Ordering number: EN 2277A

Monolithic Linear IC

SANYO 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

				unit
Maximum Supply Voltage	V_{CC}max		20	V
Allowable Power Dissipation	Pdmax	LA3607	300	mW
Operating Temperature	Topr		-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	Icco	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 (Vo=-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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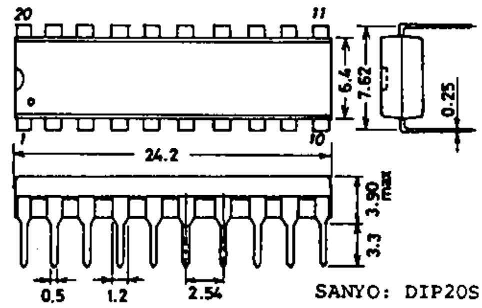
Package Dimensions
(unit: mm)
3021B



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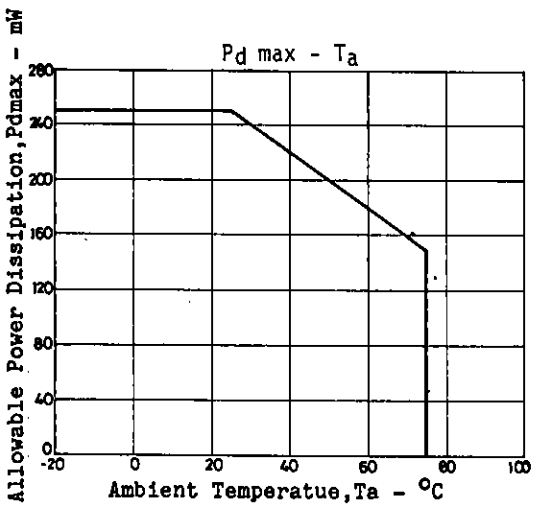
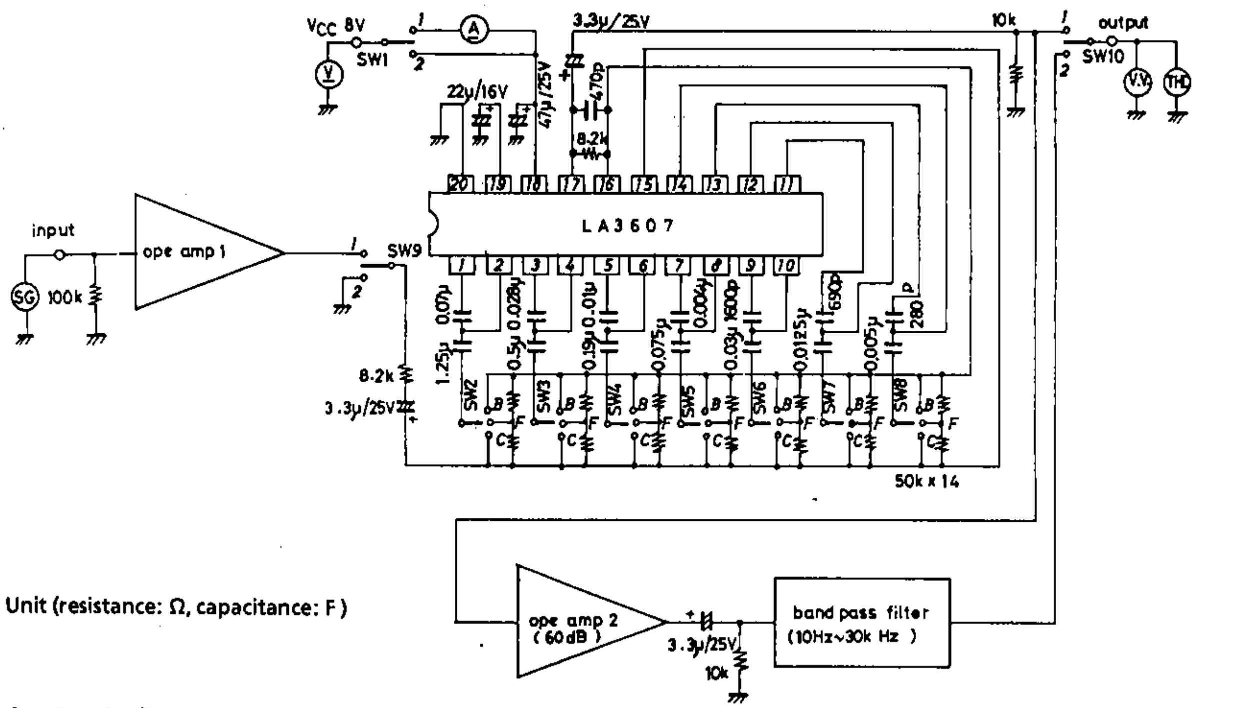
Item	Symbol	Conditions		min	typ	max	unit
Cut Amount	CUT	f=60Hz	Vo=-10dB is taken as 0dB at all flat mode at f=1kHz.	-14	-12	-10	dB
		f=150Hz		-14	-12	-10	dB
		f=400Hz		-14	-12	-10	dB
		f=1kHz		-14	-12	-10	dB
		f=2.5kHz		-14	-12	-10	dB
		f=6kHz		-14	-12	-10	dB
		f=15kHz		-14	-12	-10	dB
Total Harmonic Distortion	THD	f=1kHz,Vo=1.0V at all flat mode input			0.02	0.1	%
Output Noise Voltage	V_{NO}	All flat,input short, B.P.F.,10Hz to 30kHz			7	40	µV



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

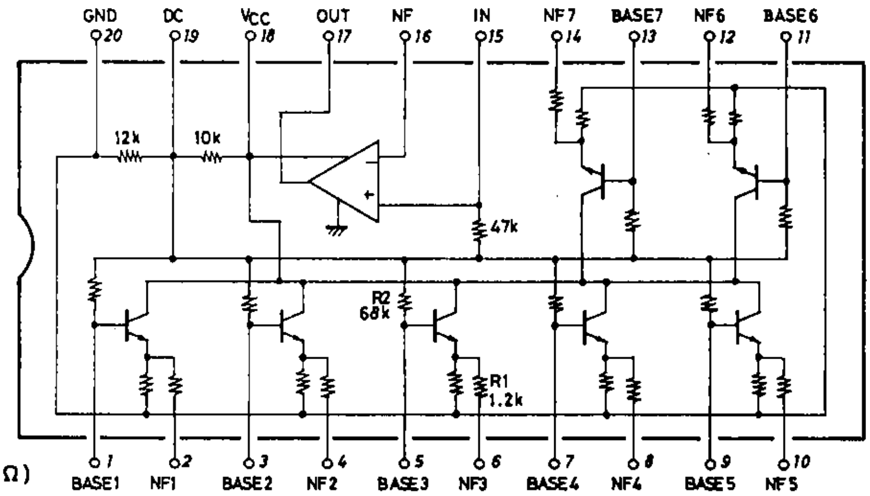
Item	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9	SW10	Conditions
Icco	1	F	F	F	F	F	F	F	2	1	
VG	2	F	F	F	F	F	F	F	1	1	f=1kHz VIN=-10dB
BOOST1	2	B	F	F	F	F	F	F	1	1	f=60Hz
BOOST2	2	F	B	F	F	F	F	F	1	1	f=150Hz
BOOST3	2	F	F	B	F	F	F	F	1	1	f=400Hz
BOOST4	2	F	F	F	B	F	F	F	1	1	f=1kHz
BOOST5	2	F	F	F	F	B	F	F	1	1	f=2.5kHz
BOOST6	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



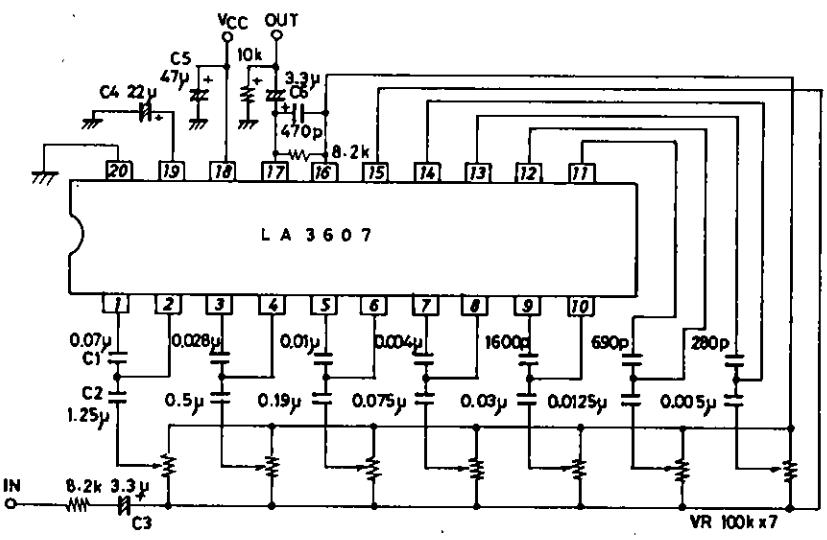
Unit (resistance: Ω, capacitance: F)

Equivalent Circuit Block Diagram



Unit (resistance: Ω)

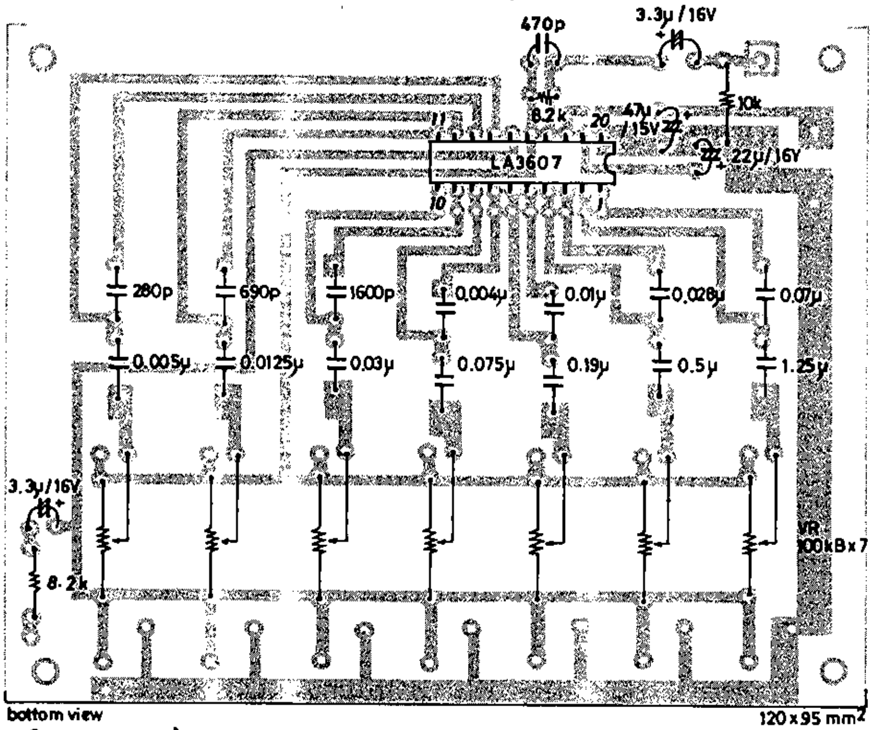
Sample Application Circuit



Unit (resistance: Ω, capacitance: F)

Sample Printed Circuit Pattern (Cu-foiled side)

Unit (resistance: Ω, capacitance: F)



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.

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

Q (quality factor)
Q is calculated using the following formula.

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

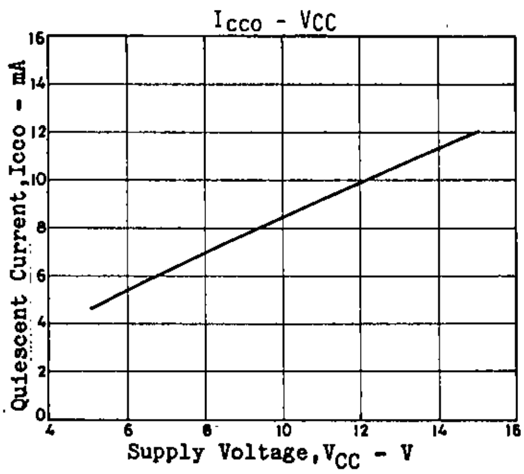
When Q is increased, the frequency band affected by the resonance circuit is narrowed and a clear distinction between this band and adjacent band is provided, but the frequency response swells greatly at all boost mode and the peak of the composite frequency is lowered. The above must be considered to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

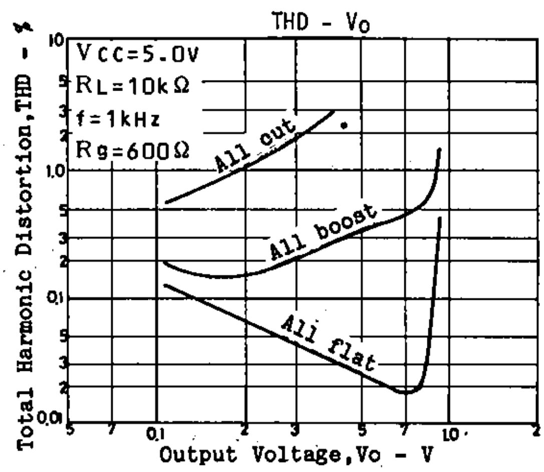
Description of external parts

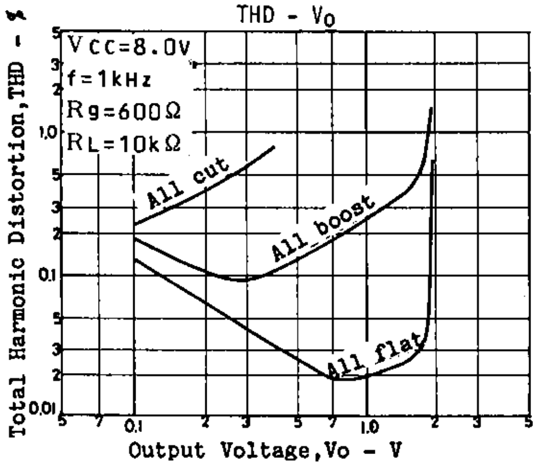
- C1, C2 : Capacitors used to fix fo (resonance frequency)
- C3 : Input capacitor. Decreasing the capacitor value lowers the frequency response at low frequencies.
- C4 : Decoupling capacitor. Decreasing the capacitor value makes the effect of power supply stronger, whereby ripple is liable to occur.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

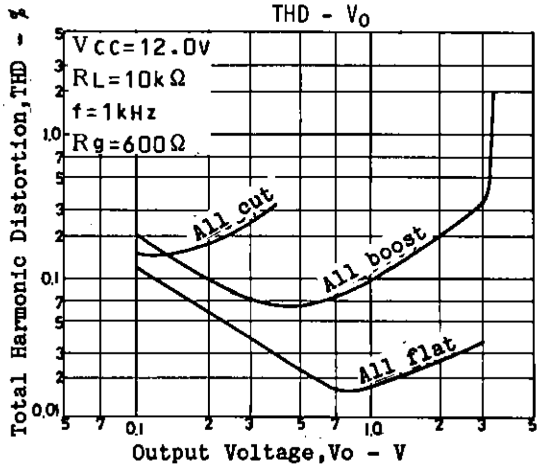
Proper cares in using IC

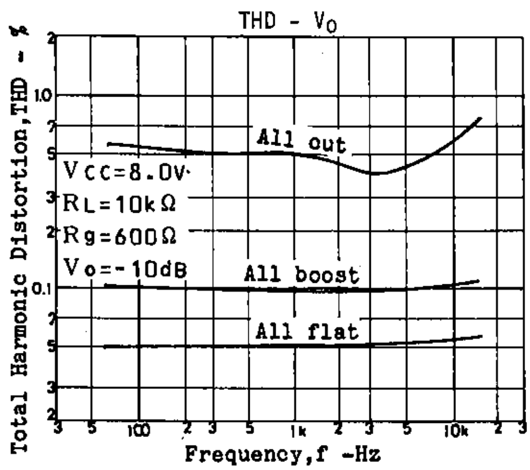
- Maximum supply voltage V_{CC}max 20V must not be exceeded. The operating voltage is in the range of 5 to 15V.
- Application of power with the pin-to-pin spaces shorted causes breakdown or deterioration of the IC to occur. When mounting the IC on the board or applying power, make sure that the pin-to-pin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

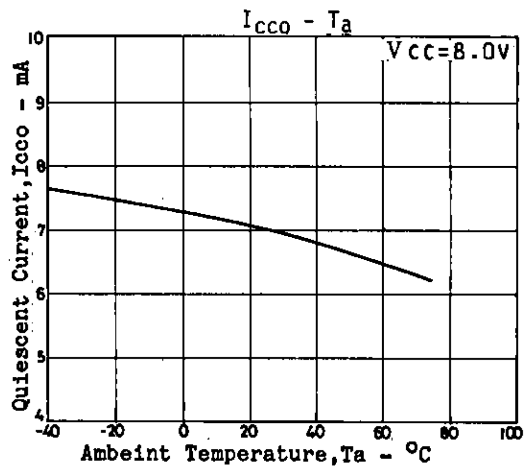

Icco - VCC
Quiescent Current,Icco - mA
0
2
4
6
8
10
12
14
16
4
6
8
10
12
14
16
Supply Voltage,VCC - V

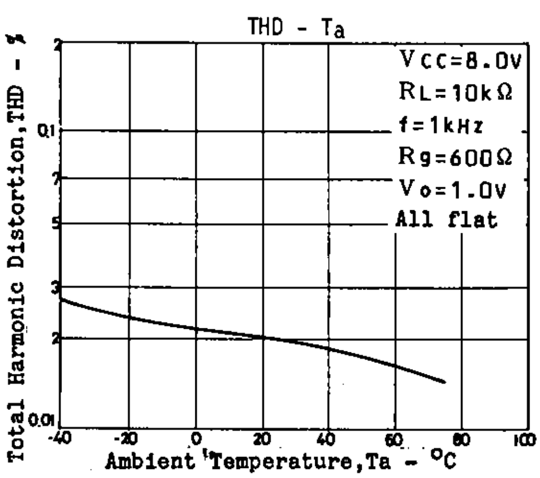

THD - Vo
VCC=5.0V
RL=10kΩ
f=1kHz
Rg=600Ω
All cut
All boost
All flat
Total Harmonic Distortion,THD - %
Output Voltage,Vo - V

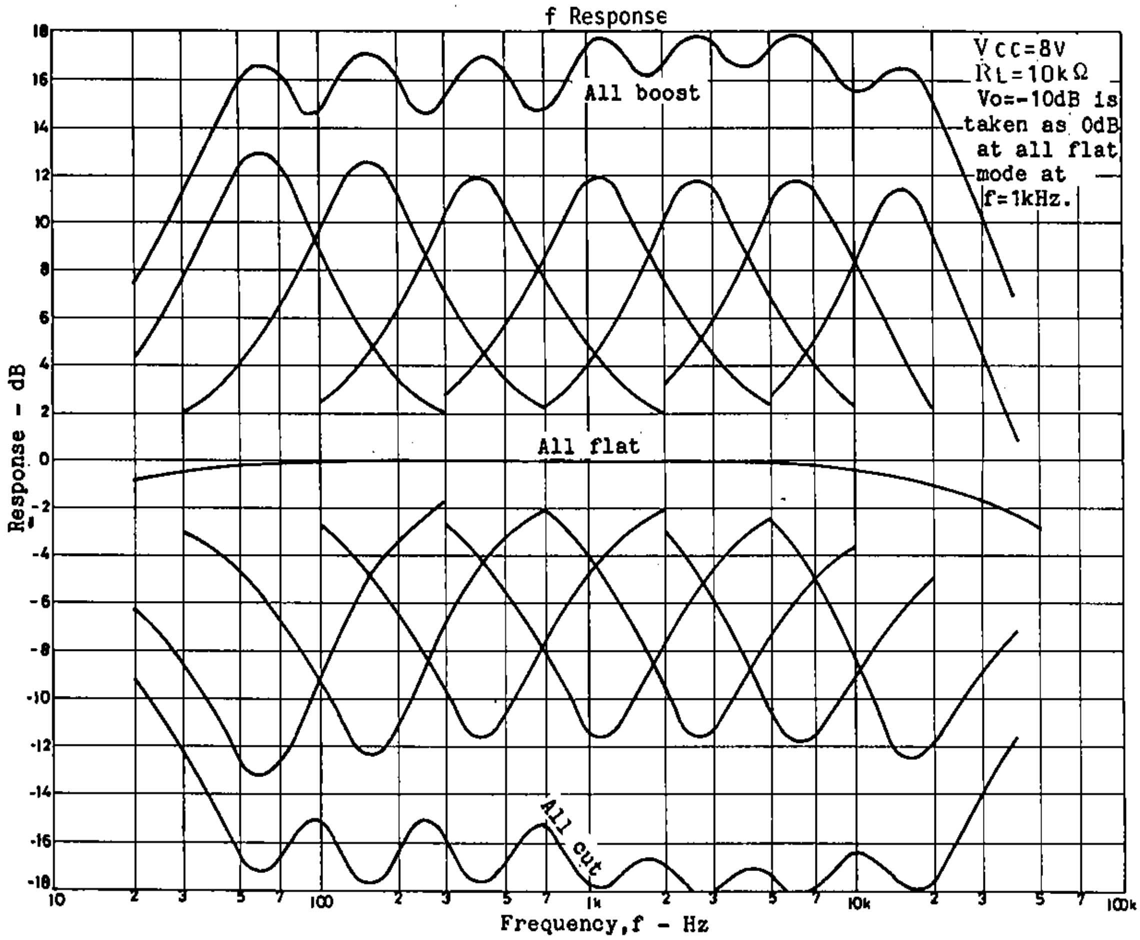

THD - Vo
VCC=8.0V
f=1kHz
Rg=600Ω
RL=10kΩ
All cut
All boost
All flat
Total Harmonic Distortion,THD - %
Output Voltage,Vo - V


THD - Vo
VCC=12.0V
RL=10kΩ
f=1kHz
Rg=600Ω
All cut
All boost
All flat
Total Harmonic Distortion,THD - %
Output Voltage,Vo - V


THD - Vo
VCC=8.0V
RL=10kΩ
Rg=600Ω
Vo=-10dB
All cut
All boost
All flat
Total Harmonic Distortion,THD - %
Frequency,f -Hz


Icco - Ta
VCC=8.0V
Quiescent Current,Icco - mA
4
5
6
7
8
9
10
-40
-20
0
20
40
60
80
100
Ambeint Temperature,Ta - °C


THD - Ta
VCC=8.0V
RL=10kΩ
f=1kHz
Rg=600Ω
Vo=1.0V
All flat
Total Harmonic Distortion,THD - %
-40
-20
0
20
40
60
80
100
Ambient Temperature,Ta - °C


f Response
Vcc=8V
RL=10kΩ
Vo=-10dB is taken as 0dB at all flat mode at f=1kHz.
All boost
All flat
All cut
Response - dB
Frequency,f - Hz
18
16
14
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
10
100
1k
10k
100k