

IC for Headphone Stereos (with volume-limiting circuit) Monolithic IC MM1336

Outline

This IC was developed for use in 3V headphone stereos. In addition to the basic functions required by headphone stereos, it incorporates a circuit for limiting volume. In some parts of Europe hearing impairment caused by the high volumes of headphone stereos has become a problem, and there has been strong demand for functions for limiting loud volumes in the sets themselves. This trend is expected to gain momentum in the U.S. as well.

This IC uses an internal ALC circuit to suppress headphone stereo output, avoiding the above problem.

Features

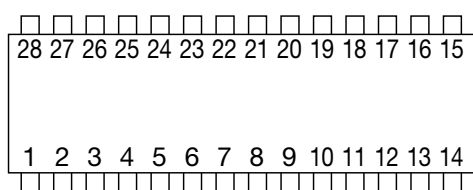
1. Configuration: Pre-and power amps, ALC circuit, motor control
2. Internal tape selector: A selector switch allows the user to select between normal and metal tapes.
3. Internal OCL circuit: There is no need for a capacitor for high-volume output, so sets can be kept thin.
4. With preamp off pin while connected to radio
5. Designed for low shock noise

Reduced noise occuring when the power supply is turned on and off

Package

SOP-28B (MM1336CF, MM1336DF)

Pin Assignment



SOP-28B

| | | | |
|----|-------|----|---------|
| 1 | COM1 | 15 | VS |
| 2 | PIN1 | 16 | C |
| 3 | PNF1 | 17 | Vcc2 |
| 4 | PBU1 | 18 | OUT2 |
| 5 | POUT1 | 19 | Vcc1 |
| 6 | IN1 | 20 | RF |
| 7 | RECT | 21 | Pre OFF |
| 8 | AVNF | 22 | N/M |
| 9 | OUT1 | 23 | IN2 |
| 10 | COM2 | 24 | POUT2 |
| 11 | GND1 | 25 | PBU2 |
| 12 | GND2 | 26 | PNF2 |
| 13 | PCOUT | 27 | PIN2 |
| 14 | PHASE | 28 | GND3 |

Absolute Maximum Ratings

| Item | Symbol | Ratings | Units |
|-----------------------|------------------|-----------|-------|
| Operating temperature | T _{OPR} | -20~+65 | °C |
| Storage temperature | T _{STG} | -40~+125 | °C |
| Power supply current | V _{CC} | -0.3~+7.5 | V |
| Power consumption | P _d | 700 | mW |

Recommended Operating Conditions

| Item | Symbol | Ratings | Units |
|-----------------------|------------------|---------|-------|
| Operating temperature | T _{OPR} | -20~65 | °C |
| Operating voltage | V _{OPR} | 2.0~5.0 | V |

Electrical Characteristics (Except where noted otherwise, V_{CC}=3V, T_a=25°C, f=1kHz, R_{L1}=10kΩ, R_{L2}=16Ω)

| Item | Symbol | Measurement conditions | Min. | Typ. | Max. | Units |
|--|-------------------|---|------|------|------|-------------------|
| Consumption current | I _{CC} | V _{IN} =0V, when motor is off | 6 | 12 | 20 | mA |
| Preamp unit | | | | | | |
| Open-circuit gain | G _{Vo} | | | 72 | | dB |
| Closed-circuit gain I | Normal | V _O =-10dBm, f=1kHz | 31 | 33.5 | 36 | dB |
| | Metal | | 29.5 | 32 | 34.5 | |
| Closed-circuit gain II | Normal | V _O =-10dBm, f=5kHz | 28 | 30.5 | 33 | dB |
| | Metal | | 23 | 25.5 | 28 | |
| Maximum output voltage | V _{om} | THD=10% | 0.30 | 0.45 | | V _{rms} |
| Total harmonic distortion ratio | THD | V _{OUT} =-10dBm | | 0.05 | 0.5 | % |
| Output noise voltage | Normal | R _g =2.2k, BPF (400~30kHz) | 30 | 75 | 150 | μV _{rms} |
| | Metal | | 20 | 45 | 100 | |
| Crosstalk between channels | C · T | R _g =2.2kΩ, V _{OUT} =-10dBm | 50 | 70 | | dB |
| Ripple rejection rate | RR | V _{CC} =3V, V _R =-20dBm, f _r =100Hz, R _g =2.2kΩ | 45 | 55 | | dB |
| Output voltage with preamp off | V _{ooff} | V _{IN} =100mV _{rms} , Pre off | | -80 | -60 | dBm |
| ALC (off) + power amp | | | | | | |
| Voltage gain | G _v | P _{OUT} =5mW | 24 | 26 | 28 | dB |
| Voltage gain difference between channels | ΔGV | | -2 | 0 | 2 | dB |
| | 2CH | | | | | |
| Maximum output current | P _{om} | THD=10% R _L =16Ω | 30 | 50 | | mW |
| Total harmonic distortion ratio | THD | P _{OUT} =5mW | | 0.5 | 1.5 | % |
| Crosstalk between channels | C · T | P _{OUT} =5mW | 35 | 45 | | dB |
| Output noise voltage | V _n | R _g =0Ω, BPF (400~30kHz) | | 85 | 200 | μV _{rms} |
| Ripple rejection rate | RR | V _{CC} =3V, V _R =-20dBm, f _r =100Hz, R _g =0Ω | 35 | 45 | | dB |
| Input resistance | R _i | | 19 | 24 | 29 | kΩ |
| ALC (on) + power amp | | | | | | |
| Power amp output voltage | VOA | V _{IN} =-40dBm | -34 | -30 | -26 | dBm |
| ALC initiation input voltage | V _{INA} | | | -56 | | dBm |
| ALC width | WALC | Input width for output from start of up to +4dB | 30 | 40 | | dB |
| ALC total harmonic distortion | THD | V _{IN} =-40dBm | | 0.5 | 1.5 | % |
| Noise of preamp+power amp+ALC | V _{nto} | R _g =2.2kΩ (preamp) | | 1.5 | 6 | mV _{rms} |

Block Diagram

