

5 BAND GRAPHIC EQUALIZER

KIA2062P/F are 5-band Graphic Equalizer ICs, 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 resonance frequency (f_0)

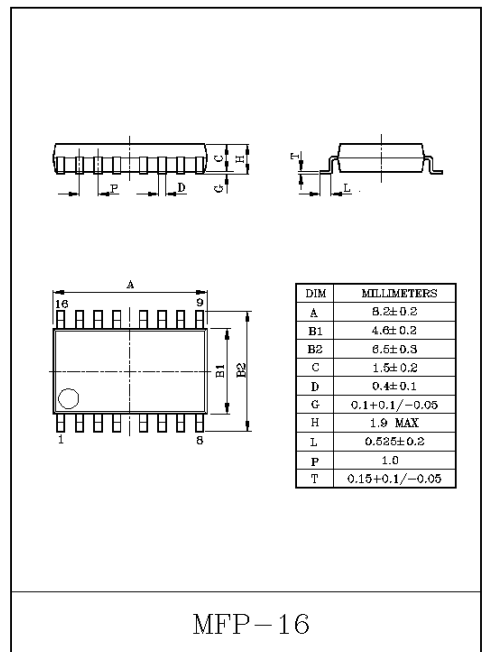
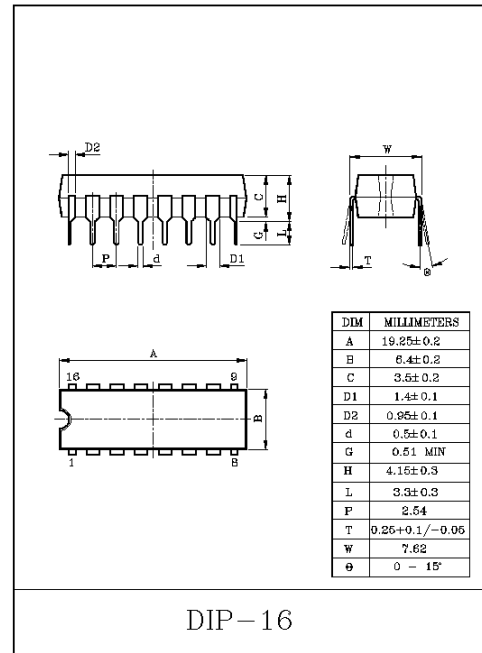
FEATURES

- Few external parts.
- Boost, cut : $\pm 12\text{dB}$.
- Low distortion : THD=0.001% (Typ.)
($V_{CC}=8\text{V}$, $R_g=0\Omega$, flat, BW=20Hz~20kHz)
- Excellent of total harmonic distortion at boost and cut : 2'nd, 3'rd=0.1% (Typ.)
($V_{CC}=8\text{V}$, $V_{IN}=1\text{V}_{\text{rms}}$, $\pm 6\text{dB}$ boost, cut, $f=20\text{Hz}\sim 20\text{kHz}$)
- Output dynamic range.
: $V_{OM}=2.3V_{\text{rms}}$ (Typ.)
($V_{CC}=8\text{V}$, $f=1.1\text{kHz}$, THD=1%, flat)
- Operating supply voltage .
: $V_{CC(\text{opr})}=4\sim 16\text{V}$ ($T_a=25^\circ\text{C}$)

MAXIMUM RATINGS ($T_a=25^\circ\text{C}$)

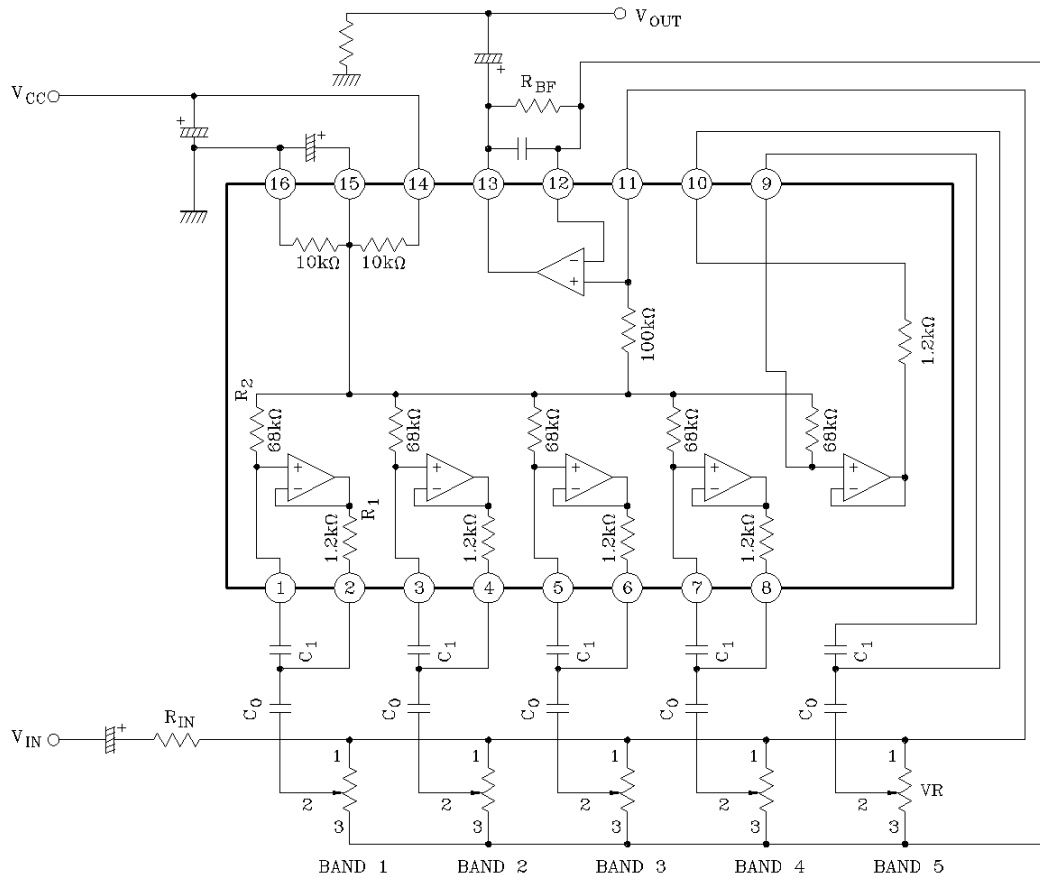
CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	16	V
Power Dissipation	KIA2062P	750	mW
	KIA2062F	350	
Operating Temperature	T_{opr}	-40~85	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55~150	$^\circ\text{C}$

Note : Derated above $T_a=25^\circ\text{C}$ in the proportion of $6\text{mW}/^\circ\text{C}$ for KIA2062P, and of 2.8mW for KIA2062F.



KIA2062P/F

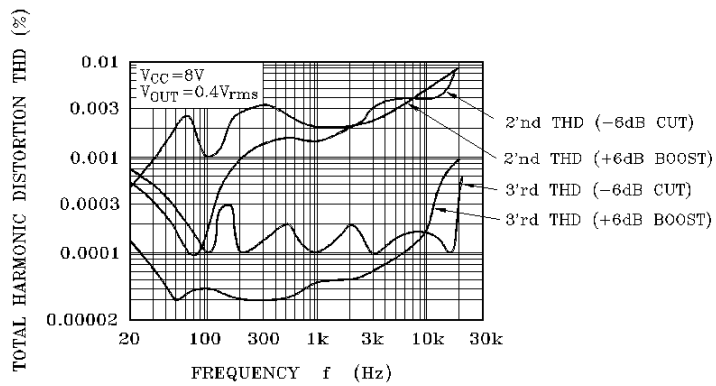
BLOCK DIAGRAM



1 : CUT 2 : FLAT 3 : BOOST

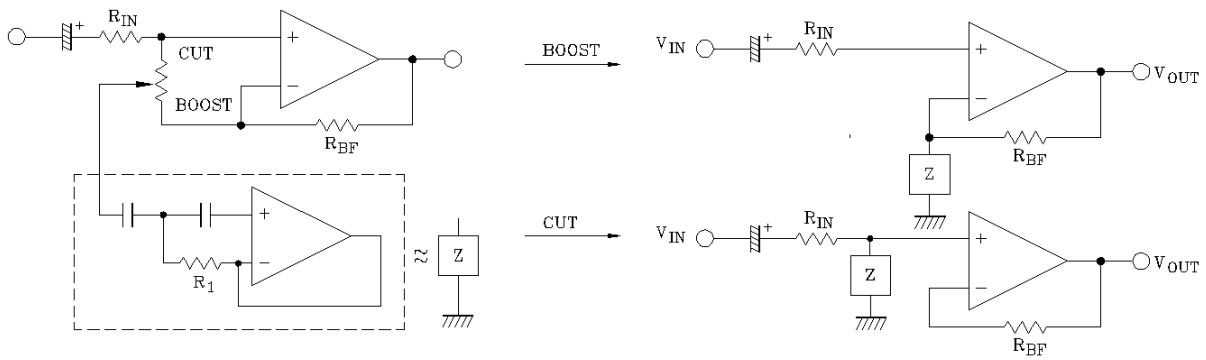
1. Total harmonic distortion at boost and cut

This IC is 2'nd, 3'rd total harmonic distortion characteristics under 0.01% (Typ.) at $\pm 6\text{dB}$ range of boost and cut. ($f=20\text{Hz}\sim 20\text{kHz}$).



(Fig. 1)

2. Control of boost and cut.



(Fig. 2)

$$G_{V(\text{BOOST})} = \frac{R_{BF} + Z}{Z} \quad \left(\approx \frac{R_{BF} + R_1}{R_1} \right)$$

$$G_{V(\text{CUT})} = \frac{Z}{R_{IN} + Z} \quad \left(\approx \frac{R_1}{R_{IN} + R_1} \right)$$

KIA2062P/F

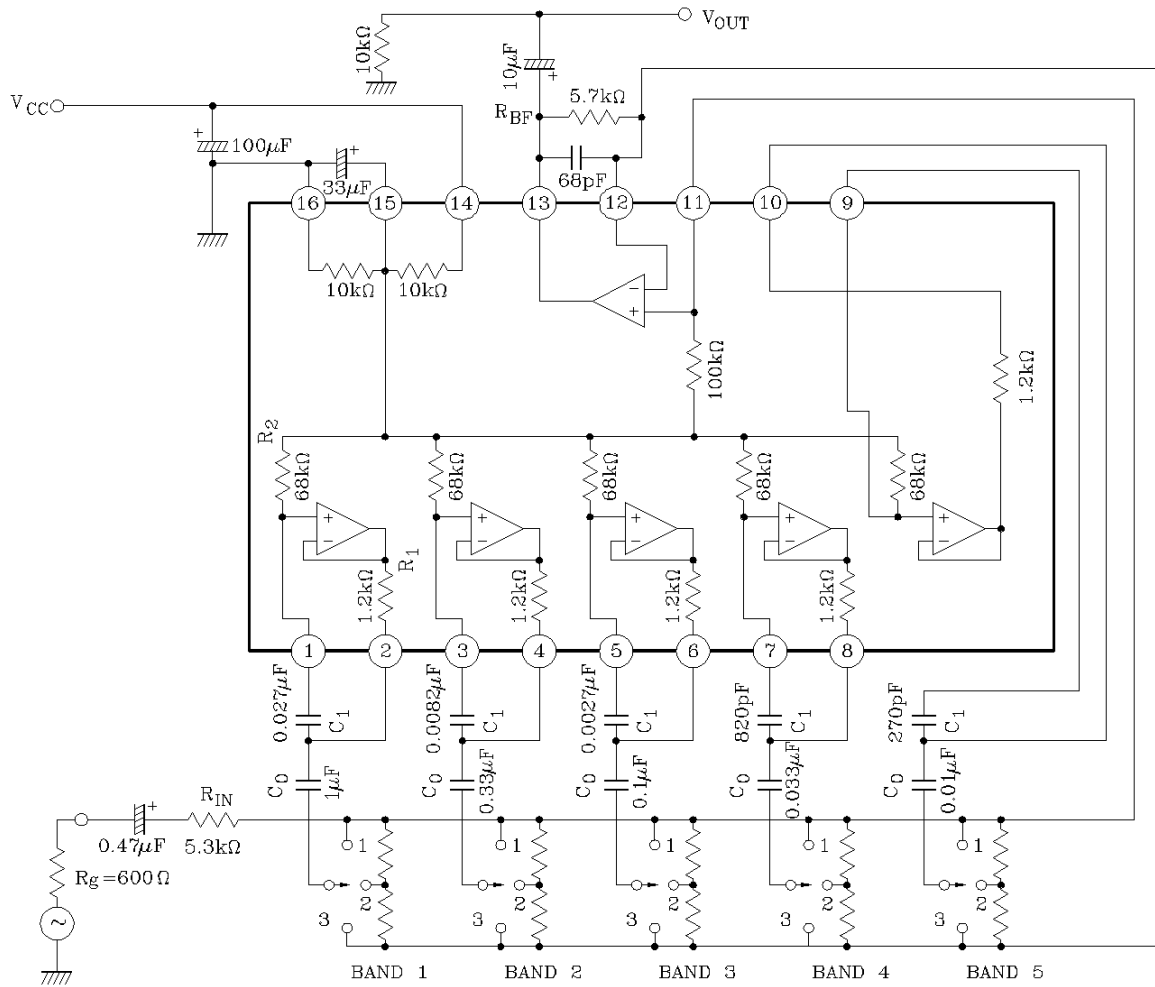
ELECTRICAL CHARACTERISTICS

(Unless otherwise specified $T_a=25^{\circ}\text{C}$, $V_{CC}=8\text{V}$, $f=1.1\text{kHz}$, $R_L=10\text{k}\Omega$)

CHARACTERISTIC	SYMBOL	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
	$G_{V(BST)}$	$V_{OUT}=1V_{rms}$, $f=110\text{Hz}$	10	12	14	
		$V_{OUT}=1V_{rms}$, $f=340\text{Hz}$	10	12	14	
		$V_{OUT}=1V_{rms}$, $f=1.1\text{kHz}$	10	12	14	
		$V_{OUT}=1V_{rms}$, $f=3.4\text{kHz}$	10	12	14	
		$V_{OUT}=1V_{rms}$, $f=11\text{kHz}$	10	12	14	
	$G_{V(CUT)}$	$V_{OUT}=1V_{rms}$, $f=110\text{Hz}$	-14	-12	-10	
		$V_{OUT}=1V_{rms}$, $f=340\text{Hz}$	-14	-12	-10	
		$V_{OUT}=1V_{rms}$, $f=1.1\text{kHz}$	-14	-12	-10	
		$V_{OUT}=1V_{rms}$, $f=3.4\text{kHz}$	-14	-12	-10	
$V_{OUT}=1V_{rms}$, $f=11\text{kHz}$		-14	-12	-10		
Total Harmonic Distortion	THD (FLT)	$V_{OUT}=1V_{rms}$	-	0.001	0.01	%
Output Noise Voltage	V_{NO} (FLT)	$R_g=620\Omega$, $V_{IN}=0$ $BW=20\text{Hz}\sim 20\text{kHz}$	-	3	8	μV_{rms}
Maximum Output	V_{OM}	THD=1%	1.8	2.3	-	V_{rms}

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TEST CIRCUIT



- Boost and cut controlled by $R_{BF} \approx (R_{IN} + R_g)$
- 1 : CUT 2 : FLAT 3 : BOOST
- f_o (Resonance Frequency)

$$f_o = \frac{1}{2\pi \sqrt{C_o \cdot C_1 \cdot R_1 \cdot R_2}} \quad (R_1 = 1.2k\Omega, R_2 = 68k\Omega \text{ on chip resistor})$$

BAND	1	2	3	4	5
C_o (F)	1μ	0.33μ	0.1μ	0.033μ	0.01μ
C_1 (F)	0.027μ	0.0082μ	0.0027μ	820p	270p
f_o (Hz)	107	340	1.07k	3.40k	10.7k