



SANYO Semiconductors

# DATA SHEET

## LA1225M — Monolithic Linear IC FM IF Detector IC

### Overview

The LA1225M is a Low-voltage operation (1.8V or higher) FM IF detector IC for the electronic tuning system.

### Features

- Low-voltage operation (1.8V or higher)
- Supports electronic tuning systems (provides built-in SD output and IF count output functions)
- FM detector circuit accepts an even wider input frequency range. (Supports the use of an external phase capacitor.)
- Miniature package: MFP-10S

### Functions

- IF amplifier
- Quadrature detector
- Signal meter
- SD
- IF buffer

### Specifications

#### Maximum Ratings at Ta = 25°C

| Parameter                   | Symbol              | Conditions | Ratings     | Unit |
|-----------------------------|---------------------|------------|-------------|------|
| Maximum supply voltage      | V <sub>CC</sub> max |            | 9.0         | V    |
| Allowable power dissipation | Pd max              | Ta ≤ 85°C  | 100         | mW   |
| Operating temperature       | Topr                |            | -20 to +85  | °C   |
| Storage temperature         | Tstg                |            | -55 to +150 | °C   |

#### Operating Conditions at Ta = 25°C

| Parameter                      | Symbol             | Conditions | Ratings    | Unit |
|--------------------------------|--------------------|------------|------------|------|
| Recommended supply voltage     | V <sub>CC</sub>    |            | 3.0        | V    |
| Operating supply voltage range | V <sub>CC</sub> op |            | 1.8 to 8.0 | V    |

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# LA1225M

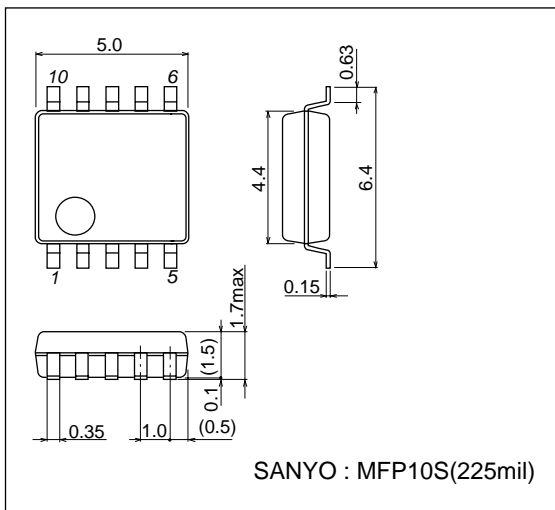
**Operating Characteristics** at  $T_a = 25^\circ\text{C}$ ,  $V_{CC} = 3.0\text{V}$ ,  $f_C = 10.7\text{MHz}$

| Parameter                 | Symbol       | Conditions   | Ratings |     |     | Unit     |
|---------------------------|--------------|--|---------|-----|-----|----------|
|                           |              |  | min     | typ | max |          |
| Current drain             | $I_{CCO}$    | No input   | 3.0     | 4.0 | 5.0 | mA       |
| Demodulator output        | $V_O$        | 100dB $\mu$ , 100% mod., $f_m = 1\text{kHz}$   | 70      | 150 | 220 | mV       |
| Total harmonic distortion | THD          | 100dB $\mu$ , 100% mod., $f_m = 1\text{kHz}$   |         | 0.5 | 0.8 | %        |
| Signal-to-noise ratio     | S/N          | 100dB $\mu$ , 100% mod., $f_m = 1\text{kHz}$   | 65      | 73  |     | dB       |
| 3dB sensitivity           | -3dBL.S      | 100dB $\mu$ , 100% mod.,<br>$f_m = 1\text{kHz}$ output reference, when the input is -3dB | 19      | 28  | 37  | dB $\mu$ |
| SD sensitivity            | SDON         | 0% mod.  | 35      | 50  | 65  | dB $\mu$ |
| IF counter buffer output  | $V_{IFBuff}$ | 100dB $\mu$  | 90      | 130 | 170 | mV       |

## Package Dimensions

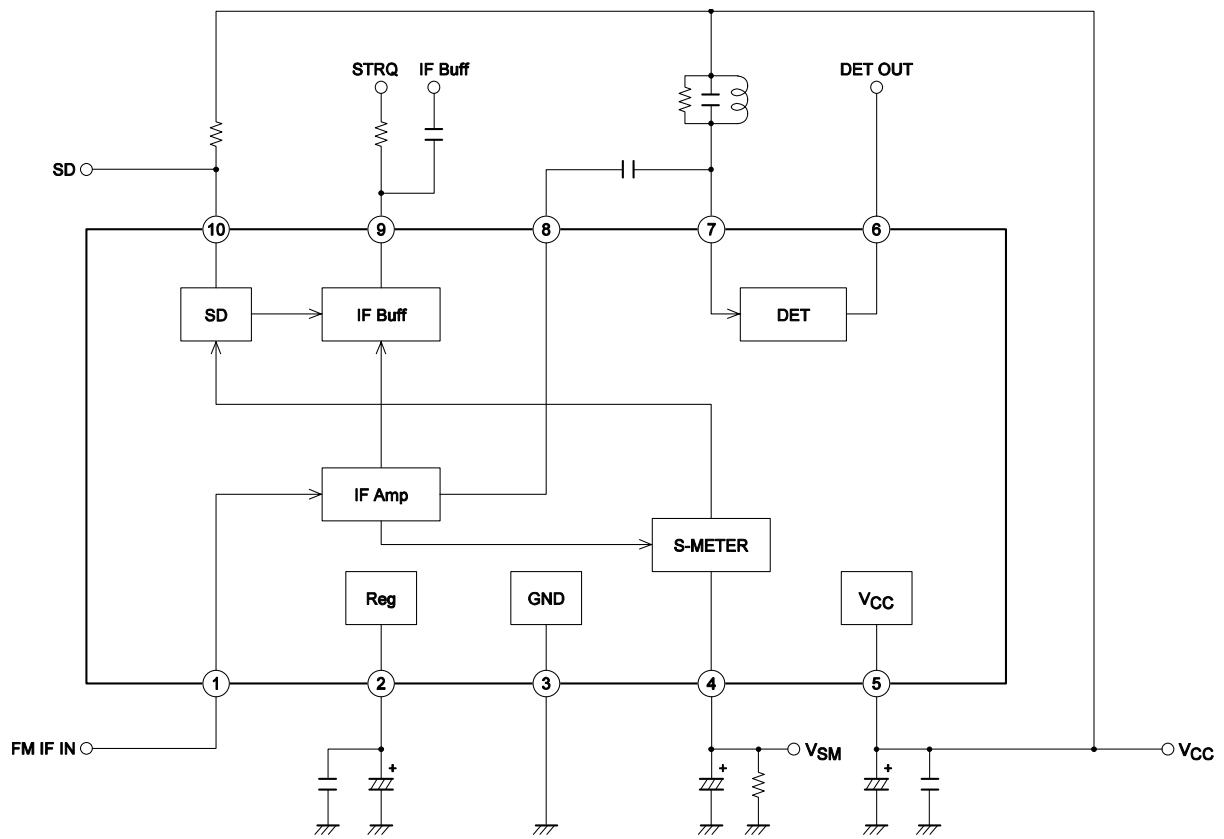
unit : mm

3086B



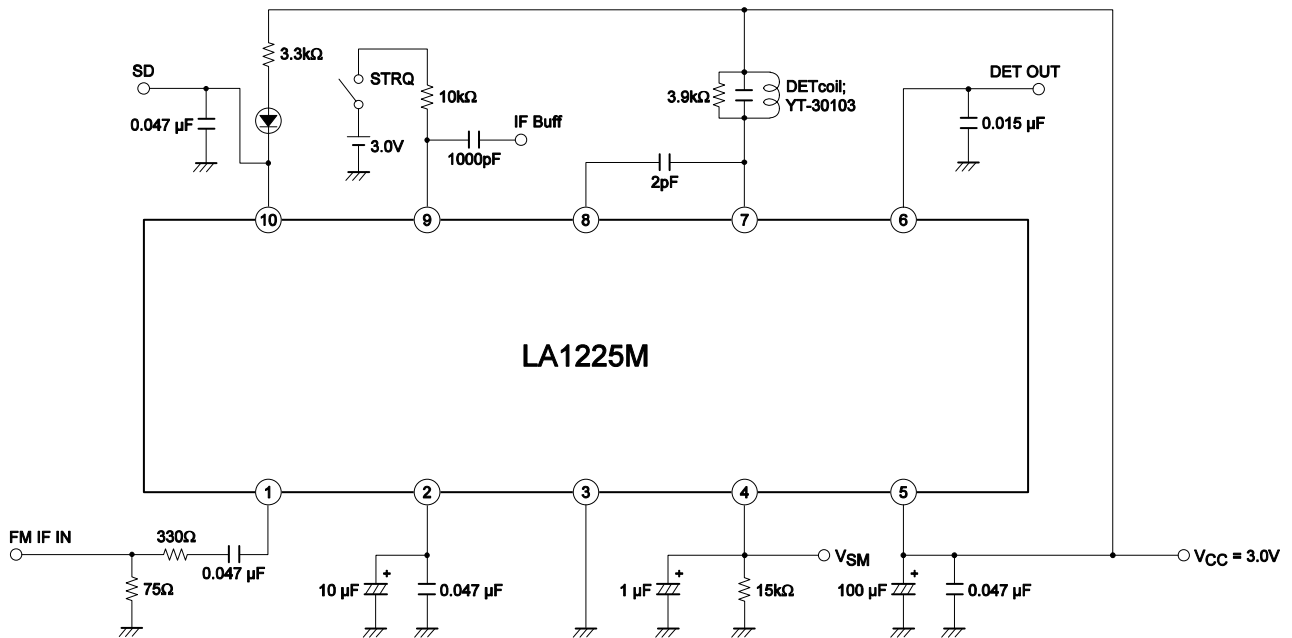
# LA1225M

## Block Diagram and Test Circuit



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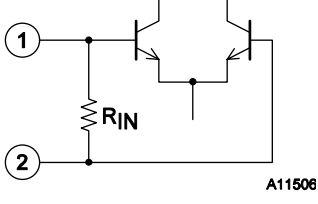
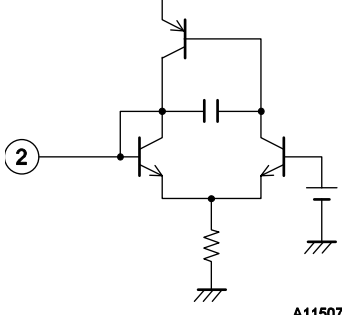
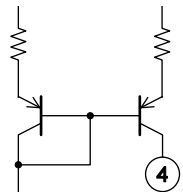
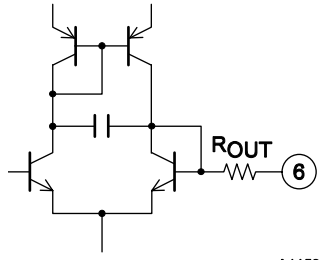
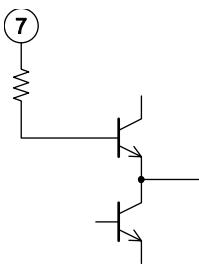
## Sample Application Circuit



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# LA1225M

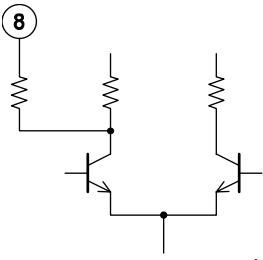
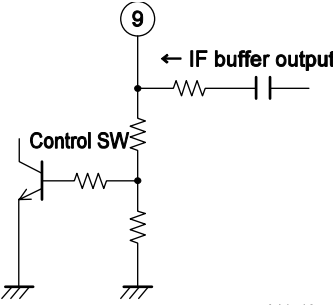
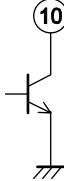
## Pin Functions No-Signal Voltage at V<sub>CC</sub> = 3.0V

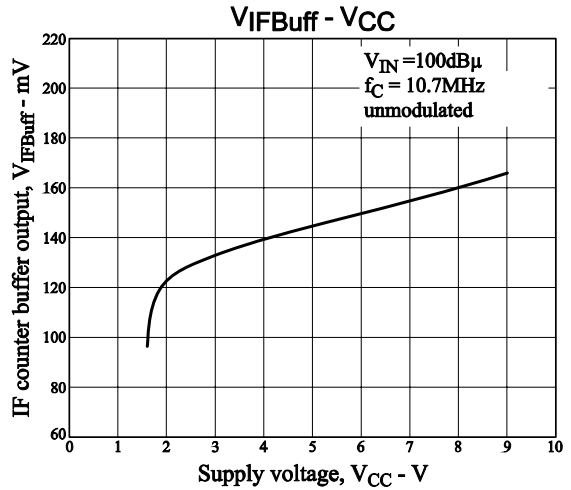
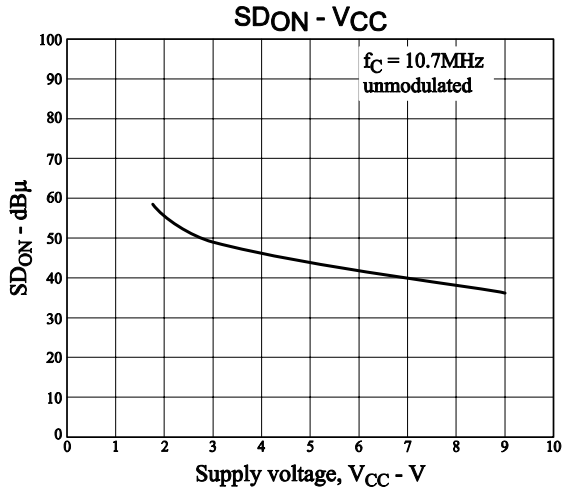
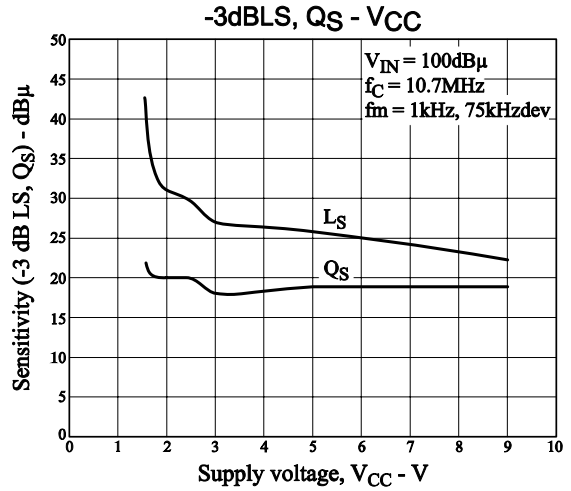
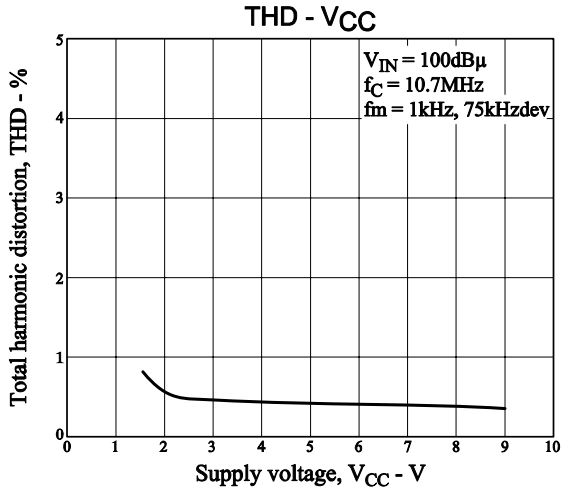
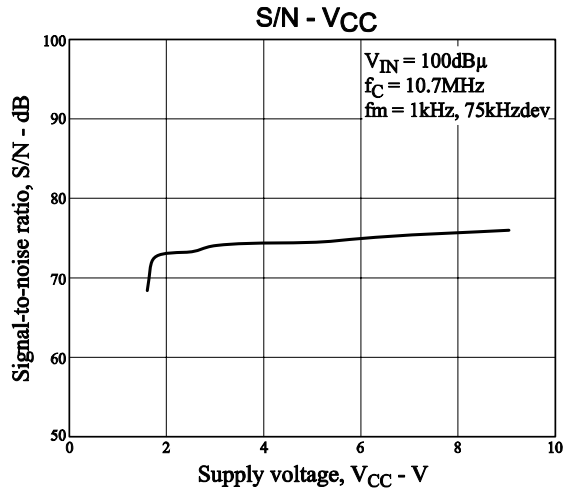
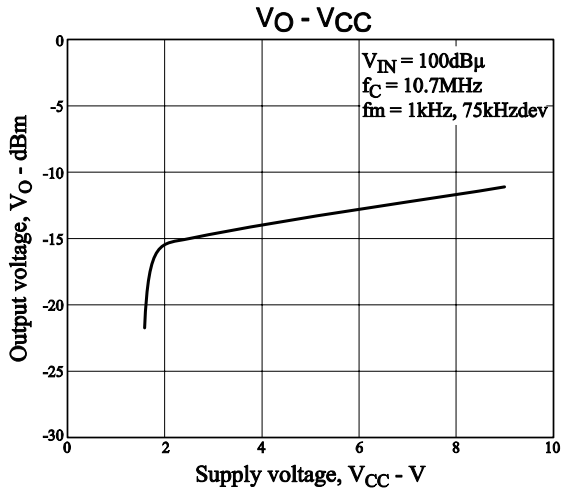
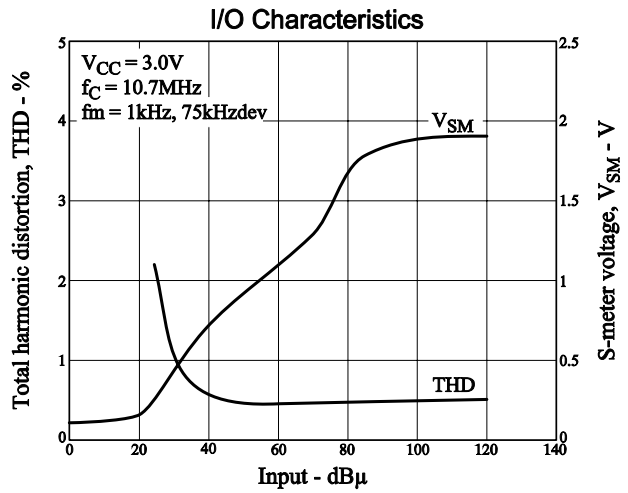
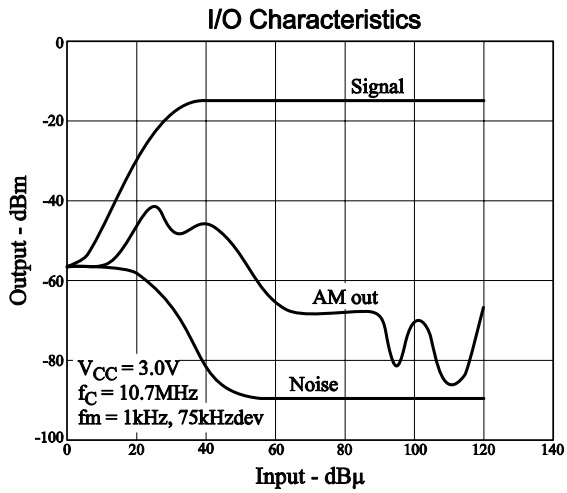
| Pin No. | Function           | No-signal voltage (V) | Equivalent circuit   | Notes   |
|---------|--------------------|-----------------------|--|---|
| 1       | IF input           | 1.2                   |  <p style="text-align: right;">A11506</p>   | Input impedance<br>$R_{IN} = 330\Omega$   |
| 2       | Reg                | 1.2                   |  <p style="text-align: right;">A11507</p>   | $V_{reg} = 1.2V$  |
| 3       | GND                | 0                     |  |   |
| 4       | S-meter output     | 0.1                   |  <p style="text-align: right;">A11508</p> | Open collector output.<br>The SD sensitivity can be adjusted with an external resistor connected to this pin. |
| 5       | V <sub>CC</sub>    | 3.0                   |  |   |
| 6       | Demodulated output | 1.5                   |  <p style="text-align: right;">A11509</p> | Output impedance<br>$R_{OUT} = 3k\Omega$  |
| 7       | DET                | 3.0                   |  <p style="text-align: right;">A11510</p> | The detector coil is inserted between pin 7 and pin 5 (V <sub>CC</sub> ).                                     |

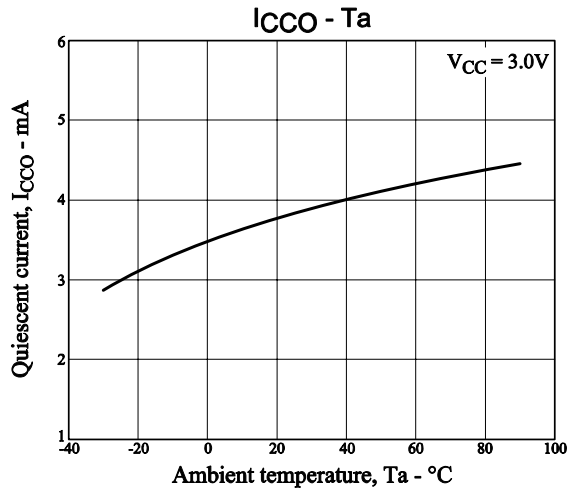
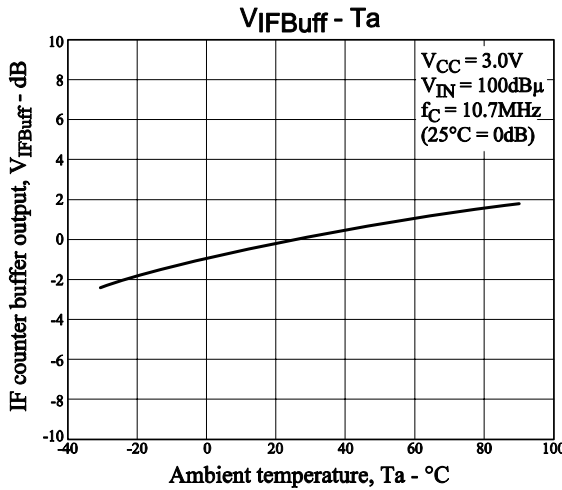
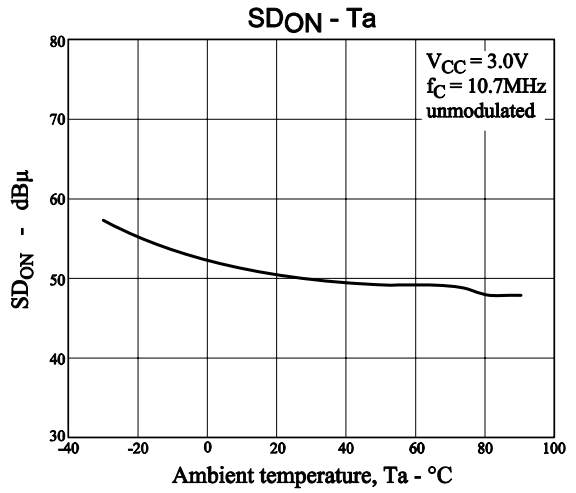
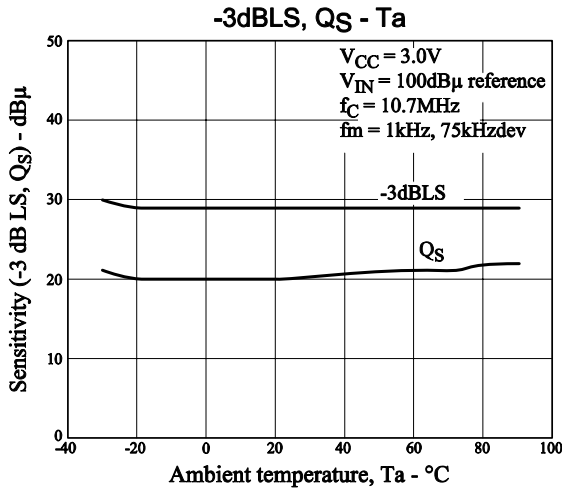
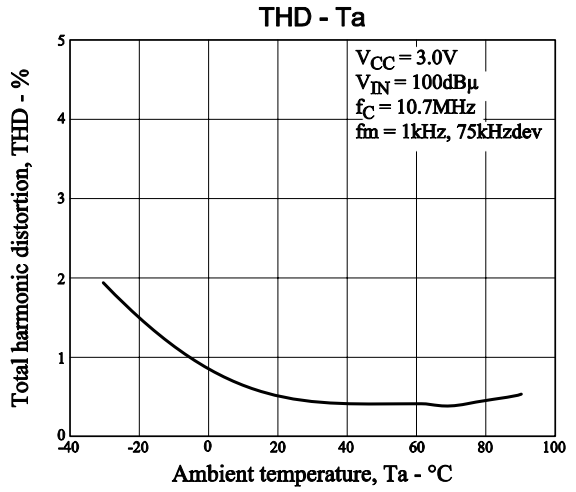
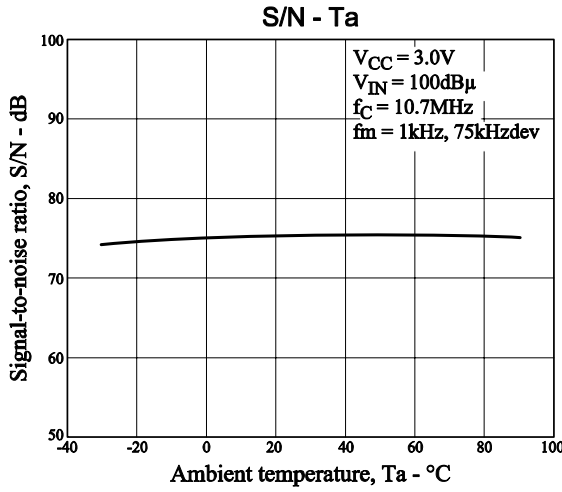
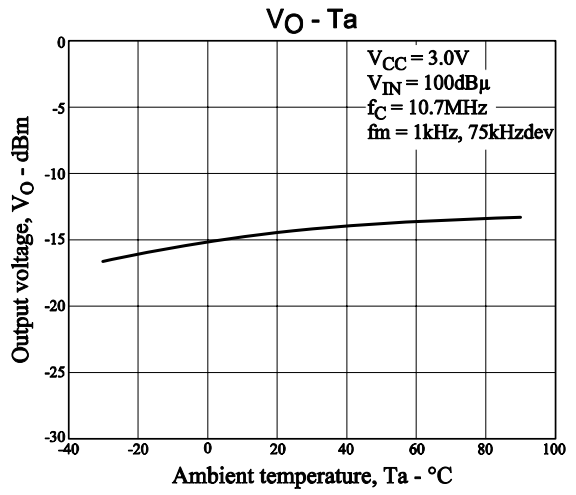
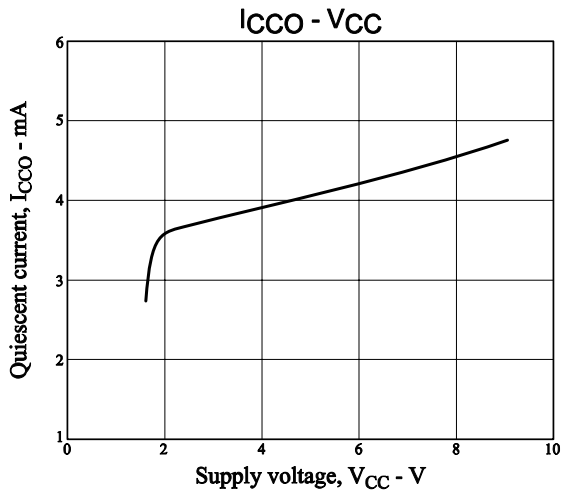
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| Pin No. | Function                                | No-signal voltage (V) | Equivalent circuit   | Notes  |
|---------|---|-----------------------|--|--|
| 8       | Limiter amplifier output                | 2.8                   |  <p style="text-align: right;">A11511</p>   | Pin 8 and pin 7 (DET) are connected through a capacitor.   |
| 9       | IF buffer<br>(Also used for control SW) | 0                     |  <p style="text-align: right;">A11512</p>   | The IF buffer output is turned on when the voltage applied to the pin is the recommended 1.5V or higher.               |
| 10      | SD                                      | 1.6                   |  <p style="text-align: right;">A11513</p> | This is an active-low output.<br>This is an open-collector output and can directly drive an LED. ( $I_{Cmax} = 20mA$ ) |





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