

# AN7299S

## Antenna diversity IC for car TV

### ■ Overview

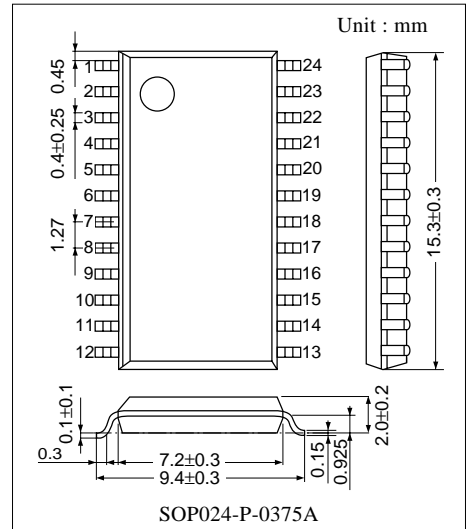
The AN7299S is an antenna diversity IC for car TV. A noise detection circuit and an antenna changeover circuit are integrated on one chip.

### ■ Features

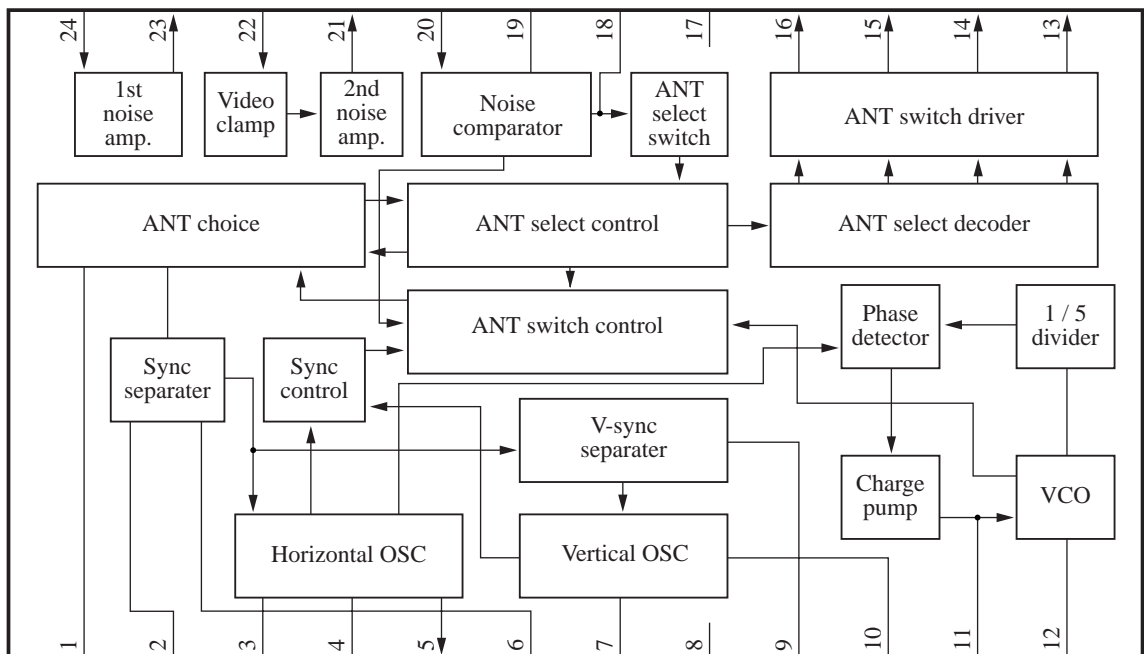
- Built-in vertical and horizontal synchronizing circuit
- Built-in antenna fixing function
- It outputs a composite synchronous signal

### ■ Applications

- Car TVs



### ■ Block Diagram



### ■ Pin Descriptions

Pin No.	Description	Pin No.	Description
1	Antenna selection level-hold capacitor	12	VCO oscillation time-constant setting
2	Sync separation video signal input	13	Antenna selection output 4
3	Horizontal synchronizing signal AFC output	14	Antenna selection output 3
4	Horizontal synchronizing signal oscillation time constant setting	15	Antenna selection output 2
		16	Antenna selection output 1
5	Horizontal synchronizing signal output	17	Power supply
6	Composite synchronizing signal output	18	Noise comparator level setting /Antenna fixing
7	Vertical synchronizing signal output		
8	GND	19	Noise level hold capacitor
9	Vertical synchronizing signal separation time constant setting	20	Noise comparator input
		21	2nd noise amplifier output
10	Vertical synchronizing signal oscillation time constant setting	22	Video clamp input
		23	1st noise amplifier output
11	Charge pump integral time-constant setting	24	Video signal input

### ■ Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage	$V_{CC}$	5.5	V
Supply current	$I_{CC}$	25	mA
Power dissipation *2	$P_D$	180	mW
Operating ambient temperature *1	$T_{opr}$	-35 to +85	°C
Storage temperature *1	$T_{stg}$	-55 to +125	°C

Note) \*1 : All items are at  $T_a = 25^\circ\text{C}$ , except for the operating ambient temperature and storage temperature.

\*2 :  $T_a = 85^\circ\text{C}$

### ■ Recommended Operating Range

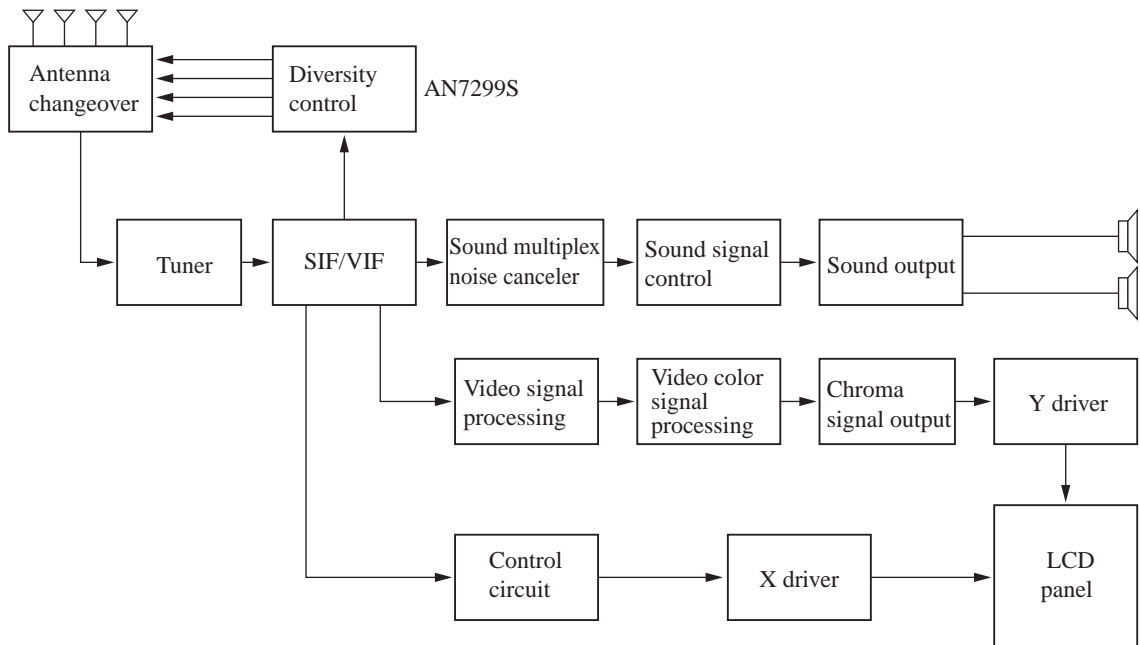
Parameter	Symbol	Range	Unit
Supply voltage	$V_{CC}$	4.5 to 5.5	V

**■ Electrical Characteristics at  $V_{CC} = 5\text{ V}$ ,  $T_a = 25^\circ\text{C}$** 

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Quiescent current without load	$I_{SCC}$	—	8.5	11.9	17.7	mA
1st amplifier voltage gain	$A_{N1}$	$V_{IN} = 10\text{ mV}_{PP}$ , $f = 10\text{ kHz}$	15.3	17.0	18.2	dB
1st amplifier input clamp voltage	$V_{CL1}$	Pin 24 DC voltage	1.87	2.00	2.15	V
1st amplifier output bias voltage	$V_{NOB1}$	Pin 23 DC voltage	2.11	3.07	3.86	V
2nd amplifier voltage gain	$A_{N2}$	$V_{IN} = 10\text{ mV}[p-p]$ , $f = 10\text{ kHz}$ , at 2nd amp. active	16.3	17.5	18.5	dB
2nd amplifier input clamp voltage	$V_{CL2}$	Pin 22 DC voltage at 2nd amp. active	1.96	2.11	2.29	V
2nd amplifier output bias voltage	$V_{NOB2}$	Pin 21 DC voltage at 2nd amp. active	0.78	1.51	2.10	V
Noise hold input bias current	$I_{NHB}$	Pin 19 DC current	40.0	110.0	240.0	nA
Noise comparator input bias current	$I_{NCB}$	Pin 20 DC current	200.0	426.0	820.0	nA
Noise level setting input bias current	$I_{NRB}$	Pin 18 DC current	350.0	548.0	950.0	nA
Antenna input amplifier voltage gain	$A_C$	$V_{IN} = 50\text{ mV}[p-p]$ , $f = 10\text{ kHz}$ , at input amp. active	4.5	5.5	6.4	dB
Level hold output bias voltage	$V_{LOB}$	Pin 1 DC voltage at input amp. active	0.94	1.43	1.91	V
Level hold output bias current	$I_{LOB}$	Pin 1 DC voltage at input amp. non-active	20.0	56.4	100.0	nA
Sync separation input clamp voltage	$V_{SCL}$	Pin 2 DC voltage	2.92	3.13	3.32	V
Sync separation comparator on-state current	$I_{SCN}$	Pin 2 DC current when pin 6 becomes low to high	93.0	116.9	149.3	$\mu\text{A}$
Composite sync separation output sink current	$I_{VH}$	Pin 6 current, when pin 6 voltage becomes lower than 0.5 V	1.0	5.0	—	mA
Vertical sync separation block on-state voltage	$V_{VSON}$	Applied voltage to pin 9 when pin 7 becomes low to high	3.94	4.17	4.40	V
Vertical synchronization time constant sink current	$I_{VSN}$	RSET = 100 k $\Omega$ , pin 9 DC current	8.82	12.19	17.71	$\mu\text{A}$
Vertical synchronization time constant source current	$I_{VSP}$	RSET = 10 k $\Omega$ , pin 9 DC current	42.57	51.14	62.64	$\mu\text{A}$
Vertical synchronizing oscillation block on-state voltage	$V_{VON}$	Applied voltage to pin 10 when pin 7 becomes low to high	2.78	2.94	3.15	V
Vertical synchronizing oscillation block schmidt voltage	$V_{VSW}$	Difference between pin 10 DC voltage and $V_{VON}$ high to low	0.83	0.90	1.01	V
Vertical synchronizing oscillation block on-state voltage	$V_{VLON}$	Applied voltage to pin 10 when pin 7 becomes low to high	2.47	2.65	2.79	V
Vertical synchronization output sink current	$I_V$	Pin 7 current, when pin 7 voltage becomes 0.5 V or less	1.0	5.0	—	mA

**■ Electrical Characteristics at  $V_{CC} = 5\text{ V}$ ,  $T_a = 25^\circ\text{C}$** 

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Horizontal synchronizing oscillation block on-state voltage	$V_{HON}$	Applied voltage to pin 4 when pin 5 becomes low to high	2.80	3.00	3.18	V
Horizontal synchronizing oscillation block schmidt voltage	$V_{HSW}$	Applied voltage to pin 4 when Pin 5 becomes high to low	0.82	0.94	1.05	V
AFC sink current	$I_{HAN}$	$V_4 = V_L$ , pin 3 DC current	127.2	160.0	206.0	$\mu\text{A}$
AFC source current	$I_{HAP}$	$V_4 = V_H$ , Pin 3 DC current	124.1	158.0	206.6	$\mu\text{A}$
Horizontal synchronization sink current	$I_H$	Pin 5 current, when pin 5 voltage becomes under 0.5 V	1.0	5.0	—	mA
Antenna switch output sink current	$I_{AS}$	Antenna selection output pin on-state time DC current	10.0	30.0	—	mA
VCO time constant sink current	$I_{VCN}$	$V_{12} = 1.5\text{ V}$ , pin 12 current	81.40	115.0	166.3	$\mu\text{A}$
VCO time constant source current	$I_{VCP}$	$V_{12} = 4\text{ V}$ , pin 12 current	81.40	114.8	166.3	$\mu\text{A}$
Charge pump sink current	$I_{CCN}$	Pin 11 current after test signal 1 input	80.39	101.7	138.2	$\mu\text{A}$
Charge pump source current	$I_{CCP}$	Pin 11 current after test signal 2 input	80.39	108.3	138.2	$\mu\text{A}$

**■ Application System Example**


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