

Low power consumption headphone driver for digital audio

BA3576FS

The BA3576FS is a headphone driver developed for use in 3.0V portable digital audio equipment.

●Applications

Portable CD and MD players.

●Features

- 1) Low power consumption (when $P_o = 0.5\text{mW}$ per channel, the power supply current is 4.7mA, and the +B current is 6.8mA (Typ.)).
- 2) High S / N ratio (96dB).
- 3) AVC circuit.
- 4) Beep output function
- 5) Mute circuit.

●Absolute maximum ratings ($T_a = 25^\circ\text{C}$)

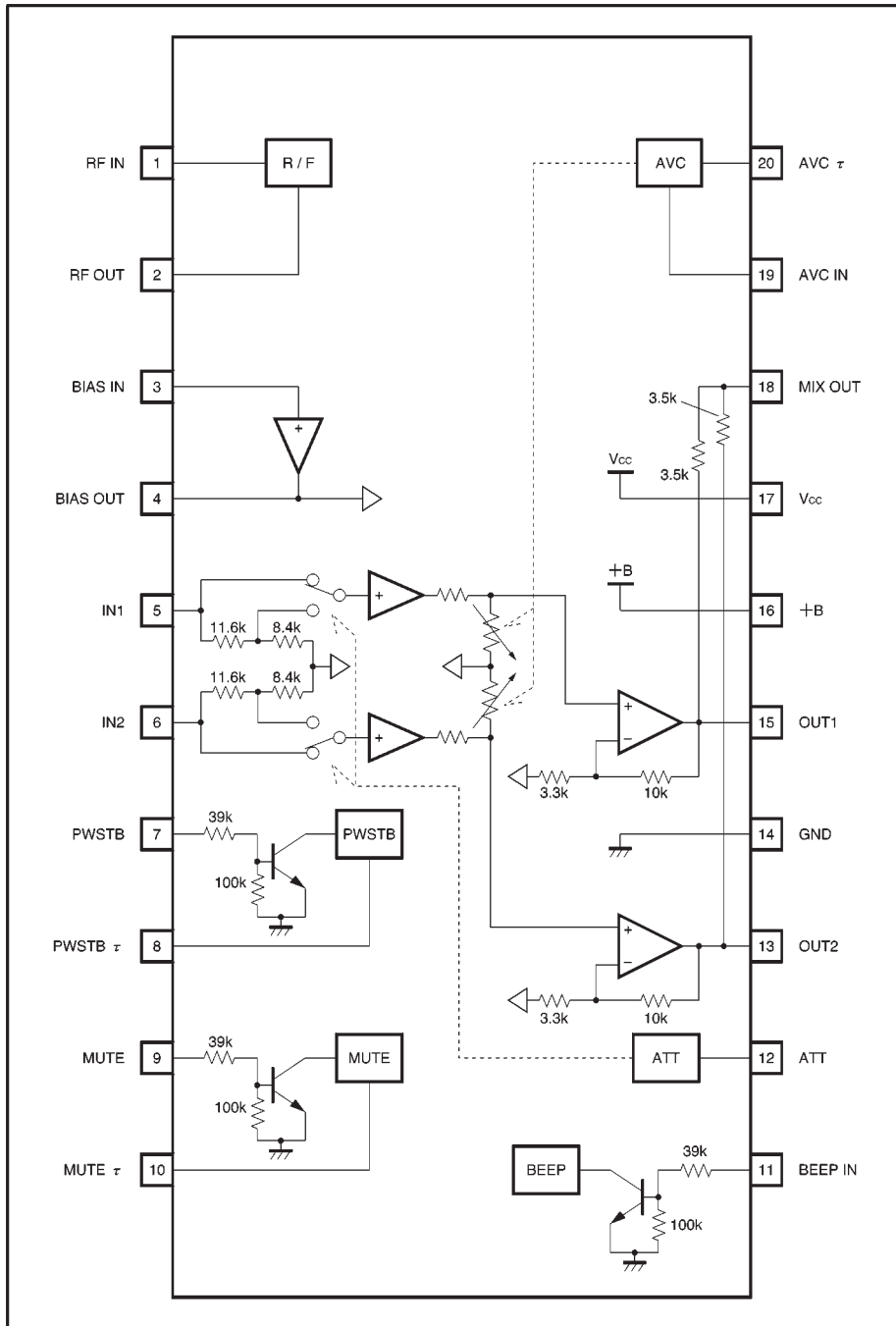
Parameter	Symbol	Limits	Unit
Power supply voltage	V_{CC}	4.5	V
	+B	6.0	V
Power dissipation	P_d	650*1	mW
Operating temperature	T_{opr}	$-15 \sim +60$	$^\circ\text{C}$
Storage temperature	T_{stg}	$-55 \sim +125$	$^\circ\text{C}$

*1 Reduced by 6.5mW for each increase in T_a of 1°C over 25°C .

●Recommended operating conditions ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power supply voltage	V_{CC}	2.6	3.0	3.6	V
	+B	1.5	2.4	5.0	V

●Block diagram

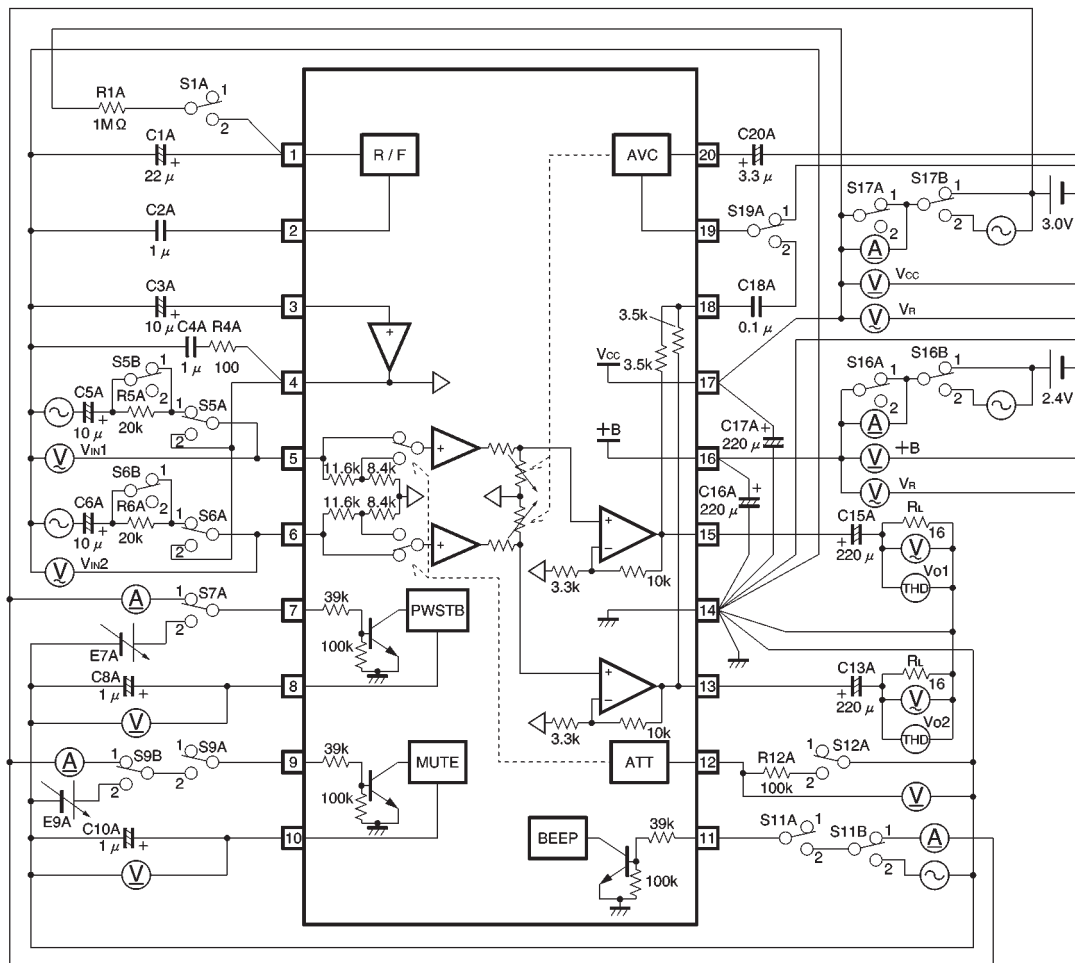


- Electrical characteristics (unless otherwise noted, $T_a = 25^\circ\text{C}$, $V_{CC} = 3.0\text{V}$, $+B = 2.4\text{V}$, $f = 1\text{kHz}$, $R_L = 16\Omega$,
DIN AUDIO PWSTB = 3.0V, MUTE = 0V, ATT = OFF and AVC = OFF)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Coniditions
Quiescent V_{CC} current	I_{Q1}	—	4.5	8.0	mA	$V_{IN1,2}=0$
Quiescent $+B$ current	I_{Q2}	—	3.4	6.8	mA	$V_{IN1,2}=0$
V_{CC} current during operation	I_{IN1}	—	4.7	8.2	mA	$P_{O1,2}=0.5\text{mW}$
$+B$ operating current	I_{IN2}	—	6.8	10.2	mA	$P_{O1,2}=0.5\text{mW}$
$+B$ leak current	ΔI_B	—	—	5.0	μA	$+B$ input current when $V_{CC}=0\text{V}$
Voltage gain 1	G_{V1}	9.0	11.5	14.5	dB	—
Voltage gain 2	G_{V2}	1.5	4.0	7.0	dB	ATT ON
Total harmonic distortion	THD	—	0.1	0.9	%	$V_O=0.1\text{V}_{\text{rms}}$
Rated output	P_O	15	25.6	—	mW	THD=10%
Output noise voltage	V_{NO}	—	−99	−91	dBV	$R_g=0$, JIS A
Input resistance	R_{IN}	15.0	19.0	23.0	k Ω	—
Channel separation	CS	63	73	—	dB	$R_g=0$, $V_O=0.1\text{V}_{\text{rms}}$, 1kHz BPF
Mute level	ML	—	−105	−95	dBV	$V_{IN}=−30\text{dBV}$, MUTE ON, 1kHz BPF
AVC level	V_{AVC}	−43.5	−40.5	−37	dBV	$V_{IN}=−30\text{dBV}$, AVC=ON
Ripple rejection 1	RR_1	60.8	67.8	—	dB	With $R_g=0$, $f_R=100\text{Hz}$, and 100Hz BPF $V_R=−20\text{dBm}$ applied to V_{CC} only
Ripple rejection 2	RR_2	66.5	74.5	—	dB	With $R_g=0$, $f_R=100\text{Hz}$, and 100Hz BPF $V_R=−20\text{dBm}$ applied to $+B$ only
Ripple rejection 3	RR_3	37.0	44.0	—	dB	With $R_g=0$, $f_R=100\text{Hz}$, and 100Hz BPF $V_R=−20\text{dBm}$ applied to V_{CC} only 1M Ω connected between R / F_{IN} and V_{CC} $V_{CC}=2.6\text{V}$
BEEP pin input current	R_{BP}	—	50	100	μA	I_{11} when $V_{11}=V_{CC}$
BEEP output voltage	V_{BP}	1.9	2.84	3.7	mV $_{\text{rms}}$	$V_{BPIN}=3.0\text{V}_{P-P}$, $f=1\text{kHz}$
PWSTB OFF pin voltage	V_P	—	1.0	1.5	V	V_7 to make $V_8 \geq 0.5\text{V}$
PWSTB OFF pin input current	I_P	—	50	100	μA	I_7 when $V_7=V_{CC}$
MUTE ON pin voltage	V_M	—	1.0	1.5	V	V_9 to make $V_{10} \leq 0.5\text{V}$
MUTE ON pin input current	I_M	—	50	100	μA	I_9 when $V_9=V_{CC}$
Voltage when ATT ON	V_A	—	0.72	0.9	V	V_{12} when ATT ON

◎Not designed for radiation resistance.

● Measurement circuit



Units:
 Resistance : Ω ($\pm 1\%$)
 Capacitance (film) : F ($\pm 1\%$)
 Capacitance (electrolytic) : F ($\pm 5\%$)

Fig.1

●Application example

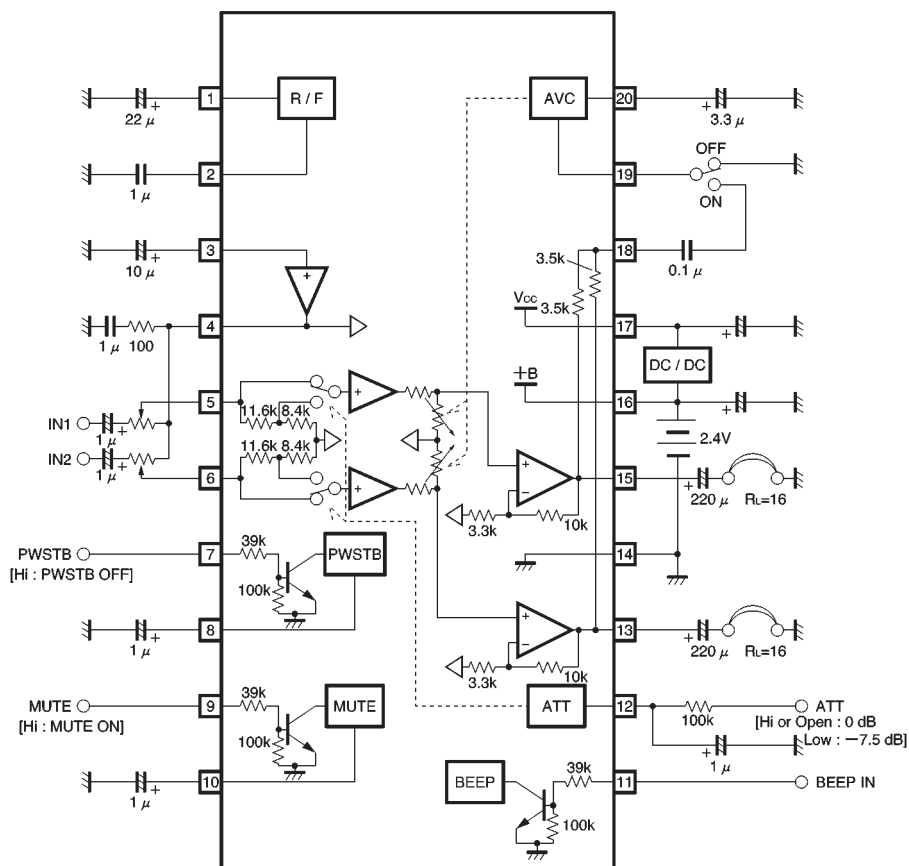


Fig.2

●External dimensions (Units: mm)

