

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

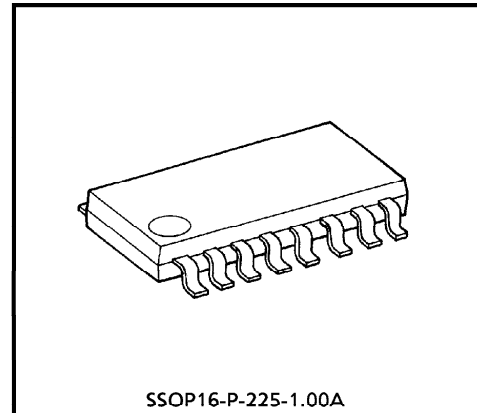
TA2062F

5 BAND GRAPHIC EQUALIZER

TA2062F is 5-Band graphic equalizer IC, which have 5 resonance circuit and an output buffer amplifier. 5 band graphic equalizer for one channel can be formed easily by externally connecting capacitors and variable resistors which fix f_0 (resonance frequency). This is suitable for sound field control of Car Audio System.

FEATURES

- Few External Parts
- BOOST / CUT CONTROL RANGE : $\pm 12\text{dB}$
- Low Distortion
 - : THD = 0.001% (Typ.)
 - ($V_{CC} = 8\text{V}$, $f = 1.1\text{kHz}$, $V_{IN} = 1V_{rms}$, FLAT)
- Low Noise
 - : $V_{NO} = 3\mu V_{rms}$
 - ($V_{CC} = 8\text{V}$, $R_g = 0\Omega$, FLAT, $BW = 20\text{Hz} \sim 20\text{kHz}$)
- Low Harmonic Distortion at Boost or Cut Mode
 - : 2nd and 3rd Harmonic Distortion are :
 - 2HD, 3HD $\leq 0.01\%$ (Typ.)
 - ($V_{CC} = 8\text{V}$, $V_{IN} = 1V_{rms}$, $\pm 6\text{dB}$ Boost or Cut, $f = 20\text{Hz} \sim 20\text{kHz}$)
- Maximum Output Voltage
 - : $V_{OM} = 2.3V_{rms}$ (Typ.)
 - ($V_{CC} = 8\text{V}$, $f = 1.1\text{kHz}$, THD = 1%, FLAT)
- Operating Supply Voltage Range
 - : $V_{CC} (opr) = 4 \sim 16\text{V}$ ($T_a = 25^\circ\text{C}$)

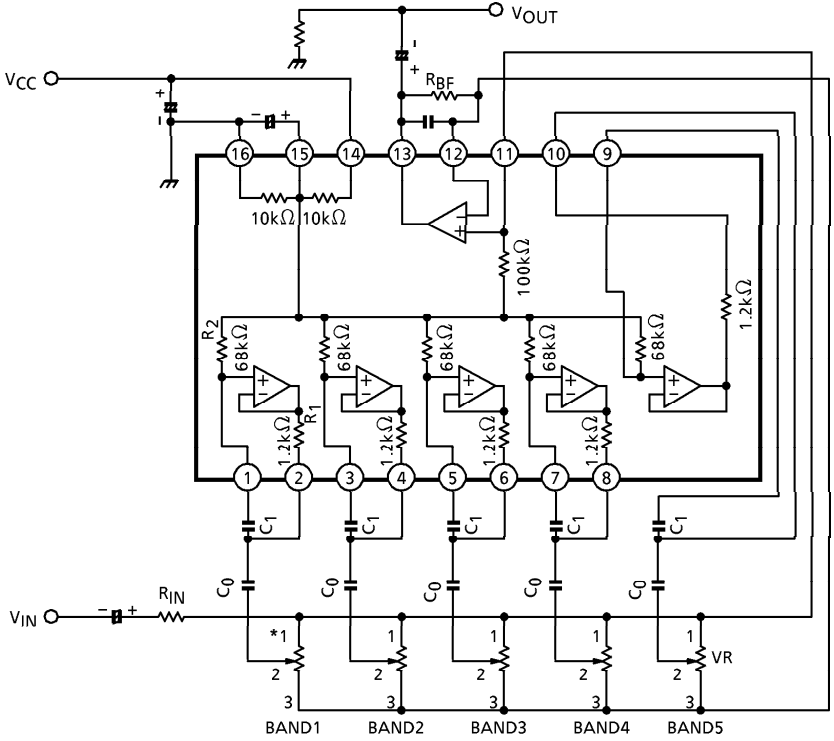


Weight : 0.14g (Typ.)

961001EBA1

- TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.
- The products described in this document are subject to foreign exchange and foreign trade control laws.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.

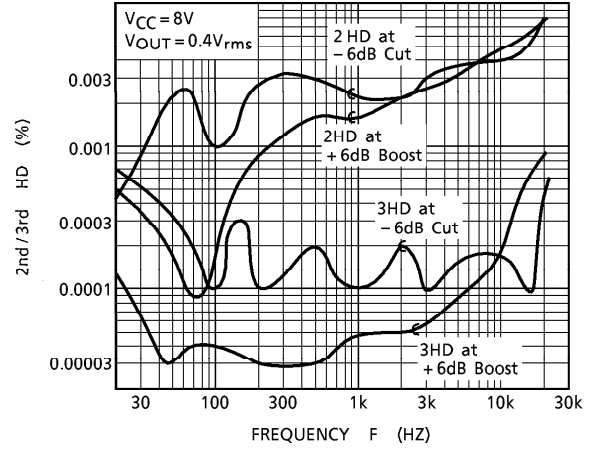
BLOCK DIAGRAM



*1 : CUT 2 : FLAT 3 : BOOST

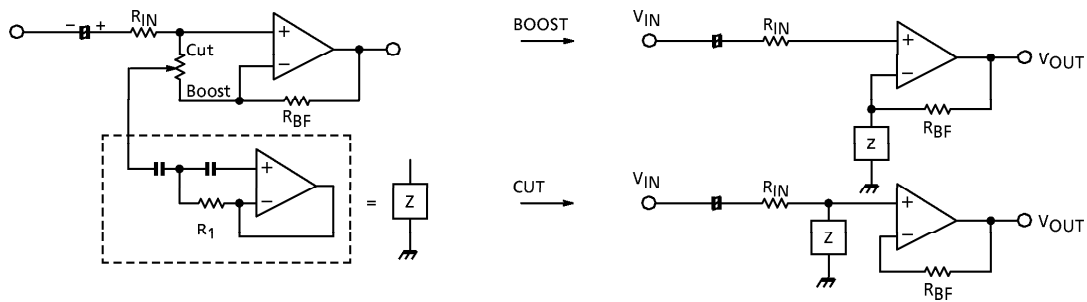
1. (2ND AND 3RD) HARMONIC DISTORTION AT 6dB BOOST OR CUT MODE

This IC is designed the 2nd and 3rd Harmonic Distortion are less than 0.01% at 6dB boost or cut between 20Hz and 20kHz.



(Fig-1)

2. ADJUSTMENT OF BOOST AND CUT AMOUNT



(Fig-2)

Boost and cut amount are decided as below.

$$\text{Boost : } G_V(\text{BOOST}) = \frac{R_{BF} + Z}{Z} \left(\approx \frac{R_{BF} + R_1}{R_1} \right)$$

$$\text{Cut : } G_V(\text{CUT}) = \frac{Z}{R_{IN} + Z} \left(\approx \frac{R_1}{R_{IN} + R_1} \right)$$

It must be adjusted $R_{BF} = R_{IN}$ if Boost amount is same as cut amount.

In case signal source resistance R_g is large enough, it is necessary to be set $R_{BF} = R_{IN} + R_g$.

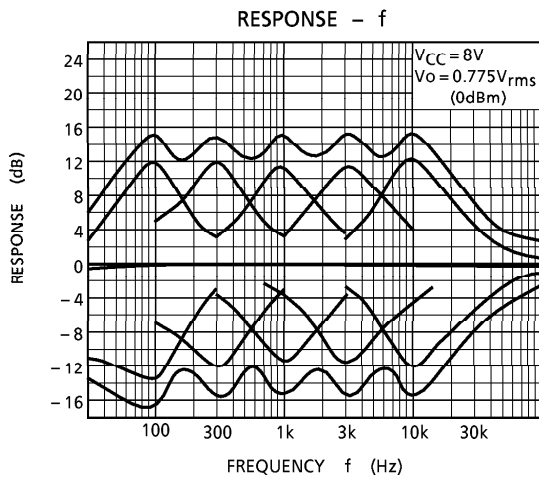
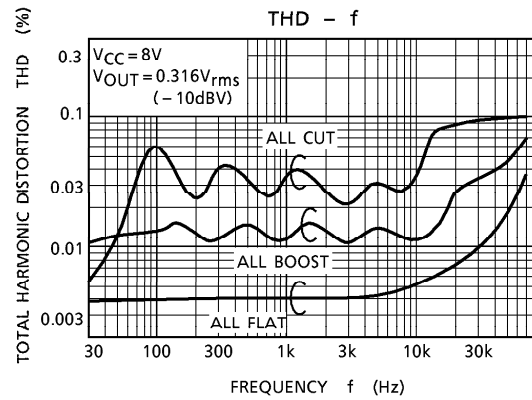
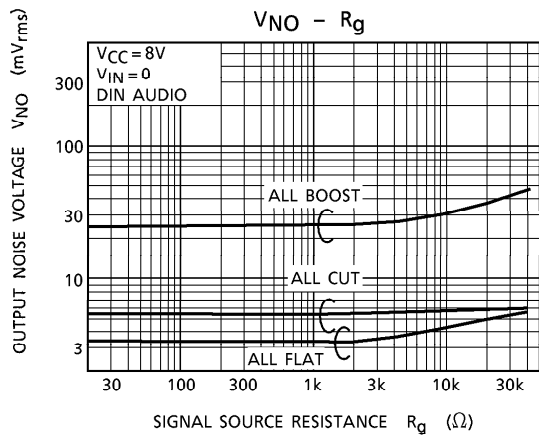
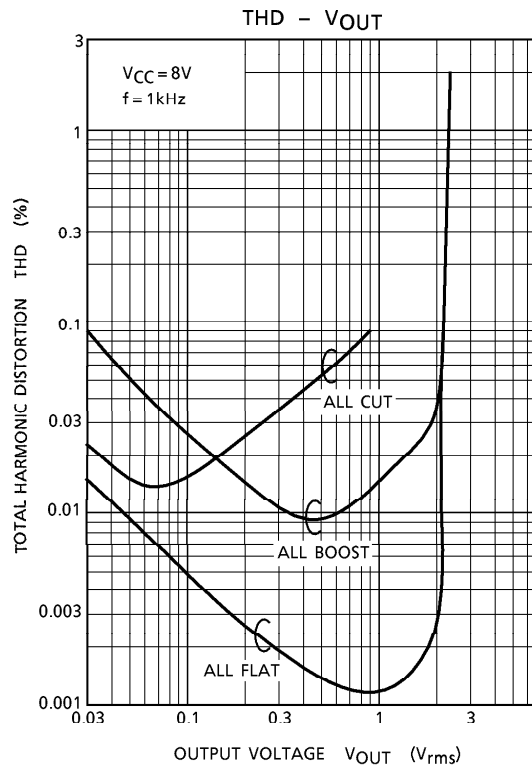
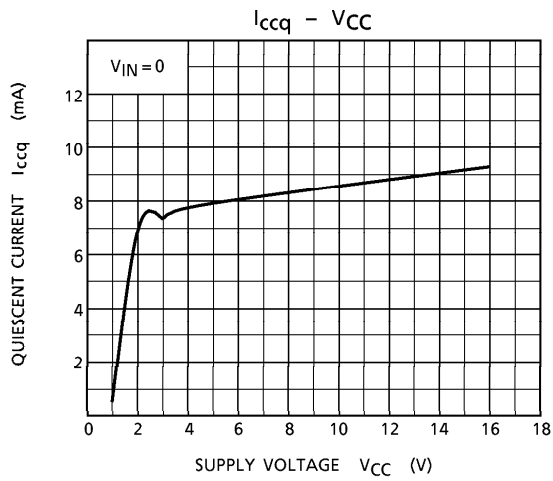
MAXIMUM RATINGS

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V _{CC}	16	V
Power Dissipation	P _D	350	mW
Operating Temperature	T _{opr}	-40~85	°C
Storage Temperature (Note)	T _{stg}	-55~150	°C

(Note) Derated above Ta = 25°C in the proportion of 2.8mW/°C.

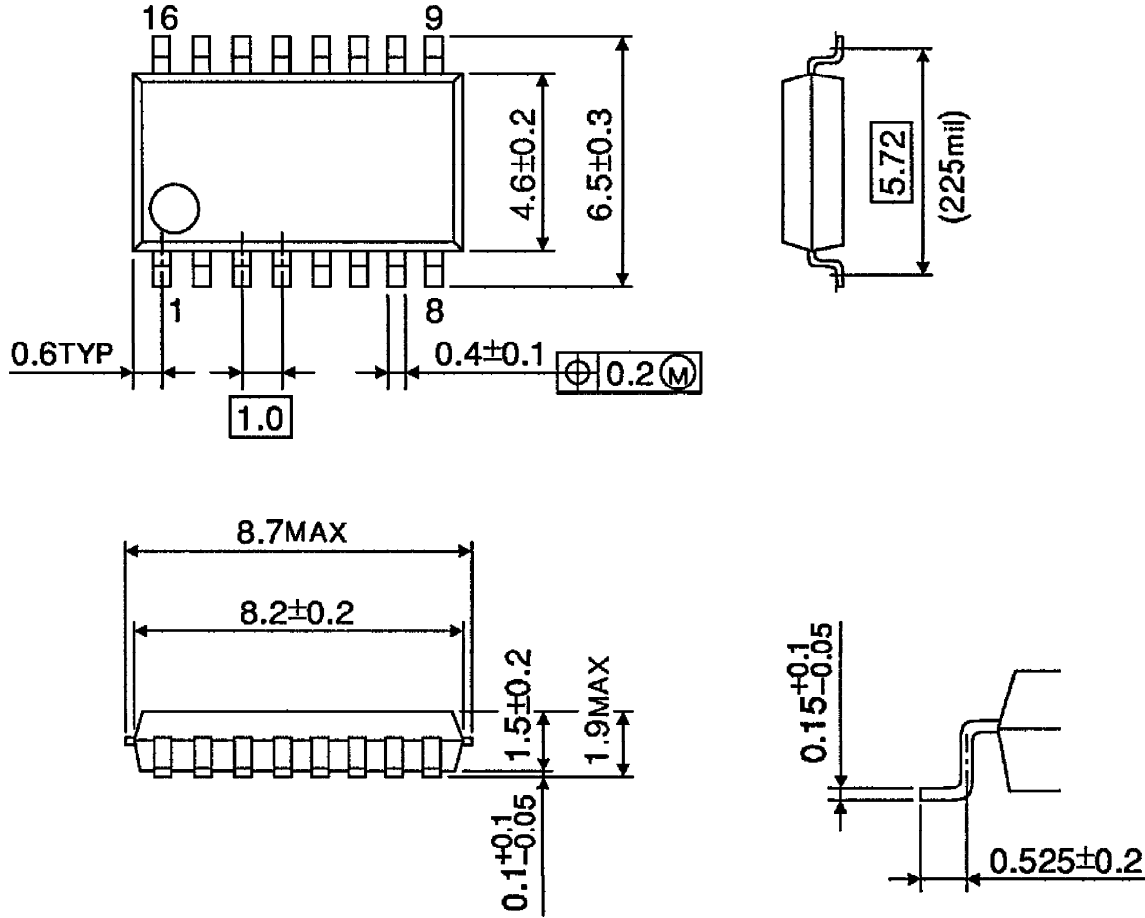
ELECTRICAL CHARACTERISTICS (Unless otherwise specified, V_{CC} = 8V, f = 1.1kHz, R_L = 10kΩ, Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Quiescent Current	I _{ccq}	—	V _{IN} = 0	—	9	15	mA
Voltage Gain	G _V (FLAT)	—	V _{OUT} = 1V _{rms}	-1.5	0	+1.5	dB
	G _V (BST)	—	V _{OUT} = 1V _{rms} , f = 110Hz	10	12	14	
			V _{OUT} = 1V _{rms} , f = 340Hz	10	12	14	
			V _{OUT} = 1V _{rms} , f = 1.1kHz	10	12	14	
			V _{OUT} = 1V _{rms} , f = 3.4kHz	10	12	14	
			V _{OUT} = 1V _{rms} , f = 11kHz	10	12	14	
	G _V (CUT)	—	V _{OUT} = 1V _{rms} , f = 110Hz	-14	-12	-10	
			V _{OUT} = 1V _{rms} , f = 340Hz	-14	-12	-10	
			V _{OUT} = 1V _{rms} , f = 1.1kHz	-14	-12	-10	
			V _{OUT} = 1V _{rms} , f = 3.4kHz	-14	-12	-10	
V _{OUT} = 1V _{rms} , f = 11kHz			-14	-12	-10		
Total Harmonic Distortion	THD (FLT)	—	V _{OUT} = 1V _{rms}	—	0.001	0.01	%
Output Noise Voltage	V _{NO} (FLT)	—	R _g = 620Ω, V _{IN} = 0 BW = 20Hz~20kHz	—	3	8	μV _{rms}
Maximum Output Voltage	V _{OM}	—	THD = 1%	1.8	2.3	—	V _{rms}



OUTLINE DRAWING
SSOP16-P-225-1.00A

Unit : mm



Weight : 0.14g (Typ.)