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LV4910T

Bi-CMOS LSI

Class-D Audio Power Amplifier BTL 2W x 2ch

Overview

LV4910T is a stereo digital amplifier for portable equipment, for example notebook-PC, portable DVD and portable mini-speakers. It is characterized by the use of an original feedback technology to improve sound quality though it is Class-D amplifier, and does not need the LC filter in the output stage.

Features

- D-class high-efficiency amplifier
- Low pop sound at SW changeover
- Differential input type

Functions

- 2W stereo digital power amplifier
- Standby switch
- Mute switch
- Various protective circuits (over-current protective, thermal protective, and under-voltage circuits) incorporated

Specifications

Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC\ max}$		6	V
Allowable power dissipation	$P_d\ max$	as mounted on the substrate	1.05	W
Operating temperature	T_{opr}		-20 to +75	$^\circ\text{C}$
Storage temperature	T_{stg}		-40 to +150	$^\circ\text{C}$

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

LV4910T

Operating Conditions at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}		5	V
Operation supply voltage range	$V_{CC\text{ opg}}$		2.5 to 5.5	V
Recommended load resistance	R_L	Speaker	4	Ω

Electrical Characteristics $T_a = 25^\circ\text{C}$, $V_{CC} = 5\text{V}$, $f = 1\text{kHz}$, $R_L = 4\Omega$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Standby current	I_{st}	Current at ST ON			1	μA
Current at no signal	I_{CCO1}	At LC filter-less		12	20	mA
Current at Mute	$I_{CCO\text{ mute}}$	At Mute of speaker		10	16	mA
Voltage gain	VG	$V_O = 0\text{dBm}$	21	23	25	dB
Channel balance	ΔVG	$V_O = 0\text{dBm}$	-1	0	1	dB
Output power	P_O	THD = 10%		2		W
Total harmonic distortion	THD	$P_O = 0.5\text{W}$, DIN AUDIO		0.4	0.7	%
Output noise voltage	V_{NO}	$R_g = 0$, DIN AUDIO		100	200	μV
Crosstalk	CT	$V_O = 0\text{dBm}$, TUN 1kHz		-60	-40	dB
Ripple rejection ratio	RR	$f_r = 100\text{Hz}$, $V_r = -10\text{dBm}$, TUN 100Hz		-40	-30	dB
Common mode rejection ratio	CMRR	$V_O = 0\text{dBm}$, DIN AUDIO		-60	-40	dB
Mute attenuation value	V_{OFF}	$V_O = 0\text{dBm}$, DIN AUDIO		-80	-70	dB
Oscillation frequency	FPWM			300		kHz
Standby ON voltage sensitivity	V_{PWROFF}	Standby ON start voltage			1	V
Standby OFF voltage sensitivity	V_{PWRON}	Standby OFF start voltage	3			V
Mute ON voltage sensitivity	V_{MUTEON}	Mute ON start voltage			0.5	V
Mute OFF voltage sensitivity	$V_{MUTEOFF}$	Mute OFF start voltage	2			V

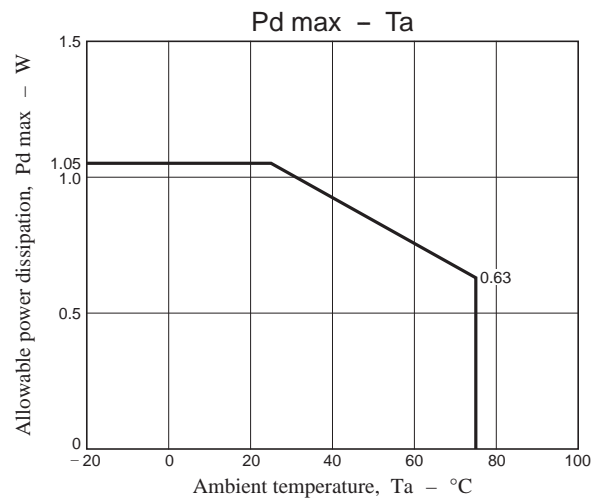
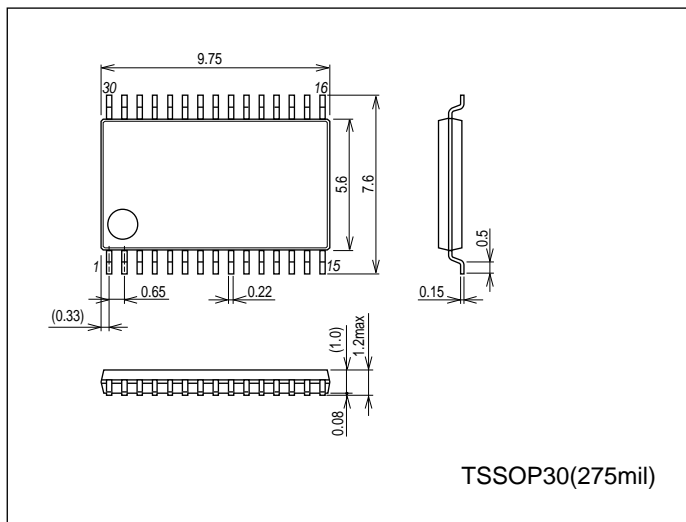
* Electrical characteristics vary depending on the substrate layout and selection of external parts.

For measurement of the above characteristics, the coil : 22 μH (Toko Kabushiki Kaisha made D63CB) is used.

Package Dimensions

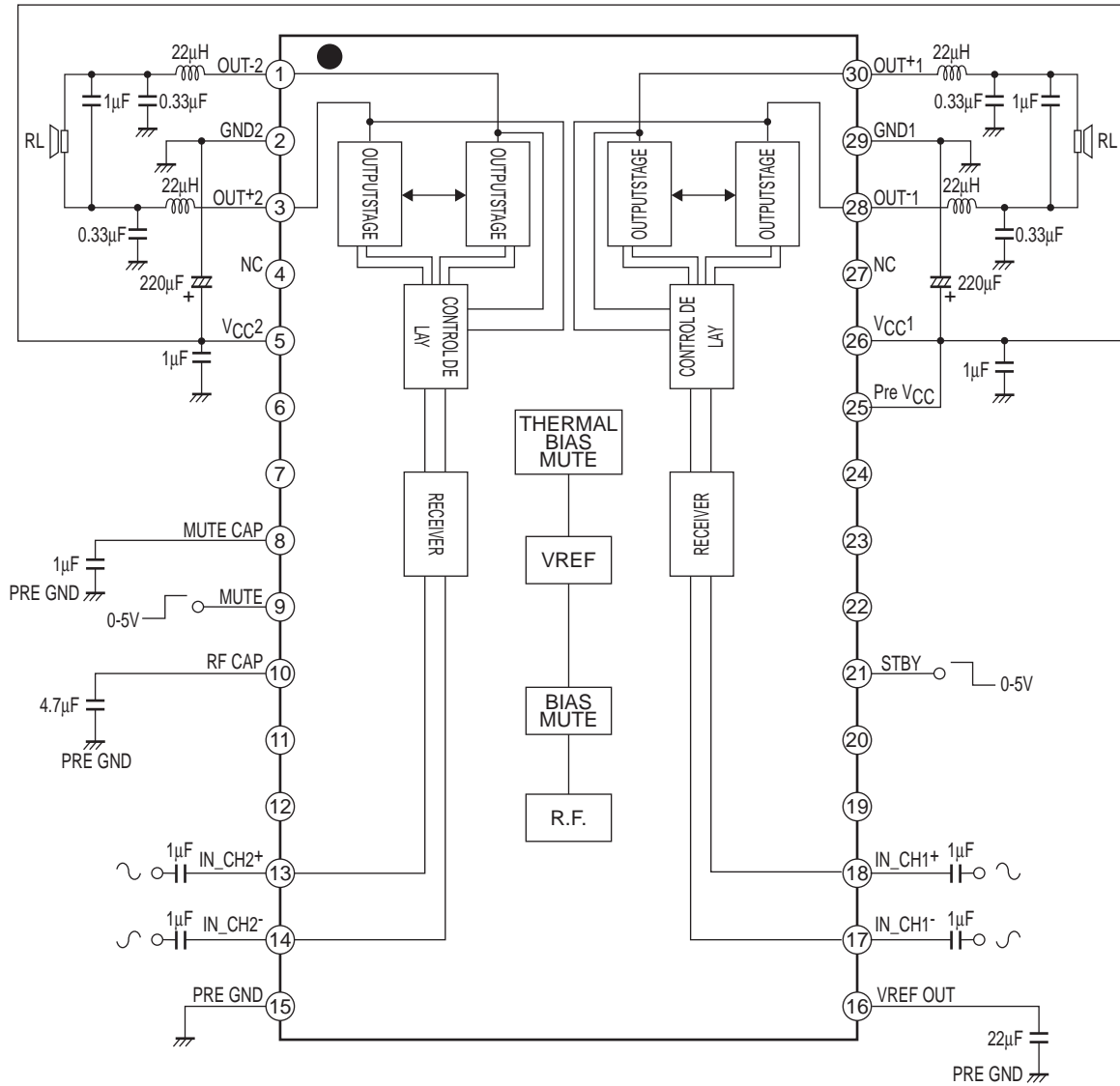
unit : mm (typ)

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LV4910T

Block Diagram



LV4910T

Pin Descriptions

Pin No.	Pin name	Pin voltage (V)	Pin description	Equivalent circuit
1 3 28 30	OUT-2 OUT+2 OUT-1 OUT+1	2.58	<ul style="list-style-type: none"> Power outputs 	
2	GND2	0		
4	NC		<ul style="list-style-type: none"> Non-connection 	
5	V _{CC2}	5		
6	NC		<ul style="list-style-type: none"> Non-connection 	
7	NC		<ul style="list-style-type: none"> Non-connection 	
8	MUTE CAP	4.9	<ul style="list-style-type: none"> Connection for the mute switch On/Off impulse noise reduction capacitor 	
9	MUTE		<ul style="list-style-type: none"> Mute On/Off switch 2 to 5.5V : Mute Off 0 to 0.7V : Mute On 	
10	RF CAP	2.6	<ul style="list-style-type: none"> Ripple filter reference 	
11	NC		<ul style="list-style-type: none"> Non-connection 	
12	NC		<ul style="list-style-type: none"> Non-connection 	
13 14 17 18	IN_ch2+ IN_ch2- IN_ch1- IN_ch1+	2.4	<ul style="list-style-type: none"> Signal input 	

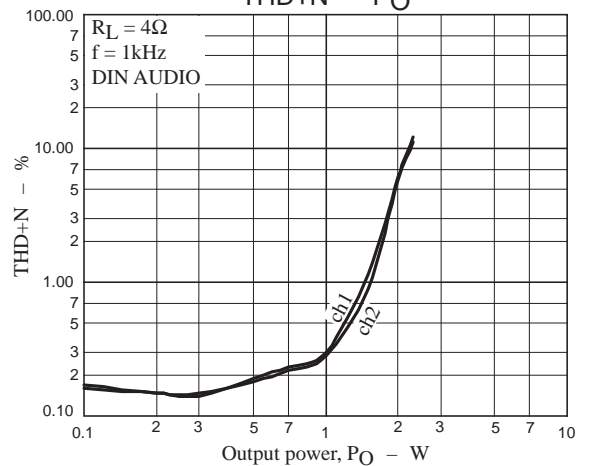
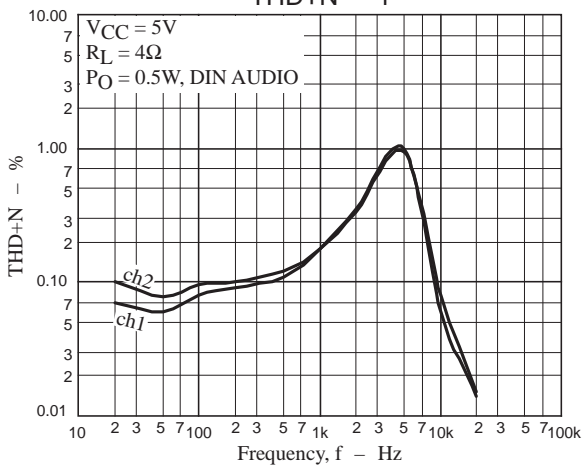
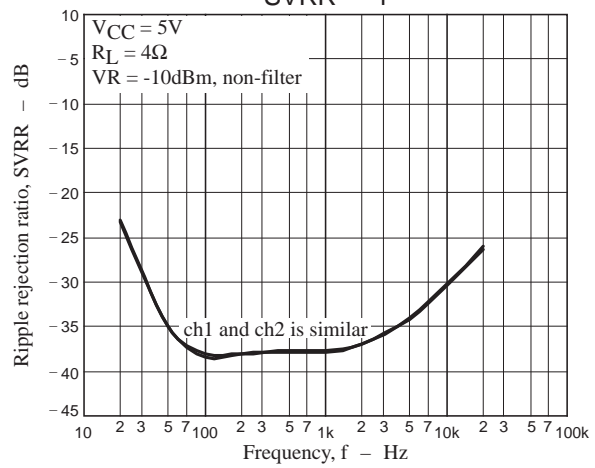
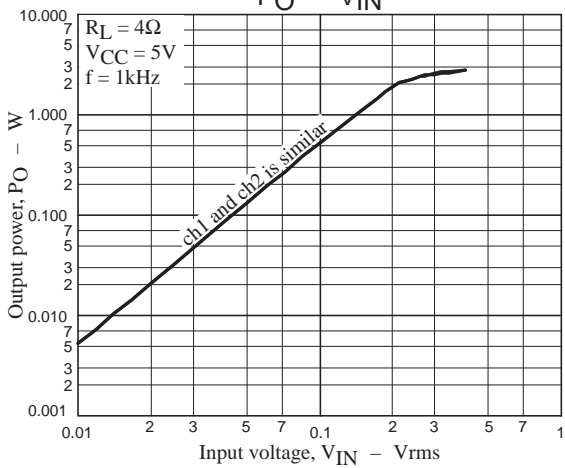
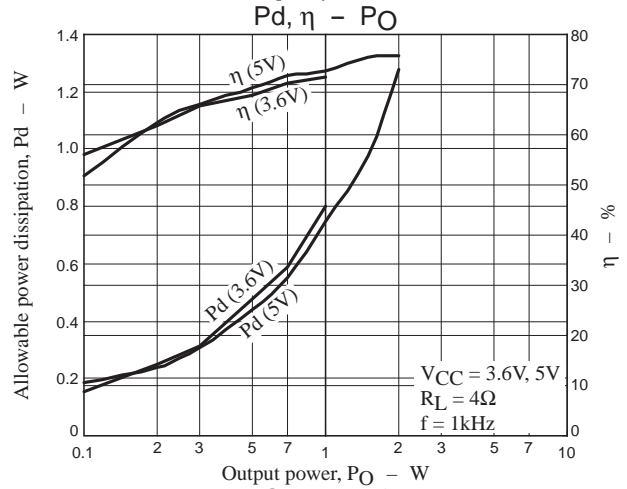
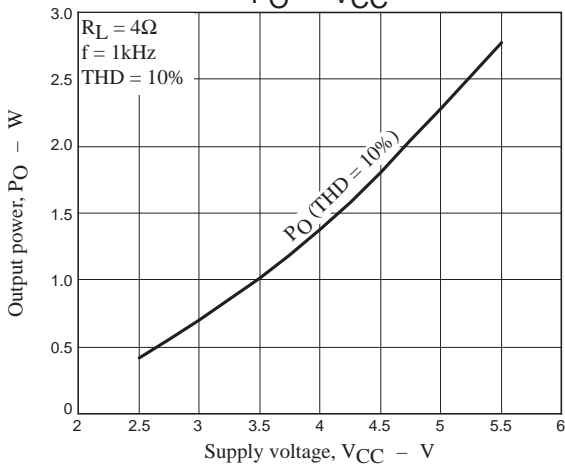
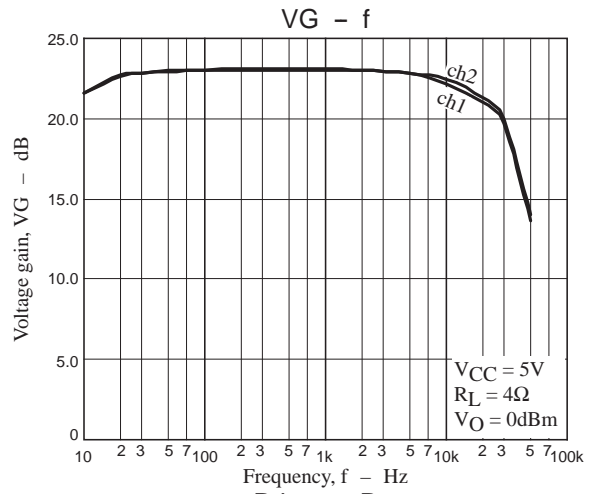
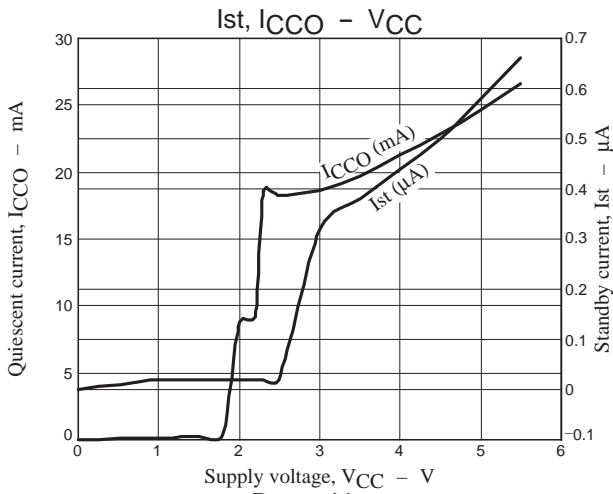
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LV4910T

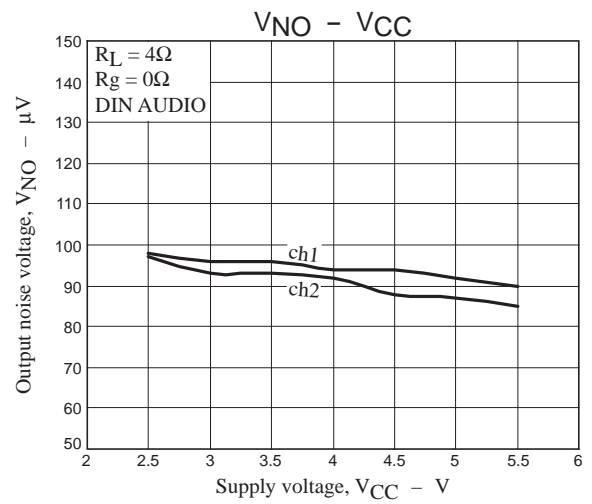
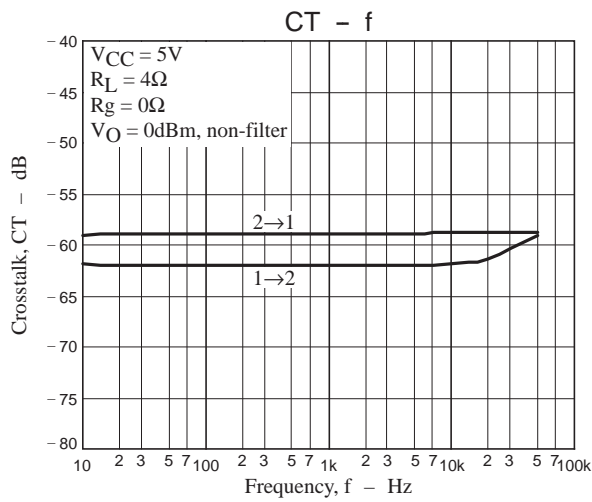
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Pin No.	Pin name	Pin voltage (V)	Pin description	Equivalent circuit
15	PRE GND	0		
16	VREF OUT	2.55	<ul style="list-style-type: none"> • VREF amplifier reference 	
19	NC		<ul style="list-style-type: none"> • Non-connection 	
20	NC		<ul style="list-style-type: none"> • Non-connection 	
21	STBY		<ul style="list-style-type: none"> • STBY On/Off switch • 0 to 1V : Power Off • 3 to 5.5V : Power On 	
22	NC		<ul style="list-style-type: none"> • Non-connection 	
23	NC		<ul style="list-style-type: none"> • Non-connection 	
24	NC		<ul style="list-style-type: none"> • Non-connection 	
25	PRE V _{CC}	5		
26	V _{CC} 1	5		
27	NC		<ul style="list-style-type: none"> • Non-connection 	
29	GND1	0		

LV4910T



LV4910T



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