

AM radio / FM IF stereo system IC

BA1450S

The BA1450S is a tuner system IC for electronic tuning for AM radios, FM IF, and MPX. It has been developed for Hi-Fi component applications.

The MPX VCO circuit requires no adjustment, which will enable a reduction in the number of production line processes. In particular, the laser lock technique used in the VCO means that no external adjustment is required.

●Applications

Synthesized tuner for Hi-Fi components.

●Features

- 1) Built-in AM monaural radio, FM IF amplifier/detector, and FM stereo demodulator.
- 2) DTS (both SD and IF count) compatible.
- 3) Built-in reference voltage power supply provides good shortwave band frequency stability.
- 4) Good FM stability.
- 5) The FM MPX VCO uses laser locking making adjustment and external components unnecessary.
- 6) Built-in forced monaural operation function for MPX (VCO stops, and LED goes off).
- 7) Low cutoff of audio is possible to improve AM fidelity.
- 8) MPX VCO stops in AM mode.
- 9) Audio muting is possible when an IF request is made.

●Absolute maximum ratings (Ta = 25°C)

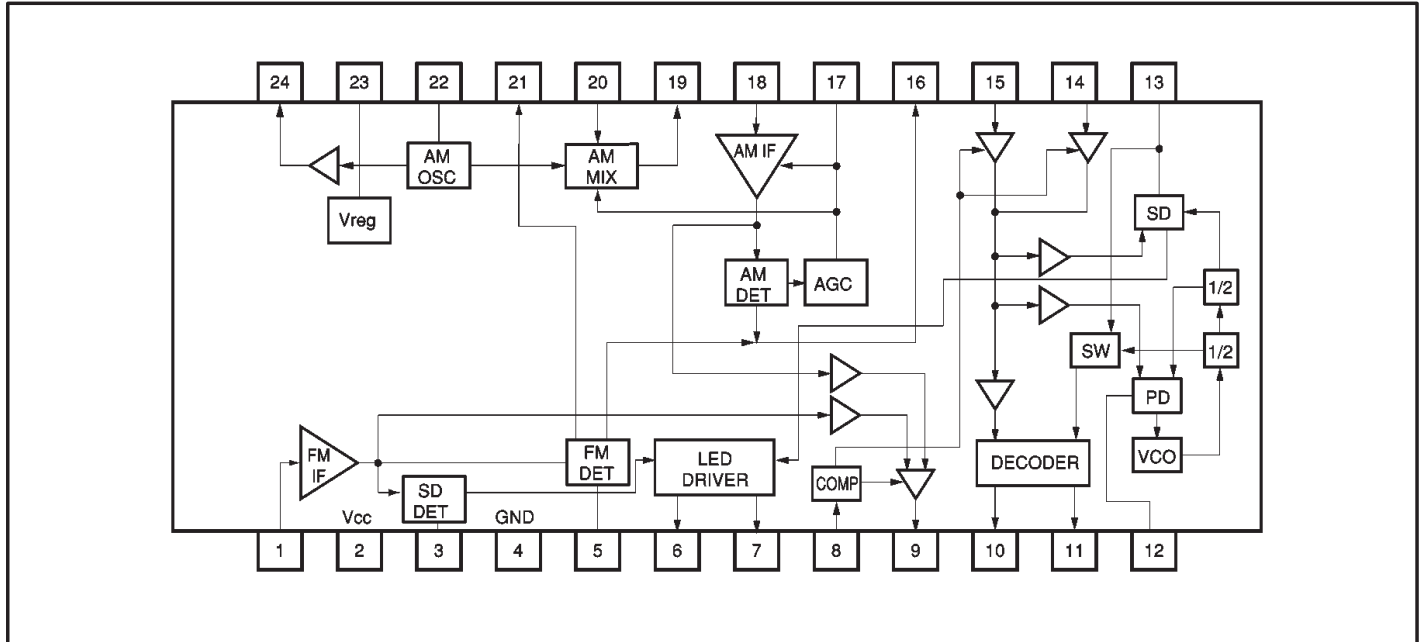
Parameter	Symbol	Limits	Unit
Power supply voltage	V _{CC}	9.0	V
Power dissipation	P _d	600*1	mW
Operating temperature	T _{opr}	-25~+75	°C
Storage temperature	T _{stg}	-55~+125	°C

*1 Reduced by 6.0mW for each increase in Ta of 1°C over 25°C.

●Recommended operating conditions (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power supply voltage	V _{CC}	3.8	5.0	8.0	V

●Block diagram



● Input / output circuits

Pin No.	Function	Internal circuit	Quiescent voltage (V)	
			FM	AM
1	FM IF amplifier input Connect to an FM ceramic filter.		2.1	2.1
2	Vcc	—	5.0	5.0
3	FM tuning ON level adjustment Connect a resistor from this pin to GND to set the required ON level for the tuning indicator.		0.25	0
4	GND	—	0	0
5	FM discriminator Connect to the discriminator coil.		5.0	5.0
6	Tuning indicator Connect to a tuning indicator display device (eg. LED)		—	—
7	Stereo indicator Connect to a stereo indicator display device (eg. LED)		—	—

Pin No.	Function	Internal circuit	Quiescent pin voltage (V)	
			FM	AM
8	<ul style="list-style-type: none"> • IF request IF signal is output when input is 4.0V or more. • MUTE MUTE on when input is 2.0V or more. 		0	0
9	<p>IF output Output for the IF signal.</p>		4.2	4.2
10	R-channel output		1.5	1.5
11	L-channel output		1.5	1.5
12	<ul style="list-style-type: none"> • PLL filter Connect to a lag/lead filter. • AM/FM band switch AM band when connected to GND. 		2.1	0
13	<ul style="list-style-type: none"> • Forced monaural Forced monaural operation when connected to GND. • Pilot filter Connect to a capacitor. 		2.1	2.1

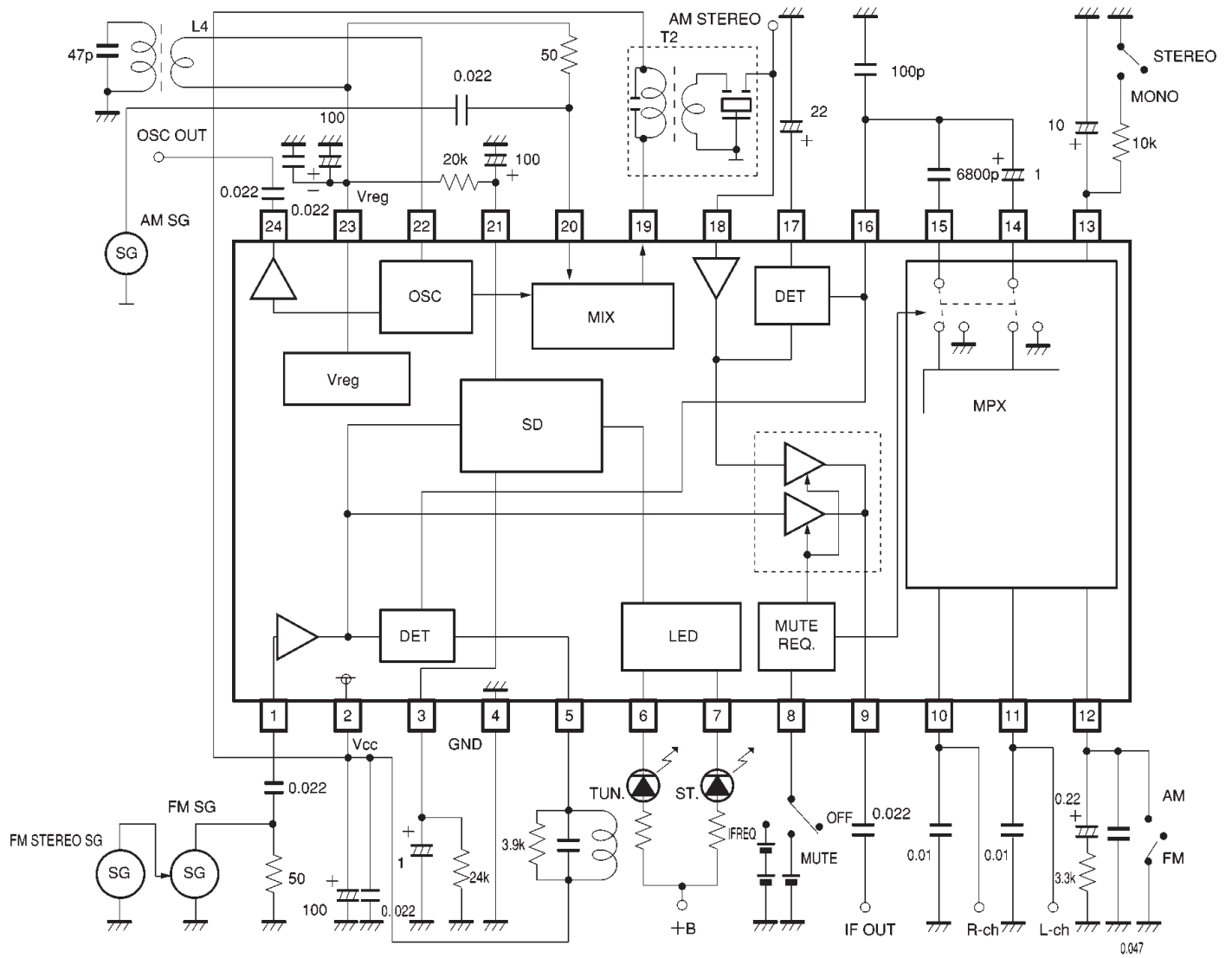
Pin No.	Function	Internal circuit	Quiescent pin voltage (V)	
			FM	AM
14	MPX input Input the FM detector output .		2.1	2.1
15	MPX input Input the AM detector output after low cut.		2.1	2.1
16	AM/FM detector output Connect to the following stage MPX and FM low pass filter.		2.1	2.1
17	AM AGC Connect to a capacitor.		0	0
18	AM IF input Connect to an AM ceramic filter.		5.0	5.0
19	AM mixer output Connect to primary side of AM IFT.		5.0	5.0
20	AM antenna Connect to AM antenna.		2.1	2.1

Pin No.	Function	Internal circuit	Quiescent pin voltage (V)	
			FM	AM
21	<p>FM detector bandwidth adjustment</p> <p>Connect a resistor from this pin to the reference voltage supply to set the required detector bandwidth.</p>		2.1	2.1
23	<p>Reference voltage supply</p> <p>Connected to a capacitor.</p>		2.1	2.1
22	<p>AM local oscillator</p> <p>Connect to the AM OSC circuit.</p>		2.1	2.1
24	<p>AM local oscillator output</p> <p>AM OSC output.</p>		1.7	1.4

- Electrical characteristics (unless otherwise noted, $T_a = 25^\circ\text{C}$ and $V_{CC} = 5\text{V}$)
 FM IF MPX signal source: $f_{IN} = 10.7\text{MHz}$, modulation 1kHz, 75kHzdev (100%)
 19kHz 7.5kHzdev (10%)
 AM: $f_{IN} = 1000\text{kHz}$, modulation 1kHz 30%

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Quiescent current FM	$I_{Q(FM)}$	13	21	29	mA	No input
Quiescent current AM	$I_{Q(AM)}$	11	19	27	mA	No input
〈FM IF MPX〉						
Detector output voltage	V_O	340	480	670	mV_{rms}	$V_{IN}=100\text{dB } \mu\text{V}$, mono
-3dB limiting sensitivity	L.S	34	37	40	$\text{dB } \mu\text{V}$	mono
Signal-to-noise ratio	S / N	72	80	—	dB	$V_{IN}=100\text{dB } \mu\text{V}$, mono
Channel balance	C.B	-2	0	+2	dB	$V_{IN}=100\text{dB } \mu\text{V}$, mono
AM suppression ratio	AMR	45	55	—	dB	AM : $V_{IN}=60\text{dB } \mu\text{V}$, mod=30%, 400Hz
Channel separation	SEP	35	45	—	dB	$V_{IN}=100\text{dB } \mu\text{V}$, main
Total harmonic distortion	THD	—	0.5	1.6	%	$V_{IN}=100\text{dB } \mu\text{V}$, main
Station detector sensitivity	SD_s	37	42	47	$\text{dB } \mu\text{V}$	Input for pin 6 current $\geq 1\text{mA}$
Station detector bandwidth	SD_{sw}	70	100	150	kHz	$V_{IN}=100\text{dB } \mu\text{V}$, mono
IF OUT output voltage	V_{IF}	300	400	530	$\text{mV}_{\text{P-P}}$	IF request ON
〈AM〉						
Detector output voltage	V_O	70	90	120	mV_{rms}	$V_{IN}=68\text{dB } \mu\text{V}$
Usable sensitivity	Q.S	22	25	28	$\text{dB } \mu\text{V}$	Input for S/N = 20dB
Signal-to-noise ratio	S / N	42	52	—	dB	$V_{IN}=68\text{dB } \mu\text{V}$
Total harmonic distortion	THD	—	0.6	1.8	%	$V_{IN}=68\text{dB } \mu\text{V}$
Station detector sensitivity	SD_s	21	26	31	$\text{dB } \mu\text{V}$	Input for pin 6 current $\geq 1\text{mA}$
IF OUT output voltage	V_{IF}	300	400	530	$\text{mV}_{\text{P-P}}$	IF request ON
Local buffer output voltage	$V_{O\text{Buff}}$	140	200	280	mV_{rms}	

● Measurement circuit



L4 : AM OSC
 T2 : AM IFT
 CD1 : FM DISCRIMINATOR COIL

Sumida
 Toko
 Sumida

2157-JPS-029
 CFMA-258
 0236-JPS-101

Unit : R [Ω]
 C [µF]

Fig. 1

●Application example

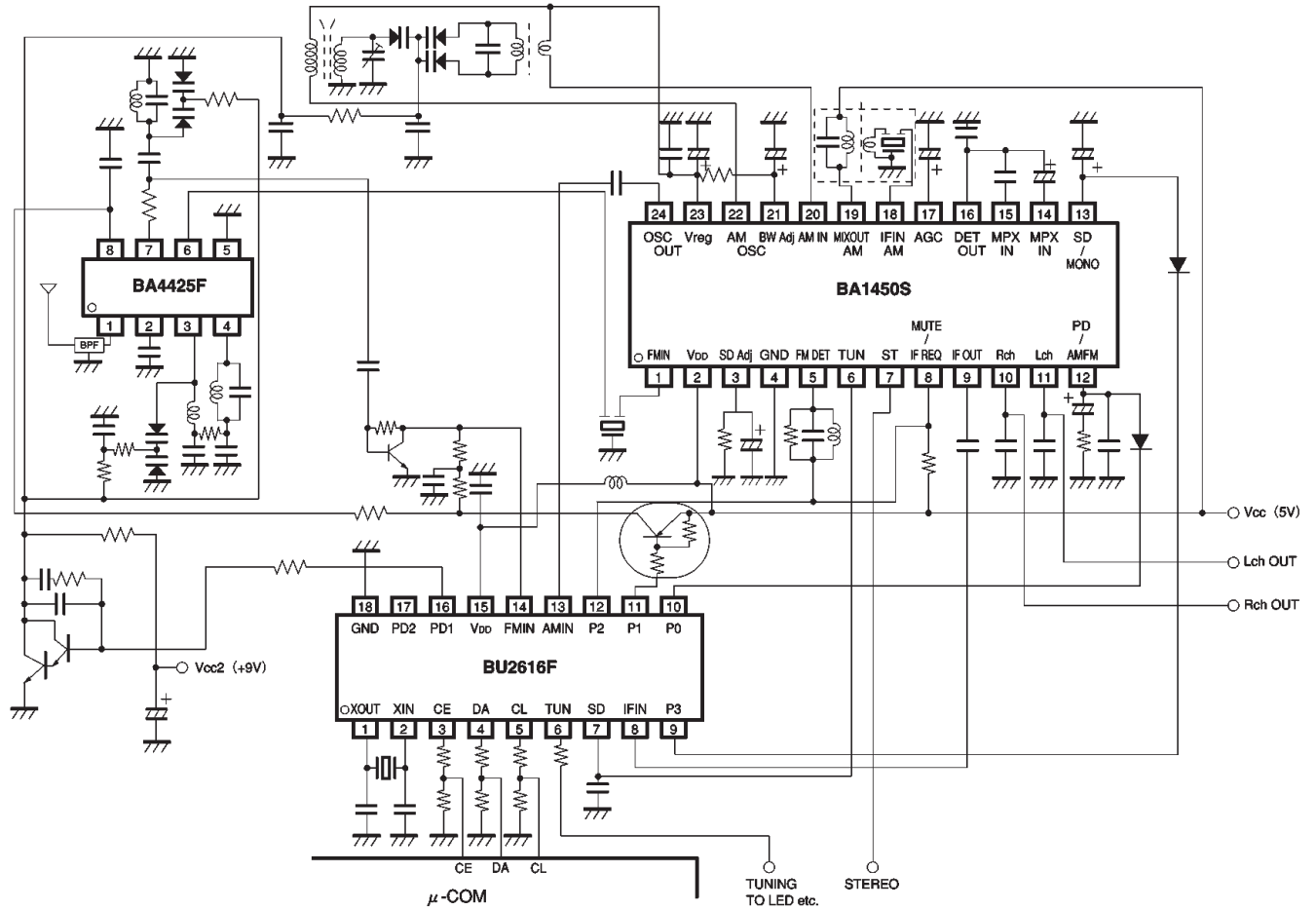


Fig. 2

●Electrical characteristics curves

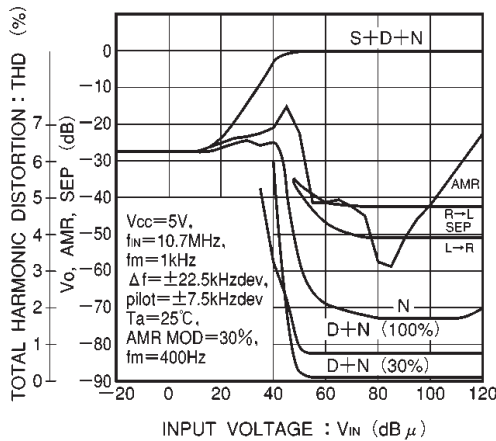


Fig. 3 FM input/output characteristics

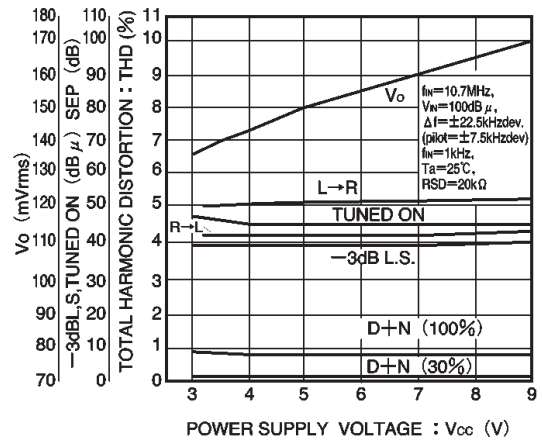


Fig. 4 FM characteristics vs. power supply voltage

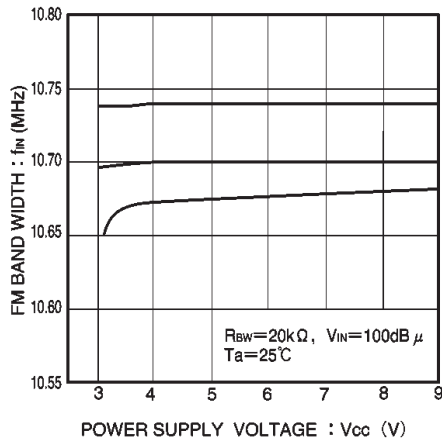


Fig. 5 FM bandwidth vs. power supply voltage

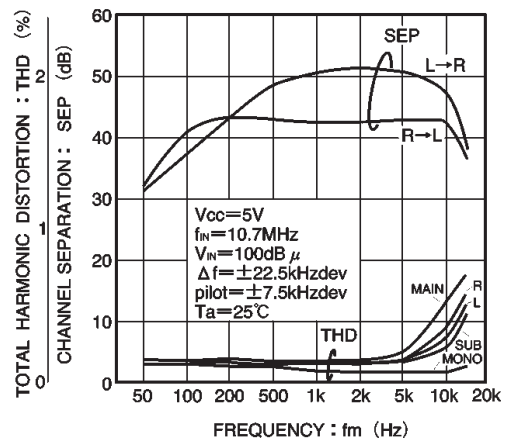


Fig. 6 Channel separation and THD vs. frequency

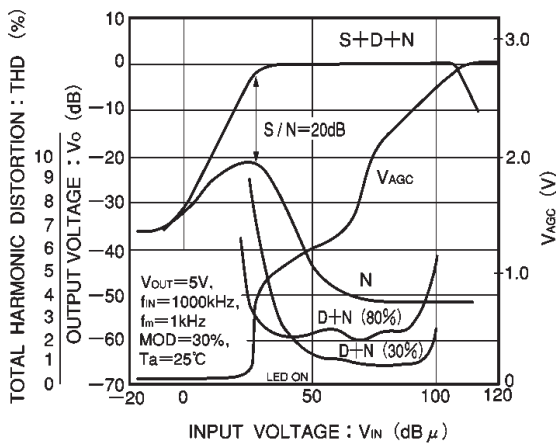


Fig. 7 AM input / output characteristics

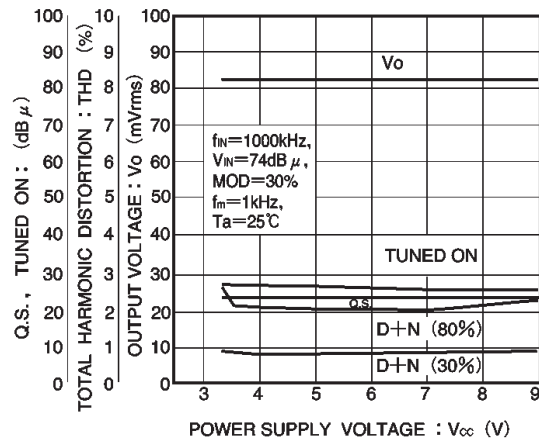


Fig. 8 AM characteristics vs. power supply voltage

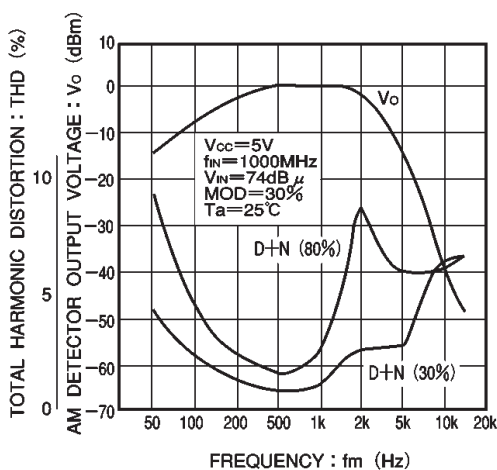
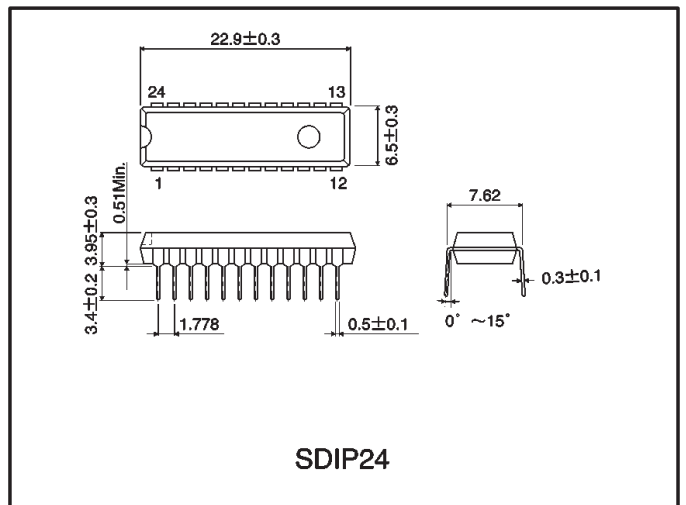


Fig. 9 AM detector output and THD vs. frequency

● External dimensions (Units: mm)



SDIP24

Notes

- No technical content pages of this document may be reproduced in any form or transmitted by any means without prior permission of ROHM CO.,LTD.
- The contents described herein are subject to change without notice. The specifications for the product described in this document are for reference only. Upon actual use, therefore, please request that specifications to be separately delivered.
- Application circuit diagrams and circuit constants contained herein are shown as examples of standard use and operation. Please pay careful attention to the peripheral conditions when designing circuits and deciding upon circuit constants in the set.
- Any data, including, but not limited to application circuit diagrams information, described herein are intended only as illustrations of such devices and not as the specifications for such devices. ROHM CO.,LTD. disclaims any warranty that any use of such devices shall be free from infringement of any third party's intellectual property rights or other proprietary rights, and further, assumes no liability of whatsoever nature in the event of any such infringement, or arising from or connected with or related to the use of such devices.
- Upon the sale of any such devices, other than for buyer's right to use such devices itself, resell or otherwise dispose of the same, no express or implied right or license to practice or commercially exploit any intellectual property rights or other proprietary rights owned or controlled by ROHM CO., LTD. is granted to any such buyer.
- Products listed in this document use silicon as a basic material.
Products listed in this document are no antiradiation design.

The products listed in this document are designed to be used with ordinary electronic equipment or devices (such as audio visual equipment, office-automation equipment, communications devices, electrical appliances and electronic toys).

Should you intend to use these products with equipment or devices which require an extremely high level of reliability and the malfunction of which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), please be sure to consult with our sales representative in advance.

About Export Control Order in Japan

Products described herein are the objects of controlled goods in Annex 1 (Item 16) of Export Trade Control Order in Japan.

In case of export from Japan, please confirm if it applies to "objective" criteria or an "informed" (by MITI clause) on the basis of "catch all controls for Non-Proliferation of Weapons of Mass Destruction.