



SANYO Semiconductors

DATA SHEET

LA8670M — Monolithic Linear IC Double-Conversion Narrow-Band FM IF System

Overview

The LA8670M is a narrow band FM IF system for use in communication equipment. In addition to the functions required for FM reception, the LA8670M provides a rich set of additional functions including noise detection and field strength detection, and is thus optimal for cordless telephones.

Functions

- First mixer, first local oscillator, first local oscillator buffer output, second mixer, second local oscillator
- IF amplifier, limiter, quadrature detector
- Signal meter
- Noise detector, noise amplifier, noise wave detector, schmitt trigger

Features

- Low voltage operation: $V_{CC\ op}=1.8$ to $6V$
- Signal meter linear over a wide range (70dB typical)
- High sensitivity, high intercept point

Specifications

Maximum Ratings at $T_a=25^\circ C$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC\ max}$		7.0	V
Allowable power dissipation	$P_d\ max$	$T_a \leq 75^\circ C$	150	mW
Operating temperature	T_{opr}		-20 to +75	$^\circ C$
Storage temperature	T_{stg}		-40 to +125	$^\circ C$

Operating Conditions at $T_a=25^\circ C$

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}		3.0	V
Operating supply voltage	$V_{CC\ op}$		1.8 to 6.0	V

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Operating Characteristics at $T_a=25^\circ\text{C}$, $V_{CC}=3\text{V}$, $f_c(\text{MIX})=49.830\text{MHz}$, $f_{\text{mod}}=1\text{kHz}$, $\Delta f=\pm 3\text{kHz}$

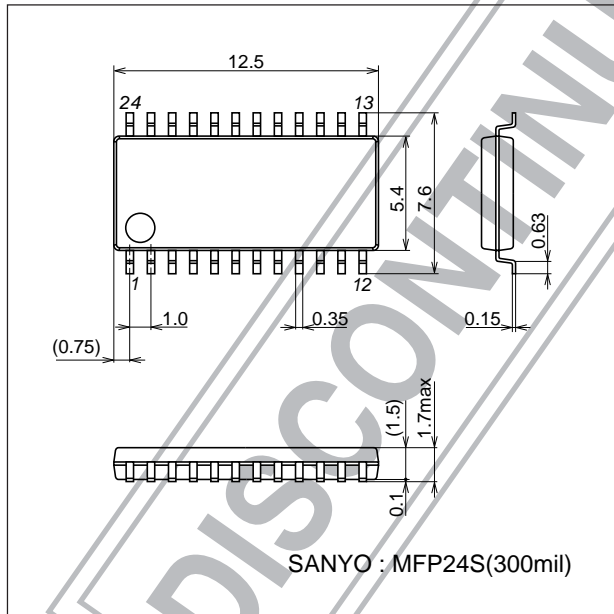
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Quiescent current	I_{CCO}	No input		7.3	9.5	mA
Mixer intercept point	I_{p3}	First mixer		-4.8		dBm
12dB sensitivity	12dB S / N	No input matching		3.2	5.0	dB μ
Demodulator output	V_O	$V_{IN}=80\text{dB}\mu$	143	180	227	mVrms
Signal-to-noise ratio	S / N	No modulation, $V_{IN}=80\text{dB}\mu$	60	67		dB
AM rejection ratio	AMR	AM 30% modulation	35	43		dB
Total harmonic distortion	THD	$V_{IN}=80\text{dB}\mu$		2.2	3.0	%
Signal meter output	V_{SM1}	$V_{IN}=0\text{dB}\mu$	0.05	0.30	0.65	V
	V_{SM2}	$V_{IN}=40\text{dB}\mu$	0.60	0.90	1.40	V
	V_{SM3}	$V_{IN}=80\text{dB}\mu$	1.05	1.40	1.85	V
Noise detector output	V_{ND1}	$f_i=40\text{kHz}$, $V_i=-50\text{dBV}$		0.10	0.25	V
	V_{ND2}	$f_i=40\text{kHz}$, $V_i=-30\text{dBV}$	1.10	1.40	1.70	V
Noise detector level	V_{141}	Schmitt on	0.53	0.63	0.73	V
	V_{142}	Schmitt off	0.33	0.43	0.53	V
Schmitt output level	V_{SH1}	$V_{14}=0.8\text{V}$			0.3	V
	V_{SH2}	$V_{14}=0.2\text{V}$	2.8			V
Mixer conversion gain	G_{M1}	First mixer		19		dB
	G_{M2}	Second mixer		24		dB
Mixer input frequency					90	MHz
Mixer input resistance		First mixer		5		k Ω
		Second mixer		330		Ω
Mixer output resistance		First mixer		330		Ω
		Second mixer		2.0		k Ω
FM detector output impedance				520		Ω

Note: AC levels are all indicated for open (EMF) circuits.

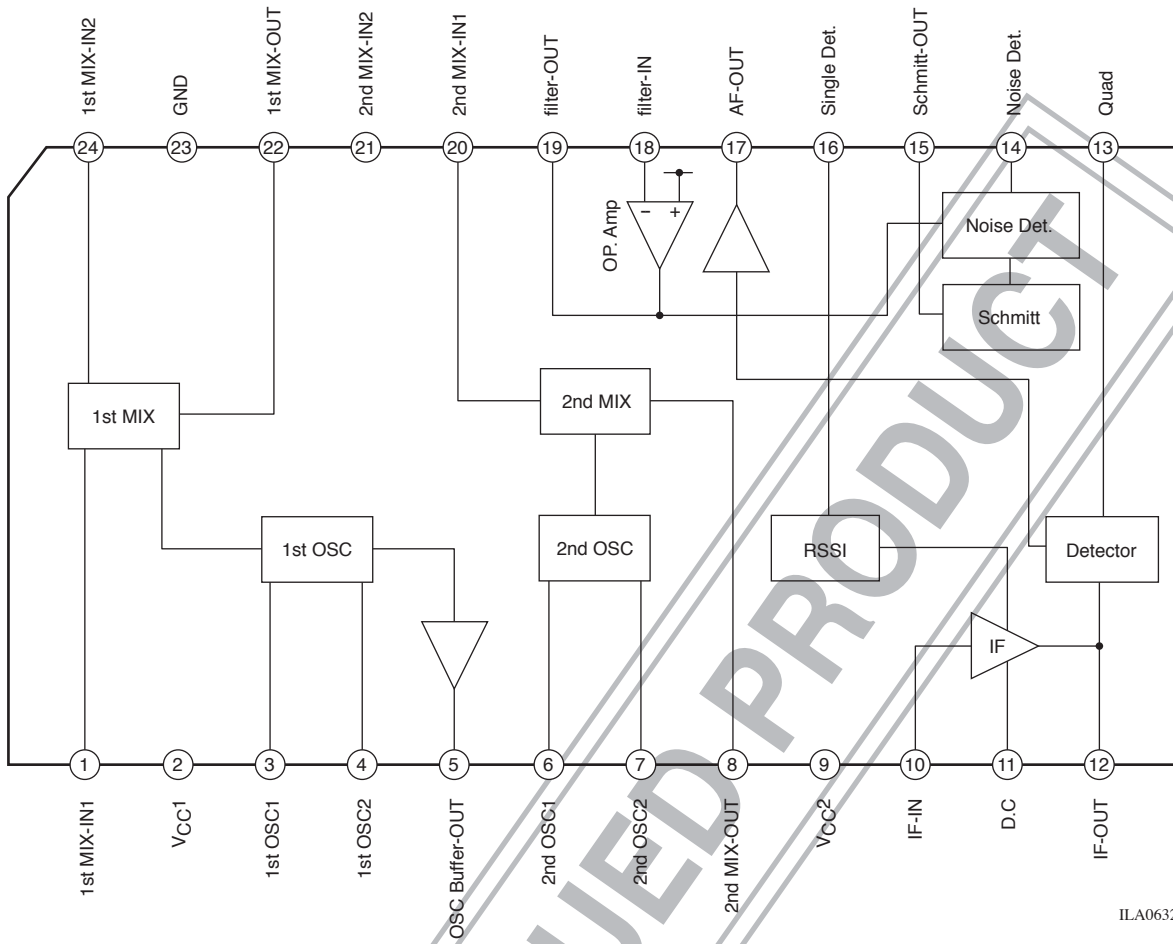
Package Dimensions

unit : mm

3112B



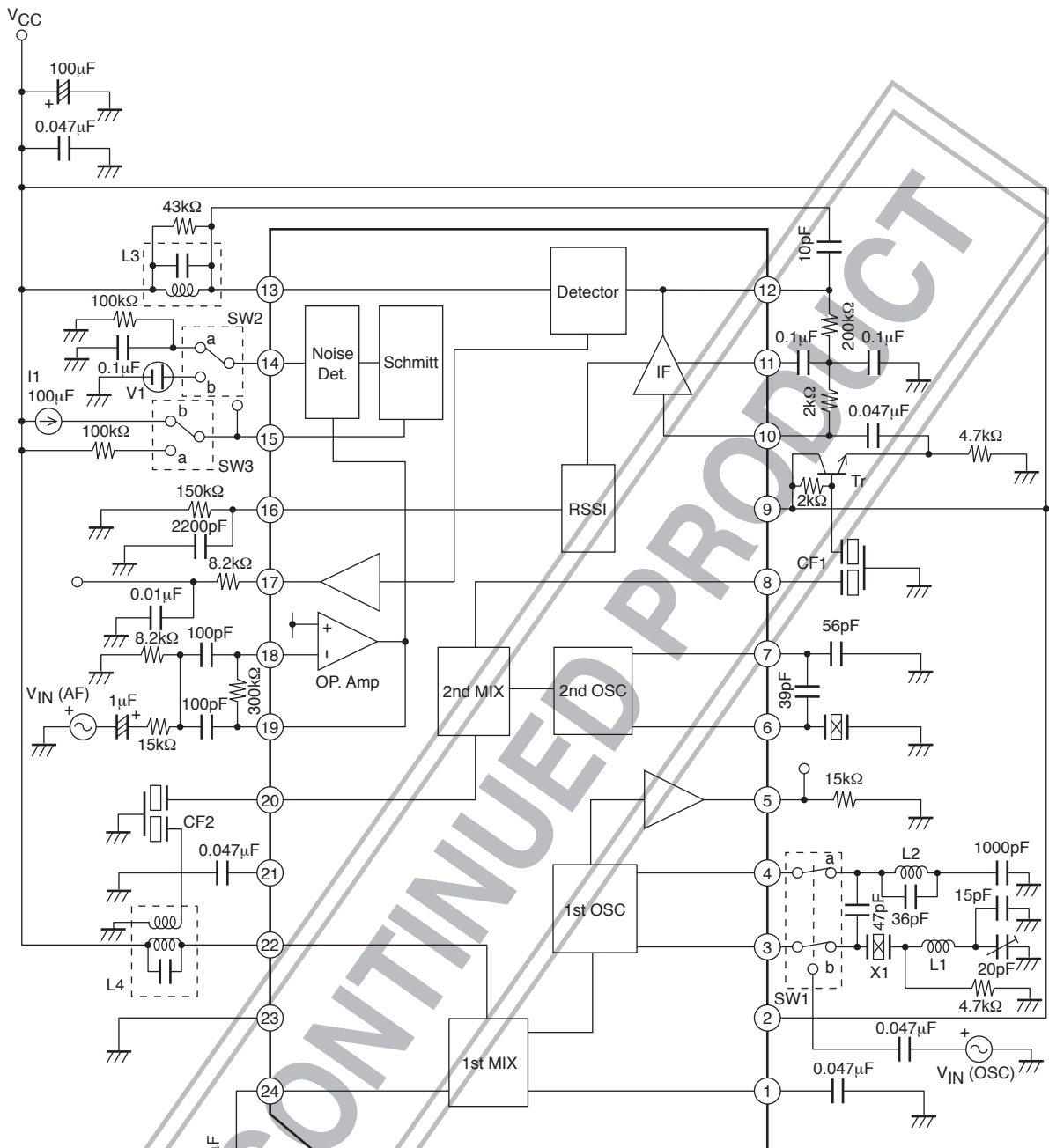
Equivalent Circuit Block Diagram



ILA06328

DISCONTINUED PRODUCT

Test Circuit

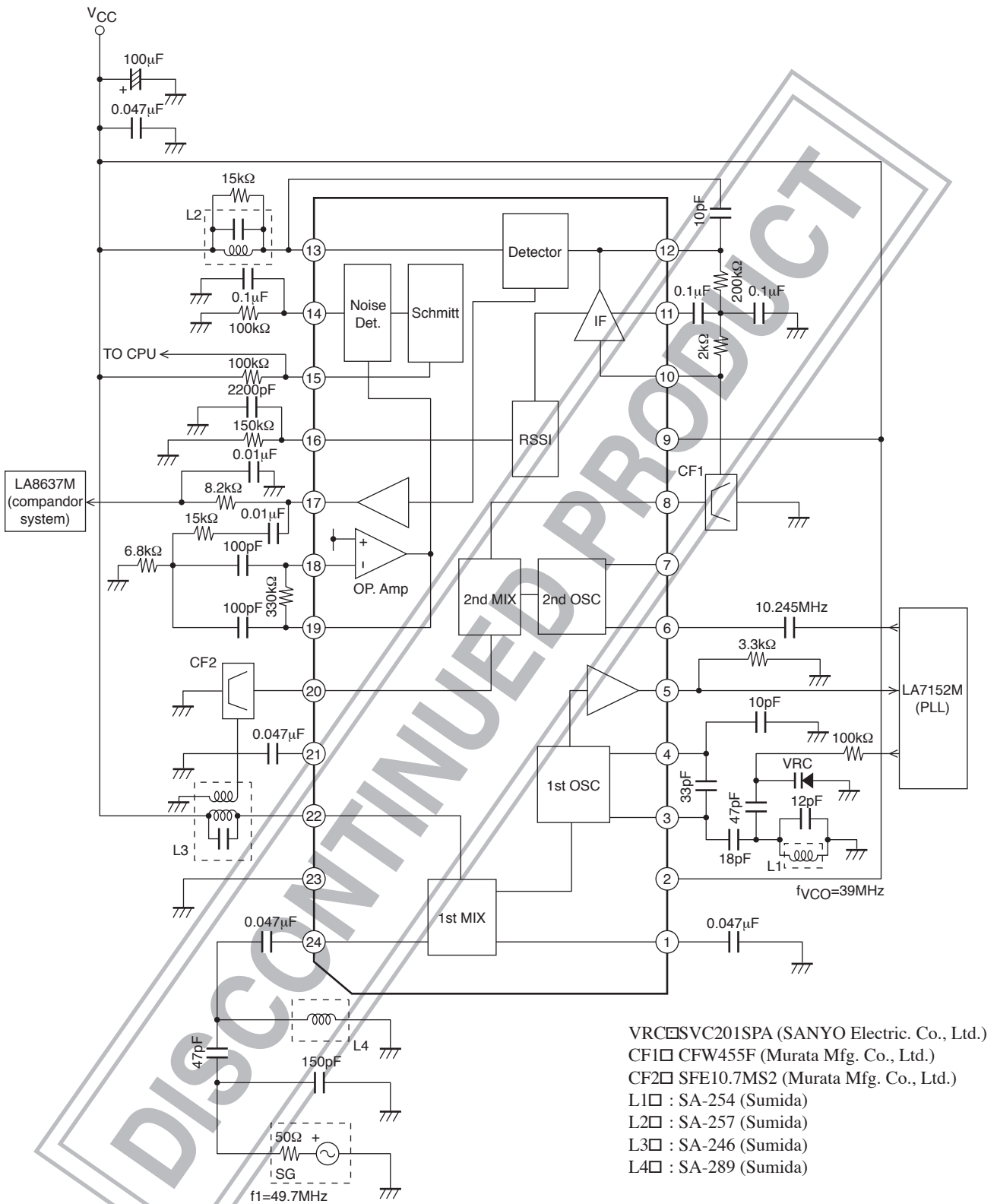


- CF1 □ CFW455F (Murata Mfg. Co., Ltd.)
- CF2 □ SFE10.7MS2 (Murata Mfg. Co., Ltd.)
- X1 □ 39.130MHz
- X2 □ 10.245MHz
- L1 □ 1.8μH
- L2 □ YD1002 (Mitsumi Electric. Co., Ltd.)
- L3 □ YD0051 (Mitsumi Electric. Co., Ltd.)
- L4 □ SA-246 (Sumida)
- Tr □ 2SC2999

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Sample Application Circuit



ILA06330

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Pin Functions

Pin No.	Symbol	Internal equivalent circuit	Note
24	1st MIX-IN 2	<p>ILA06331</p>	First mixer inputs
1	1st MIX-IN 1		
2	VCC1		Power supply for the first mixer
3	1st OSC 1	<p>ILA06332</p>	Local oscillator inputs
4	1st OSC 2		
5	OSC Buffer-OUT		Local oscillator buffer output
6	2nd OSC 1	<p>ILA06333</p>	Local oscillator inputs When external insertion is used, input the signal to pin6 and leave pin7 open.
7	2nd OSC 2		
8	2nd MIX-OUT	<p>ILA06334</p>	Second mixer output
9	VCC2		Power supply
10	IF-IN	<p>ILA06335</p>	IF amplifier input
11	D.C		IF amplifier DC feedback
12	IF-OUT	<p>ILA06336</p>	Limiter amplifier output

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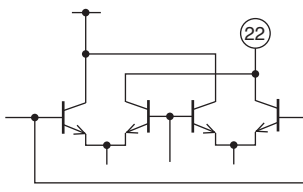
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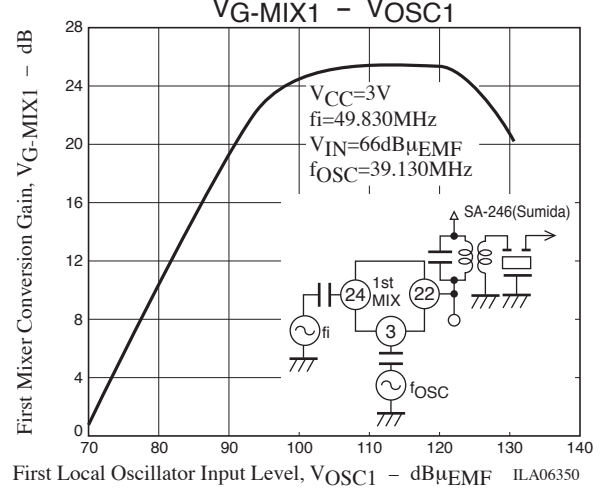
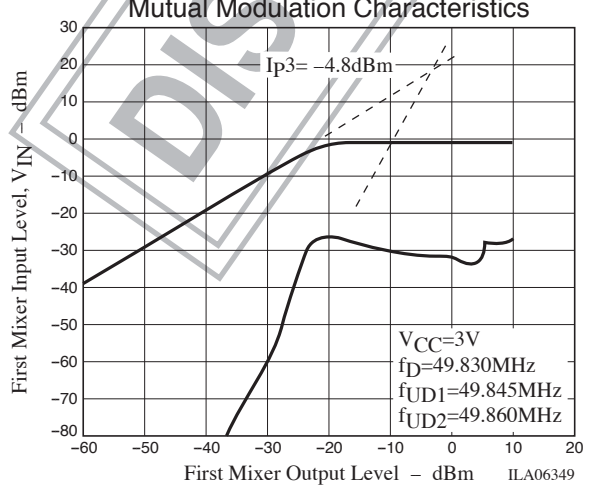
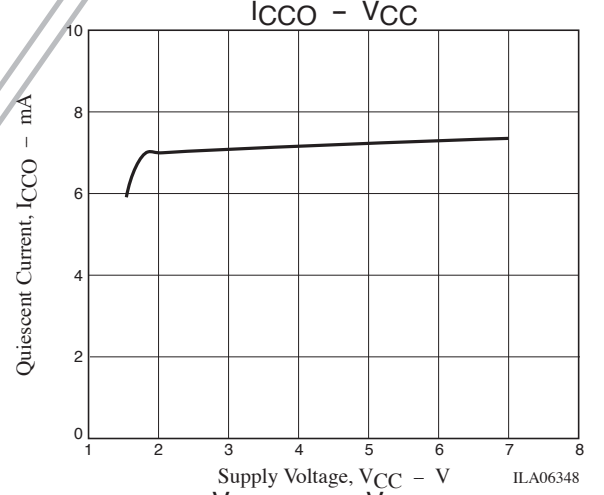
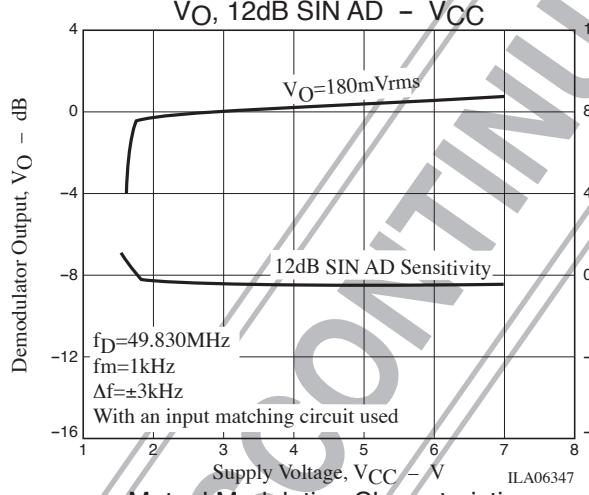
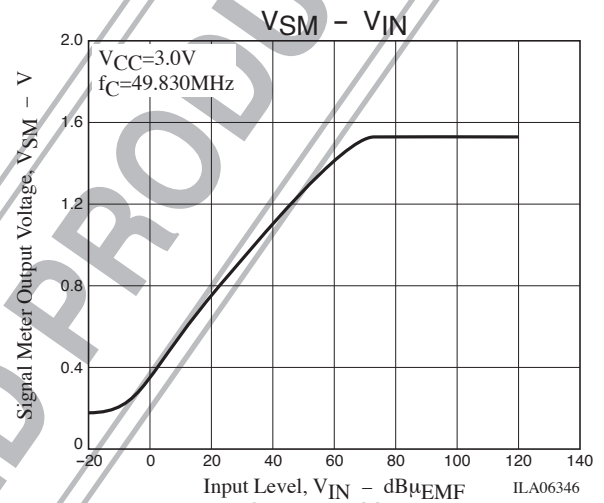
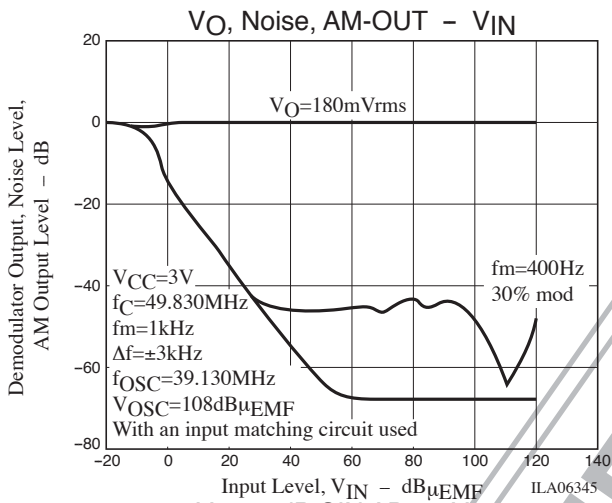
Pin No.	Symbol	Internal equivalent circuit	Note
13	Quad.	<p style="text-align: right;">ILA06337</p>	Discriminator connection
14	Noise det.	<p style="text-align: right;">ILA06338</p>	Noise detector
15	Schmitt-OUT	<p style="text-align: right;">ILA06339</p>	Noise Schmitt output
16	Signal DET.	<p style="text-align: right;">ILA06340</p>	Field strength signal output
17	AF-OUT	<p style="text-align: right;">ILA06341</p>	FM detector output
18	Filter-IN	<p style="text-align: right;">ILA06342</p>	Noise filter input
19	Filter-OUT		Noise filter output
20	2nd MIX-IN 1	<p style="text-align: right;">ILA06343</p>	Second mixer input
21	2nd MIX-IN 2		

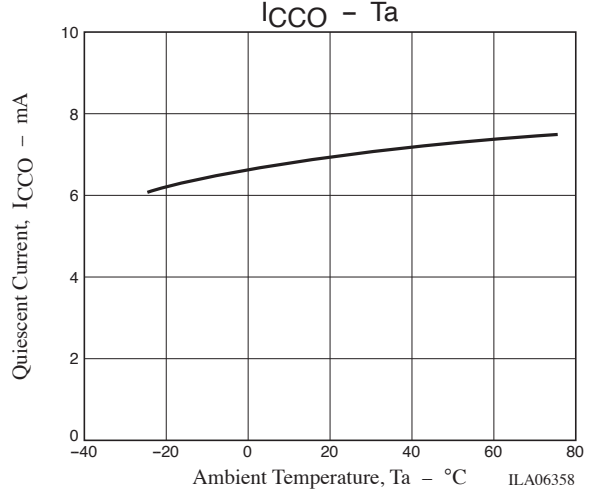
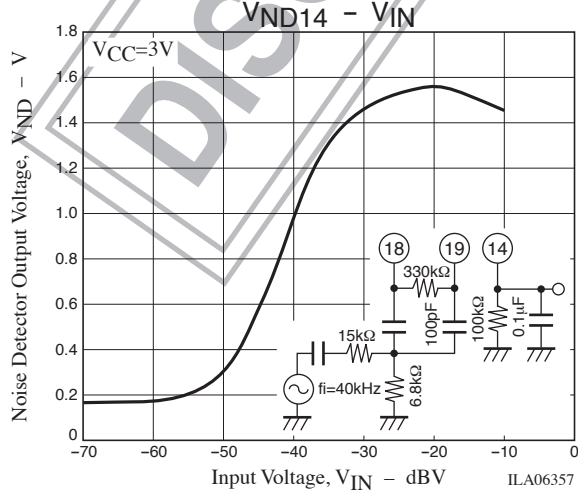
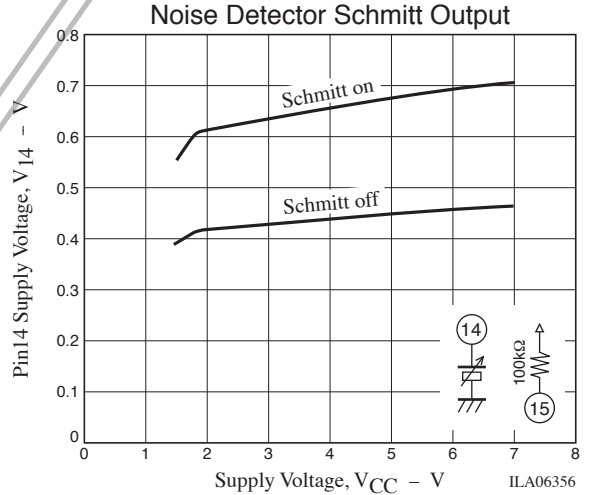
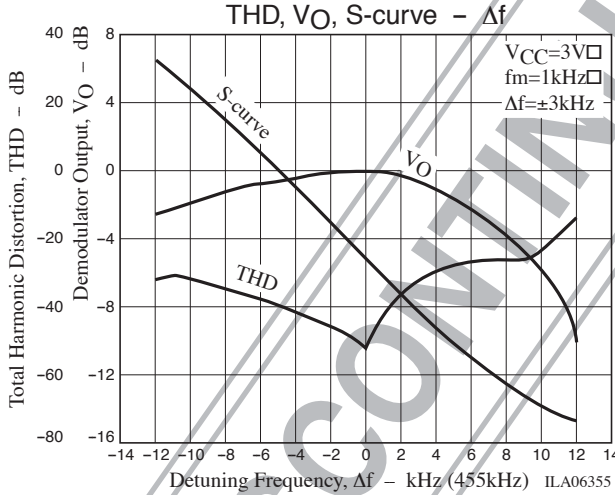
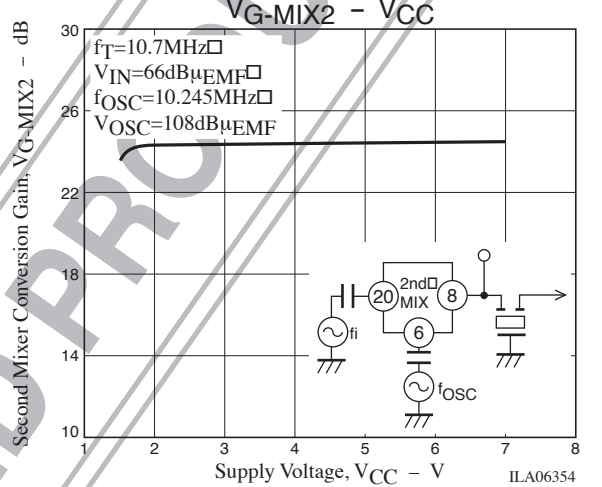
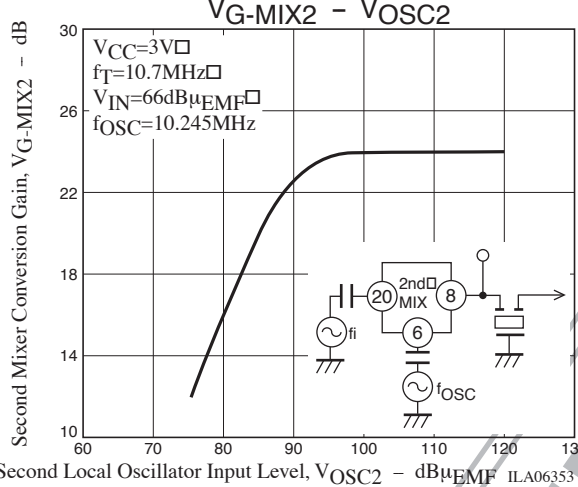
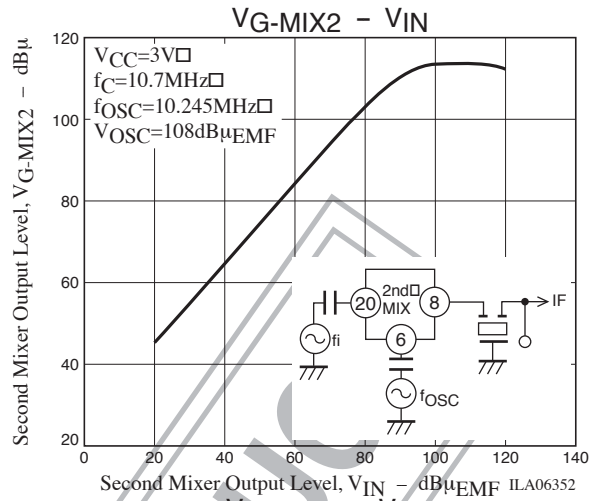
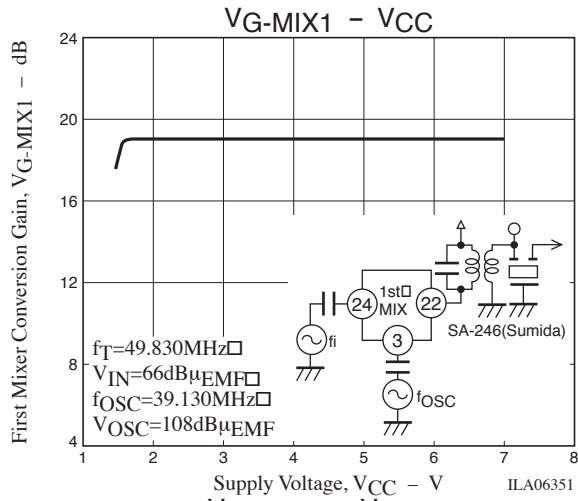
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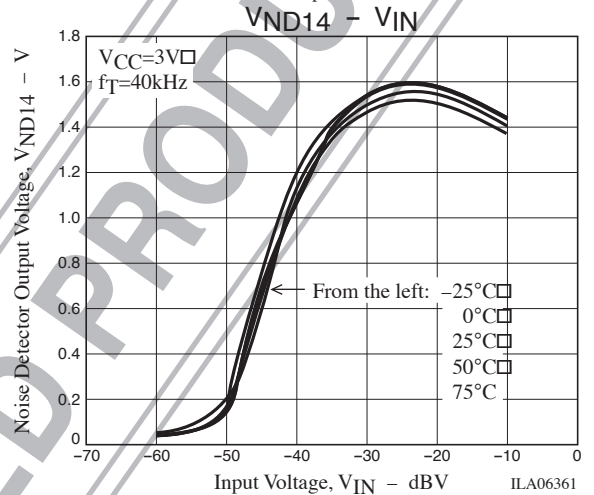
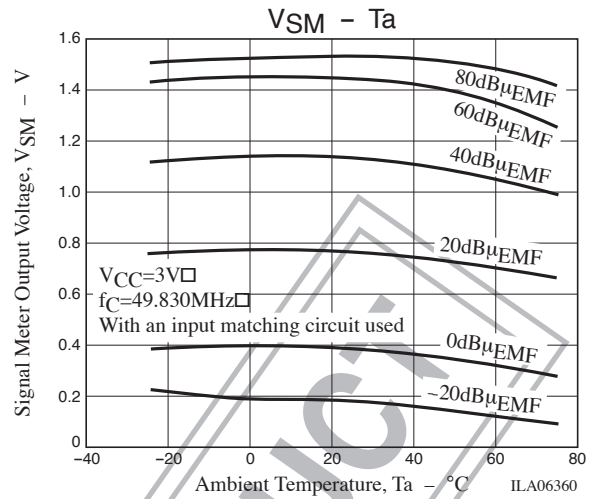
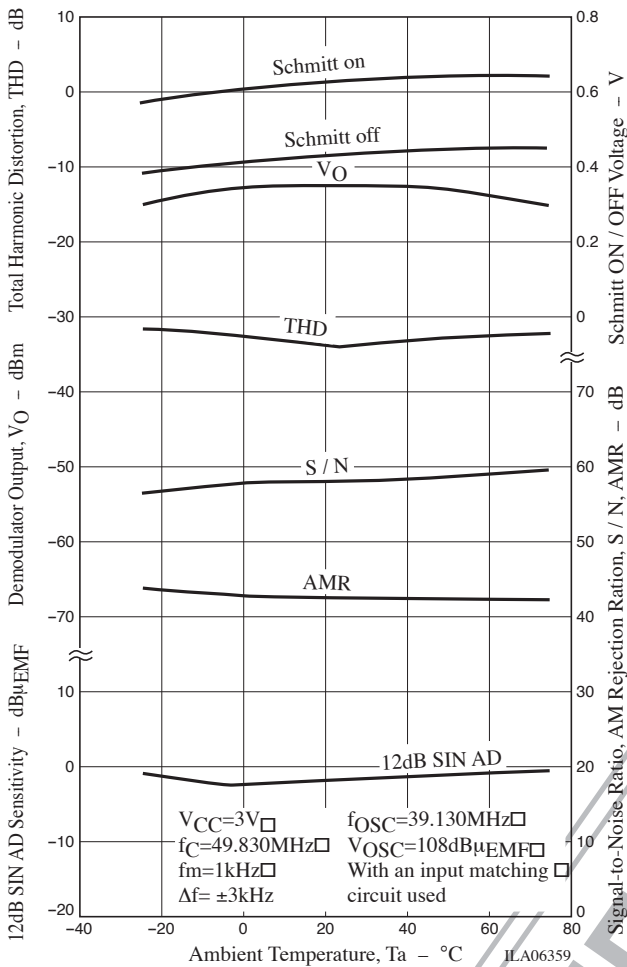
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Pin No.	Symbol	Internal equivalent circuit	Note
22	1st MIX-OUT	 <p>ILA06344</p>	First mixer output
23	GND		Ground







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