

# AN7286S

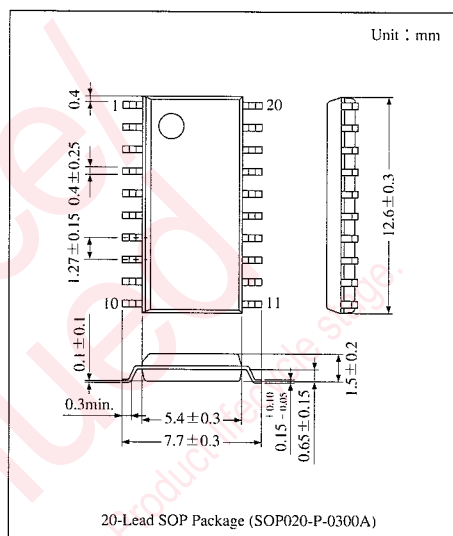
## AM Demodulator Circuit for Car Tuner

### Overview

The AN7286S is an IC designed for AM radio demodulation. It is best suitable to be mounted in a car. It is superior in auditory sense for weak electric field by employing ATC (Auto Tone Controller) and has realized high performance also for strong electric field.

### Features

- ATC function
- Low distortion factor (0.3%)
- High S/N (55dB)
- SEEK sensitivity switching function

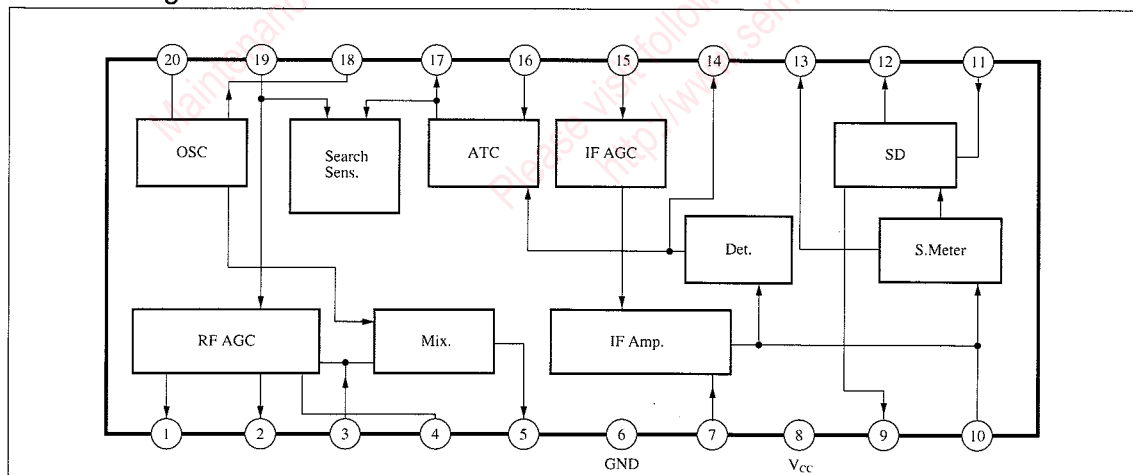


### Pin Name

| Pin No. | Pin Name                           | Pin No. | Pin Name                                                         |
|---------|------------------------------------|---------|------------------------------------------------------------------|
| 1       | Voltage Output for RF Gain Control | 11      | SSC SW                                                           |
| 2       | Current Output for PIN Diode Drive | 12      | IF Count Output & LO/DX Changeover                               |
| 3       | Mix. Input                         | 13      | Signal Meter Output                                              |
| 4       | RFAGC Time Constant Setting Pin    | 14      | Detector Output                                                  |
| 5       | Mix. Output                        | 15      | IF AGC Level Detection                                           |
| 6       | GND                                | 16      | ATC Input & ATC sw                                               |
| 7       | IF Input                           | 17      | AF Output & LO Sensitivity Setting                               |
| 8       | V <sub>CC</sub>                    | 18      | OSC Buffer Output                                                |
| 9       | SD Output                          | 19      | Wide Frequency Band AGC Level Detection & DX Sensitivity Setting |
| 10      | IF Amp. Load Pin                   | 20      | OSC Coil Pin                                                     |

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### Block Diagram



### ■ Absolute Maximum Ratings (Ta=25°C)

| Parameter                            | Symbol           | Rating     | Unit |
|--------------------------------------|------------------|------------|------|
| Supply Voltage                       | V <sub>CC</sub>  | 9.2        | V    |
| Supply Current                       | I <sub>CC</sub>  | 45         | mA   |
| Power Dissipation <sup>Note 1)</sup> | P <sub>D</sub>   | 207        | mW   |
| Operating Ambient Temperature        | T <sub>opr</sub> | -30 ~ +80  | °C   |
| Storage Temperature                  | T <sub>stg</sub> | -55 ~ +125 | °C   |

Note 1) Value at Ta=80°C, Free air

### ■ Recommended Operating Range (Ta=25°C)

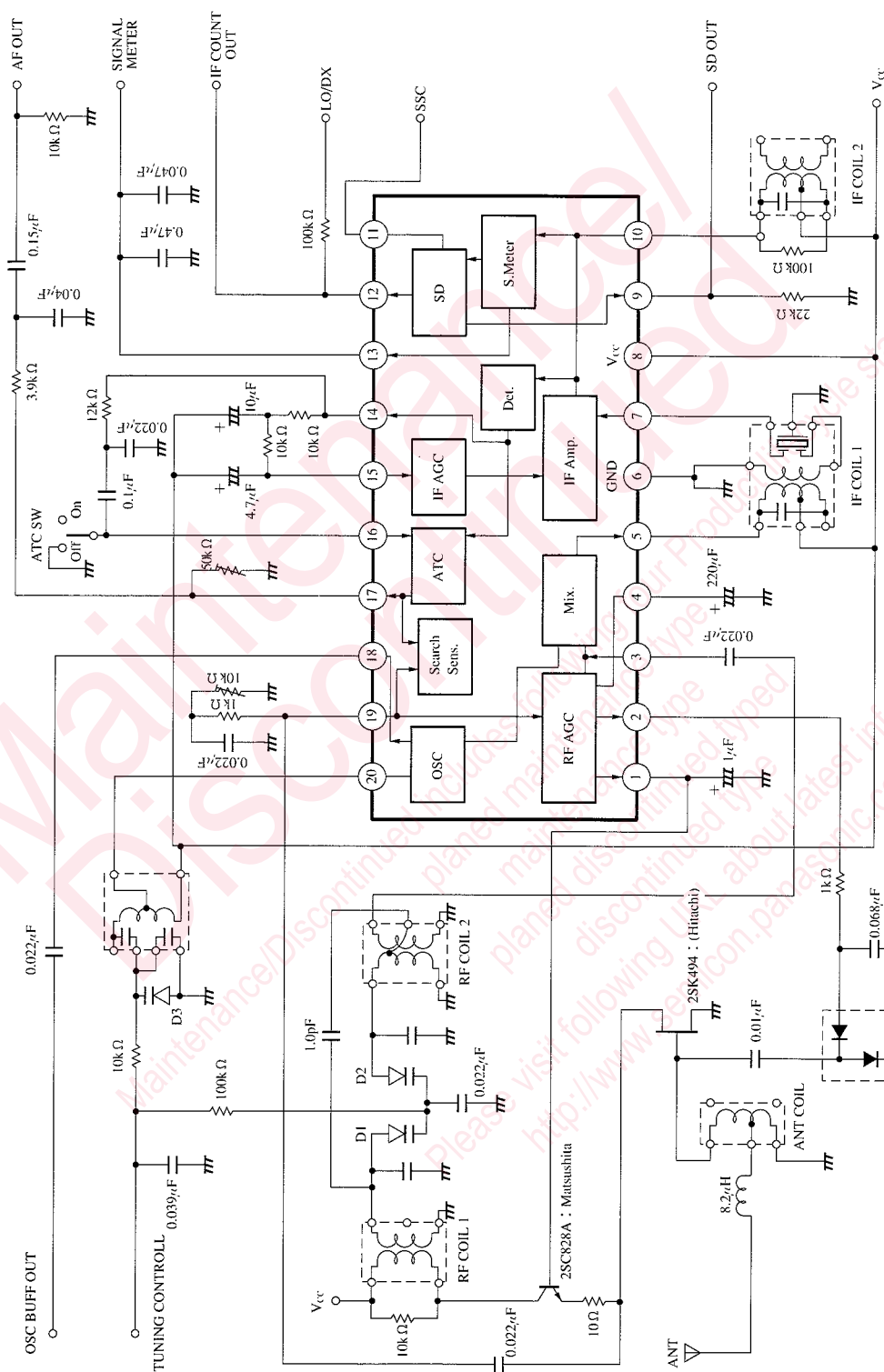
| Parameter                      | Symbol          | Range       |
|--------------------------------|-----------------|-------------|
| Operating Supply Voltage Range | V <sub>CC</sub> | 7.2V ~ 9.0V |

### ■ Electrical Characteristics (V<sub>CC</sub>=8V, f<sub>i</sub>=1kHz, Ta=25°C)

| Parameter                       | Symbol           | Condition                                                                                                   | min. | typ. | max. | Unit            |
|---------------------------------|------------------|-------------------------------------------------------------------------------------------------------------|------|------|------|-----------------|
| Consumption Current 1           | I <sub>io1</sub> | No input                                                                                                    | 20   | 30   | 35   | mA              |
| Consumption Current 2           | I <sub>io2</sub> | V <sub>in</sub> = 130dB <sub>μ</sub>                                                                        | 25   | 34   | 40   | mA              |
| Detection Output                | V <sub>O</sub>   | V <sub>in</sub> = 74dB <sub>μ</sub> , 400Hz 30%mod.                                                         | 100  | 125  | 155  | mV              |
| Signal to Noise Ratio           | SN               | V <sub>in</sub> = 74dB <sub>μ</sub> , 400Hz 30%mod.                                                         | 50   | 54   | 58   | dB              |
| AGC Width                       | W                | 74dB <sub>μ</sub> 400Hz 30%, Output -10dB Input Width                                                       | 54   | 58   | 62   | dB              |
| ATC Operation                   | ΔATC             | V <sub>i</sub> = 14dB <sub>μ</sub> 1kHz 30%mod.<br>(V <sub>O</sub> at ATC off) - (V <sub>O</sub> at ATC on) | 2    | 4    | 6    | dB              |
| Distortion Factor 1             | THD1             | V <sub>in</sub> = 74dB <sub>μ</sub> , 400Hz 80%mod.                                                         | 0.01 | 0.3  | 1.0  | %               |
| Distortion Factor 2             | THD2             | V <sub>in</sub> = 130dB <sub>μ</sub> , 400Hz 80%mod.                                                        | 0.01 | 0.4  | 1.0  | %               |
| Wide Frequency Band AGCon Input | V <sub>wa</sub>  | No input of desired wave, Interference wave 1.4MHz                                                          | 82   | 88   | 94   | dB <sub>μ</sub> |
| Local Osc. Buffer Output        | V <sub>os</sub>  | No input                                                                                                    | 170  | 210  | 250  | mV              |
| IF Count Output 1               | V <sub>if1</sub> | V <sub>in</sub> = 40dB <sub>μ</sub> 400Hz 30%mod.                                                           | 145  | 200  | 255  | mV              |
| IF Count Output 2               | V <sub>if2</sub> | No input                                                                                                    | —    | —    | 10   | mV              |
| SD Output 1                     | V <sub>sd1</sub> | V <sub>in</sub> = 40dB <sub>μ</sub> 400Hz 30%mod.                                                           | 4.5  | 4.8  | 5.0  | V               |
| SD Output 2                     | V <sub>sd2</sub> | No input                                                                                                    | 0.0  | 0.2  | 0.5  | V               |
| Signal Meter Output 1           | V <sub>sm1</sub> | No input                                                                                                    | 1    | 10   | 100  | mV              |
| Signal Meter Output 2           | V <sub>sm2</sub> | V <sub>in</sub> = 30dB <sub>μ</sub> 400Hz 30%mod.                                                           | 0.6  | 0.85 | 1.1  | V               |
| Signal Meter Output 3           | V <sub>sm2</sub> | V <sub>in</sub> = 130dB <sub>μ</sub> 400Hz 30%mod.                                                          | 4.0  | 4.6  | 4.95 | V               |
| Search Sensitivity DX           | Sd               | Input for f = 450k ± 2kHz (400Hz 30%mod.),<br>IF count output : 120mV or more                               | 24.5 | 30   | 35.5 | dB <sub>μ</sub> |
| Search Sensitivity LO           | SL               | Input for f = 450k ± 2kHz (400Hz 30%mod.),<br>IF count output : 120mV or more                               | 44.5 | 50   | 55.5 | dB <sub>μ</sub> |

Note) Tuning condition : Adjust the tuning control voltage so that frequency of local Osc. buffer output could be 1450kHz.  
No input : V<sub>in</sub> ≤ -20dB<sub>μ</sub>

# Application Circuit



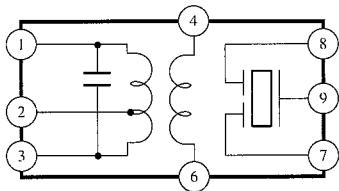
For ANT COIL, IF COIL 1, refer to the following topic "Parts Specifications."

RF COIL 1 : Sumida 2134-397  
 RF COIL 2 : Sumida 2134-398  
 OSC COIL : Sumida 2136-022  
 IF COIL 2 : Sumida SA-044  
 D1, D2, D3 : Tohko KV1235Z

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## Parts Specifications

IF COIL 1



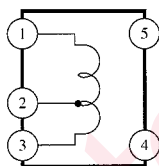
COIL section (Mitsumi products)

No load  $Q = 35 \pm 20\%$   
 Inside capacitance  $= 180\text{pF} \pm 10\%$   
 1-2 : 39T  
 2-3 : 130T  
 4-6 : 27T

Ceramic film section (Equivalents)

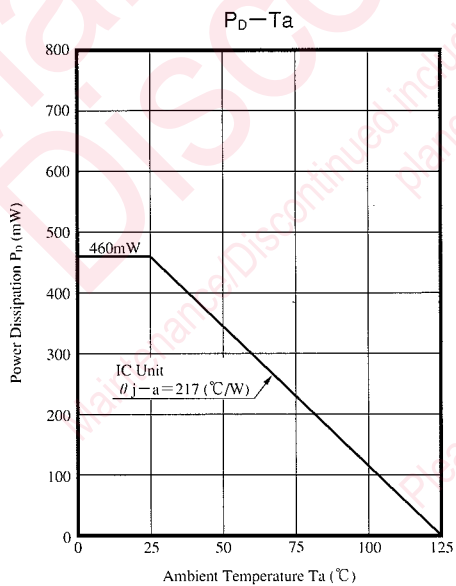
Murata Seisakusho : SFP450H

ANT COIL



No load  $Q = 50\text{min.}$   $L = 5, 9\text{mH} \pm 3\%$   
 ( $f = 252\text{kHz}$ )

3-1 : 405T  
 3-2 : 197T  
 2-1 : 208T



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