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 fo (resonance frequency).
. Series connection of two LA3605's makes multiband available.
. Highly stable to capacitive load.

Maximum Ratings at Ta=25°C

			unit
Maximum Supply Voltage	V_{CC}max	20	V
Allowable Power Dissipation	Pdmax	300	mW
Operating Temperature	Topg	-20 to +75	°C
Storage Temperature	Tstg	-40 to +125	°C

Operating Conditions at Ta=25°C

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

Operating Characteristics at Ta=25°C, V_{CC}=8V, R_L=10kohms, Rg=600ohms, See specified test circuit.

			min	typ	max	unit
Quiescent Current	I_{CCO}	Quiescent		7	9	mA
Voltage Gain	VG	f=1kHz, Vin=-10dB at all flat mode	-3.8	-0.8	2.2	dB
Boost Amount	BOOST	f=60Hz [Vo=-10dB is taken as 0dB at all flat mode at f=1kHz.]	8	10	12	dB
		f=150Hz	8	10	12	dB
		f=400Hz	8	10	12	dB
		f=1kHz	8	10	12	dB

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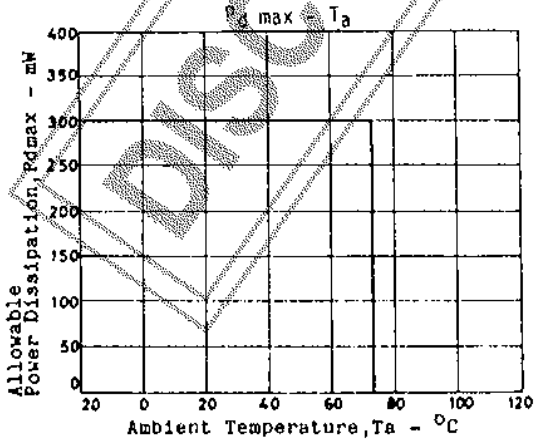
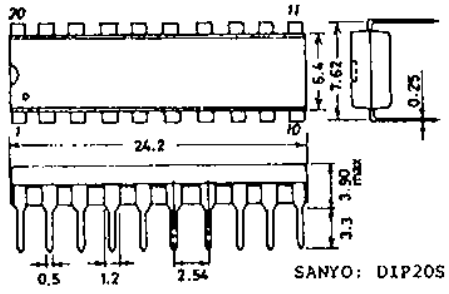


Case Outline 3021B-D20SIC
(unit:mm)



Specifications and information herein are subject to change without notice.

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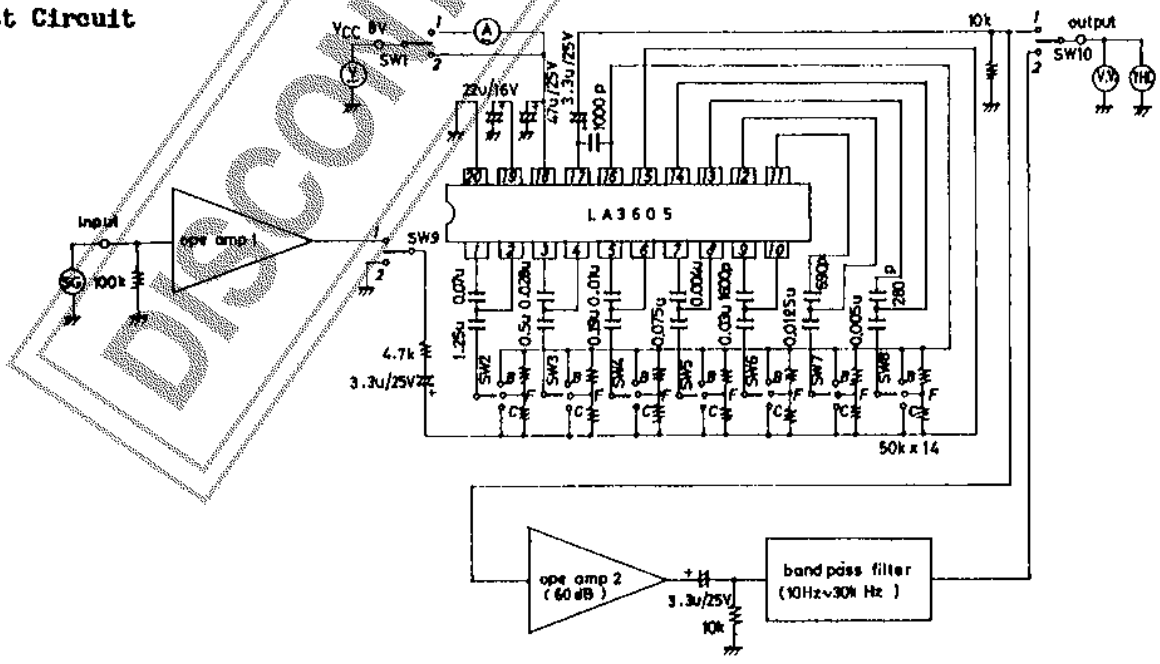
				min	typ	max	unit
Boost Amount	BOOST	f=2.5kHz		8	10	12	dB
		f=6kHz	Vo=-10dB is taken	8	10	12	dB
		f=15kHz	as 0dB at all	8	10	12	dB
Cut Amount	CUT	f=60Hz	flat mode at f=	-12	-10	-8	dB
		f=150Hz	1kHz.	-12	-10	-8	dB
		f=400Hz		-12	-10	-8	dB
		f=1kHz		-12	-10	-8	dB
		f=2.5kHz		-12	-10	-8	dB
		f=6kHz		-12	-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	V_{NO}	All FLAT, input short, B.P.F, 10Hz to 30kHz			3	20	uV

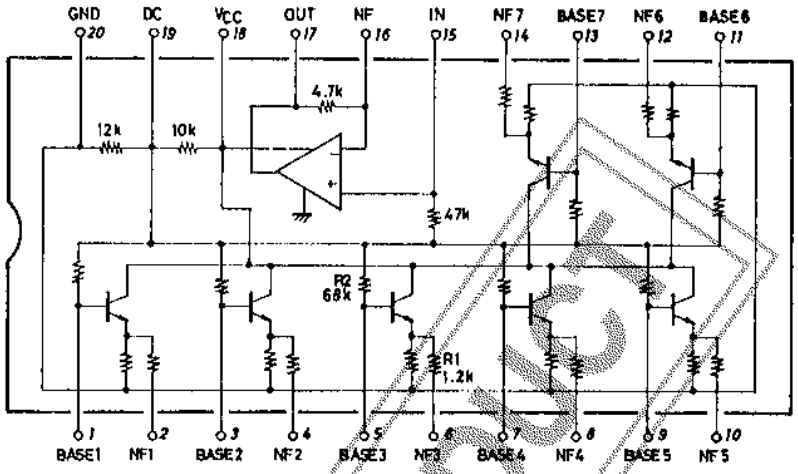
Test Method: V_{CC}=8V, R_L=10kohms, Rg=600ohms

Item	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9	SW10	Conditions
Icco	1	F	F	F	F	F	F	F	2	1	
VG	2	F	F	F	F	F	F	F	1	1	f=1kHz, V_{IN}=-10dB
BOOST1	2	B	F	F	F	F	F	F	1	1	f=60Hz
BOOST2	2	F	B	F	F	F	F	F	1	1	f=150Hz
BOOST3	2	F	F	B	F	F	F	F	1	1	f=400Hz
BOOST4	2	F	F	F	B	F	F	F	1	1	f=1kHz
BOOST5	2	F	F	F	F	B	F	F	1	1	f=2.5kHz
BOOST6	2	F	F	F	F	F	B	F	1	1	f=6kHz
BOOST7	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, Vo=1.0V
VNO	2	F	F	F	F	F	F	F	2	2	

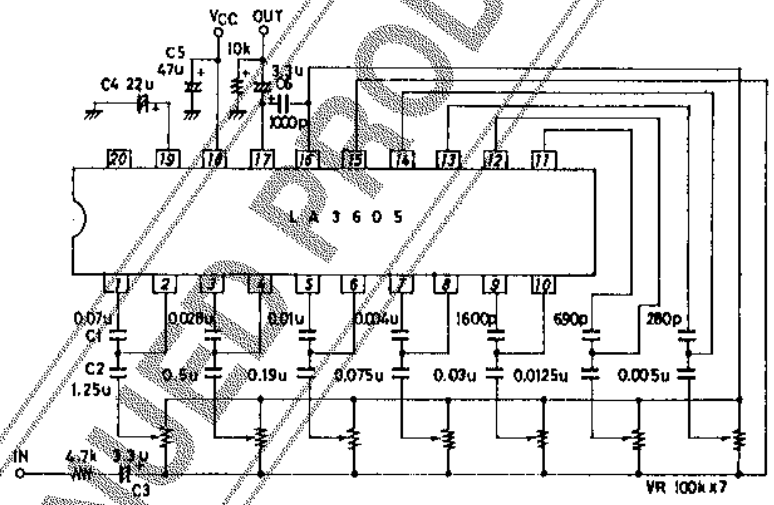
Test Circuit



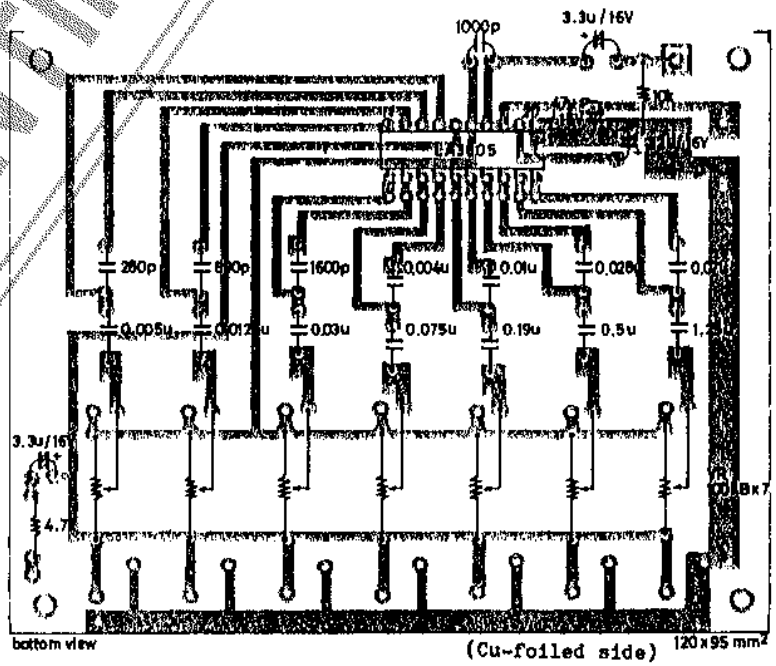
Equivalent Circuit Block Diagram



Sample Application Circuit



Sample Printed Circuit Pattern



fo(resonance frequency)

In the sample application circuit, fo for each of 7 bands is set as follows:
fo=60Hz, 150Hz, 400Hz, 1kHz, 2.5kHz, 6kHz, 15kHz
fo is calculated using the following formula.

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

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 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 C1, C2.

Description of external parts

C1,C2 : Capacitors used to fix fo (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.