

LV47002P

Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V _{CC} max1	No signal, t = 1 minute	26	V
	V _{CC} max2	During operations	18	V
Maximum output current	I _O peak	Per channel	4.5/ch	A
Allowable power dissipation	P _d max	With an infinity heat sink	50	W
Operating temperature	T _{opr}		-40 to +85	°C
Storage temperature	T _{stg}		-40 to +150	°C
Thermal resistance between the junction and case	θ _{j-c}		1	°C/W

Recommended Operating Ranges at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V _{CC}		14.4	V
Recommended load resistance	R _L op		4	Ω
Operating supply voltage range	V _{CC} op	A range not exceeding P _d max	9 to 16	V

Electrical Characteristics at Ta = 25°C, V_{CC} = 14.4V, R_L = 4Ω, f = 1kHz, R_g = 600Ω

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Quiescent current	I _{CCO}	R _L = ∞, R _g = 0Ω		200	400	mA
Standby current	I _{st}	V _{st} = 0V			10	μA
Voltage gain	V _G	V _O = 0dBm	25	26	27	dB
Voltage gain difference	ΔV _G		-1		+1	dB
Output power	P _O	THD = 10%	23	28		W
	P _O max1	JEITA max		43		W
	P _O max2	V _{CC} = 15.2, JEITA max		48		W
Output offset voltage	V _n offset	R _g = 0Ω	-100		+100	mV
Total harmonic distortion	THD	P _O = 4W		0.03	0.2	%
Channel separation	CHsep	V _O = 0dBm, R _g = 10kΩ	55	65		dB
Ripple rejection ratio	SVRR	R _g = 0Ω, f _r = 100Hz, V _{CC} R = 0dBm	45	65		dB
Output noise voltage	V _{NO}	R _g = 0Ω, B.P.F. = 20Hz to 20kHz		80	200	μVrms
Input resistance	R _i		40	50	65	kΩ
Mute attenuation	Matt	V _O = 20dBm, mute : on	75	90		dB
Standby pin control voltage	V _{stby} H	Amp : on	2.5		V _{CC}	V
	V _{stby} L	Amp : off	0.0		0.5	V
Mute pin control voltage	V _{mute} H	Mute : off	Open			-
	V _{mute} L	Mute : on	0.0		1.5	V
Output offset detection						
Detection threshold voltage	V _{osdet}		±1.2	±1.8	±2.4	V

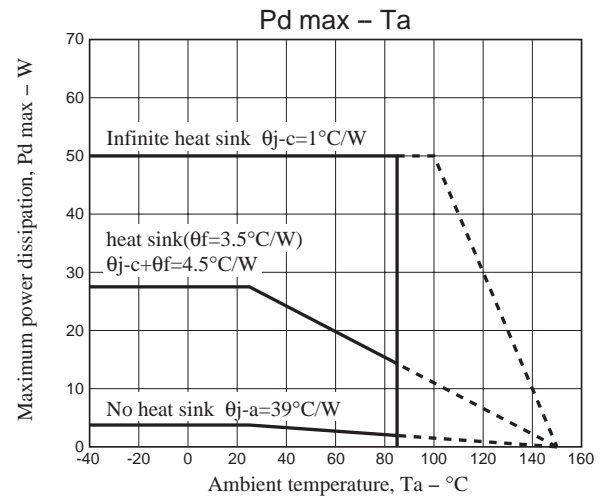
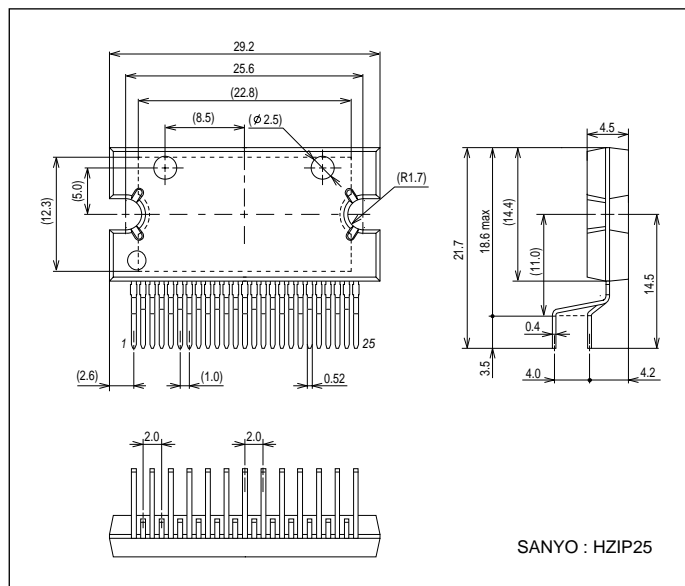
* 0dBm = 0.775Vrms

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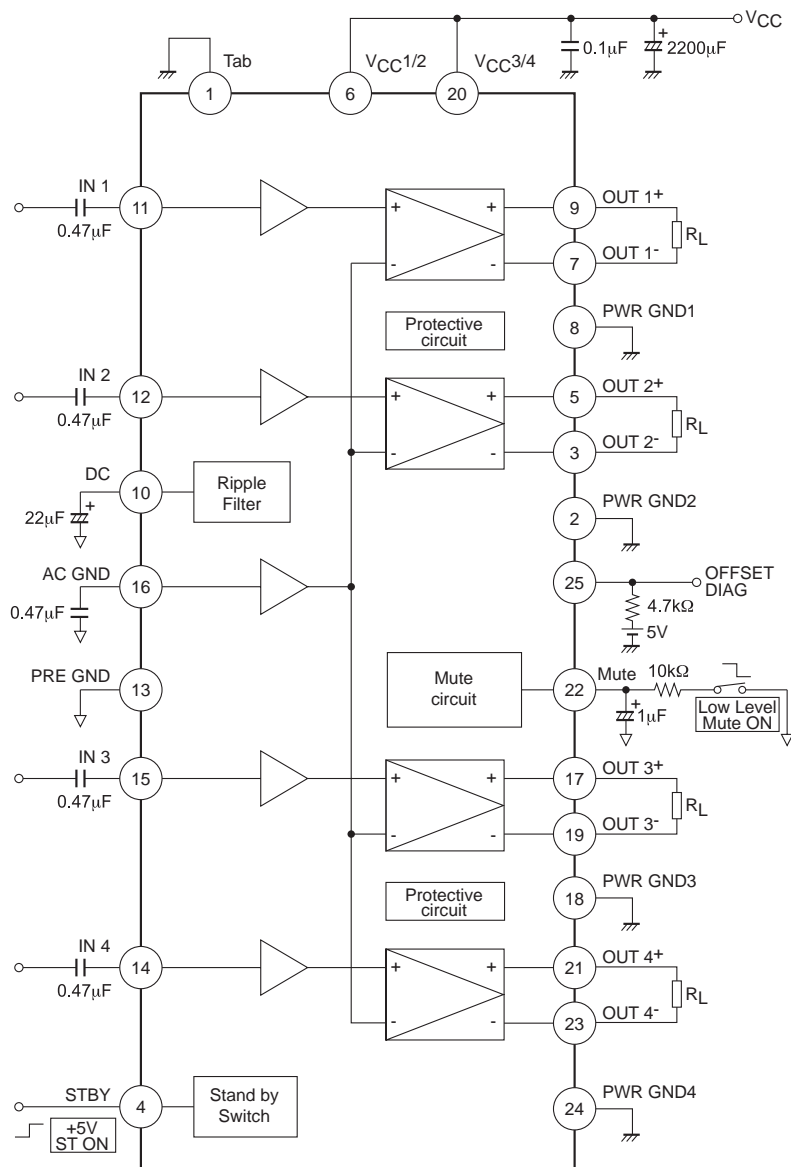
Package Dimensions

unit : mm (typ)

3236A



Block Diagram



External Components

Part Name	Recommended Value	Purpose	Remarks
C1 to C5	0.47μF	Cuts DC voltage	The larger the constant value, the lower the cut-off frequency The values of C1 to C5 must be the same
C6	22μF	Reduces ripples Reduces pop noise	The larger the constant value, the longer the amplifier ON/OFF time
C7	2200μF	Ripple filter	Eliminating power supply ripples
C8	0.1μF	Improves oscillation stability	Reducing high-frequency noise
C9	1μF	Reduces pop noise	The larger the constant value, the longer the mute ON/OFF time
R1	10kΩ	Reduces pop noise	The larger the constant value, the longer the mute ON/OFF time
R2	4.7kΩ	Pull-up resistor	

* The components and constant values within the test circuit are used for confirmation of characteristics and are not guarantees that incorrect or trouble will not occur in application equipment.

Description of Operation

1. Standby switch function (pin 4)

Threshold voltage of the pin 4 is set by about $2V_{BE}$.

The amplifier is turned on by the applied voltage of 2.5V or more. Also, the amplifier is turned off by the applied voltage of 0.5V or less.

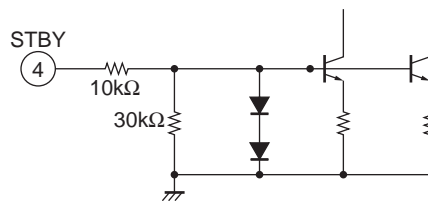


Fig1 Standby equivalent circuit

2. Muting function (pin 22)

The muted state is obtained by setting pin 22 to the ground potential, enabling audio muting.

The muting function is turned on by the applied voltage of 1V or less to the resistance of 10k Ω . And the muting function is turn off when this pin opens.

Also, the time constant of the muting function is determined by external capacitor and resistor constants.

It is concerned with a pop noise in amplifier ON/OFF and mute ON/OFF. After enough examination, please set it.

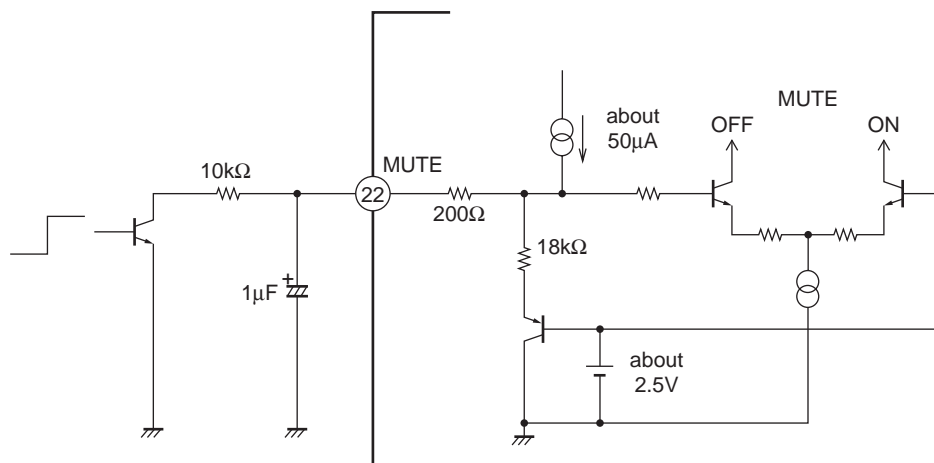


Fig2 Mute equivalent circuit

3. ACGND pin (pin 16)

The capacitor of the pin 16 must use the same capacitance value as the input capacitor.

Also, connect to the same PREGND as the input capacitor.

4. Self-diagnostics function (pin 25)

By detecting the unusual state of the IC, the signal is output to the pin 25.

Also, by controlling the standby switch after the signal of the pin 25 is detected by the microcomputer, the burnout of the speaker can be prevented.

- (1) Shorting to V_{CC} /Shorting to ground : The pin 25 becomes the low level.
- (2) Load shorting : The pin 25 is alternated between the low level and the high level according to the output signal.
- (3) Output offset detection : when the output offset voltage exceeds the detection threshold voltage, the pin 25 becomes the low level.

* Note: The output offset abnormality is thought of as the leakage current of the input capacitor.

In addition, the pin 25 has become the NPN open collector output (active low).

The pin 25 must be left open when this function is not used.

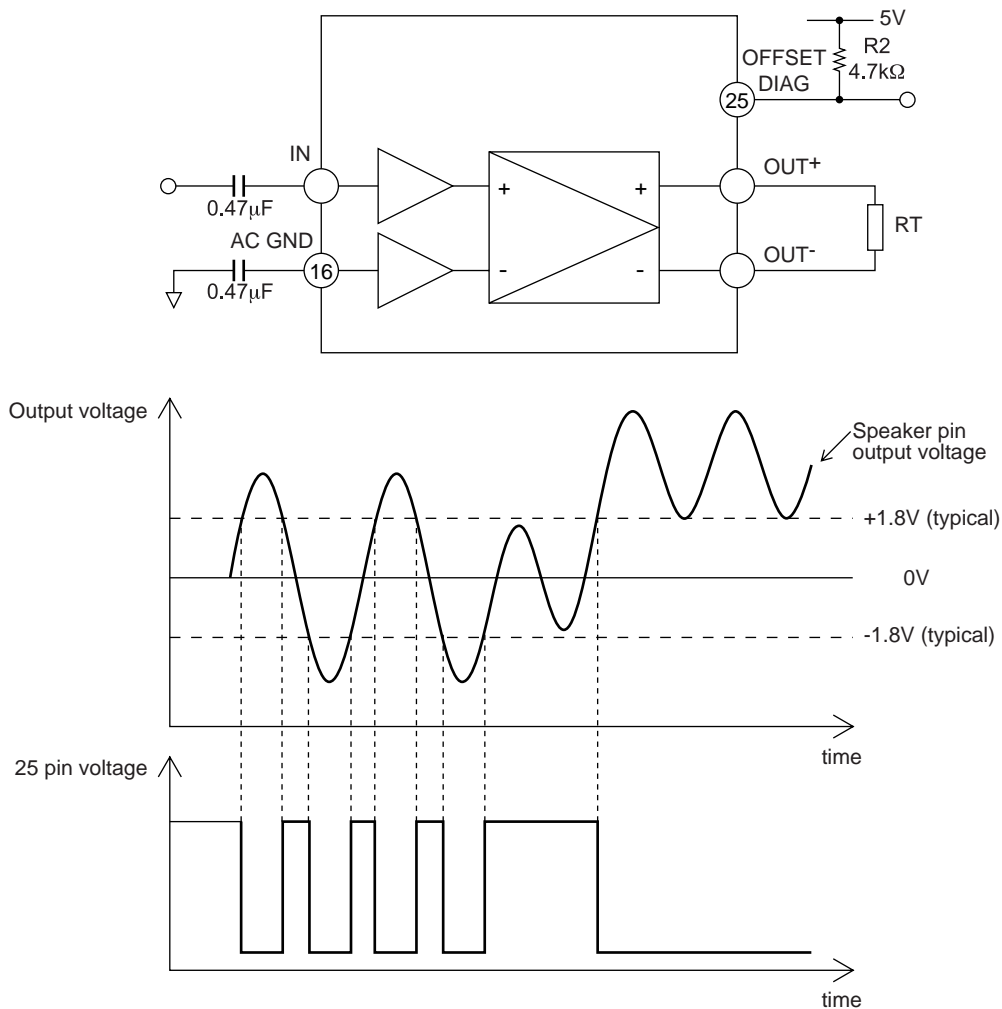


Fig3 Self-diagnosis Function Diagram

5. Sound quality (low frequencies)

By varying the value of input capacitor, low-frequency characteristic can be improved.

However, it is concerned the shock noise. Please confirm in each set when the capacitance value varies.

6. Pop noise

For pop noise prevention, it is recommended to use the muting function at the same time.

- Please turn on the muting function simultaneously with power supply on when the amplifier is turned on. Next, turn off the muting function after the output DC potential stabilization.
- When the amplifier is turn off, turn off the power supply after turning on the muting function.

7. Oscillation stability

Pay due attention on the following points because parasitic oscillation may occur due to effects of the capacity load, board layout, etc.

(1) Capacity load

When the capacitor is to be inserted between each output pin and GND so as to prevent electric mirror noise, select the capacitance of maximum 1500pF. (Conditions : Our recommended board, $R_L = 4\Omega$)

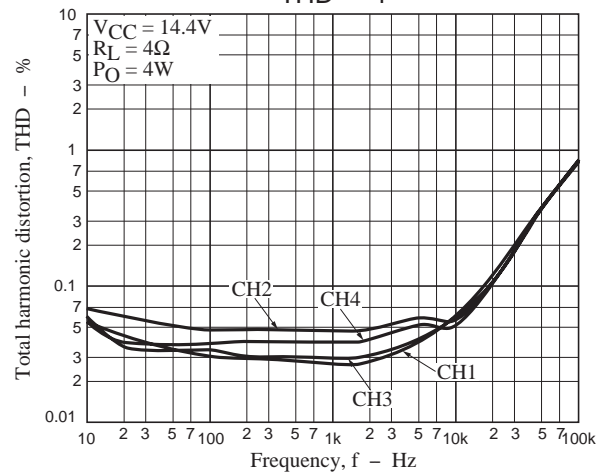
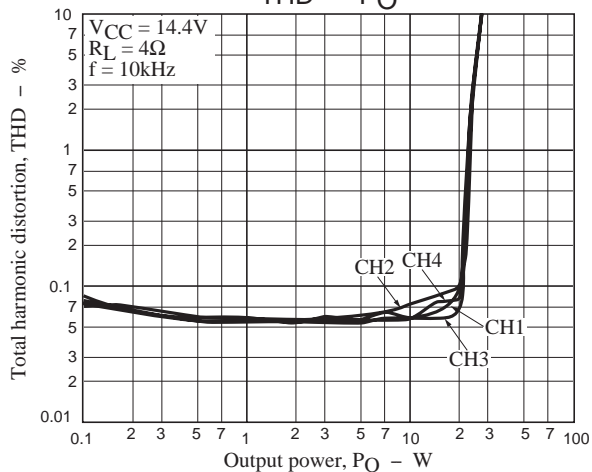
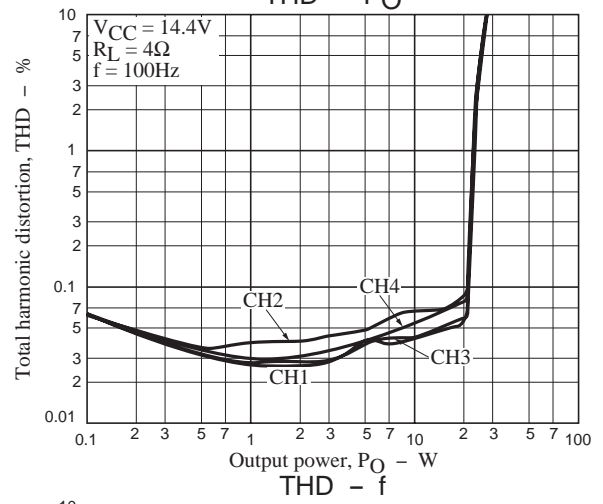
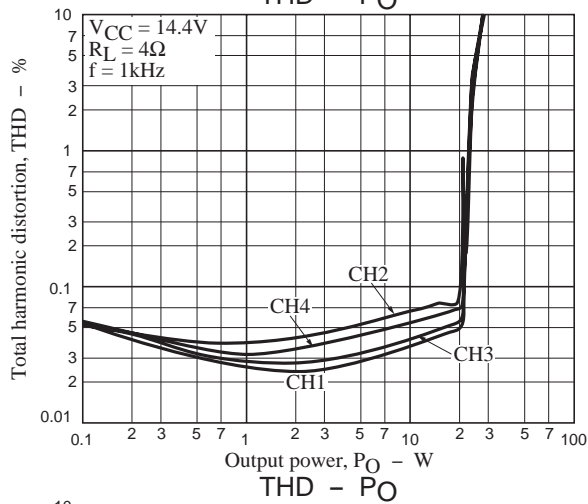
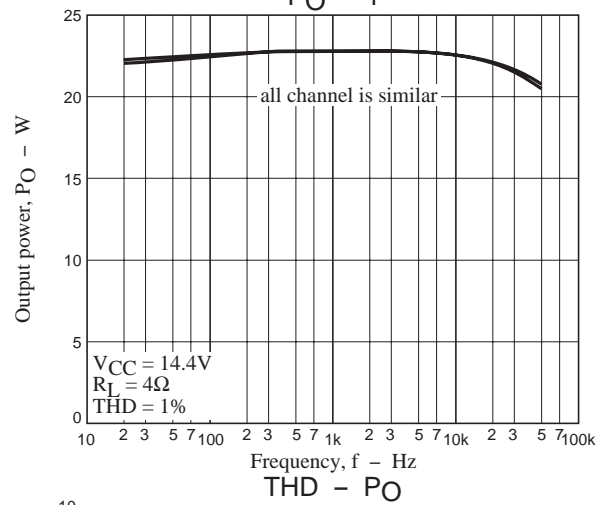
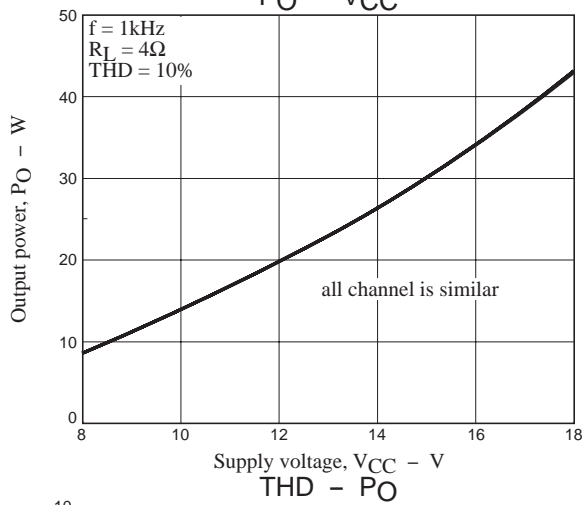
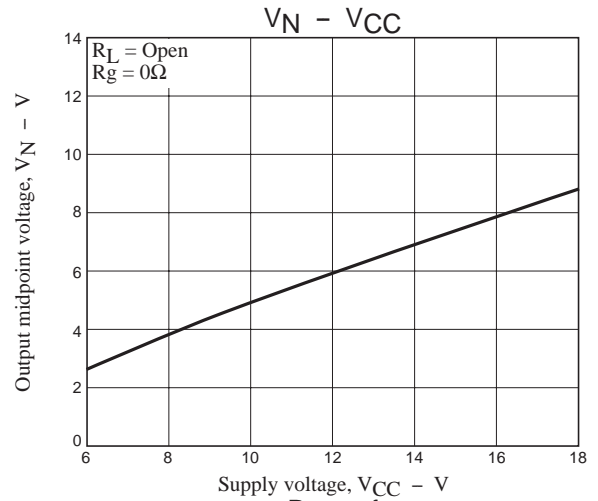
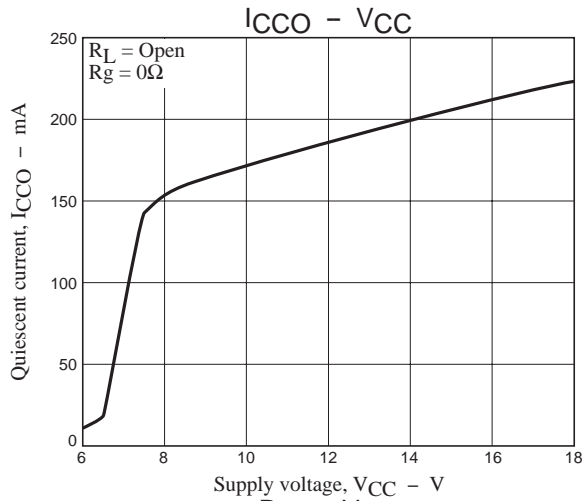
(2) Board layout

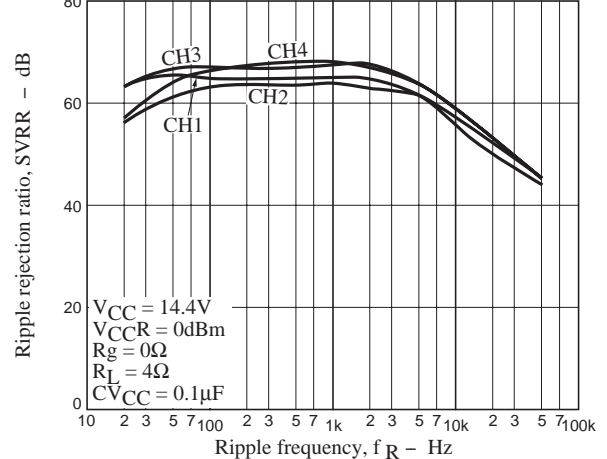
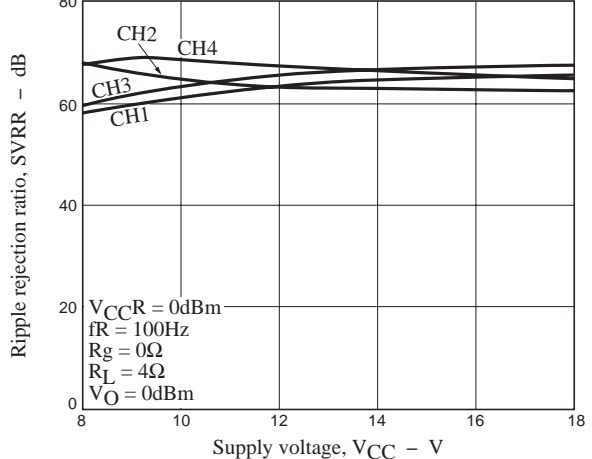
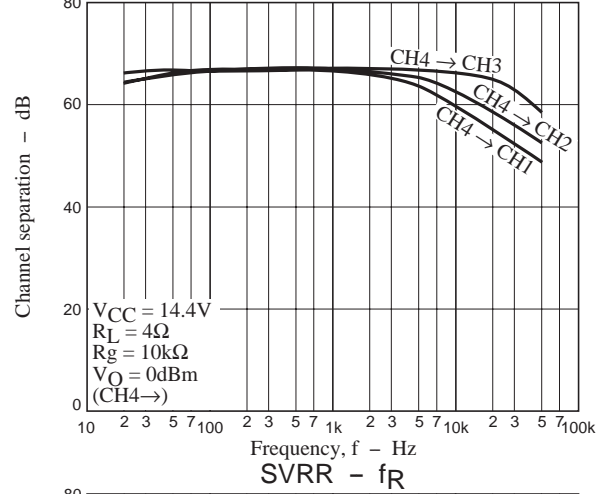
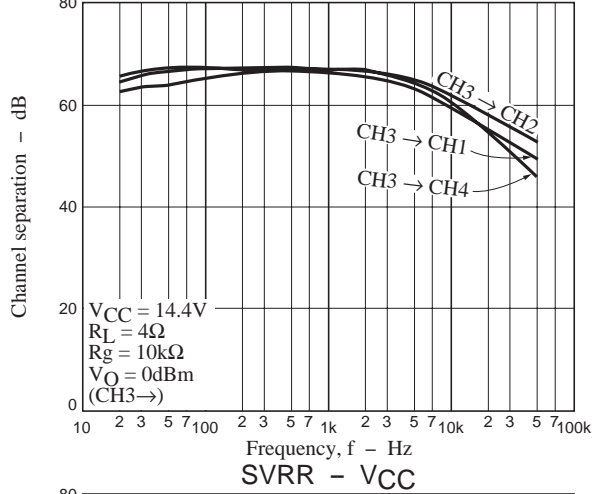
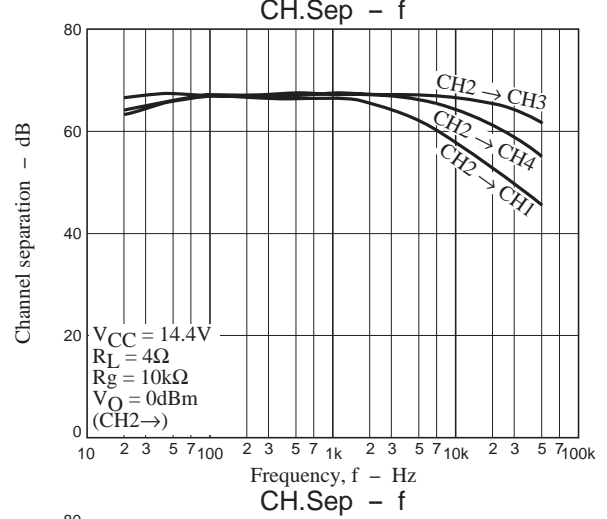
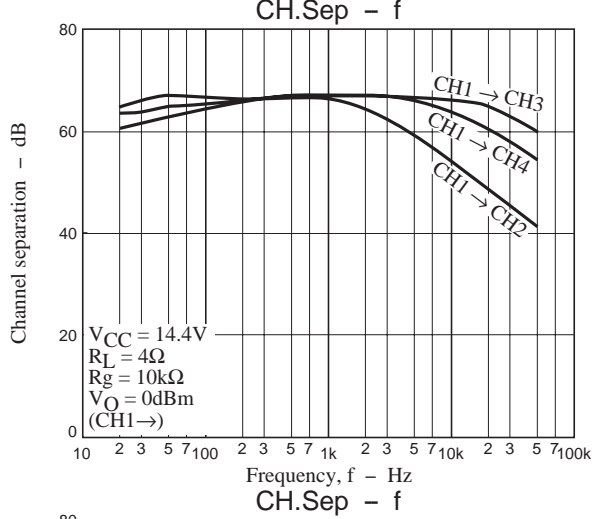
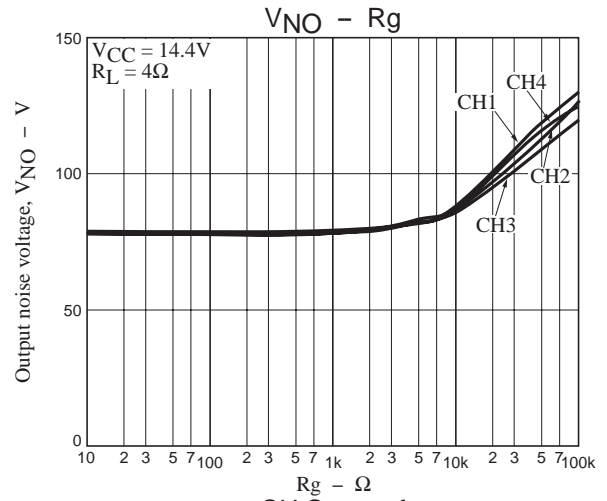
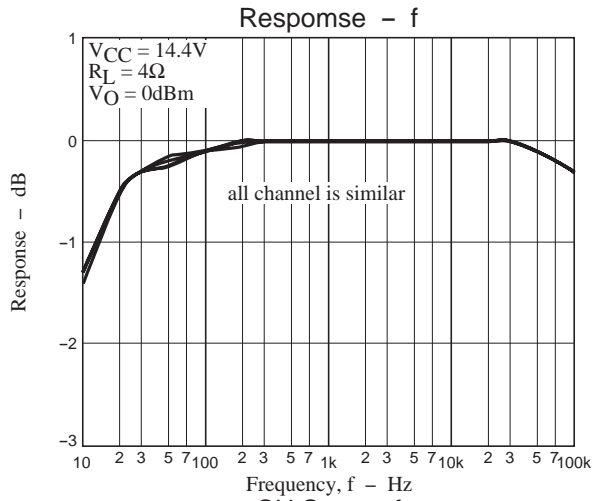
- Provide the V_{CC} capacitor of 0.1 μ F in the position nearest to IC.
- PREGND must be independently wired and connected to the GND point that is as stable as possible, such as the minus pin of the 2200 μ F V_{CC} capacitor.

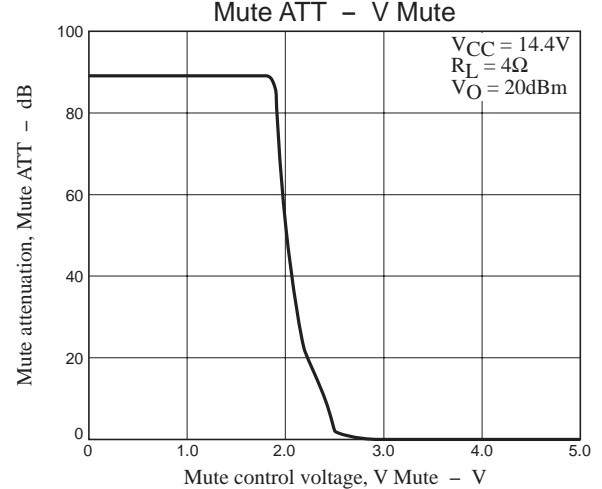
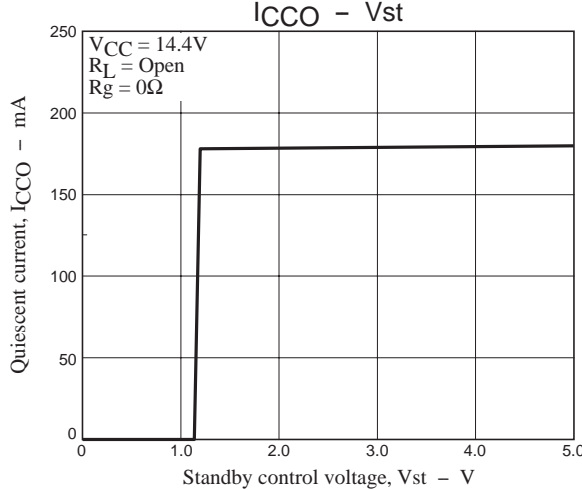
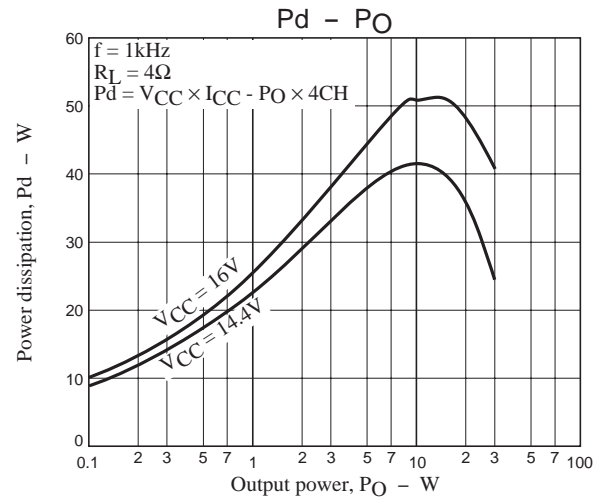
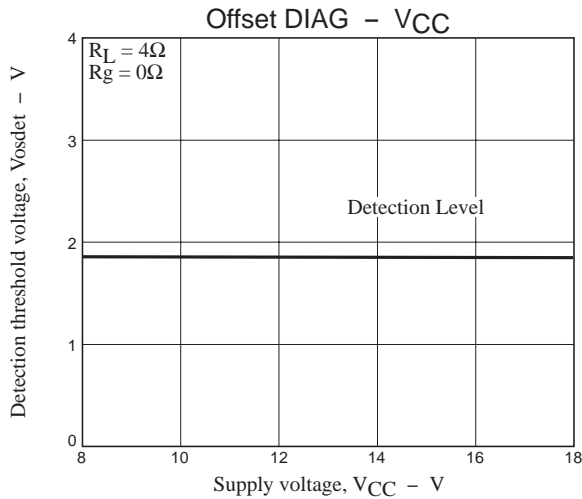
In case of occurrence of parasitic oscillation, any one of following parts may be added as a countermeasure.

Note that the optimum capacitance must be checked for each set in the mounted state.

- Series connection of CR (0.1 μ F and 2.2 Ω) between BTL outputs
- Series connection of CR(0.1 μ F and 2.2 Ω) between each output pin and GND.







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