



LA8630, 8630M

Low Voltage and Current Dissipation Compandor IC

Applications

- Cordless telephone.
- FM transceiver.

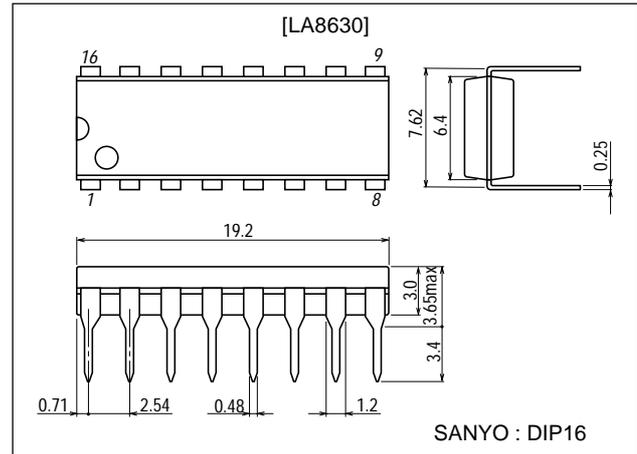
Functions

- Compressor (VCA circuit, full-wave rectifying circuit, adder amplifier).
- Expander (VCA circuit, full-wave rectifying circuit, adder amplifier).
- Operational amplifier (in the compressor).
- Operational amplifier with muting function (in the expander).
- Analog switch for data signal input (in the compressor).
- Regulator.

Package Dimensions

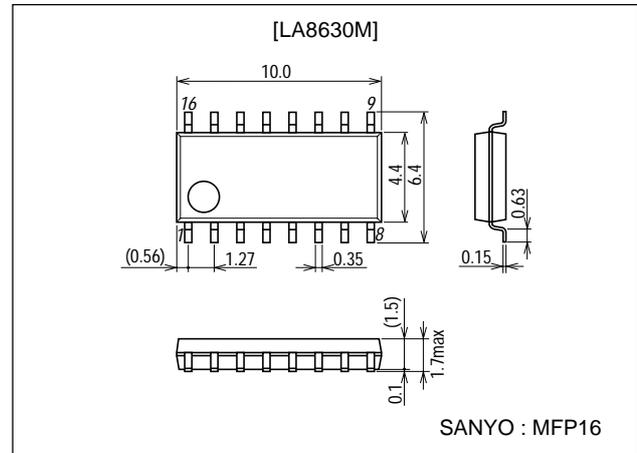
unit:mm

3006B-DIP16



unit:mm

3035B-MFP16



■ Any and all SANYO products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your SANYO representative nearest you before using any SANYO products described or contained herein in such applications.

■ SANYO assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all SANYO products described or contained herein.

LA8630, 8630M

Specifications

Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max		8	V
Allowable power dissipation	P_d max		300	mW
Operating temperature	T_{opr}		-20 to +75	$^\circ\text{C}$
Storage temperature	T_{stg}		-40 to +125	$^\circ\text{C}$

Operating Conditions at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}		3	V
Operating voltage range	V_{CC} op		2.2 to 6	V

Operating Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC}=3.0\text{V}$, $f=1\text{kHz}$, $V_{in}=100\text{mV}_{rms}$ (0dB)

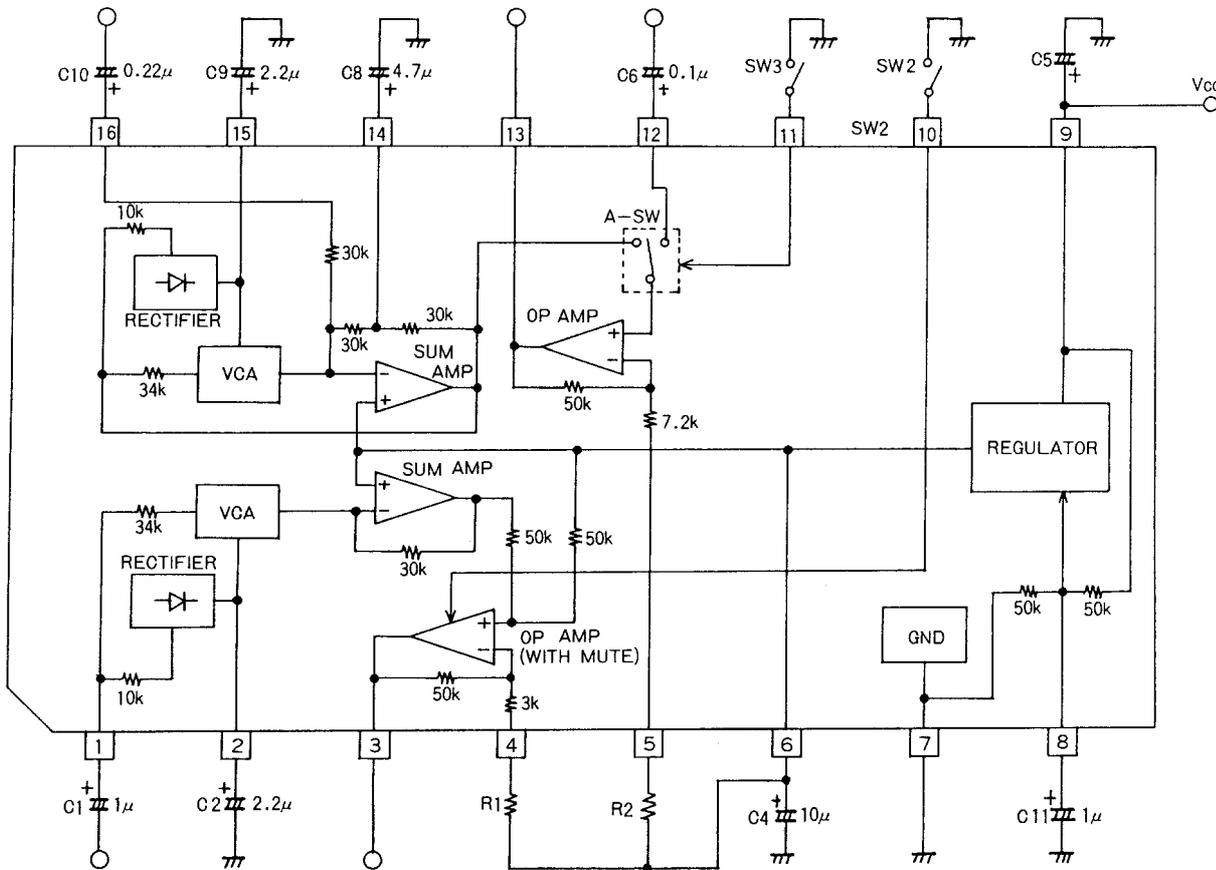
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Current drain	I_{CC}	With no signal input		2.5	3.7	mA
Input reference voltage	V_{inref}			100		mVrms
[Expander] (Operational amplifier gain : 0dB)						
Output level	V_{oref}	$V_{in}=0\text{dB}$ (Operational amplifier gain : -6dB)	-26.5	-24.5	-22.5	dBV
Gain error	V_{gee1}	$V_{in}=+5\text{dB}$	-0.5	0	+0.5	dB
	V_{gee2}	$V_{in}=-20\text{dB}$	-1.0	0	+1.0	dB
	V_{gee3}	$V_{in}=-30\text{dB}$	-1.5	0	+2.0	dB
Distortion factor	$THDe$	$V_{in}=0\text{dB}$		0.35	1.0	%
Output noise voltage	V_{NOe}	$V_{in}=\infty$, $R_g=620\Omega$, $f=20$ to 20000Hz		12	80	μVrms
Frequency characteristic	f	$V_{in}=0\text{dB}$, $f=200$ to 3500Hz		0.0		dB
Maximum output voltage	V_O max	$R_L=10\text{k}\Omega$, $THD=10\%$	0.6	1.0		Vrms
[Compressor] (Operational amplifier gain : 0dB)						
Output level	V_{oref}	$V_{in}=0\text{dB}$	-23	-21	-19	dBV
Gain error	V_{gec1}	$V_{in}=+20\text{dB}$	-0.5	0	+0.5	dB
	V_{gec2}	$V_{in}=-20\text{dB}$	-0.5	0	+0.5	dB
	V_{gec3}	$V_{in}=-40\text{dB}$	-1.0	0	+1.0	dB
Distortion factor	$THDc$	$V_{in}=0\text{dB}$		0.35	1.0	%
Output noise voltage	V_{NOc}	$V_{in}=\infty$, $R_g=620\Omega$, $f=20$ to 20000Hz		0.3	0.7	mVrms
Frequency characteristic	f	$V_{in}=0\text{dB}$, $f=200$ to 3500Hz		0.0		dB
[Muting circuit] (Operational amplifier gain : 0dB)						
Muting attenuation	$CT1$	$V_{in}=0\text{dB}$, $f=1\text{kHz}$	60	90		dB
Threshold voltage	V_{thm}		1.25	1.35	1.45	V
[Analog switch circuit] (operational amplifier gain : 0dB)						
Crosstalk	$CT2$	$V_{in}=0\text{dB}$, $f=1\text{kHz}$	40	47		dB
Threshold voltage	V_{tha}		1.25	1.35	1.45	V

* Be careful that the threshold voltage is determined by V_{CC} ($V_{th}=0.45V_{CC}$).

LA8630, 8630M

Equivalent Circuit Block Diagram/Sample Application Circuit

Unit (resistance: Ω , capacitance: F)

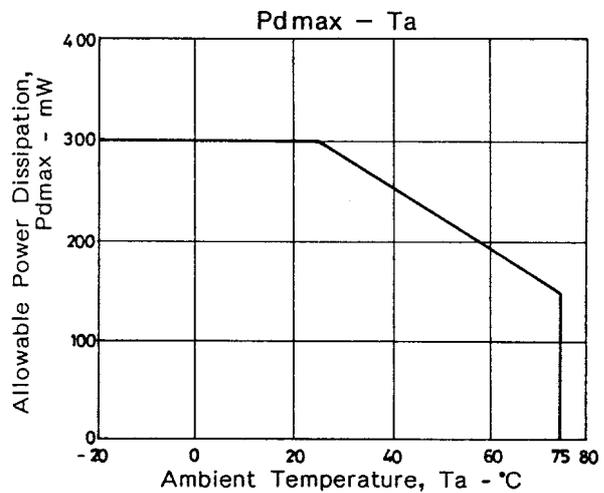


Pin Name

Pin No.	Name
1	EXP. VIN
2	EXP. VREC
3	EXO. VOUT
4	OP. AMP NF (EXP)
5	OP. AMP NF (COMP)
6	VREF
7	GND
8	1/2VCC
9	VCC
10	MUTE CONT
11	DATA CONT.
12	DATA IN
13	COMP. VOUT
14	COMP. NF
15	COMP. VREC
16	COMP. VIN

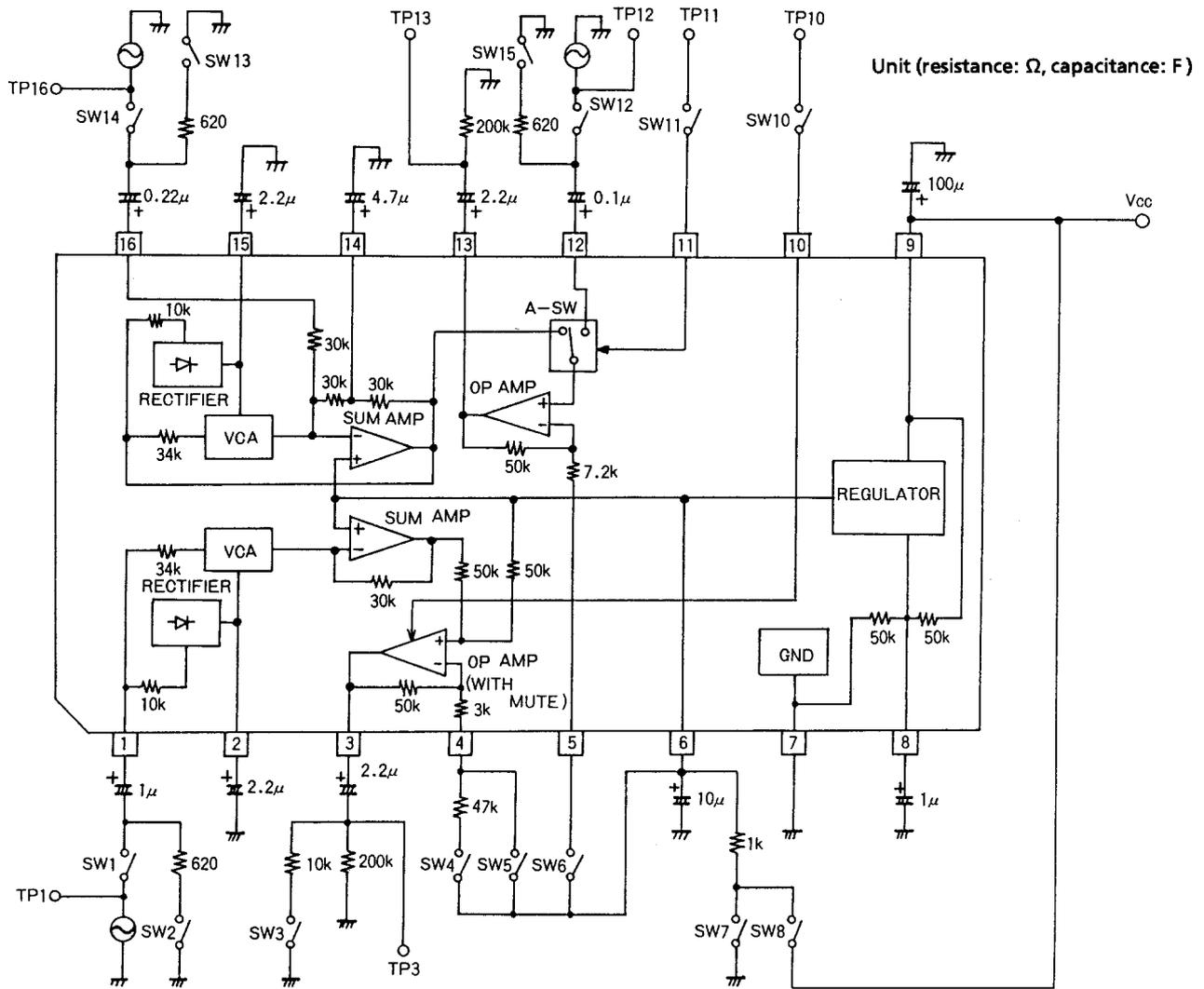
Control Mode

Mode	Audio signal	Data
Pin 10	Open	Output
	[Low]	Mute
Pin 11	Open	Mute
	[LOW]	Output



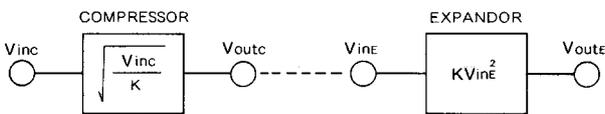
LA8630, 8630M

Test Circuit



Summary of Compressor

(1) Operation



<for example>

$$V_{ref} = 100\text{mV}$$

$$K = 10$$

$$V_{inc} = 1\text{mV} \quad V_{outc} = \sqrt{\frac{1}{10} \times 1 \times 10^{-3}} \approx 10\text{mV} = -20\text{dB}$$

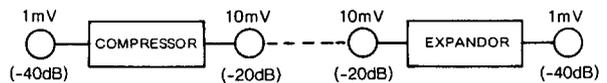
$$V_{inc} < V_{ref} \quad (-40\text{dB})$$

$$V_{ine} = 10\text{mV} \quad V_{oute} = (10 \times 10^{-3})^2 \times 10 = 1\text{mV} = -40\text{dB}$$

$$V_{outc} = \sqrt{V_{inc}/K}$$

$$V_{ine} = V_{outc}^2$$

$$V_{oute} = K V_{ine}^2 = K \sqrt{\frac{V_{inc}}{K}} = V_{inc}$$

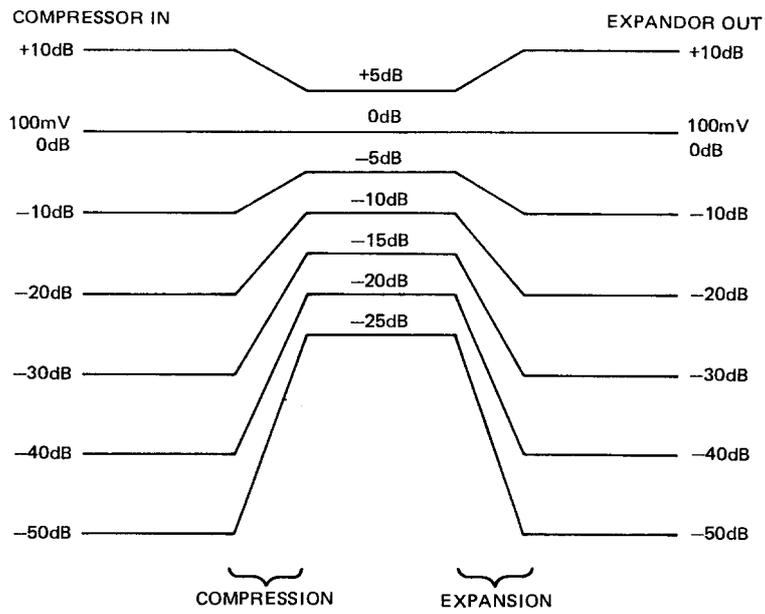


at Reference level (V_{ref}) $V_{inc} = V_{outc}$, $V_{ine} = V_{oute}$

- $V_{inc} < V_{ref}$ COMPRESSOR → Amplifier
- $V_{inc} < V_{ref}$ EXPANDOR → Attenuator
- $V_{inc} > V_{ref}$ COMPRESSOR → Attenuator
- $V_{inc} > V_{ref}$ EXPANDOR → Amplifier

LA8630, 8630M

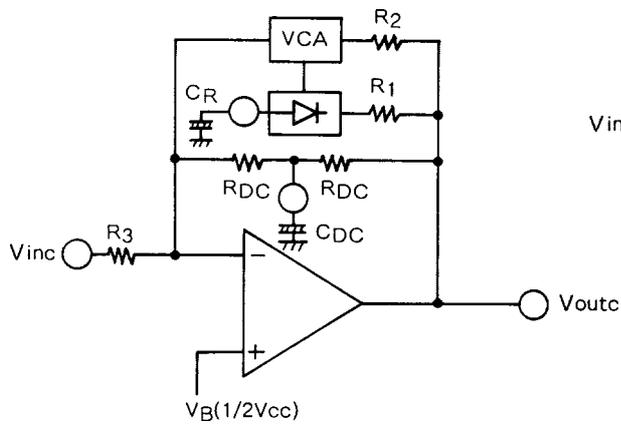
(2) Level Diagram



(3) Block Diagram <COMPRESSOR>

$$V_{outc} = \sqrt{\frac{R_1 R_2 I_1}{2 R_3}} V_{inc}$$

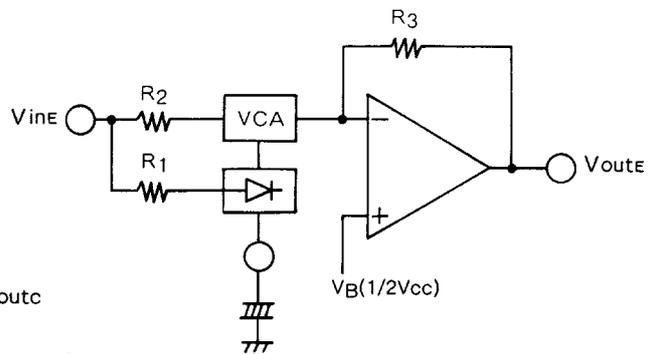
$$= \sqrt{\frac{1}{10}} V_{in}$$



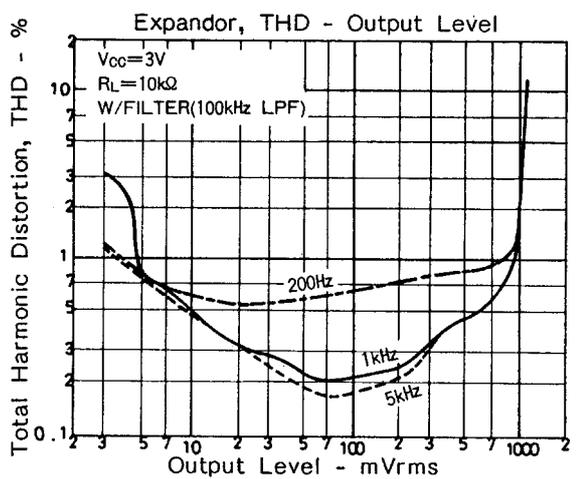
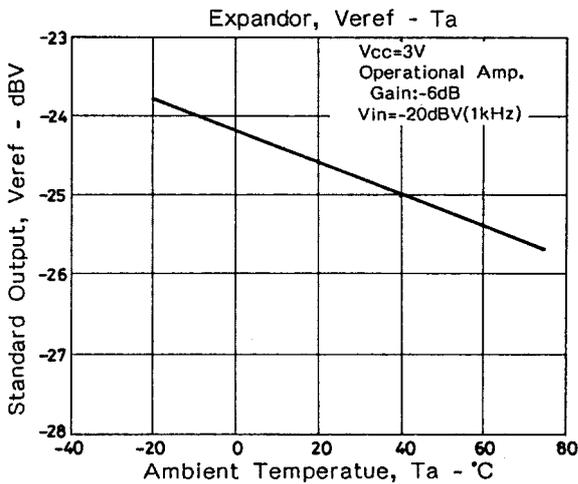
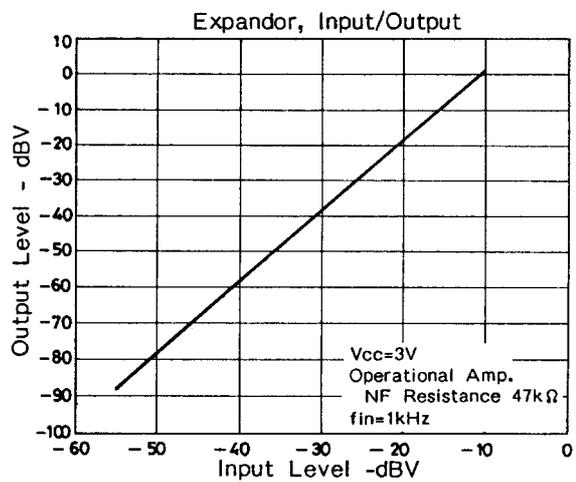
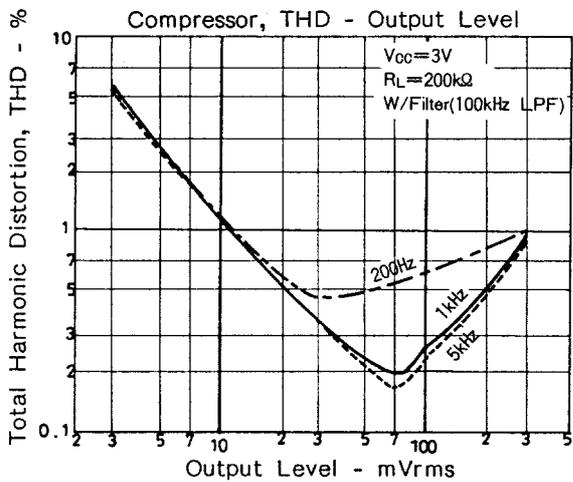
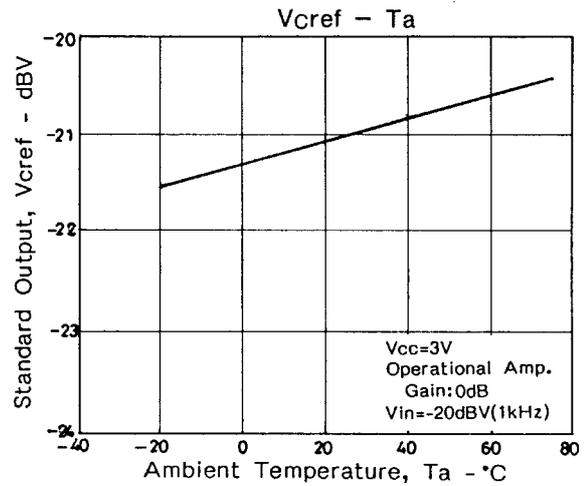
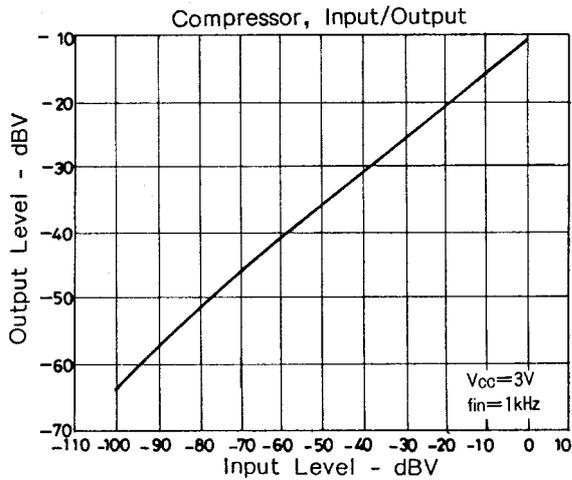
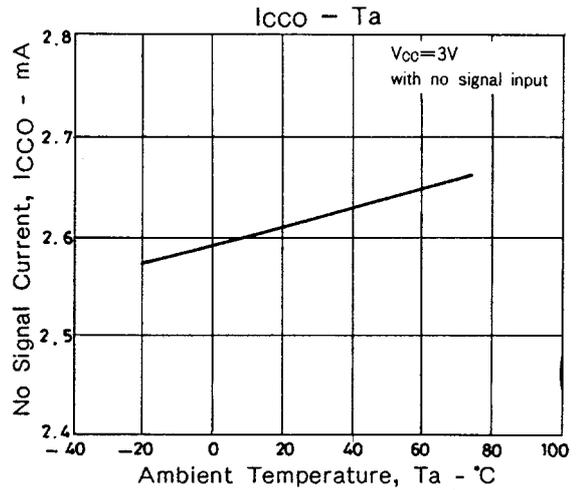
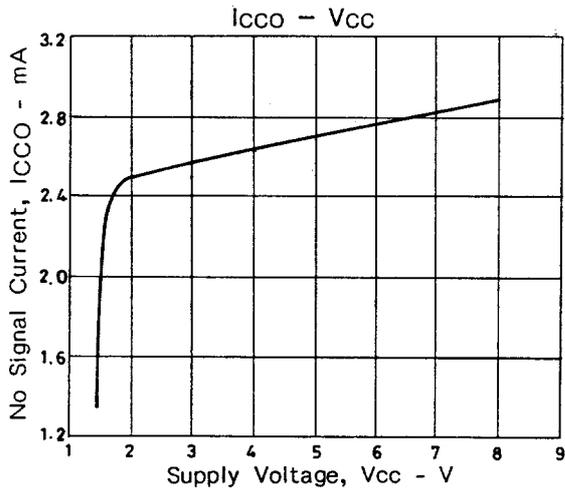
<EXPANDOR>

$$V_{oute} = \frac{2 R_3}{R_1 R_2 I_1} V_{inE}^2$$

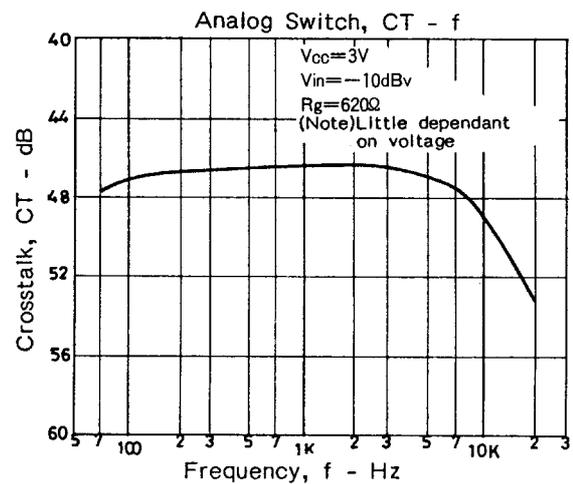
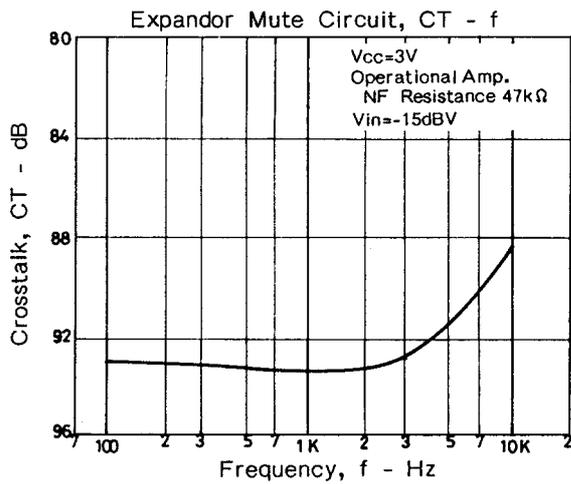
$$= 10 V_{inE}^2$$



LA8630, 8630M



LA8630, 8630M



- Specifications of any and all SANYO products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.
- SANYO Electric Co., Ltd. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.
- In the event that any or all SANYO products (including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.
- No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of SANYO Electric Co., Ltd.
- Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the SANYO product that you intend to use.
- Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production. SANYO believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.

This catalog provides information as of January, 2001. Specifications and information herein are subject to change without notice.