Ordering number : ENA2052

LA1225MC

Monolithic Linear IC

FM IF Detector IC

ON Semiconductor®

http://onsemi.com

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	Topr		-20 to +85	°C
Storage temperature	Tstg		-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

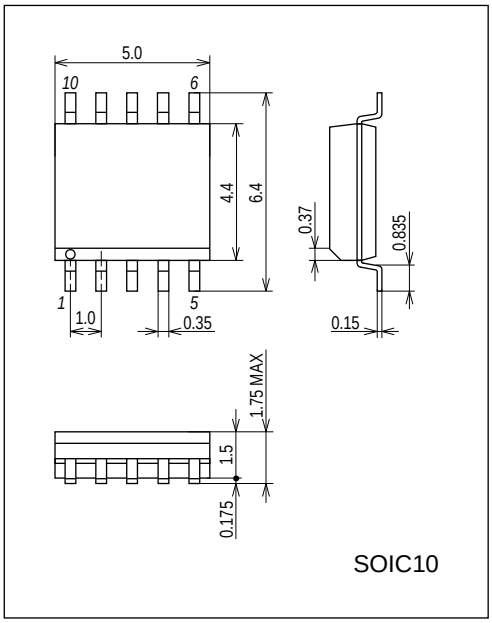
Operating Characteristics at Ta = 25°C, V_{CC} = 3.0V, f_C = 10.7MHz

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

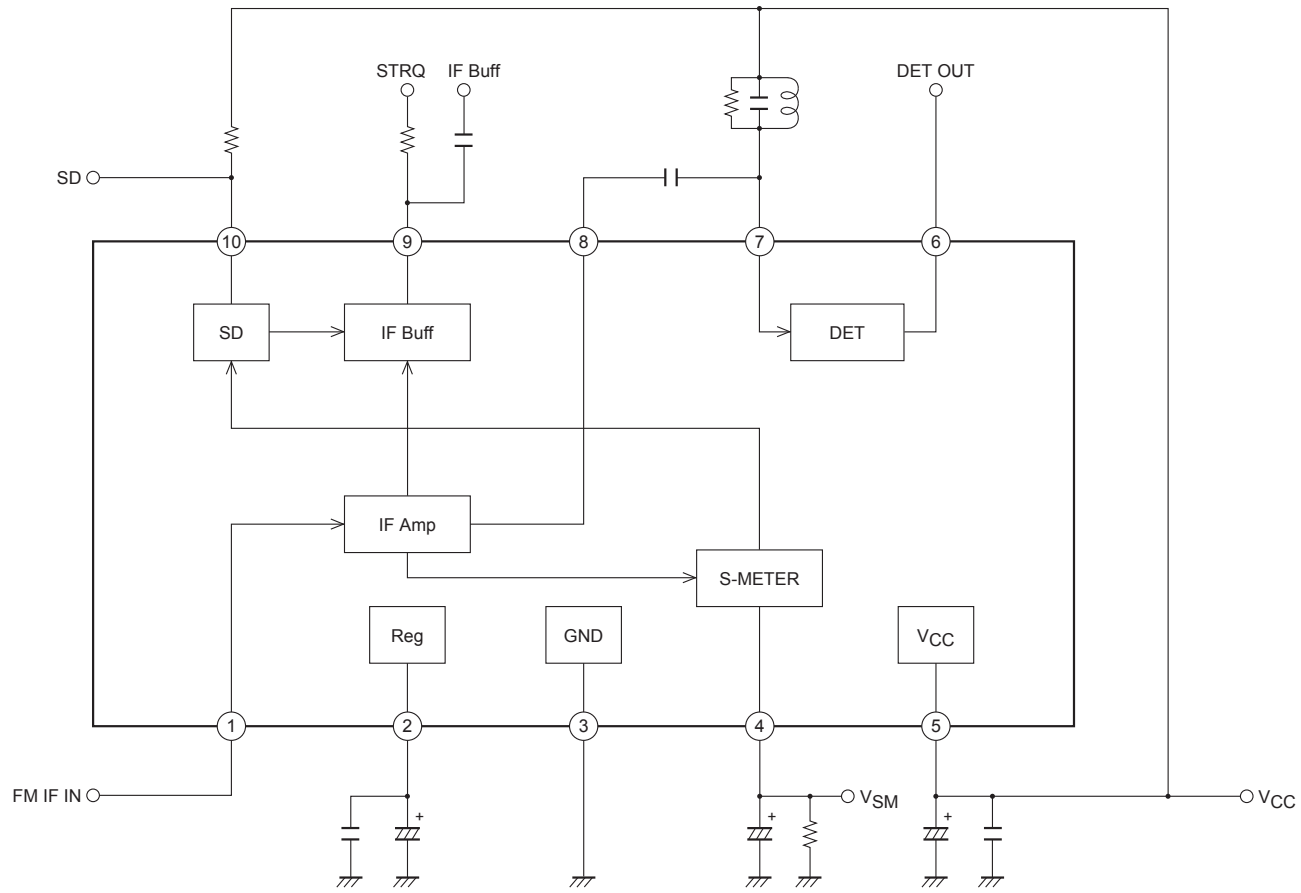
Package Dimensions

Unit : mm

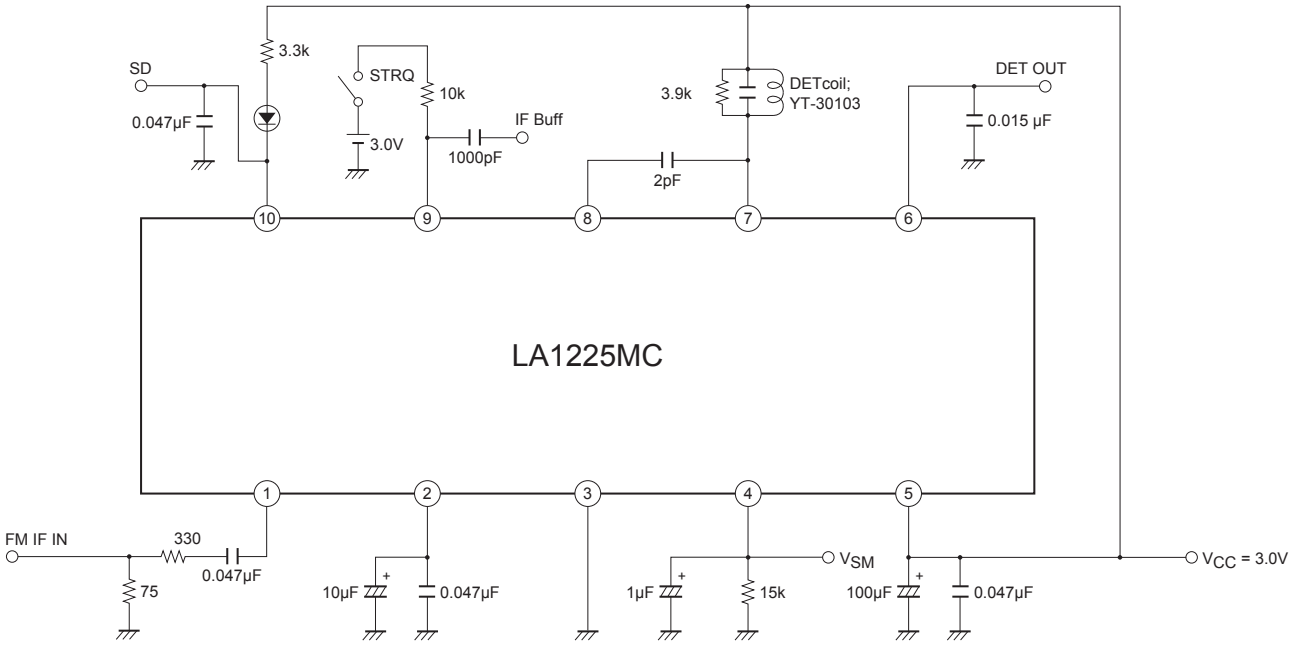
3426



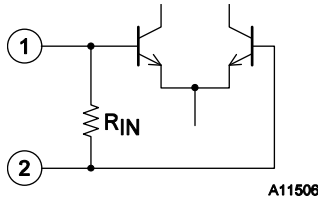
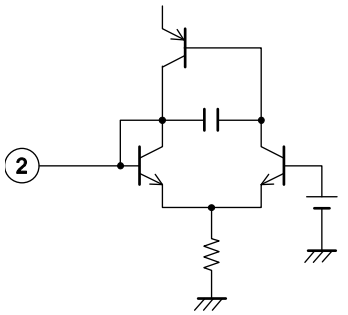
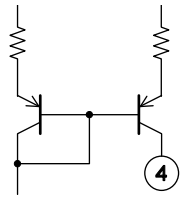
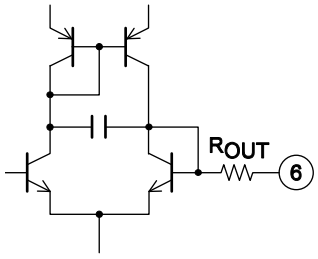
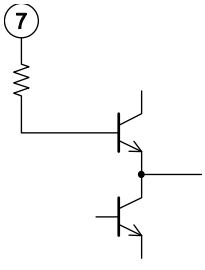
Block Diagram and Test Circuit



Sample Application Circuit



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} = 330Ω
2	Reg	1.2		Vreg = 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} = 3kΩ
7	DET	3.0		The detector coil is inserted between pin 7 and pin 5 (V_{CC}).

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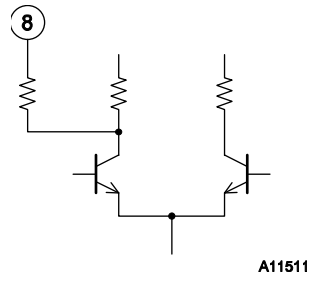
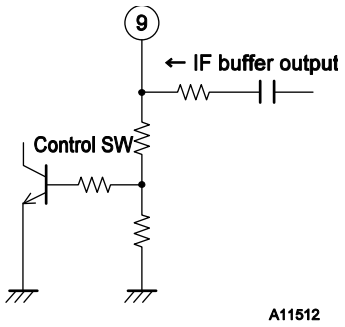
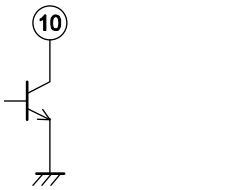
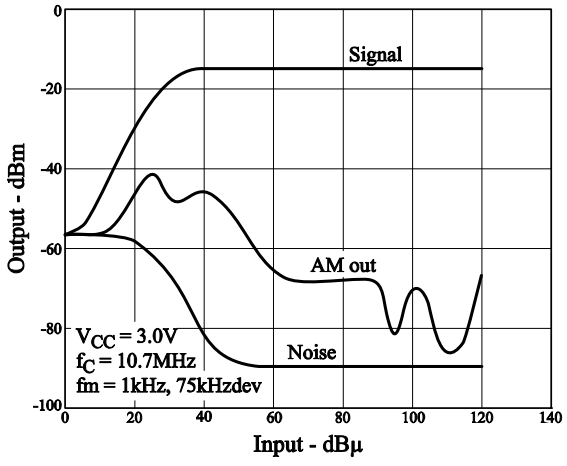
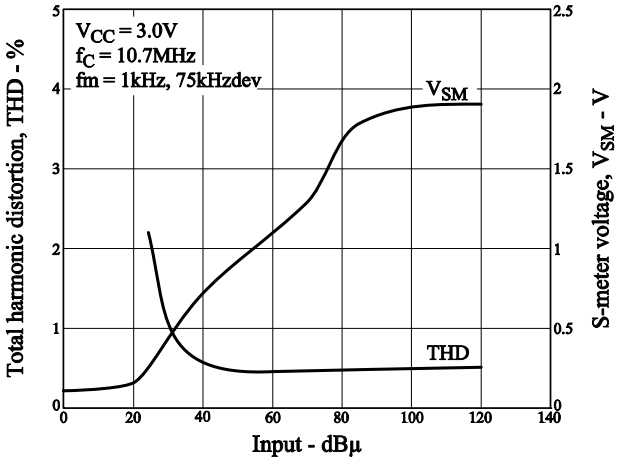
Pin No.	Function	No-signal voltage (V)	Equivalent circuit	Notes
8	Limiter amplifier output	2.8		Pin 8 and pin 7 (DET) are connected through a capacitor.
9	IF buffer (Also used for control SW)	0		The IF buffer output is turned on when the voltage applied to the pin is the recommended 1.5V or higher.
10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

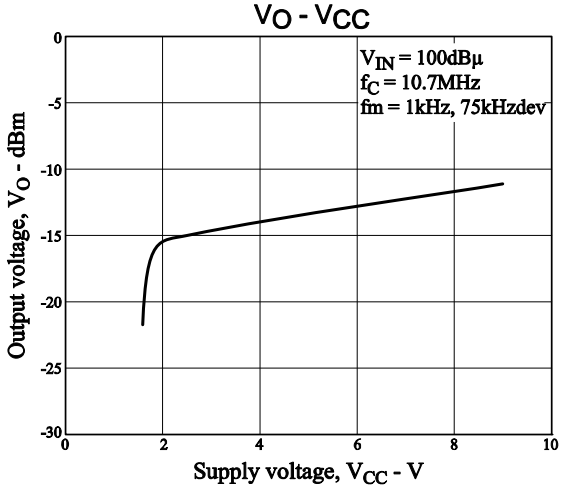
I/O Characteristics



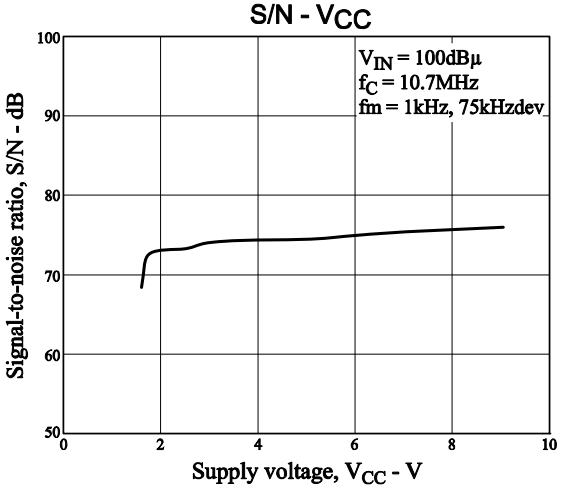
I/O Characteristics



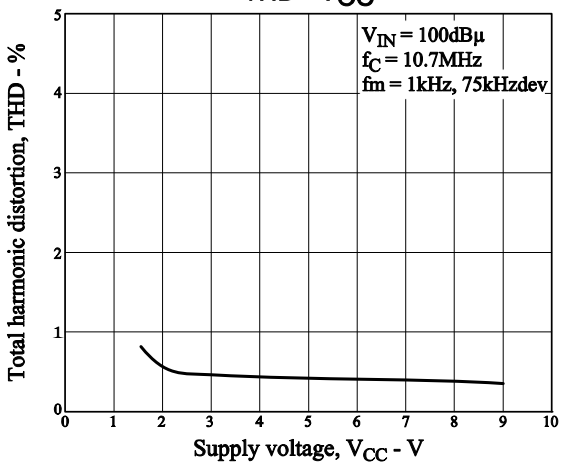
V_O - V_{CC}



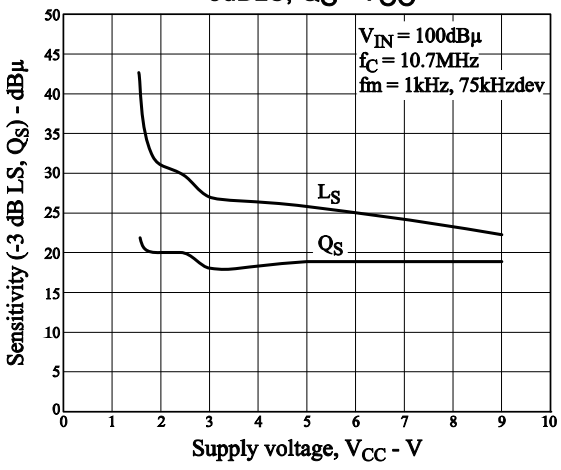
S/N - V_{CC}



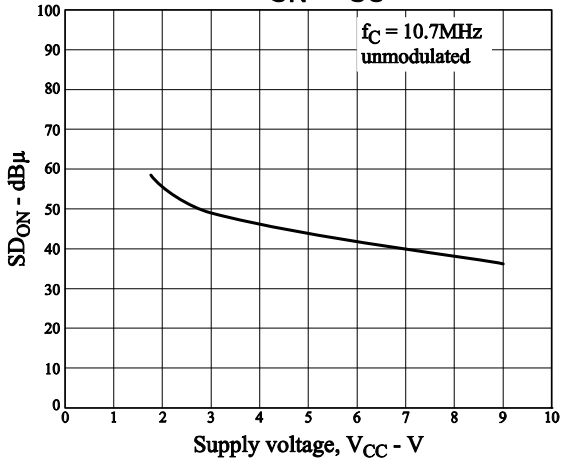
THD - V_{CC}



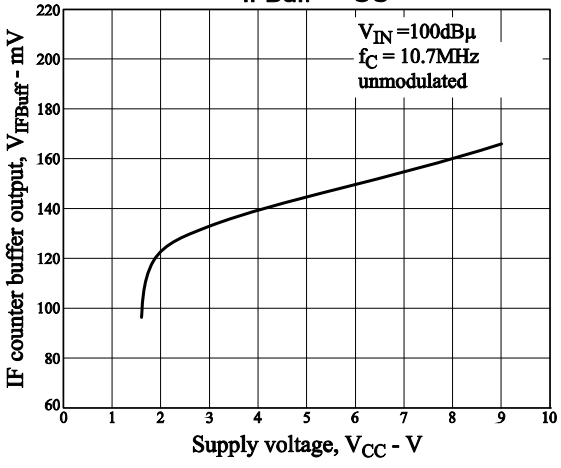
-3dBLS, Q_S - V_{CC}

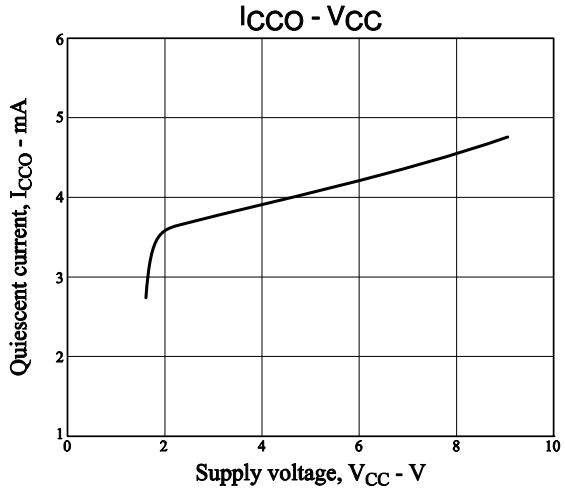


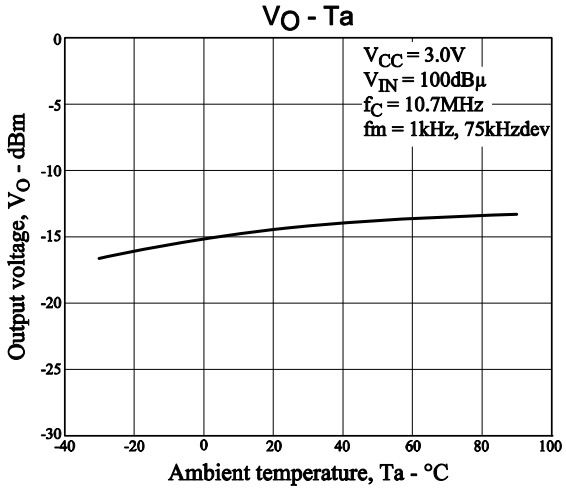
SD_{ON} - V_{CC}

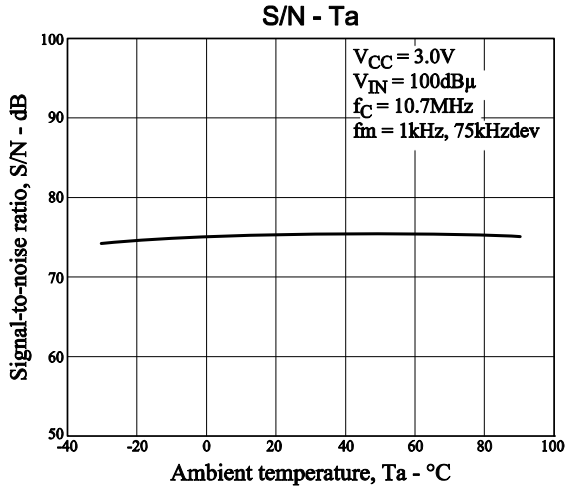


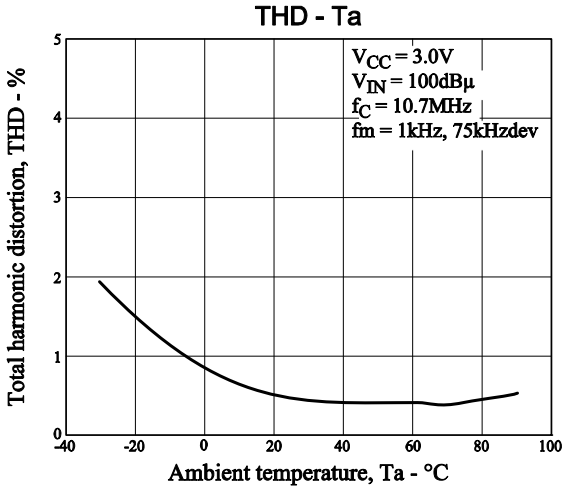
V_{IFBuff} - V_{CC}

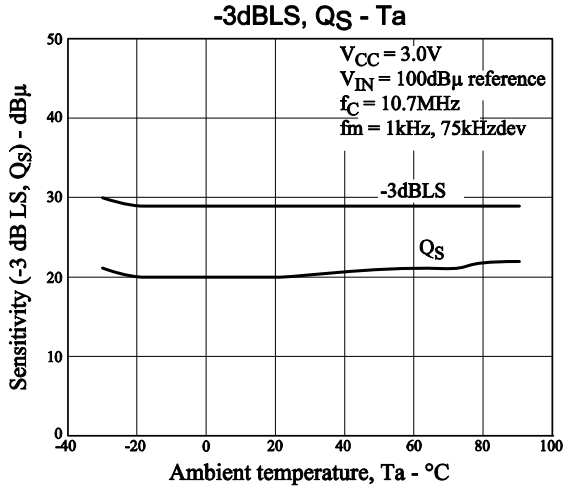


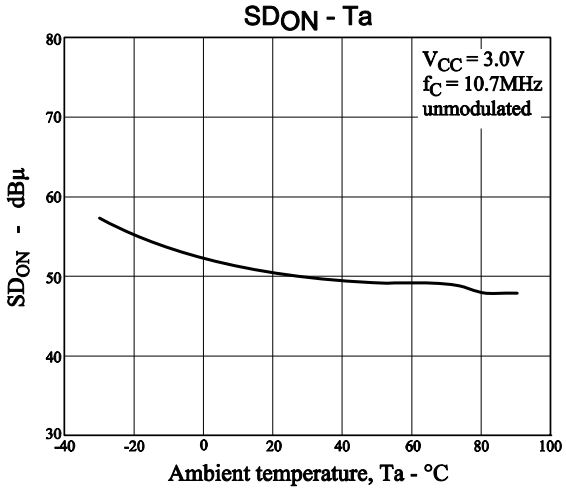

ICCO - VCC
Quiescent current, ICCO - mA
Supply voltage, VCC - V

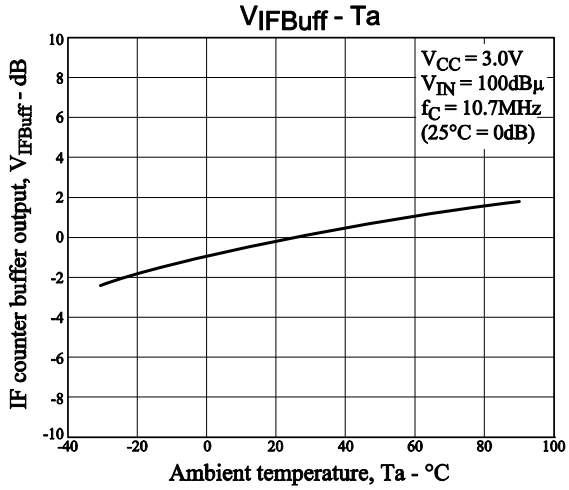

VO - Ta
VCC = 3.0V
VIN = 100dBμ
fC = 10.7MHz
fm = 1kHz, 75kHzdev
Output voltage, VO - dBm
Ambient temperature, Ta - °C

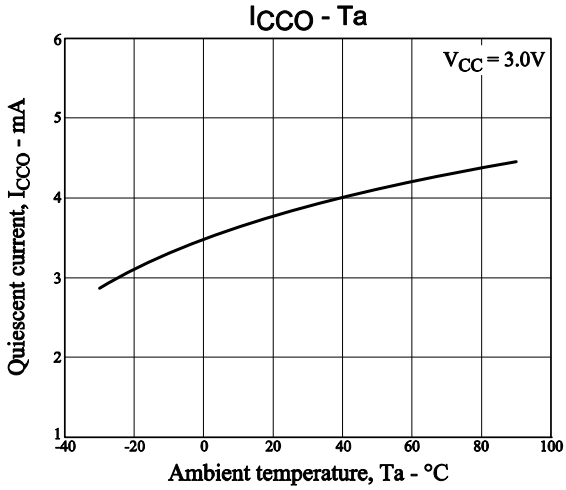

S/N - Ta
VCC = 3.0V
VIN = 100dBμ
fC = 10.7MHz
fm = 1kHz, 75kHzdev
Signal-to-noise ratio, S/N - dB
Ambient temperature, Ta - °C


THD - Ta
VCC = 3.0V
VIN = 100dBμ
fC = 10.7MHz
fm = 1kHz, 75kHzdev
Total harmonic distortion, THD - %
Ambient temperature, Ta - °C


-3dBLS, QS - Ta
VCC = 3.0V
VIN = 100dBμ reference
fC = 10.7MHz
fm = 1kHz, 75kHzdev
-3dBLS
QS
Sensitivity (-3 dB LS, QS) - dBμ
Ambient temperature, Ta - °C


SDON - Ta
VCC = 3.0V
fC = 10.7MHz
unmodulated
SDON - dBμ
Ambient temperature, Ta - °C


VIFBuff - Ta
VCC = 3.0V
VIN = 100dBμ
fC = 10.7MHz
(25°C = 0dB)
IF counter buffer output, VIFBuff - dB
Ambient temperature, Ta - °C


ICCO - Ta
VCC = 3.0V
Quiescent current, ICCO - mA
Ambient temperature, Ta - °C