Ordering number : ENN6017

Monolithic Linear IC

# LA1225M

## FM IF Detector IC

## Functions

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

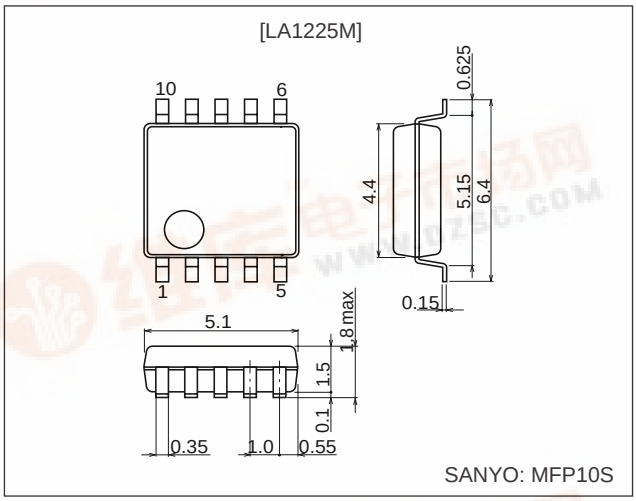
## Features

- Low-voltage operation (1.8 V 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

## Package Dimensions

unit: mm

**3086A-MFP10S**




## 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 ≤ 80°C | 100 | mW |
| Operating temperature | Topr | | –20 to +80 | °C |
| Storage temperature | Tstg | | –55 to +150 | °C |

### 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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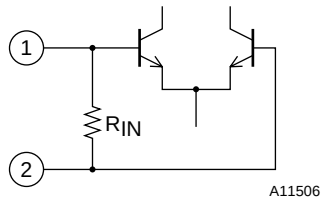
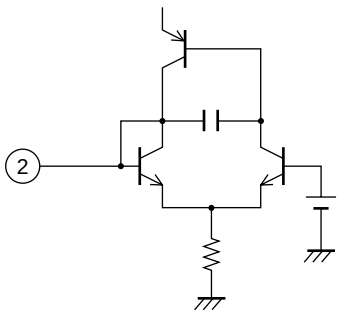
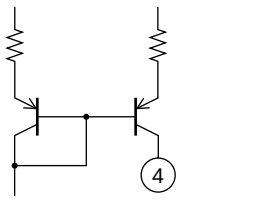
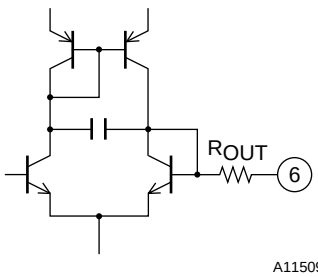
## Operating Characteristics at Ta = 25°C, $V_{CC}$ = 3.0 V, fc = 10.7 MHz

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

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

| Pin No. | Function | Notes | No-signal voltage (V) | Equivalent circuit |
|---|---|---|---|---|
| 1 | IF input | Input impedance<br>$R_{IN}$ = 330 Ω | 1.2 |  |
| 2 | Reg | Vreg = 1.2 V | 1.2 |  |
| 3 | GND | | 0 | |
| 4 | S-meter output | Open collector output<br>The SD sensitivity can be adjusted with an external resistor connected to this pin. | 0.1 |  |
| 5 | $V_{CC}$ | | 3.0 | |
| 6 | Demodulated output | Output impedance<br>$R_{OUT}$ = 3 kΩ | 1.5 |  |

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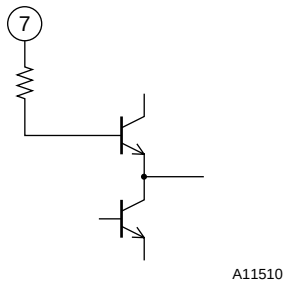
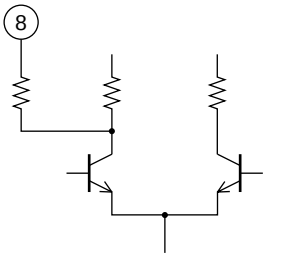
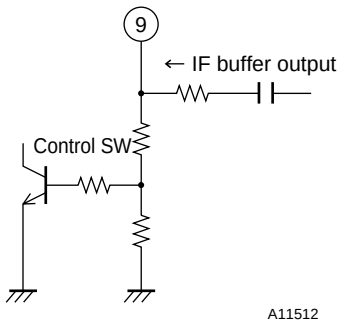
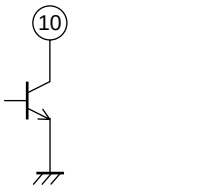
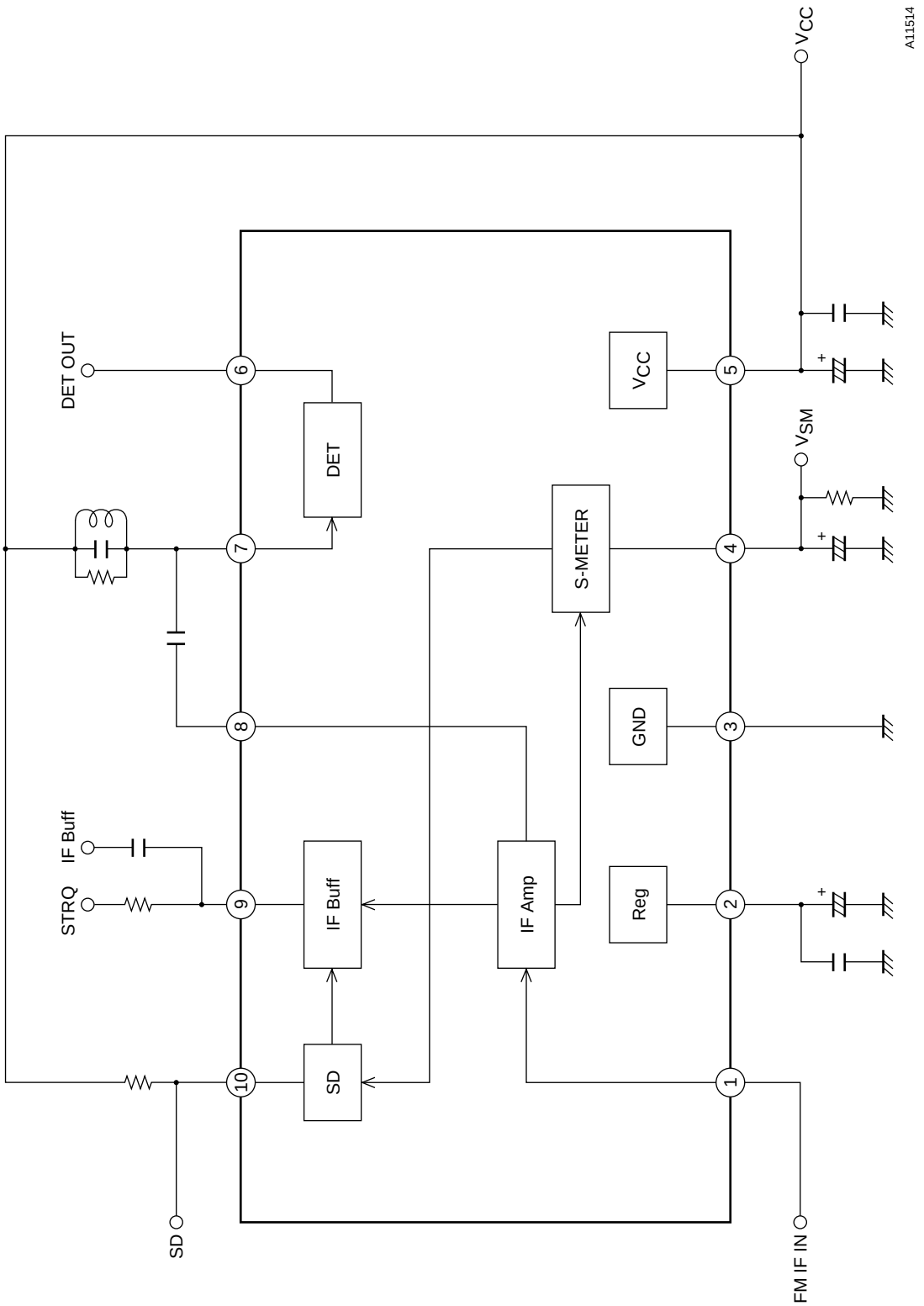
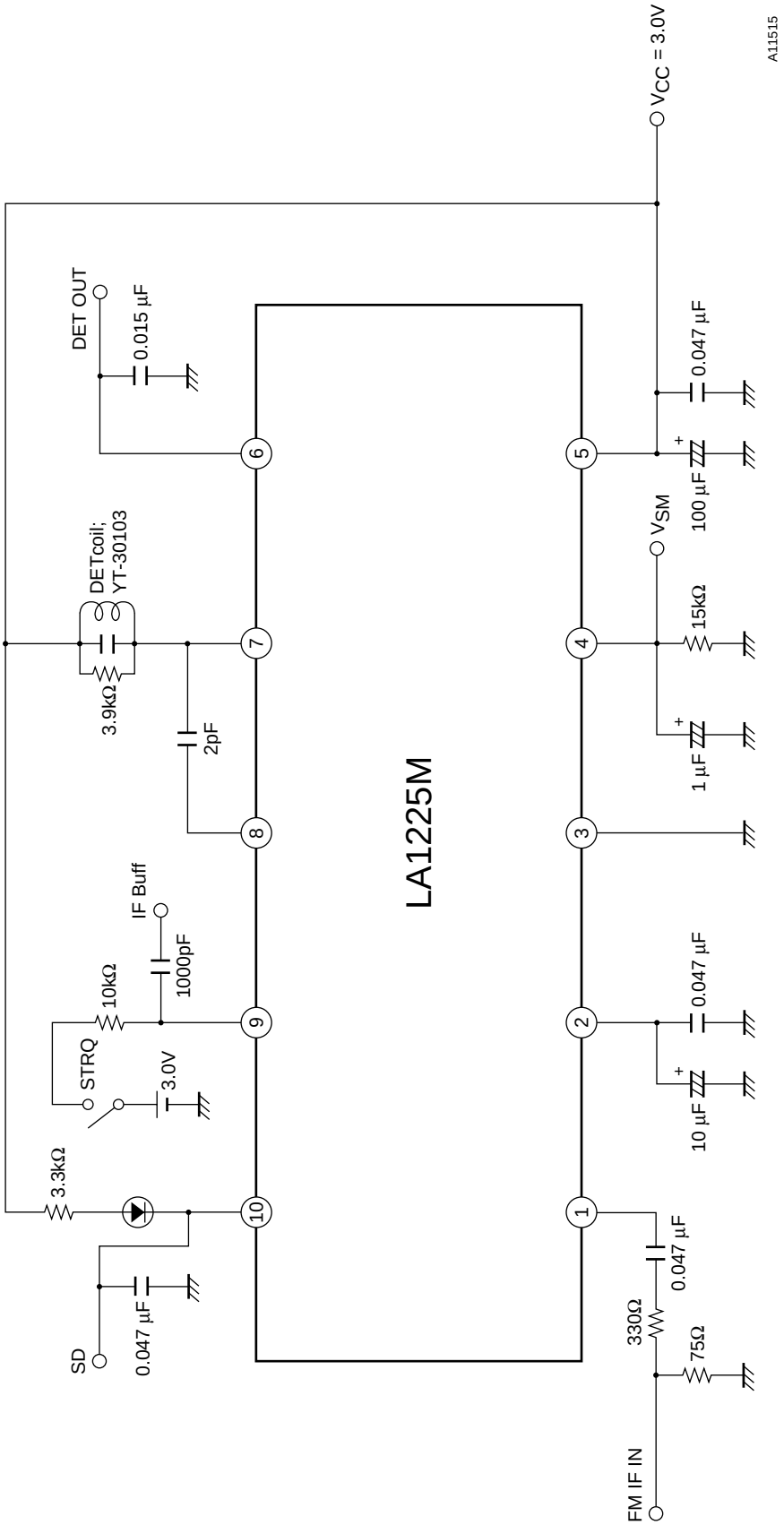
| Pin No. | Function | Notes | No-signal voltage (V) | Equivalent circuit |
|---|---|---|---|---|
| 7 | DET | The detector coil is inserted between pin 7 and pin 5 ($V_{CC}$). | 3.0 |  |
| 8 | Limiter amplifier output | Pin 8 and pin 7 (DET) are connected through a capacitor. | 2.8 |  |
| 9 | IF buffer<br>(Also used for control SW) | The IF buffer output is turned on when the voltage applied to the pin is the recommended 1.5 V or higher. | 0 |  |
| 10 | SD | This is an active-low output.<br>This is an open-collector output and can directly drive an LED. ($I_C$max = 20 mA) | 1.6 |  |

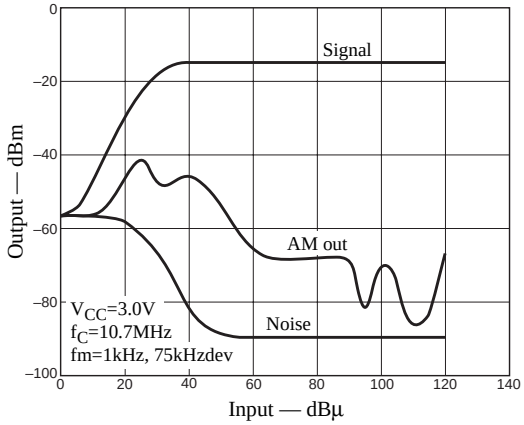
## Block Diagram



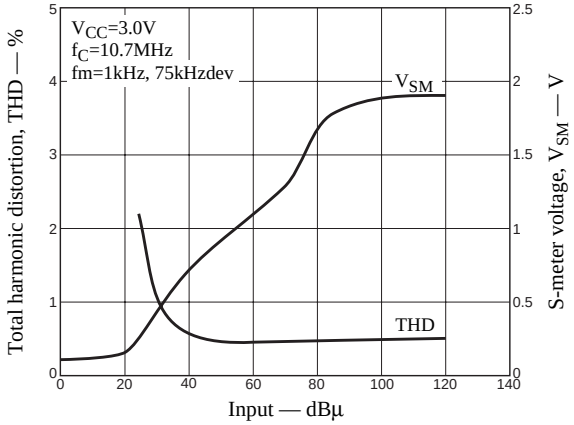
## Sample Application Circuit



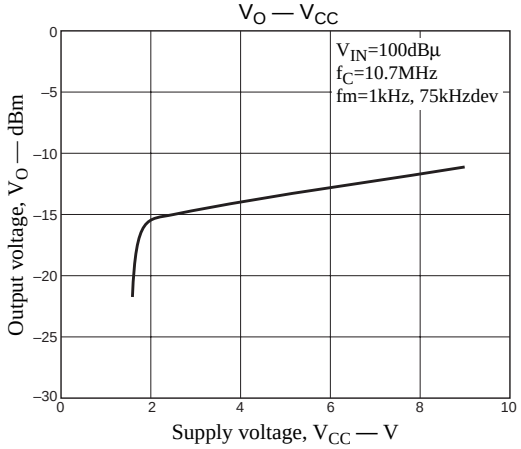
I/O Characteristics



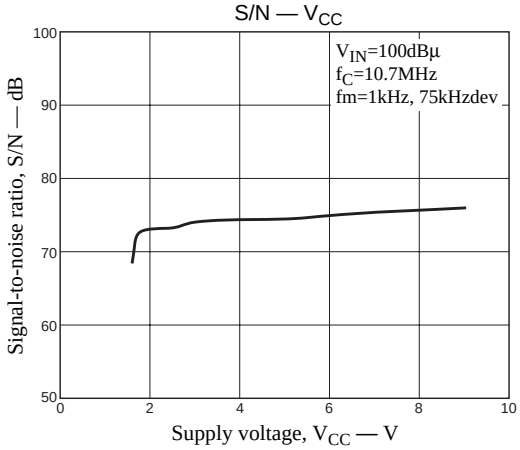

I/O Characteristics



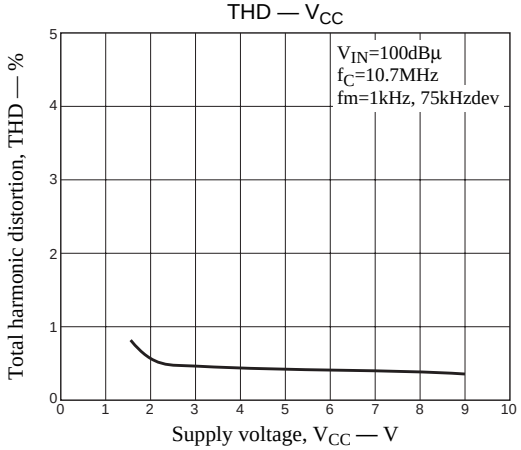

$V_O$ — $V_{CC}$



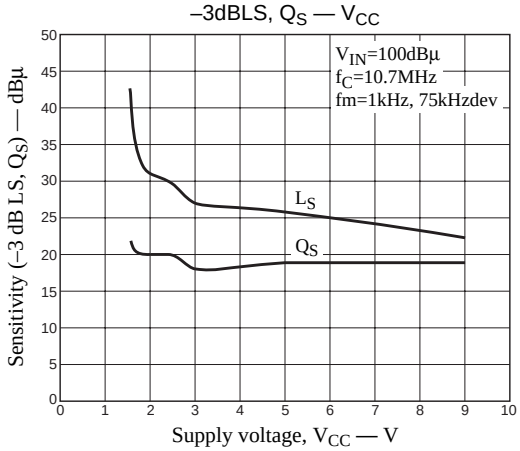

S/N — $V_{CC}$



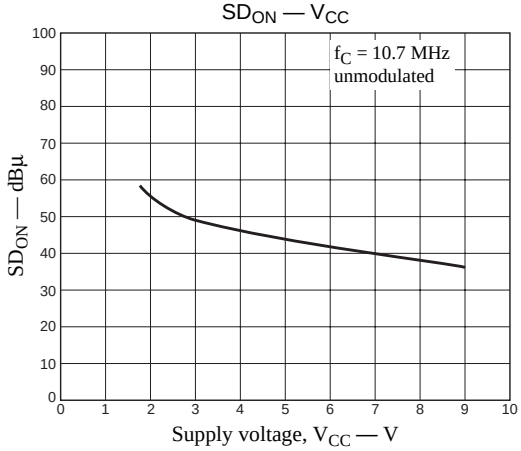

THD — $V_{CC}$



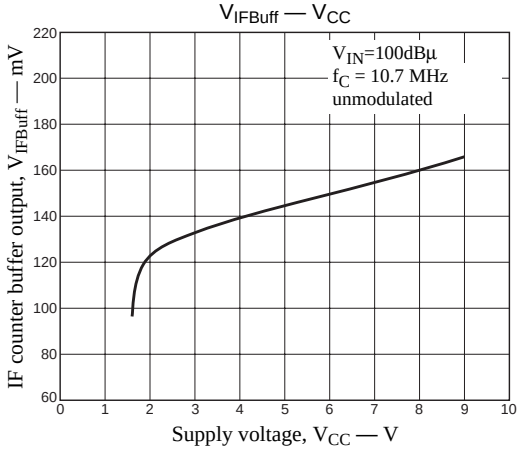

–3dBLS, $Q_S$ — $V_{CC}$



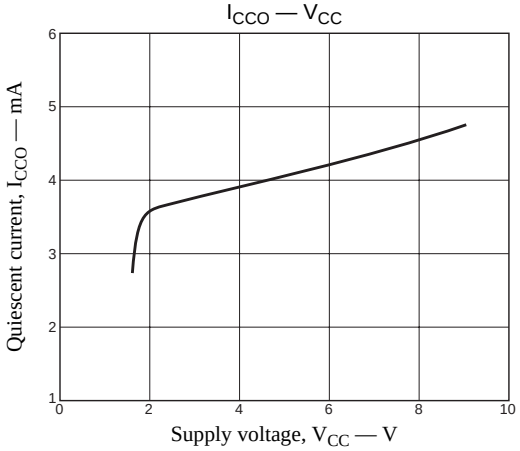

$SD_{ON}$ — $V_{CC}$



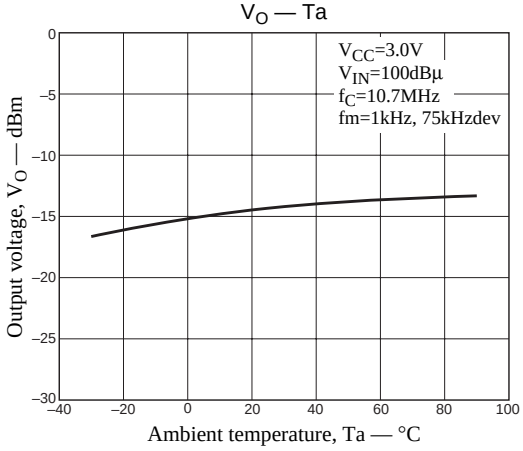

$V_{IFBuff}$ — $V_{CC}$



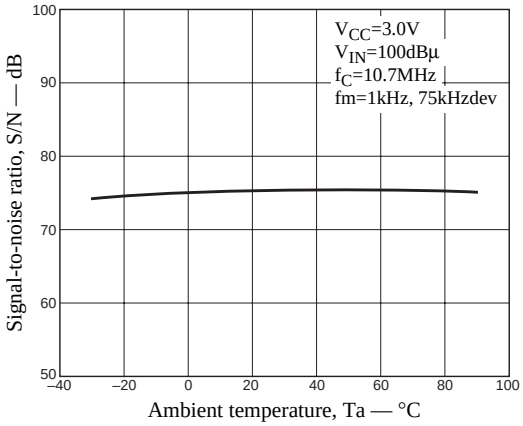
$I_{CCO}$ — $V_{CC}$



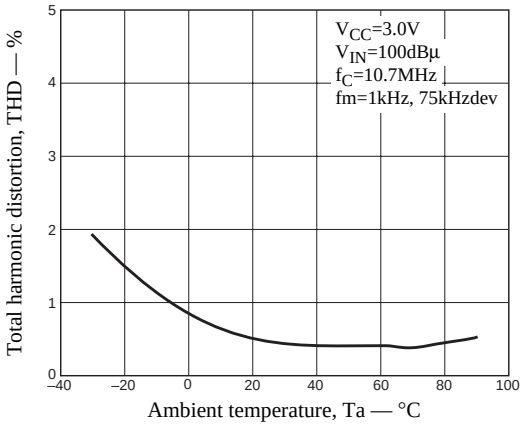

$V_O$ — Ta



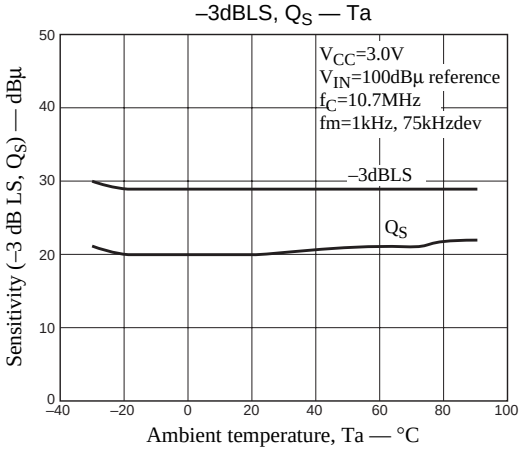

S/N — Ta



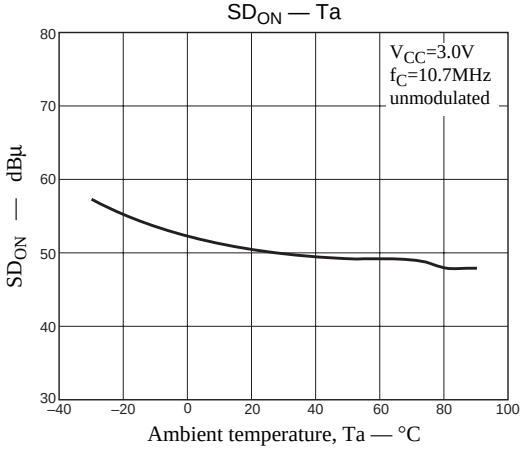

THD — Ta



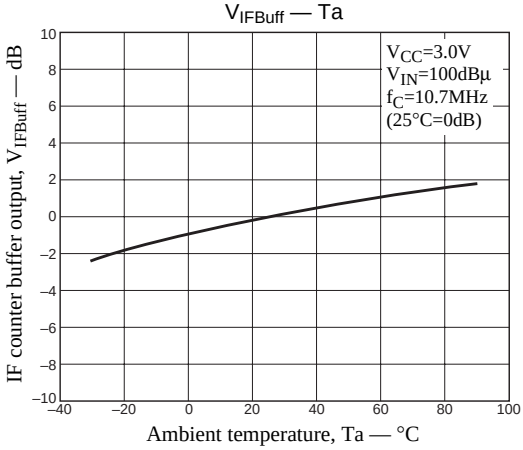

–3dBLS, $Q_S$ — Ta




$SD_{ON}$ — Ta




$V_{IFBuff}$ — Ta




$I_{CCO}$ — Ta