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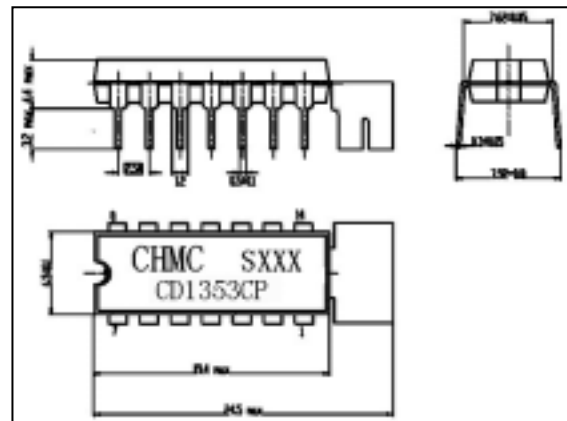
## 2.4W AUDIO AMPLIFIER, SIF AMPLIFIER AND DETECTOR FOR TV SILICON MONOLITHIC BIPOLAR INTEGRATED CIRCUIT CD1353CP

### DESCRIPTION

The CD1353CP is a silicon monolithic integrated circuit designed for SIF and Audio section in television receivers. This IC has all functions including sound IF Amplifier, FM Detector, DC volume control circuit, Audio Output amplifier with 2.4W output power and voltage regulator.

This IC is encapsulated in 14pin dual in-line package with heat tab.

### Outline Drawing



### FEATURES:

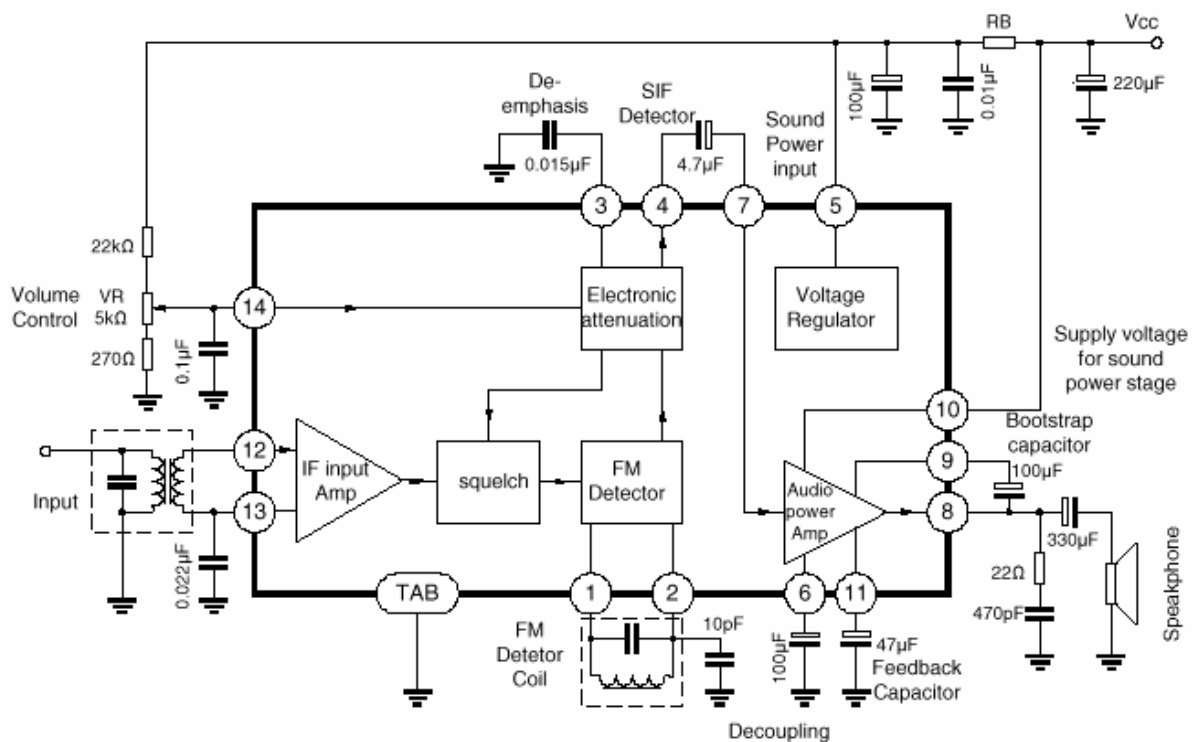
- All functions for SIF and audio stage are provided by this one-chip IC and this IC will realize reduction of assembly cost as well as reduction of number of other components.
- Audio output power is controlled by electronic attenuation circuit which operate at DC. Therefore, unnecessary radiation, oscillation etc. are eliminated. Due to DC control, shielded wire is not required and variable resistor will be placed anywhere required.
- Electronic attenuator has enough attenuation (Typ.80dB) by the adoption of squelch circuit. In addition, as attenuation characteristic is same with resistance change of variable resistor, suitable variable resistor will be selected easily.
- As Peak differential detection method is adopted for FM detection, outside circuitry can be very simple easy.
- As operation voltage (Vcc) range for output stage is very wide (9-18V), suitable Vcc can be freely determined for required output level.

For example:

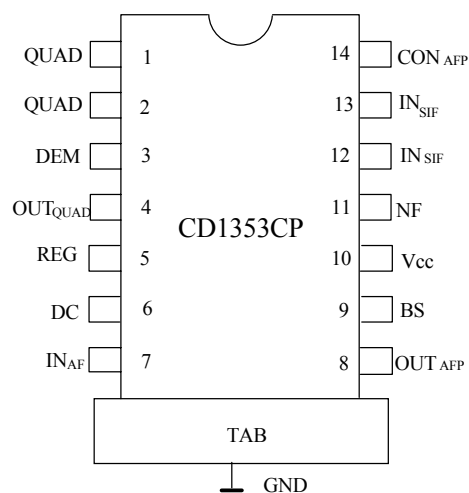
$P_o=2.4W$  at  $V_{cc}=18V$ ,  $R_L=8$

$P_o=1.2W$  at  $V_{cc}=12V$ ,  $R_L=8$

## BLOCK DIAGRAM



## PIN CONNECTION



## PIN DESCRIPTION

| Pin | Description                  | Symbol              | Pin | Description                          | Symbol             |
|-----|------------------------------|---------------------|-----|--------------------------------------|--------------------|
| 1   | FM Detector Coil             | QUAD                | 8   | Sound Power Out                      | OUT <sub>AFP</sub> |
| 2   | FM Detector Coil             | QUAD                | 9   | Bootstrap Capacitor                  | BS                 |
| 3   | DE Emphasis Capacitor        | DEM                 | 10  | Supply Voltage For Sound Power Stage | V <sub>cc</sub>    |
| 4   | SIF Detector Output          | OUT <sub>QUAD</sub> | 11  | Feed Back Capacitor                  | NF                 |
| 5   | Supply Voltage For SIF Stage | REG                 | 12  | SIF Input (Hot End)                  | IN <sub>SIF</sub>  |
| 6   | Decoupling Capacitor         | DC                  | 13  | SIF Input (Cold End)                 | IN <sub>SIF</sub>  |
| 7   | Sound Power Input            | IN <sub>AF</sub>    | 14  | Volume Control                       | CON <sub>VOL</sub> |

## ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

| Characteristic        | Symbol           | Value                 | Unit             |
|-----------------------|------------------|-----------------------|------------------|
| Supply Voltage Pin 10 | V <sub>10</sub>  | 20                    | V                |
| Supply Current Pin 10 | I <sub>10</sub>  | 1                     | A                |
| Supply Current Pin 5  | I <sub>5</sub>   | 100                   | mA               |
| Input Signal Voltage  | V <sub>i</sub>   | 3                     | V <sub>p-p</sub> |
| Power Dissipation     | P <sub>d1</sub>  | 0.8(Ta=75°C) Free Air | W                |
| Power Dissipation     | P <sub>d2</sub>  | 1.4*                  | W                |
| Operating Temperature | T <sub>opt</sub> | -20 to +75            | °C               |
| Storage Temperature   | T <sub>stg</sub> | -40 to +150           | °C               |

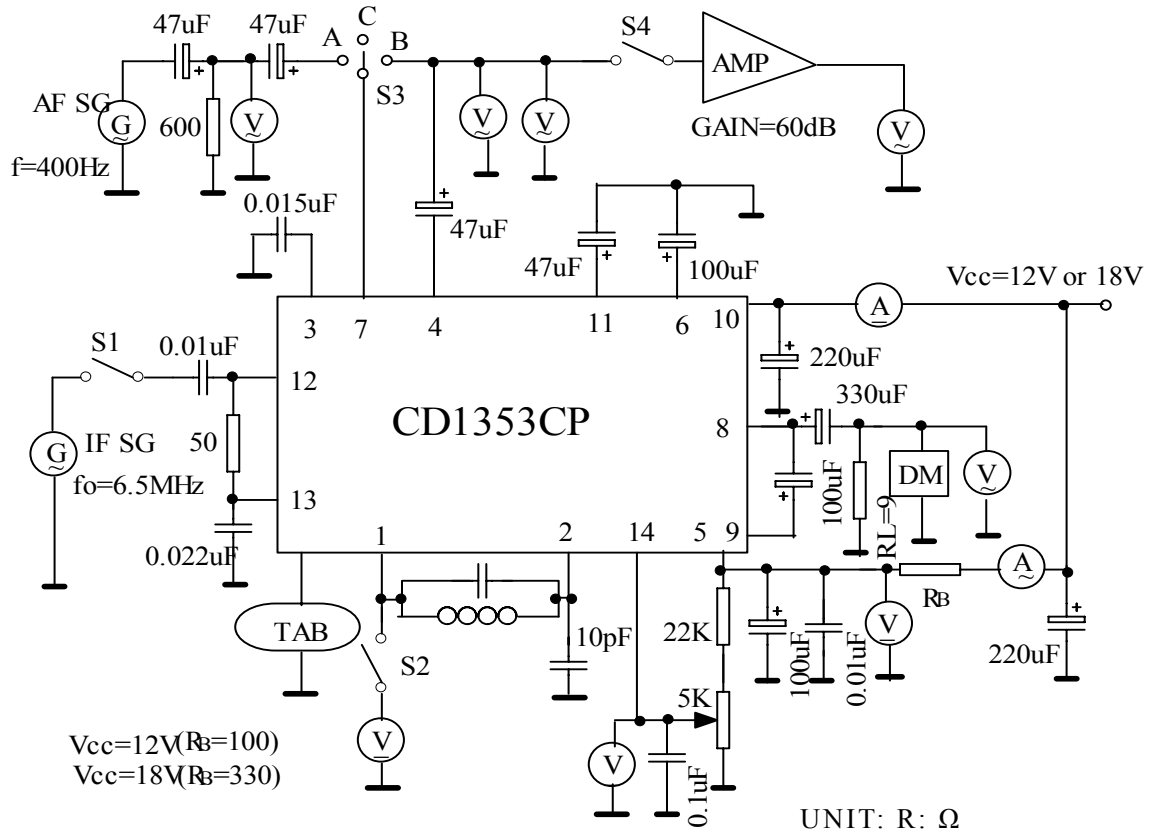
- Printed Circuit copper Area 50×50mm<sup>2</sup>

**ELECTRICAL CHARACTERISTICS** (Ta=25±3°C)

| Characteristic  | Symbol  | Test Condition                    | Min | Typ | Max | Unit  |
|---|---------|-----------------------------------|-----|-----|-----|-------|
| <b>If Stage</b> (Vcc=12V RB=100Ω Rg=50Ω V14≥1.3V fo=4.5MHz fM=400Hz f=±25kHz) |         |                                   |     |     |     |       |
| Pin 5 Voltage   | V5A     |                                   | 7.5 | 8.0 | 8.5 | V     |
| Pin 5 Voltage   | V5B     | Vcc=18V RB=330Ω                   | 7.5 | 8.0 | 8.5 | V     |
| Pin 10 Current  | I10A    | No Input Signal                   | 14  | 19  | 24  | mA    |
| Pin 10 Current  | I10B    | Vcc=18V RB=330Ω No Input Signal   | 16  | 28  | 35  | mA    |
| IF Limiting Voltage   | Vi(lim) | VOAF(Vi=10mVrms)-3dB              |     | 200 | 400 | μVrms |
| Detector Output Voltage   | VOD     | Vi=10mVrms                        | 300 | 360 |     | mVrms |
| Detector Distortion   | THD1    | Vi=10mVrms                        |     | 0.7 |     | %     |
| AM Rejection  | AMR     | AM MOD 30%<br>fM=400Hz Vi=10mVrms | -40 | -50 |     | dB    |
| Maximum Attenuation   | ATTMAX  | V14=0V                            | -60 | -80 |     | dB    |
| <b>Sound Power Stage</b> (vcc=12V RB=100Ω RL=8Ω f=400Hz Rg=600Ω)              |         |                                   |     |     |     |       |
| Sound Stage Voltage Gain  | Av      | Vi=30mVrms                        | 33  | 37  | 41  | dB    |
| Sound Output Power  | PO1     | THD=10%                           | 0.9 | 1.2 |     | W     |
| Sound Output Power  | PO2     | Vcc=18V RB=330Ω<br>THD=10%        | 2.0 | 2.4 |     | W     |
| Sound Output Distortion   | THD2    | Po=0.5W                           |     | 0.6 | 2.0 | %     |
| Sound Output Distortion   | THD3    | Vcc=18V RB=330Ω<br>Po=0.5W        |     | 0.5 | 2.0 | %     |
| <b>If Stage + Sound Power Stage</b>   |         |                                   |     |     |     |       |
| Over All Sound Output Distortion  | THD4    | Po=0.5W Vi=10mVrms                |     | 1.5 | 4.0 | %     |
| <b>Reference Data</b>   |         |                                   |     |     |     |       |
| Pin 10 Current  | I10     | THD.2A=10%                        | 200 |     | 210 | mA    |
| Pin 10 Current  | I10     | THD.2B=10%                        | 270 |     | 280 | mA    |
| Sound Output Power  | PO1     | THD=3%                            |     | 1.1 |     | W     |
| Sound Output Power  | PO2     | Vcc=18V RB=330Ω<br>THD=3%         |     | 2.0 |     | W     |
| Sound Stage Band Width  | BW      | -3dB                              | 50  |     | 50k | Hz    |

| Pin Inpedance          | fo=4.5MHz |     | 5.5MHz |     | 6.0MHz |     | 6.5MHz |     | Unit  |
|------------------------|-----------|-----|--------|-----|--------|-----|--------|-----|-------|
|                        | R         | C   | R      | C   | R      | C   | R      | C   |       |
| Pin 12 IF Input        | 2         | 9.5 | 2      | 9.4 | 1.9    | 9.4 | 1.9    | 9.4 | kΩ/pF |
| Pin 1 Detector Connect | 2.4       | 6.3 | 2.4    | 6.2 | 2.4    | 6.1 | 2.4    | 6.1 | kΩ/pF |
| Pin2 Detector Connect  | 11.5      | 9   | 9      | 8.5 | 8.5    | 8.3 | 7.8    | 8.1 | kΩ/pF |

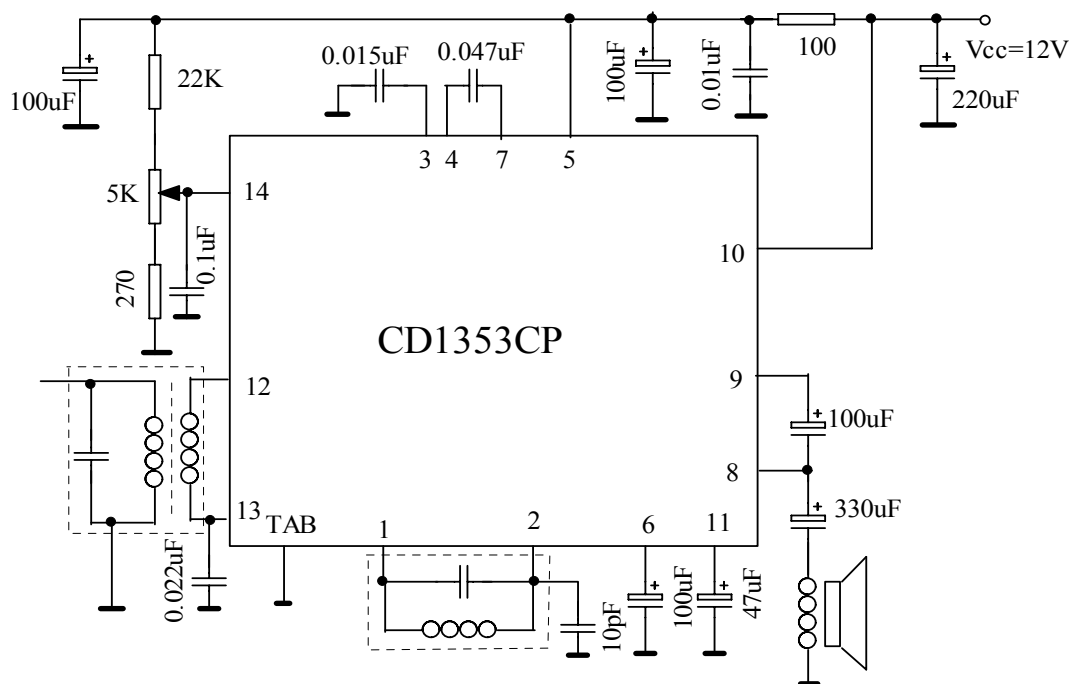
TEST CIRCUIT



TEST SWITCH SITUATION TABLE

| Characteristics      | S1  | S2  | S3 | S4  | Characteristics    | S1  | S2  | S3 | S4     |
|----------------------|-----|-----|----|-----|--------------------|-----|-----|----|--------|
| V <sub>5A</sub>      | off | off | C  | off | ATT <sub>MAX</sub> | on  | off | B  | off→on |
| V <sub>5B</sub>      | off | off | C  | off | A <sub>v</sub>     | off | off | A  | off    |
| I <sub>10A</sub>     | off | off | C  | off | P <sub>o1</sub>    | off | off | A  | off    |
| I <sub>10B</sub>     | off | off | C  | off | P <sub>o2</sub>    | off | off | A  | off    |
| V <sub>i</sub> (lim) | on  | off | B  | off | THD <sub>2</sub>   | off | off | A  | off    |
| V <sub>OD</sub>      | on  | off | B  | off | THD <sub>3</sub>   | off | off | A  | off    |
| THD <sub>1</sub>     | on  | off | B  | off | THD <sub>4</sub>   | on  | off | C  | off    |
| AMR                  | on  | off | B  | off |                    |     |     |    |        |

APPLICATION CIRCUIT



UNIT: R:Ω

CHARACTERISTICS CURVES

