Ordering number: EN3516B

Monolithic Linear IC

No.3516B

SANYO

LA8630,8630M

Low Voltage and Current Dissipation Compandor IC

Applicaitons

- Cordless telephone
- FM transceiver

Functions

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

Maximum Ratings at Ta=25℃			unit
Maximum Supply Voltage	Vccmax	8	V
Allowable Power Dissipation	Pdmax	300	mW
Operating Temperature	Topr	-20 to +75	℃
Storage Temperature	Tstg	-40 to +125	℃

Operating Conditions at Ta=25℃			unit
Recommended Supply Voltage	Vcc	3	V
Operating Voltage Range	Vcc op	2.2 to 6	V

Operating Characteristics at Ta=25℃, Vcc=3.0V, f=1kHz, Vin=100mVrms (0dB)			min	typ	max	unit
Current Dissipation	Icc	With no signal input		2.5	3.7	mA
Input Reference Voltage	Vinref			100		mVrms

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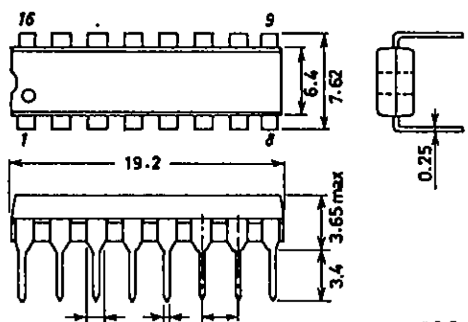
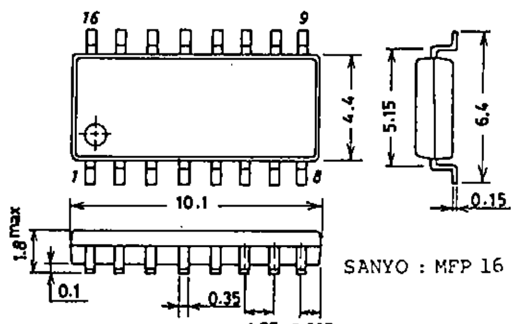
Package Dimensions [LA8630]
(unit: mm)
3006B



Package Dimensions [LA8630M]
(unit: mm)
3035A



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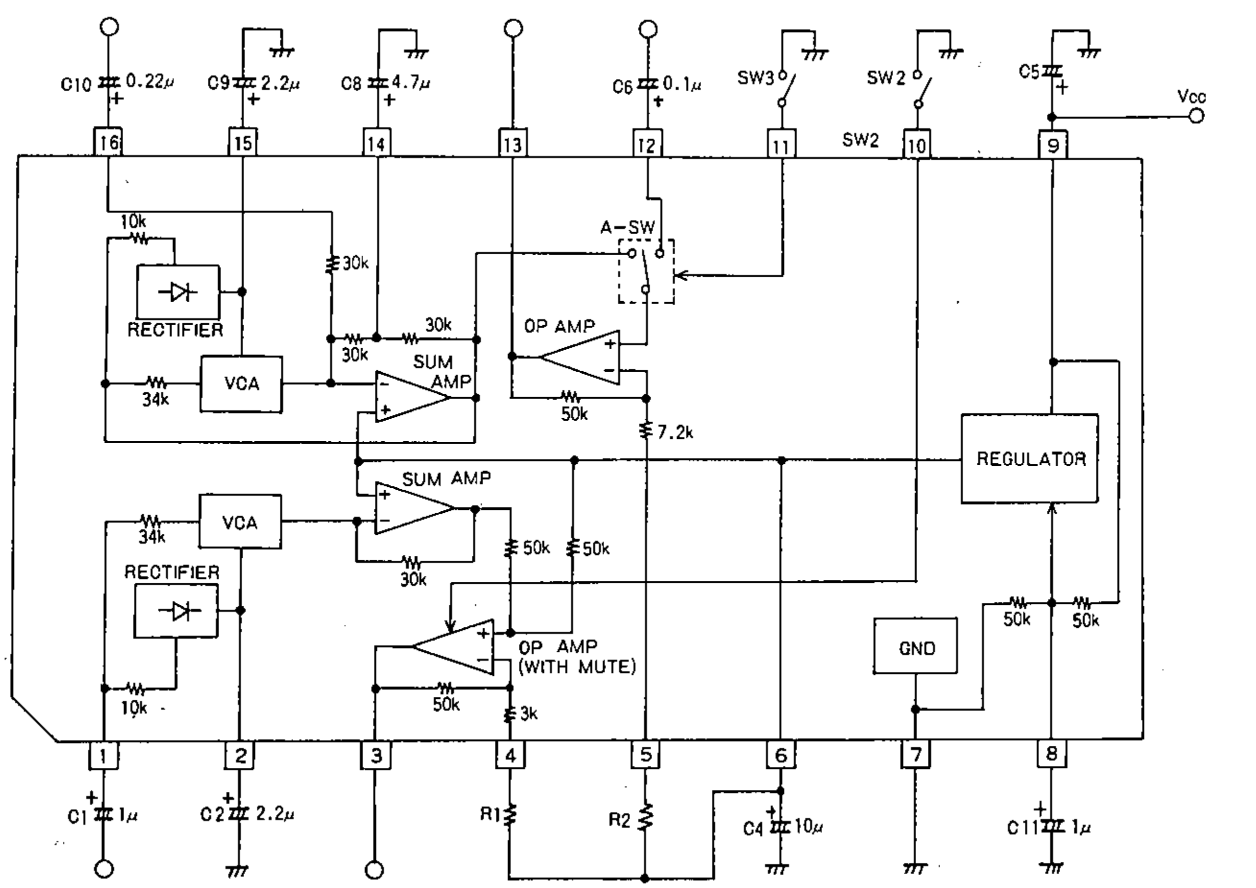
Parameter	Symbol	Conditions	min	typ	max	unit
[Expandor] (Operational amplifier gain: 0dB)						
Output Level	Vorefe	Vin=0dB(Operational amplifier gain: -6dB)	-26.5	-24.5	-22.5	dBV
Gain Error	Vgee(1)	Vin=+5dB	-0.5	0	+0.5	dB
	Vgee(2)	Vin=-20dB	-1.0	0	+1.0	dB
	Vgee(3)	Vin=-30dB	-1.5	0	+2.0	dB
Distortion Factor	THDe	Vin=0dB		0.35	1.0	%
Output Noise Voltage	V_{NOe}	Vin=-∞,Rg=620Ω, f=20 to 20000Hz		12	80	μVrms
Frequency Characteristic	f	Vin=0dB, f=200 to 3500Hz		0.0		dB
Maximum Output Voltage	Vomax	R_L=10kΩ, THD=10%	0.6	1.0		Vrms
[Compressor] (Operational amplifier gain: 0dB)						
Output Level	Vorefc	Vin=0dB	-23	-21	-19	dBV
Gain Error	Vgec(1)	Vin=+20dB	-0.5	0	+0.5	dB
	Vgec(2)	Vin=-20dB	-0.5	0	+0.5	dB
	Vgec(3)	Vin=-40dB	-1.0	0	+1.0	dB
Distortion Factor	THDc	Vin=0dB		0.35	1.0	%
Output Noise Voltage	V_{NOc}	Vin=-∞,Rg=620Ω, f=20 to 20000Hz		0.3	0.7	mVrms
Frequency Characteristic	f	Vin=0dB, f=200 to 3500Hz		0.0		dB
[Muting Circuit] (Operational amplifier gain: 0dB)						
Muting Attenuation	CT(1)	Vin=0dB, f=1kHz	60	90		dB
Threshold Voltage	Vthm		1.25	1.35	1.45	V
[Analog Switch Circuit] (Operational amplifier gain: 0dB)						
Crosstalk	CT(2)	Vin=0dB, f=1kHz	40	47		dB
Threshold Voltage	Vtha		1.25	1.35	1.45	V

*Be careful that the threshold voltage is determined by Vcc (Vth=0.45Vcc).

Equivalent Circuit Block Diagram/Sample Application Circuit

Unit (resistance: Ω, capacitance: F)

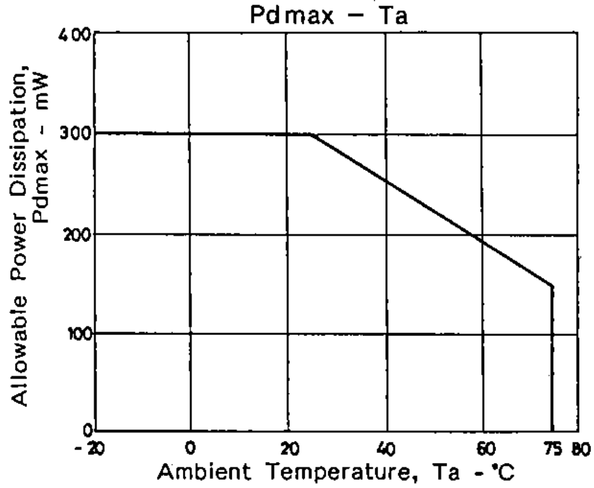


Pin Name

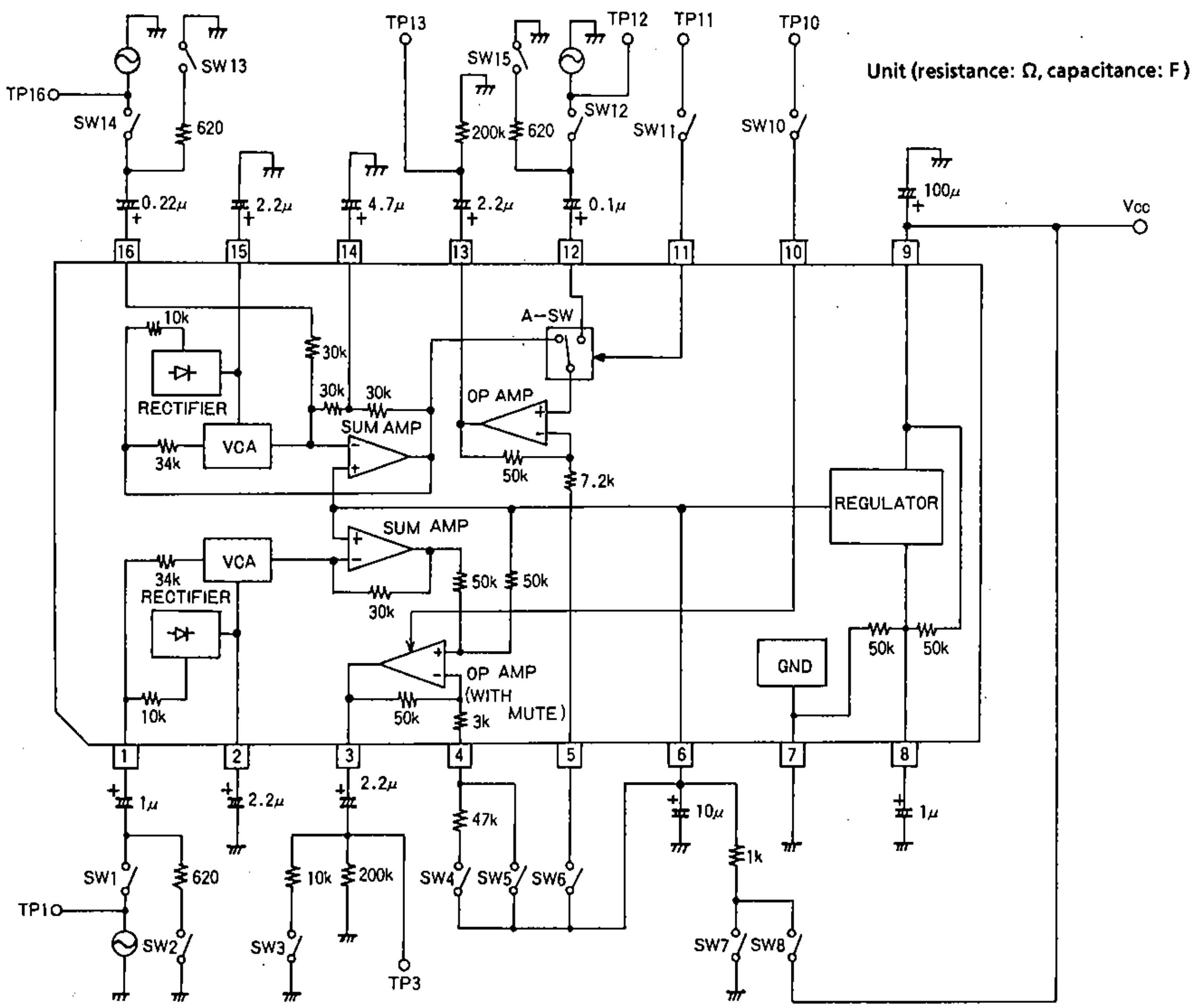
Pin No.	Name
1	EXP.VIN
2	EXP.VREC
3	EXP.VOUT
4	OP.AMP NF(EXP)
5	OP.AMP NF(COMP)
6	VREF
7	GND
8	1/2VCC
9	VCC
10	MUTE CONT.
11	DATA CONT.
12	DATA IN
13	COMP.VOUT
14	COMP.NF
15	COMP.VREC
16	COMP.VIN

Control Mode

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

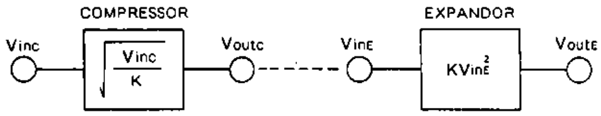


Test Circuit



Summary of Compandor

(1) Operation



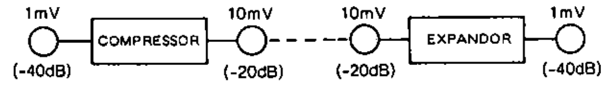
<for example>

Vref = 100mV

K = 10

Vinc = 1mV (-40dB) Voutc = $\sqrt{\frac{1}{10} \times 1 \times 10^{-3}} \fallingdotseq 10mV = -20dB$

VinE = 10mV VoutE = $(10 \times 10^{-3})^2 \times 10 = 1mV = -40dB$



$Voutc = \sqrt{Vinc/K}$

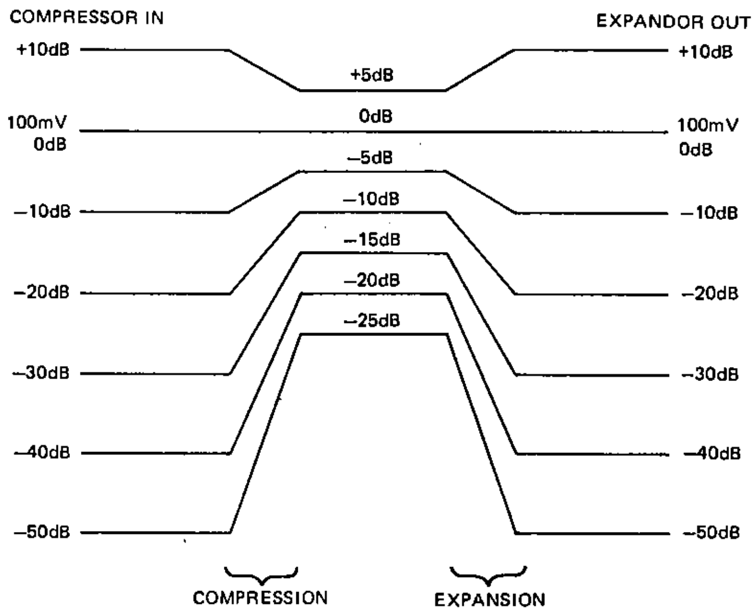
$VinE = Voutc$

$VoutE = KVinE^2 = K\sqrt{\frac{Vinc}{K}}^{2} = Vinc$

at Reference level (Vref) Vinc = Voutc, VinE = VoutE

Vinc <Vref	COMPRESSOR →	Amplifier
VinE <Vref	EXPANDOR →	Attenuator
Vinc >Vref	COMPRESSOR →	Attenuator
VinE >Vref	EXPANDOR →	Amplifier

(2) Level Diagram

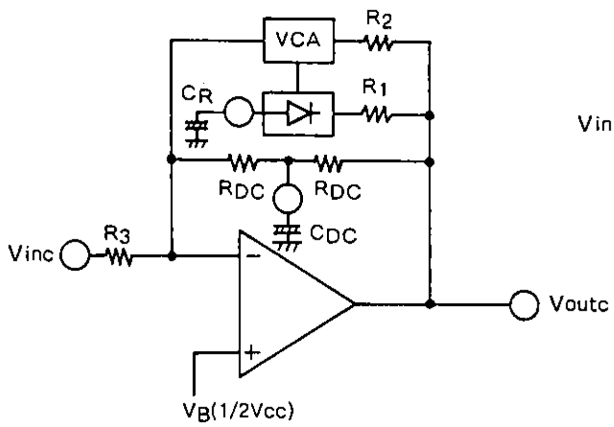


(3) Block Diagram

<COMPRESSOR>

$$Voutc = \sqrt{\frac{R_1 R_2 I_1}{2R_3} Vinc}$$

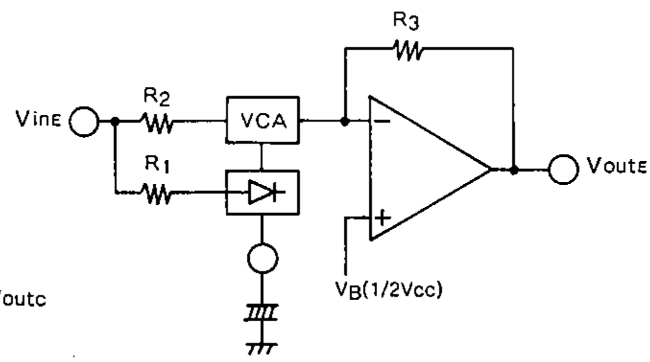
$$= \sqrt{\frac{1}{10} Vin}$$



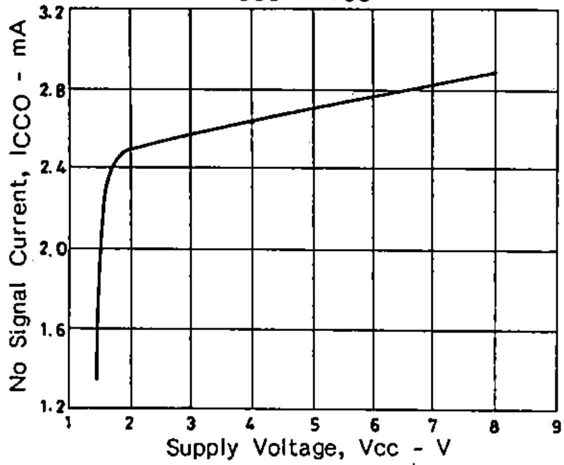
<EXPANDOR>

$$VoutE = \frac{2R_3}{R_1 R_2 I_1} VinE^2$$

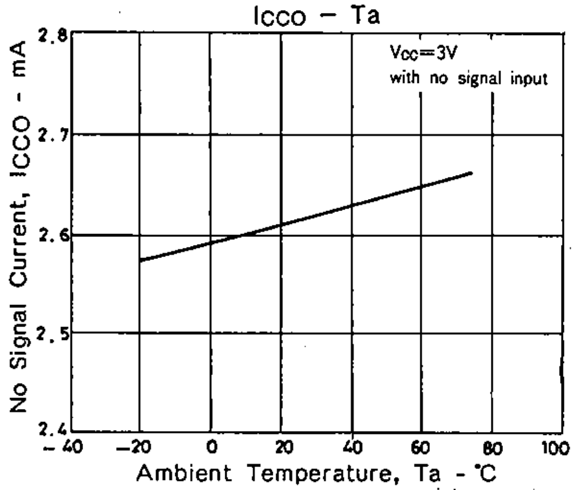
$$= 10VinE^2$$



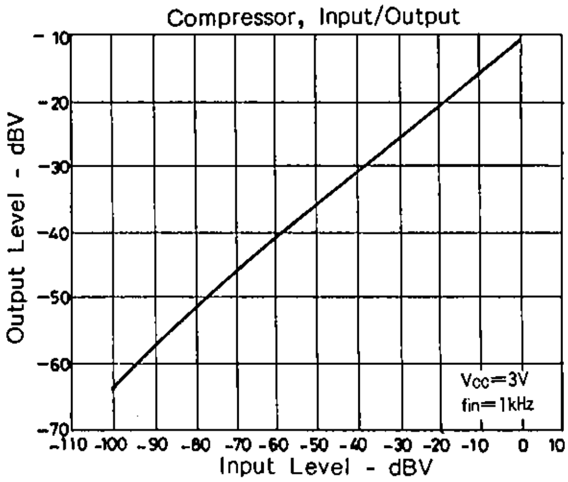
Icco – Vcc



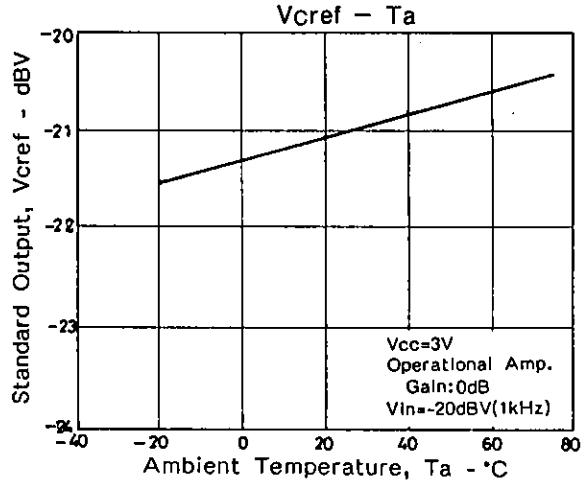
Icco – Ta



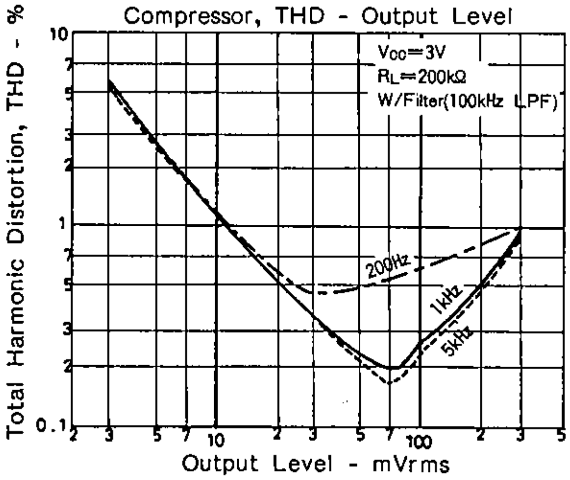
Compressor, Input/Output



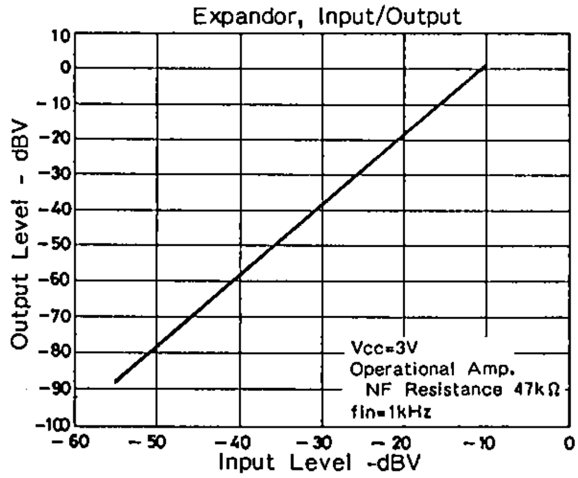
Vcref – Ta



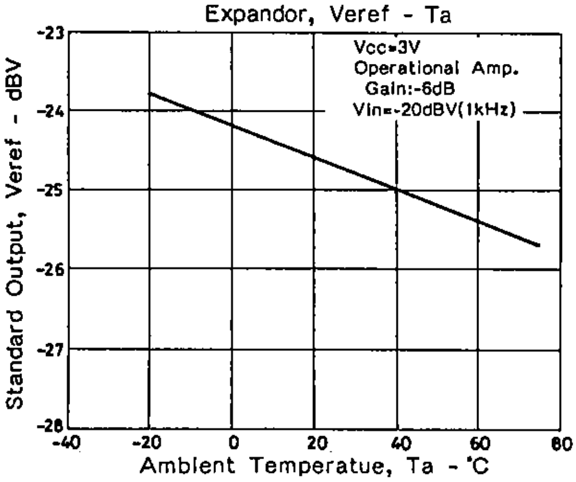
Compressor, THD - Output Level



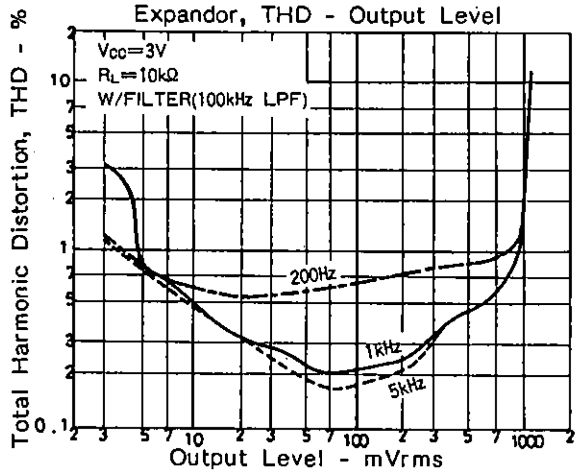
Expandor, Input/Output



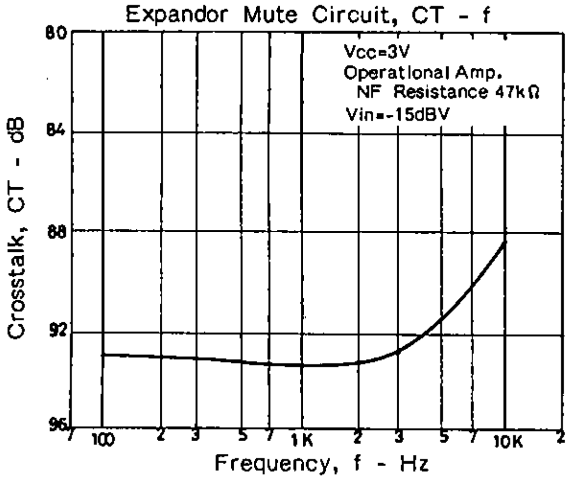
Expandor, Veref - Ta



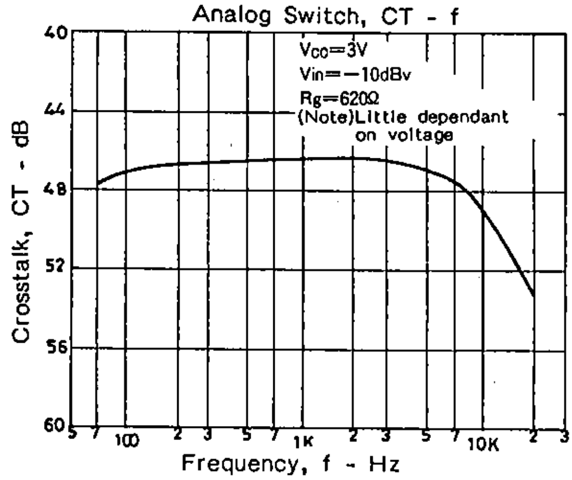
Expandor, THD - Output Level



Expandor Mute Circuit, CT - f



Analog Switch, CT - f



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