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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.

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## 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	$\Omega$

## 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	$\mu\text{A}$
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	$\Delta\text{VG}$	$V_O = 0\text{dBm}$	-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	$\mu\text{V}$
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

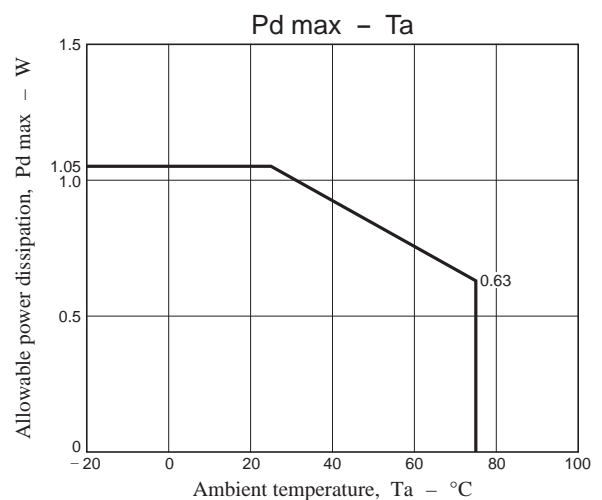
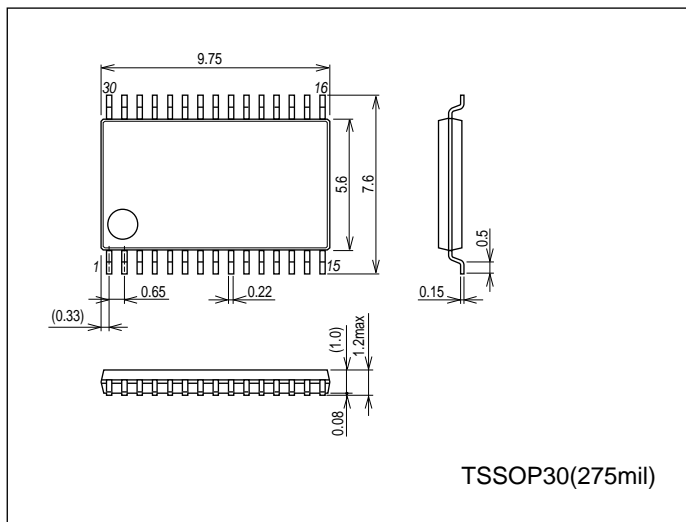
\* Electrical characteristics vary depending on the substrate layout and selection of external parts.

For measurement of the above characteristics, the coil :  $22\mu\text{H}$  (Toko Kabushiki Kaisha made D63CB) is used.

## Package Dimensions

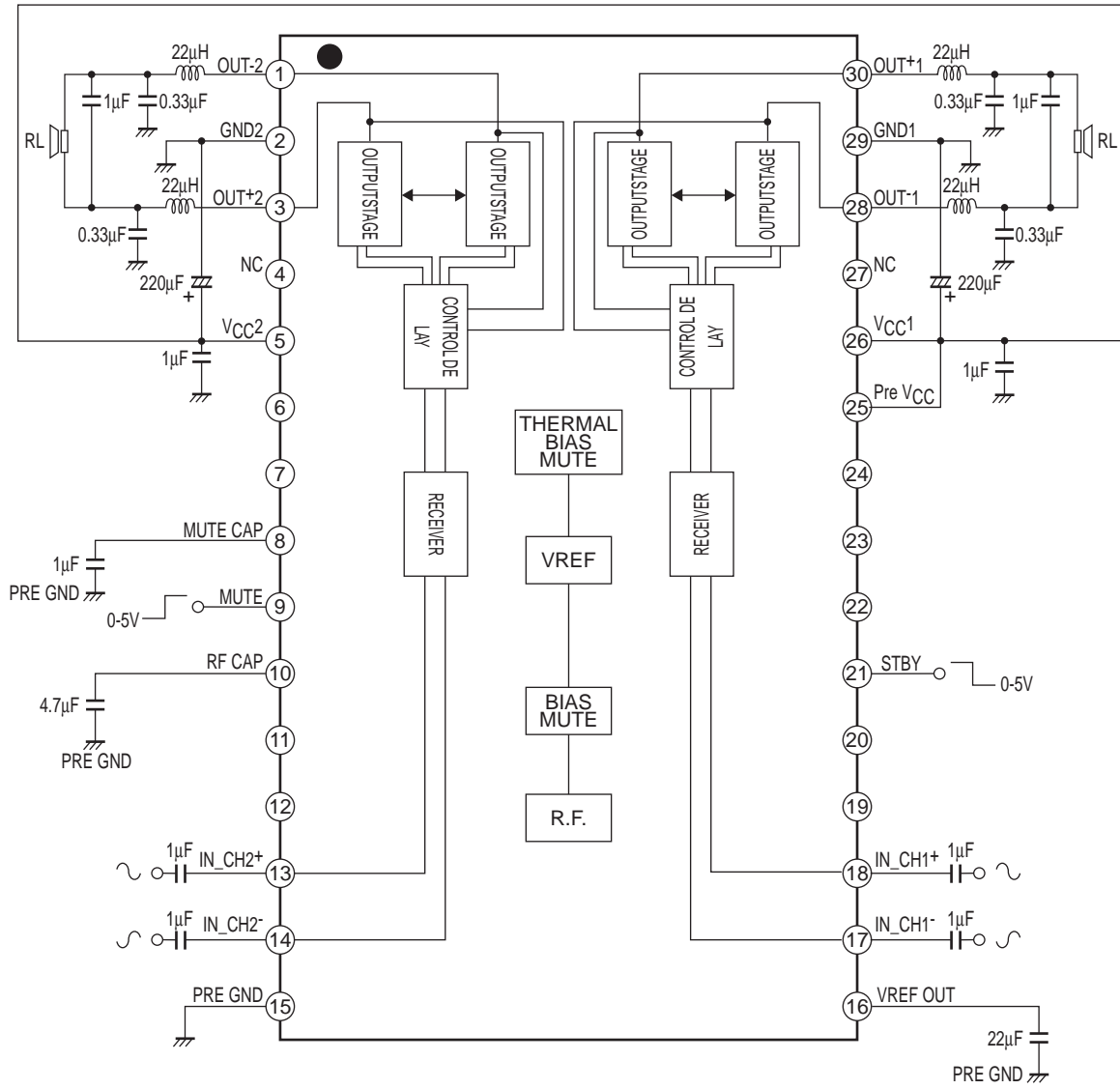
unit : mm (typ)

3259



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## Block Diagram



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## 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"> <li>Power outputs</li> </ul>	
2	GND2	0		
4	NC		<ul style="list-style-type: none"> <li>Non-connection</li> </ul>	
5	V <sub>CC</sub> 2	5		
6	NC		<ul style="list-style-type: none"> <li>Non-connection</li> </ul>	
7	NC		<ul style="list-style-type: none"> <li>Non-connection</li> </ul>	
8	MUTE CAP	4.9	<ul style="list-style-type: none"> <li>Connection for the mute switch On/Off impulse noise reduction capacitor</li> </ul>	
9	MUTE		<ul style="list-style-type: none"> <li>Mute On/Off switch</li> <li>2 to 5.5V : Mute Off</li> <li>0 to 0.7V : Mute On</li> </ul>	
10	RF CAP	2.6	<ul style="list-style-type: none"> <li>Ripple filter reference</li> </ul>	
11	NC		<ul style="list-style-type: none"> <li>Non-connection</li> </ul>	
12	NC		<ul style="list-style-type: none"> <li>Non-connection</li> </ul>	
13 14 17 18	IN_ch2+ IN_ch2- IN_ch1- IN_ch1+	2.4	<ul style="list-style-type: none"> <li>Signal input</li> </ul>	

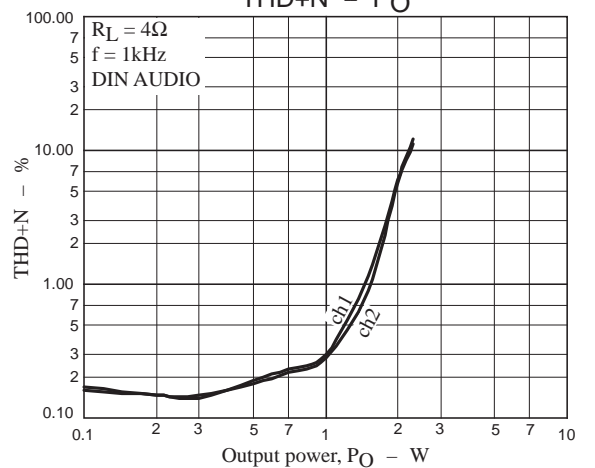
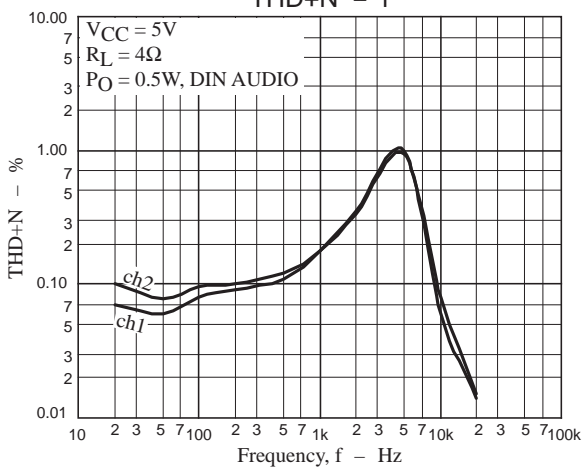
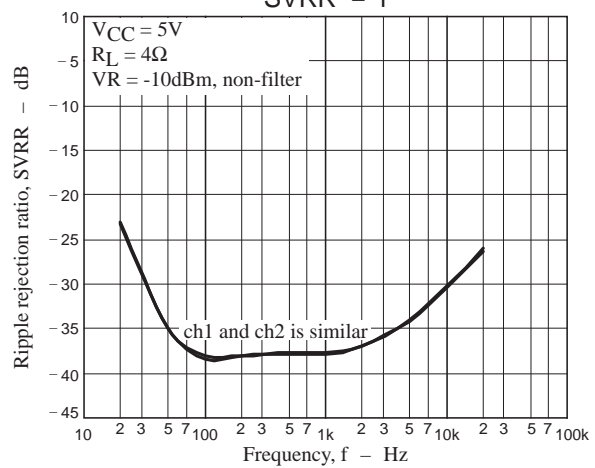
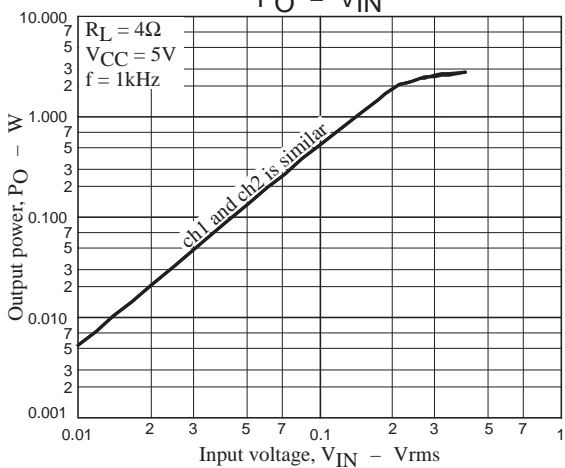
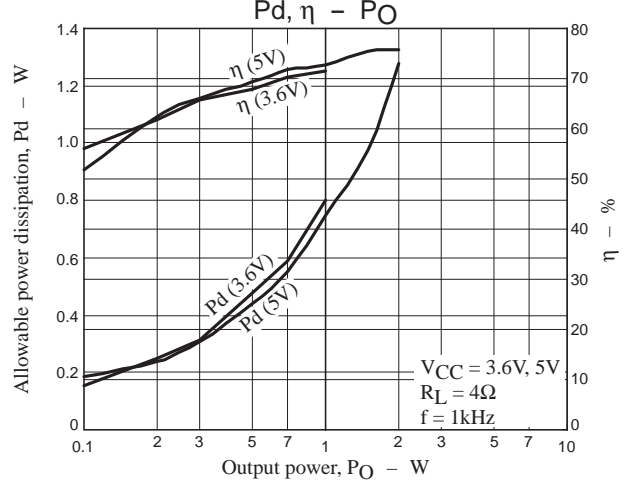
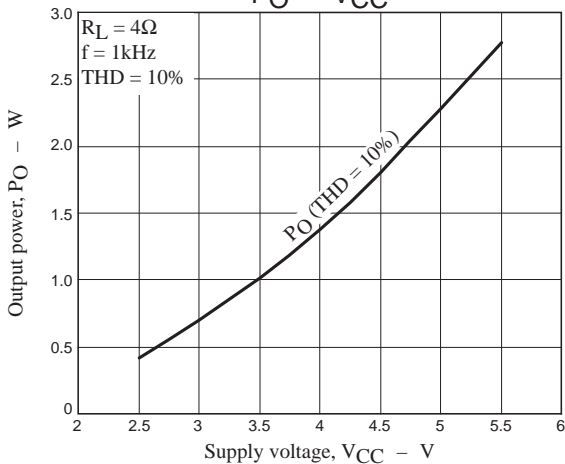
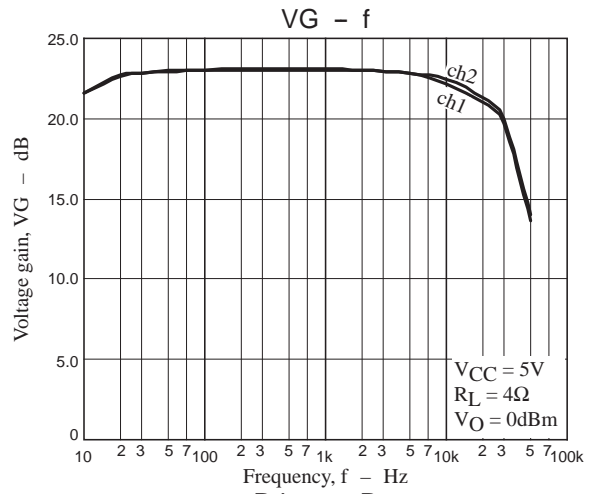
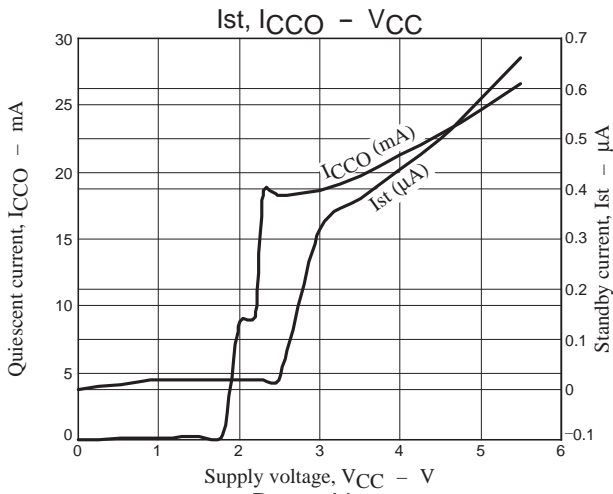
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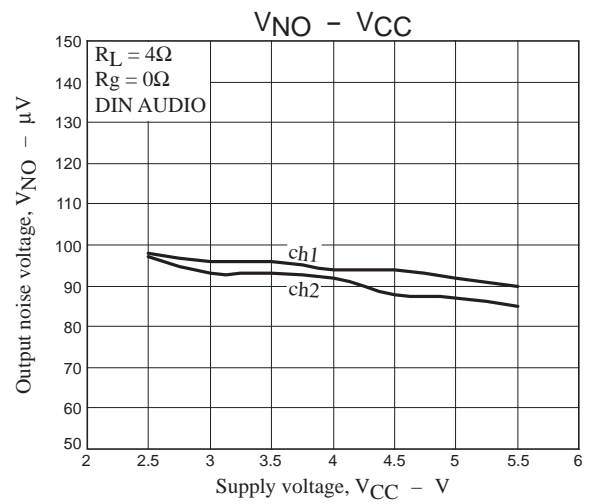
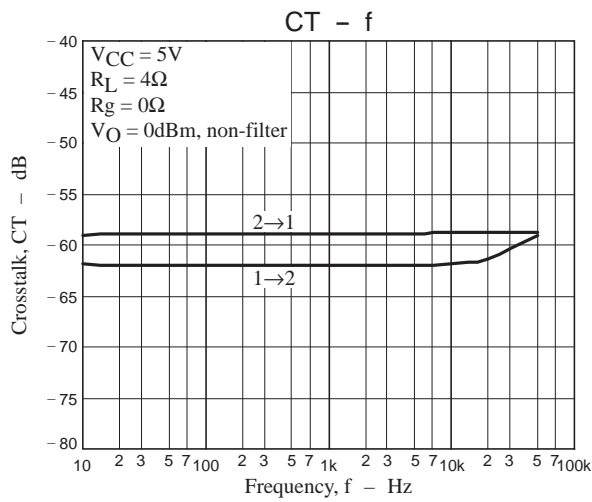
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Pin No.	Pin name	Pin voltage (V)	Pin description	Equivalent circuit
15	PRE GND	0		
16	VREF OUT	2.55	<ul style="list-style-type: none"> <li>• VREF amplifier reference</li> </ul>	
19	NC		<ul style="list-style-type: none"> <li>• Non-connection</li> </ul>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

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