

## 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 k $\Omega$ . The BA7623F output pins can be connected directly in a DC coupling mode. Each output can drive 2 lines of load (75 $\Omega$ x2). 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 and 1 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°C)**

Parameter	Symbol	Limits	Unit
Supply voltage	V <sub>Max</sub>	8.0	V
Power dissipation	Pd	550 *1	mW
Operating temperature	Topr	-25~+75	°C
Storage temperature	Tstg	-55~+125	°C

25°C

\*1 Reduce by 5.5 mW/°C over

●Operating range (Ta=25°C)

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°C, Vcc=5 V and 2 lines are driven.)

BA7622F

Parameter	Symbol	Min.	Typ.	Max	Unit	Conditions
Circuit Current	I <sub>cc</sub>	-	23.6	35.4	mA	No signal
Maximum output level	V <sub>om</sub>	2.8	3.3	-	Vp-p	f=1kHz, THD=1.0%
Voltage gain	G <sub>v</sub>	-1.2	-0.6	0	dB	f=1kHz, V <sub>IN</sub> =2.0Vp-p
Frequency characteristic	G <sub>f</sub>	-3	0	1.3	dB	10kHz/1MHz, V <sub>IN</sub> =1.0Vp-p
Differential gain 75Ω drive1	DG1	-	0.4	1.0	%	V <sub>IN</sub> =2.0Vp-p, Standard staircase signal
Differential phase 75Ω drive1	DP1	-	0.4	1.0	deg	V <sub>IN</sub> =2.0Vp-p, Standard staircase signal
Differential gain 75Ω drive2	DG2	-	0.7	2.0	%	V <sub>IN</sub> =2.0Vp-p, Standard staircase signal
Differential phase 75Ω drive2	DP2	-	0.7	2.0	deg	V <sub>IN</sub> =2.0Vp-p, Standard staircase signal
Interchannel crosstalk	C <sub>T</sub>	-	-60	-	dB	f=4.43MHz, V <sub>IN</sub> =2.0Vp-p
Input impedance(V <sub>IN3</sub> )	Z <sub>IN3</sub>	17	20	23	kΩ	—
Total harmonic distortion(V <sub>IN3</sub> )	T <sub>HD32</sub>	-	0.1	0.5	%	f=1kHz, V <sub>IN</sub> =1.0Vp-p

BA7623F

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

●Block diagram

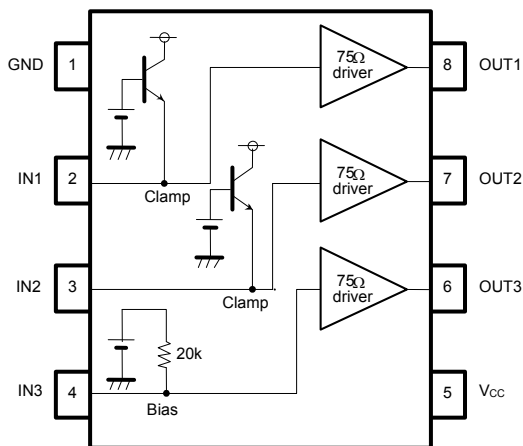


Fig.1 BA7622F

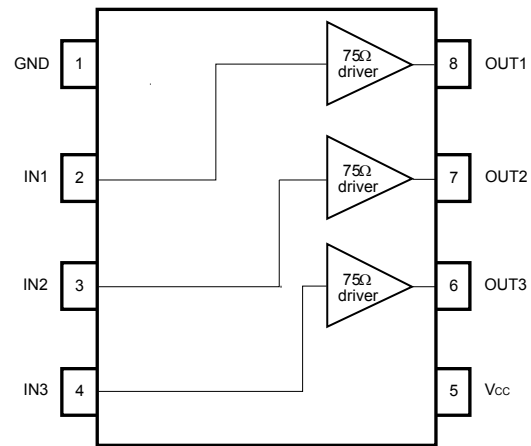


Fig.2 BA7623F

•Measurement circuit

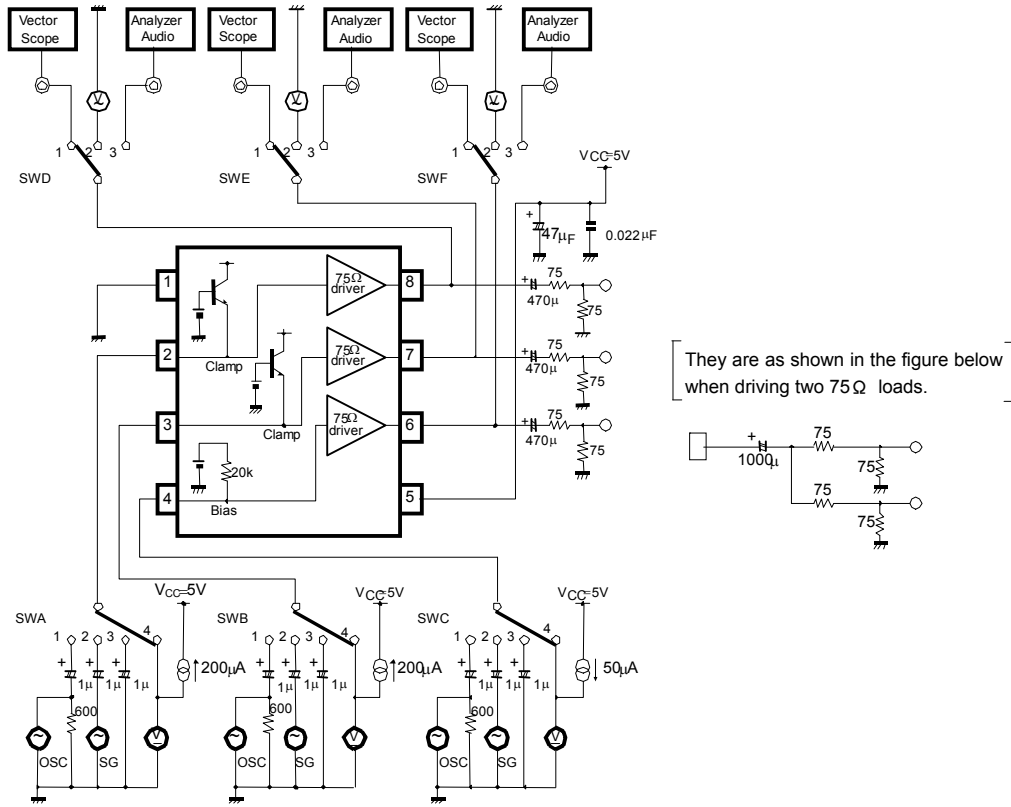


Fig.3 BA7622F

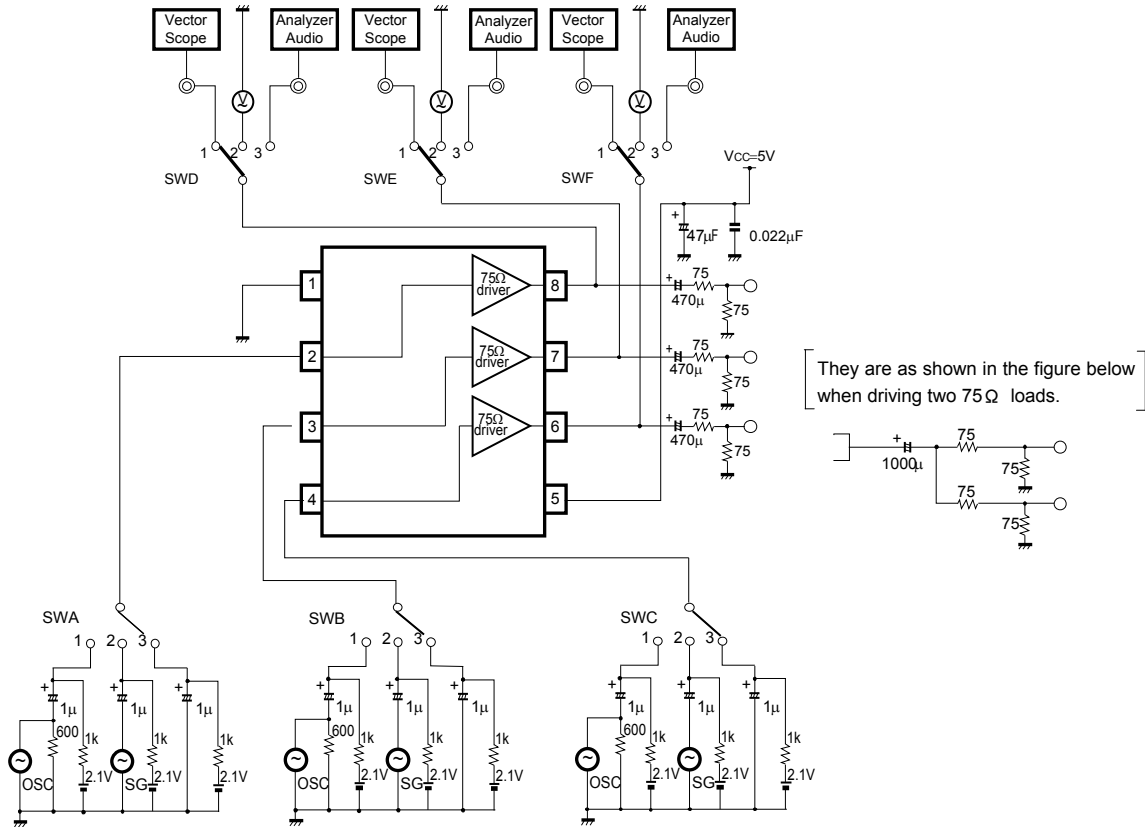


Fig.4 BA7623F

●Measurement methods and conditions (BA7622F)

Parameter	Symbol	IN1	IN2	IN3	OUT1	OUT2	OUT3	Conditions
		SWA	SWB	SWC	SWD	SWE	SWF	
Circuit current	I <sub>CC</sub>	3	3	3	×	×	×	-
Maximum output level	V <sub>OM12</sub>	1	3	3	3	×	×	* 1
	V <sub>OM22</sub>	3	1	3	×	3	×	
	V <sub>OM32</sub>	3	3	1	×	×	3	
Voltage gain	G <sub>V12</sub>	1	3	3	3	×	×	* 2
	G <sub>V22</sub>	3	1	3	×	3	×	
	G <sub>V32</sub>	3	3	1	×	×	3	
Frequency characteristic	f <sub>12</sub>	1	3	3	3	×	×	-
	f <sub>22</sub>	3	1	3	×	3	×	
	f <sub>32</sub>	3	3	1	×	×	3	
Interchannel crosstalk	C <sub>T112</sub>	1	3	3	×	3	×	-
	C <sub>T113</sub>	1	3	3	×	×	3	
	C <sub>T211</sub>	3	1	3	3	×	×	
	C <sub>T213</sub>	3	1	3	×	×	3	
	C <sub>T311</sub>	3	3	1	3	×	×	
Input impedance	Z <sub>IN3</sub>	3	3	4	×	×	×	* 3
	T <sub>HD12</sub>	1	3	3	3	×	×	* 4
Total harmonic distortion	T <sub>HD22</sub>	3	1	3	×	3	×	
	T <sub>HD32</sub>	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  $G_V=20\log[V_{OUT}/V_{IN}]$  (dB).
- \* 3 : Input resistance  
Measure the input pin voltage V<sub>IN50</sub>, when 50 μA is injected at the input pin. Measure the open voltage V<sub>IN0</sub> of the input pin. The input resistance  $Z=(V_{IN50}-V_{IN0})/50\times 10^{-6}$  [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.

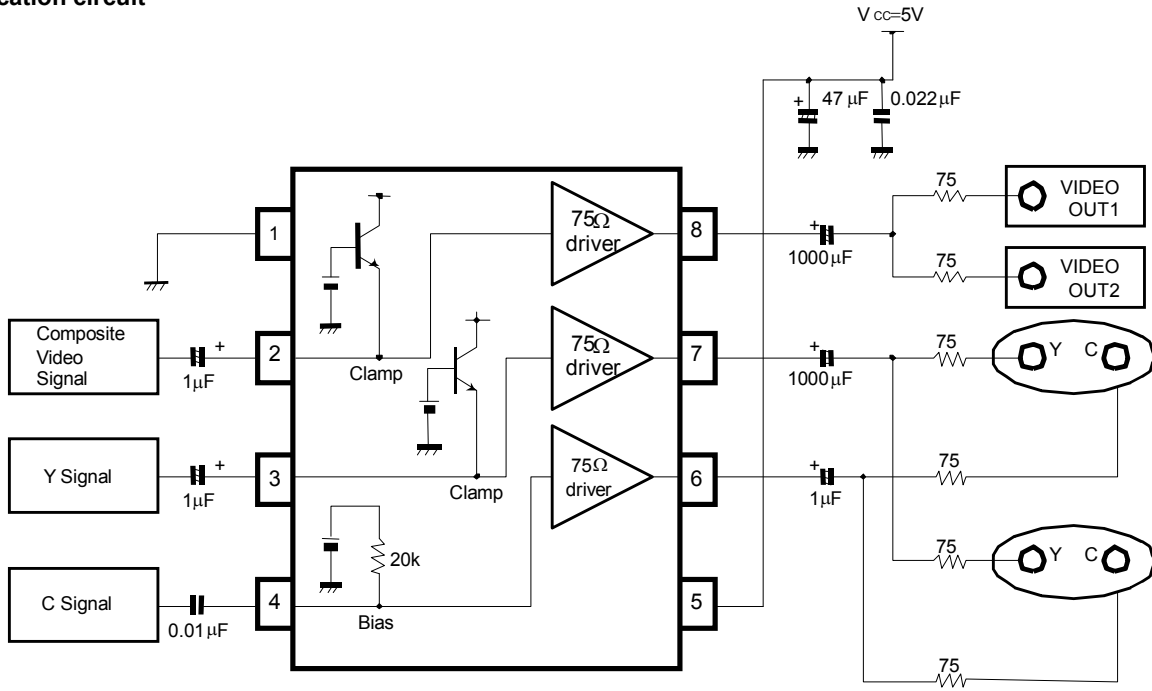
●Measurement methods and conditions (BA7623F)

Parameter	Symbol	IN1	IN2	IN3	OUT1	OUT2	OUT3	Conditions
		SWA	SWB	SWC	SWD	SWE	SWF	
Circuit current	I <sub>CC</sub>	3	3	3	×	×	×	-
Maximum output level	V <sub>OM12</sub>	1	3	3	3	×	×	* 1
	V <sub>OM22</sub>	3	1	3	×	3	×	
	V <sub>OM32</sub>	3	3	1	×	×	3	
Voltage gain	G <sub>V12</sub>	1	3	3	3	×	×	* 2
	G <sub>V22</sub>	3	1	3	×	3	×	
	G <sub>V32</sub>	3	3	1	×	×	3	
Frequency characteristic	f <sub>12</sub>	1	3	3	3	×	×	-
	f <sub>22</sub>	3	1	3	×	3	×	
	f <sub>32</sub>	3	3	1	×	×	3	
Interchannel crosstalk	C <sub>T112</sub>	1	3	3	×	3	×	-
	C <sub>T113</sub>	1	3	3	×	×	3	
	C <sub>T211</sub>	3	1	3	3	×	×	
	C <sub>T213</sub>	3	1	3	×	×	3	
	C <sub>T311</sub>	3	3	1	3	×	×	
Total harmonic distortion	T <sub>HD12</sub>	1	3	3	3	×	×	* 3
	T <sub>HD22</sub>	3	1	3	×	3	×	
	T <sub>HD32</sub>	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

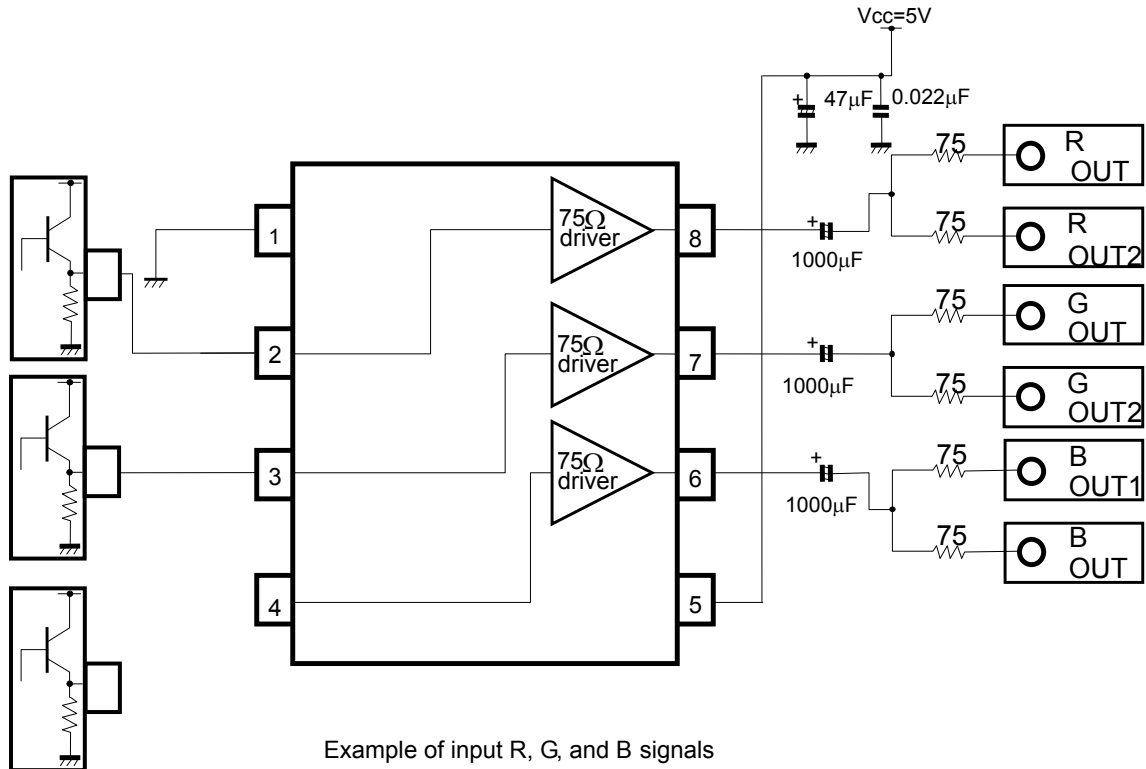
- \* 1 : Maximum output level  
Connect a distortion meter to the output. Apply a f=1 kHz, 1 Vp-p sine wave to the input and adjust the input level so that the output distortion becomes 1.0%. The maximum output level Vom (Vp-p) is the output voltage at that time.
- \* 2 : Voltage gain  
Apply a f=1MHz, 2.0 Vp-p sine wave to the input. The voltage gain is calculated as follows:  $G_V=20\log[V_{OUT}/V_{IN}]$  (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

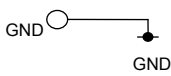
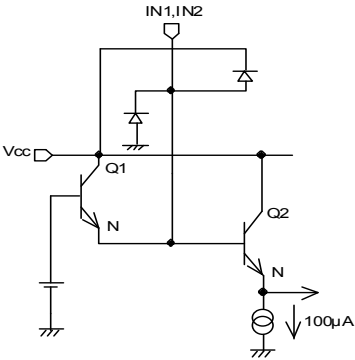
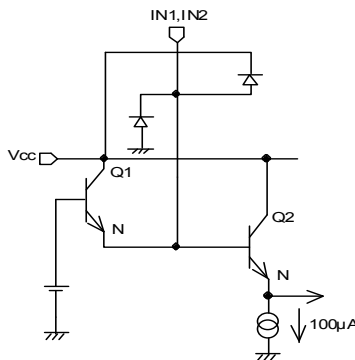
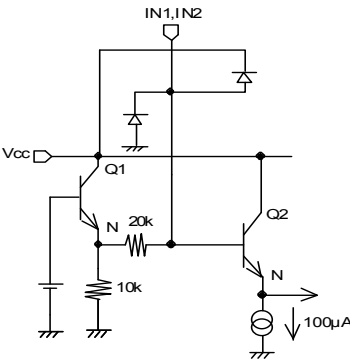


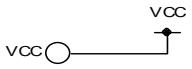
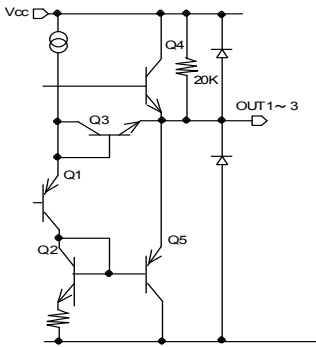
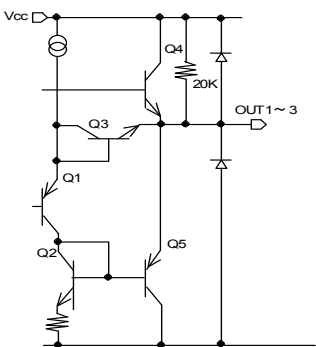
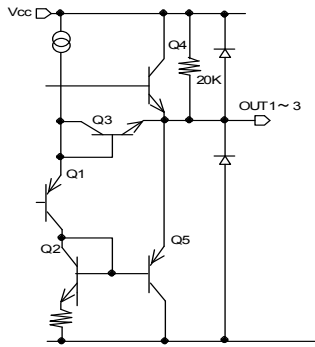
Example of input R, G, and B signals

Fig.6 BA7623F

•Pin descriptions (1/2)

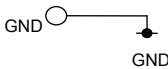
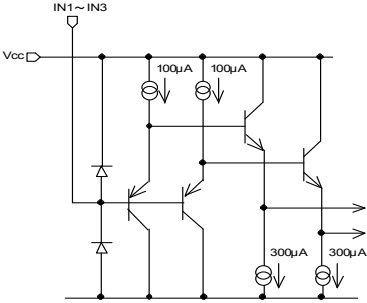
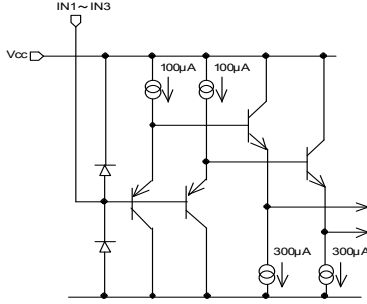
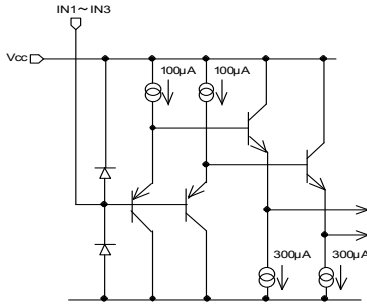
BA7622F

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.

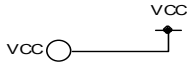
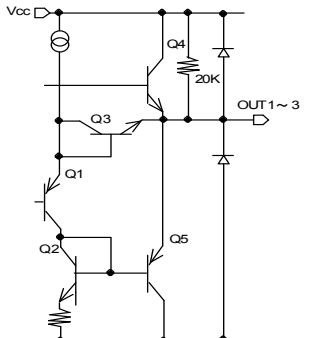
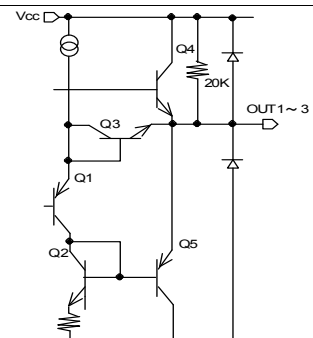
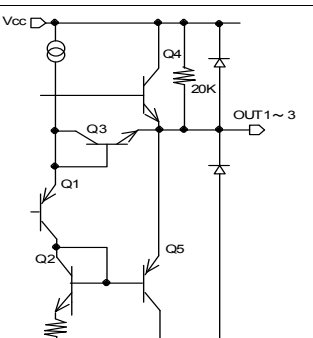
Pin No.	Pin name	IN	OUT	Typical voltage	Equivalent Circuit	Function
5	VCC	○	—	5.0V		Vcc terminal
6	OUT3	—	○	2.0V		<p>Video driver output (Bias input)</p> <p>Outputs a chroma signal.</p> <p>When output is forced to ground, the protection circuit activates power save mode.</p>
7	OUT2	—	○	0.6V		<p>Video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

•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)

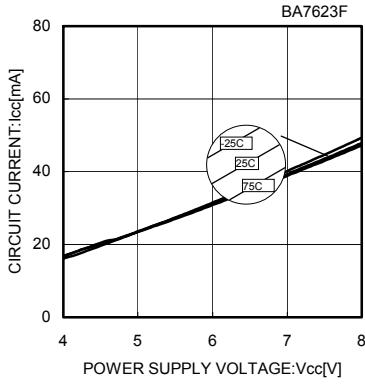


Fig.7 Circuit current vs. Supply voltage

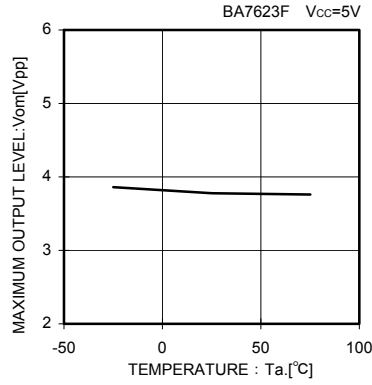


Fig.8 Maximum output level vs. Temperature

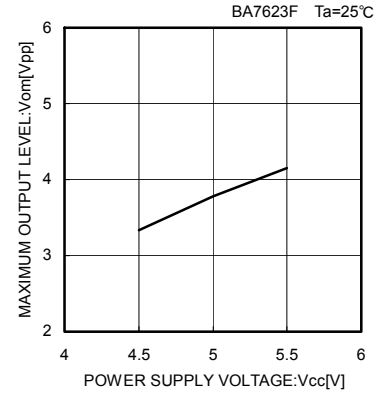


Fig.9 Maximum output level vs. Supply voltage

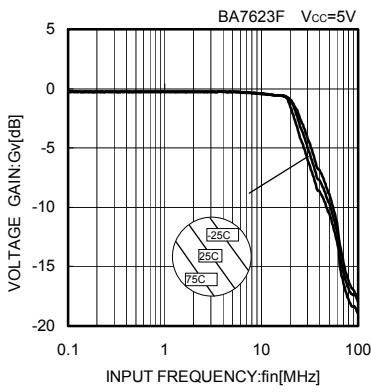


Fig.10 Frequency characteristic vs. Temperature

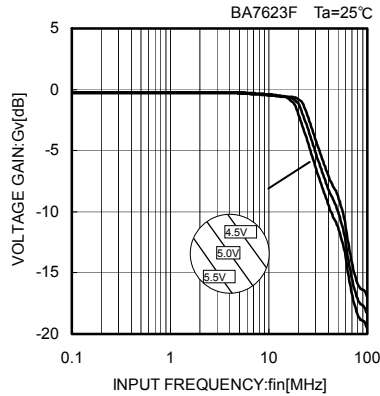


Fig.11 Frequency characteristic vs. Supply voltage

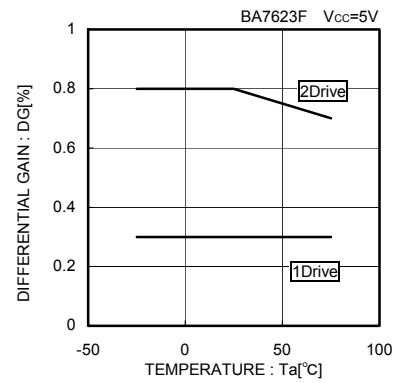


Fig.12 Differential gain vs. Temperature

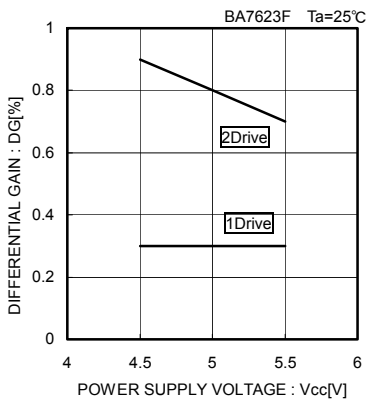


Fig.13 Differential gain vs. Supply voltage

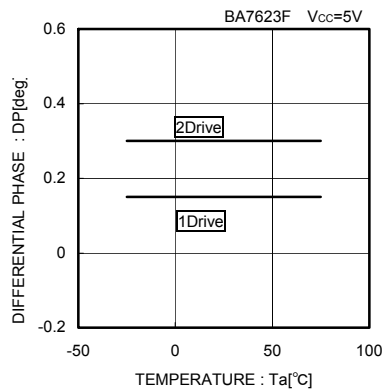


Fig.14 Differential phase vs. Temperature

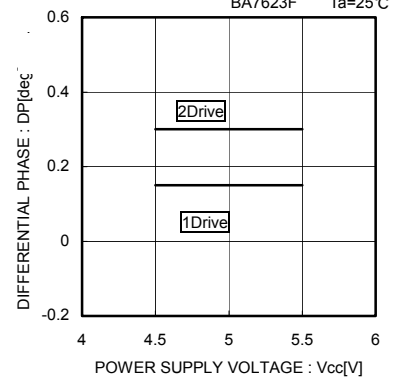


Fig.15 Differential phase vs. Supply voltage

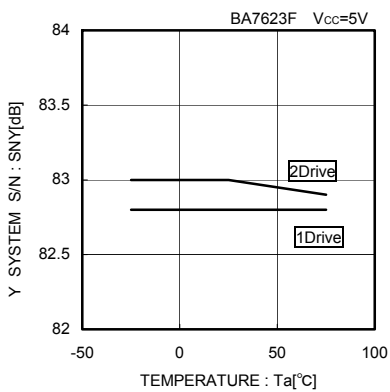


Fig.16 Y system S/N vs. Temperature

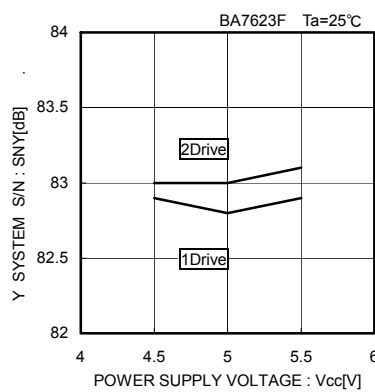


Fig.17 Y system S/N vs. Supply voltage

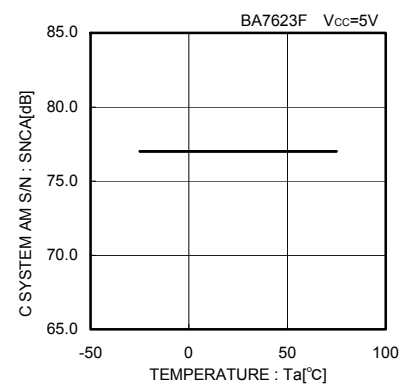


Fig.18 C system AM S/N vs. Temperature

●Reference data (2/5)

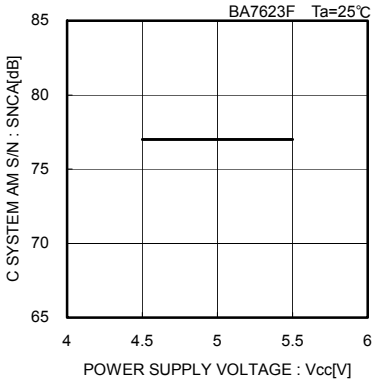


Fig.19 C system AM S/N vs. Supply voltage

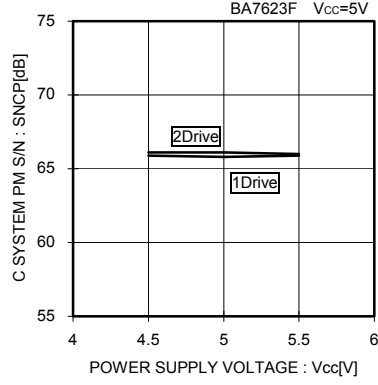


Fig.20 C system PM S/N vs. Supply voltage

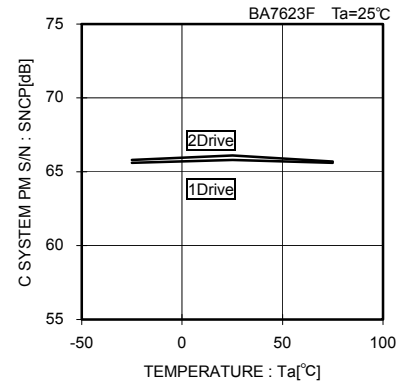


Fig.21 C system PM S/N vs. Temperature

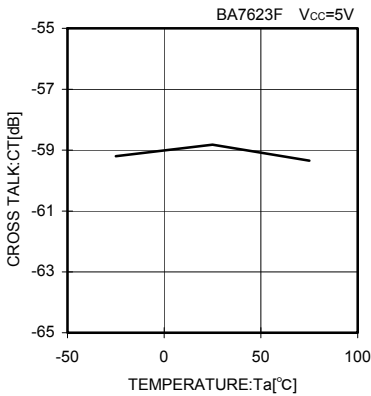


Fig.22 Cross talk vs. Temperature

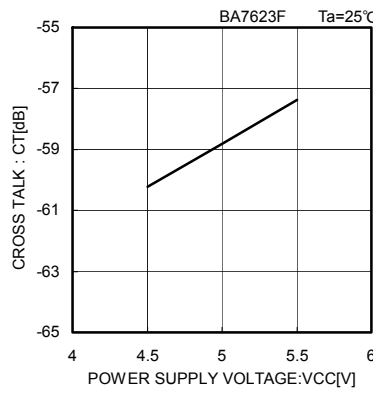


Fig.23 Cross talk vs. Supply voltage

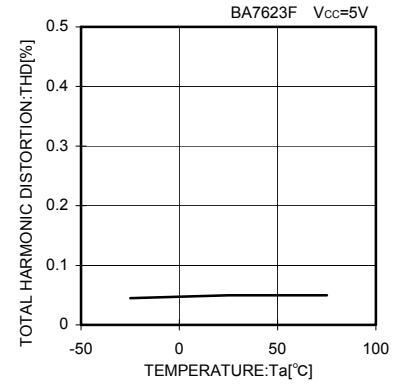


Fig.24 Total harmonic distortion vs. Temperature

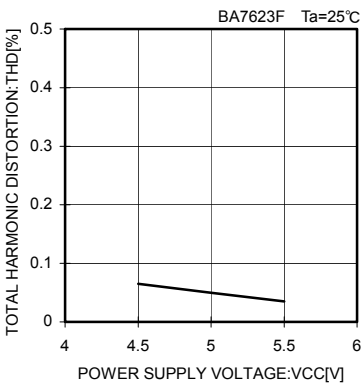


Fig.25 Total harmonic distortion vs. Supply voltage

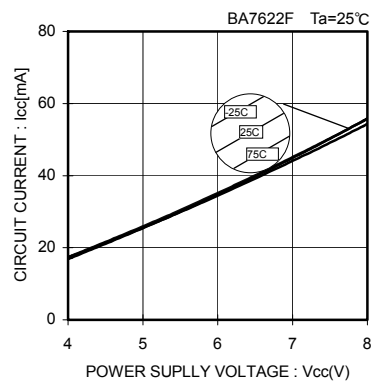


Fig.26 Circuit current vs. Supply voltage

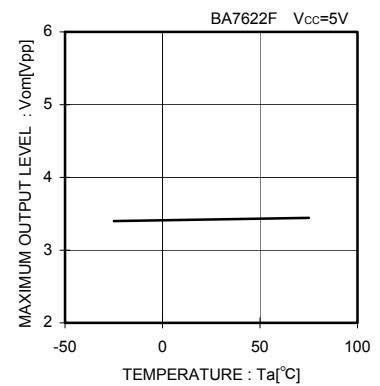


Fig.27 Maximum output level vs. Temperature

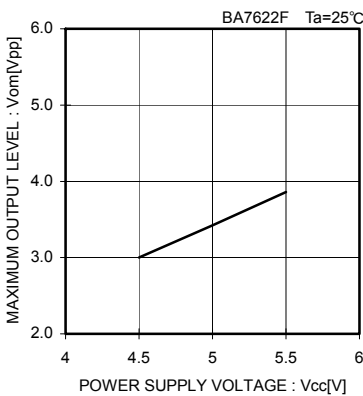


Fig.28 Maximum output level (clamp) vs. Supply voltage

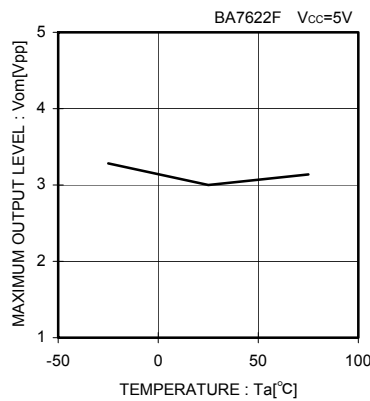


Fig.29 Maximum output level (bias) vs. Temperature

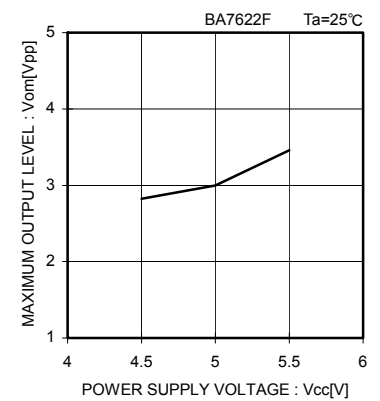


Fig.30 Maximum output level (bias) vs. Supply voltage

●Reference data (3/5)

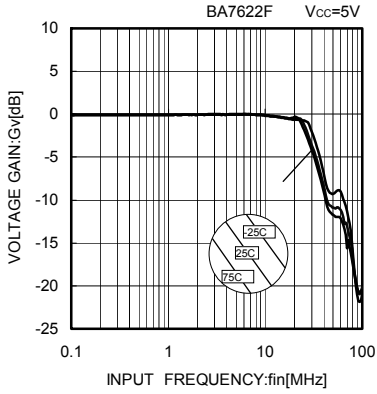


Fig.31 Frequency characteristic (clamp) vs. Temperature

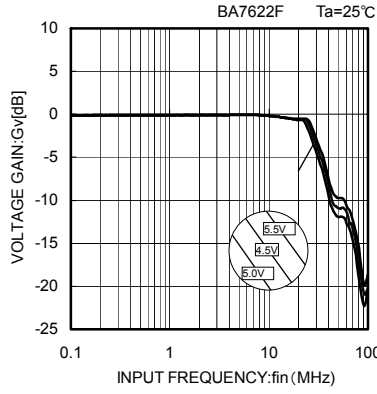


Fig.32 Frequency characteristic (clamp) vs. Supply voltage

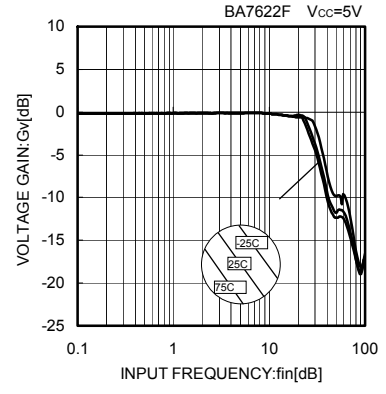


Fig.33 Frequency characteristic (bias) vs. Temperature

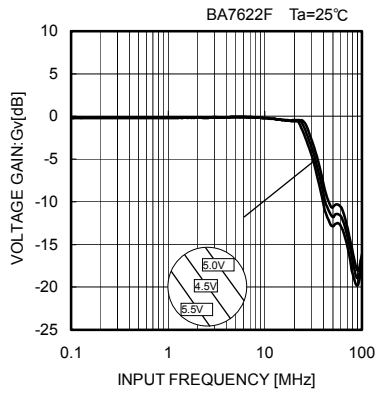


Fig.34 Frequency characteristic (bias) vs. Supply voltage

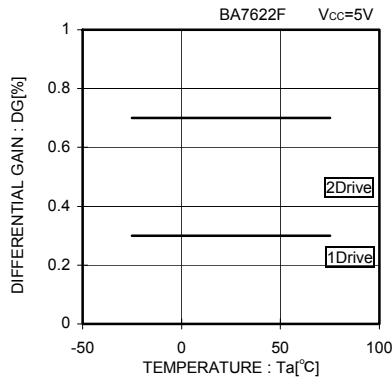


Fig.35 Differential gain (clamp) vs. Temperature

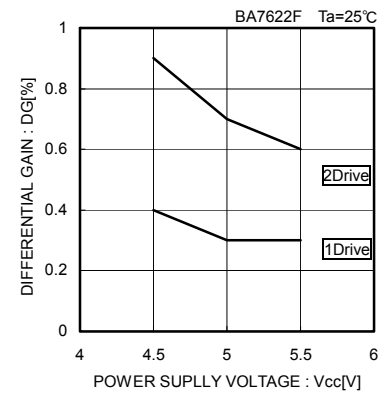


Fig.36 Differential gain (clamp) vs. Supply voltage

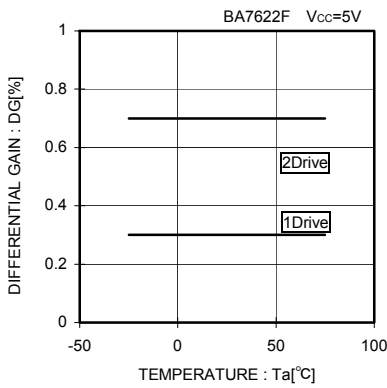


Fig.37 Differential gain (bias) vs. Temperature

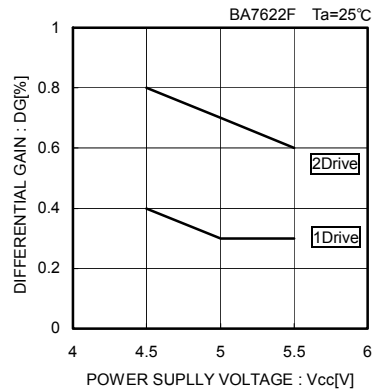


Fig.38 Differential gain (bias) vs. Supply voltage

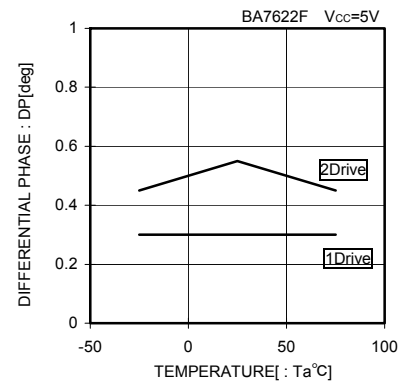


Fig.39 Differential phase (clamp) vs. Temperature

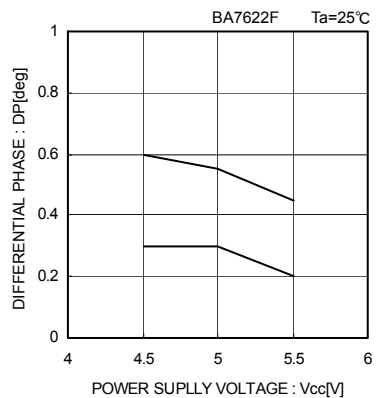


Fig.40 Differential phase (clamp) vs. Supply voltage

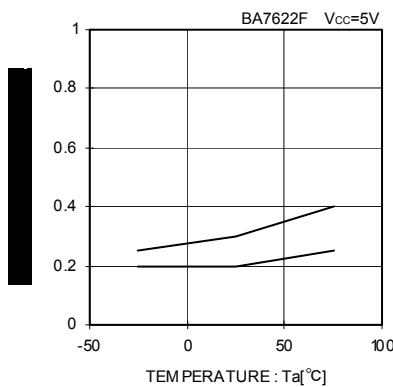


Fig.41 Differential phase (bias) vs. Temperature

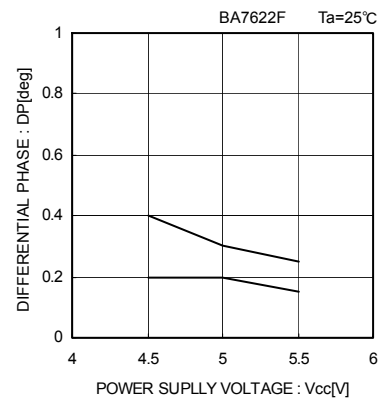


Fig.42 Differential phase (bias) vs. Supply voltage

●Reference data (4/5)

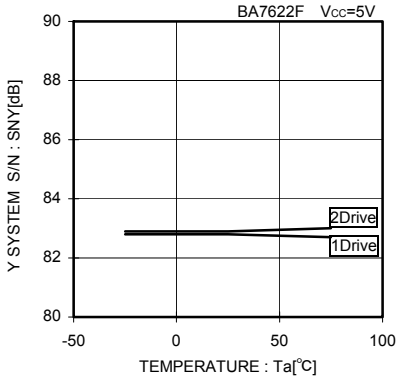


Fig.43 Y system S/N (clamp) vs. Temperature

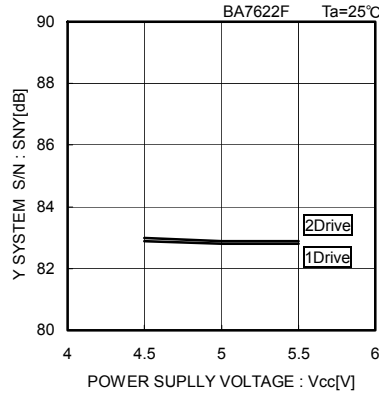


Fig.44 Y system S/N (clamp) vs. Supply voltage

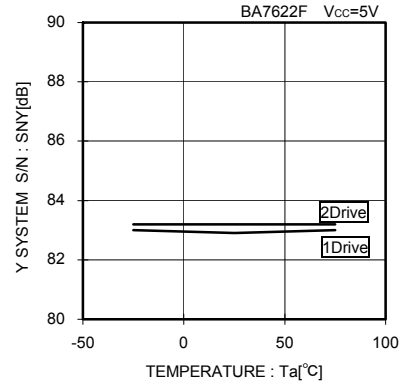


Fig.45 Y system S/N (bias) vs. Temperature

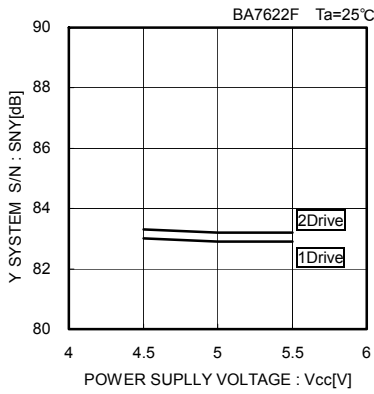


Fig.46 Y system S/N (bias) vs. Supply voltage

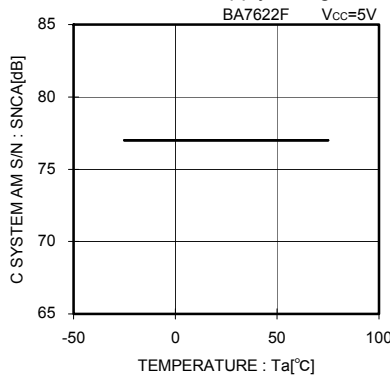


Fig.47 C system AM S/N (clamp) vs. Temperature

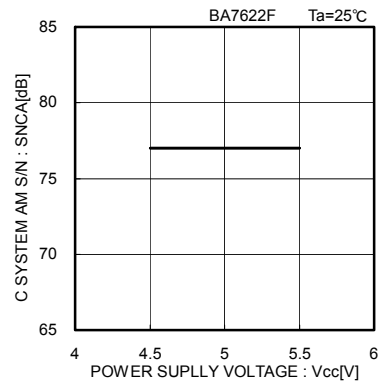


Fig.48 C system AM S/N (clamp) vs. Supply voltage

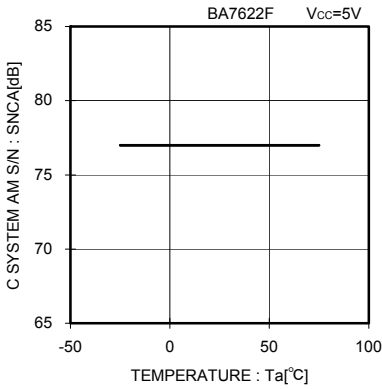


Fig.49 C system AM S/N (bias) vs. Temperature

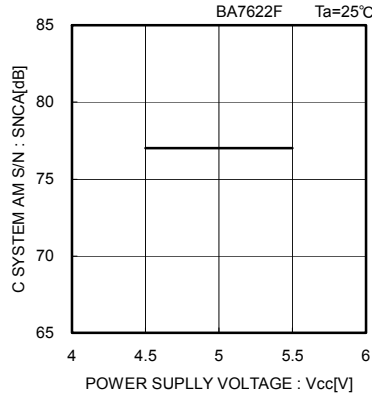


Fig.50 C system AM S/N (bias) vs. Supply voltage

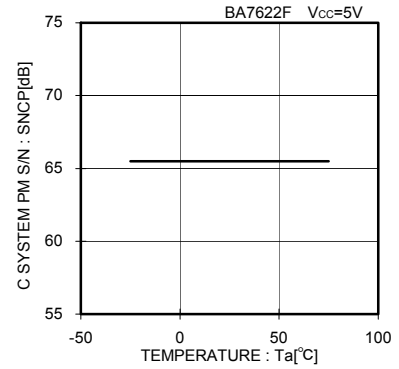


Fig.51 C system PM S/N (clamp) vs. Temperature

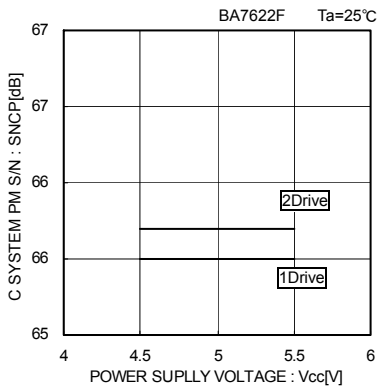


Fig.52 C system PM S/N (clamp) vs. Supply voltage

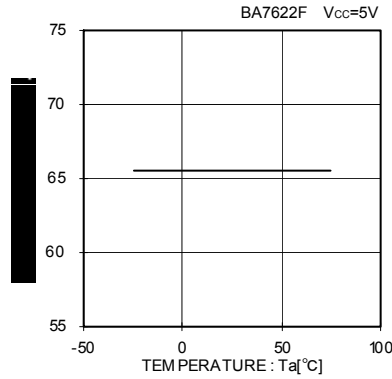


Fig.53 C system PM S/N (bias) vs. Temperature

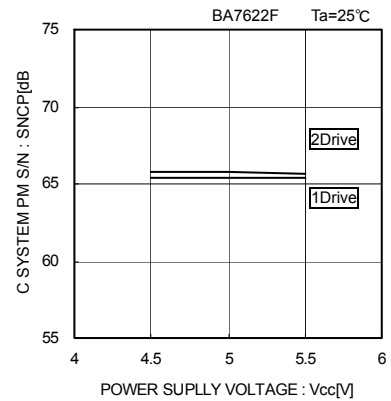


Fig.54 C system PM S/N (bias) vs. Supply voltage

●Reference data (5/5)

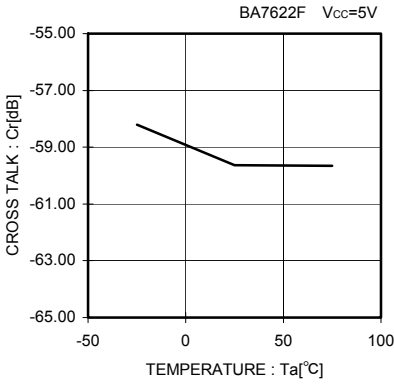


Fig.55 Cross talk vs. Temperature

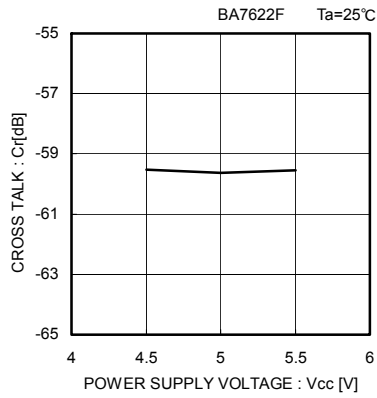


Fig.56 Cross talk vs. Supply voltage

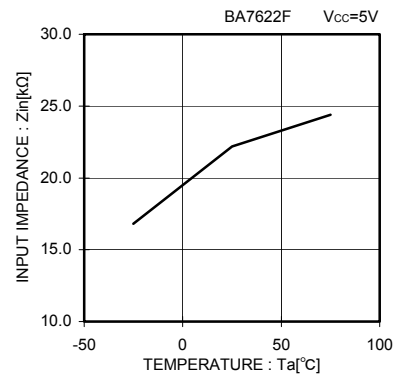


Fig.57 Input impedance vs. Temperature

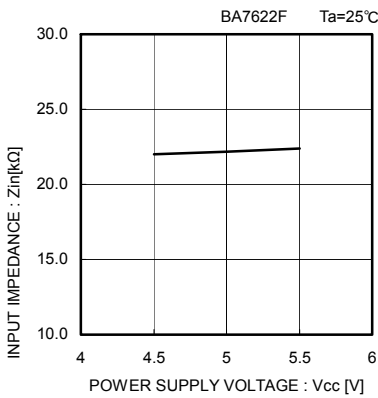


Fig.58 Input impedance vs. Supply voltage

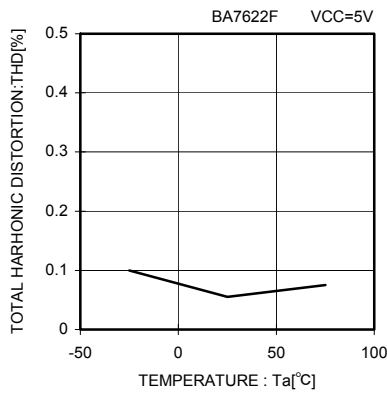


Fig.59 Total harmonic distortion (clamp) vs. Temperature

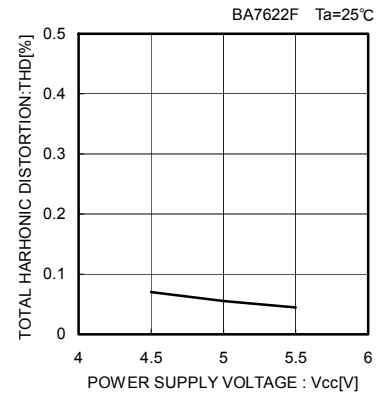


Fig.60 Total harmonic distortion (clamp) vs. Supply voltage

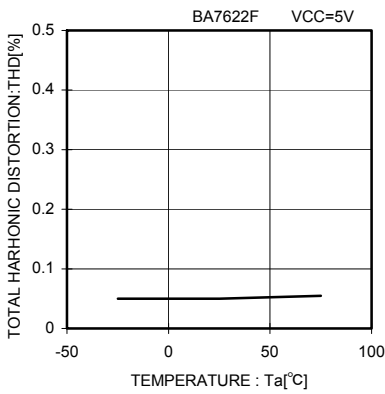


Fig.61 Total harmonic distortion (bias) vs. Temperature

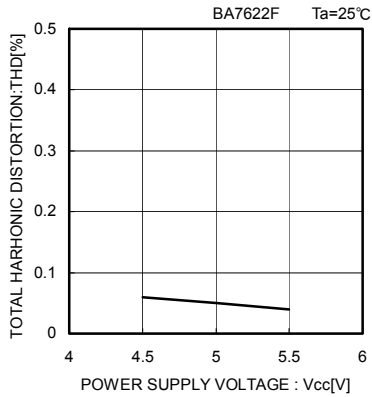


Fig.62 Total harmonic distortion (bias) vs. Supply voltage

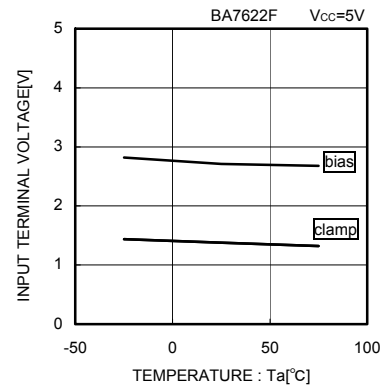


Fig.63 Input terminal voltage vs. Temperature

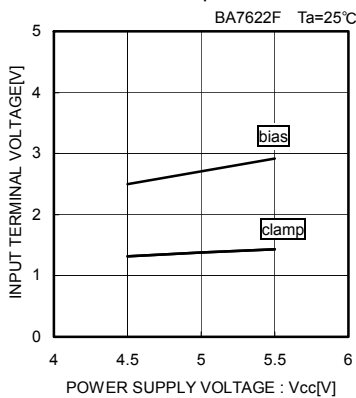


Fig.64 Input terminal voltage vs. Supply voltage

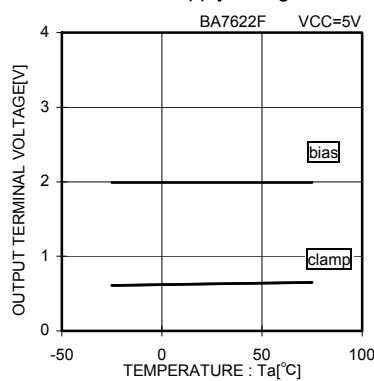


Fig.65 Output terminal voltage vs. Temperature

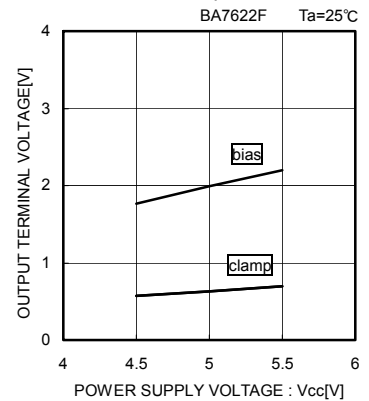
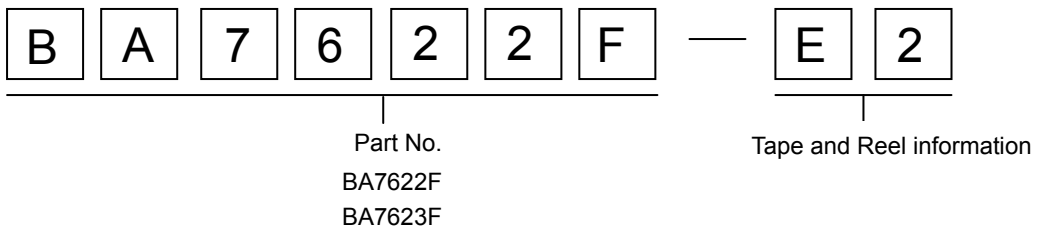
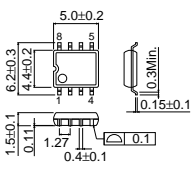
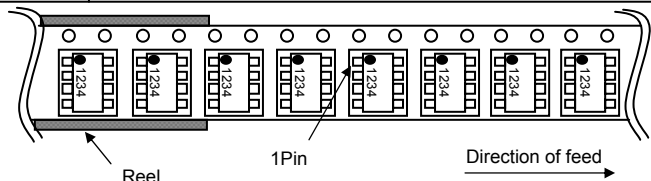


Fig.66 Output terminal voltage vs. Supply voltage

●Selection of order type



**SOP8**

<p>&lt;Dimension&gt;</p>  <p style="text-align: right;">(Unit:mm)</p>	<p>&lt;Tape and Reel information&gt;</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Tape</td> <td>Embossed carrier tape</td> </tr> <tr> <td>Quantity</td> <td>2500pcs</td> </tr> <tr> <td>Direction of feed</td> <td>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)</td> </tr> </table>  <p style="text-align: right;">※Orders are available in complete units only.</p>	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)
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)						



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