

AN7233SH

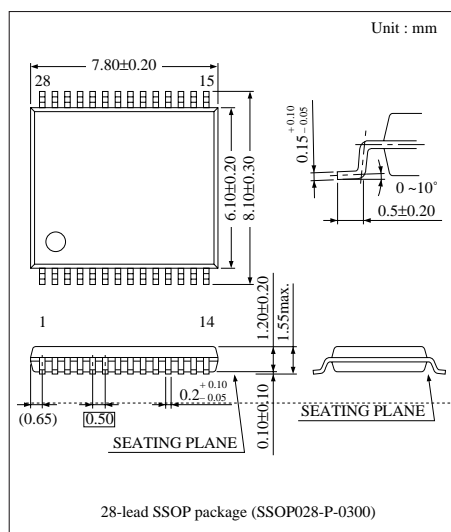
FM/AM Tuner for 1.5V Headphone Stereo

Overview

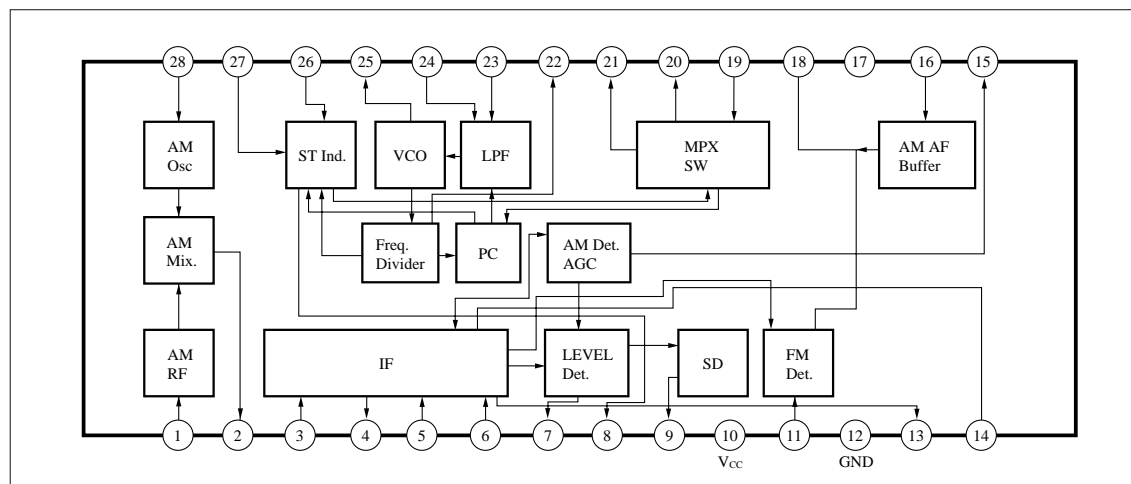
The AN7233SH is an IC for tuner of 1.5V headphone stereo. It incorporates AM tuner + FM IF + FM detector + FM MPX and has been provided with the station detection function and IF count output function required to support DTS, and the AM IF output function required to support AM stereo. It is included in the 28-lead SSOP package with 0.5mm pitch.

Features

- Low voltage operation : $V_{CC}=1.0V$ or more
- AM tuner/FM IF + FM detection + FM MPX : one chip
- DTS supported
- AM stereo support possible
- Adjustable sensitivity for station detection
- Small package



Block Diagram



■ Absolute Maximum Ratings (Ta=25°C)

| Parameter | Symbol | Rating | Unit |
|-------------------------------|------------------|-------------|------|
| Supply Voltage | V _{CC} | 7.0 | V |
| Supply Current | I _{CC} | 10 | mA |
| Power Dissipation | P _D | 70 | mW |
| Operating Ambient Temperature | T _{opr} | -20 ~ + 75 | °C |
| Storage Temperature | T _{stg} | -55 ~ + 125 | °C |

■ Recommended Operating Range (Ta=25°C)

| Parameter | Symbol | Range |
|--------------------------------|-----------------|-------------|
| Operating Supply Voltage Range | V _{CC} | 1.0V ~ 2.0V |

■ Electrical Characteristics (V_{CC}=1.2V, Ta= 25°C±2°C)

| Parameter | Symbol | Condition | min. | typ. | max. | Unit |
|--------------------------------------|-------------------------|---|------|------|------|-------|
| FM | | | | | | |
| Total Circuit Current | I _{tot (FM)} | No signals (under VCO operating) | 5.5 | 7.5 | 9.5 | mA |
| Output Voltage | V _{O (FM)} | | 26 | 44 | 61 | mV |
| Limiting Sensitivity | V _{i (lim)} | V _i for V _O = -3dB | 38 | 45 | 48 | dBμ |
| S/N Ratio | S/N (FM) | | 55 | — | — | dB |
| THD | THD (FM) | | — | — | 1.4 | % |
| LED ON Sensitivity | V _{i (FMLED1)} | V _{CC} =1.1V, No modulation REQ OFF | 48 | 55 | 61 | dBμ |
| LED Decreased Voltage ON Sensitivity | V _{i (FMLED2)} | V _{CC} =1.0V, No modulation REQ OFF | 48 | 58 | 69 | dBμ |
| IF Buffer Output 1 | V _{OIF1 (FM)} | V _{IN} = 80dBμ, No modulation | — | 48 | 86 | mVrms |
| IF Buffer Output 2 | V _{OIF2 (FM)} | V _{CC} =1.0V, V _{IN} = 80dBμ, No modulation | 19 | — | — | mVrms |
| AM | | | | | | |
| Total Circuit Current | I _{tot (AM)} | | 3.0 | 5.0 | 7.0 | mA |
| Output Voltage | V _{O (AM)} | | 21 | 31 | 41 | mV |
| Weak Input Detection Output Voltage | V _{O (AMMIN)} | V _{IN} = 26dBμ | 12 | 24 | — | mV |
| S/N Ratio | S/N (AM) | | 36 | — | — | dBμ |
| THD | THD (AM) | | — | — | 5.0 | % |
| LED ON Sensitivity | V _{i (AMLED)} | V _{CC} =1.1 V, No modulation REQ OFF | 16 | 23 | 30 | dB |
| IF Buffer Output 1 | V _{OIF1 (AM)} | V _{CC} =1.1V, V _{IN} = 45dBμ, No modulation | 29 | 43 | 57 | mVrms |
| IF Buffer Output 2 | V _{OIF2 (AM)} | V _{CC} =1.0V, V _{IN} = 45dBμ, No modulation | 15 | — | — | mVrms |
| AM IF Output Voltage | V _{O (AM IF)} | V _{IN} = 50dBμ, No modulation | 15 | 30 | 60 | mVrms |
| MPX | | | | | | |
| Channel Balance | CB | Monaural Df= 75kHz | -2 | 0 | 2 | dB |
| Separation | Sep. | MPX Portion only L + R= 30% | 22 | 35 | — | dB |
| THD (Stereo) | THD (STEREO) | L + R= 90%, Pilot= 10% | — | — | 5.0 | % |
| Stereo LED ON Level | V _{P (ON)} | Pilot only | — | 4.8 | 7.0 | % |
| Stereo LED OFF Level | V _{P (OFF)} | Pilot only | 0.8 | 1.9 | — | % |

Note) FM : f = 10.7MHz, Df = 22.5kHz, f_m = 1kHz, V_{IN} = 80dBμ, AM : f = 1MHz, Mod. = 30%, f_m = 1kHz, V_{IN} = 50dBμ
 MPX : f = 10.7MHz, Df = 75kHz (L+ R90%, Pilot90%), f_m = 1kHz, V_{IN} = 80dBμ

■ Pin Descriptions

| Pin No. | Pin Name | Pin No. | Pin Name |
|---------|---|---------|---|
| 1 | AM RF Amp. Input | 15 | AM Detection Pin |
| 2 | AM Mixer Output | 16 | AM AF Amp. Input Pin |
| 3 | Supply Pin for IF Input Portion/AMOSC Section | 17 | Oscillation Prevention Capacitor Pin |
| 4 | AM AGC | 18 | FM/AM Detection Output Pin |
| 5 | AM IF Amp. Input | 19 | MPX Input Pin |
| 6 | FM IF Amp. Input | 20 | Rch Output Pin |
| 7 | SD LED ON Level Adjustment | 21 | Lch Output Pin |
| 8 | Stereo LED Drive/AMIF Output Pin | 22 | AM/FM Changeover/19kHz Output Pin |
| 9 | SD LED Drive Pin | 23 | Loop Filter Pin 1 for PLL |
| 10 | Supply Pin | 24 | Loop Filter Pin 2 for PLL |
| 11 | Phase-Shifter Pin for FM Detection | 25 | CR Connecting Pin for VCO |
| 12 | GND Pin | 26 | Low Pass Filter Pin 1 for Pilot Detection |
| 13 | Output for FM/AM IF Count | 27 | Low Pass Filter Pin 2 for Forced MONO/Pilot Detection |
| 14 | IF Count Control Pin | 28 | AM Local Oscillation Coil Pin |

■ Application Circuit

