High-performance Video Signal Switchers

Single Circuit Video Signal Switcher

BA7654F, BA7653AF/AFV ,BA7652AF

Pb Free
ROHM Electronic Components

●Description

The BA7654F, BA7653AF/AFV, 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 0.01 μ F (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	—	4.0 ～ 7.0
BA7653AF/AFV	3 in 1 Circuit	—	
BA7652AF	3 in 1 Circuit	○	

Aug.2008

●**Absolute maximum ratings**（Ta=25℃）

Parameter	Symbol	Limits				Unit
		BA7654F	BA7653AF	BA7653AFV	BA7652AF	
Supply voltage	V_{CC}	9				V
Power dissipation	P_d	500*1	500*1	350*2	500*1	mW
Operating temperature	T_{opr}	-25～+75	-30～+80	-30～+80	-30～+80	℃
Storage temperature	T_{stg}	-55～+125				℃

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

*2 Reduce by 3.5mW/°C over 25°C, when mounted on a 50mm×50mm PCB board.(BA7653AFV)

●**Operating range**（Ta=25℃）

Parameter	Symbol	Limits	Unit
Supply voltage	V_{CC}	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	Min.	Typ.	Max.	Unit	Conditions
Circuit current	I_{CC}	2.7	5.0	8.2	mA	
Maximum output level	V_{om}	2.6	3.1	—	V_{P-P}	f=1kHz, THD=1.0%
Voltage gain	G_V	-0.5	0	+0.5	dB	f=1MHz, V_{IN}=1.0V_{P-P}
Inter channel crosstalk	C_{ta}	—	-70	—	dB	f=4.43MHz, V_{IN}=1.0V_{P-P}
Frequency characteristics	C_f	-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	Min.	Typ.	Max.	Unit	Conditions
Differential phase	D_G	—	0	0.5	%	V_{IN}=1.0V_{P-P}, standard staircase signal
Differential gain	D_P	—	0.5	1.0	deg	V_{IN}=1.0V_{P-P}, standard staircase signal

●**Block diagram**

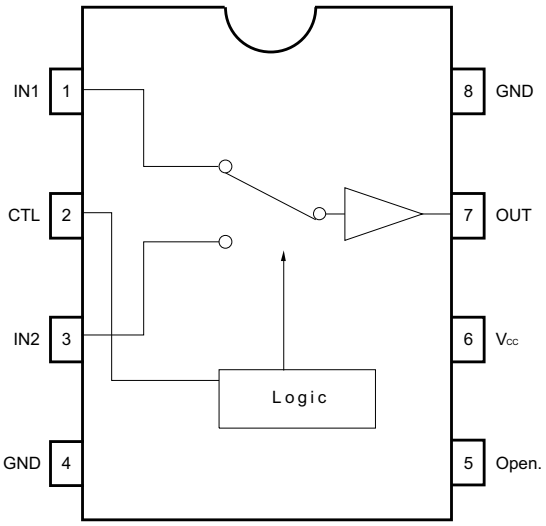


Fig.1 BA7654F

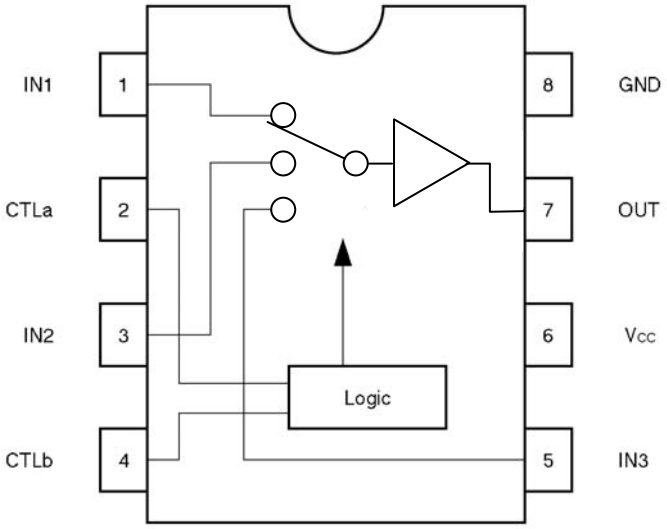


Fig.2 BA7653AF/AFV

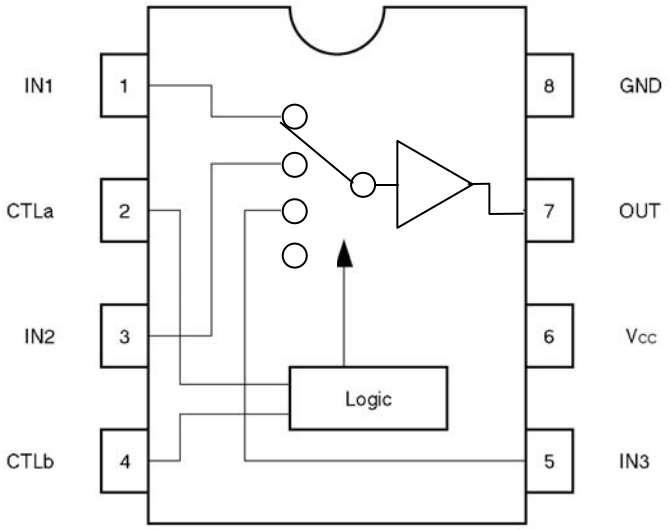


Fig.3 BA7652AF

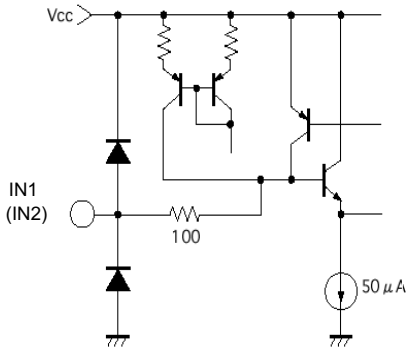
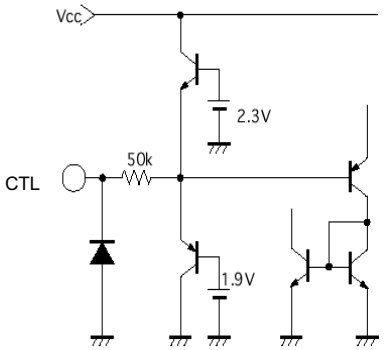
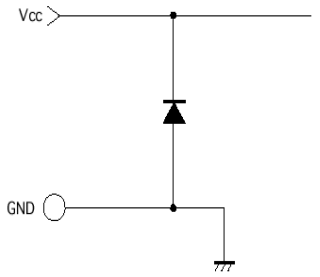
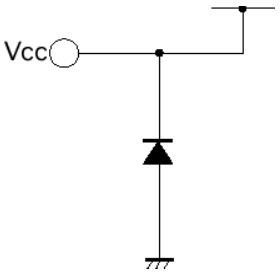
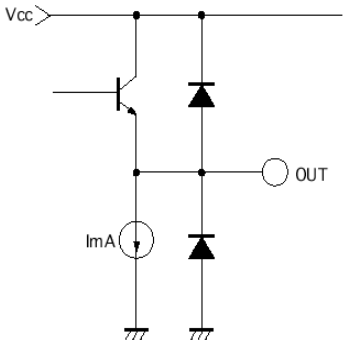
●**Control Pin Settings**

BA7654F	
CTL	OUT
L	IN1
H	IN2

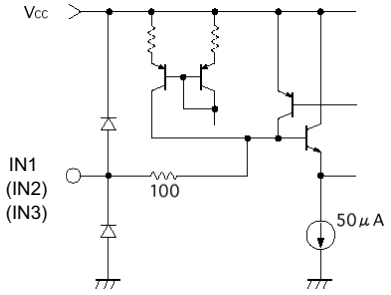
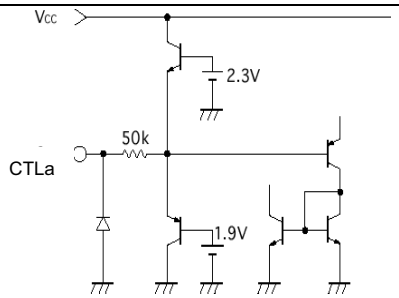
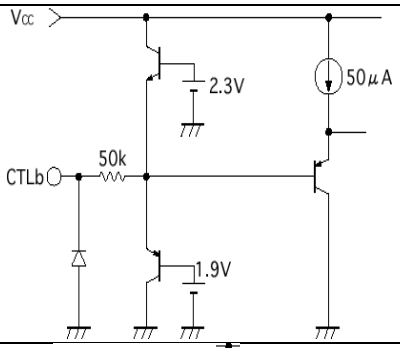
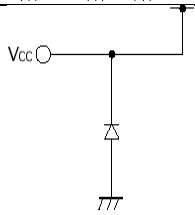
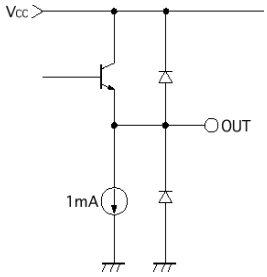
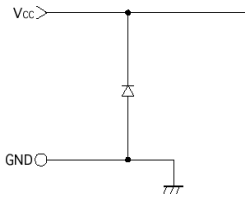
BA7653AF/AFV		
CTLa	CTLb	OUT
L	L	IN1
H	L	IN2
L	H	IN3
H	H	IN3

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

●**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	5V	—	
7	OUT	0.95V	26Ω	

●**Pin descriptions** 2/2 (BA7653AF/53AFV/52AF)

BA7653AF/53AFV/52AF				
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）

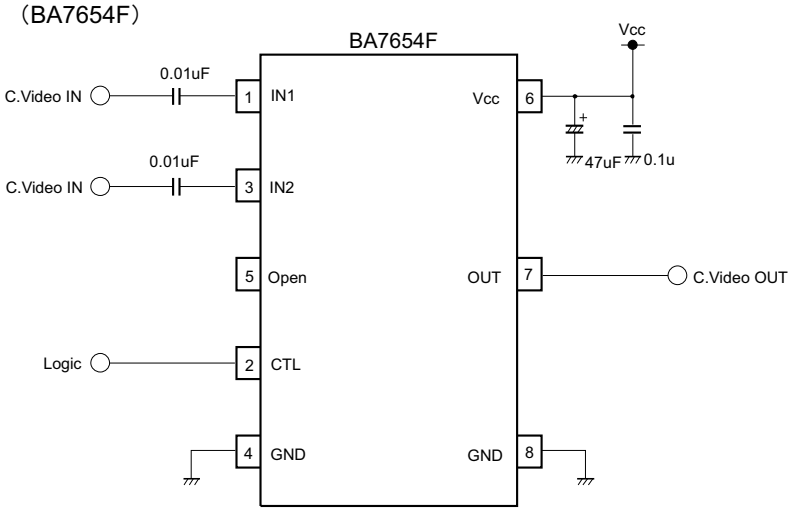


Fig.4

（When superimpossion is used）

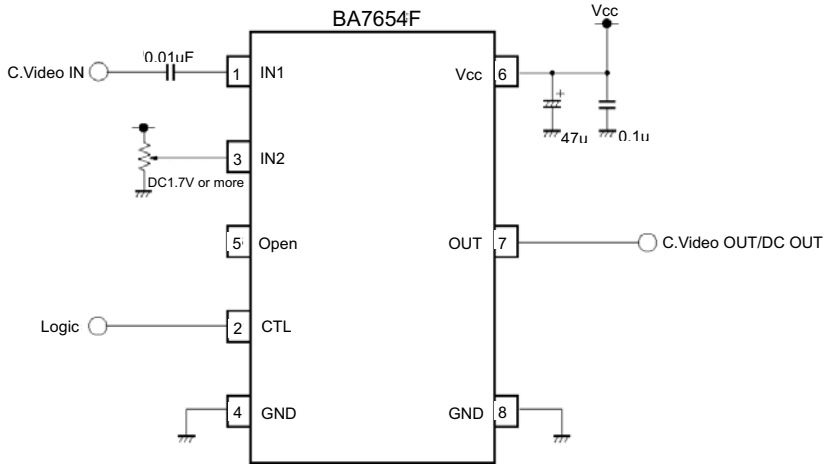


Fig.5

●**Cautions on 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 a BA7654AF 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 (A 0.01μF (FZ) ceramic capacitor is recommended).
10. CTL pin is in indeterminate status when left Open. Set it at “H” or “L” level.
11. For superimposed, a 1.7v DC voltage should be applied directly to an input pin.

●**Application circuit** 2/2 （BA7653AF/53AFV/52AF）

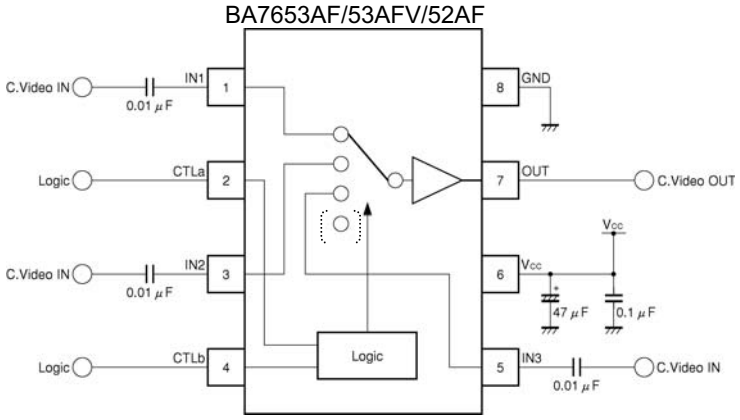


Fig.6

（When superimpossion is used）

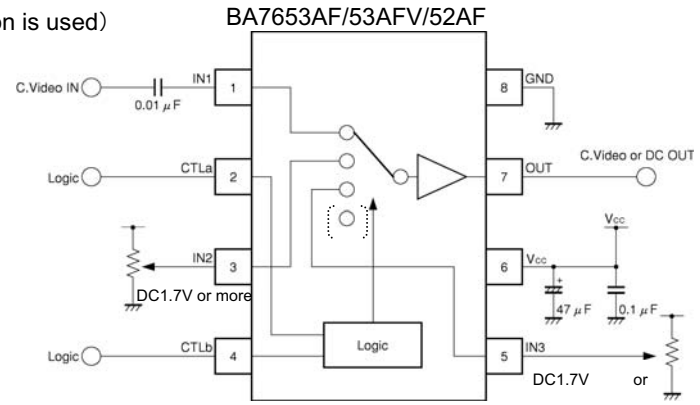


Fig.7

●**Cautions on use**

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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 a BA7653AF/53AFV/52AF 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 (A 0.01μF (FZ) ceramic capacitor is recommended).

10. The BA7653AF/53AFV/52AF is a 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 V_{CC} 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.

- Selection of order type

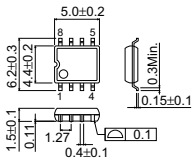
B	A	7	6	5	4	F	—	E	2

Part No.
BA7654F
BA7653AF/AFV
BA7652AF

Tape and Reel information

SOP8

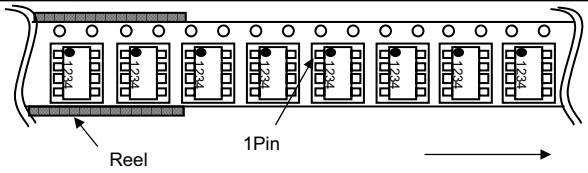
<Dimension>



(Unit:mm)

<Tape and Reel information>

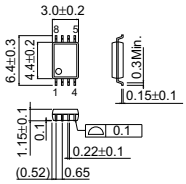
Tape	Embossed carrier tape
Quantity	2500pcs
Direction of feed	E2 (The direction is the 1pin of product is at the upper left when you hold reel on the left hand and you pull out the tape on the right hand)



※When you order , please order in times the amount of package quantity.

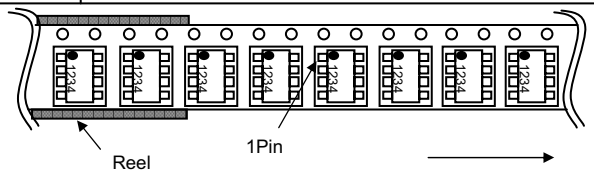
SSOP-B8

<Dimension>



<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)



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Seoul	TEL: +82-2-8182-700	FAX: +82-2-8182-715
Masan	TEL: +82-55-240-6234	FAX: +82-55-240-6236
Dalian	TEL: +86-411-8230-8549	FAX: +86-411-8230-8537
Beijing	TEL: +86-10-8525-2483	FAX: +86-10-8525-2489
Tianjin	TEL: +86-22-23029181	FAX: +86-22-23029183
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Hangzhou	TEL: +86-571-87658072	FAX: +86-571-87658071
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Kaohsiung	TEL: +886-7-237-0881	FAX: +886-7-238-7332
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Philippines	TEL: +63-2-807-6872	FAX: +63-2-809-1422
Thailand	TEL: +66-2-254-4890	FAX: +66-2-256-6334
Kuala Lumpur	TEL: +60-3-7958-8355	FAX: +60-3-7958-8377
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Catalog No.08T298A '08.8 ROHM

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It is our top priority to supply products with the utmost quality and reliability. However, there is always a chance of failure due to unexpected factors. Therefore, please take into account the derating characteristics and allow for sufficient safety features, such as extra margin, anti-flammability, and fail-safe measures when designing in order to prevent possible accidents that may result in bodily harm or fire caused by component failure. ROHM cannot be held responsible for any damages arising from the use of the products under conditions out of the range of the specifications or due to non-compliance with the NOTES specified in this catalog.

Thank you for your accessing to ROHM product informations.
More detail product informations and catalogs are available, please contact your nearest sales office.

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