

# AN7333S

## 4-Element Graphic Equalizer IC for Radio/Radio Cassette Recorder

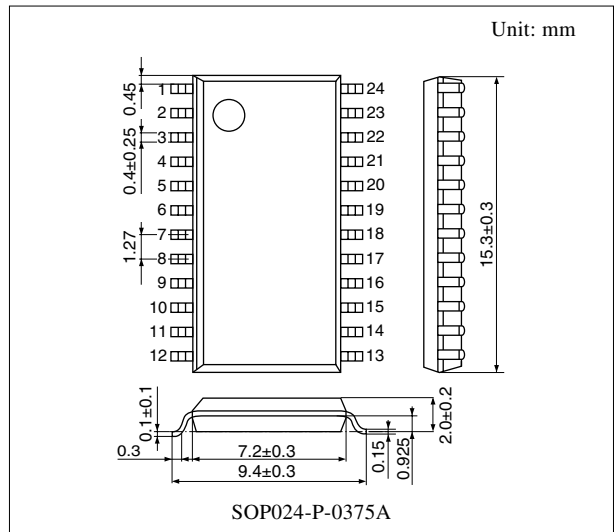
### ■ Overview

The AN7333S is an integrated circuit for 4-element graphic equalizers most suitable for radio cassette / portable component stereo equipment.

2-channel 4-element graphic equalizer can be configured by applying frequency setting capacitors and variable resistors externally. Non-step adjustment of the boost and the cutting quantity is possible by variable resistors.

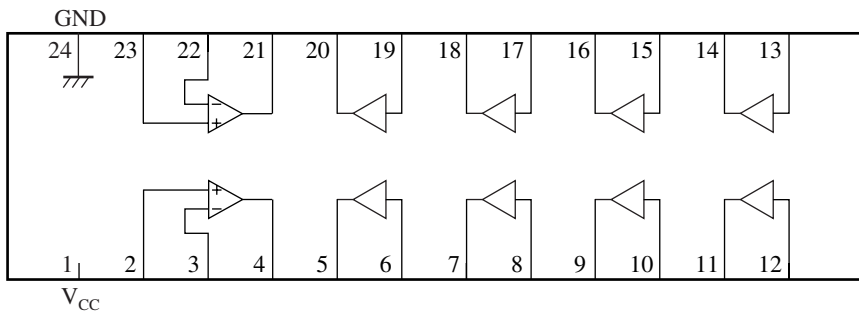
### ■ Features

- The resonance frequency can be freely set by optional selection of the capacitor capacitance.
- Low distortion rate: THD = 0.04% ( $V_{CC} = 5\text{ V}$ )
- Wide dynamic range:  $V_O = 800\text{ mV[rms]}$  (at Boost THD = 1%)
- Low noise level:  $V_{no} = 10\text{ }\mu\text{V}$  ( $V_{CC} = 5\text{ V}$ )



Note) The package of this product will be changed to lead-free type (SOP024-P-0375C). See the new package dimensions section later of this datasheet.

### ■ Block Diagram



### ■ Pin Descriptions

Pin No.	Description	Pin No.	Description
1	Power supply	13	Input pin
2	Non inverting input	14	Negative feedback
3	Inverting input	15	Input pin
4	Output	16	Negative feedback
5	Negative feedback	17	Input pin
6	Input pin	18	Negative feedback
7	Negative feedback	19	Input pin
8	Input pin	20	Negative feedback
9	Negative feedback	21	Output
10	Input pin	22	Inverting input
11	Negative feedback	23	Non inverting input
12	Input pin	24	GND

### ■ Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage	$V_{CC}$	14.4	V
Supply current	$I_{CC}$	30	mA
Power dissipation	$P_D$	432	mW
Operating ambient temperature *1	$T_{opr}$	-20 to +75	°C
Storage temperature *1	$T_{stg}$	-55 to +125	°C

Note) \*1: Except for the operating ambient temperature and storage temperature, all ratings are for  $T_a = 25^\circ\text{C}$ .

### ■ Recommended Operating Range

Parameter	Symbol	Range	Unit
Supply voltage	$V_{CC1}, V_{CC2}$	4 to 14	V

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

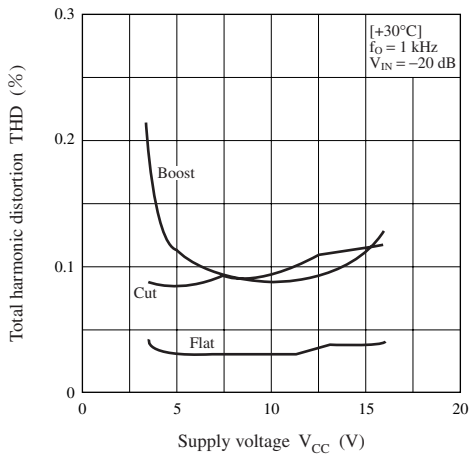
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Total circuit current	$I_{tot}$	$V_{IN} = 0\text{ mV}$	—	7.5	—	mA
Voltage gain	$G_V$	$f = 1\text{ kHz}$ , $V_O = -10\text{ dBV}$	—	-1.5	—	dB
Boost quantity	Boost	$V_O = -20\text{ dBV}$ is set to 0 dBV	—	9.5	—	dB
Cut quantity	Cut	$V_O = -20\text{ dBV}$ is set to 0 dBV	—	-9.5	—	dB
Total harmonic distortion	THD	$f = 1\text{ kHz}$ , $V_O = -20\text{ dBV}$	—	0.04	—	%
Output noise voltage	$V_{no}$	$R_g = 0\ \Omega$ , Total Flat, DIN/AUDIO	—	10	—	$\mu\text{V}$
Crosstalk	CT	$f = 1\text{ kHz}$ , $R_g = 0\ \Omega$ , Total Flat, $V_O = -20\text{ dBV}$	—	12	—	$\mu\text{V}$

■ Terminal Equivalent Circuits

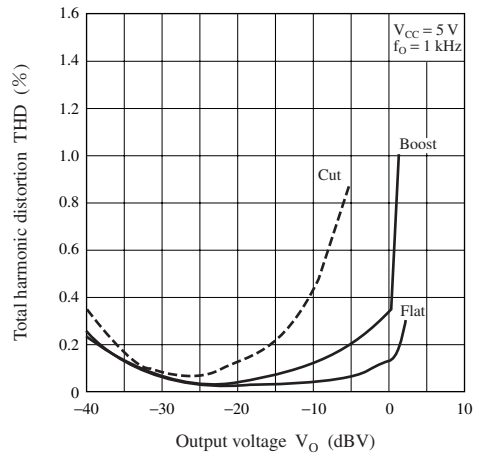
Pin No.	Equivalent circuit	Description	Pin voltage (V)
1	—	Power supply: Supply pin	5
2 23		Non inverting input: Output buffer circuit non-inverting input pin	$\frac{1}{2} V_{CC}$
3 22		Inverting input: Output buffer circuit inverting input pin	Center electric potential
4 21		Output: Output buffer output pin	Center electric potential
5, 7, 9, 11, 14, 16, 18, 20		Negative feedback: Resonance circuit negative feedback pin	Center electric potential
6, 8, 10, 12, 13, 15, 17, 19		Input pin: Resonance circuit input pin	Center electric potential
24	—	GND pin:	0

■ Main Characteristics

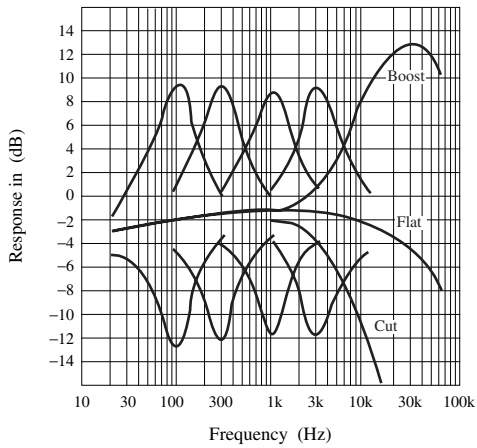
THD —  $V_{CC}$



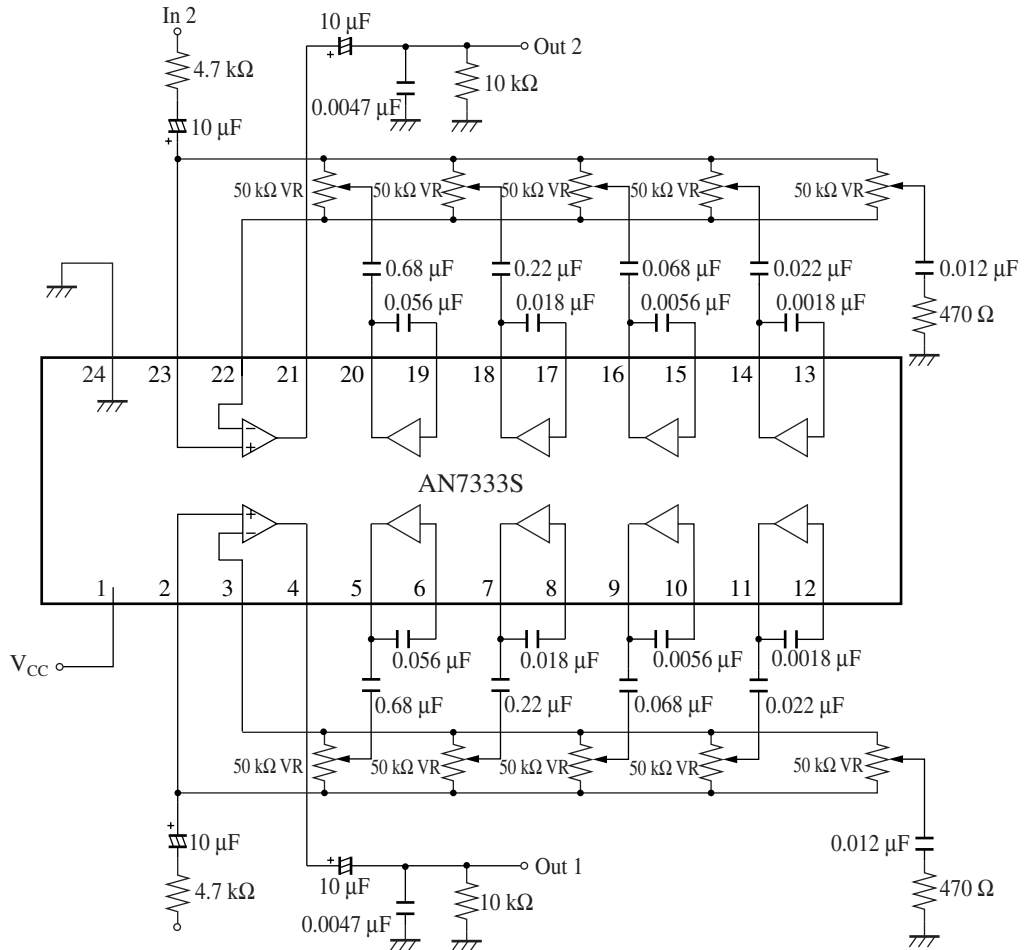
THD —  $V_O$



Frequency characteristics

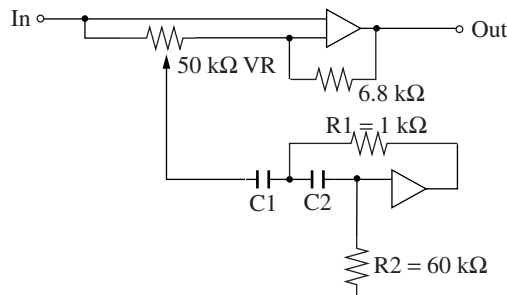


■ Application Circuit Example



Note) VR is B or G type.

• Resonant frequency fo



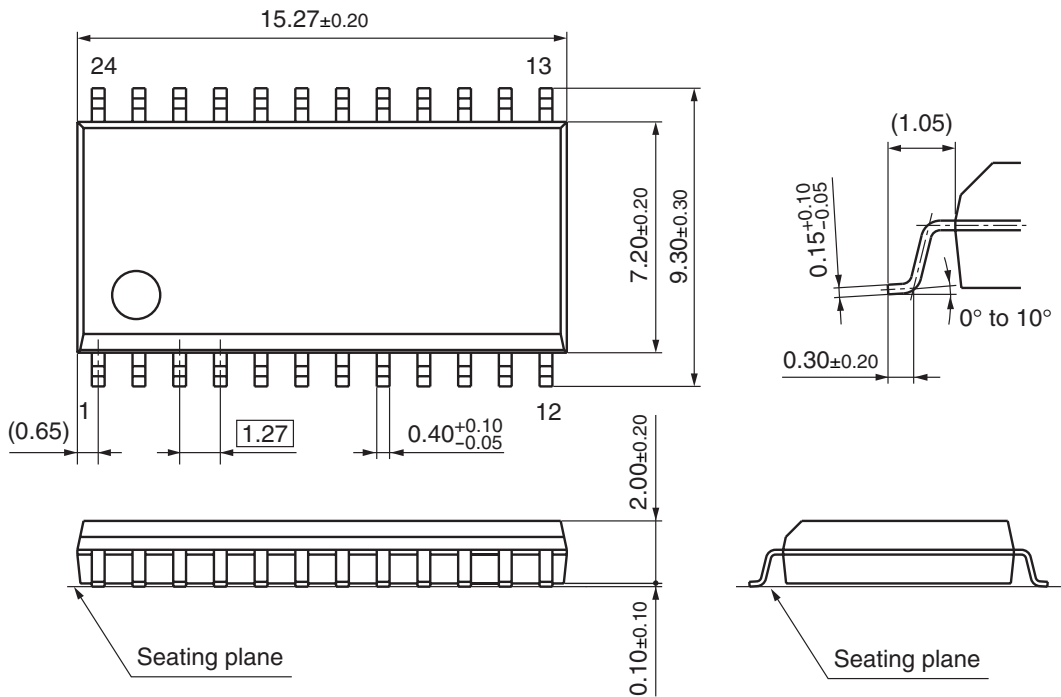
$$f_0 = \frac{1}{2\pi\sqrt{C1 \times C2 \times R1 \times R2}}$$

(Internal resistance: R1 = 1 kΩ, R2 = 60 kΩ)

- \* Internal resistance: As R1 and R2 of internal resistors are common in each oscillation circuit, f<sub>0</sub> can be adjustable from an external capacitor.
- \* Gain can be adjusted by the 50 kΩ variable resistor.

■ New Package Dimensions (Unit: mm)

- SOP024-P-0375C (Lead-free package)



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