



SANYO Semiconductors

## DATA SHEET

# LA47512 — Monolithic Linear IC Four-Channel BTL Power Amplifier IC for Car Stereo Systems

## Overview

The LA47512 is a four-channel 45W BTL power amplifier IC for car stereo systems.

## Features

- Maximum output : 45W×4 (at  $V_{CC} = 14.4V$ ,  $R_L = 4\Omega$ ,  $V_I = 2.5V_{rms}$ )
- Very low external component count (No oscillator prevention RC circuit, NF circuit, or BS capacitor required)
- Electrically driven mirror noise countermeasure pin provided
- Mute function
- Standby switch
- Full compliment of protection circuits, including shorting to power, shorting to ground, load shorting, and thermal protection circuits

## Specifications

**Maximum Ratings** at  $T_a = 25^\circ C$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC\ max1}$	No signal, $t = 1$ minute	26	V
	$V_{CC\ max2}$	With signal	18	V
Maximum output current	$I_O\ peak$	Per channel	4.5	A
Allowable power dissipation	$P_d\ max$	With a infinity large heat sink (note)	50	W
Operating temperature	$T_{opr}$		-40 to +85	$^\circ C$
Storage temperature	$T_{stg}$		-40 to +150	$^\circ C$
Junction-to-case thermal resistance	$\theta_{j-c}$		1	$^\circ C/W$

Note : Power consumption ( $P_d$ ), junction-to-case thermal resistance ( $\theta_{j-c}$ ), heat sink thermal resistance ( $\theta_f$ ), junction temperature ( $T_j$ ), case temperature ( $T_c$ ), and ambient temperature ( $T_a$ ) have the relationship shown in the following equation.

$$T_j = P_d (\theta_{j-c} + \theta_f) + T_a$$

$$= P_d \times \theta_{j-c} + T_c,$$

$$*T_c = P_d \times \theta_f + T_a \quad \text{However, } T_j \text{ max is limited by } T_{stg\ max} (150^\circ C)$$

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# LA47512

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

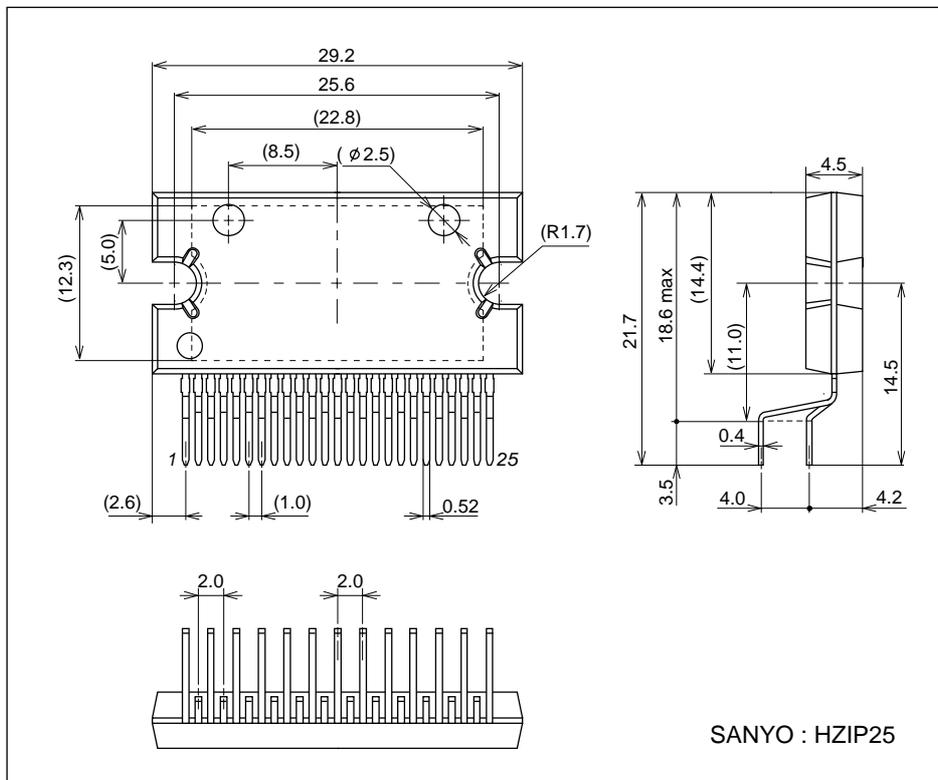
Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	$V_{CC}$		14.4	V
Recommended load resistance	$R_L$		4	$\Omega$
Operating supply voltage range	$V_{CC\text{ op}}$	$P_d$ max shall not be exceeded.	9 to 18	V

## Electrical Characteristics at $T_a = 25^\circ\text{C}$ , $V_{CC} = 14.4\text{V}$ , $f = 1\text{kHz}$ , $R_L = 4\Omega$ , $R_g = 600\Omega$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Quiescent current	$I_{CCO}$	$R_L = \infty$ , $R_g = 0$		200	350	mA
Standby current	$I_{st}$	$V_{st} = 0\text{V}$			10	$\mu\text{A}$
Output offset voltage	$V_n$ offset	$R_g = 0$	-150		+150	mV
Voltage gain	VG	$V_O = 0\text{dBm}$	31	32	33	dB
Voltage gain difference	$\Delta\text{VG}$		-1		+1	dB
Output power	$P_{O1}$	THD = 10%	23	28		W
	$P_{O\text{ max}1}$	$V_{CC} = 13.7\text{V}$ , $V_{IN} = 2.5\text{Vrms}$		40		W
	$P_{O\text{ max}2}$	$V_{IN} = 2.5\text{Vrms}$		45		W
Total harmonic distortion	THD	$P_O = 4\text{W}$		0.1	0.4	%
Channel separation	CHsep	$V_O = 0\text{dBm}$ , $R_g = 10\text{k}\Omega$	55	65		dB
Ripple rejection ratio	SVRR	$f_r = 100\text{Hz}$ , $V_r = 0\text{dBm}$ , $R_g = 0$	50	70		dB
Output noise voltage	$V_{NO}$	$R_g = 0$ , B.P.F = 20Hz to 20kHz		80	200	$\mu\text{Vrms}$
Mute attenuation	Ma	$V_O = 20\text{dBm}$	70	90		dB

## Package Dimensions

unit : mm (typ)  
3236A



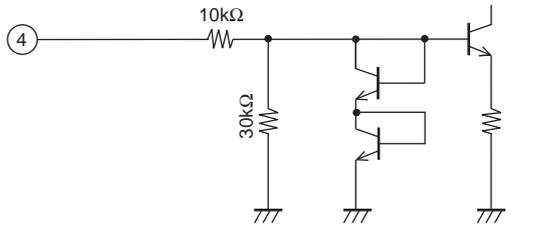
**Usage Notes**

A capacitor about twice the size of the input capacitors must be used for the capacitor between pins 1 and 25 that is used to minimize for noise from the electrically driven mirror. In the sample application circuit, a 0.47 $\mu$ F capacitor is used for 0.22 $\mu$ F input capacitors.

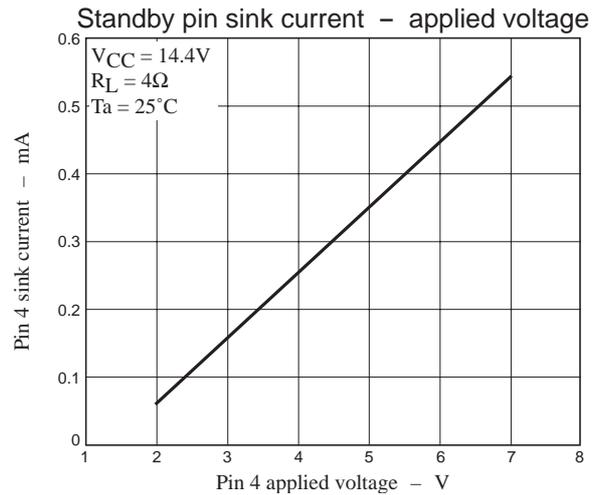
Note that the capacitor connected between pins 1 and 25 must be connected to the same pre-ground as the input capacitors.

**Standby switch and muting switch usage methods (for reference purposes)**

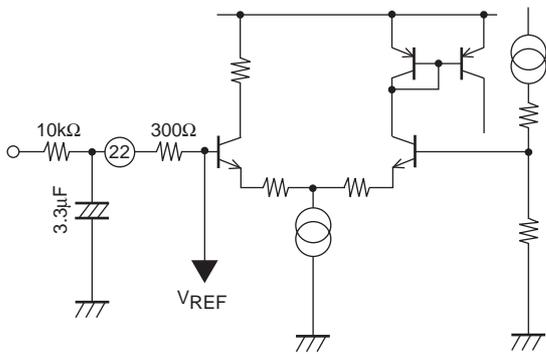
- (1) The amplifier will be on when the standby switch (pin 4) has a voltage of 2V or higher applied, and will be off when that pin is at the ground level.



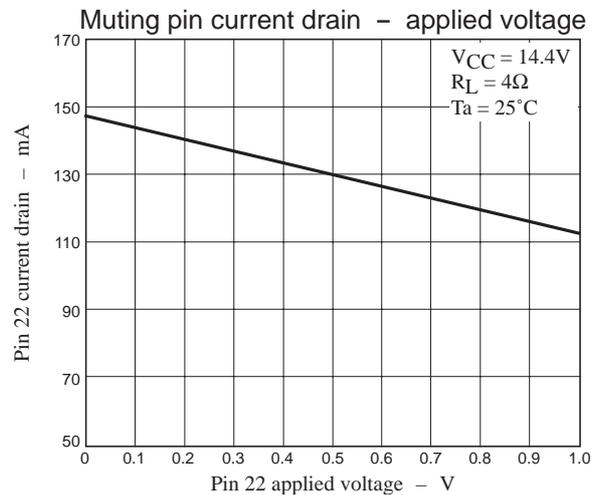
Standby pin internal equivalent circuit diagram



- (2) Muting will be on when muting switch (pin 22) has a voltage of 1V or lower applied, and will be off when that pin is open



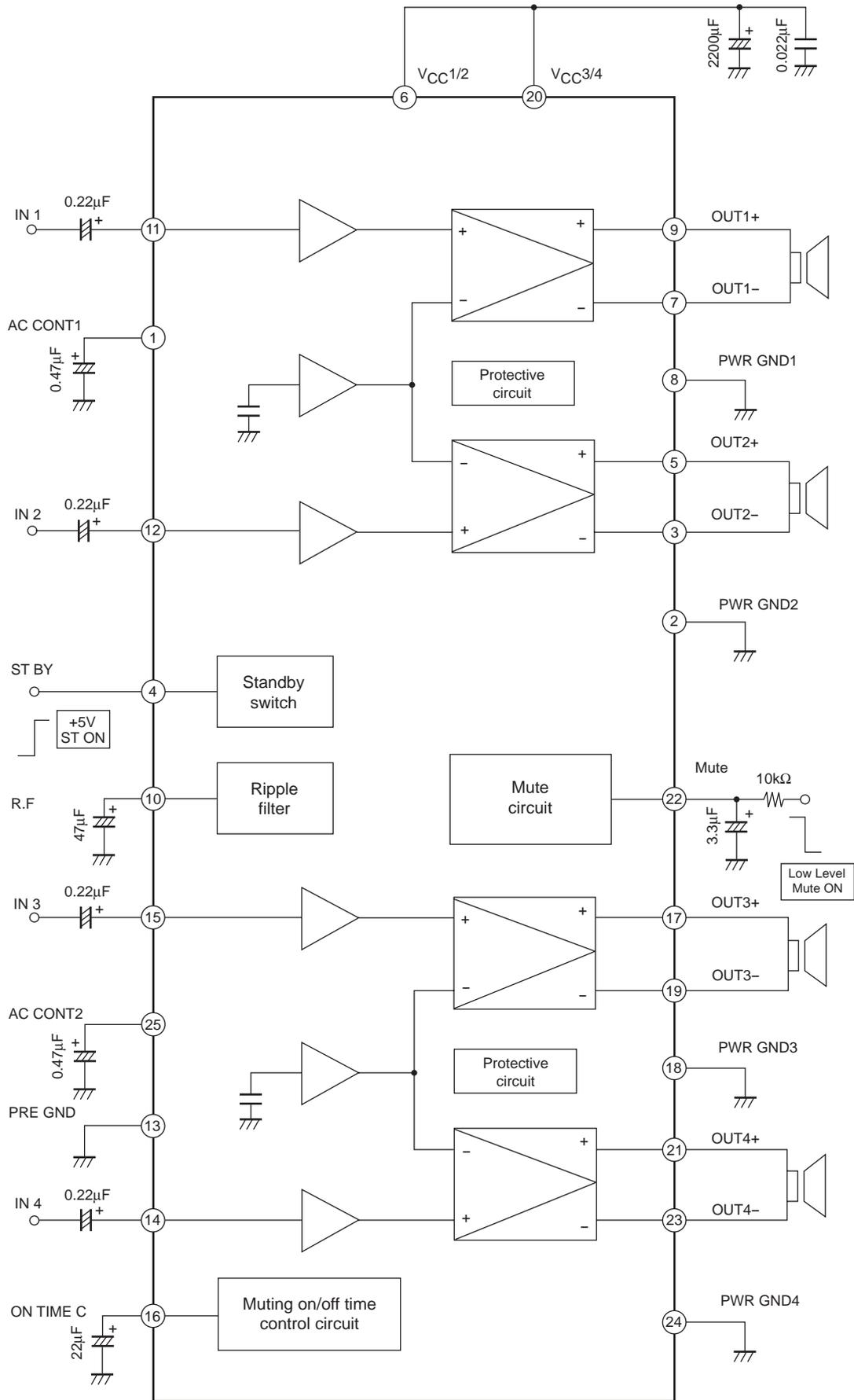
Muting pin internal equivalent circuit



Muting on/off times for the recommended external component values  
 Muting on time : 50ms  
 Muting off time : 20ms

# LA47512

## Block Diagram



\* Package : HZIP25

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