
PRODUCT INFORMATION

Vol.121

High-Output (50-Watt Class) Four-Channel Car Stereo BTL Power Amplifier IC Series

Devices that contribute to increased performance in car stereo systems

LA47501, LA47503

Overview

There have been phenomenal developments in the automotive electronics environment in recent years, such as the popularization of in-car navigation systems. Furthermore, since the car is now seen as a mobile entertainment space, the needs for increased functionality and performance are escalating, and increasing use of multimedia is expected. Thus even higher levels of performance, such as higher output, lower noise, miniaturization, and low power consumption, are required in the audio power amplifiers that support these systems.

To respond to these market needs, SANYO has now developed two new car audio power amplifier ICs, the LA47501 and the LA47503. These ICs achieve the industry's best output noise voltage characteristics despite providing the high total output of 200 W (50 W per channel \times 4 channels). Furthermore, they include functions for suppressing noise due to operation of power mirrors.

These newly-developed ICs adopt SANYO's hyper vertical output transistors that are fabricated using SANYO's latest process technology. Although these devices achieve the industry's highest power output level of 50 W per channel, they minimize the effects of supply voltage fluctuations by adopting SANYO's well-regarded nonlinear amplifier circuit technology as a high-efficiency (power saving) technology.

The audio quality provided by these amplifiers is superb. By adopting techniques that are seen as standard in high-fidelity audio systems, namely fully independent amplifier channels and a separate signal system ground, they achieve a depth and width of sound field reproduction that was impossible with previous car stereo amplifiers. They also achieve the industry's lowest output noise voltage (LA47501: 40 μ V rms (typical)) due to the new input circuits adopted. Furthermore, the newly-developed drive circuit achieves optimal drive from low to high frequencies at all output levels so that stable high-quality audio can be provided at all times.

These devices provide the added functionality of the industry's first power mirror noise reduction pin. Noise from power mirrors can be reduced significantly by attaching a capacitor to this pin.

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Features

- Maximum output: 48 W × 4 channels ($V_{CC} = 14.4\text{ V}$, $4\ \Omega$, $V_{in} = 5\text{ V rms}$)
- Reduced number of external components: from 31 to 7 (the oscillation prevention RC circuit, the noise filter, and the BS capacitor are no longer required).
- Power mirror noise reduction pin
- Muting function
- Standby switch
- Full complement of protection circuits (protection circuits for shorting to V_{CC} , shorting to ground, output load shorting, overvoltage, and overheating)
- Maximum supply voltage without damage in the open ground state: 16 V

Specifications

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

Parameter	Symbol	Conditions	Typical value	Unit
Maximum supply voltage	$V_{CC\text{ max1}}$	Operating	18	V
	$V_{CC\text{ max2}}$	Quiescent	26	V

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

Parameter	Symbol	Typical value	Unit
Recommended supply voltage	V_{CC}	14.4	V
Recommended load resistance	RL	4	Ω
Operating supply voltage range	V_{CCop}	9 to 18	V

Operating 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	Typical value	Unit
Quiescent current	I_{CCO}	$R_L = \infty$, $R_g = 0$	200	mA
Voltage gain	VG	$V_o = 0\text{ dBm}$	26	dB
Output power	P_{o1}	THD = 10%	29	W
	$P_{o\text{max}2}$	$V_{in} = 5\text{ Vrms}$	48	W
Total harmonic distortion	THD	$P_o = 4\text{ W}$	0.05	%
Channel separation	Chsep	$P_o = 0\text{ dBm}$, $R_g = 10\text{ k}\Omega$	70	dB
Ripple rejection ratio	SVRR	$f_r = 100\text{ Hz}$, $V_r = 0\text{ dBm}$, $R_g = 0$	70	dB
Output noise voltage	V_{no}	$R_g = 0$, B.P.F. = 20 Hz to 20 kHz	40	μVrms
Muting attenuation	Ma	$V_o = 20\text{ dBm}$	90	dB

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Sample Availability

The 26 dB voltage gain LA47501 and the 32 dB voltage gain LA47503 will be available in sample quantities in August 2001 and in production quantities (100,000 units/month) by late 2001.

JULY 18, 2001

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