

Electronic volume for VCRs and audio devices

BA7735FS

The BA7735FS is an electronic volume IC developed for VCRs and audio devices.

●Applications

VCRs

●Features

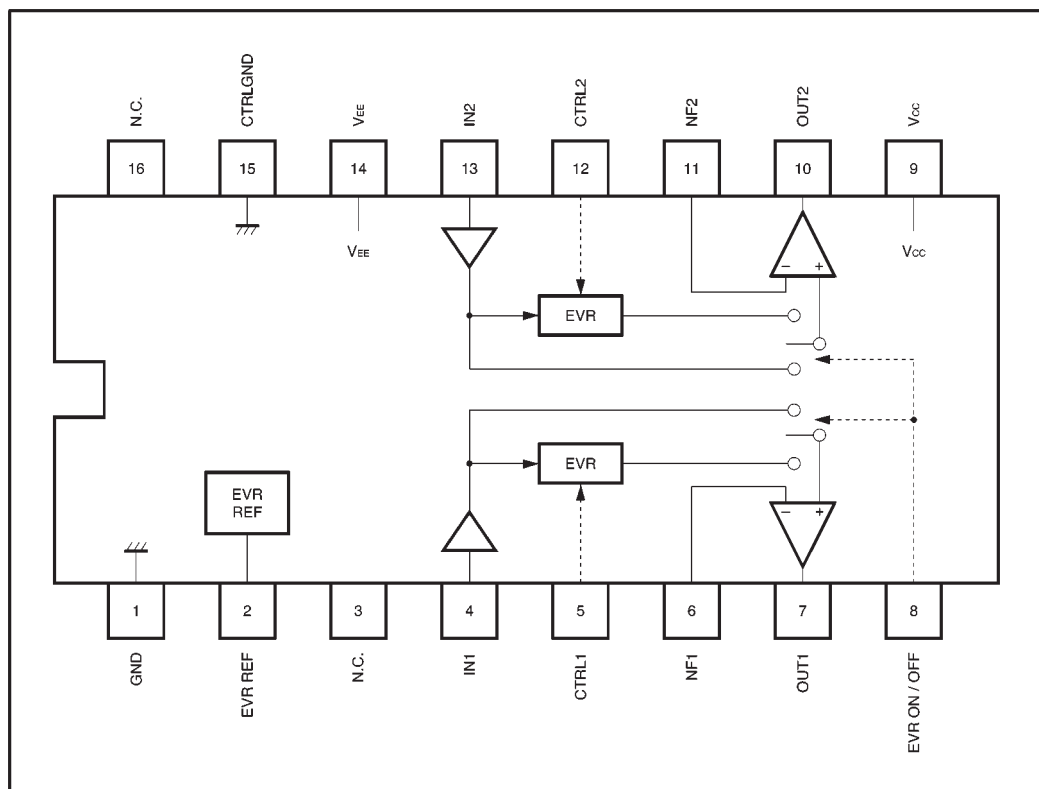
- 1) Internal high-performance electronic volume with a dynamic range of 100dB (Typ.).
- 2) Internal switching between EVR ON and EVR OFF modes.
- 3) Gain of output amplifier can be set to any value between 0 and 12dB using an external resistor.
- 4) ± 2 power supply supported.

●Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage	V _{CC}	6.0	V
	V _{EE}	−6.0	V
Power dissipation	P _d	500*	mW
Operating temperature	T _{stg}	−55~+125	°C
Storage temperature	T _{opr}	−10~+70	°C

*Reduced by 5.0mW for each increase in Ta of 1°C over 25°C.

- Block diagram

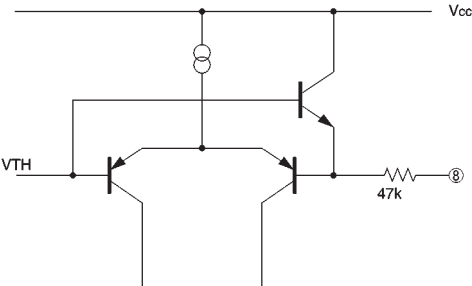


● Pin descriptions

Pin No.	Pin name	Function	Pin voltage	Pin model
1	GND	GND	0.0	—
2	EVR REF	Reference voltage output for control	2.6	EF (NPN)
3	N.C.	N.C.	—	—
4, 13	IN1 / IN2	Input	0.0	100kΩ
5, 12	CTRL1 / CTRL2	EVR control GND: VR=MAX, EVR REF: VR=MIN	—	B (NPN)
6, 11	NF1 / NF2	Output amplifier negative feedback	0.0	B (NPN)
7, 10	OUT1 / OUT2	Output	0.0	EE (P-P)
8	EVR ON / OFF	EVR ON / OFF control High: ON, Low: OFF	—	47kΩ ~ B (PNP)
9	V _{CC}	V _{CC}	5.0	—
14	V _{EE}	V _{EE}	−5.0	—
15	CTRL GND	GND	0.0	—
16	N.C.	N.C.	—	—

Note: Abbreviations for pin models have the following meanings: EF: emitter follower; P-P: push-pull; B: base.
 All numeric values are design values (V_{CC}=+5.0V, V_{EE}=−5.0V) based on the measurement circuit in Fig.1.
 The standards are not guaranteed for these values.

● Input / output circuit



●Electrical characteristics (unless otherwise noted, $V_{CC} = +5.0V$, $V_{EE} = -5.0V$, $T_a = 25^{\circ}C$)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Coniditions
Circuit current (positive power supply)	I_{CC}	5.4	7.5	12.5	mA	No input, EVR ON mode, $V_{EVR} = \text{Typ.}$
Circuit current (negative power supply)	I_{EE}	4.9	6.8	11.3	mA	No input, EVR ON mode, $V_{EVR} = \text{Typ.}$
EVR REF pin voltage	V_{REF}	2.20	2.60	3.00	V	$R_L = 10k\Omega$, positive thermal characteristic
〈EVR ON mode〉						
Output level	V_O	-21.3	-20.0	-18.7	dBV	$V_{IN} = -18\text{dBV}$, $V_{EVR} = \text{Typ.}$
Output distortion	THD	—	0.02	0.20	%	$V_{IN} = -18\text{dBV}$, $V_{EVR} = \text{Typ.}$ *1
Max. output level	V_{OM}	-2.4	-0.4	—	dBV	THD=1% *1
Max. gain allowance	G_{VM}	9.9	11.7	—	dB	$V_{IN} = -18\text{dBV}$, $V_{EVR} = \text{Typ.}$, Max. level deviation
Noise level	V_{ON}	—	-100	-95	dBV	No input, $R_g = 1k\Omega$ *2
Crosstalk 1	CT_1	—	-94	—	dBV	$V_{IN} = \text{dBV}$, $V_{EVR} = \text{Max.}$ *2
Crosstalk 2	CT_2	—	-100	—	dBV	$V_{IN} = \text{dBV}$, $V_{EVR} = \text{Typ.}$ *2
〈EVR OFF mode〉						
Output level	V_{OFF}	-19.3	-18.0	-16.7	dBV	$V_{IN} = -18\text{dBV}$
Output distortion	THD_{OFF}	—	0.03	0.20	%	$V_{IN} = -18\text{dBV}$ *1
〈Mode retention voltage〉						
EVR OFF mode	V_{ON}	GND	—	0.5	V	—
EVR ON mode	V_{OFF}	4.5	—	5.0	V	—

Signal frequency: 1kHz

*1 B.W.=0.4 to 30kHz

*2 DIN AUDIO

●Measurement circuit

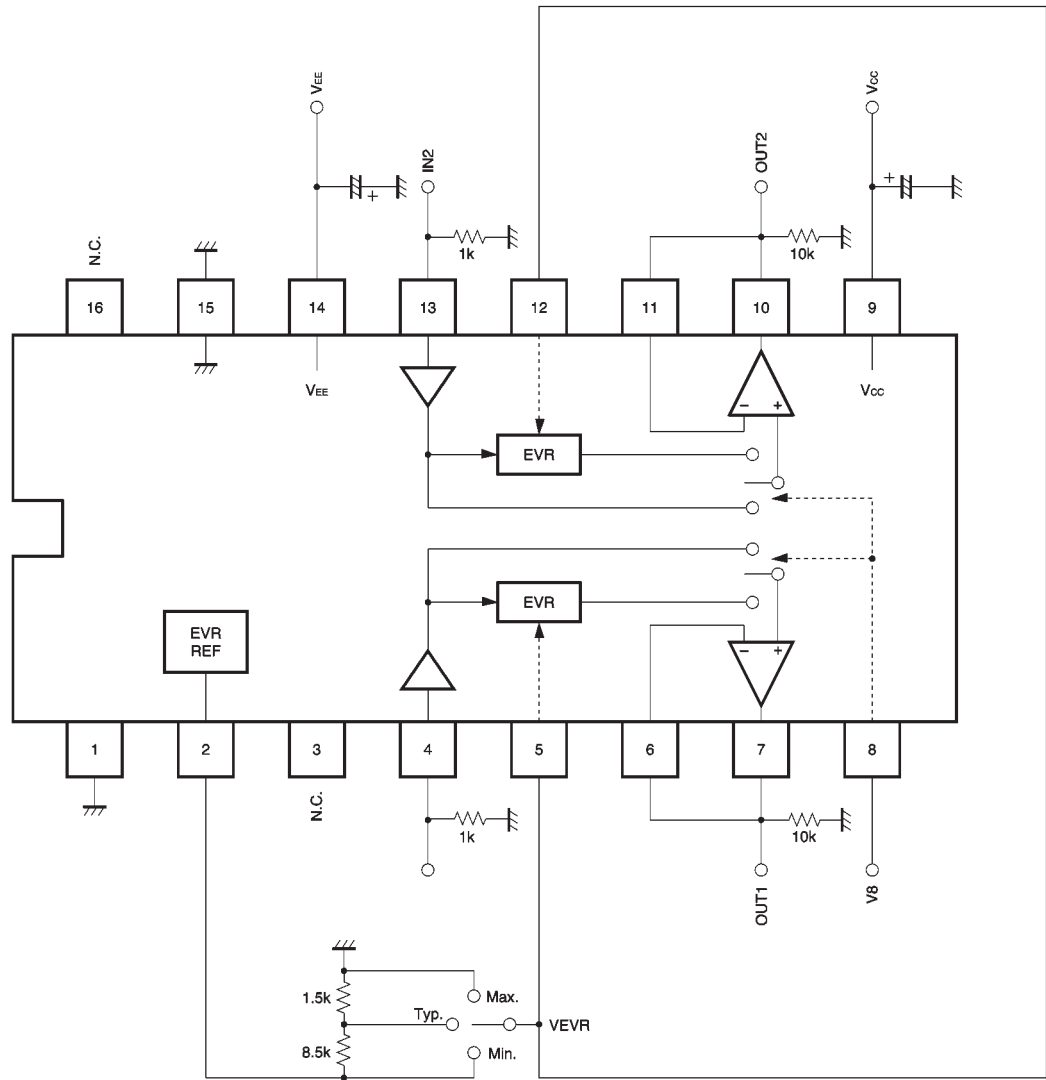


Fig.1

●Control pin description

EVR ON/OFF

This selects the EVR ON or EVR OFF mode.

V8 (8pin)	
L	H
EVR OFF	EVR ON

●Circuit operation

EVR control characteristic

Gain control is carried out by means of voltage divider between the GND and the EVR REF pin (pin 2).

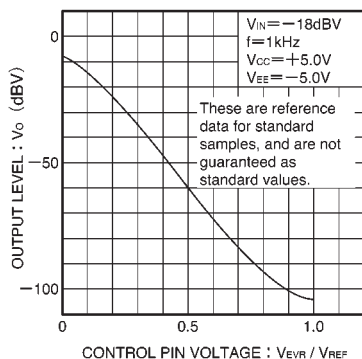


Fig.2 EVR control characteristic

●Operation notes

- (1) Since muting measures are not taken in the IC when the power supply is turned on or off, these measures should be taken externally if necessary.
- (2) The gain for the output amplifier should be set to a value between 0 and 12dB.
- (3) DC offset voltage may be produced, depending on the EVR control point. If this is a problem, insert a coupling capacitor at the point where connection is made to the next stage.
- (4) If DC offset voltage is a problem when switching modes, countermeasures such as providing a time constant to the control pin (pin 8) can be taken.

●External dimensions (Units: mm)

