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LA1225MC

Monolithic Linear IC FM IF Detector IC

Overview

The LA1225MC 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: SOIC10

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 _{CC} max | | 9.0 | V |
| Allowable power dissipation | Pd max | Ta ≤ 85°C | 100 | mW |
| Operating temperature | T _{opr} | | -20 to +85 | °C |
| Storage temperature | T _{stg} | | -55 to +150 | °C |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

Operating Conditions at Ta = 25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|--------------------------------|--------------------|------------|------------|------|
| Recommended supply voltage | V _{CC} | | 3.0 | V |
| Operating supply voltage range | V _{CC} op | | 1.8 to 8.0 | V |

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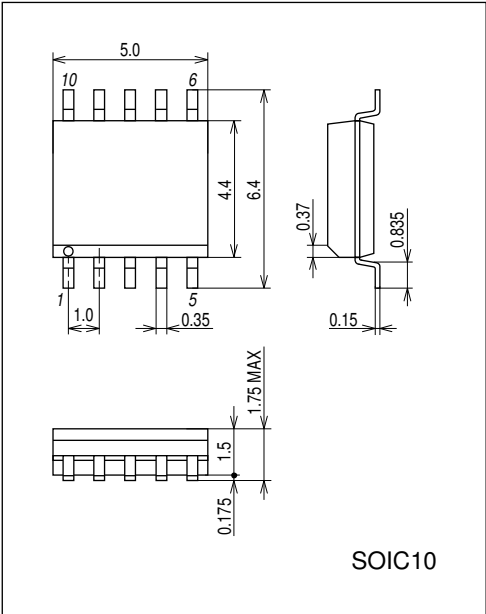
Operating Characteristics at $T_a = 25^{\circ}\text{C}$, $V_{CC} = 3.0\text{V}$, $f_C = 10.7\text{MHz}$

| 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 μV , 100% mod., $f_m = 1\text{kHz}$ | 70 | 150 | 220 | mV |
| Total harmonic distortion | THD | 100dB μV , 100% mod., $f_m = 1\text{kHz}$ | | 0.5 | 0.8 | % |
| Signal-to-noise ratio | S/N | 100dB μV , 100% mod., $f_m = 1\text{kHz}$ | 65 | 73 | | dB |
| 3dB sensitivity | -3dBL.S | 100dB μV , 100% mod., $f_m = 1\text{kHz}$ output reference, when the input is -3dB | 19 | 28 | 37 | dB μV |
| SD sensitivity | SD_{ON} | 0% mod. | 35 | 50 | 65 | dB μV |
| IF counter buffer output | V_{IFBuff} | 100dB μV | 90 | 130 | 170 | mV |

Package Dimensions

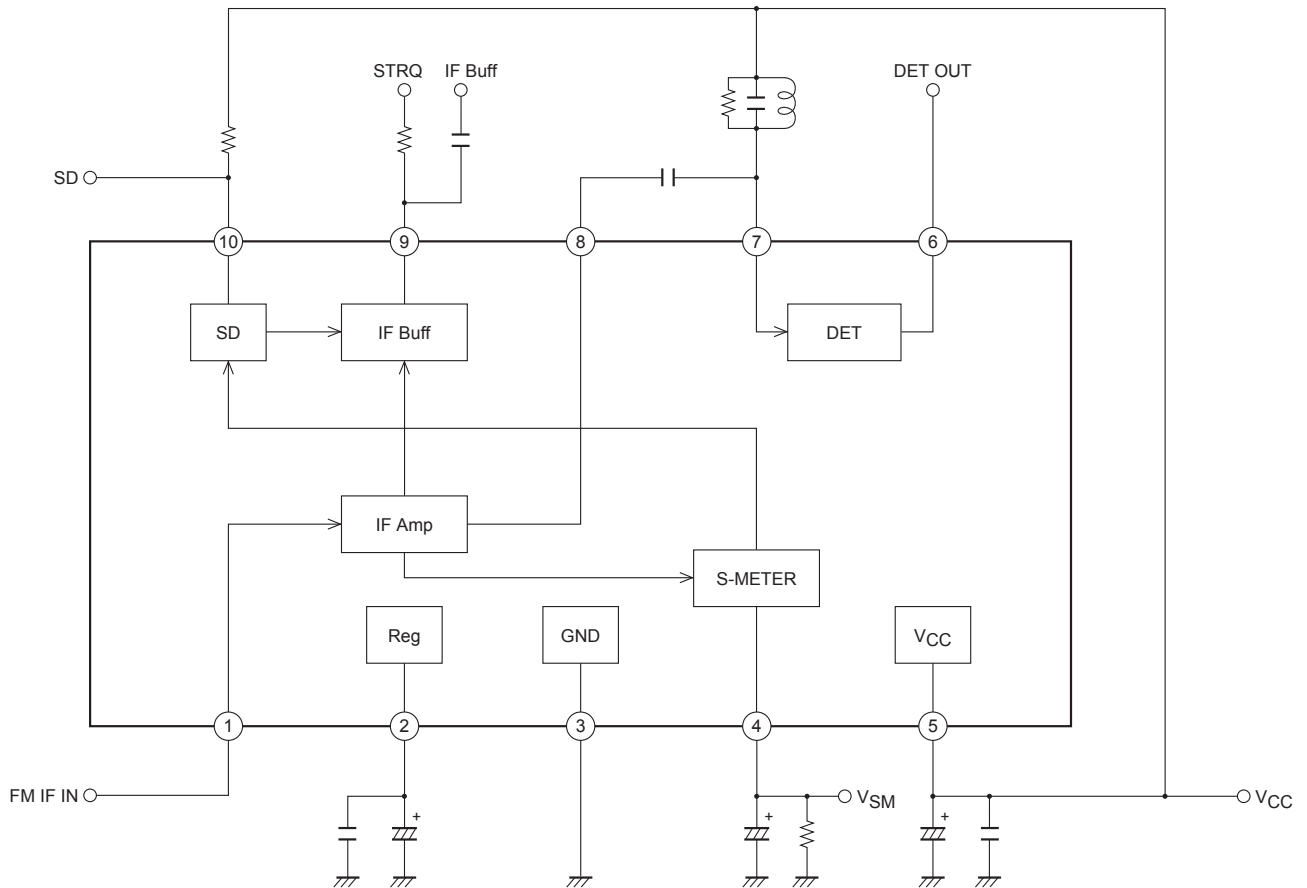
Unit : mm

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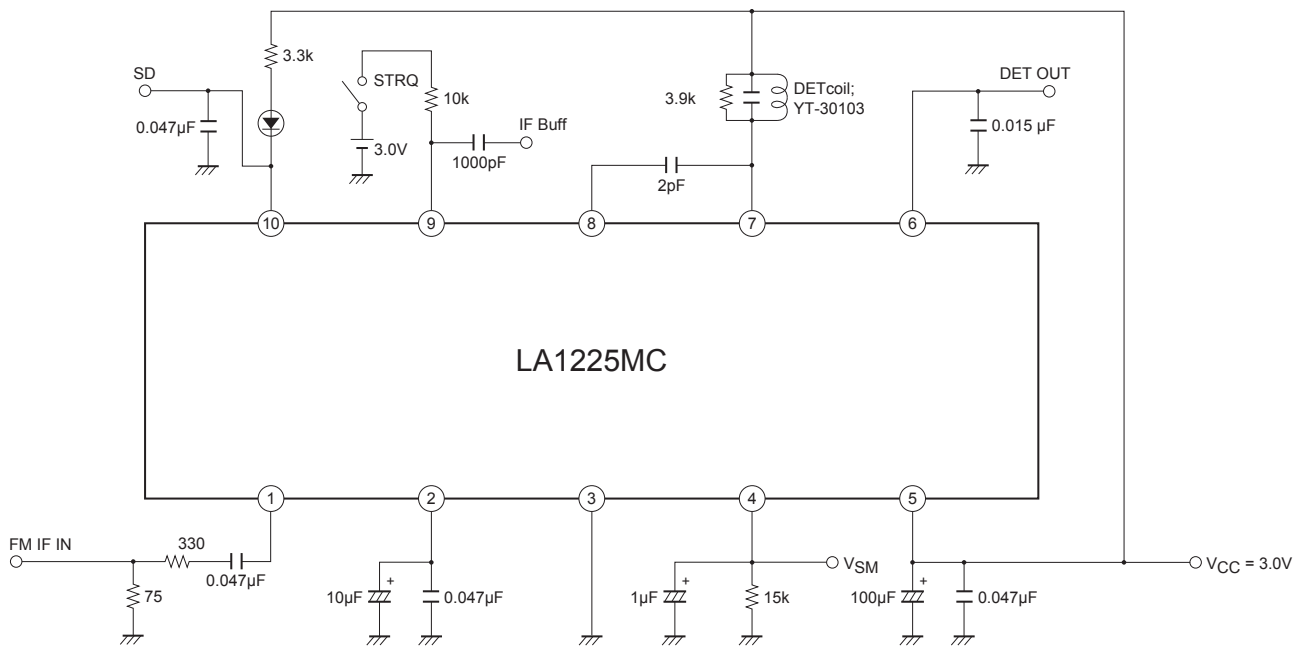


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Block Diagram and Test Circuit

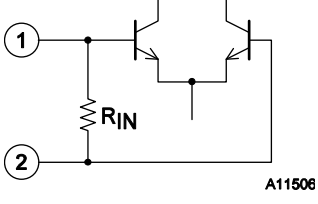
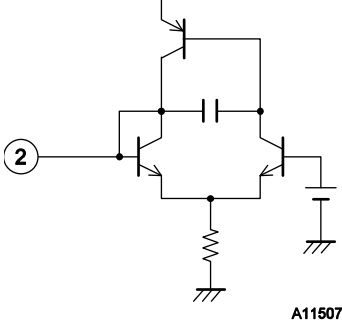
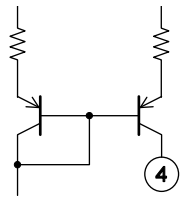
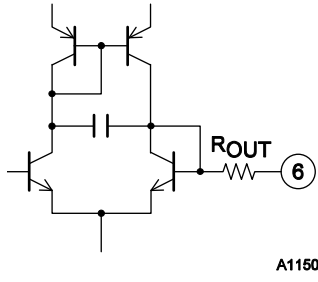
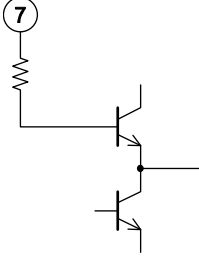


Sample Application Circuit



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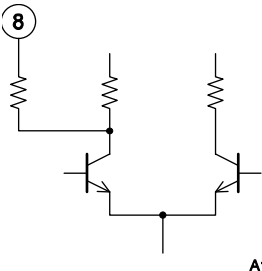
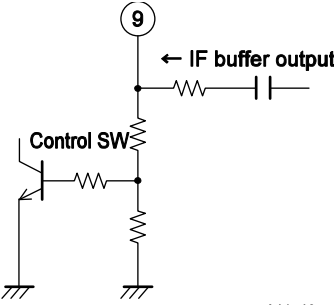
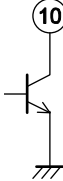
Pin Functions No-Signal Voltage at $V_{CC} = 3.0V$

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

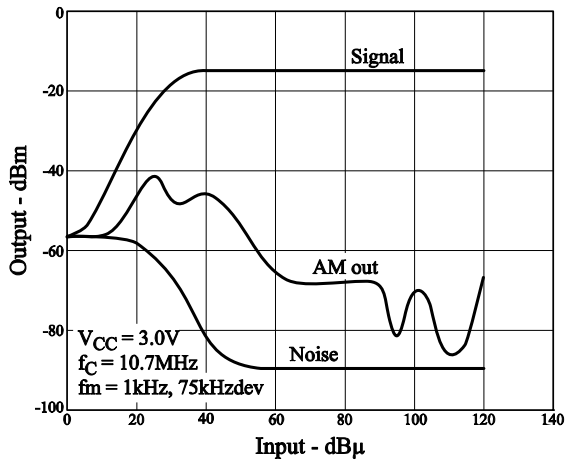
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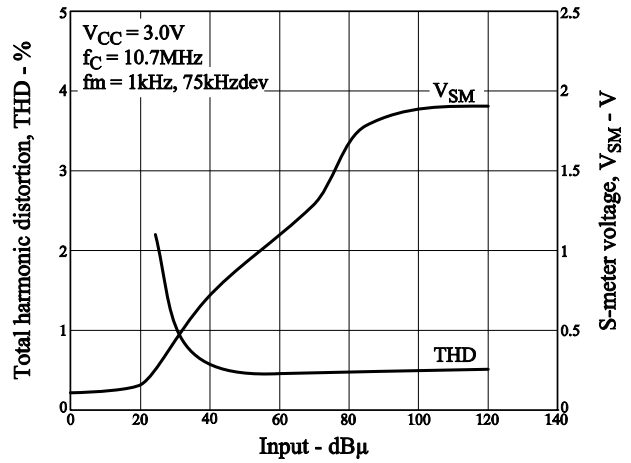
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| Pin No. | Function | No-signal voltage (V) | Equivalent circuit | Notes |
|---------|---|-----------------------|---|--|
| 8 | Limiter amplifier output | 2.8 |  A11511 | Pin 8 and pin 7 (DET) are connected through a capacitor. |
| 9 | IF buffer (Also used for control SW) | 0 |  A11512 | 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 |  A11513 | This is an active-low output. This is an open-collector output and can directly drive an LED. ($I_{Cmax} = 20mA$) |

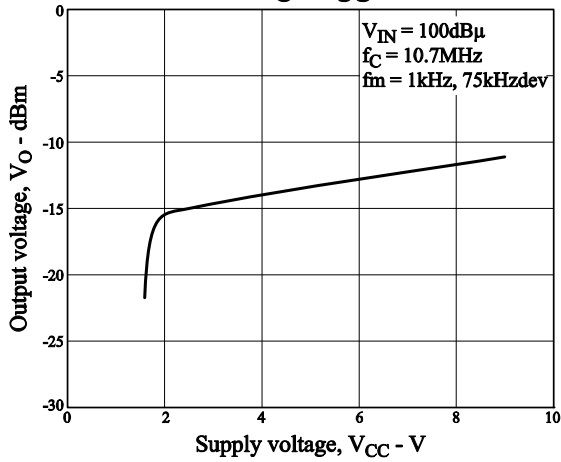
I/O Characteristics



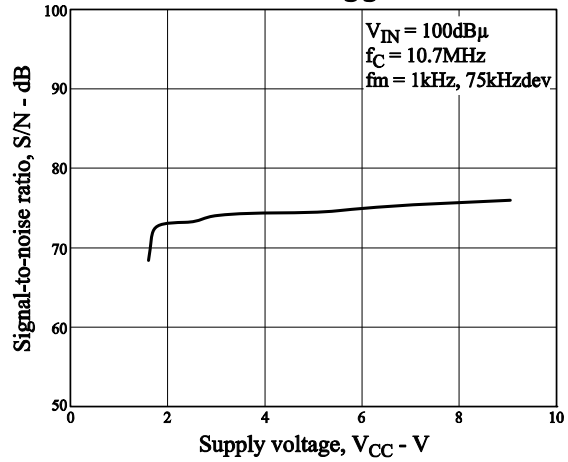
I/O Characteristics



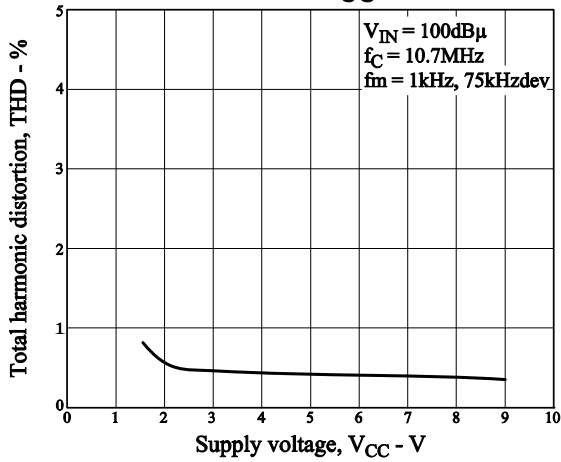
$V_O - V_{CC}$



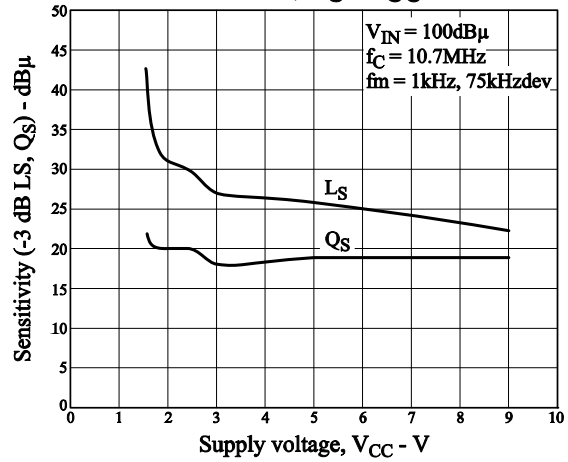
S/N - V_{CC}



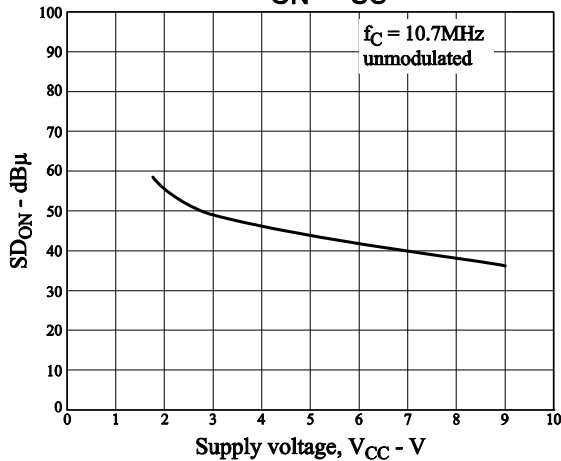
THD - V_{CC}



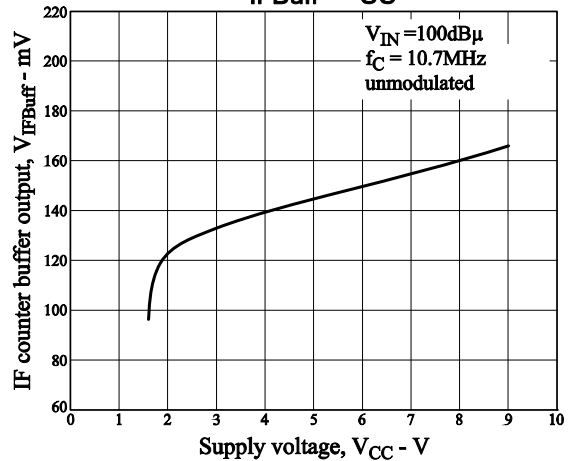
-3dBLS, $Q_S - V_{CC}$

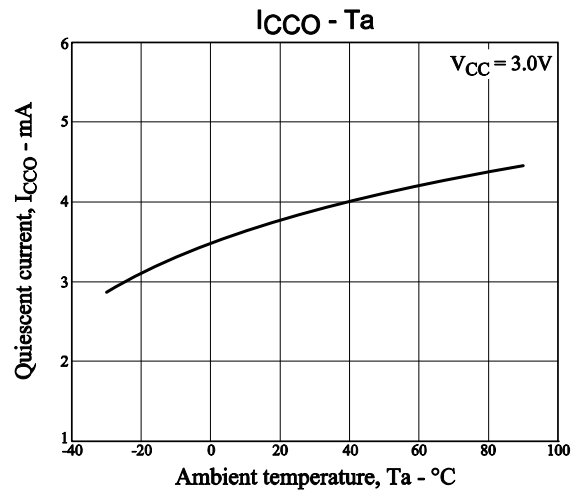
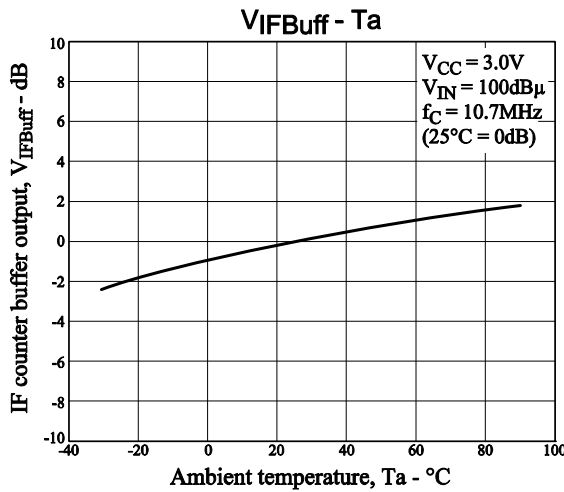
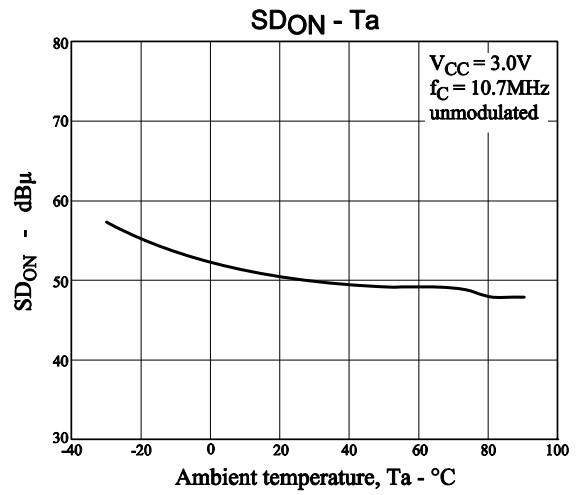
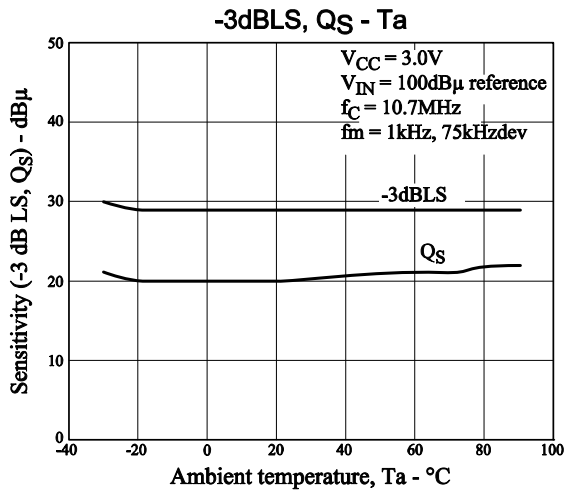
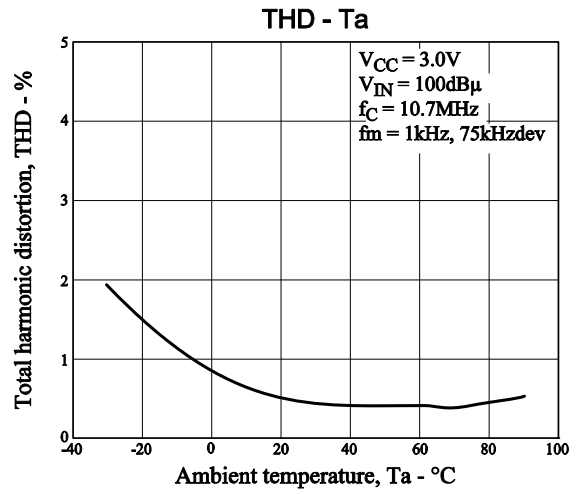
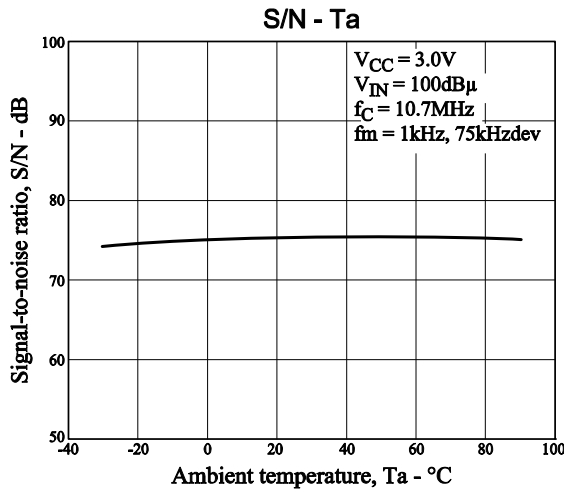
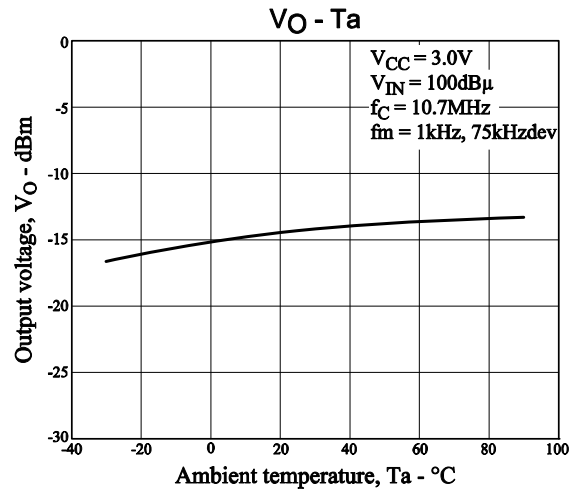
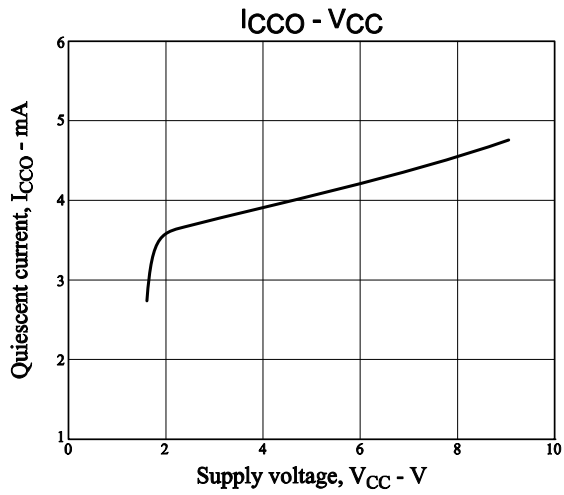


$SD_{ON} - V_{CC}$



$V_{IFBuff} - V_{CC}$





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