Ordering number : ENA1273



SANYO Semiconductors

DATA SHEET

# LA8123TT — Monolithic Linear IC For Digital CATV/Cable Modem Receiver AGC Amplifier

## Overview

LA8123TT is an AGC amplifier. It is ideally suited for use with Digital TV, Digital CATV, Cable modem receiver and IP Telephony receiver.

## Functions

- IF AGC control
- IF AGC amplifier
- Driver amplifier

## Specifications

### Maximum Ratings at Ta = 25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|---|---|---|---|---|
| Maximum supply voltage | $V_{CC}$ max | Pin 1 | 7.0 | V |
| Input voltages | Vin | Pin 2, 3, 4 | -0.3 to $V_{CC}$ op+0.3 | V |
| Circuit Current | I6 | Pin 6 sink current | 2 | mA |
| | I7 | Pin 7 sink current | 2 | mA |
| Allowable Power Dissipation | Pd max | Ta ≤ 85°C * | 310 | mW |
| Operating Temperature Range | Topr | | -20 to 85 | °C |
| Storage Temperature Range | Tstg | | -55 to 150 | °C |

* : Specified board : 45.0mm × 43.0mm × 1.6mm, glass epoxy board.

**Recommended Operating Conditions** at Ta = 25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|---|---|---|---|---|
| Recommended supply voltage | $V_{CC}$ | Pin 1 | 5.0 | V |
| Operating supply voltage range | $V_{CC}$ op | Pin 1 | 4.5 to 5.5 | V |
| AGC control voltage range | Vagc | Pin 4 | 0 to 3.3 | V |

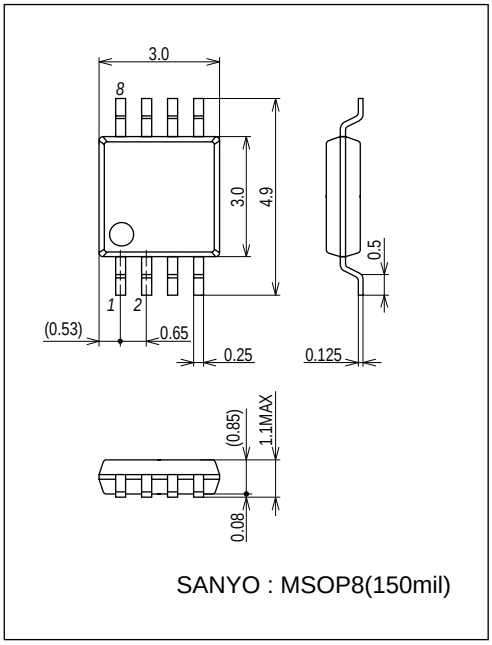
**Electrical Characteristics** at Ta = 25°C, $V_{CC}$ = 5.0V

| Parameter | Symbol | Pin No. | Conditions | Test circuit | Ratings min | Ratings typ | Ratings max | Unit |
|---|---|---|---|---|---|---|---|---|
| Circuit current | $I_{total}$ | 1 | No signal | 1 | 33 | 38 | 43 | mA |
| Input frequency range | fin | 2, 3 | fc : -3dB | 1 | 30 | | 70 | MHz |
| Noise figure | NF | 6, 7 | V4 = 3.0V, f = 45MHz | 2 | | 5 | | dB |
| Inter modulation | IM3 | 6, 7 | V4 = 3.0V,<br>f1 = 44MHz, f2 = 45MHz,<br>Output level = 104dBμV/tone | 1 | 50 | | | dBc |
| Total amplifier gain | G (AGC1) | 6/2, 3<br>7/2, 3 | V4 = 3.0V, f = 45MHz | 1 | 57 | 60 | 63 | dB |
| AGC range | GR (1) | 6/2, 3<br>7/2, 3 | Output level = 110dBμV<br>V4 = 0.3V to 3.0V, f = 45MHz | 1 | 40 | | | dB |
| | GR (2) | 6/2, 3<br>7/2, 3 | Input level = 50dBμV<br>V4 = 0.3V to 3.0V, f = 45MHz | 1 | 45 | | | dB |
| Maximum Output Level | $V_O$ | 6, 7 | f = 45MHz | 1 | 1.8 | | | Vp-p |
| Output offset | $dV_O$ | 6, 7 | V4 = 3.0V, f = 45MHz<br>Output level = 110dBμV<br>(Pin 7 output) - (Pin 6 output) | 1 | -0.5 | 0 | 0.5 | dB |
| Maximum gain AGC control voltage | $V_{4H}$ | 4 | Maximum gain | 1 | 3.0 | | 3.3 | V |
| Minimum gain AGC control voltage | $V_{4L}$ | 4 | Minimum gain | 1 | 0 | | 0.3 | V |
| Input impedance | Zin | 2, 3 | V4 = 0V, f = 45MHz | 3 | | 1//4.7 | | kΩ//pF |

## Package Dimensions

unit : mm (typ)

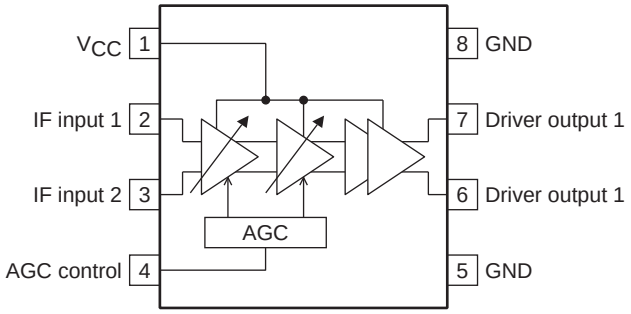
3245B



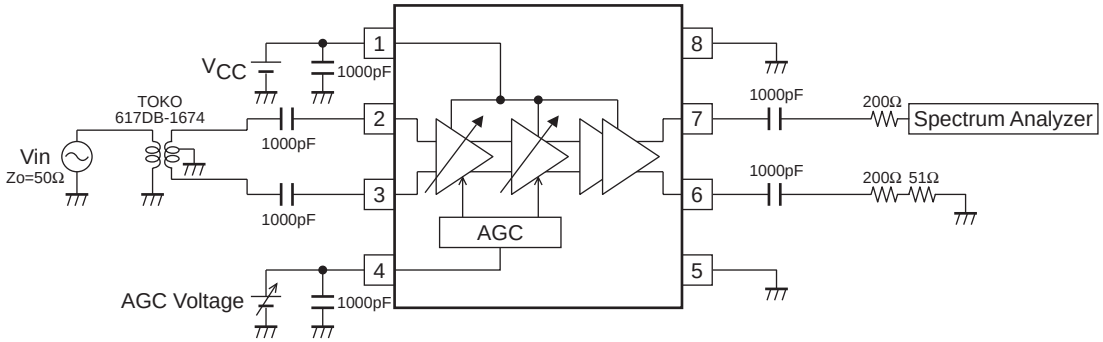

SANYO : MSOP8(150mil)

## Block Diagram



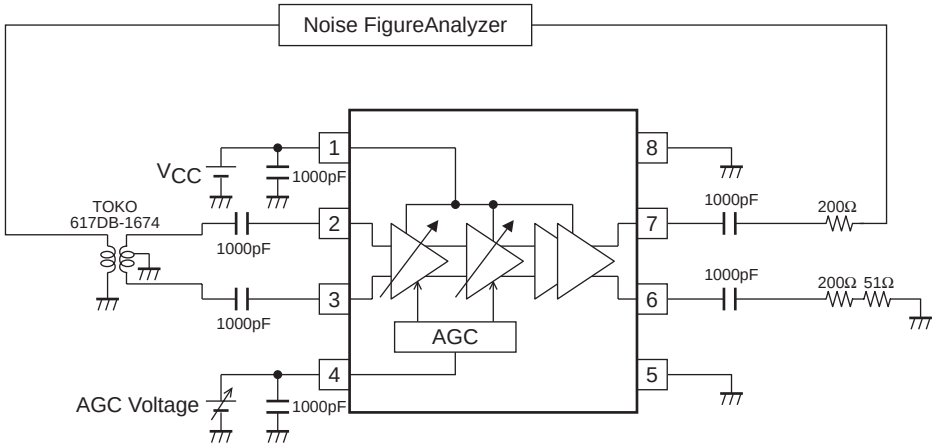



## Test Circuit 1

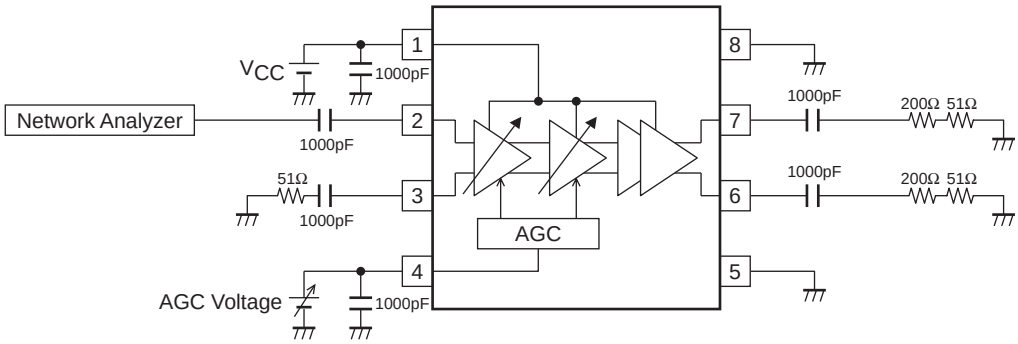



Output Voltage is divided by 50Ω / (200+50)Ω

## Test Circuit 2

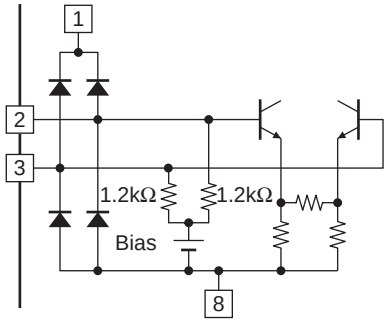
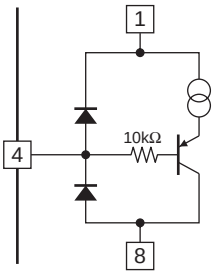
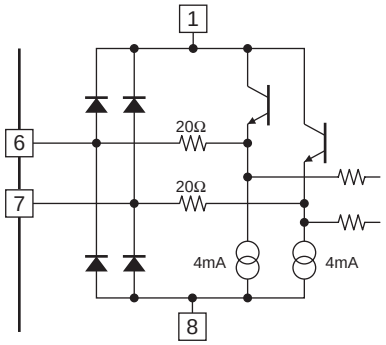



## Test Circuit 3

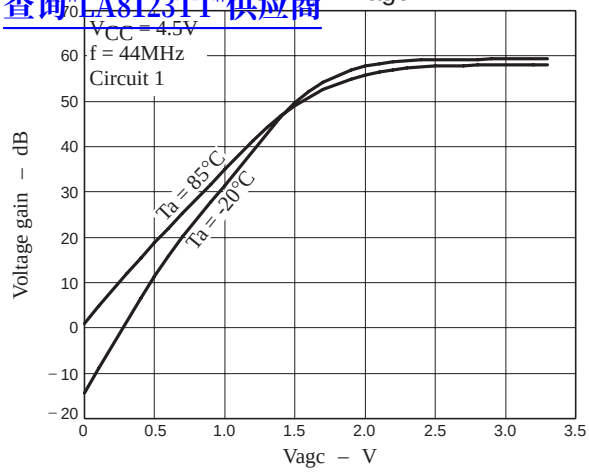


## Pin Function

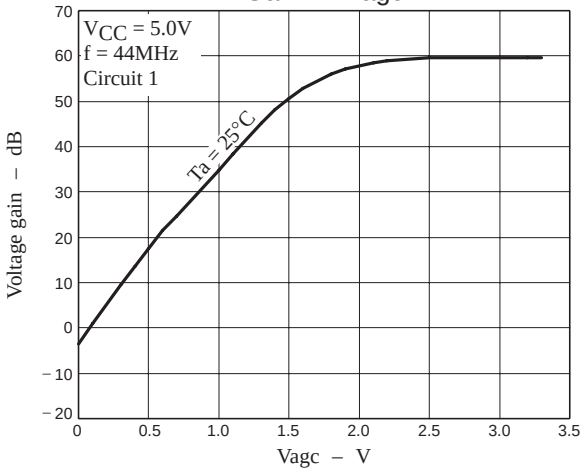


| Pin No. | Function | Equivalent circuit |
|---|---|---|
| 1 | $V_{CC}$ | |
| 2<br>3 | IF input. |  |
| 4 | AGC control. |  |
| 5 | Gain control Switch. | |
| 6<br>7 | Driver output. |  |
| 8 | GND | |

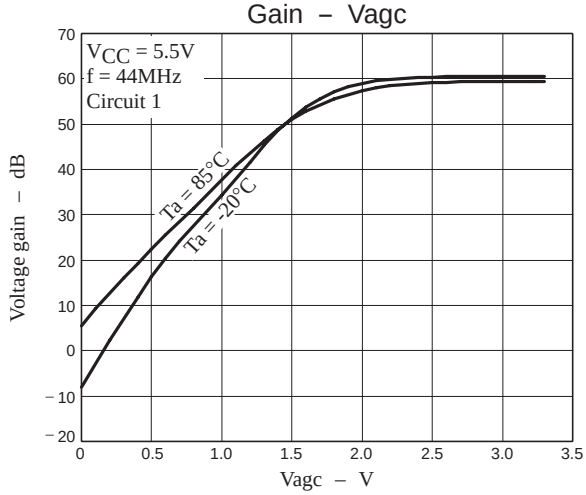
Gain – Vagc



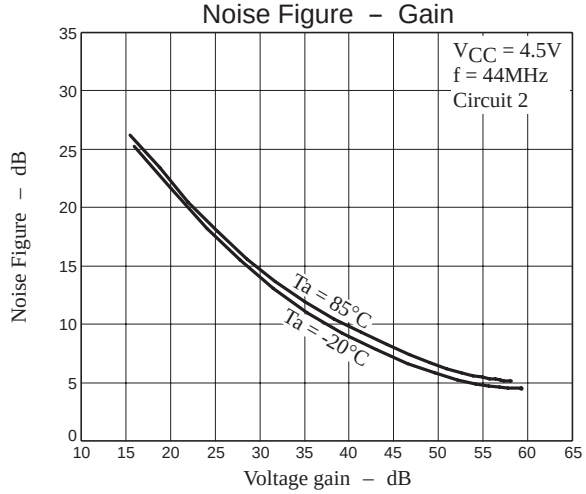

Gain – Vagc



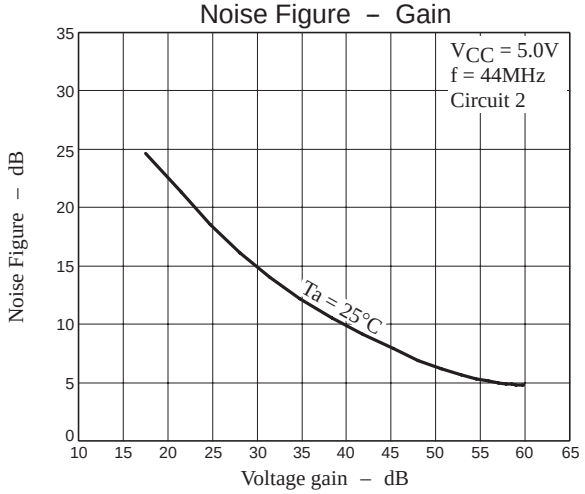

Gain – Vagc



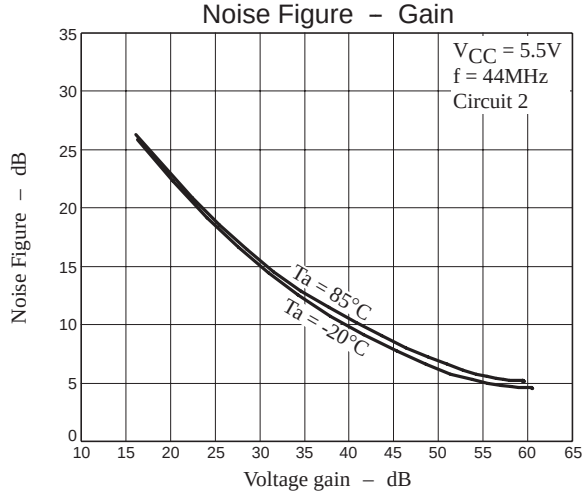

Noise Figure – Gain



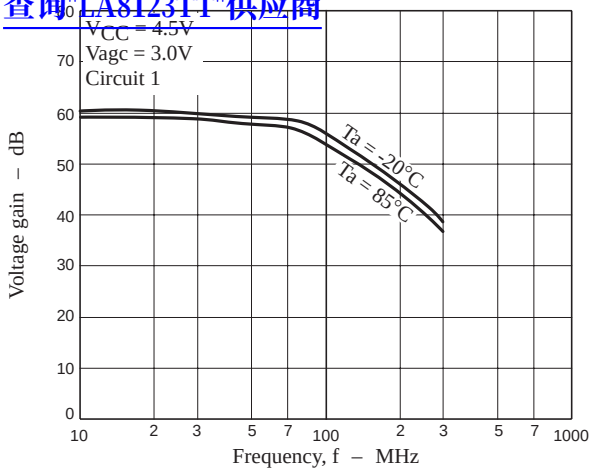

Noise Figure – Gain



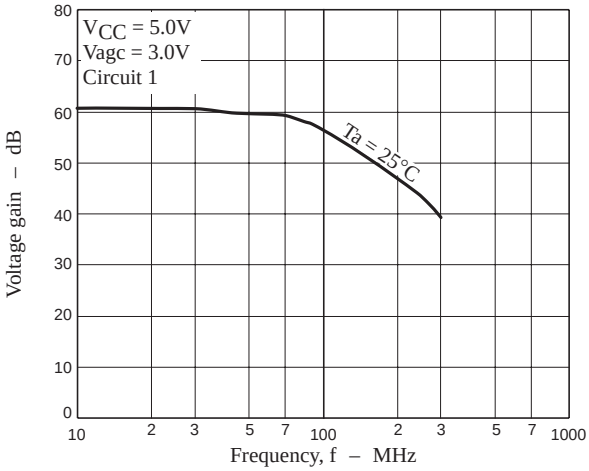

Noise Figure – Gain



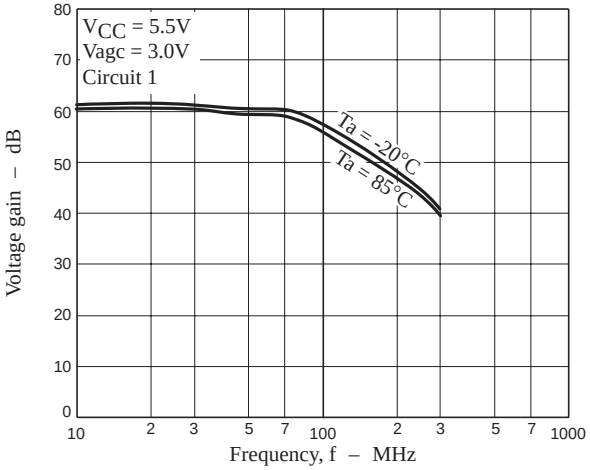
Gain – f



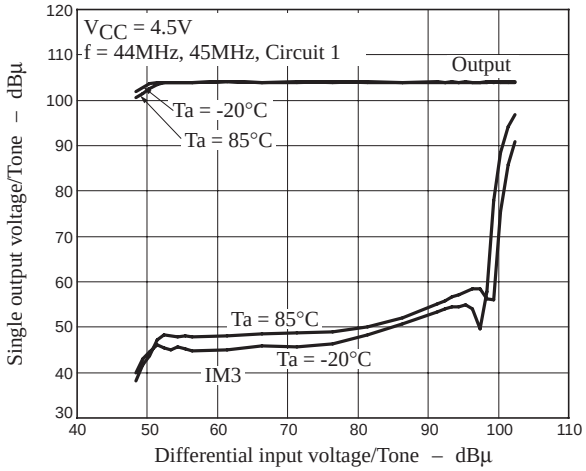

Gain – f



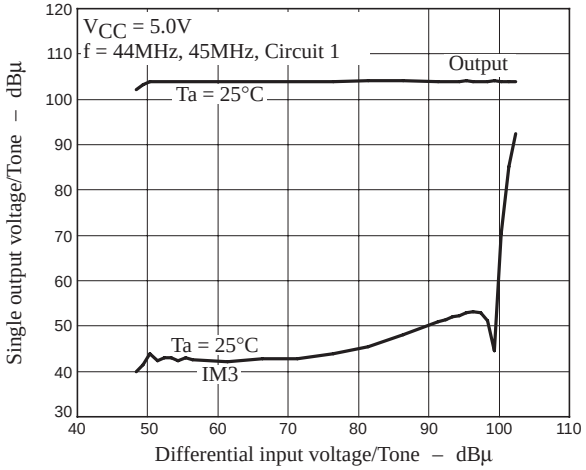

Gain – f




Intermodulation Characteristic




Intermodulation Characteristic




Intermodulation Characteristic