

**KEC**

KOREA ELECTRONICS CO.,LTD.

**SEMICONDUCTOR  
TECHNICAL DATA**

**KIA6248K**

BIPOLAR LINEAR INTEGRATED CIRCUIT

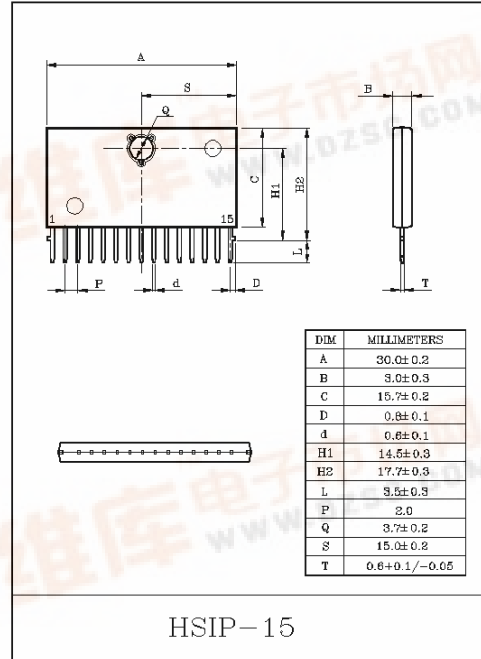
7.3W DUAL AUDIO POWER IC

The KIA6248K is dual audio power amplifier for application.

It contains various kind of protectors and the function of stand-by switch.

FEATURES

- Output Power
  - :  $P_{OUT(1)}$  = 7.3W (Typ.)  
( $V_{CC}$  = 13.2V,  $R_L$  = 2 $\Omega$ ,  $f$  = 1kHz, THD = 10%)
  - :  $P_{OUT(2)}$  = 6.4W (Typ.)  
( $V_{CC}$  = 14.4V,  $R_L$  = 4 $\Omega$ ,  $f$  = 1kHz, THD = 10%)
  - :  $P_{OUT(3)}$  = 5.3W (Typ.)  
( $V_{CC}$  = 13.2V,  $R_L$  = 4 $\Omega$ ,  $f$  = 1kHz, THD = 10%)
- Total Harmonic Distortion
  - : THD = 0.1% (Typ.)  
( $V_{CC}$  = 13.2V,  $R_L$  = 4 $\Omega$ ,  $f$  = 1kHz,  $P_{OUT}$  = 1W)
- Built-in Stand-by Switch Function
  - : ISTBY = 1 $\mu$ A (Typ.)  
(With ⑨ pin set at High, power is turned ON.)
- Built-in Various Protection Circuits
  - : OVER Voltage, Thermal Shut Down  
Out to GND, out to  $V_{CC}$  Short
- Built-in Junction Temperature Detection Function  
(Pin ① : 10mW/ $^{\circ}$ C)
- Operation supply voltage range :  $V_{CC}$  = 6~18V.



# KIA6248K

## MAXIMUM RATINGS (Ta=25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Peak Supply Voltage (0.2 sec)	V <sub>CC surge</sub>	50	V
DC Supply Voltage	V <sub>CC DC</sub>	20	V
Operating Supply Voltage	V <sub>CC opr</sub>	18	V
Output Current (Peak)	I <sub>O(peak)</sub>	4.5	A
Power Dissipation	P <sub>D</sub>	15	W
Operating Temperature	T <sub>opr</sub>	-30~85	°C
Storage Temperature	T <sub>stg</sub>	-55~150	°C

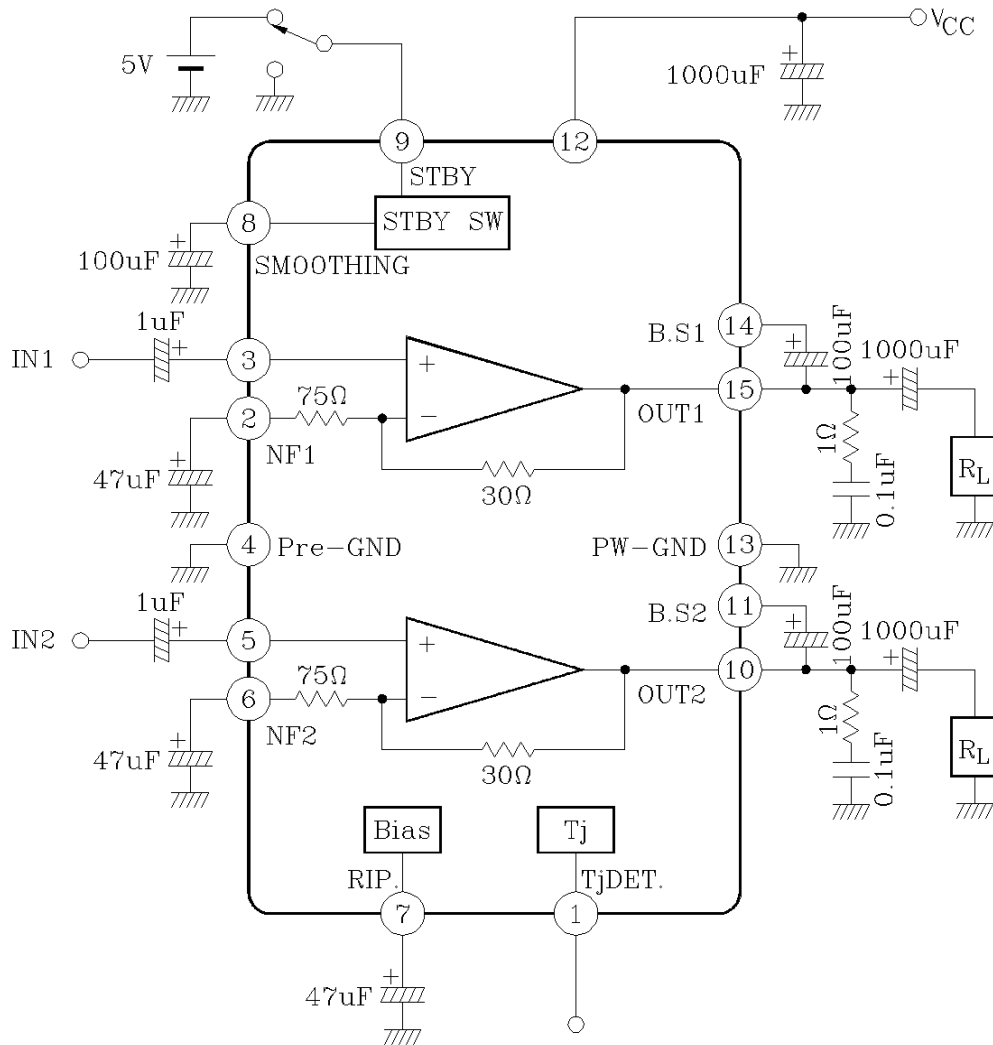
## ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, V<sub>CC</sub>=13.2V, f=1kHz, R<sub>g</sub>=600Ω, R<sub>L</sub>=4Ω, Ta=25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Quiescent Current	I <sub>CCQ</sub>	V <sub>IN</sub> =0	-	60	150	mA
Output Power	P <sub>OUT</sub> (1)	R <sub>L</sub> =2Ω, THD=10%	-	7.3	-	W
	P <sub>OUT</sub> (2)	V <sub>CC</sub> =14.4V, THD=10%	-	6.4	-	
	P <sub>OUT</sub> (3)	THD=10%	4.8	5.3	-	
Total Harmonic Distortion	THD	P <sub>OUT</sub> =1W	-	0.1	0.5	%
Voltage Gain	G <sub>V</sub>	V <sub>OUT</sub> =0dBm	50	52	54	dB
Voltage Gain Ratio	Δ G <sub>V</sub>	V <sub>OUT</sub> =0dBm	-1	0	1	dB
Output Noise voltage	V <sub>NO</sub>	R <sub>g</sub> =0Ω, BW=20Hz~20kHz	-	0.20	0.7	mV <sub>rms</sub>
Ripple Rejection Ratio	R.R	R <sub>g</sub> =600Ω, V <sub>RIP</sub> =0dBm, f <sub>RIP</sub> =100Hz	40	57	-	dB
Cross Talk	C.T	R <sub>g</sub> =600Ω, V <sub>OUT</sub> =0dBm	-	65	-	dB
Input Resistance	R <sub>IN</sub>	-	-	30	-	kΩ
Stand-By Current	I <sub>STBY</sub>	Pin ⑨ : GND	-	1	10	μA

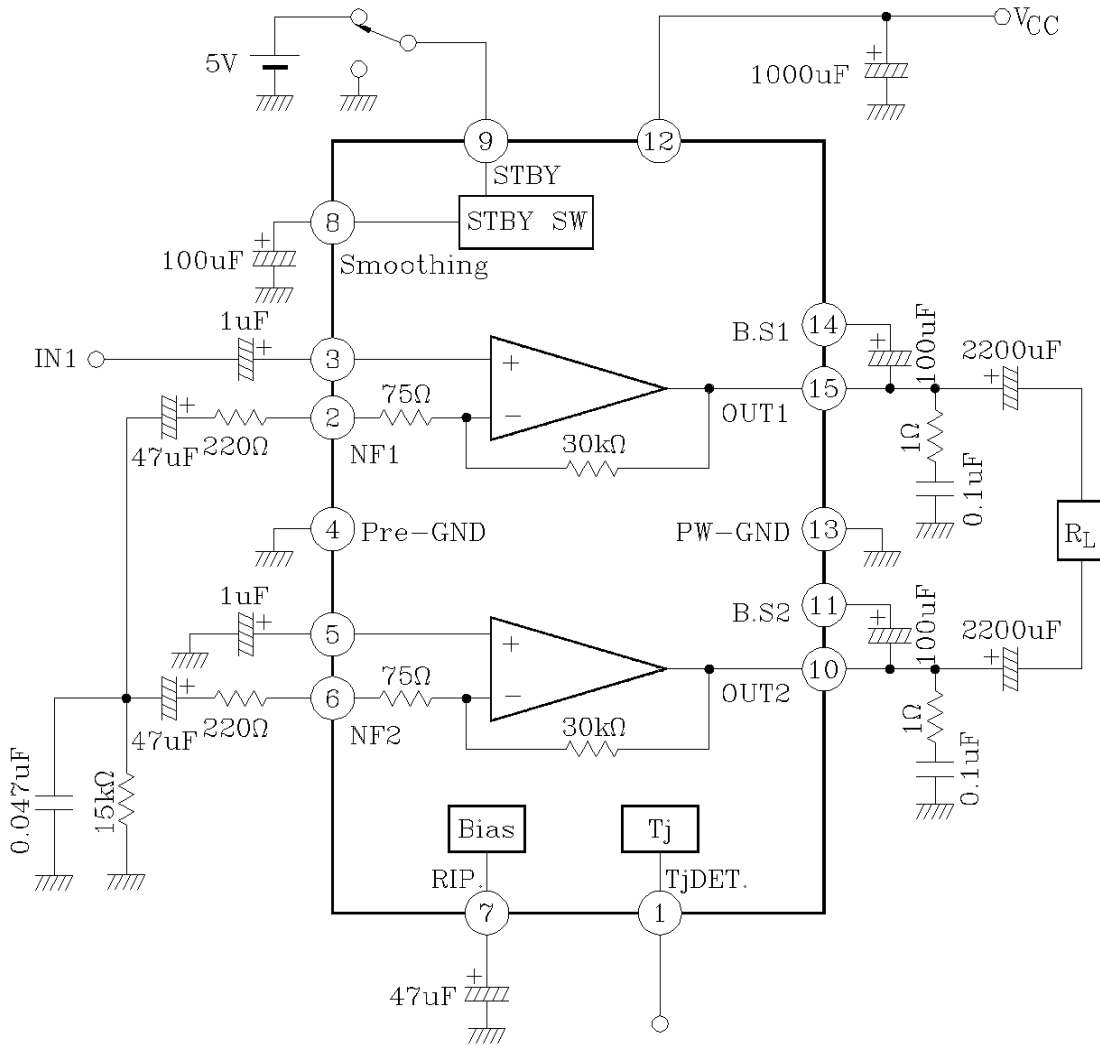
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## BLOCK DIAGRAM / TEST CIRCUIT



# KIA6248K

## APPLICATION CIRCUIT (BTL MODE)



# KIA6248K

CAUTION AND APPLICATION METHOD  
(Description is made only on the single channel.)

## 1. Voltage Gain Adjustment

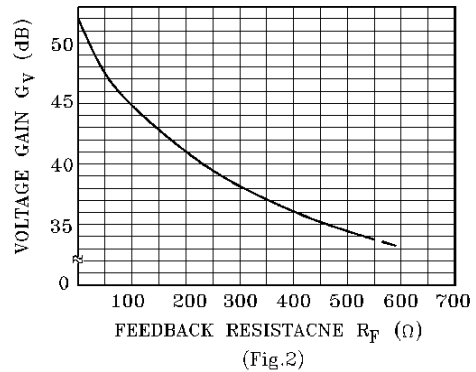
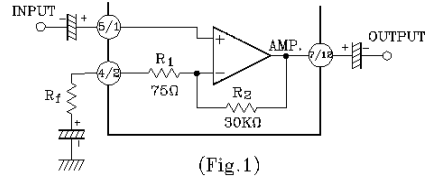
The closed loop voltage gain ( $G_V$ ) is determined by  $R_1$ ,  $R_2$  and  $R_f$ .

$$G_V = 20 \log \frac{R_f + R_1 + R_2}{R_f + R_1} \text{ (dB)}$$

When  $R_f = 0$ ,  $G_V = 52 \text{ dB (Typ.)}$  is given.

The voltage gain is reduced when  $R_f$  is increased. (Fig.2)

With the voltage gain reduced, since the oscillation stability is reduced, refer to the items 3.

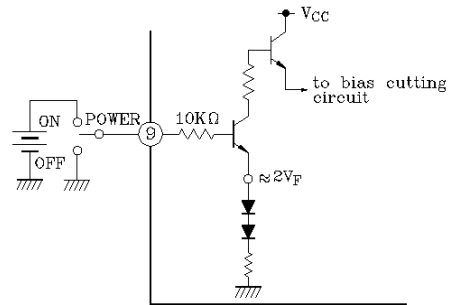


## 2. Stand-by SW Function

By means of controlling pin ⑨ (Stand-by terminal) to high and low, the power supply can be set to ON and OFF. The threshold voltage of pin ⑨ is set at  $2.1V (3V_{BE})$ , and the power supply current is about  $1\mu A$  (Typ.) at the stand-by state.

Control Voltage pin ⑨ :  $V_{(SB)}$

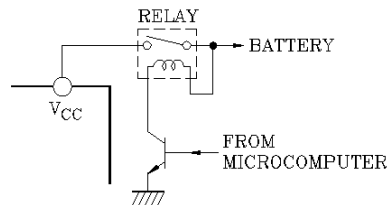
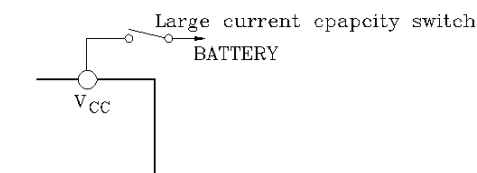
Stand-by	Power	$V_{(SB)}$ (V)
ON	OFF	0~2
OFF	ON	3~ $V_{CC}$



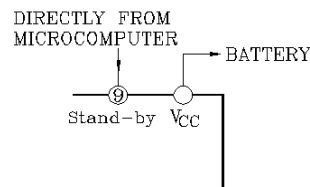
(Fig.3) With pin ⑨ set to High, Power is turned ON

Advantage of Stand-by SW

- (1) Since  $V_{CC}$  can directly be controlled to ON, OFF by the microcomputer, the switching relay can be omitted.
- (2) Since the control current is microscopic, the switching relay of small current capacity is satisfactory for switching.



- Conventional Method -



- Stand-by Switch Method -

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### 3. Preventive Measure Against Oscillation

$C_{OSC}$  : For preventing the oscillation, it is advisable to use  $C_{OSC}$ , the condenser of polyester film having small characteristic fluctuation of the temperature and the frequency.

The resistance R to be series applied to  $C_{OSC}$  is effective for phase correction of high frequency, and improves the oscillation allowance.

- (1) Voltage gain to be used ( $G_V$  Setting)
- (2) Capacity value of condenser
- (3) Kind of condenser
- (4) Layout of printed board

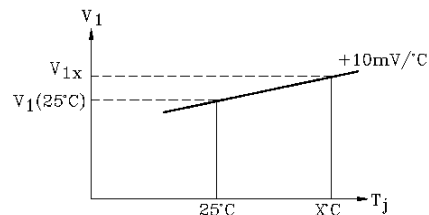
In case of its use with the voltage gain  $G_V$  reduced or with the feedback amount increased, care must be taken because the phase-inversion is caused by the high frequency resulting in making the oscillation liable generated.

### 4. Junction Temperature Detecting pin ①

Using temperature characteristic of a band gap circuit and in proportion to junction temperature, pin① DC voltage :  $V_2$  rises at about  $+10\text{mV}/^\circ\text{C}$  temperature characteristic. So, the relation between  $V_2$  at  $T_j=25^\circ\text{C}$  and  $V_{2x}$  at  $T_j=x^\circ\text{C}$  is decided by the following expression :

$$T(x^\circ\text{C}) = \frac{V_{2x} - V_2(25^\circ\text{C})}{10\text{mV}/^\circ\text{C}} + 25(^\circ\text{C})$$

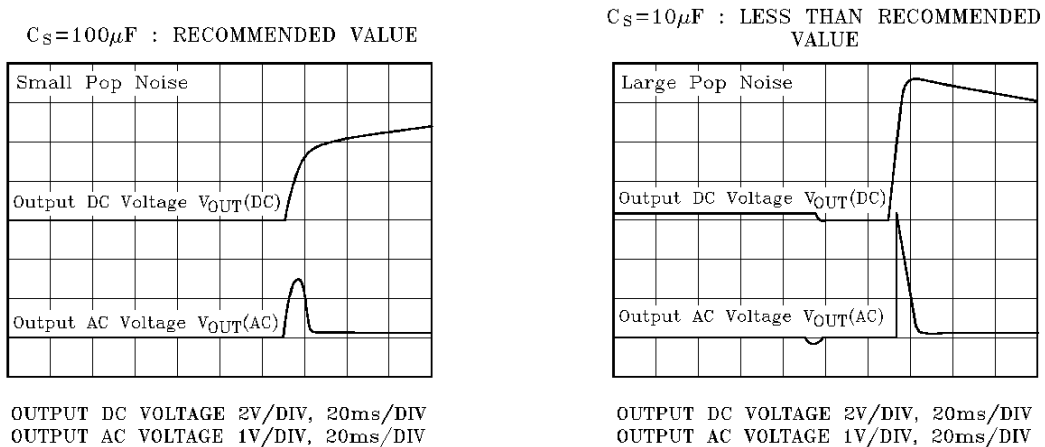
In deciding a heat sink size, a junction temperature can be easily made clear by measuring voltage at this pin while a backside temperature of IC was so far measured using a thermocouple type thermometer.



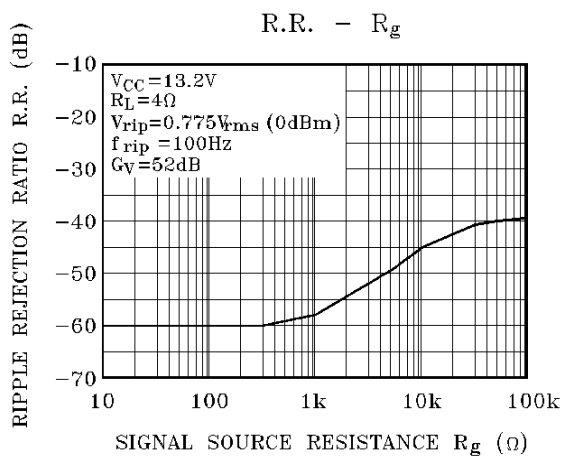
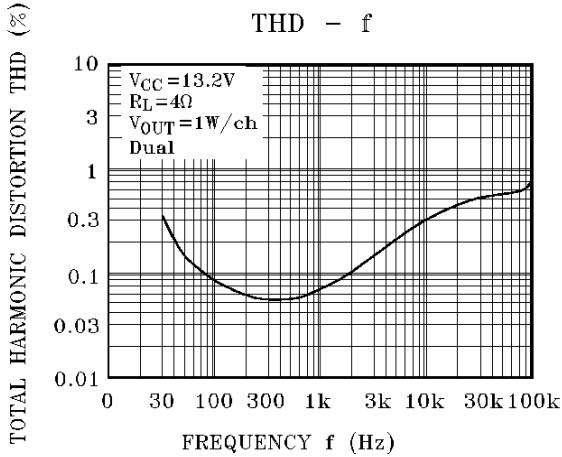
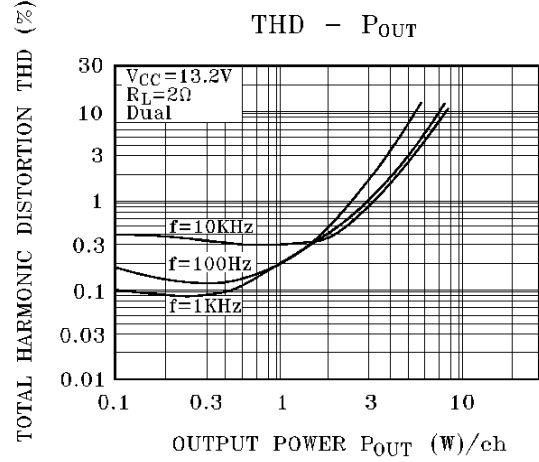
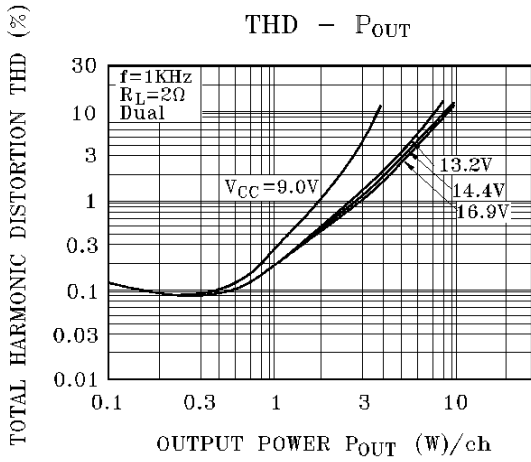
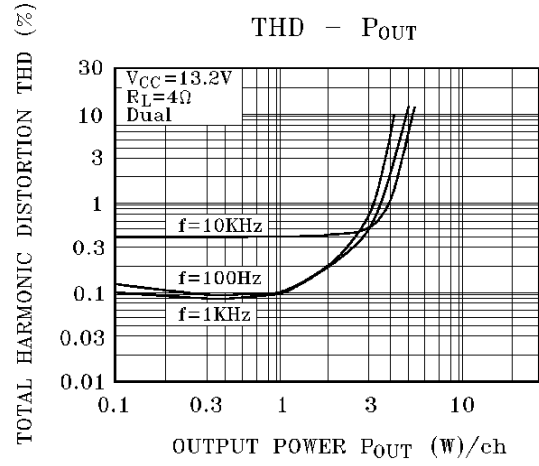
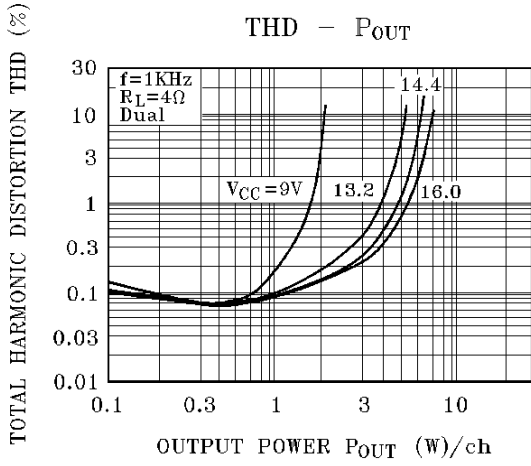
### 5. Pop Noise

The pop noise is reduced by the time constant  $\tau$  of pin⑧ : smoothing.

Therefore, we recommend  $C_S=100\mu\text{F}$ , which is between pin⑧ and GND, because the pop noise will become worse by using the smaller capacity of  $C_S$ .



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