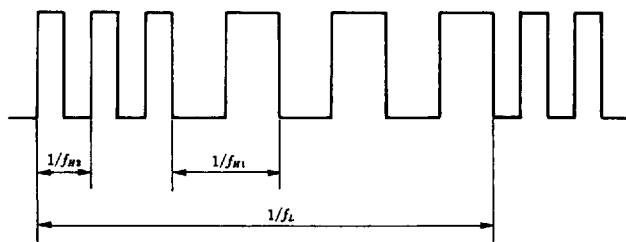
- Output frequency is variable.
- Low power dissipation.
- As it has a regulator power source with hysteresis, it can prevent a resonance which occurs in case of parallel connection (branch) of telephone.
- 2 levels of supply initiation voltage can be selected (HA16802PS).
- Supply initiation voltage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

BLOCK DIAGRAM



- 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



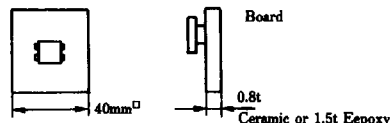
(FP-8D)

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■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

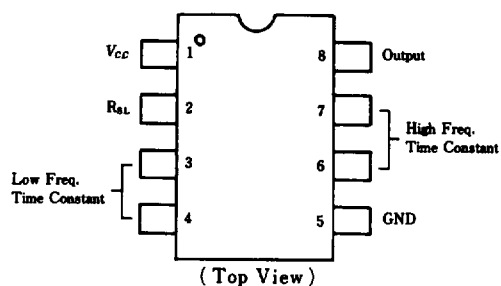
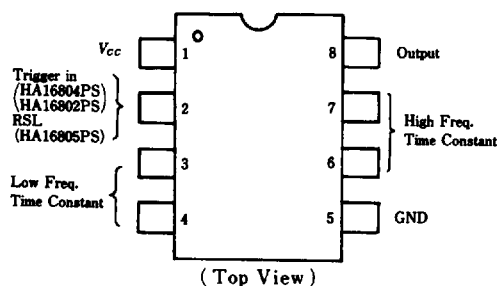
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PIN ARRANGEMENT

● HA16802PS, HA16804PS, HA16805PS

● HA16805F



PIN FUNCTION

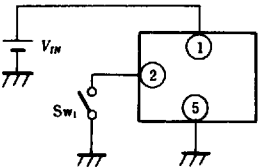
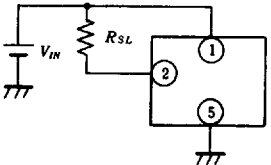
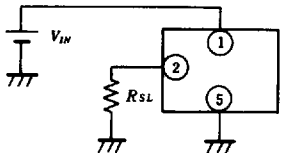
Pin No.	Pin Name	Function	
1	Vcc	Positive Power Supply	
2	TRIGGER IN	HA16802PS	Shown below
		HA16804PS	
	R _{SL}	HA16805PS/F	
3	LOW FREQ. TIME	Low Frequency Time Constant Setting	
4	CONSTANT		
5	GND	Negative Power Supply	
6	HIGH FREQ. TIME	High Frequency Time Constant Setting	
7	CONSTANT		
8	OUTPUT	Tone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

HA16802PS, HA16804PS, HA16805PS/F Series

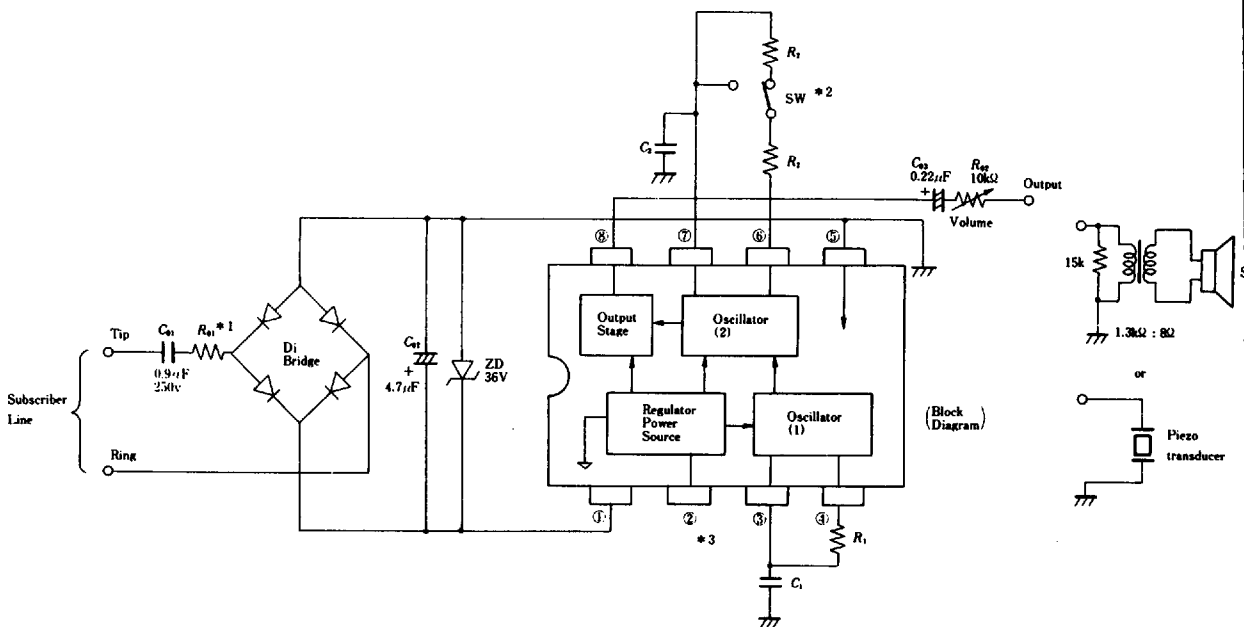
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TRIGGER IN TERMINAL
R_{SL}

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>R_{SL}</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>	R _{SL}	Vsi	Open	19V typ.	1MΩ	17V typ.	500kΩ	15V typ.
R _{SL}	Vsi									
Open	19V typ.									
1MΩ	17V typ.									
500kΩ	15V typ.									
HA16805PS/F	Supply Initiation Current Variable (Isi)	 <table><tr><th>R_{SL}</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>	R _{SL}	Isi	6.3k	3.2mA typ.	13k	2mA typ.	20k	1.2mA typ.
R _{SL}	Isi									
6.3k	3.2mA typ.									
13k	2mA typ.									
20k	1.2mA typ.									

APPLICATION



Note *1 HA16802PS, HA16805PS/F → 10kΩ
HA16804PS → 2kΩ

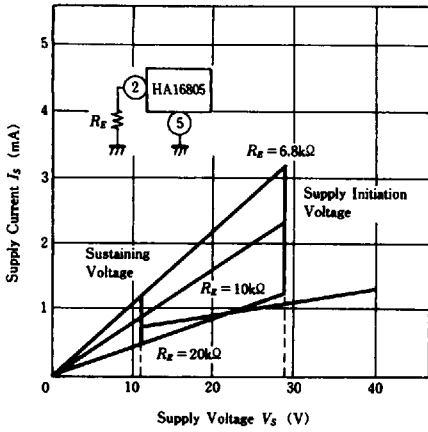
*2 Possible timbre adjustment by changing the resistance value of R₂

*3 Additional function control terminal

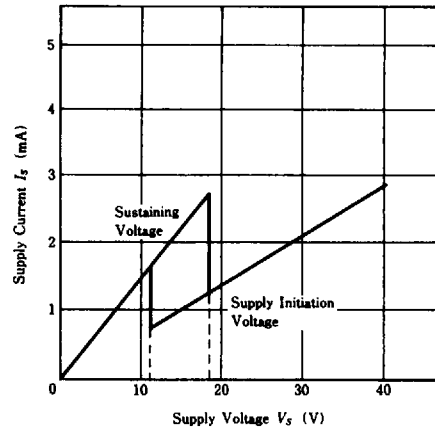
Tone Ringer Application Circuit Example

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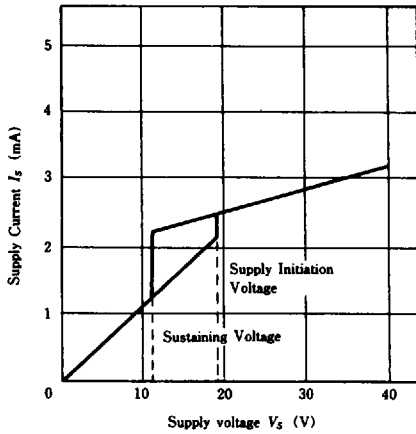
HA16805 Supply Voltage vs. Supply Current Characteristic.



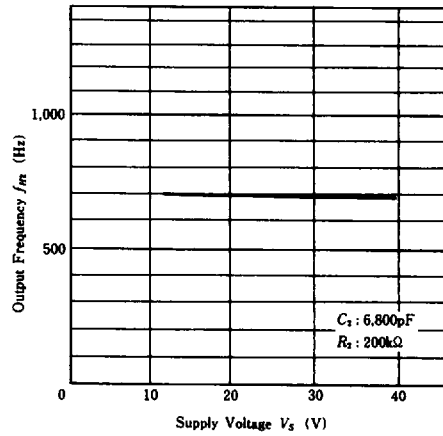
HA16804 (at Pin 2 Open) Supply Voltage vs. Supply Current Characteristic



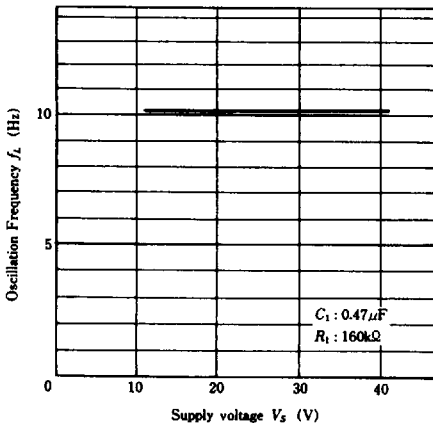
HA16802 (at Pin 2 Open) Supply Voltage vs. Supply Current Characteristic



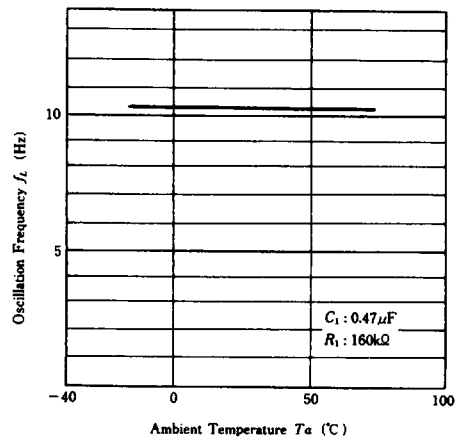
Output Frequency vs. Supply Voltage Characteristic



Oscillation Frequency vs. Supply Voltage Characteristic



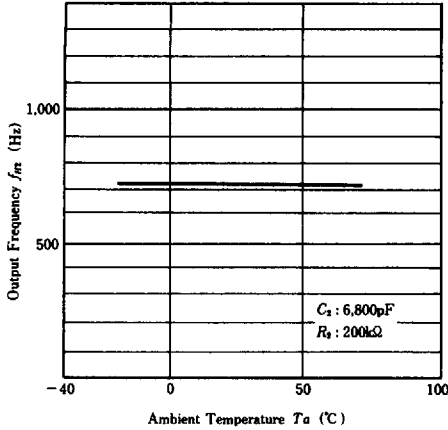
Oscillation Frequency vs. Ambient Temperature Characteristic



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Output Frequency vs. Ambient Temperature Characteristic



Supply Initiation Voltage vs. Ambient Temperature Characteristic

