ROHM SEMICONDUCTOR

Technical Note

High-performance Video Driver Series

Standard 3-output Video Driver

BA7622F, BA7623F

No.09065EAT04

●Description

The BA7622F and BA7623F are video driver ICs with three built-in circuits, developed for video equipment. The three circuits in the BA7622F, two sync-tip clamp inputs and one bias input, are terminated by internal resistances of 20 kΩ. The BA7623F output pins cab be connected directly in a DC coupling mode. Each output can drive 2 lines of load (75Ωx2).
Suitable to connect to a 2Vpp output type signal processing LSI and DAC.

●Features

Common

1) 2 lines can be driven from each output
2) Can be operated by Vcc=4.5 V

BA7622F

1) Large output dynamic range (3.3 Vpp, Vcc=5 V)
2) Built-in, 2 clamp input circuits and1 bias input circuit
3) Y signal, C signal, and composite video signal can be driven simultaneously by this particular IC.

BA7623F

1) Wide output dynamic range (3.3 Vpp, Vcc=5 V)
2) Can be directly connected to previous stage circuit

●Applications

TV, VCR, camcorder, and other video equipment.

●Product lineup

Parameter	BA7622F	BA7623F
Input pin configuration	2 clamp input circuits 1 bias input circuit	Previous stage direct connection (Base direct input)

●Absolute maximum ratings (Ta=25℃)

Parameter	Symbol	Limits	Unit
Supply voltage	V_{Max}	8.0	V
Power dissipation	Pd	550 *1	mW
Operating temperature	Topr	-25～+75	℃
Storage temperature	Tstg	-55～+125	℃

*1 Reduce by 5.5 mW/°C over 25°C

●**Operating range** (Ta=25℃)

Parameter	Symbol	Limits	Unit
Supply Voltage	VCC	4.5～5.5	V

Note: This IC is not designed to be radiation-resistant..

●**Electrical characteristics** (Unless otherwise specified, Ta=25℃, Vcc=5 V and 2 lines are driven.)

BA7622F

Parameter	Symbol	Min.	Typ.	Max	Unit	Conditions
Circuit Current	Icc	-	23.6	35.4	mA	No signal
Maximum output level	V_{om}	2.8	3.3	-	Vp-p	f=1kHz,THD=1.0%
Voltage gain	Gv	-1.2	-0.6	0	dB	f=1kHz,V_{IN}=2.0Vp-p
Frequency characteristic	Gf	-3	0	1.3	dB	10kHz/1MHz, V_{IN}=1.0Vp-p
Differential gain 75Ω drive1	DG1	-	0.4	1.0	%	V_{IN}=2.0Vp-p,Standard staircase signal
Differential phase 75Ω drive1	DP1	-	0.4	1.0	deg	V_{IN}=2.0Vp-p, Standard staircase signal
Differential gain 75Ω drive2	DG2	-	0.7	2.0	%	V_{IN}=2.0Vp-p, Standard staircase signal
Differential phase 75Ω drive2	DP2	-	0.7	2.0	deg	V_{IN}=2.0Vp-p, Standard staircase signal
Interchannel crosstalk	C_T	-	-60	-	dB	f=4.43MHz, V_{IN}=2.0Vp-p
Input impedance(V_{IN}3)	Z_{IN}3	17	20	23	kΩ	—
Total harmonic distortion(V_{IN}3)	T_{HD}32	-	0.1	0.5	%	f=1kHz,V_{IN}=1.0Vp-p

BA7623F

Parameter	Symbol	Min.	Typ.	Max	Unit	Conditions
Circuit Current	Icc	-	25.2	37.8	mA	No signal
Maximum output level	V_{om}	2.9	3.4	-	Vp-p	f=1kHz,THD=1.0%
Voltage gain	Gv	-1.0	-0.5	0	dB	f=1kHz,V_{IN}=2.0Vp-p
Frequency characteristics	Gf	-3	0	1	dB	10kHz/1MHz, V_{IN}=1.0Vp-p
Differential gain 75Ω drive1	DG1	-	0.4	1.0	%	V_{IN}=2.0Vp-p, Standard staircase signal
Differential phase 75Ω drive1	DP1	-	0.4	1.0	deg	V_{IN}=2.0Vp-p, Standard staircase signal
Differential gain 75Ω drive2	DG2	-	0.7	2.0	%	V_{IN}=2.0Vp-p, Standard staircase signal
Differential phase 75Ω drive2	DP2	-	0.7	2.0	deg	V_{IN}=2.0Vp-p, Standard staircase signal
Interchannel crosstalk	C_T	-	-60	-	dB	f=4.43MHz, V_{IN}=2.0Vp-p
Total harmonic distortion	THD	-	0.1	0.5	%	f=1kHz,V_{IN}=1.0Vp-p

●**Block diagram**

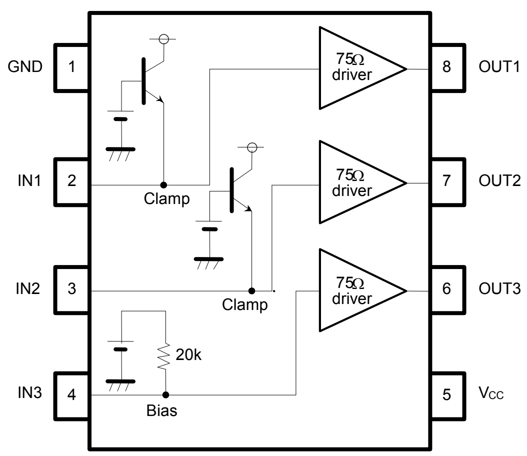


Fig.1 BA7622F

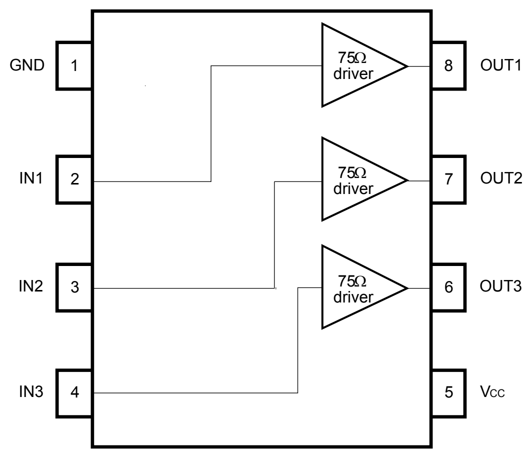


Fig.2 BA7623F

●Measurement circuit

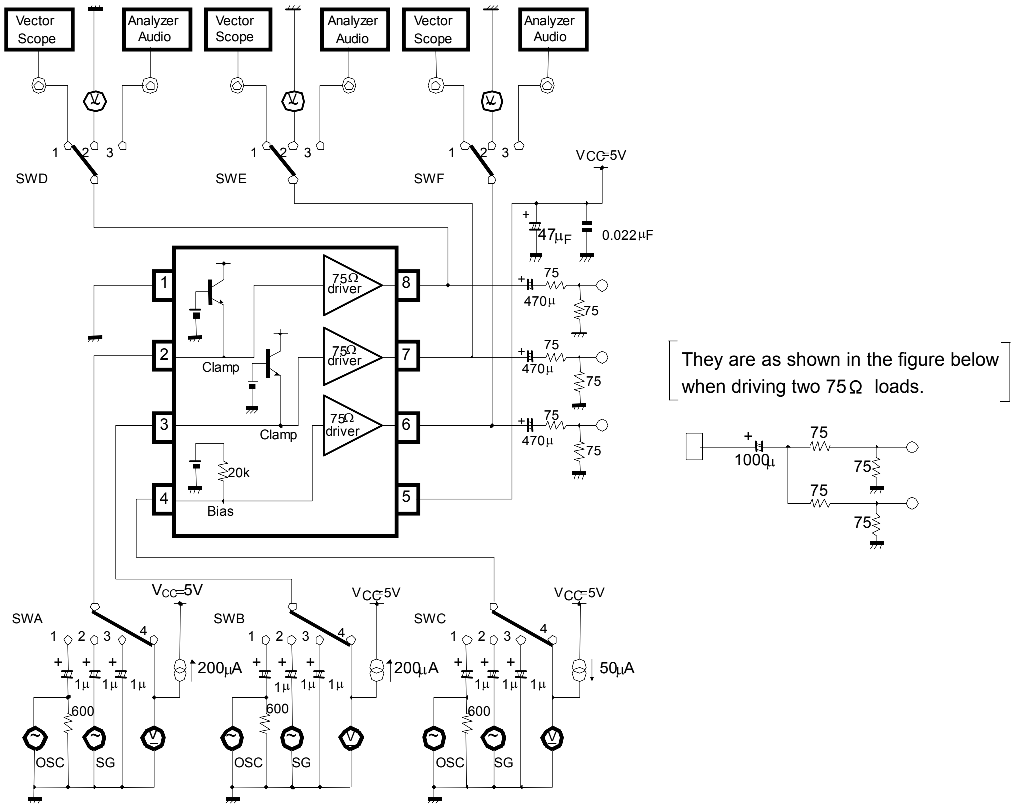


Fig.3 BA7622F

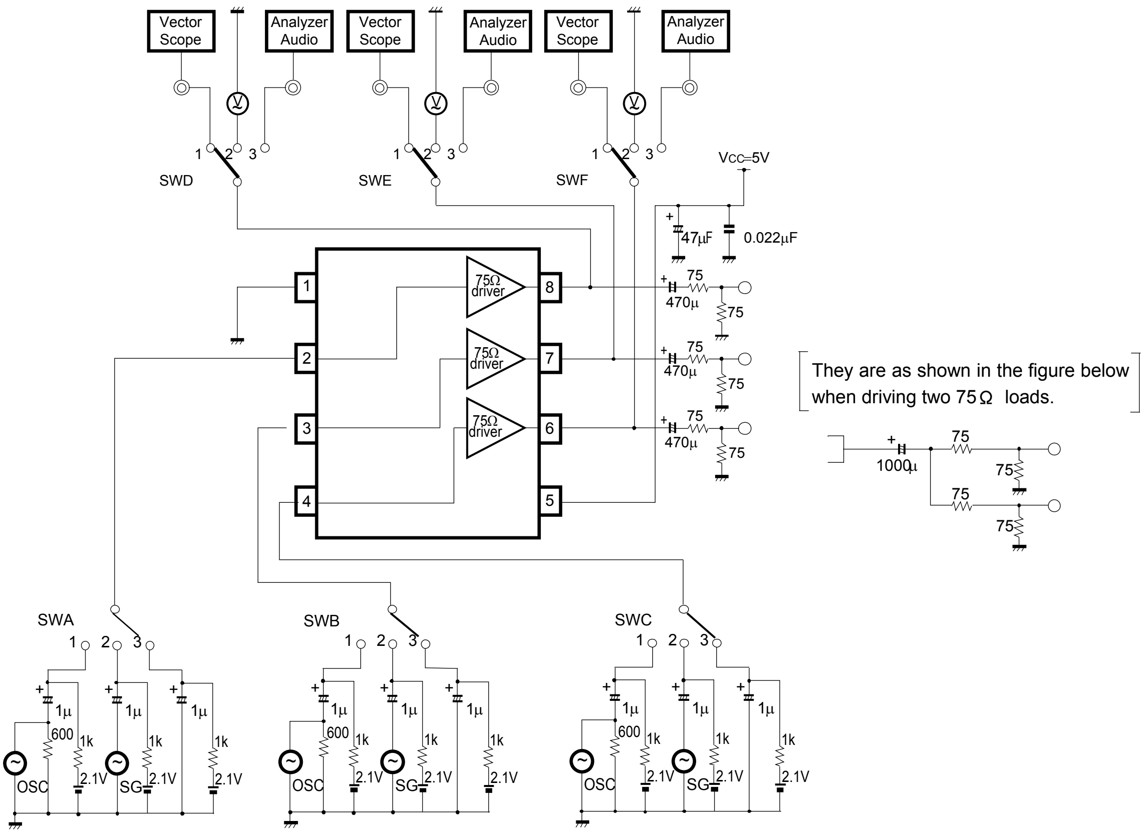


Fig.4 BA7623F

●Measurement methods and conditions (BA7622F)

Parameter	Symbol	IN1 SWA	IN2 SWB	IN3 SWC	OUT1 SWD	OUT2 SWE	OUT3 SWF	Conditions
Circuit current	Icc	3	3	3	×	×	×	-
Maximum output level	Vom12	1	3	3	3	×	×	＊1
	Vom22	3	1	3	×	3	×	
	Vom32	3	3	1	×	×	3	
Voltage gain	Gv12	1	3	3	3	×	×	＊2
	Gv22	3	1	3	×	3	×	
	Gv32	3	3	1	×	×	3	
Frequency characteristic	f12	1	3	3	3	×	×	-
	f22	3	1	3	×	3	×	
	f32	3	3	1	×	×	3	
Interchannel crosstalk	C_T112	1	3	3	×	3	×	-
	C_T113	1	3	3	×	×	3	
	C_T211	3	1	3	3	×	×	
	C_T213	3	1	3	×	×	3	
	C_T311	3	3	1	3	×	×	
	C_T312	3	3	1	×	3	×	
Input impedance	Z_{IN}3	3	3	4	×	×	×	＊3
Total harmonic distortion	T_{HD}12	1	3	3	3	×	×	＊4
	T_{HD}22	3	1	3	×	3	×	
	T_{HD}32	3	3	1	×	×	3	

×：Switches 1, 2, and 3 can be

＊1：Maximum output level
Connect a distortion meter to the output. Apply a f=1 kHz, 1 Vp-p sine wave to the input and adjust the input level so that the output distortion becomes 1.0%.
The maximum output level Vom (Vp-p) is the output voltage at that time.

＊2：Voltage gain
Apply a f=1MHz, 2.0 Vp-p sine wave to the input.. The voltage gain G_V=20log[VOUT/V_{IN}] (dB).

＊3：Input resistance
Measure the input pin voltage V_{IN}50, when 50 μA is injected at the input pin. Measure the open voltage V_{IN}0 of the input pin.
The input resistance Z=(V_{IN}50- V_{IN}0)/50×10^{-6} [Ω].

＊4：Total harmonic distortion
Apply a f=1kHz, 1.0 Vp-p sine wave to the input and measure by connecting a distortion meter to the output.

●Measurement methods and conditions (BA7623F)

Parameter	Symbol	IN1 SWA	IN2 SWB	IN3 SWC	OUT1 SWD	OUT2 SWE	OUT3 SWF	Conditions
Circuit current	Icc	3	3	3	×	×	×	-
Maximum output level	Vom12	1	3	3	3	×	×	＊1
	Vom22	3	1	3	×	3	×	
	Vom32	3	3	1	×	×	3	
Voltage gain	Gv12	1	3	3	3	×	×	＊2
	Gv22	3	1	3	×	3	×	
	Gv32	3	3	1	×	×	3	
Frequency characteristic	f12	1	3	3	3	×	×	-
	f22	3	1	3	×	3	×	
	f32	3	3	1	×	×	3	
Interchannel crosstalk	C_T112	1	3	3	×	3	×	-
	C_T113	1	3	3	×	×	3	
	C_T211	3	1	3	3	×	×	
	C_T213	3	1	3	×	×	3	
	C_T311	3	3	1	3	×	×	
	C_T312	3	3	1	×	3	×	
Total harmonic distortion	T_{HD}12	1	3	3	3	×	×	＊3
	T_{HD}22	3	1	3	×	3	×	
	T_{HD}32	3	3	1	×	×	3	
Differential gain (DG)	DG1	2	3	3	1	×	×	-
	DG2	3	2	3	×	1	×	
	DG3	3	3	2	×	×	1	
Differential phase (DP)	DP1	2	3	3	1	×	×	-
	DP2	3	2	3	×	1	×	
	DP3	3	3	2	×	×	1	

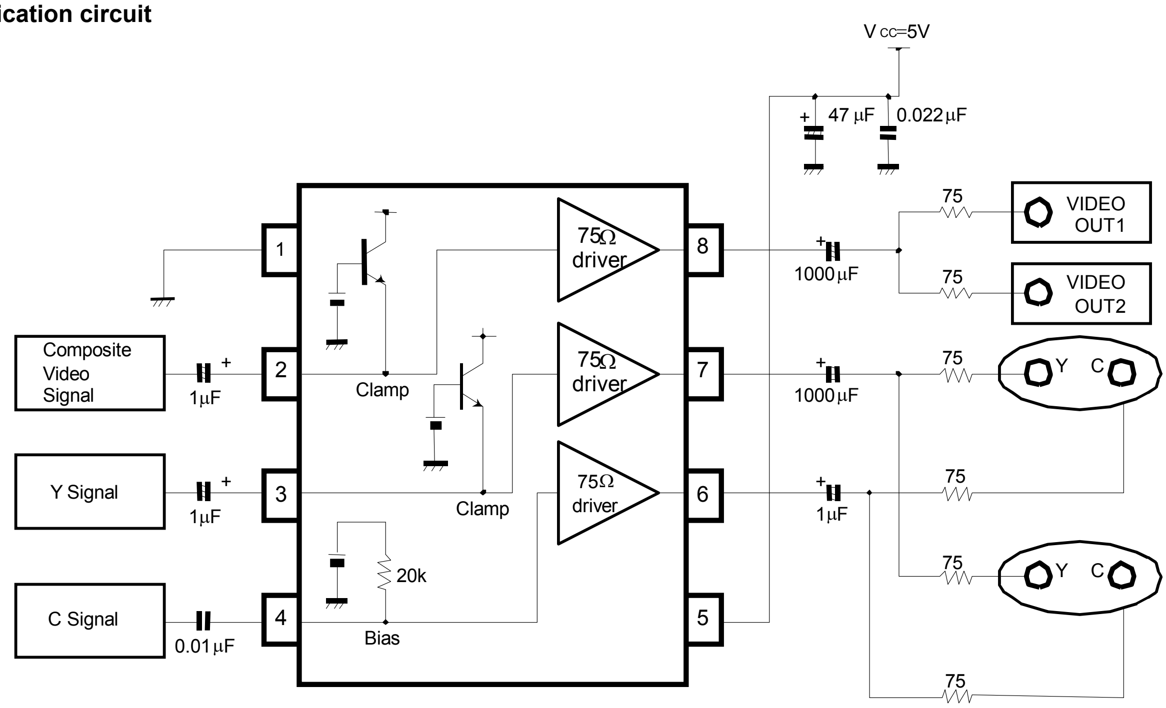
×：Switches 1, 2, and 3 can be

＊1：Maximum output level
Connect a distortion meter to the output. Apply a f=1 kHz, 1 Vp-p sine wave to the input and adjust the input level so that the output distortion becomes 1.0%.
The maximum output level Vom (Vp-p), is the output voltage at that time.

＊2：Voltage gain
Apply a f=1MHz, 2.0 Vp-p sine wave to the input. The voltage gain is calculated as follows: G_V=20log[VOUT/V_{IN}] (dB)

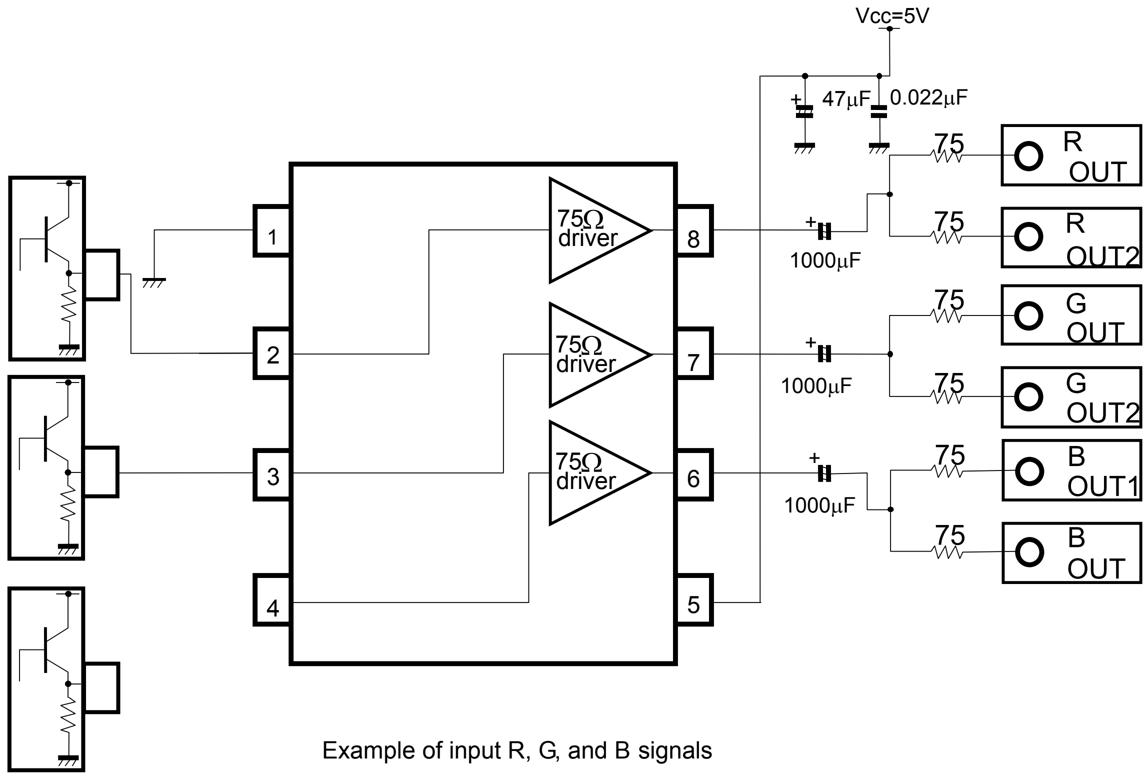
＊3：Total harmonic distortion
Apply a f=1kHz, 1.0 Vp-p sine wave to the input and measure by connecting a distortion meter to the output.

●**Application circuit**



Example of input VIDEO ,Y , and C signals.

Fig.5 BA7622F

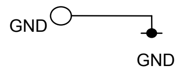
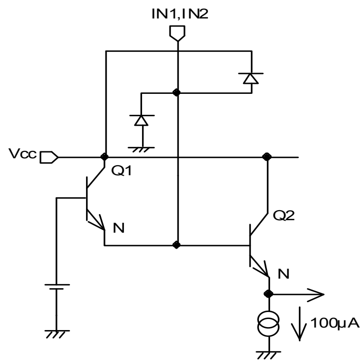
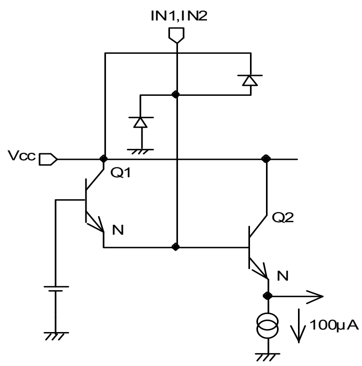
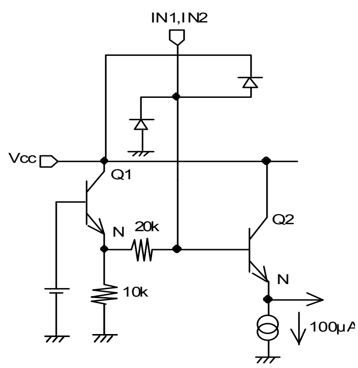


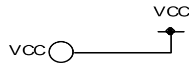
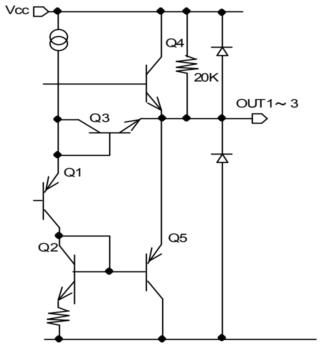
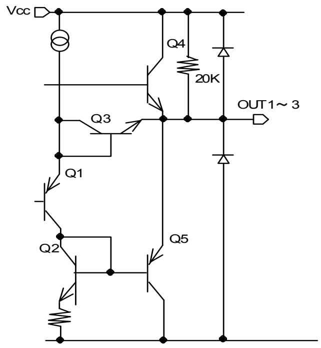
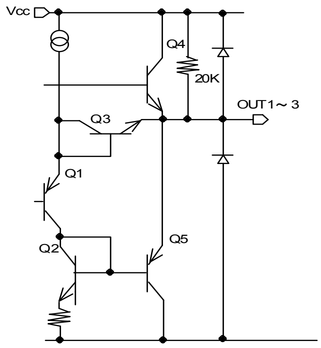
Example of input R, G, and B signals

Fig.6 BA7623F

●**Pin descriptions** (1/2)

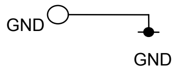
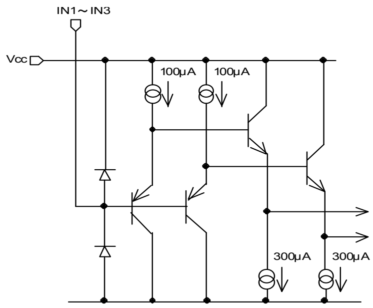
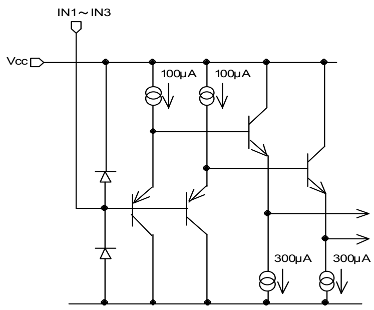
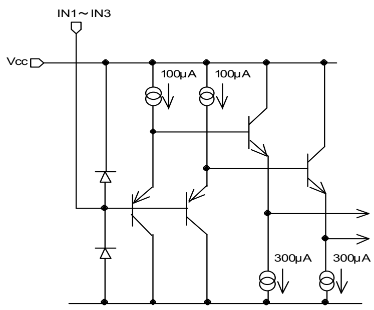
BA7622F

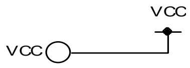
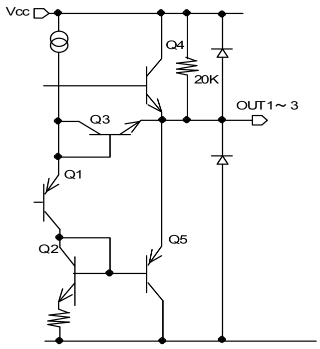
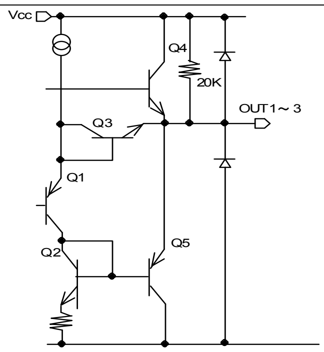
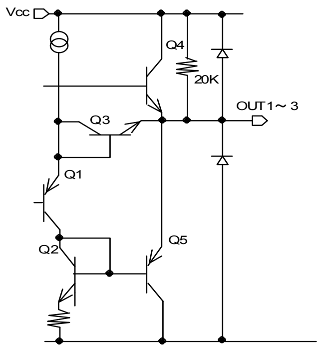
Pin No.	Pin name	IN	OUT	Typical voltage	Equivalent Circuit	Function
1	GND	○	—	0V		GND terminal
2	IN1	○	—	1.4V		Clamp input pin Inputs a video signal or Y/C separated Y signal.
3	IN2	○	—	1.4V		Clamp input pin Inputs a video signal or Y/C separated Y signal.
4	IN3	○	—	2.7V		Bias input pin Inputs a chroma signal.

Pin No.	Pin name	IN	OUT	Typical voltage	Equivalent Circuit	Function
5	VCC	○	—	5.0V		Vcc terminal
6	OUT3	—	○	2.0V		Video driver output (Bias input) Outputs a chroma signal. When output is forced to ground, the protection circuit activates power save mode.
7	OUT2	—	○	0.6V		Video driver output pin (Clamp input) Outputs a video signal or Y/C separated Y signal When output is forced to ground, the protection circuit activates power save mode.
8	OUT1	—	○	0.6V		Video driver output pin (Clamp input) Outputs a video signal or Y/C separated Y signal When output is forced to ground, the protection circuit activates power save mode.

●**Pin descriptions** (2/2)

BA7623F

Pin No.	Pin name	IN	OUT	Typical voltage	Equivalent Circuit	Function
1	GND	○	—	0V		GND terminal
2	IN1	○	—	＊1		Base direct connect input Set the input signal as composite video signal, chroma signal, or RGB signal. Input signal range 0.5～3.8 V.
3	IN2	○	—	＊1		Base direct connect input pin Set the input signal as composite video signal, chroma signal, or RGB signal. Input signal range 0.5～3.8 V.
4	IN3	○	—	＊1		Base direct connect input pin Set the input signal as composite video signal, chroma signal, or RGB signal. Input signal range 0.5～3.8 V.

Pin No.	Pin name	IN	OUT	Typical voltage	Equivalent Circuit	Function
5	VCC	○	—	5.0V		Vcc terminal
6	OUT3	—	○	＊2		Video driver output (Base direct connect input) ＊2 Output potential and ＊1 input potential have the same signal level. When output is forced to ground, the protection circuit activates power save mode.
7	OUT2	—	○	＊2		Video driver output (Base direct connect input) ＊2 Output potential and ＊1 input potential have the same signal level. When output is forced to ground, the protection circuit activates power save mode.
8	OUT1	—	○	＊2		Video driver output (Base direct connect input) ＊2 Output potential and ＊1 input potential have the same signal level. When grounded to ground, the protection circuit operates to move to power save mode.

●Operation Notes

1. Numbers and data in entries are representative design values and are not guaranteed values of the items.

2. Although ROHM is confident that the example application circuit reflects the best possible recommendations, be sure to verify circuit characteristics for your particular application. Modification of constants for other externally connected circuits may cause variations in both static and transient characteristics for external components as well as this Rohm IC. Allow for sufficient margins when determining circuit constants.

3. Absolute maximum ratings
   Use of the IC in excess of absolute maximum ratings, such as the applied voltage or operating temperature range (Topr), may result in IC damage. Assumptions should not be made regarding the state of the IC (short mode or open mode) when such damage is suffered. A physical safety measure, such as a fuse, should be implemented when using the IC at times where the absolute maximum ratings may be exceeded.

4. GND potential
   Ensure a minimum GND pin potential in all operating conditions. Make sure that no pins are at a voltage below the GND at any time, regardless of whether it is a transient signal or not.

5. Thermal design
   Perform thermal design, in which there are adequate margins, by taking into account the permissible dissipation (Pd) in actual states of use.

6. Short circuit between terminals and erroneous mounting
   Pay attention to the assembly direction of the ICs. Wrong mounting direction or shorts between terminals, GND, or other components on the circuits, can damage the IC.

7. Operation in strong electromagnetic field
   Using the ICs in a strong electromagnetic field can cause operation malfunction.

●Reference data (1/5)

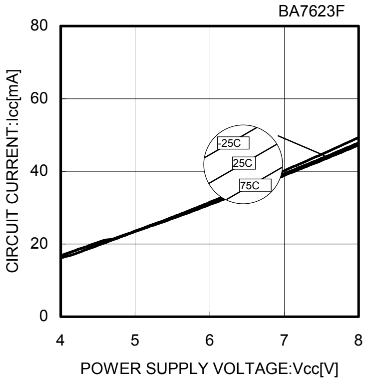


Fig.7 Circuit current vs. Supply voltage

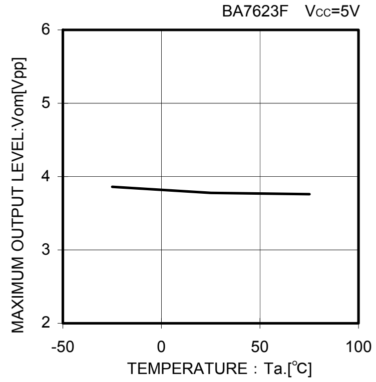


Fig.8 Maximum output level vs. Temperature

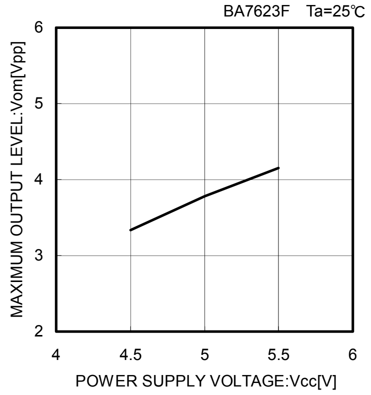


Fig.9 Maximum output level vs. Supply voltage

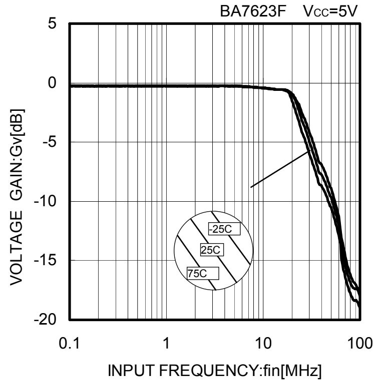


Fig.10 Frequency characteristic vs. Temperature

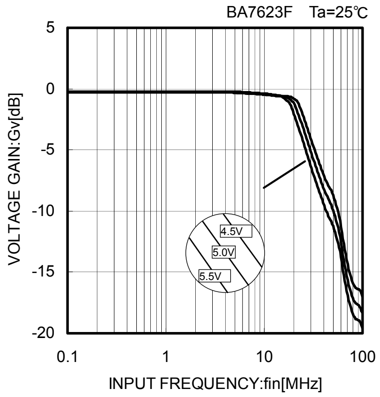


Fig.11 Frequency characteristic vs. Supply voltage

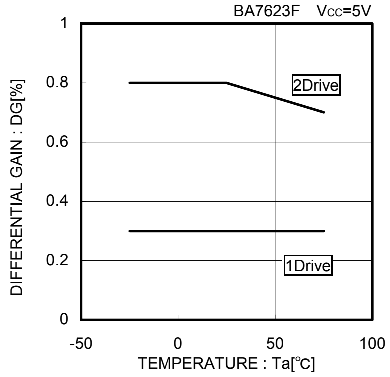


Fig.12 Differential gain vs. Temperature

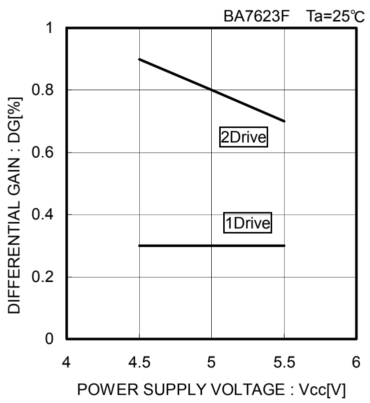


Fig.13 Differential gain vs. Supply voltage

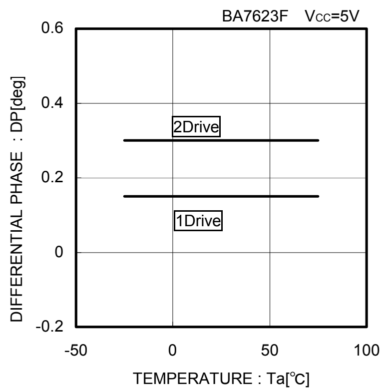


Fig.14 Differential phase vs. Temperature

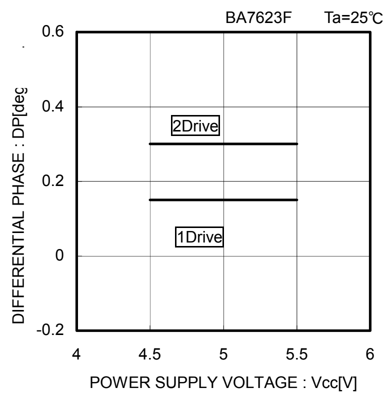


Fig.15 Differential phase vs. Supply voltage

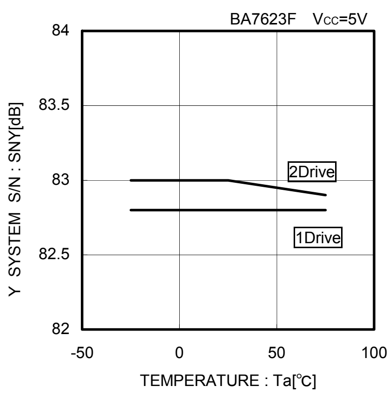


Fig.16 Y system S/N vs. Temperature

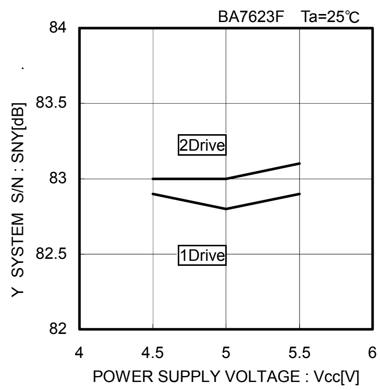


Fig.17 Y system S/N vs. Supply voltage

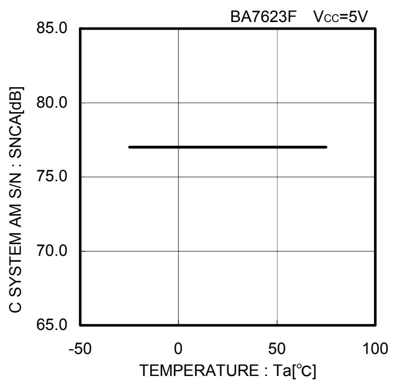


Fig.18 C system AM S/N vs. Temperature

●**Reference data** (2/5)

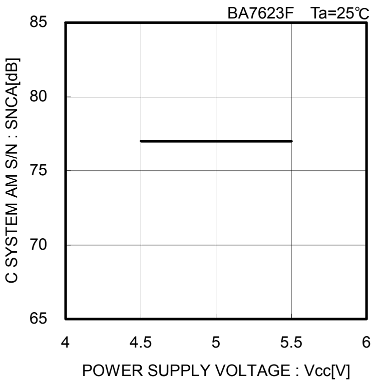


Fig.19 C system AM S/N vs. Supply voltage

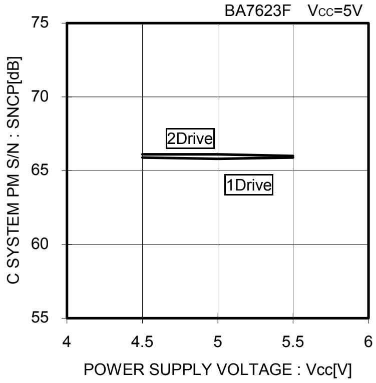


Fig.20 C system PM S/N vs. Supply voltage

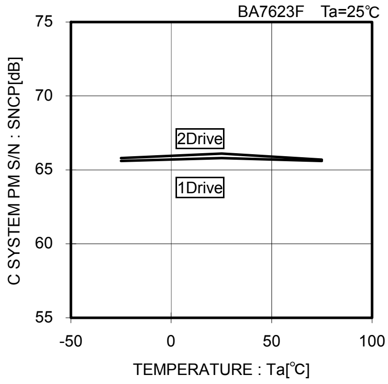


Fig.21 C system PM S/N vs. Temperature

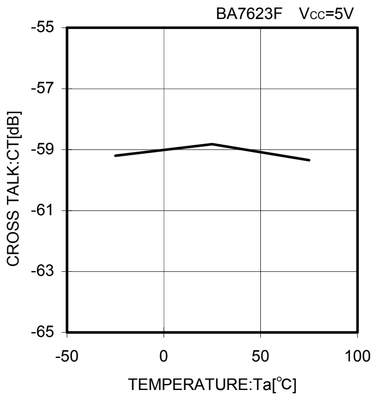


Fig.22 Cross talk vs. Temperature

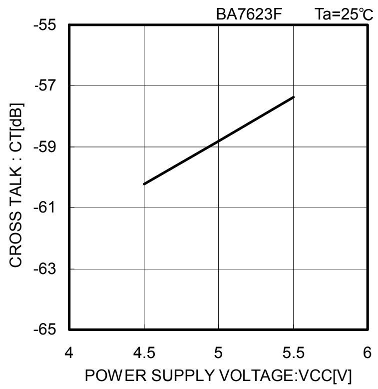


Fig.23 Cross talk vs. Supply voltage

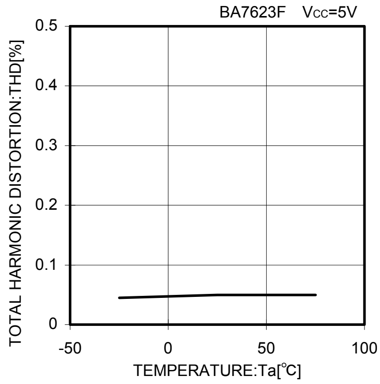


Fig.24 Total harmonic distortion vs. Temperature

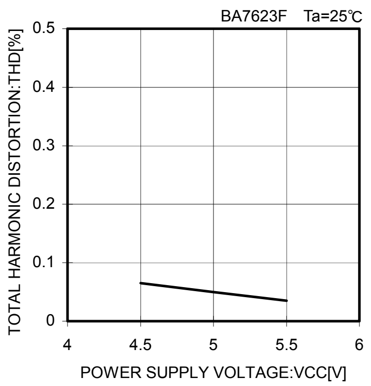


Fig.25 Total harmonic distortion
vs. Supply voltage

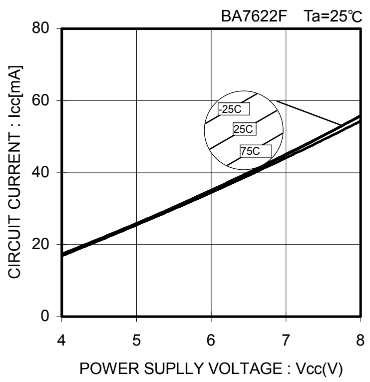


Fig.26 Circuit current vs. Supply voltage

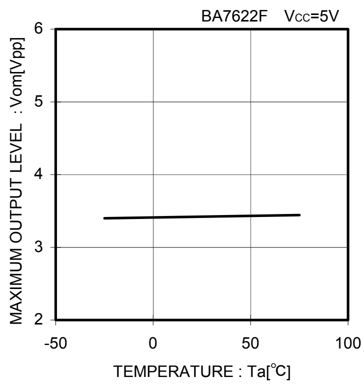


Fig.27 Maximum output level vs. Temperature

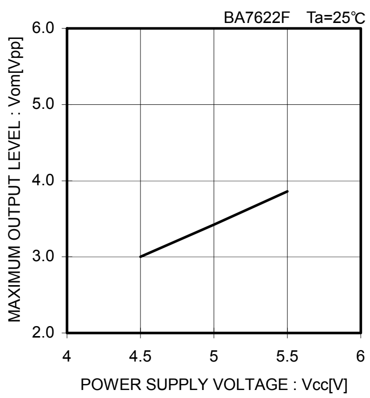


Fig.28 Maximum output level (clamp)
vs. Supply voltage

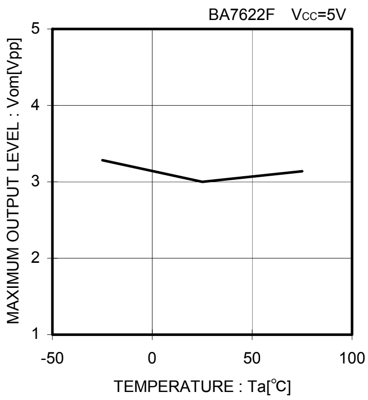


Fig.29 Maximum output level (bias)
vs. Temperature

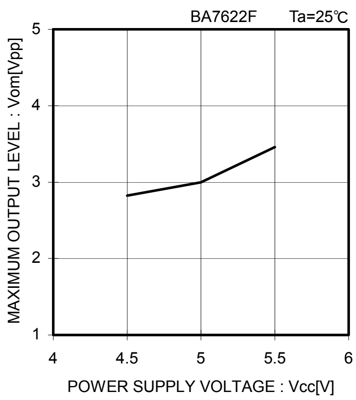


Fig.30 Maximum output level (bias)
vs. Supply voltage

●**Reference data** (3/5)

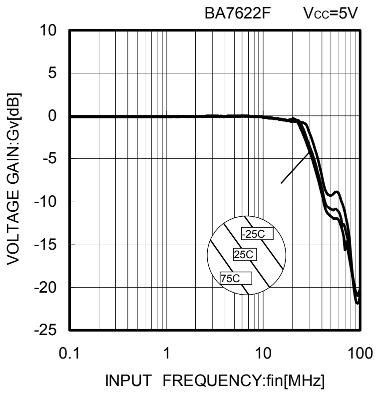


Fig.31 Frequency characteristic (clamp) vs. Temperature

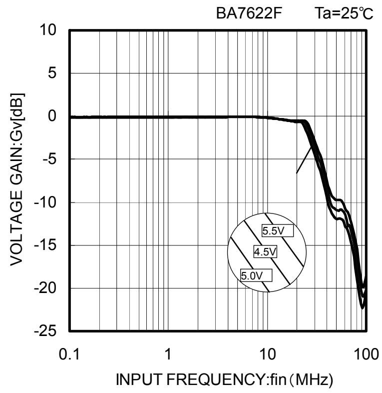


Fig.32 Frequency characteristic (clamp) vs. Supply voltage

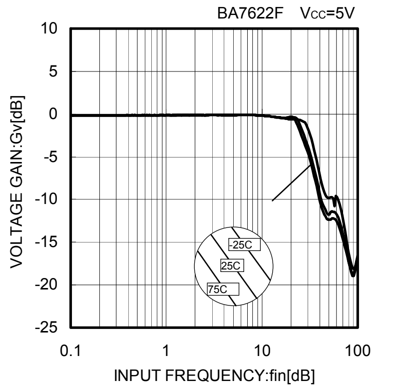


Fig.33 Frequency characteristic (bias) vs. Temperature

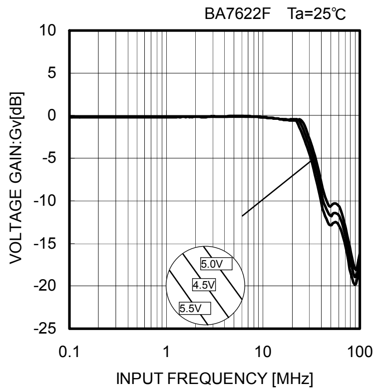


Fig.34 Frequency characteristic (bias) vs. Supply voltage

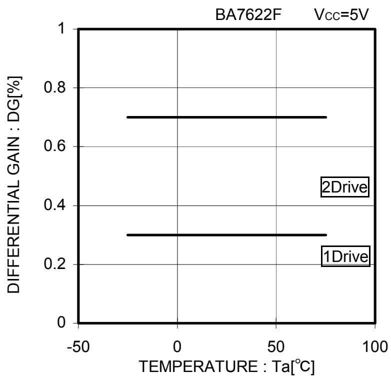


Fig.35 Differential gain (clamp) vs. Temperature

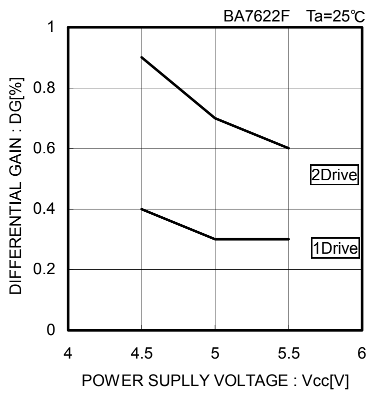


Fig.36 Differential gain (clamp) vs. Supply voltage

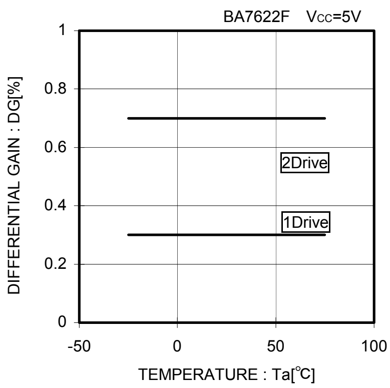


Fig.37 Differential gain (bias) vs.Temperature

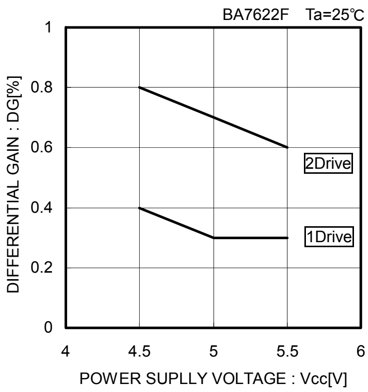


Fig.38 Differential gain (bias) vs. Supply voltage

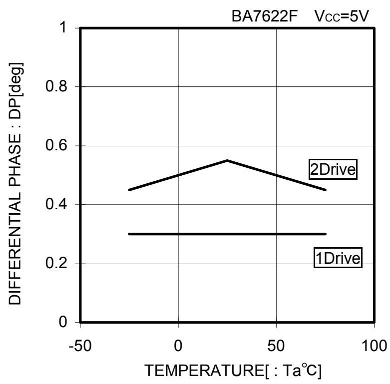


Fig.39 Differential phase (clamp) vs. Temperature

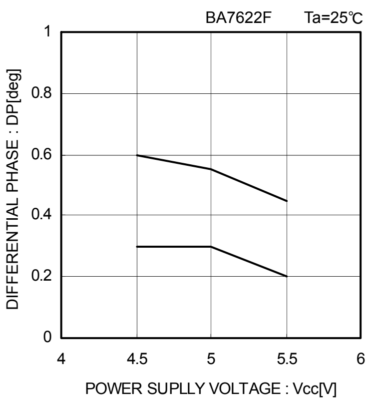


Fig.40 Differential phase (clamp) vs. Supply voltage

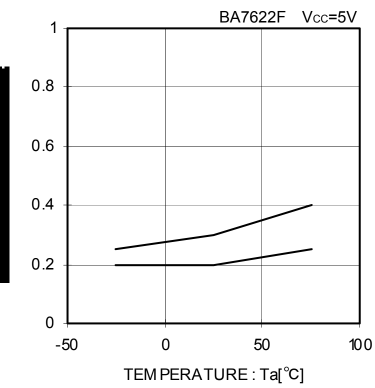


Fig.41 Differential phase (bias) vs. Temperature

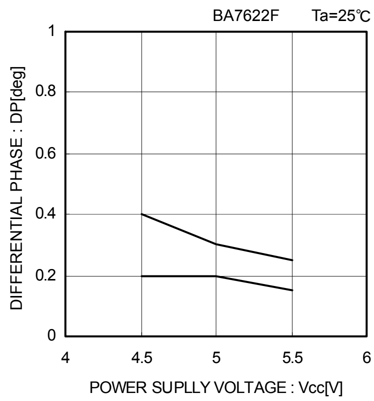


Fig.42 Differential phase (bias) vs. Supply voltage

●**Reference data** (4/5)

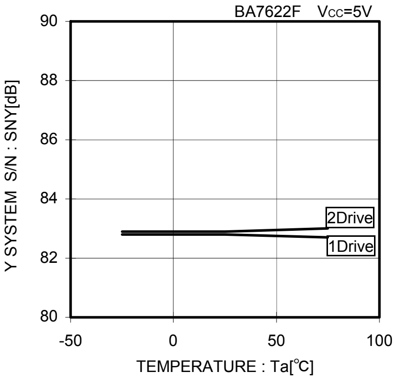


Fig.43 Y system S/N (clamp) vs. Temperature

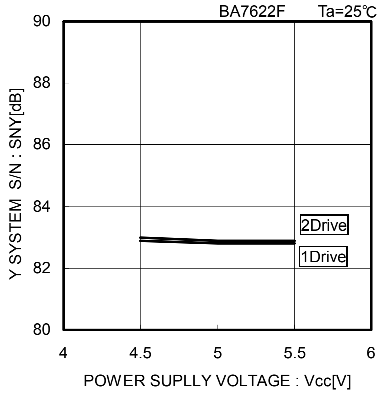


Fig.44 Y system S/N (clamp) vs. Supply voltage

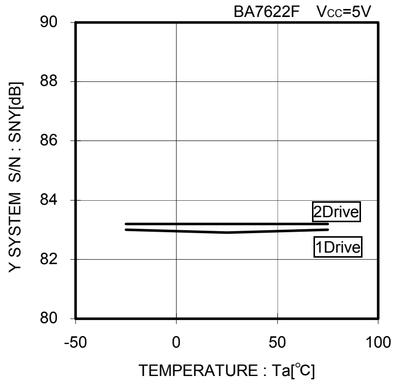


Fig.45 Y system S/N (bias) vs. Temperature

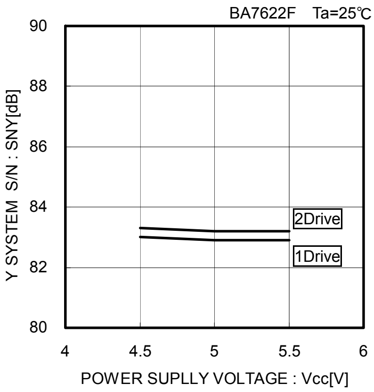


Fig.46 Y system S/N (bias) vs. Supply voltage

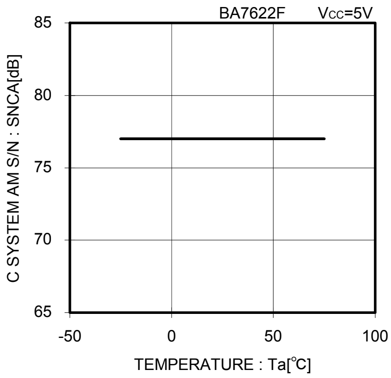


Fig.47 C system AM S/N (clamp) vs. Temperature

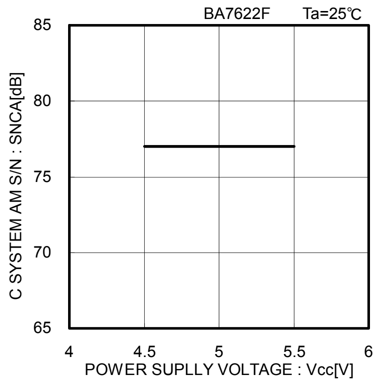


Fig.48 C system AM S/N (clamp) vs. Supply voltage

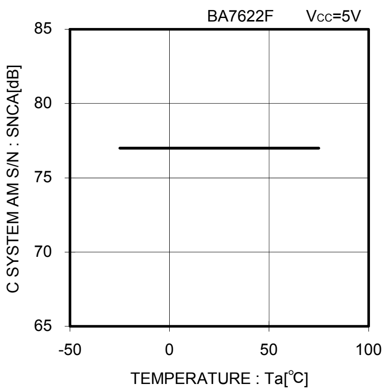


Fig.49 C system AM S/N (bias) vs. Temperature

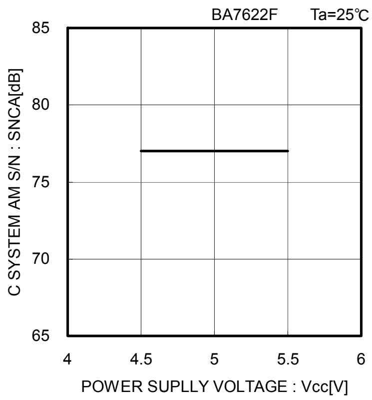


Fig.50 C system AM S/N (bias) vs. Supply voltage

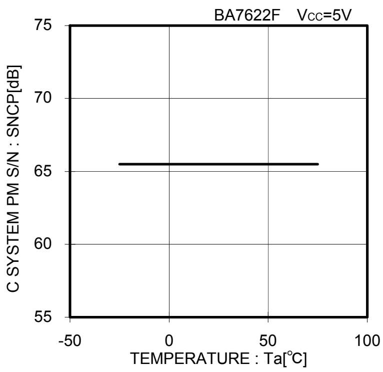


Fig.51 C system PM S/N (clamp) vs. Temperature

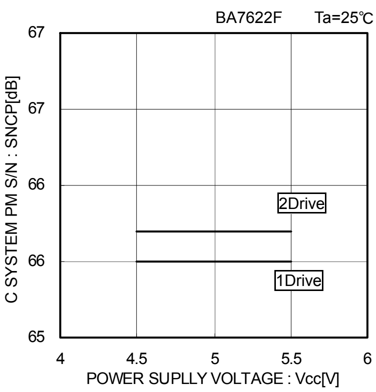


Fig.52 C system PM S/N (clamp) vs. Supply voltage

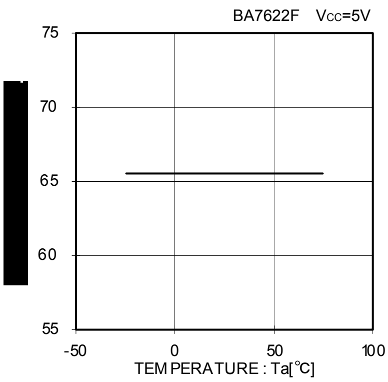


Fig.53 C system PM S/N (bias) vs. Temperature

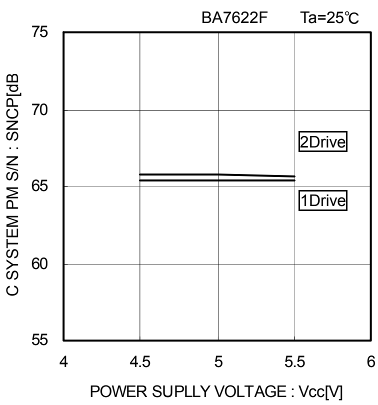


Fig.54 C system PM S/N (bias) vs. Supply voltage

●**Reference data** (5/5)

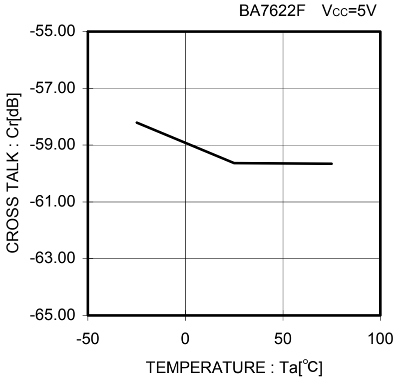


Fig.55 Cross talk vs. Temperature

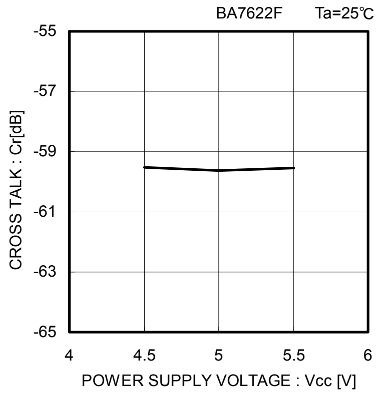


Fig.56 Cross talk vs. Supply voltage

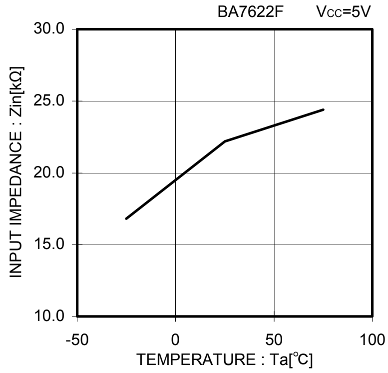


Fig.57 Input impedance
vs. Temperature

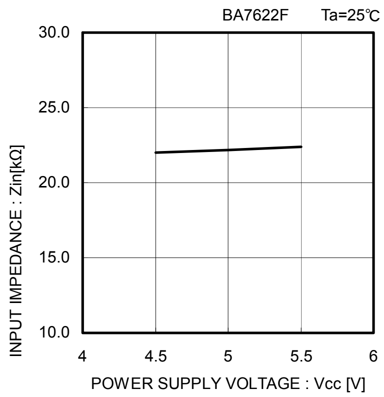


Fig.58 Input impedance
vs. Supply voltage

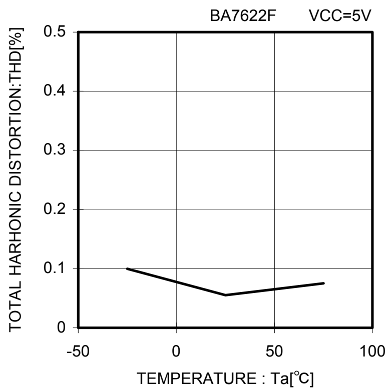


Fig.59 Total harmonic distortion (clamp)
vs. Temperature

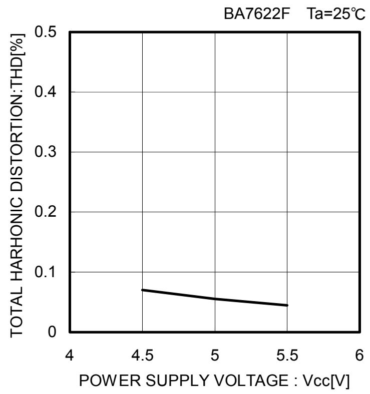


Fig.60 Total harmonic distortion (clamp)
vs. Supply voltage

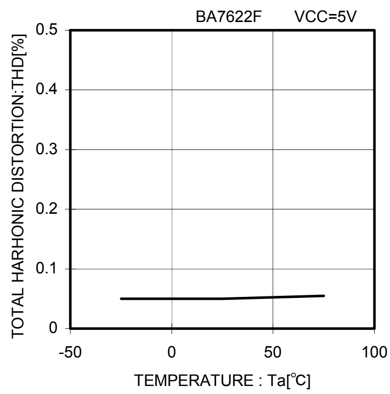


Fig.61 Total harmonic distortion (bias)
vs. Temperature

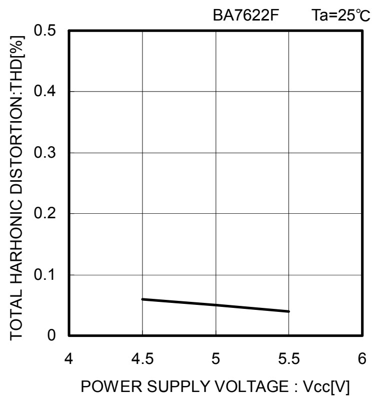


Fig.62 Total harmonic distortion (bias)
vs. Supply voltage

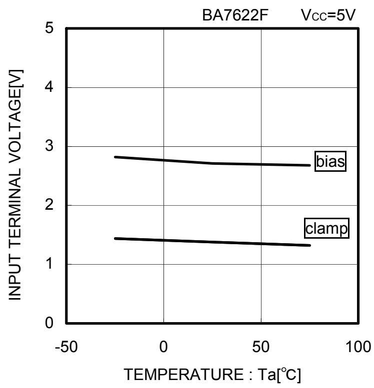


Fig.63 Input terminal voltage
vs. Temperature

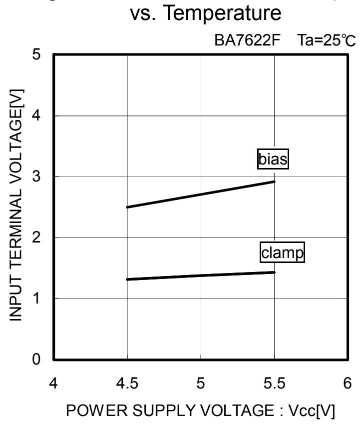


Fig.64 Input terminal voltage
vs. Supply voltage

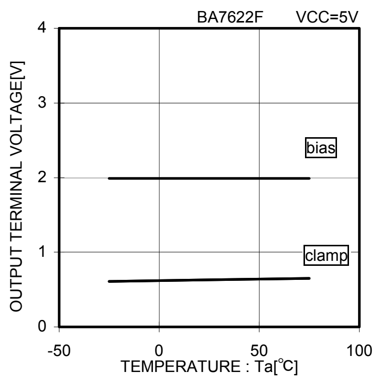


Fig.65 Output terminal voltage
vs. Temperature

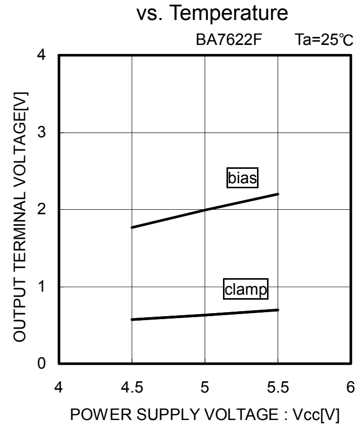


Fig.66 Output terminal voltage
vs. Supply voltage

●Selection of order type

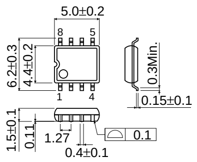
B	A	7	6	2	2	F	—	E	2

Part No.
BA7622F
BA7623F

Tape and Reel information

SOP8

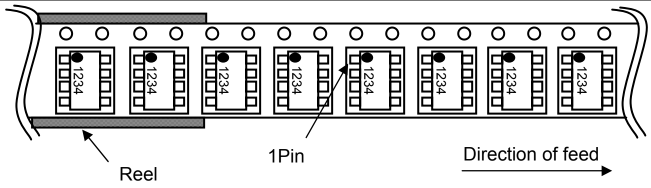
<Dimension>



(Unit:mm)

<Tape and Reel information>

Tape	Embossed carrier tape
Quantity	2500pcs
Direction of feed	E2 (Correct direction: 1pin of product should be at the upper left when you hold reel on the left hand, and you pull out the tape on the right hand)



※Orders are available in complete units only.

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