

Vocal fader IC

BA3836

Realizes karaoke functionality by enabling you to erase only the vocals from commercially available music software.

●Applications

Mini-components, radio cassette players, car stereos, karaoke sets

●Features

- 1) Vocal fader functions (erase vocals from commercially available music software) all on one chip.
- 2) Has internal secondary active LPF to enable a high-degree of vocal cancellation (synchronous rejection ratio) while retaining the same feeling.
- 3) Three control pins for switching between 4 modes: through, vocal fader, sound multiplexing, and mute.
- 4) Key controller input and internal switches.
- 5) Internal microphone amplifier.
- 6) Low noise and low distortion.
- 7) Few external components.

●Absolute maximum ratings (Ta = 25°C)

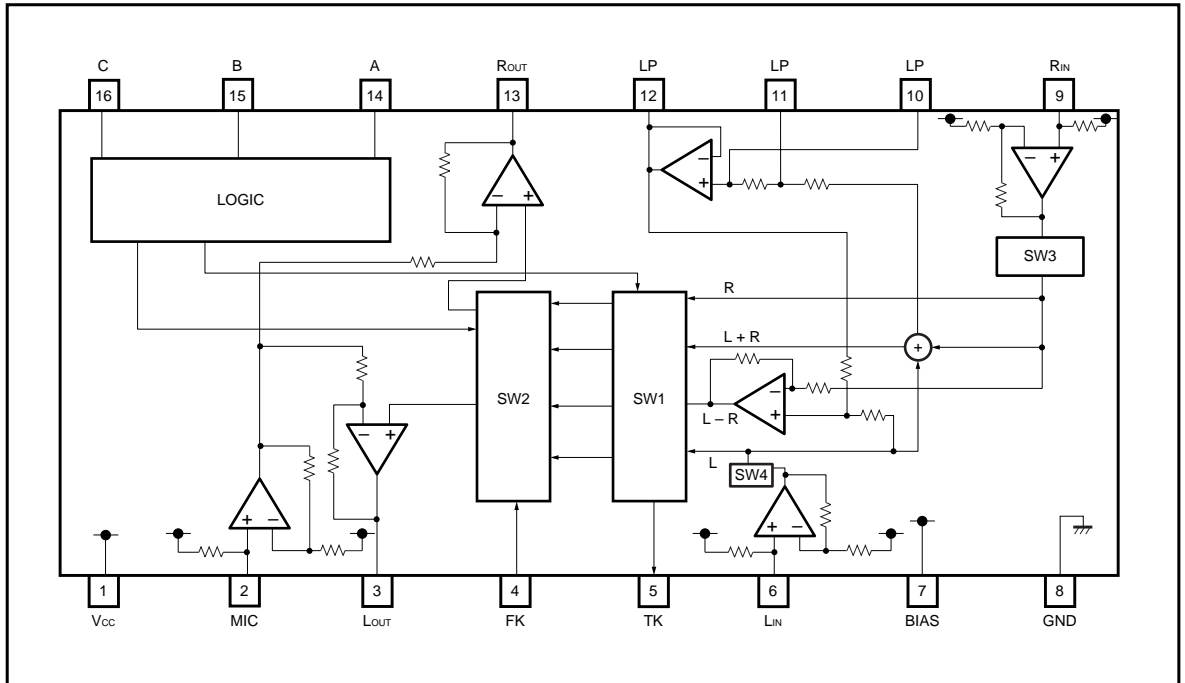
Parameter	Symbol	Limits	Unit
Power supply voltage	V _{cc} Max.	18	V
Power dissipation	P _d	1000*1	mW
Operating temperature	T _{opr}	- 40 ~ + 85	°C
Storage temperature	T _{stg}	- 55 ~ + 125	°C

*1 Reduced by 10mW for each increase in Ta of 1°C over 25°C when mounted.

●Recommended operating conditions (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power supply voltage	V _{cc}	5.4	—	10	V

●Block diagram



●Electrical characteristics (unless otherwise noted, $T_a = 25^\circ\text{C}$, $V_{CC} = 10\text{V}$, $f_{IN} = 1\text{kHz}$, $V_{IN} = 150\text{mV}$, $R_L = 100\text{k}\Omega$)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Quiescent current	I_Q	1.6	2.6	3.3	mA	Through mode
Maximum output voltage	V_{om}	2.3	2.8	—	V _{rms}	THD = 1%, through mode
L / R gain	G_{VT}	10	14	17	dB	Through mode
Low frequency gain	G_{VF}	10	14	17	dB	$f_{IN} = 50\text{Hz}$, vocal fader mode
Microphone gain	G_{VM}	5	8	11	dB	—
Crosstalk	CT	54	70	—	dB	$f_{IN} = 1\text{kHz}$
Mute attenuation	MU	74	80	—	dB	$f_{IN} = 1\text{kHz}$
Vocal suppression rate	SV	27	33	—	dB	Vocal fader mode
Total harmonic distortion	THD	—	0.02	0.07	%	Through mode, BW: 400Hz to 30kHz
Noise level	V_N	—	15	22	V _{rms}	$R_g = 0$, DIN AUDIO
Input impedance	R_{IN}	35	50	65	k Ω	LIN, RIN, MICIN, FK
Control pin threshold (high)	V_{thH}	4.7	—	—	V	—
Control pin threshold (low)	V_{thL}	—	—	0.3	V	—
Output switching DC differential	ΔDCB	—	6	18	mV	Pin 15 switching
	ΔDCC	—	6	18	mV	Pin 16 switching

● Measurement circuit

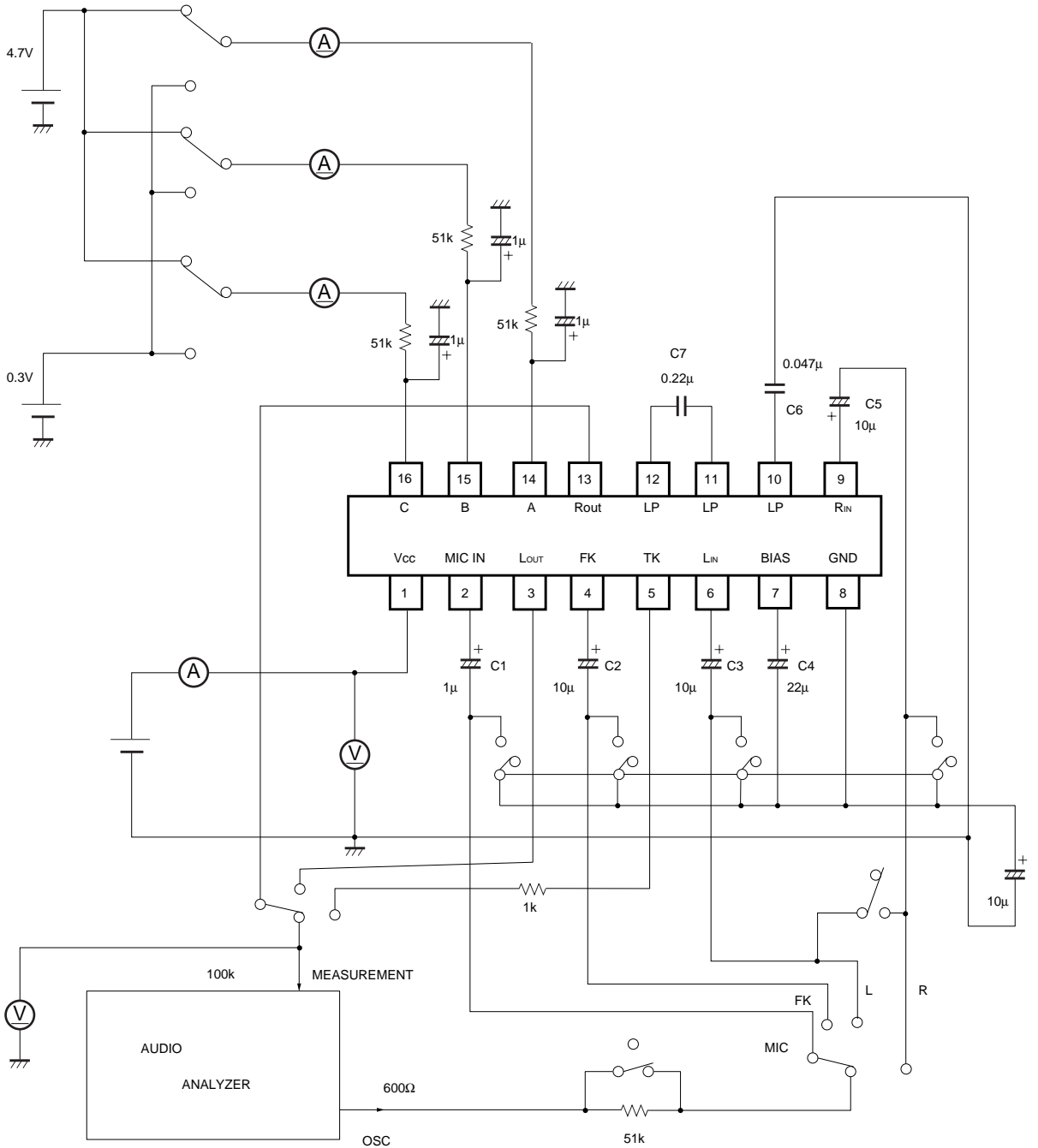


Fig.1

●Circuit operation

Mode table (A: pin 14, B: pin 15, C: pin 16)

A	B	C	LOUT	ROUT	TK	MODE
0	0	0	MUTE	MUTE	MUTE	Mute
0	0	1	VF	VF	VF	Vocal fader
0	1	0	L	L	L	Sound multiplexing
0	1	1	L	R	L	Through
1	0	0	KC	KC	R	Sound multiplexing
1	0	1	KC	KC	VF	Vocal fader
1	1	0	KC	KC	L	Sound multiplexing
1	1	1	KC	KC	L + R	L + R

0: 0V

1: 5V

VF: Vocal fader output

KC: Signal passed through key controller

(1) Microphone output is not muted during muting (ABC = 000 or 100).

(2) For the gain and relative phase, see block diagram.

- 1) L / R input and output in the through mode are synchronous with a gain of 14dB.
- 2) L / R input and TK output in the key controller mode are synchronous with a gain of 8dB.
- 3) L / R output and FK input in the key controller mode are synchronous with a gain of 6dB.
- 4) MIC input and L / R output are negative phase with a gain of 8dB.

●Application example

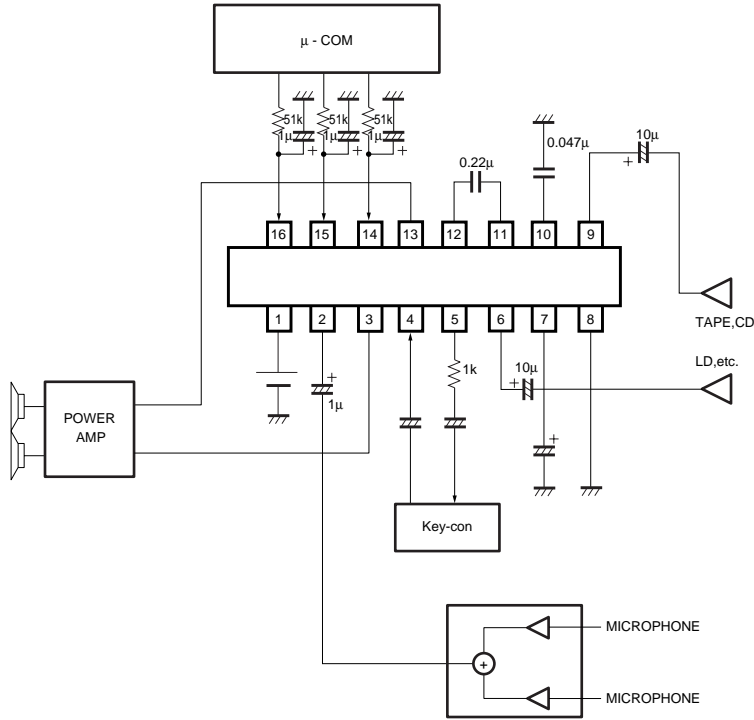
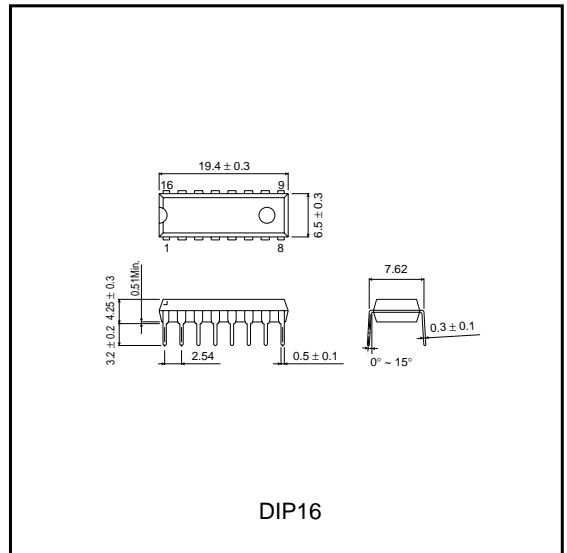


Fig.2

●Operation notes

- (1) We guarantee the application circuit design, but recommend that you thoroughly check its characteristics in actual use. If you change any of the external component values, check both the static and transient characteristics of the circuit, and allow sufficient margin in your selections to take into account variations in the components and ICs.
- (2) The vocal fader works by canceling out the synchronous component of the signal, leaving the low components in place. Consequently, the vocal fader may not be very effective with certain recordings.
- (3) In cases where output DC differential can cause noise when switching between modes, use a time constant for the timing of control pin switching, or take some other measure.
- (4) Operating supply voltage may vary according to ambient temperature. Using this IC outside the recommended supply voltage range may result in increased crosstalk or mute attenuation.

●External dimensions (Units: mm)



DIP16