

SANYO

No.1845C

**LA3605**Monolithic Linear IC
7-BAND GRAPHIC EQUALIZER**Applications**

- Portable component stereos, radio-cassette recorders, tape recorders, car stereos.

Features

- One OP amp on chip.
- 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 two LA3605's makes multiband available.
- Highly stable to capacitive load.

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

			unit
Maximum Supply Voltage	$V_{CC\text{max}}$	20	V
Allowable Power Dissipation	$P_{d\text{max}}$	300	mW
Operating Temperature	T_{opg}	-20 to +75	$^\circ\text{C}$
Storage Temperature	T_{stg}	-40 to +125	$^\circ\text{C}$

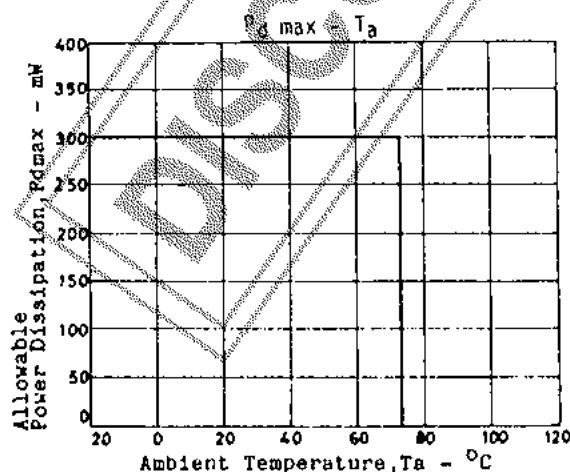
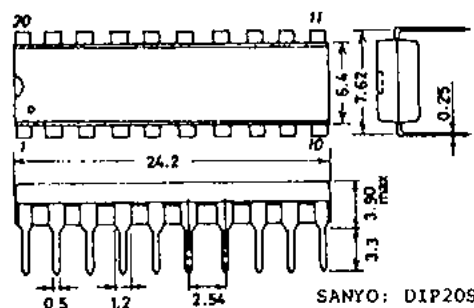
Operating Conditions at $T_a=25^\circ\text{C}$

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

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.

			min	typ	max	unit
Quiescent Current	I_{CCQ}	Quiescent		7	9	mA
Voltage Gain	V_G	$f=1\text{kHz}$, $V_{in}=-10\text{dB}$ at all flat mode	-3.8	-0.8	2.2	dB
Boost Amount	BOOST	$f=60\text{Hz}$ [$V_o=-10\text{dB}$ is taken]	8	10	12	dB
		$f=150\text{Hz}$ as 0dB at all	8	10	12	dB
		$f=400\text{Hz}$ flat mode at $f=$	8	10	12	dB
		$f=1\text{kHz}$ 1kHz.	8	10	12	dB

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**Case Outline 3021B-D20SIC**
(unit:mm)

SANYO: DIP20S

Specifications and information herein are subject to change without notice.

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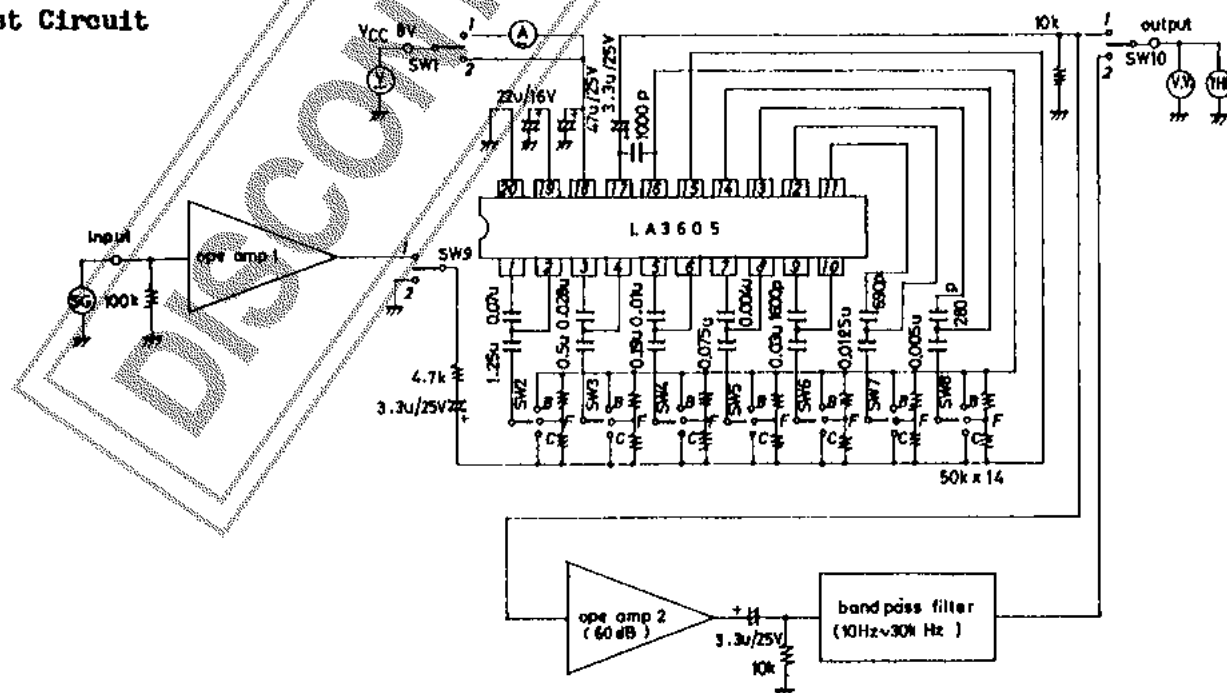
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			min	typ	max	unit
Boost Amount	BOOST	f=2.5kHz	8	10	12	dB
		f=6kHz	8	10	12	dB
		f=15kHz	8	10	12	dB
Cut Amount	CUT	f=60Hz	-12	-10	-8	dB
		f=150Hz	-12	-10	-8	dB
		f=400Hz	-12	-10	-8	dB
		f=1kHz	-12	-10	-8	dB
		f=2.5kHz	-12	-10	-8	dB
		f=6kHz	-12	-10	-8	dB
		f=15kHz	-12	-10	-8	dB
Total Harmonic Distortion	THD	All FLAT, Vo=1.0V, f=1kHz	0.04	0.1		%
Output Noise Voltage	VNO	All FLAT, input short, B.P.F, 10Hz to 30kHz	3	20		uV

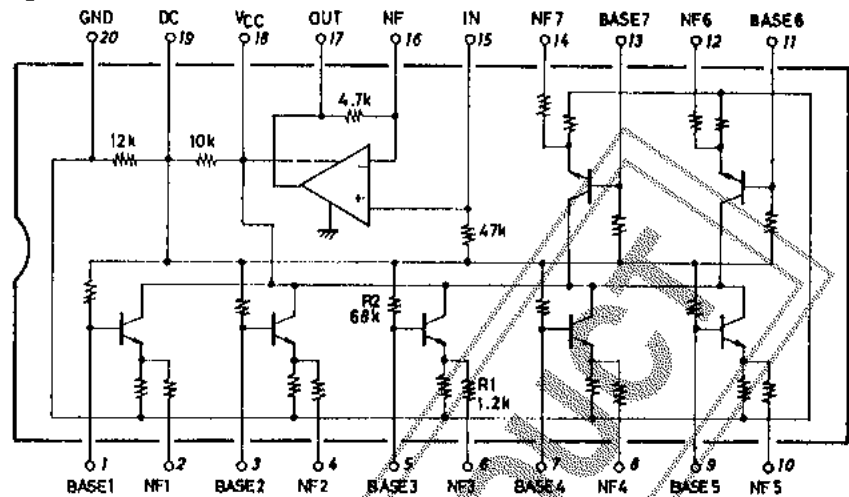
Test Method: $V_{CC}=8V, R_L=10k\Omega, R_g=600\Omega$

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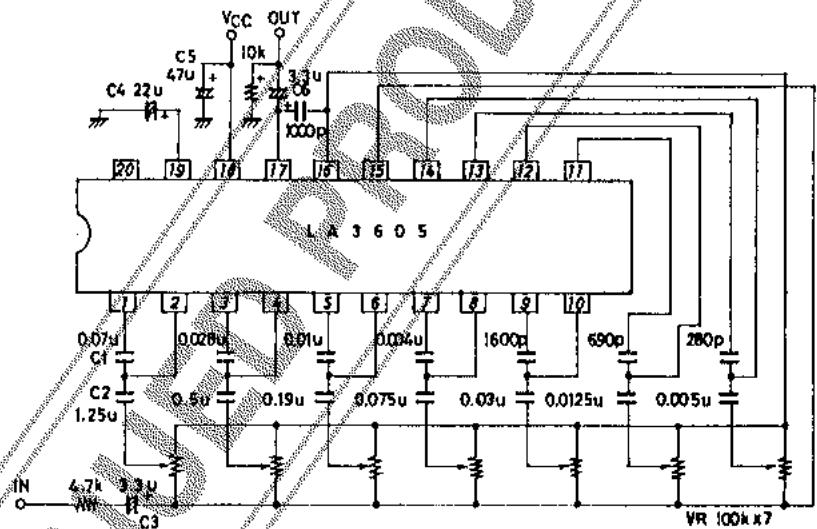
Test Circuit



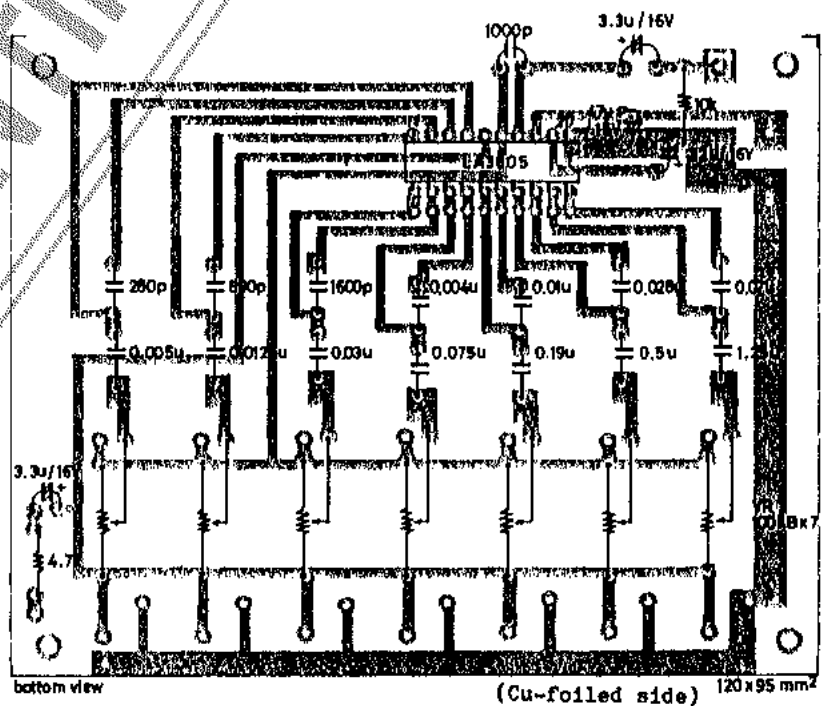
Equivalent Circuit Block Diagram



Sample Application Circuit



Sample Printed Circuit Pattern



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.

$$f_0 = \frac{1}{2\pi\sqrt{C_1 \cdot C_2 \cdot R_1 \cdot R_2}}$$

Q (quality factor)

Q is calculated using the following formula.

$$Q = \sqrt{\frac{C_1 \cdot R_2}{C_2 \cdot R_1}}$$

When Q is increased, the frequency band affected by the resonance circuit is narrowed and a clear distinction between this band and an adjacent band is provided, but the frequency response swells greatly at all boost mode and the peak of the composite frequency is lowered.

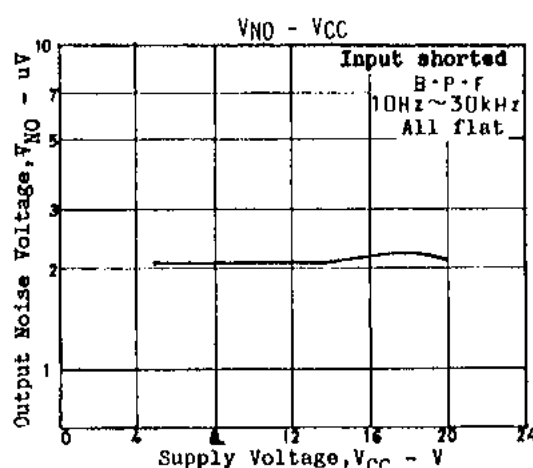
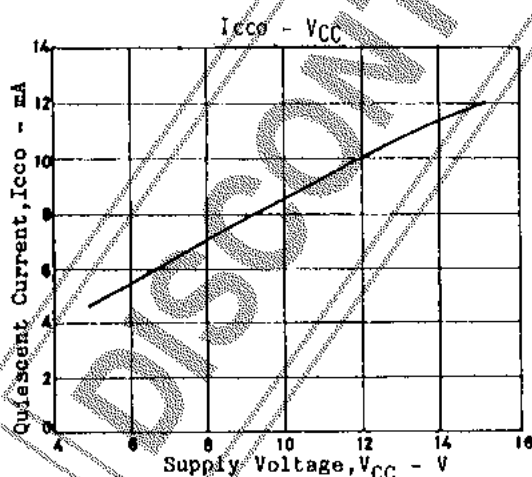
The above must be considered to fix C_1, C_2 .

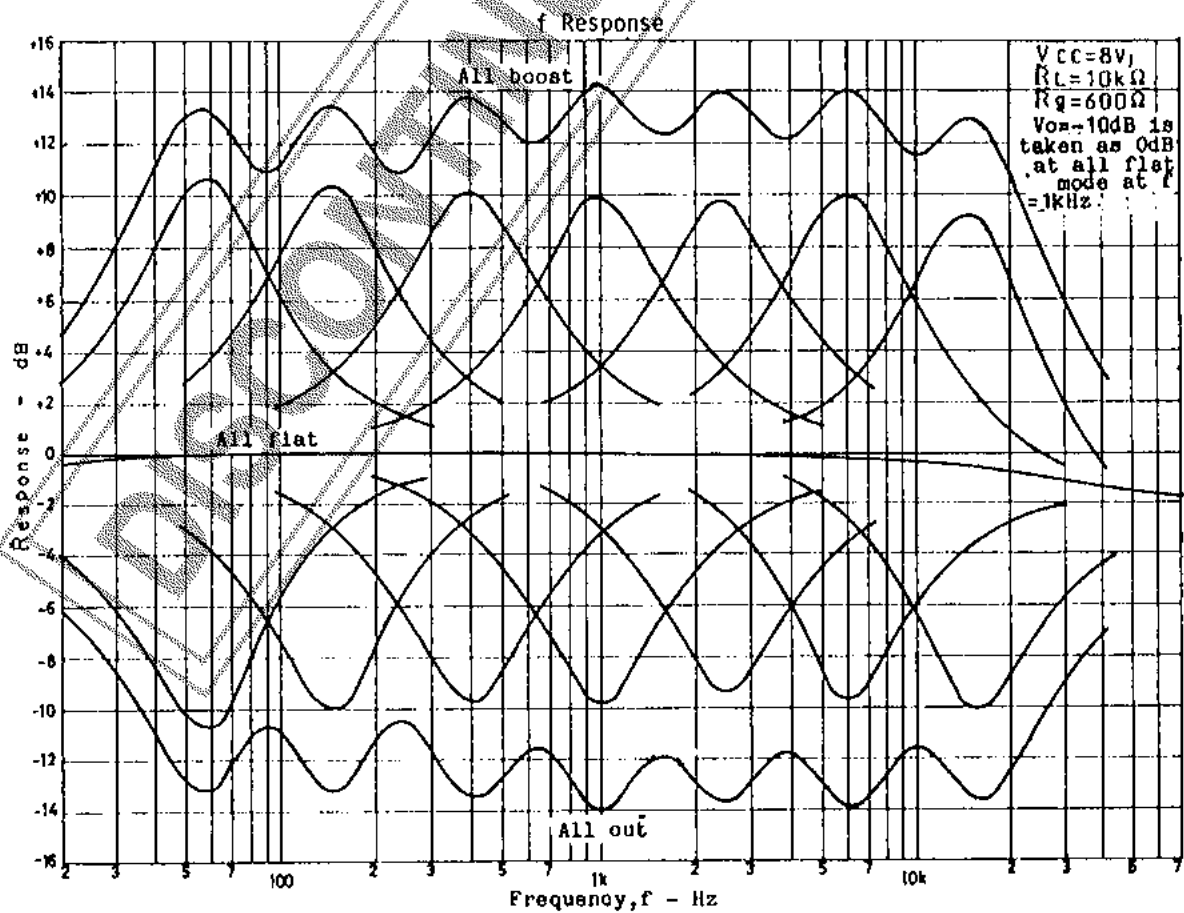
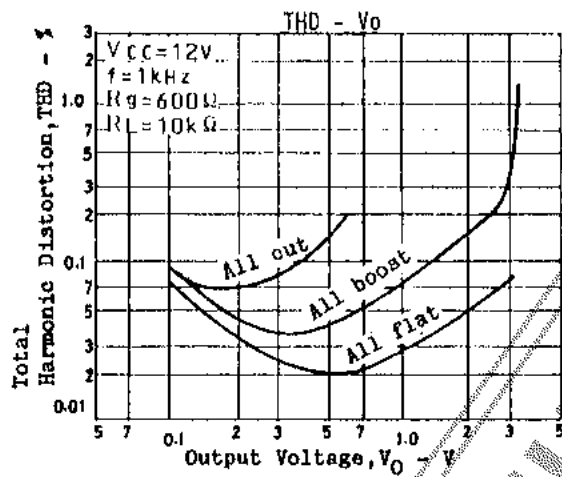
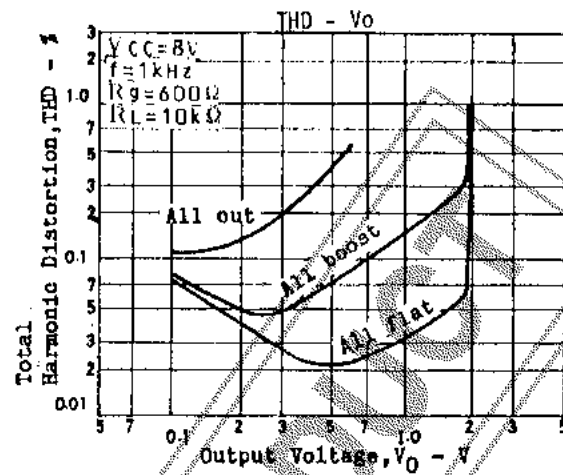
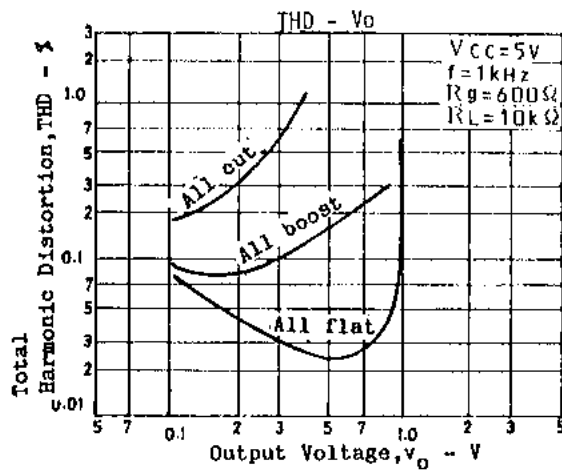
Description of external parts

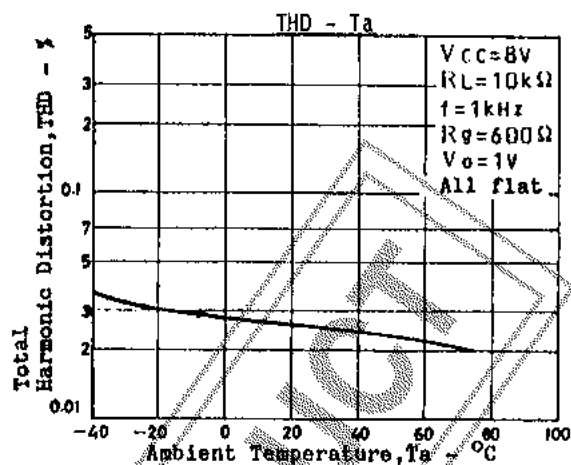
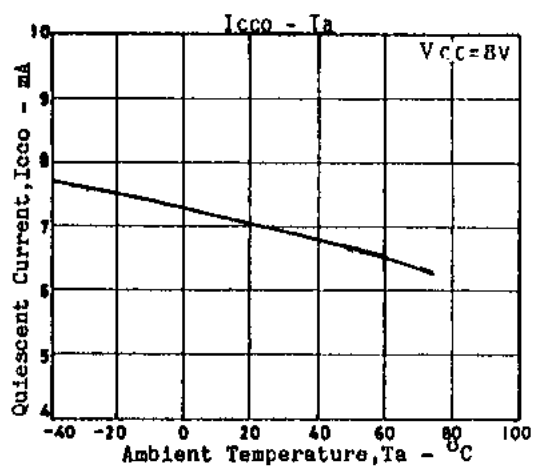
- C_1, C_2 : Capacitors used to fix f_0 (resonance frequency)
- C_3 : Input capacitor. Decreasing the capacitor value lowers the frequency response at low frequencies.
- C_4 : Decoupling capacitor. Decreasing the capacitor value makes the effect of power supply stronger, whereby ripple is liable to occur.
- C_5 : Power capacitor.
- C_6 : 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.







DISCONTINUED PRODUCT

The application circuit diagrams and circuit constants herein are included as an example and provide no guarantee for designing equipment to be mass-produced.
The information herein is believed to be accurate and reliable. However, no responsibility is assumed by SANYO for its use; nor for any infringements of patents or other rights of third parties which may result from its use.