High-performance Video Signal Switchers

Single-circuit
Video Switchers

BA7654F,BA7653AF,BA7653AFV,BA7652AF

No.11066EAT04

●Description

The BA7654F, BA7653A F/FV or BA7652AF is a video signal (display signal) switch containing one 2-input or 3-input circuit. Each of the input pin formats is "sync-tip clamp input" that matches the synchronous tips of video signals (display signals) to the same potential. The inputs have an high input impedance configuration, in which they can utilize a small clamp capacitor (0.01 μF (FZ) ceramic capacitor is recommended).

●Features

1) Low value clamp capacitance can be used (Min. 3000 pF Recommended 0.01μF (FZ) ceramic capacitor)
2) Low voltage operation is possible (Operating range 4.0～7.0V)
3) Superimposed can be applied since switching speed of SW is fast and there is little switching noise (Typ. 70ns)
4) Low power consumption (Typ. 25mW when Vcc=5V)
5) Large dynamic range (Typ. 3.1V_{P-P} when Vcc=5V)
6) Good frequency characteristics (Typ. 10 MHz 0 dB)
7) Low interchannel crosstalk (Typ. –70 dB)
8) Voltage can be applied to the CTL pin without a VCC voltage.
9) Built-in mute function (BA7652AF)

●Applications

VCR, TV, and other applications that use display signals.

●Product lineup

Part No.	Input type	Mute	Supply voltage(V)
BA7654F	2 in 1 Circuit	－	
BA7653AF, BA7653AFV	3 in 1 Circuit	－	4.0 ～ 7.0
BA7652AF	3 in 1 Circuit	○	

●Absolute maximum ratings(Ta=25℃)

Parameter	Symbol	Ratings				Unit
		BA7654F	BA7653AF	BA7653AFV	BA7652AF	
Supply voltage	Vcc	9				V
Power dissipation	Pd	500[*1]	500[*1]	350[*2]	500[*1]	mW
Operating temperature	Topr	-25～+75	-30～+80	-30～+80	-30～+80	℃
Storage temperature	Tstg	-55～+125				℃

*1 Reduce by 5.0mW/℃ over 25℃, when mounted on a 50mm×50mm PCB board.(BA7654F, BA7653AF, BA7652AF)
*2 Reduce by 3.5mW/℃ over 25℃, when mounted on a 50mm×50mm PCB board.(BA7653AFV)

●Operating range(Ta=25℃)

Parameter	Symbol	Ratings	Unit
Supply voltage	Vcc	4.0 〜 7.0	V

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

●Electrical characteristics(Unless otherwise noted, Ta=25℃, Vcc=5.0V)

Parameter	Symbol	Limits			Unit	Conditions
		Min.	Typ.	Max.		
Circuit current	Icc	2.7	5.0	8.2	mA	
Maximum output level	Vom	2.6	3.1	—	V$_{P-P}$	f=1kHz, THD=1.0%
Voltage gain	Gv	-0.5	0	+0.5	dB	f=1MHz, V$_{IN}$=1.0V$_{P-P}$
Inter channel crosstalk	Cta	—	-70	—	dB	f=4.43MHz, V$_{IN}$=1.0V$_{P-P}$
Frequency characteristics	Cf	-3.0	0	+1.0	dB	f=10MHz/1MHz, V$_{IN}$=1.0V$_{P-P}$
CTL switching voltage	V$_{TH L}$	—	—	1.0	V	V$_{TH}$ =(Vcc-0.75)×0.44
	V$_{TH H}$	2.5	—	—		

●Guaranteed design parameters (Unless otherwise noted, Ta=25℃, Vcc=5.0V)

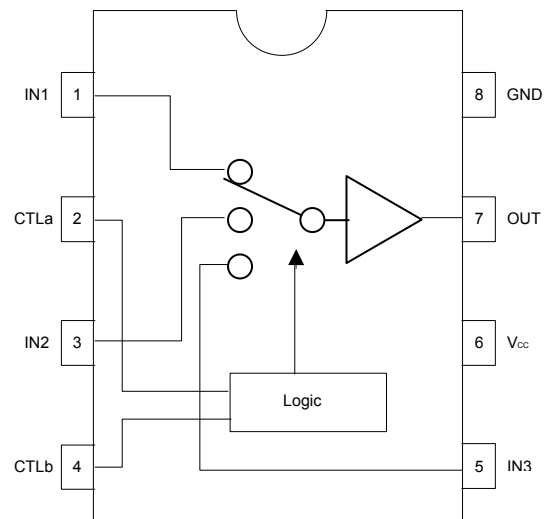| Parameter	Symbol	Limits			Unit	Conditions
		Min.	Typ.	Max.		
Differential phase	DG	—	0	0.5	%	V$_{IN}$=1.0V$_{P-P}$, standard staircase signal
Differential gain	DP	—	0.5	1.0	deg	V$_{IN}$=1.0V$_{P-P}$, standard staircase signal

●Block diagram
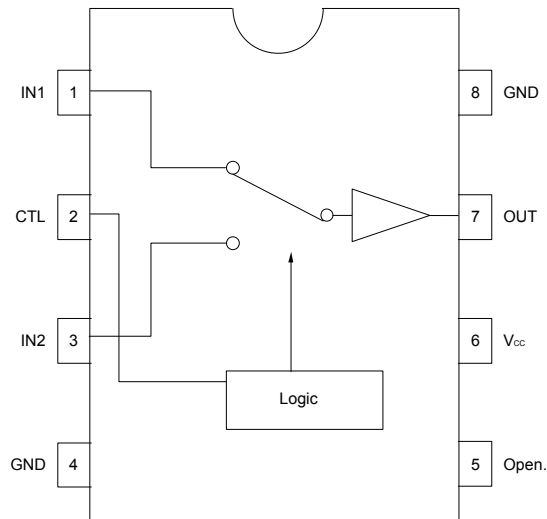
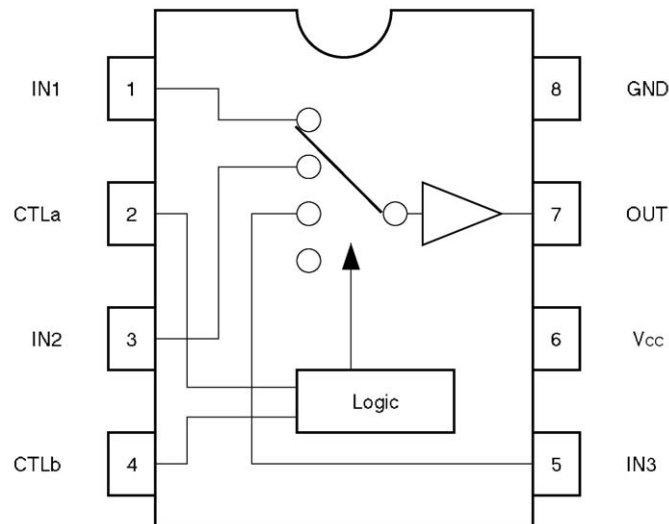Fig.1   BA7654F

Fig.2   BA7653AF, BA7653AFV

Fig.3   BA7652AF

●Control Pin Settings

BA7654F	
CTL	OUT
L	IN1
H	IN2

BA7653AF, BA7653AFV		
CTLa	CTLb	OUT
L	L	IN1
H	L	IN2
L	H	IN3
H	H	IN3

BA7652AF		
CTLa	CTLb	OUT
L	L	IN1
H	L	IN2
L	H	IN3
H	H	MUTE

2011.04 - Rev.A

●Pin descriptions 1/2 (BA7654F)

		BA7654F		
Pin No.	Pin name	DC voltage (Vcc=5V)	Input/output impedance	Equivalent circuit
1 (3)	IN1 (IN2)	1.65V	10MΩ or more	
2	CTL	—	—	
4 (8)	GND	0V	—	
5	N.C.	open	open	—
6	Vcc	0.5V	—	
7	OUT	0.95V	26Ω	

●Pin descriptions 2/2 (BA7653AF, BA7653AFV, BA7652AF)

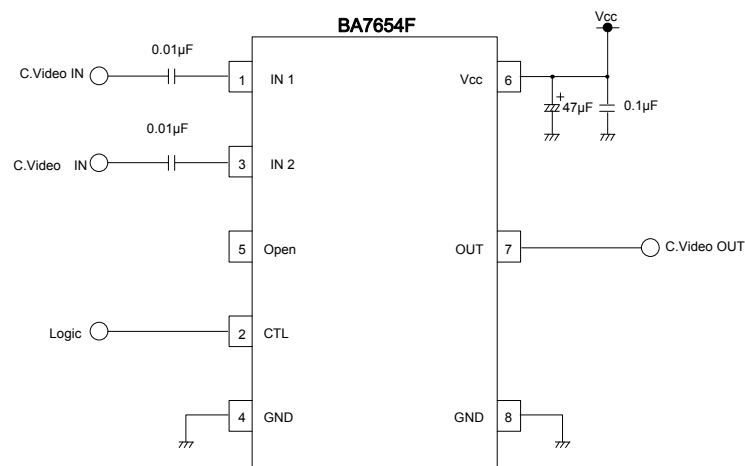|				BA7653AF, BA7653AFV, BA7652AF
Pin No.	Pin name	DC voltage (Vcc=5V)	Input/output impedance	Equivalent circuit
1 (3) (5)	IN1 (IN2) (IN3)	1.65V	10MΩ or more	
2	CTLa	—	—	
4	CTLb	—	—	
6	Vcc	5.0V	—	
7	OUT	0.95V	26Ω	
8	GND	0V	—	

●Application circuit 1/2　(BA7654F)

Fig.4

(When superimpossion is used)
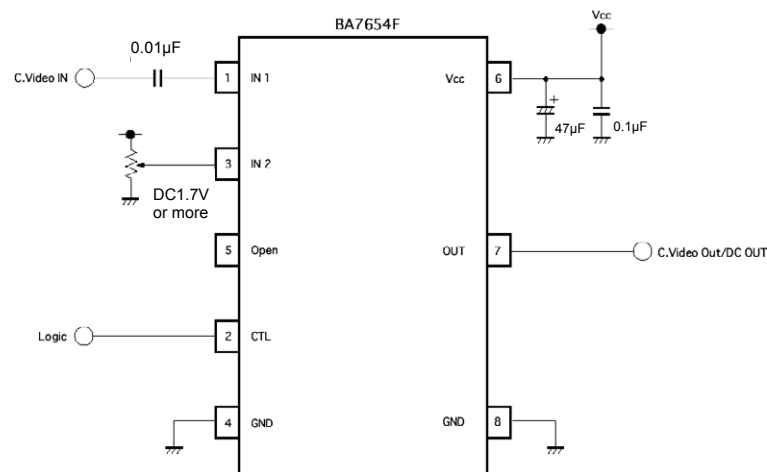

Fig.5

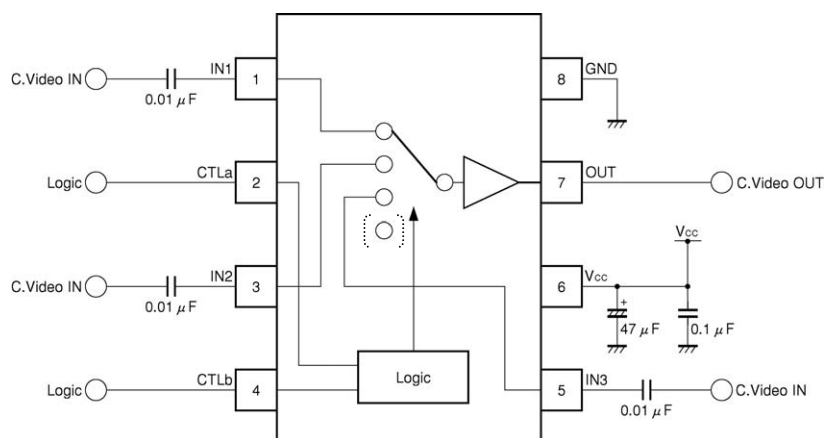●Application circuit 2/2 (BA7653AF, BA7653AFV, BA7652AF)

BA7653AF, BA7653AFV, BA7652AF

Fig.6

(When superimpossion is used)

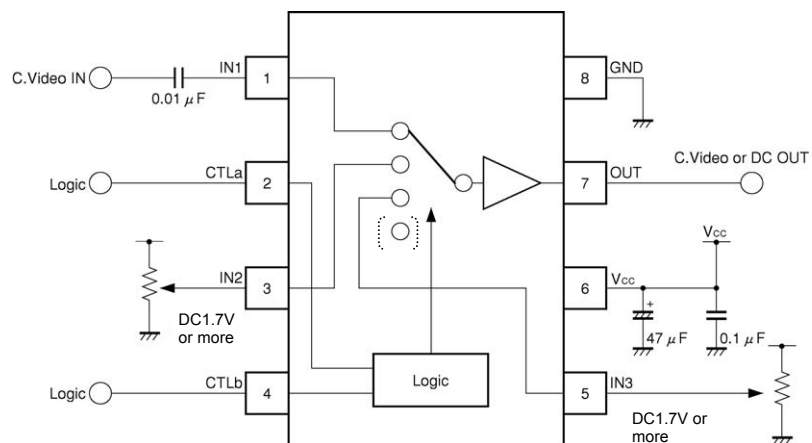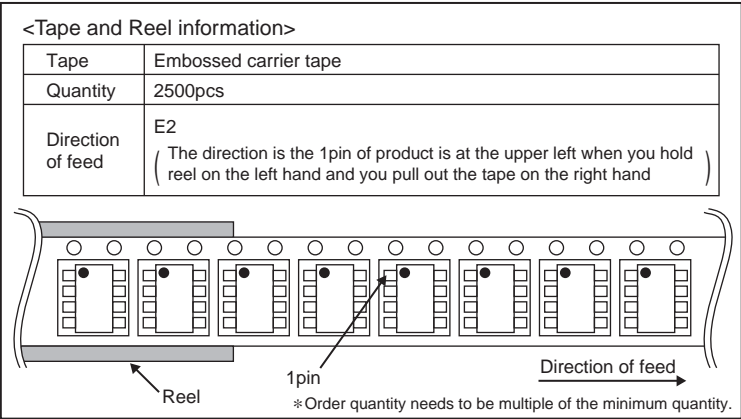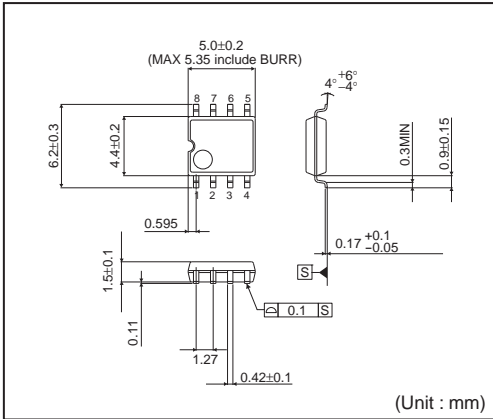BA7653AF, BA7653AFV, BA7652AF

Fig.7

●Notes for use

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.

8. For clamp operation stability
    Set the output impedance of the stage before input pin no more than 1 kΩ.

9. An input clamp capacitor will cause delay in operation at power on. Therefore, it is recommended to use a clamp capacitor no larger than 0.1 µF (0.01µF (FZ) ceramic capacitor is recommended).

10. TheBA7653AF, BA7653AFV and BA7652AF are 3-input, 1-output switch. If it is used as a 2-input, 1-output switch, by leaving one input Open and unused, the Open input pin will oscillate.   However, this does not affect other pins and is not particularly a problem for operation. If necessary, connect the input pin to GND via a capacitor or connect the input pin directly to VCC to stop oscillation.

11. CTL pin is in indeterminate status when left Open. Set it at "H" or "L" level.

12. For superimposed, a 1.7v DC voltage should be applied directly to an input pin.
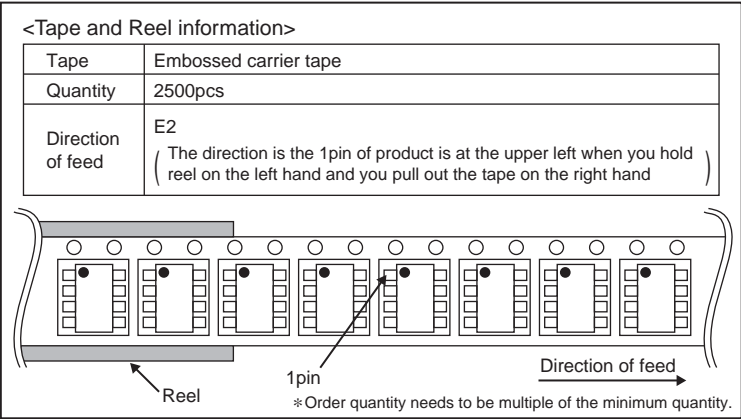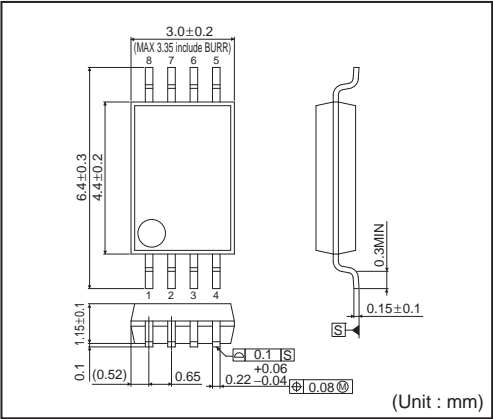
●Ordering part number

| B | A | | 7 | 6 | 5 | 3 | A | | F | V | - | E | 2 |

Part No.

Part No.
7654
7653A
7652A

Package
F : SOP8
FV:SSOP-B8

Packaging and forming specification
E2: Embossed tape and reel

SOP8

5.0±0.2
(MAX 5.35 include BURR)

8 7 6 5

4°⁺⁶°₋₄°

6.2±0.3
4.4±0.2

0.3MIN
0.9±0.15

1 2 3 4

0.595

1.5±0.1

0.17⁺⁰·¹₋₀.₀₅

0.11

S

0.1 S

1.27

0.42±0.1

(Unit : mm)

<Tape and Reel information>	
Tape	Embossed carrier tape
Quantity	2500pcs
Direction of feed	E2 (The direction is the 1pin of product is at the upper left when you hold reel on the left hand and you pull out the tape on the right hand)

Reel

1pin

Direction of feed

＊Order quantity needs to be multiple of the minimum quantity.

SSOP-B8

3.0±0.2
(MAX 3.35 include BURR)

8 7 6 5

6.4±0.3
4.4±0.2

0.3MIN

1 2 3 4

1.15±0.1

0.1

0.15±0.1

S

(0.52)

0.65

0.22⁺⁰·⁰⁶₋₀.₀₄

0.1 S

⊕ 0.08 Ⓜ

(Unit : mm)

<Tape and Reel information>	
Tape	Embossed carrier tape
Quantity	2500pcs
Direction of feed	E2 (The direction is the 1pin of product is at the upper left when you hold reel on the left hand and you pull out the tape on the right hand)

Reel

1pin

Direction of feed

＊Order quantity needs to be multiple of the minimum quantity.

Notes

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