Class-AB Speaker Amplifiers

1.1W to1.5W Monaural Speaker Amplifiers

BH7824FVM,BH7826FVM

No.10077EAT04

●Description

The BH7824FVM and BH7826FVM are speaker amplifier ICs for low-voltage drives and low power consumption audio, specialized for mobile telephones and other mobile audio devices.

●Features

1) BTL monaural speaker amplifier
2) Capable of high power 500mW/8Ω/BTL output
3) Wide power supply voltage range
4) Supports active/shutdown modes
5) Built-in anti-pop circuit
6) Built-in thermal shutdown circuit

●Applications

Mobile telephones, PDAs, notebook computers, DSC, DVC, and other mobile audio devices.

●Product lineup

Part No.	BH7824FVM	BH7826FVM
Input type	Unbalanced input	Balanced input
Supply voltage(V)	2.4 ~ 5.5	2.6 ~ 5.5

●Absolute maximum ratings(Ta=25℃)

Parameter	Symbol	Limits	Unit
Supply voltage	V_{CC}max.	6.0	V
Power dissipation	Pd	470(*1)	mW
Operating temperature	Topr	-30 ~ +85(*2)	℃
Storage temperature	Tstg	-55 ~ +125	℃

*1 Reduced by 4.7 mW/°C at 25°C or higher, when mounted on a 70mm×70mm×1.6mm PCB board.
*2 Topr=70℃ ~ 85℃ is the range for performing basic operations and does not guarantee characteristics or rated output. Moreover, TSD (Thermal Shutdown) may become operable if input signals occurring in this range are excessive.

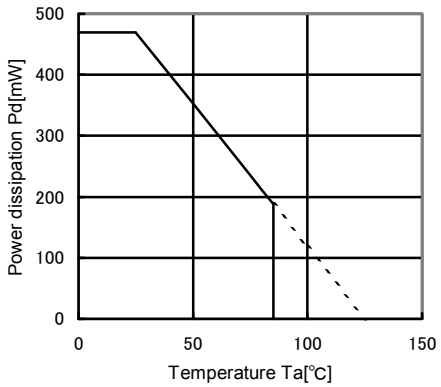


Fig.1 Ta-Pd (when mounted on a PCB board)

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●Operating conditions (Ta=25℃)

Parameter	Ratings	
	BH7824FVM	BH7826FVM
Supply voltage	2.4V ~ 5.5V	2.6 ~ 5.5

* Note: This IC is not designed to be radiation-resistant.

●Electrical characteristics (Unless otherwise noted Ta=25℃, Vcc=3.6V, f=1kHz, RL=8Ω)

Parameter	Symbol	Limits(Typ.)		Unit	Conditions
		BA7824FVM	BA7826FVM		
Circuit current 1	I_{CC1}	3.5	3.5	mA	No signal , Active mode
Circuit current 2	I_{CC2}	0	0	μA	No signal, Suspend mode
Voltage gain 1	G_{V1}	+11.5	+11.5	dB	V_{IN}=-20dBV,1st Op-amp gain
Voltage gain 2	G_{V2}	0	—	dB	2nd Op-amp gain
Maximum output voltage1	V_{OM1}	+6.0	+6.0	dBV	DSTN=1% ,BTL *1
Maximum output voltage2	V_{OM2}	—	+5.1	dBV	V_{CC}=3.4V,DSTN=1%,BTL *1
Output distortion	D_{STN}	0.07	0.2	%	V_{IN}=-20dB,V SE *1
Output noise level	V_{NO}	-94	-94	dBV	No signal, SE Active mode *2
Suspend attenuation	G_S	-107	-107	dBV	V_{IN}=-20dB,V BTL *2
Bias setting voltage	V_{BIAS}	1.8	1.8	V	3pin DC voltage
Suspend hold voltage / H	V_{SH1}	V_{CC} × 0.8 ~ V_{CC}	2.0 ~ V_{CC}	V	Active mode, Hold voltage
Suspend hold voltage / L	V_{SH2}	0 ~ 0.5	0 ~ 0.5	V	Suspend mode, Hold voltage

*1 : B.W.=0.4 ~ 30kHz
*2 : DIN AUDIO

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●Measurement circuit

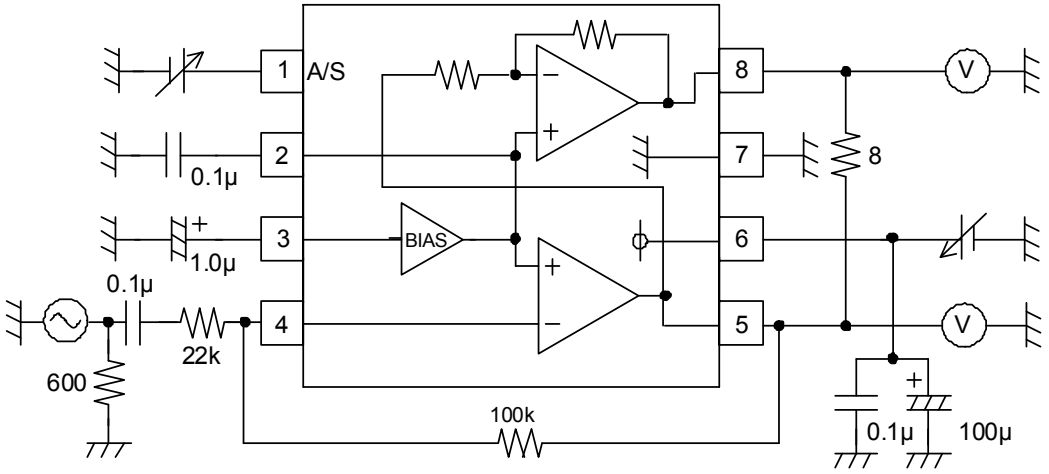


Fig.2 BH7824FVM

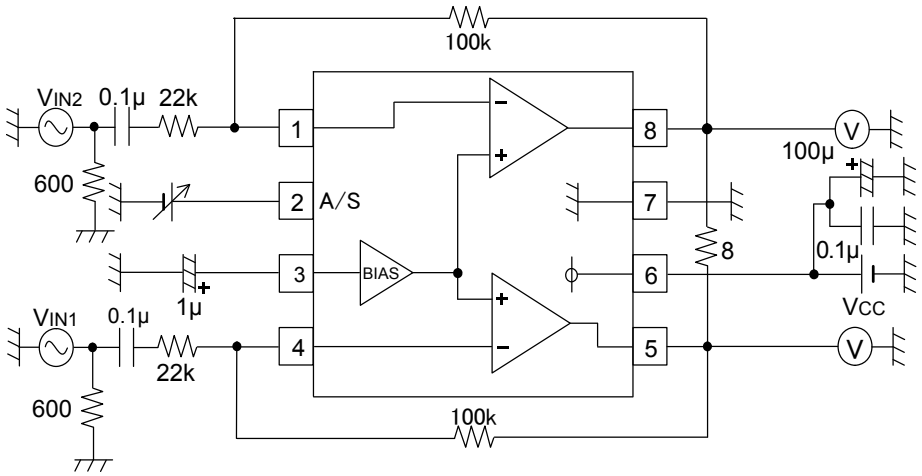


Fig.3 BH7826FVM

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●Block diagram

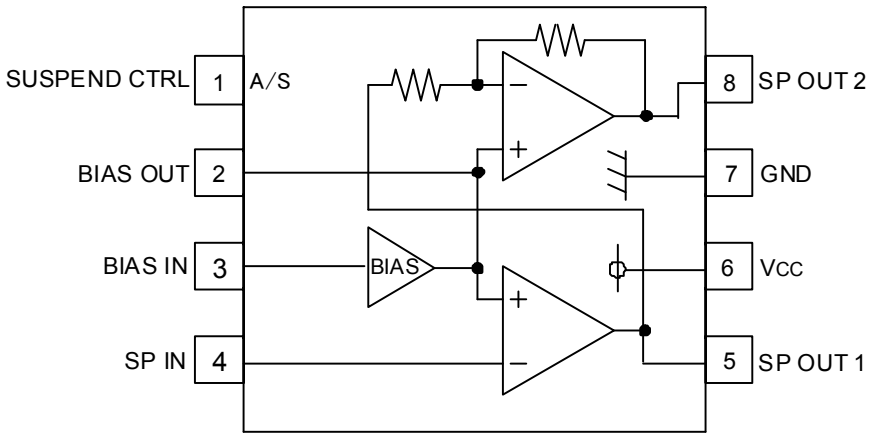


Fig.4 BH7824FVM

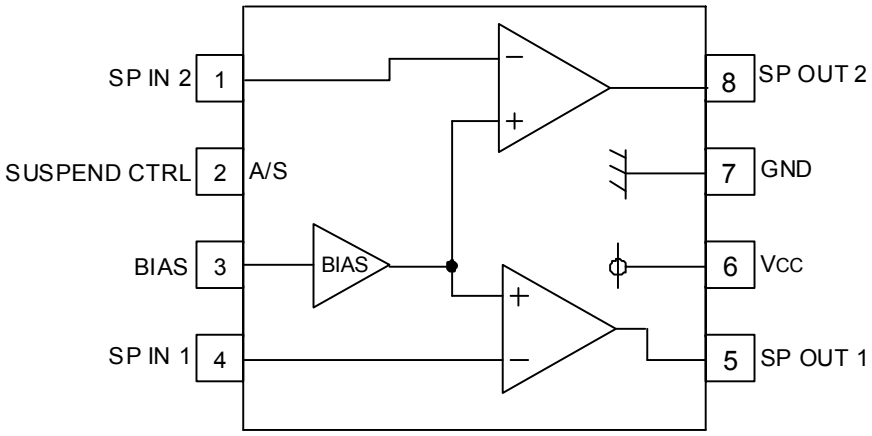
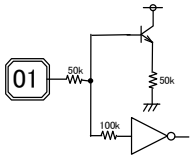
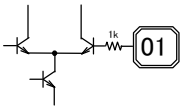
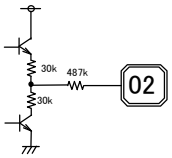
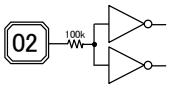
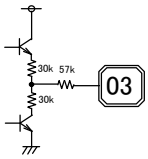
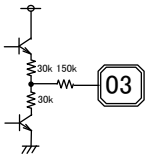
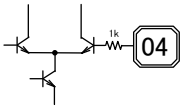
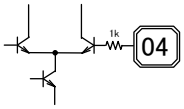
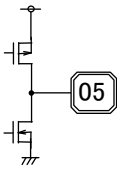
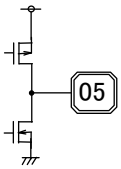
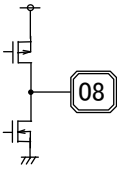
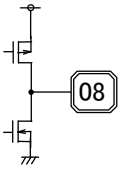


Fig.5 BH7826FVM

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●Equivalent circuit

Pin No.	BH7824FVM		BH7826FVM	
	Pin name	Equivalent circuit	Pin name	Equivalent circuit
1	SUSPEND CTRL		SUSPEND CTRL	
2	BIAS OUT		BIAS OUT	
3	BIAS IN		BIAS IN	
4	SP IN		SP IN	
5	SP OUT1		SP OUT1	
6	V_{CC}	–	V_{CC}	–
7	GND	–	GND	–
8	SP OUT2		SP OUT2	

Note: Numerical values in figures are design values, and do not guarantee ratings.

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●Application circuit

BH7824FVM

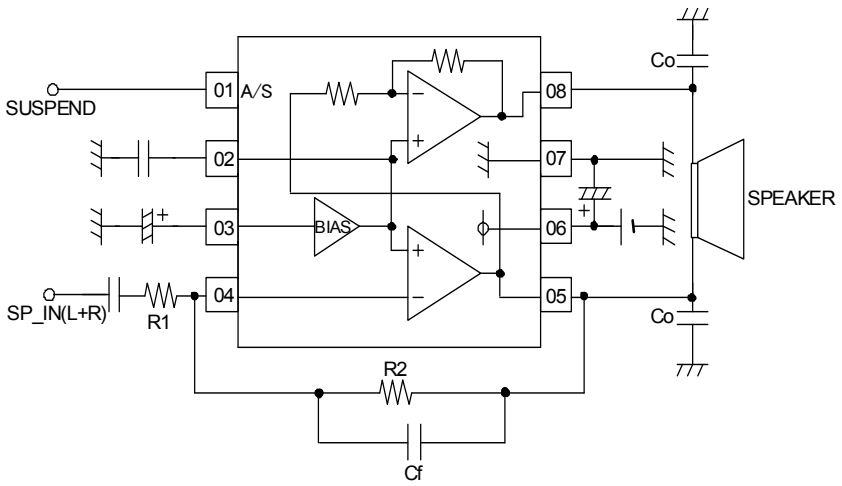


Fig.6

BH7826FVM

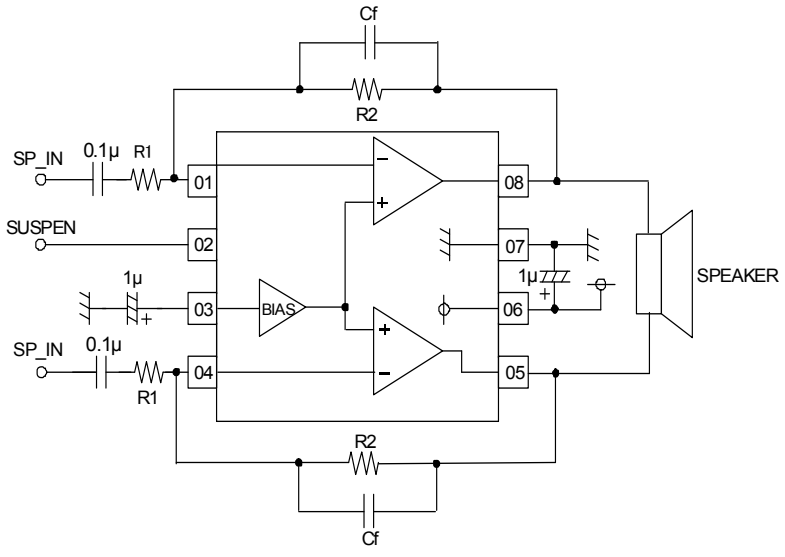


Fig.7

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●Cautions for use

1) Set within the ranges below.

Parameter	8, 12Ωspeaker	16Ωspeaker
	BH7824FVM/26FVM	BH7824FVM
R1	10kΩ ≦ R1 ≦120kΩ	←
R2	47kΩ ≦ R1 ≦120kΩ	←
Cf	Cf≦560pF (G＞+6dB) Cf≦270pF(0＜G≦+6dB)	←
Co	Co ≦ 100pF	Co ≦ 47pF
fcutoff	fcutoff ≦ 4kHz fcutoff = $1/(2\pi R_2 Cf)$ [Hz]	←

2) Do not use this IC without a load.

3) Do not connect a capacitive load greater than 100 pF between an output pin (pin 5 or 8) and GND.
Because of the multiple feedback configurations, if a large capacitive load were connected, the amplifier might oscillate.

4) This IC is compatible with dynamic speaker loads (8/12/16Ω: BH7824FVM, 8/12Ω: BH7826FVM) and is not compatible with loads other than these mentioned.

5) A soft mute setting becomes effective on connecting a resistor and capacitor to the SUSPEND pin (1pin: BH7824FVM, 2pin: BH7826FVM).

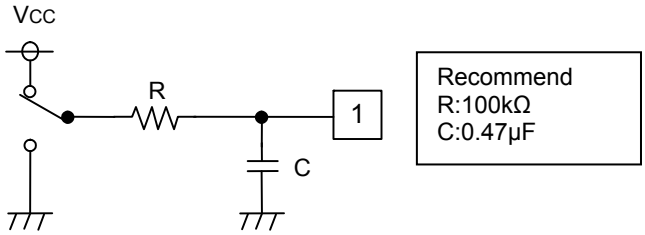


Fig.8 BH7824FVM Soft mute

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●Reference data

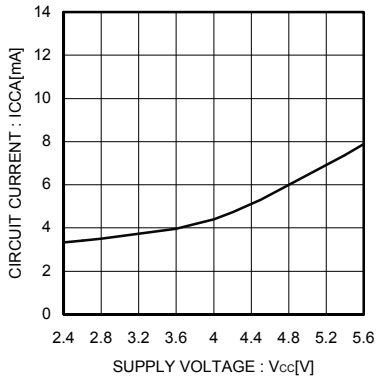


Fig.9 Circuit current (ACTIVE) vs Supply voltage

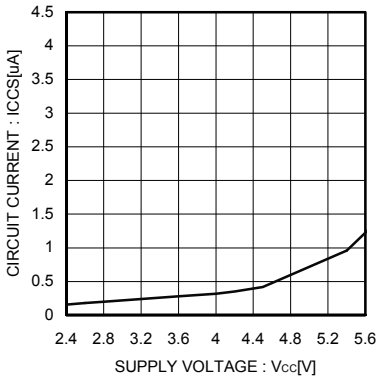


Fig.10 Circuit current (SUSPEND) vs Supply voltage

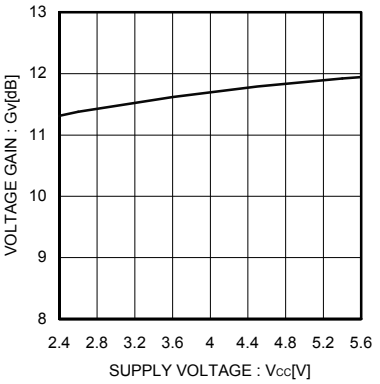


Fig.11 Voltage gain vs Supply voltage

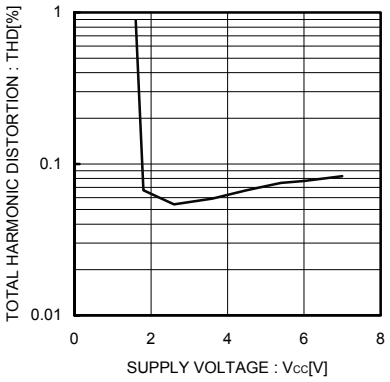


Fig.12 Total harmonic distortion vs Supply voltage

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●Notes for use

1) Numbers and data in entries are representative design values and are not guaranteed values of the items.

2) Although ROHM is confident that the example application circuit reflects the best possible recommendations, be sure to verify circuit characteristics for your particular application. Modification of constants for other externally connected circuits may cause variations in both static and transient characteristics for external components as well as this Rohm IC. Allow for sufficient margins when determining circuit constants.

3) Absolute maximum ratings
Use of the IC in excess of absolute maximum ratings, such as the applied voltage or operating temperature range (Topr), may result in IC damage. Assumptions should not be made regarding the state of the IC (short mode or open mode) when such damage is suffered. A physical safety measure, such as a fuse, should be implemented when using the IC at times where the absolute maximum ratings may be exceeded.

4) GND potential
Ensure a minimum GND pin potential in all operating conditions. Make sure that no pins are at a voltage below the GND at any time, regardless of whether it is a transient signal or not.

5) Thermal design
Perform thermal design, in which there are adequate margins, by taking into account the permissible dissipation (Pd) in actual states of use.

6) Short circuit between terminals and erroneous mounting
Pay attention to the assembly direction of the ICs. Wrong mounting direction or shorts between terminals, GND, or other components on the circuits, can damage the IC.

7) Operation in strong electromagnetic field
Using the ICs in a strong electromagnetic field can cause operation malfunction.

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●Ordering part number

B	H	7	8	2	4	F	V	M	-	T	R

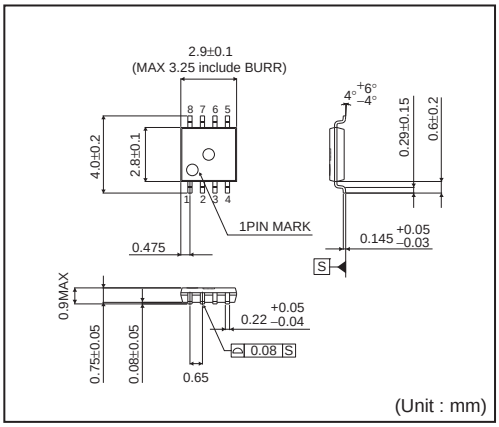
Part No.

Part No.
7824
7826

Package
FVM: MSOP8

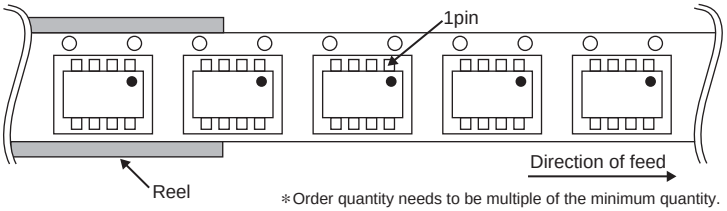
Packaging and forming specification
TR: Embossed tape and reel

MSOP8



<Tape and Reel information>

Tape	Embossed carrier tape
Quantity	3000pcs
Direction of feed	TR (The direction is the 1pin of product is at the upper right when you hold reel on the left hand and you pull out the tape on the right hand)



∗Order quantity needs to be multiple of the minimum quantity.

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