AN7243S

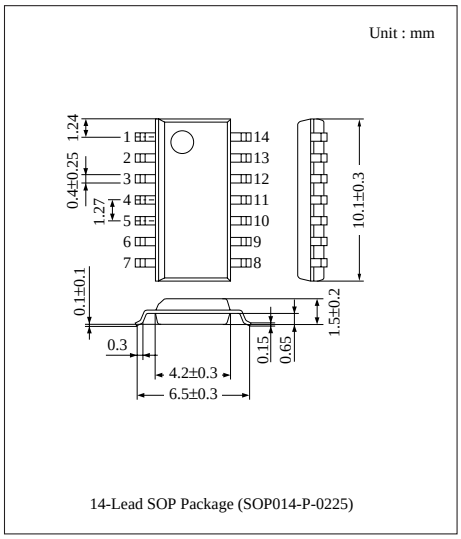
FM Front-end Circuit for Car Radio

■ Overview

The AN7243S is an FM front-end IC designed for DTS except RF amp. of car radio. It is built-in local oscillation frequency buffer output and PIN diode (ADX) driver for antenna damping.

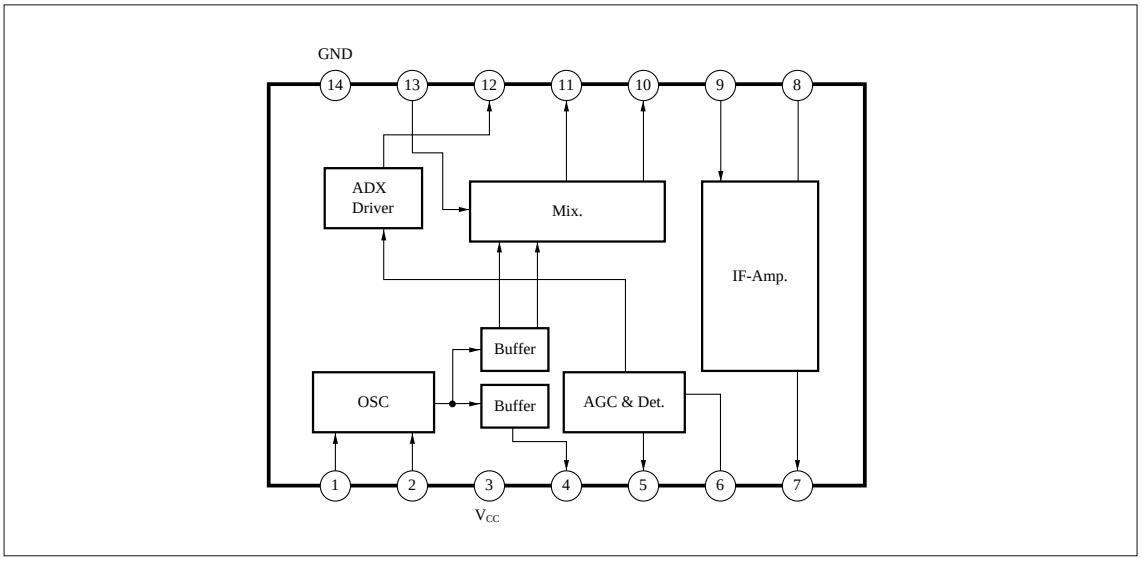
■ Features

- High sensitivity · High S/N ratio
- Good IM characteristics at strong input
- Timing for AGC input level is variable.
- Built-in pre-IF-Amp. having negative (positive) temperature characteristics to RF amp.



14-Lead SOP Package (SOP014-P-0225)

■ Block Diagram



■ Absolute Maximum Ratings (Ta=25˚C)

Parameter	Symbol	Rating	Unit
Supply Voltage	V_{CC}	9.6	V
Supply Current	I_{CC}	50	mA
Power Dissipation	P_D	380	mW
Operating Ambient Temperature	T_{opr}	–40 ~ + 80	˚C
Storage Temperature	T_{stg}	–55 ~ + 125	˚C

■ Recommended Operating Range (Ta=25˚C)

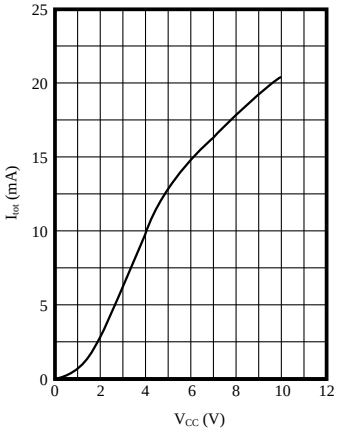
Parameter	Symbol	Range
Operating Supply Voltage Range	V_{CC}	6.5V ~ 9.6V

■ Electrical Characteristics (V_{CC} = 8V, f_{in} = 98MHz, 400Hz 30%Modulation, S_1 : Open, Ta= 25˚C)

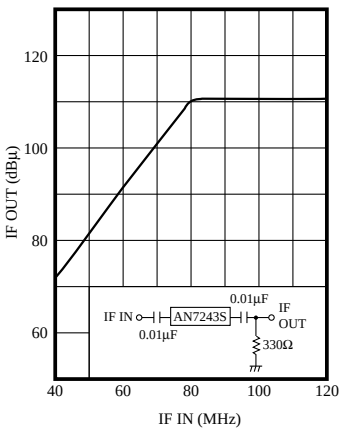
Parameter	Symbol	Condition	min.	typ.	max.	Unit
S/N Ratio	N_{OUT}	V_{in} =17dBμ no conversion However, S= output at 400Hz 30%conversion	22	30	—	dB
Local Oscillation Output Level	V_{OSC}	f_{OSC} =108.7MHz Measured by Pin4, No signal	160	250	330	mV
IF Output Level	V_{OUT}	No modulation, V_{in} = 53dBμ	41	58	82	mV
AGC Maximum Sensitivity	S_{AGC}	Input level at V_{AGC} = 3V	60	65	70	dBμ
AGC Level (L)	$V_{AGC(L)}$	V_{in} = 72dBμ	—	0.02	0.5	V
AGC Level (H)	$V_{AGC(H)}$	V_{in} = 58dBμ	6	6.6	—	V
AGC Sensitivity Variable Range		At S_1ON, difference between input level at V_{AGC} = 3V and AGC maximum sensitivity	18	—	—	dB
ADX Drive Current	$I_{X(max.)}$	V_{in} = 72dBμ	20	—	—	mA
ADX Leak Current	$I_{X(leak)}$	V_{in} = 63dBμ	—	—	1	μA

■ Characteristics Curve

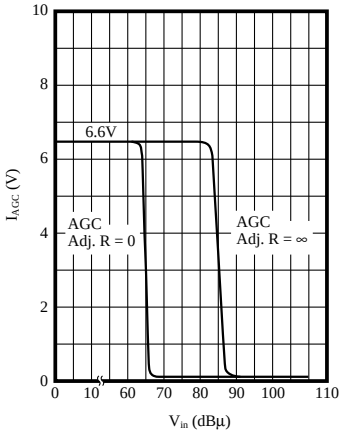
$I_{tot} - V_{CC}$



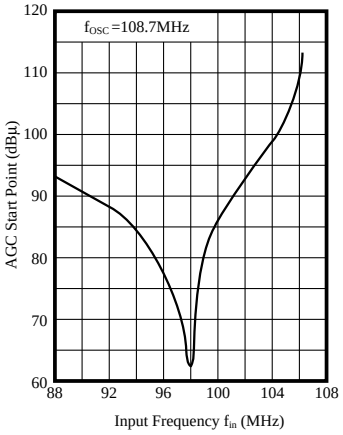
IF – Amp. Input/Output Characteristics



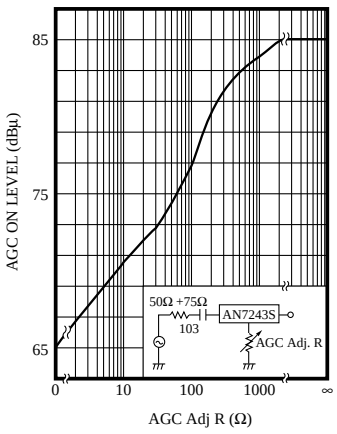
AGC Start Point Variable Axis



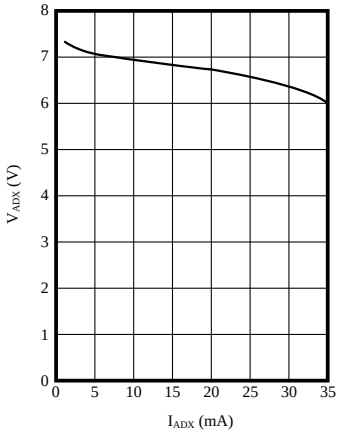
AGC Freq. Characteristics



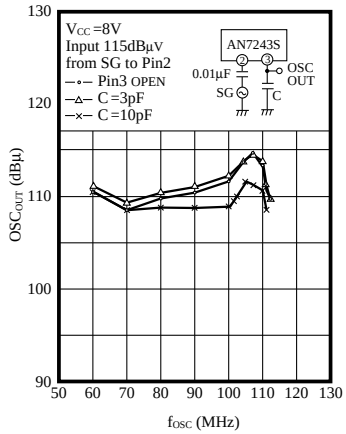
AGC Adj. R – AGC ON Level



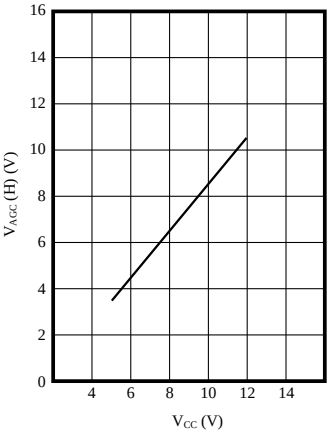
I_{ADX} – V_{ADX}



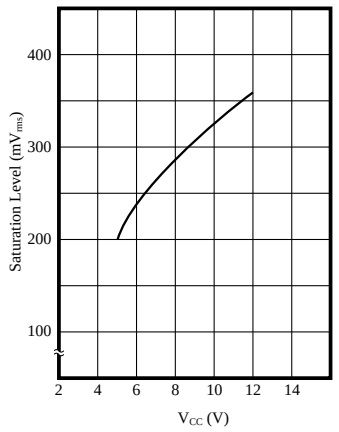
OSC OUT – f_{OSC}



V_{AGC} (H) Supply Voltage Characteristics

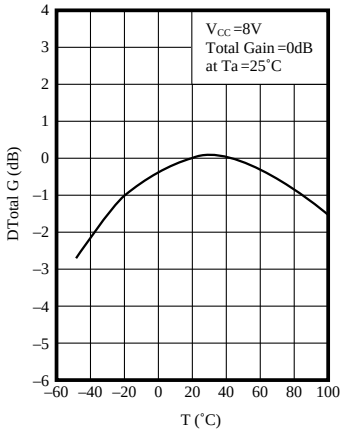


IF Amp. Saturation Level

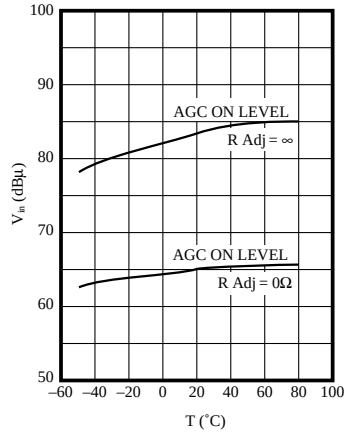


Mixer + IF Amp.

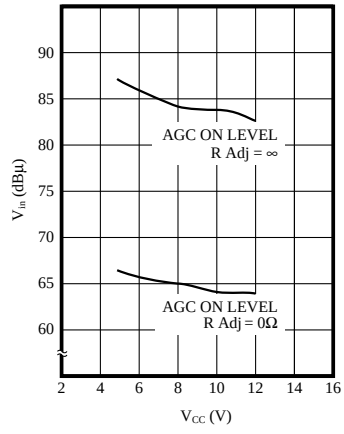
Total Gain Temperature Characteristics



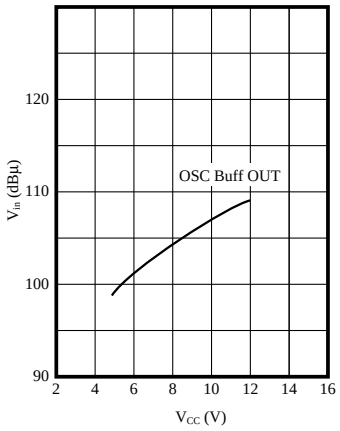
AGC ON Level Temperature Characteristics



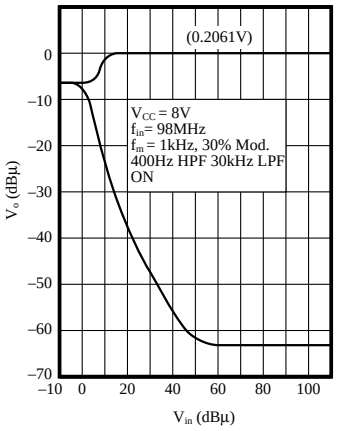
AGC ON Level V_{CC} Dependence



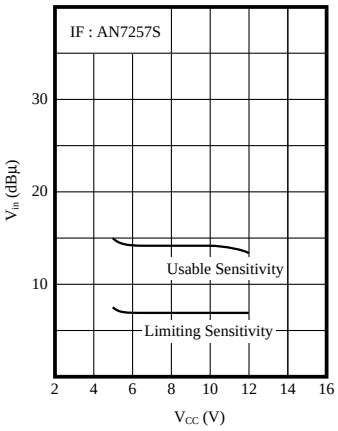
OSC Buff OUT
V_{CC} Dependence



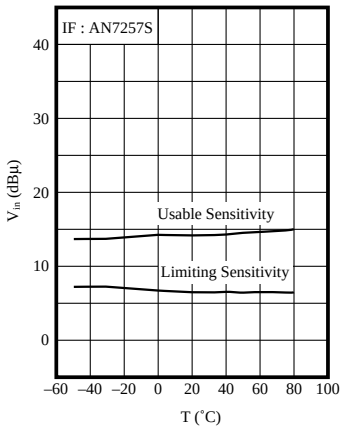
Input/Output Characteristics
Example



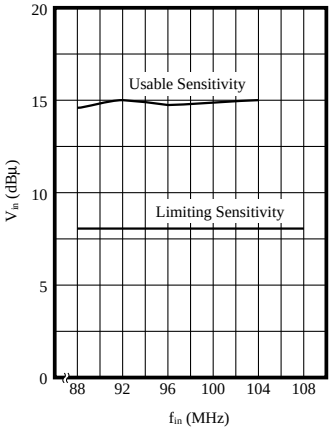
Limiting Sensitivity,
Usable Sensitivity V_{CC} Dependence



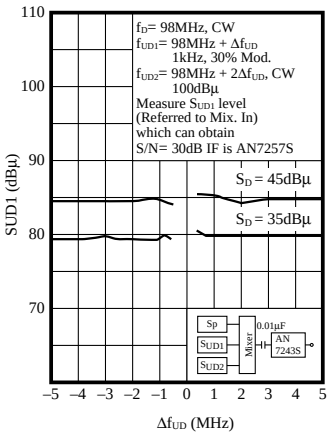
Limiting Sensitivity,
Usable Sensitivity,
Temperature Characteristics



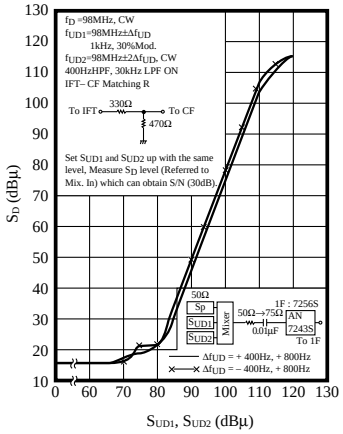
Limiting Sensitivity,
Usable Sensitivity,
Frequency Characteristics



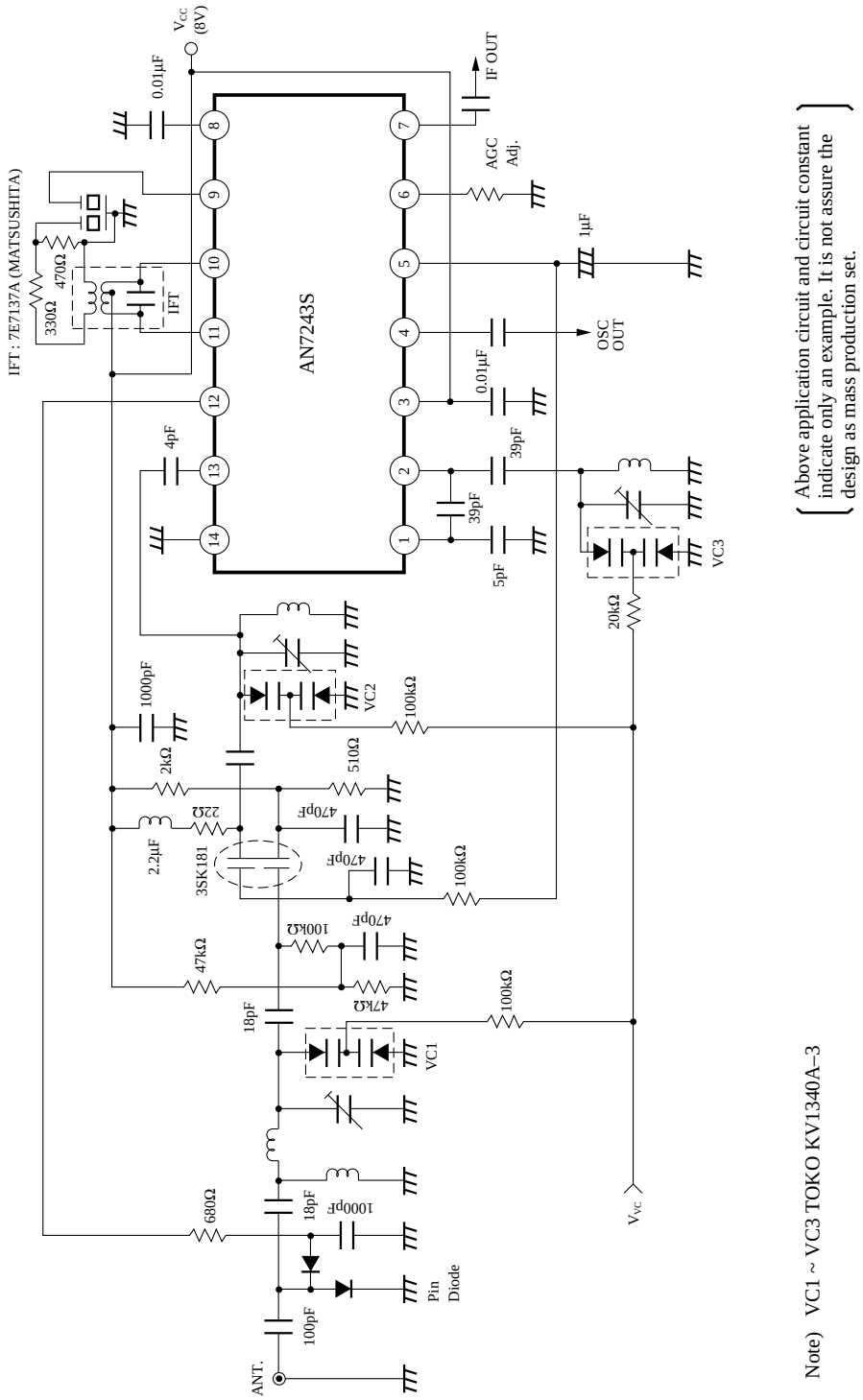
IM Characteristics (1)



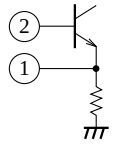
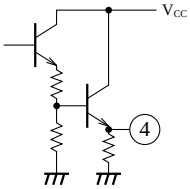
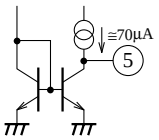
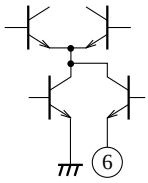
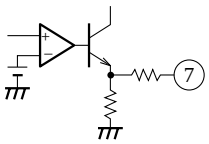
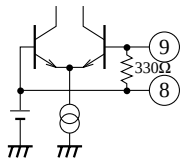
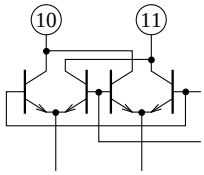
IM Characteristics (2)



■ Application Circuit



■ Pin Descriptions

Pin No.	Pin Name	Typ. Waveform	Description	Equivalent Circuit
1	Oscillation Emitter	108.7MHz	Oscillation transistor's emitter pin	
2	Oscillation Base	108.7MHz	Oscillation transistor's base pin	
3	V_{CC}	DC 8V	Main circuit V_{CC}	
4	OSC Output	108.7MHz	Output oscillation signal to microcomputer through buffer.	
5	AGC Output	6.6V ≅ 0V	Output AGC signal according to Mix. output dimensions.	
6	AGC-Amp. Gain Adjustment	DC 0.8V	Adjust AGC-Amp. gain by external resistance. (Refer to P.275 AGC circuit.)	
7	IF Amp. Output	10.7MHz	IF signal (10.7MHz) output pin $Z_{out} \cong 330\Omega$	
8	IF Amp. By-pass	DC 3.2V	IF amp. by-pass control	
9	IF Amp. Input	10.7MHz	IF signal (10.7MHz) input pin	
10	Mix. Output	10.7MHz	Convert RF signal to IF signal and output.	
11		10.7MHz		

Note) Typical waveform frequency is the value when tuning receiving frequency to 98.0MHz.

■ Pin Descriptions (Cont.)

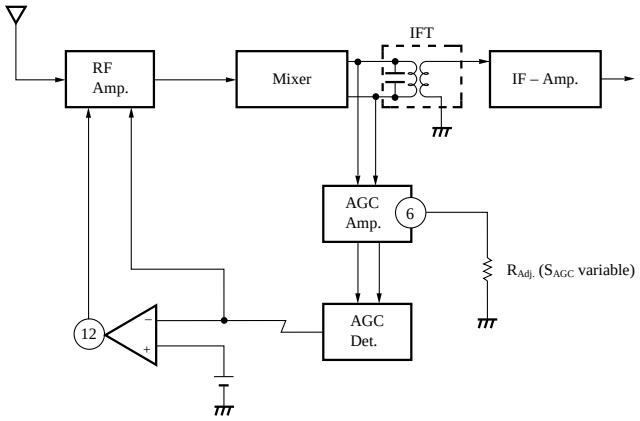
Pin No.	Pin Name	Typ. Waveform	Description	Equivalent Circuit
12	PIN Diode Driver Output	7.2V / .0V	Drive PIN diode for input attenuate of RF-Amp. Determine drive current by Pin12 external resistance.	V_{CC}, 12
13	Mix.Output	RF	Input signal from RF Amp.	2.2kΩ, 2.2kΩ, 13
14	GND	—	Main circuit GND	———

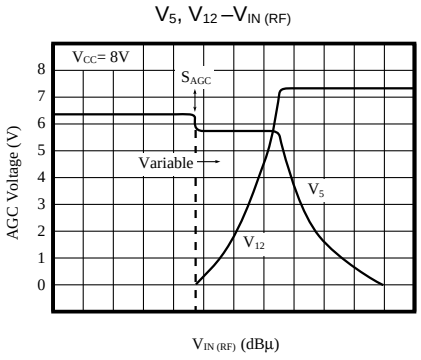
Note) Typical waveform frequency is the value when tuning receiving frequency 98.0 MHz.

■ Supplementary Explanation

• AGC

AGC used at the AN7243S uses mixer output (IFT primary side) signal and controls AGC output.





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