

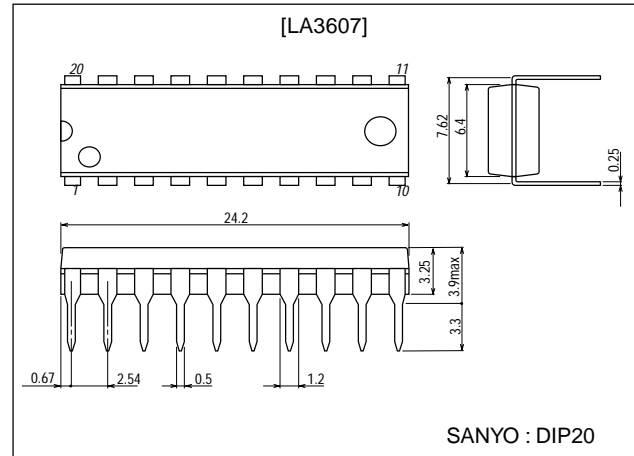
**LA3607****7-Band Graphic Equalizer****Features**

- 7-band graphic equalizer for one channel can be formed easily by externally connecting capacitors and variable resistors which fix  $f_0$  (resonance frequency).
- Series connection of the LA3607 makes multiband available.
- Boost, cut amount can be varied by external resistors.
- Highly stable to capacitive load.

**Package Dimensions**

unit:mm

3021B-DIP20

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

Parameter	Symbol	Conditions	Ratings	Unit
Maximum Supply Voltage	$V_{CC \text{ max}}$		20	V
Allowable Power Dissipation	$P_d \text{ max}$		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	$V_{CC}$		8	V
Operating Voltage Range	$V_{CC \text{ op}}$		5 to 15	V

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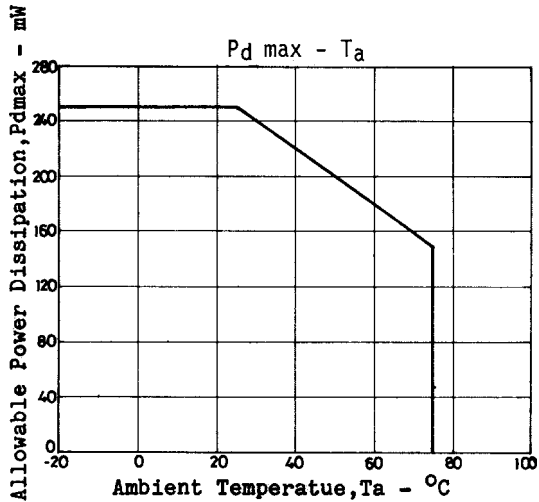
**SANYO Electric Co.,Ltd. Semiconductor Company**

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# LA3607

**Operating Characteristics** at  $T_a = 25^\circ\text{C}$ ,  $V_{CC}=8\text{V}$ ,  $R_L=10\text{k}\Omega$ ,  $R_g=600\Omega$ , See specified Test Circuit.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Quiescent Current	$I_{CCO}$	Quiescent		7	9	mA
Voltage Gain	VG	$f=1\text{kHz}$ , $V_{in}=-10\text{dB}$ at all flat mode	-3.8	-0.8	+2.2	dB
Boost Amount	BOOST	$f=60\text{Hz}$	10	12	14	dB
		$f=150\text{Hz}$	10	12	14	dB
		$f=400\text{Hz}$	10	12	14	dB
		$f=1\text{kHz}$	10	12	14	dB
		$f=2.5\text{kHz}$	10	12	14	dB
		$f=6\text{kHz}$	10	12	14	dB
		$f=15\text{kHz}$	10	12	14	dB
Cut Amount	CUT	$f=60\text{Hz}$	-14	-12	-10	dB
		$f=150\text{Hz}$	-14	-12	-10	dB
		$f=400\text{Hz}$	-14	-12	-10	dB
		$f=1\text{kHz}$	-14	-12	-10	dB
		$f=2.5\text{kHz}$	-14	-12	-10	dB
		$f=6\text{kHz}$	-14	-12	-10	dB
		$f=15\text{kHz}$	-14	-12	-10	dB
Total Harmonic Distortion	THD	$f=1\text{kHz}$ , $V_O=1.0\text{V}$ at all flat mode input		0.02	0.1	%
Output Noise Voltage	$V_{NO}$	All flat, input short, B.P.F., 10Hz to 30kHz		7	40	$\mu\text{V}$

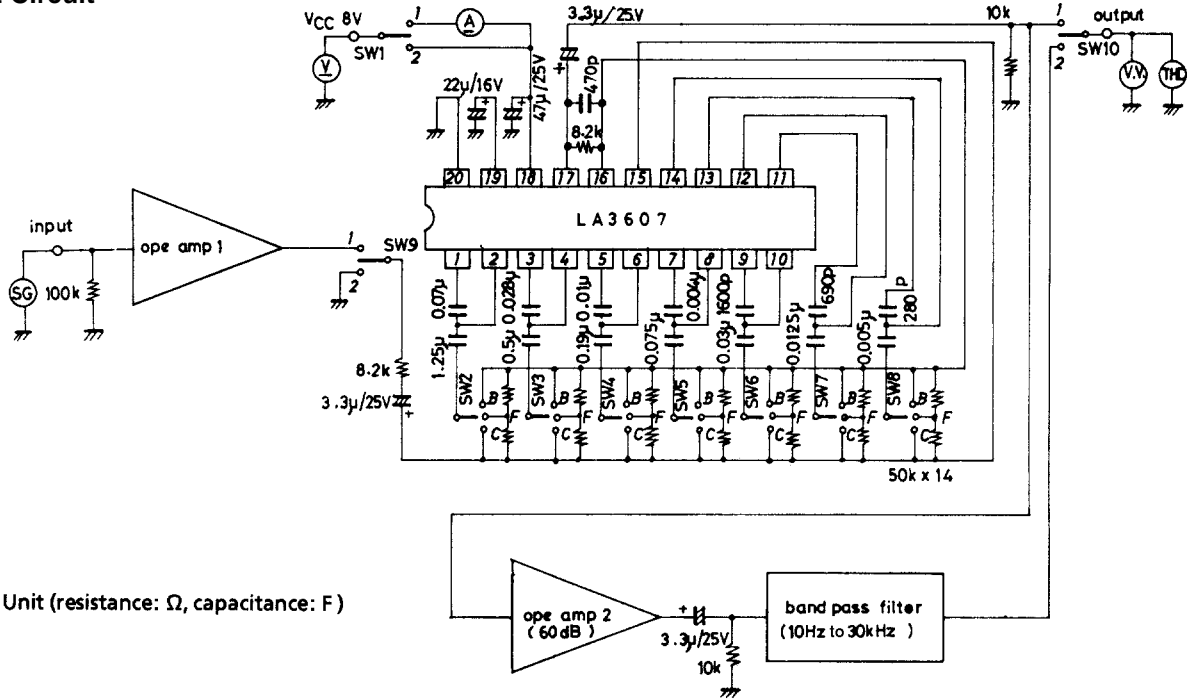


Test Method :  $V_{CC}=8\text{V}$ ,  $R_L=10\text{k}\Omega$ ,  $R_g=600\Omega$

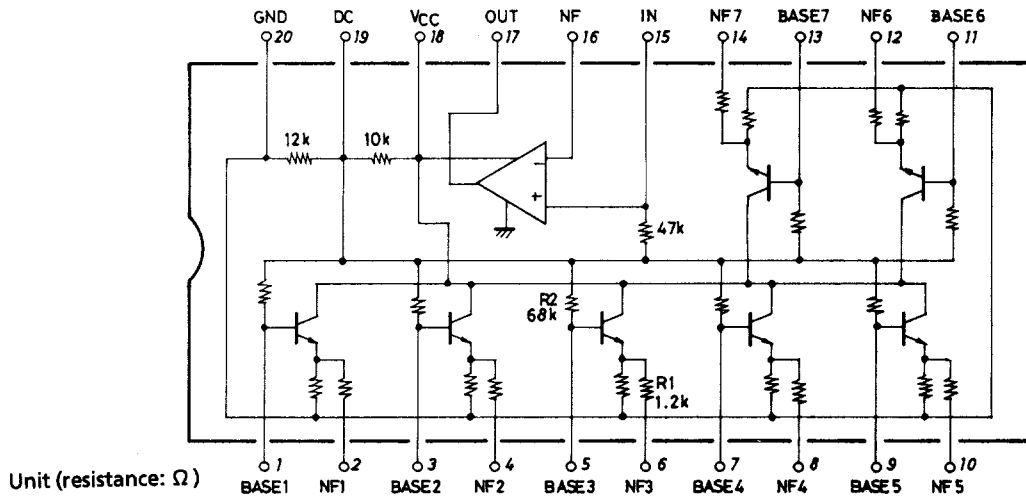
Item	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9	SW10	Conditions
$I_{CCO}$	1	F	F	F	F	F	F	F	2	1	
VG	2	F	F	F	F	F	F	F	1	1	$f=1\text{kHz}$ , $V_{IN}=-10\text{dB}$
BOOST1	2	B	F	F	F	F	F	F	1	1	$f=60\text{Hz}$
BOOST2	2	F	B	F	F	F	F	F	1	1	$f=150\text{Hz}$
BOOST3	2	F	F	B	F	F	F	F	1	1	$f=400\text{Hz}$
BOOST4	2	F	F	F	B	F	F	F	1	1	$f=1\text{kHz}$
BOOST5	2	F	F	F	F	B	F	F	1	1	$f=2.5\text{kHz}$
BOOST6	2	F	F	F	F	F	B	F	1	1	$f=6\text{kHz}$
BOOST7	2	F	F	F	F	F	F	B	1	1	$f=15\text{kHz}$
CUT1	2	C	F	F	F	F	F	F	1	1	$f=60\text{Hz}$
CUT2	2	F	C	F	F	F	F	F	1	1	$f=150\text{Hz}$
CUT3	2	F	F	C	F	F	F	F	1	1	$f=400\text{Hz}$
CUT4	2	F	F	F	C	F	F	F	1	1	$f=1\text{kHz}$
CUT5	2	F	F	F	F	C	F	F	1	1	$f=2.5\text{kHz}$
CUT6	2	F	F	F	F	F	C	F	1	1	$f=6\text{kHz}$
CUT7	2	F	F	F	F	F	F	C	1	1	$f=15\text{kHz}$
THD	2	F	F	F	F	F	F	F	1	1	$f=1\text{kHz}$ , $V_O=1.0\text{V}$
$V_{NO}$	2	F	F	F	F	F	F	F	2	2	

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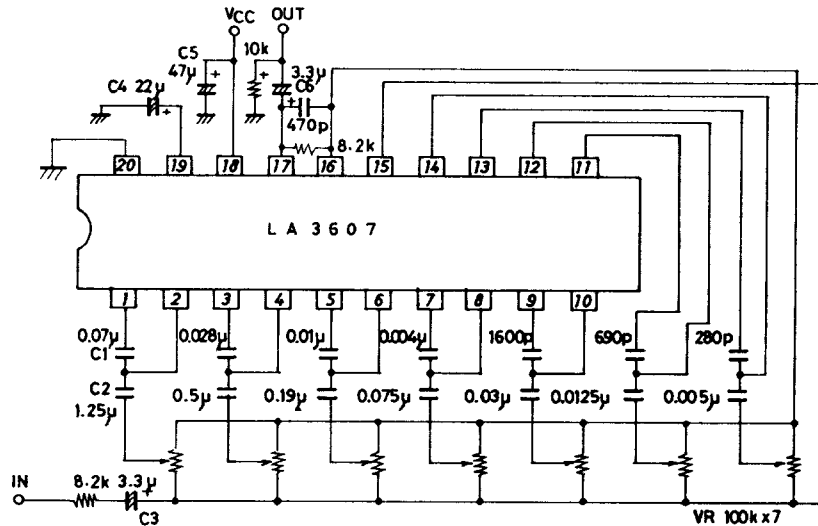
## Test Circuit



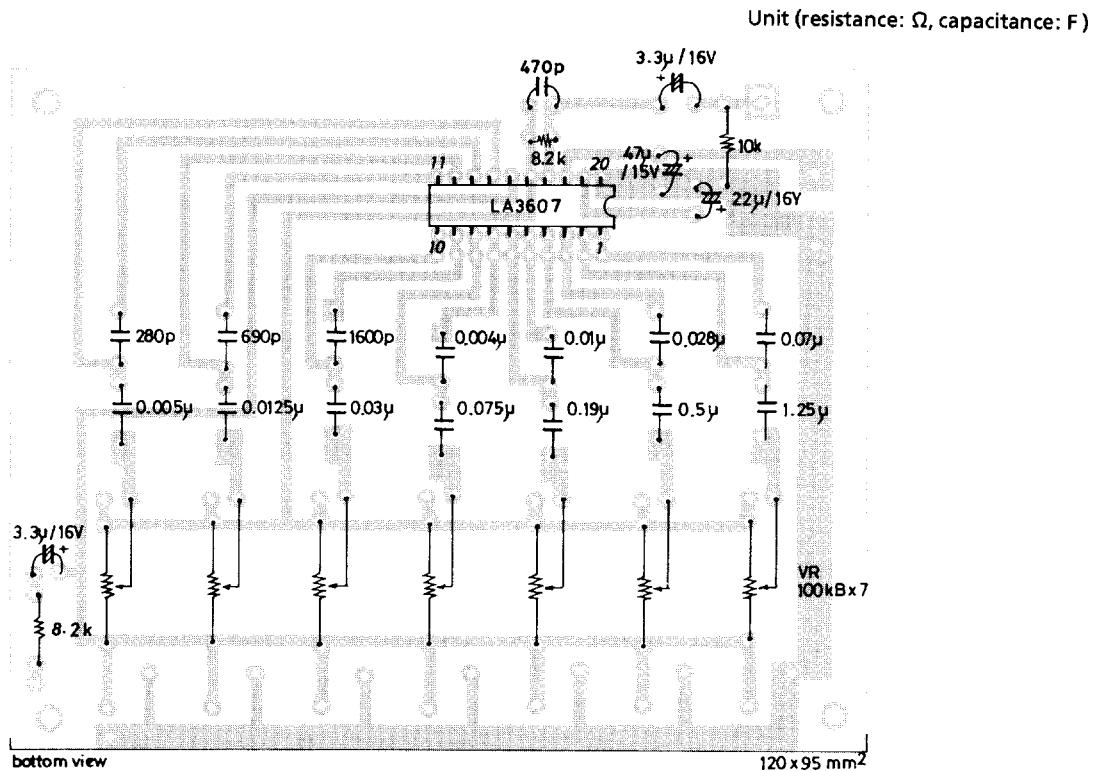
## Equivalent Circuit Block Diagram



## Sample Application Circuit



## Sample Printed Circuit Pattern (Cu-foilde side)



$f_0$  (resonance frequency)

In the sample application circuit,  $f_0$  for each of 7 bands is set as follows :

$f_0 = 60\text{Hz}, 150\text{Hz}, 400\text{Hz}, 1\text{kHz}, 2.5\text{kHz}, 6\text{kHz}, 15\text{kHz}$

$f_0$  is calculated using the following formula.

$$f_0 = \frac{1}{2\pi \sqrt{C1 \cdot C2 \cdot R1 \cdot R2}}$$

Q (quality factor)

Q is calculated using the following formula.

$$Q = \sqrt{\frac{C1 \cdot R2}{C2 \cdot R1}}$$

When Q is increased, the frequency band affected by the resonance circuit is narrowed and a clear distinction between this band and adjacent band is provided, but the frequency response swells greatly at all boost mode and the peak of the composite frequency is lowered. The above must be considered to fix C1, C2.

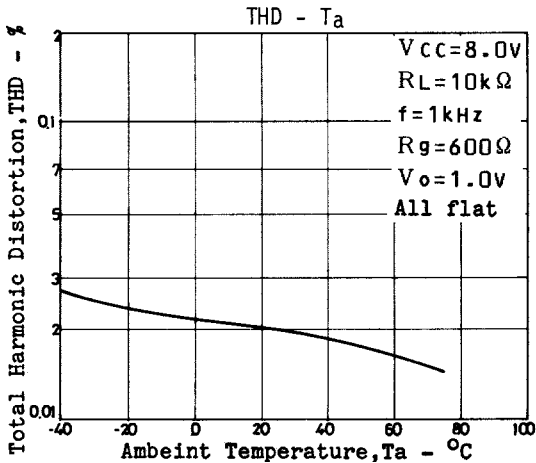
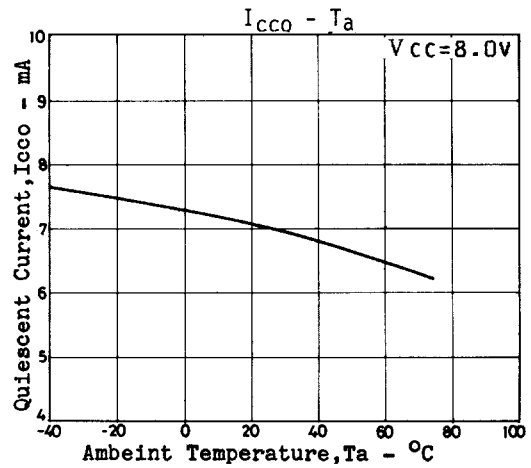
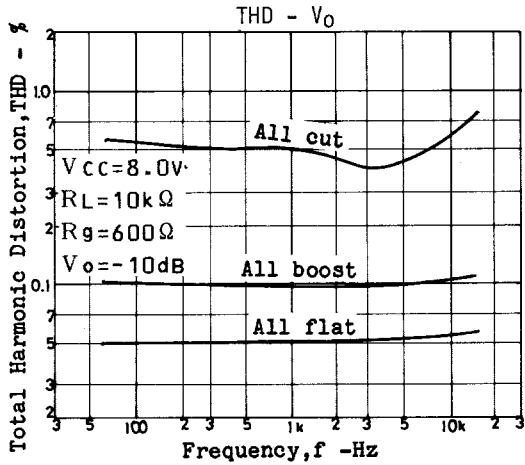
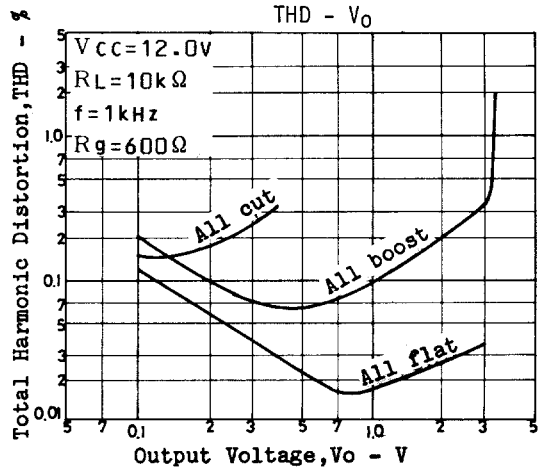
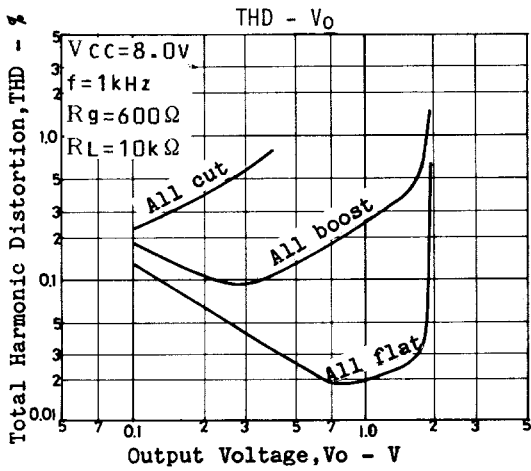
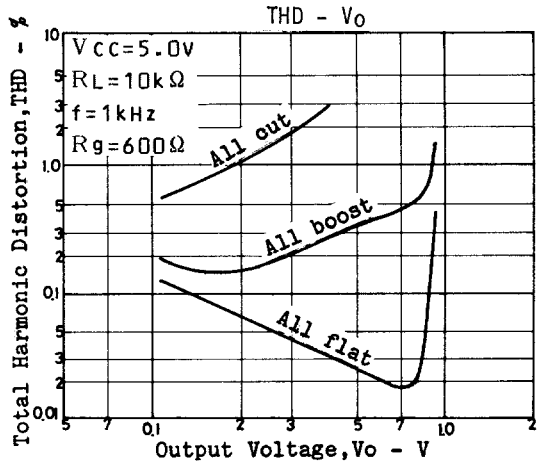
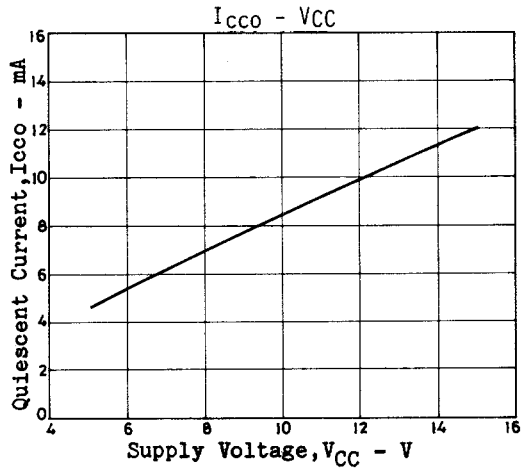
Description of external parts

- C1, C2 : Capacitors used to fix  $f_0$  (resonance frequency)
- C3 : Input capacitor. Decreasing the capacitor value lowers the frequency response at low frequencies.
- C4 : Decoupling capacitor. Decreasing the capacitor value makes the effect of power supply stronger, whereby reple is liable to occur.
- C5 : Power capacitor.
- C6 : Output capacitor. Decreasing the capacitor value lowers the frequency response at low frequencies.

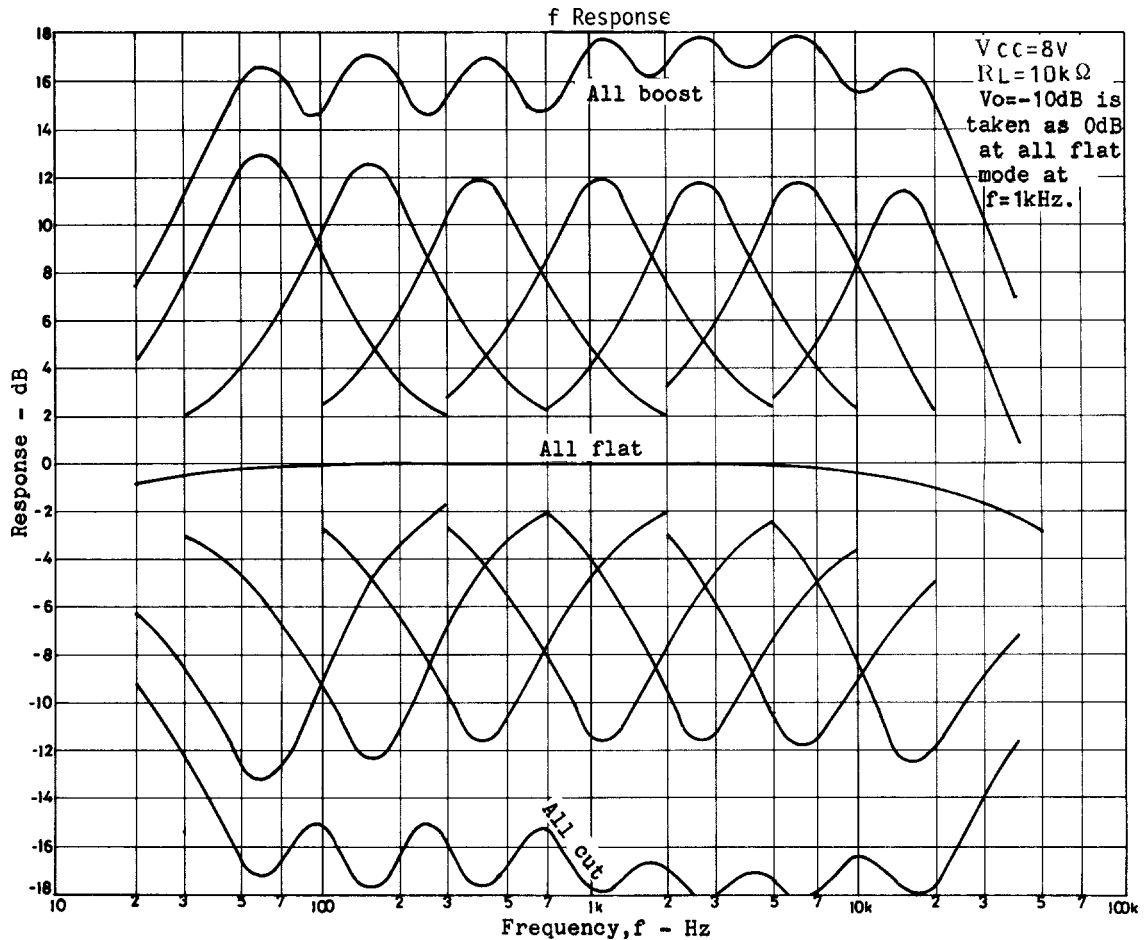
Proper cares in using IC

- Maximum supply voltage  $V_{CC}$  max 20V must not be exceeded. The operating voltage is in the range of 5 to 15V.
- Application of power with the pin-to-pin spaces shorted causes breakdown or deterioration of the IC to occur.
- When mounting the IC on the board of applying power, make sure that the pin-to-pin spaces are not shorted with solder, etc.

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