

# AN7289NSC

## FM-FE+AM IC for car radio

### Overview

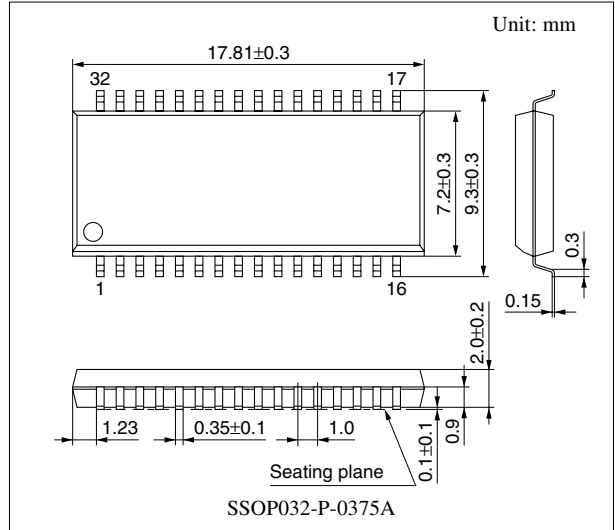
The AN7289NSC is an IC having FM-FE+AM functions for car radio. A tuner block of car radio can be constructed by combination of this IC and the AN7293NSC / NFBQ.

### Features

- A less number of electrolytic capacitors is required (3 capacitors reduction compared with our conventional IC)
- AM: Practical sensitivity is improved by 2 dB by ATC
- AM: Strong input characteristics is improved by 2-loop AGC function

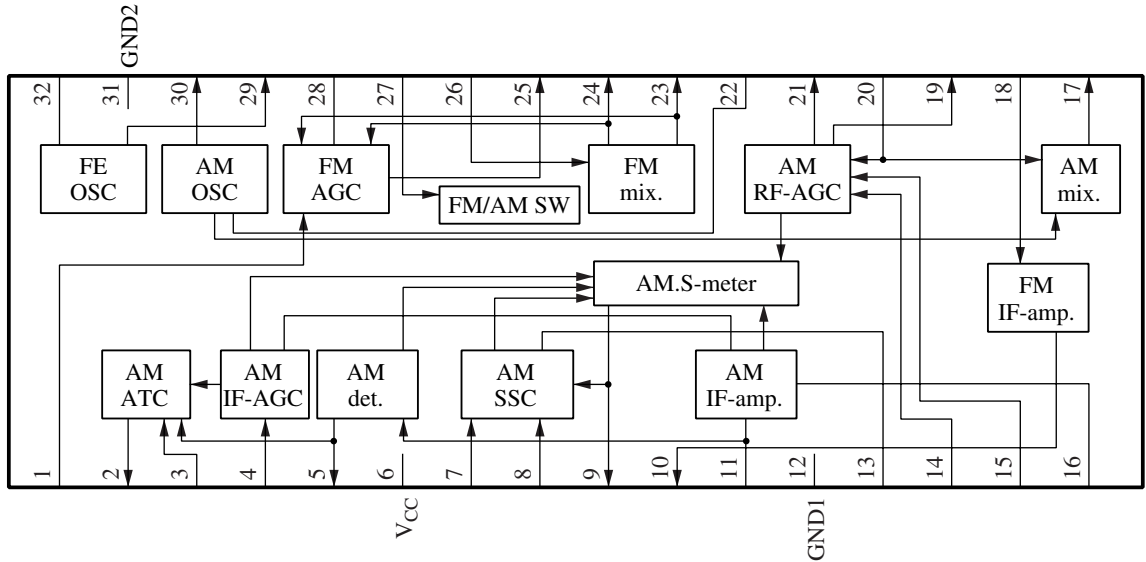
### Applications

- Car radios



Note) The package of this product will be changed to lead-free type (SSOP032-P-0375C). See the new package dimensions section later of this datasheet.

### Block Diagram



### ■ Pin Description

Pin No.	Description	Pin No.	Description
1	FM-keyed-AGC input	18	FM-IF input
2	AM-AF output / LO setting	19	AM-RF gain control
3	AM-ATC input	20	AM-mix. input
4	AM-IF level detection	21	FM-PIN-diode driver
5	AM detection output	22	AM-OSC coil pin
6	V <sub>CC1</sub>	23	FM-mix. output (2)
7	AM-IF counter output / DX / LO SW	24	FM-mix. output (1)
8	AM-SD output	25	FM-PIN-diode driver
9	AM-signal meter output	26	FM-mix. input
10	FM-IF output	27	V <sub>CC2</sub> / FM / AM SW
11	AM-IF output	28	FM-AGC output
12	GND1	29	FM-OSC buffer output
13	SSC	30	AM-OSC buffer output / FE-AGC sensitivity setting
14	AM-RF level detection		
15	AM-WAGC detection / DX setting	31	GND2
16	AM-IF input	32	FM-OSC coil pin
17	AM-mix. output		

### ■ Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage	V <sub>CC</sub>	9.1	V
Supply current	I <sub>CC</sub>	56	mA
Power dissipation *2	P <sub>D</sub>	380.2	mW
Operating ambient temperature *1	T <sub>opr</sub>	-35 to +80	°C
Storage temperature *1	T <sub>stg</sub>	-55 to +125	°C

Note) \*1: Except for the power dissipation, operating ambient temperature, and storage temperature, all ratings are for T<sub>a</sub> = 25°C.

\*2: T<sub>a</sub> = 80°C

### ■ Recommended Operating Range

Parameter	Symbol	Range	Unit
Supply voltage	V <sub>CC</sub>	7.2 to 9.0	V

## ■ Electrical Characteristics at $T_a = 25^\circ\text{C}$

### 1. AM mode $V_{CC} = 8.0\text{ V}$ , $f_{IN} = 1\text{ MHz}$

AM tuning condition: OSC output frequency = 1 450 kHz  $\pm$ 500 Hz

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
AM consumption current	amI <sub>I1</sub>	Without input	28	36	44	mA
AM-AF output	amV <sub>O</sub>	AM-AF output at $V_{IN2} = 74\text{ dB}\mu$ , 400 Hz 30%	100	125	155	mA
AM signal-to-noise ratio	amSN	AM-AF output S/N at $V_{IN2} = 74\text{ dB}\mu$ , 400 Hz 30%	48	52	58	dB
AM-AGC width	amW	AM-AF output when input changes -10 dB at $V_{IN2} = 74\text{ dB}\mu$ , 400 Hz 30%	55	59	63	dB
AM-ATC operation	amATC	(Output ratio [dB] of 400 Hz and 3 kHz when $V_{IN2} = 18\text{ dB}\mu$ ) - (Output ratio [dB] of 400 Hz and 3 kHz when $V_{IN2} = 74\text{ dB}\mu$ ) 80% Mod., AM-AF Out output	3.5	6.5	9.5	dB
AM-distortion 1	amT <sub>1</sub>	$V_{IN2} = 74\text{ dB}\mu$ 400 Hz 80% AM-AF output distortion	0.01	0.5	1.5	%
AM-distortion 2	amT <sub>2</sub>	$V_{IN2} = 130\text{ dB}\mu$ 400 Hz 80% AM-AF output distortion	0.01	0.5	1.5	%
AM wide band AGC on input	amV <sub>W</sub>	$f_{IN2} = 1.4\text{ MHz}$ Input when pin 15 voltage becomes below 3 V	97	103	109	dB $\mu$
AM local oscillation buffer output	amV <sub>OS</sub>	Without input	160	210	260	mV
AM-IF count output 1	amIF <sub>1</sub>	$V_{IN2} = 40\text{ dB}\mu$	150	210	270	mV
AM-IF count output 2	amIF <sub>2</sub>	Without input	—	—	10	mV
AM-SD output 1	amSD <sub>1</sub>	$V_{IN2} = 40\text{ dB}\mu$	4.5	4.9	5.1	V
AM-SD output 2	amSD <sub>2</sub>	Without input	0.0	0.2	0.5	V
AM signal meter output 1	amV <sub>S1</sub>	Without input, pin 9 voltage	1	50	200	mV
AM signal meter output 2	amV <sub>S2</sub>	Pin 9 voltage at $V_{IN2} = 30\text{ dB}\mu$	0.7	0.95	1.2	V
AM signal meter output 3	amV <sub>S3</sub>	Pin 9 voltage at $V_{IN2} = 130\text{ dB}\mu$	4.1	4.8	5.1	V
AM search sensitivity DX	amDX	AM-IF count output is 120 mV or over $V_{IN2}$ when f becomes 450 kHz $\pm$ 2 kHz	24	30	36	dB $\mu$
AM search sensitivity LO	amLO	AM-IF count output is 120 mV or over $V_{IN2}$ when f becomes 450 kHz $\pm$ 2 kHz	44	50	56	dB $\mu$

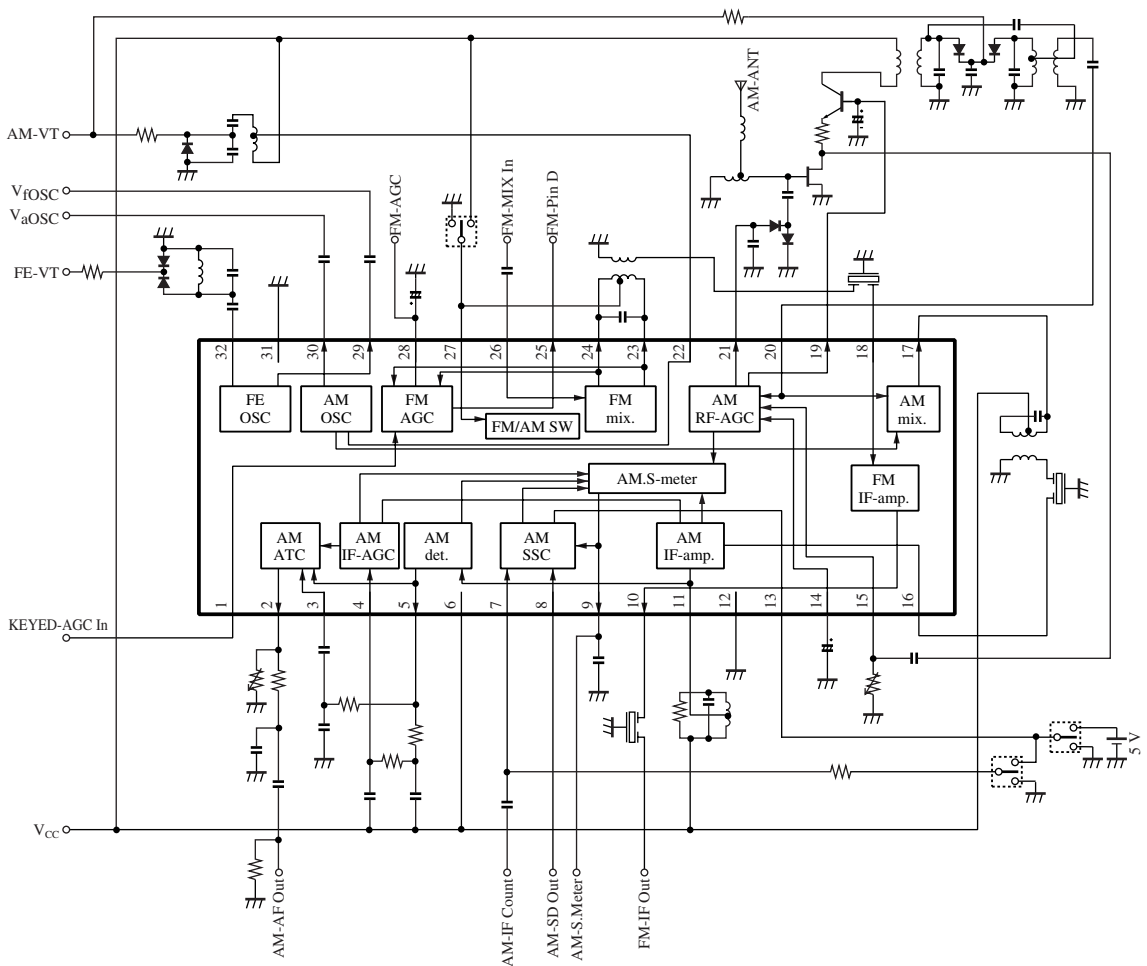
■ Electrical Characteristics at  $T_a = 25^\circ\text{C}$  (continued)

2. FM mode  $V_{CC} = 8.0\text{ V}$ ,  $f_{IN1} = 98\text{ MHz}$

FM tuning condition: OSC output frequency =  $108.7\text{ MHz} \pm 10\text{ kHz}$

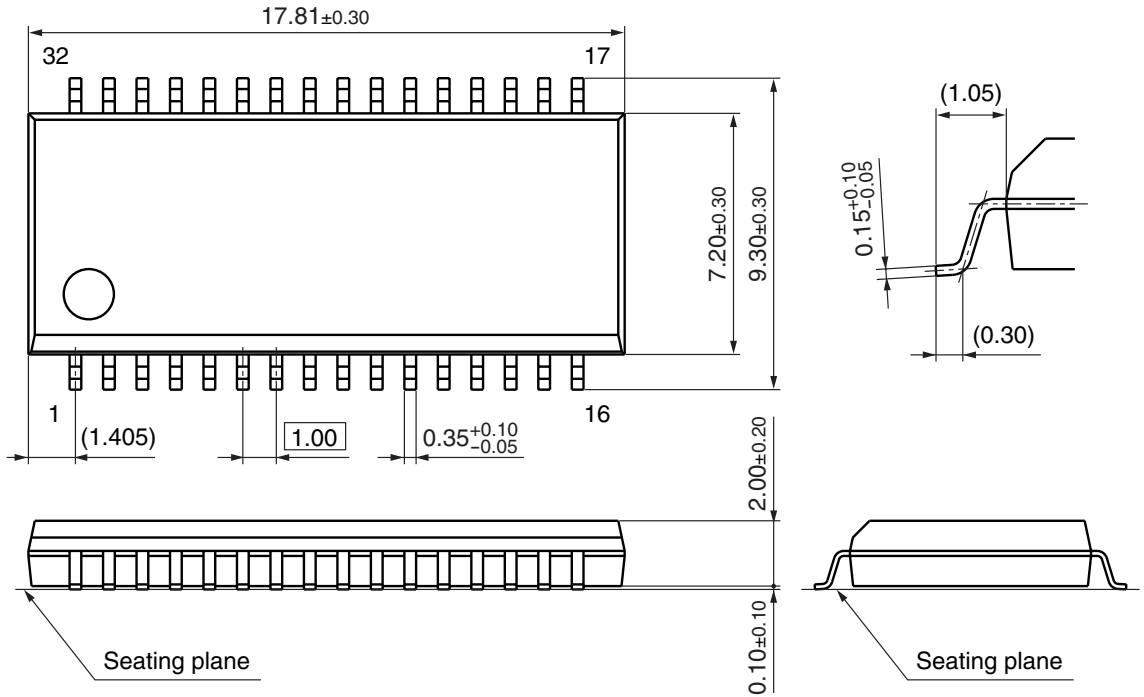
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
FM local oscillation buffer output	fmV <sub>OS</sub>	$f_{OSC} = 108.7\text{ MHz}$ without input	140	200	260	mV
FM-IF output level	fmIF	$V_{IN1} = 71\text{ dB}\mu$	50	95	140	mV
FM-AGC sensitivity	fmAGC	$V_{IN1}$ level when $V_{28}$ becomes 3 V	59	63	67	dB $\mu$
FM-AGC voltage (high)	fmV <sub>aH</sub>	$V_{IN1} = 70\text{ dB}\mu$ $V_{28}$	6.0	6.4	6.8	V
FM-AGC voltage (low)	fmV <sub>aL</sub>	$V_{IN1} = 82\text{ dB}\mu$ $V_{28}$	—	0.05	0.5	V
FM consumption current	fmI <sub>t</sub>	Without input	26	35	44	mA

■ Application Circuit Example



■ New Package Dimensions (Unit: mm)

- SSOP032-P-0375C (Lead-free package)



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