

<b>SANYO</b>	No.2277A	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 fo (resonance frequency).
- . Series connection of the LA3607 makes multiband available.
- . Boost, cut amount can be varied by external resistors.
- . Highly stable to capacitive load

**Maximum Ratings at Ta=25°C**

Maximum Supply Voltage	$V_{CCmax}$	20	unit V
Allowable Power Dissipation	$P_{dmax}$	300	mW
Operating Temperature	$T_{opr}$	-20 to +75	°C
Storage Temperature	$T_{stg}$	-40 to +125	°C

**Operating Conditions at Ta=25°C**

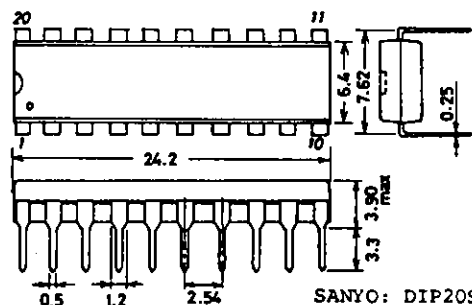
Recommended Supply Voltage	$V_{CC}$	8	unit V
Operating Voltage Range	$V_{CCop}$	5 to 15	V

**Operating Characteristics at Ta=25°C,  $V_{CC}=8V, R_L=10k\Omega, R_g=600\Omega,$**

		See specified Test Circuit.			min	typ	max	unit
Quiescent Current	$I_{cco}$	Quiescent			7	9		mA
Voltage Gain	VG	$f=1kHz, V_{IN}=-10dB$ at all flat mode	-3.8	-0.8	2.2			dB
Boost Amount	BOOST	$f=60Hz$	}	$V_o=-10dB$ is taken as 0dB at all flat mode at $f=1kHz.$	10	12	14	dB
		$f=150Hz$			10	12	14	dB
		$f=400Hz$			10	12	14	dB
		$f=1kHz$			10	12	14	dB
		$f=2.5kHz$			10	12	14	dB
		$f=6kHz$			10	12	14	dB
		$f=15kHz$			10	12	14	dB

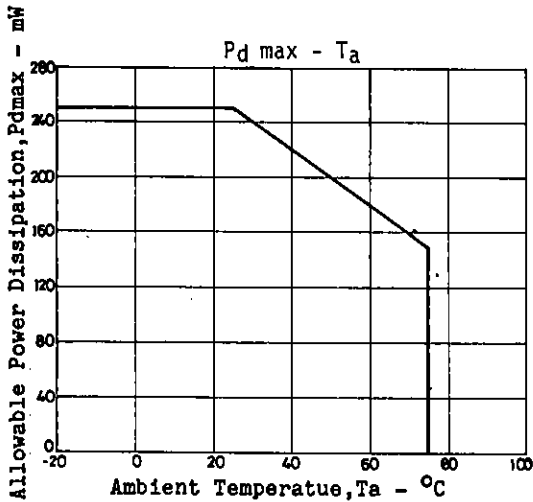
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**Package Dimensions  
(unit: mm)  
3021B**



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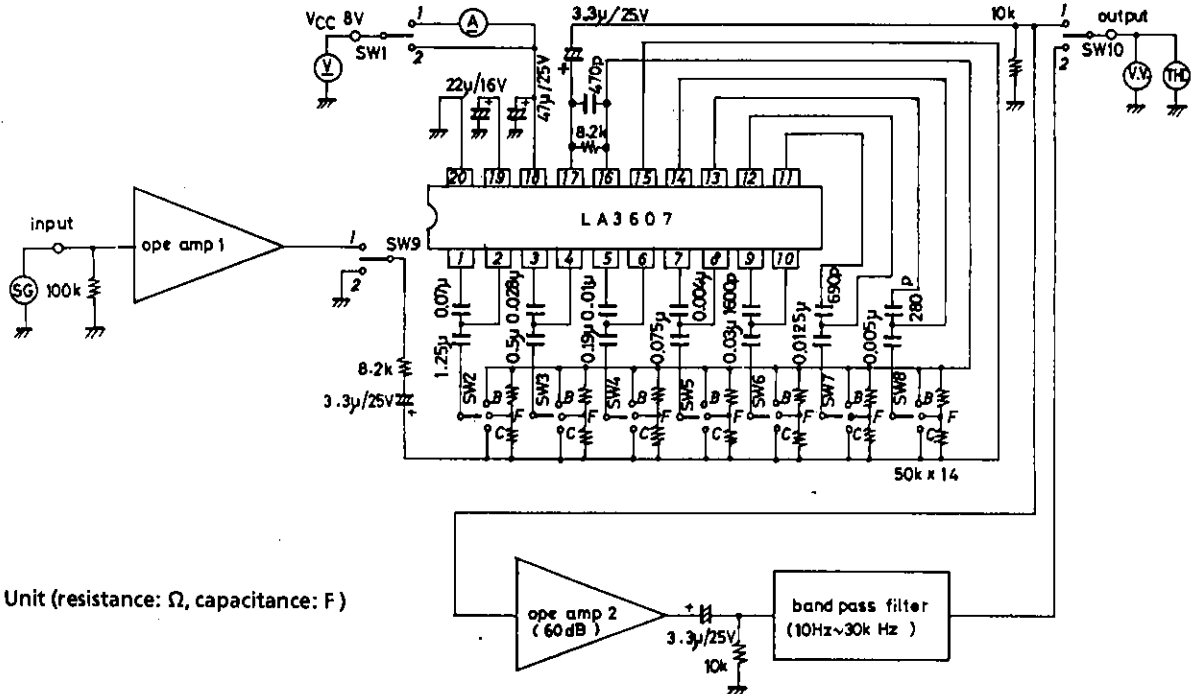
			min	typ	max	unit
Cut Amount	CUT	f=60Hz	-14	-12	-10	dB
		f=150Hz	-14	-12	-10	dB
		f=400Hz	-14	-12	-10	dB
		f=1kHz	-14	-12	-10	dB
		f=2.5kHz	-14	-12	-10	dB
		f=6kHz	-14	-12	-10	dB
		f=15kHz	-14	-12	-10	dB
Total Harmonic Distortion	THD	f=1kHz, Vo=1.0V at all flat mode input	0.02	0.1		%
Output Noise Voltage	V <sub>NO</sub>	All flat, input short, B.P.F., 10Hz to 30kHz	7	40		µV



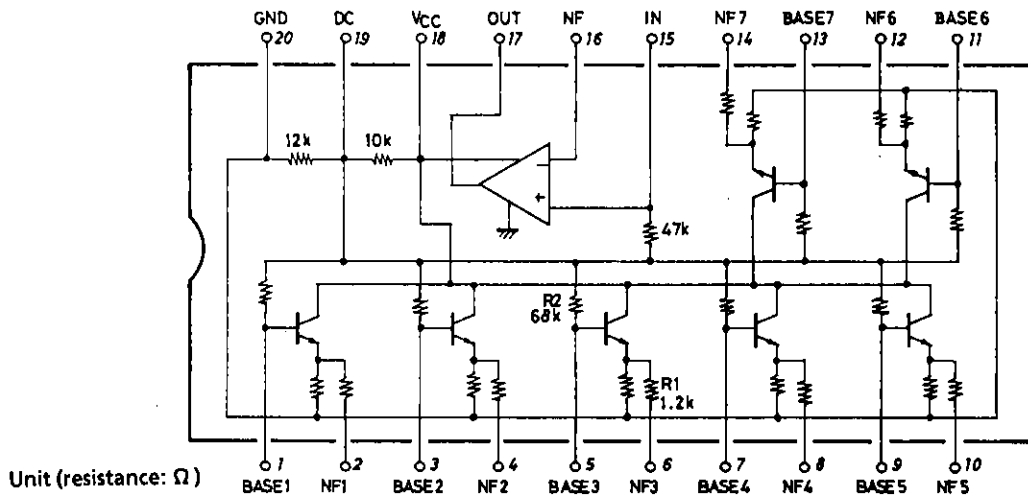
Test Method: V<sub>CC</sub>=8V, R<sub>L</sub>=10kohms, R<sub>g</sub>=600ohms

Item	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9	SW10	Conditions
I <sub>cco</sub>	1	F	F	F	F	F	F	F	2	1	
V <sub>G</sub>	2	F	F	F	F	F	F	F	1	1	f=1kHz V <sub>IN</sub> =-10dB
B00ST1	2	B	F	F	F	F	F	F	1	1	f=60Hz
B00ST2	2	F	B	F	F	F	F	F	1	1	f=150Hz
B00ST3	2	F	F	B	F	F	F	F	1	1	f=400Hz
B00ST4	2	F	F	F	B	F	F	F	1	1	f=1kHz
B00ST5	2	F	F	F	F	B	F	F	1	1	f=2.5kHz
B00ST6	2	F	F	F	F	F	B	F	1	1	f=6kHz
B00ST7	2	F	F	F	F	F	F	B	1	1	f=15kHz
CUT1	2	C	F	F	F	F	F	F	1	1	f=60Hz
CUT2	2	F	C	F	F	F	F	F	1	1	f=150Hz
CUT3	2	F	F	C	F	F	F	F	1	1	f=400Hz
CUT4	2	F	F	F	C	F	F	F	1	1	f=1kHz
CUT5	2	F	F	F	F	C	F	F	1	1	f=2.5kHz
CUT6	2	F	F	F	F	F	C	F	1	1	f=6kHz
CUT7	2	F	F	F	F	F	F	C	1	1	f=15kHz
THD	2	F	F	F	F	F	F	F	1	1	f=1kHz, V <sub>o</sub> =1.0V
V <sub>NO</sub>	2	F	F	F	F	F	F	F	2	2	

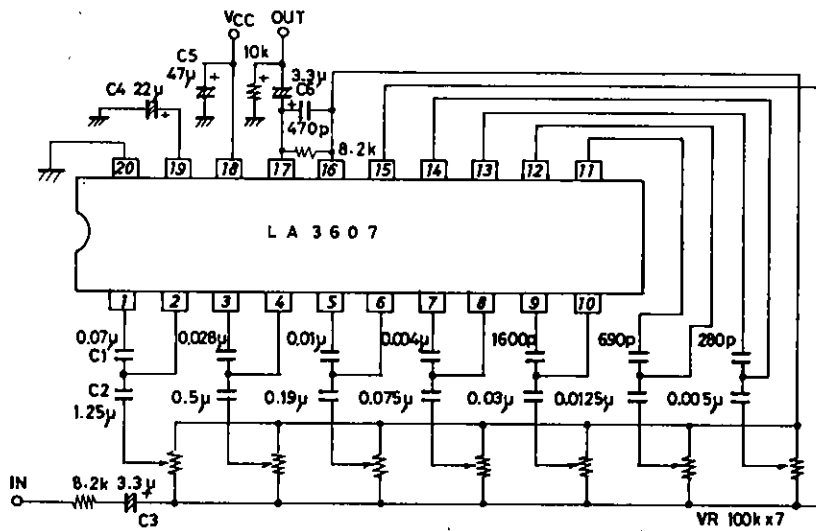
**Test Circuit**



**Equivalent Circuit Block Diagram**



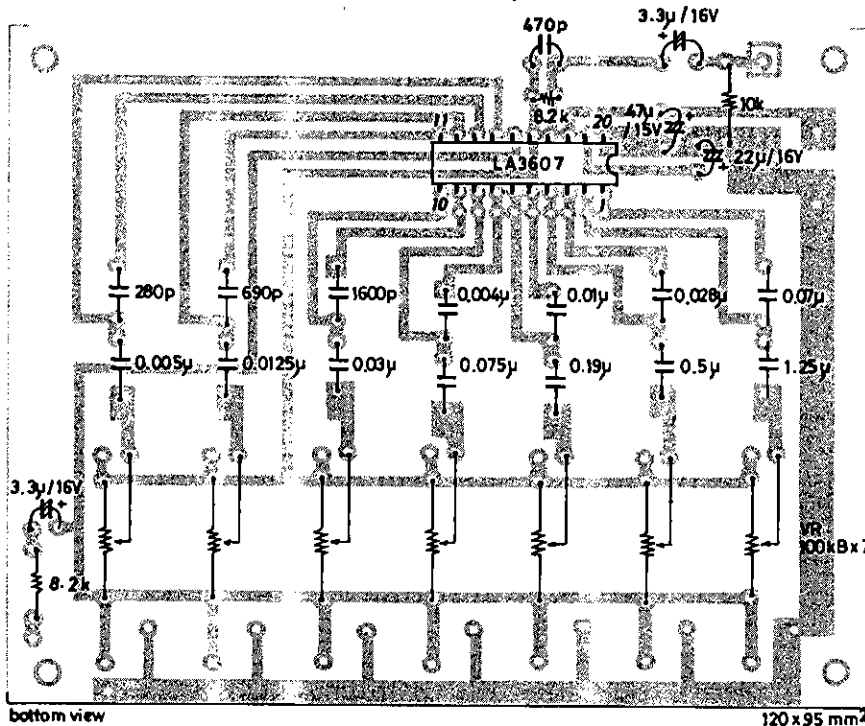
**Sample Application Circuit**



# LA3607

Sample Printed Circuit Pattern (Cu-foiled side)

Unit (resistance:  $\Omega$ , capacitance: F)



$f_0$ (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.

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

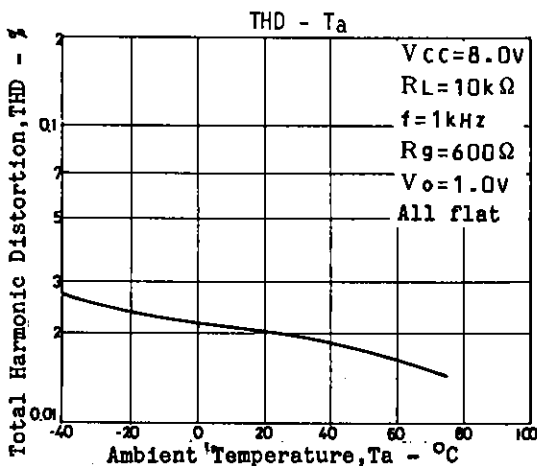
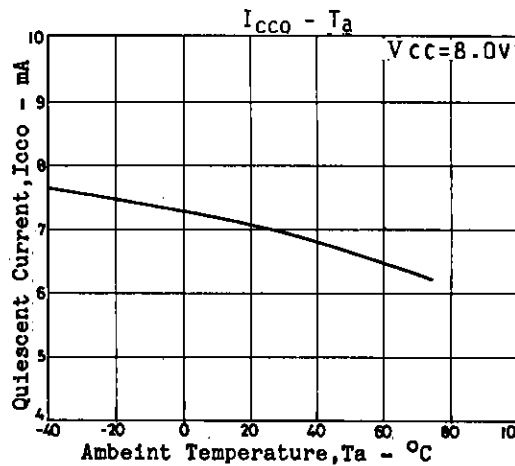
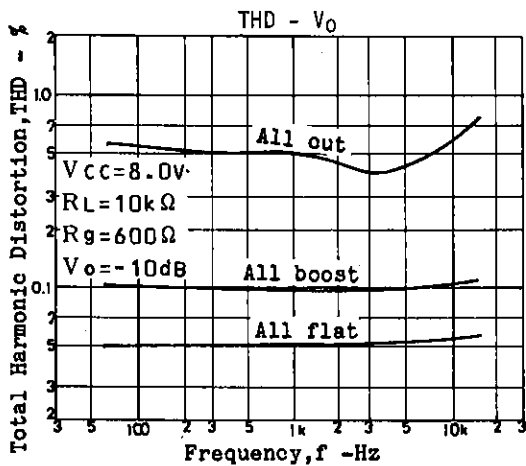
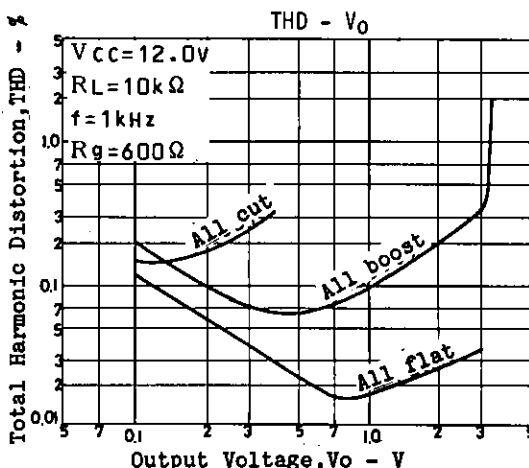
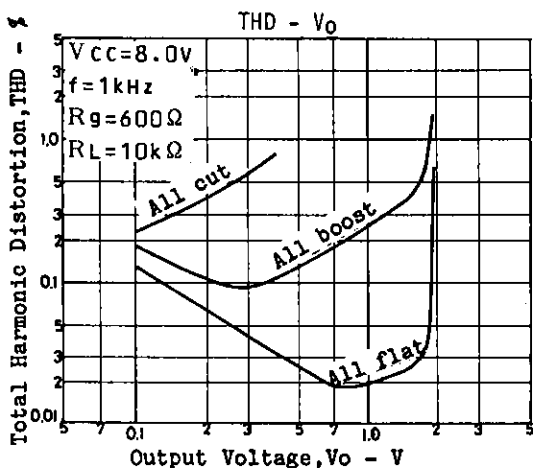
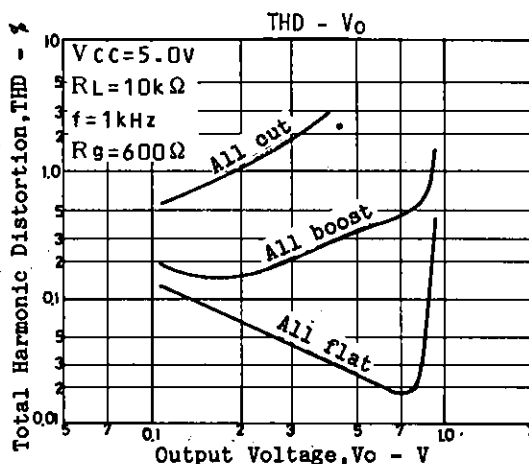
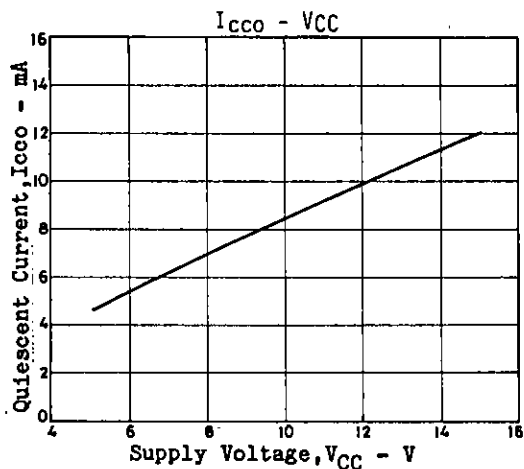
When Q is increased, the frequency band affected by the resonance circuit is narrowed and a clear distinction between this band and adjacent band is provided, but the frequency response swells greatly at all boost mode and the peak of the composite frequency is lowered. The above must be considered to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

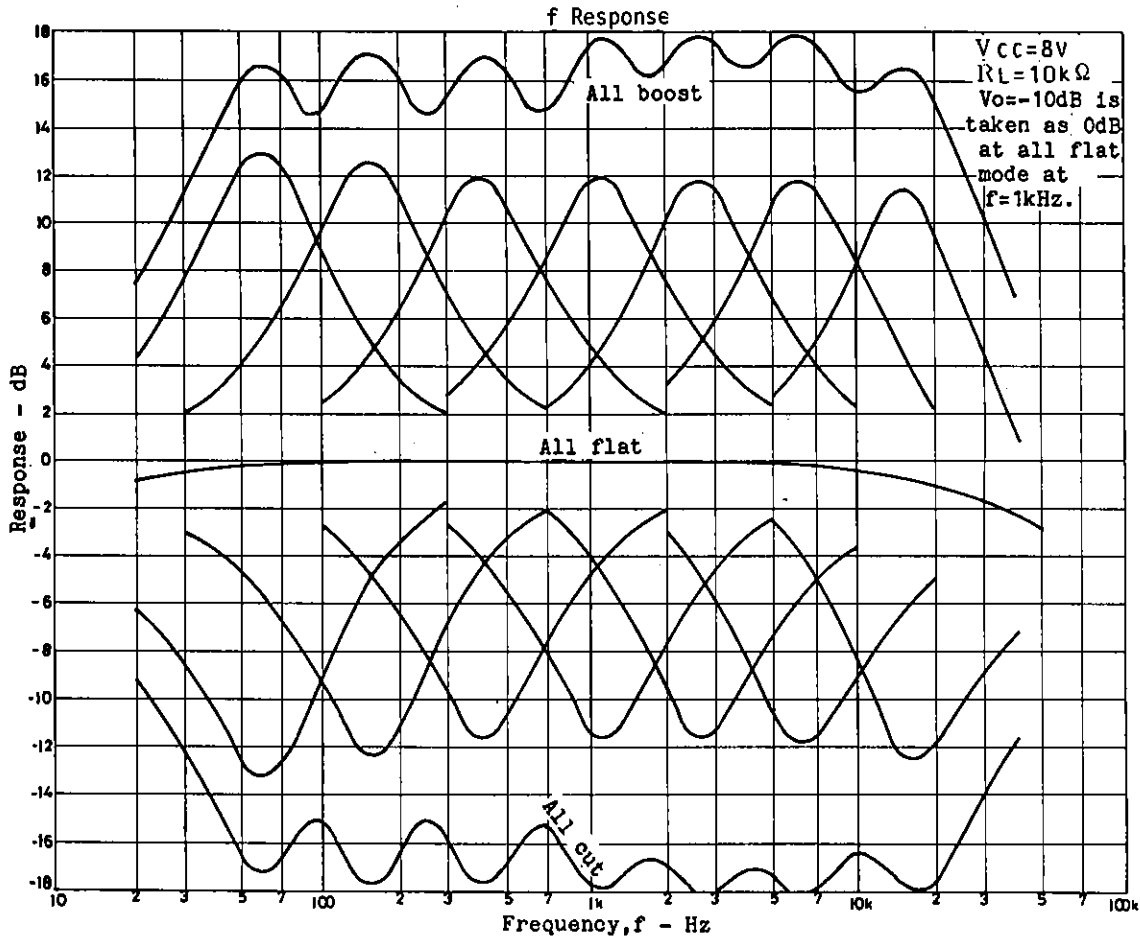
Description of external parts

- 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 ripple 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 or applying power, make sure that the pin-to-pin spaces are not shorted with solder, etc.





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