Technical Note

High-Performance Video Signal Switchers

Triple-circuit Video Switchers

BA7602F,BA7603F,BA7606F,BA7606FS,BA7607F,BA7609F,BA7627FV

No.11066EAT02

●Description

These video switching ICs, which contain two or three 2-input circuits, were developed for switching TV, DVD, and other video signals. Input pin formats can be selected from bias mode (R=20 kΩ), sync-tip mode, and pedestal clamp mode. Having a large dynamic range and broad frequency characteristics, these switches are suited to a wide range of applications from audio signals to video signals.

●Features

1) Contain three 2-input, 1-output switch circuits
2) Power supply voltage (4.5~5.5 V)
3) Low power consumption
4) Good frequency characteristics
5) Large dynamic range
6) Bias input (BA7602F)
   Sync-tip clamp input (BA7603F)
   Pedestal clamp input (BA7606F, BA7606FS)
   Bias input + sync-tip clamp input (BA7607F, BA7609F, BA7627FV)
7) Large input impedance (Typ.20kΩ)
8) Fast switching speed (Typ. 50ns)

●Applications

For switching TV, DVD, and Other video signals

●Line up matrix

Part No.	Circuit current (mA)	Built-in circuit	Input type	Distortion (%)	Maximum output level (V_{P-P})	Package
BA7602F	14.0	2 in 3 circuits	Bias	—	3.1	SOP16
BA7603F	13.0	2 in 3 circuits	Clamp	—	2.9	SOP16
BA7606F BA7606FS	15.0	2 in 3 circuits	Pedestal Clamp	—	2.6	SOP16/ SSOP-A16
BA7607F	12.5	2 in 3 circuits	Clamp 2 Bias1	0.007	3.0	SOP16
BA7609F	12.5	2 in 3 circuits	Clamp 1 Bias 2	0.007	3.0	SOP16
BA7627FV	12.5	2 in 3 circuits	Clamp 2 Bias1	0.007	3.0	SSOP-B16

●Absolute Maximum Ratings (Ta=25℃)

Parameter		Symbol	Ratings	Unit
Supply voltage		Vcc	9	V
Power dissipation	BA7602F BA7603F BA7606F BA7607F BA7609F	Pd	500 *1	mW
	BA7606FS		650 *2	
	BA7627FV		450 *1	
Operating temperature		Topr	−40～＋85	℃
Storage temperature		Tstg	−55～＋125	℃

*1 Deratings is done at 5.0mW/℃ above Ta=25℃.(BA7603F, BA7606F, BA7607F, BA7609F, BA7627FV)
*2 Deratings is done at 6.5mW/℃ above Ta=25℃.(BA7606FS)

●Operating Range (Ta=25℃)

Parameter	Symbol	Ratings			Unit
		Min.	Typ.	Max.	
Supply voltage	Vcc	4.5	5.0	5.5	V

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

Parameter		Symbol	Limits (Typ.)						Unit	Conditions
			02F	03F	06F/ 06FS	07F	09F	27FV		
Circuit current		Icc	14.0	13.0	15.0	12.5			mA	—
Maximum output level1	Clamp	Vom1	—	2.9	—	2.9			V_{P-P}	f=1kHz, THD=0.5%, with clamp
Maximum output level2	Bias	Vom2	3.1	—	—	3.0			V_{P-P}	f=1kHz, THD=0.5%, without clamp
Maximum output level U	Pedestal clamp	VomU	—		1.65	—			V_{P-P}	Dynamic range on positive side of clamp level
Maximum output level D	Pedestal clamp	VomD	—		0.95	—			V_{P-P}	Dynamic range on negative side of clamp level
Voltage gain		Gv	0						dB	f=1MHz, V_{IN}=1 V_{P-P}
Interchannel crosstalk		C_T	-65						dB	f=4.43MHz, V_{IN}=1 V_{P-P}
Frequency characteristic		Gf	0		-1	0			dB	10MHz/1MHz, V_{IN}= V_{P-P}
Total harmonic distortion		THD	—			0.007			%	f=1kHz, 1Vp-p, Bias type
CTL pin switching level		V_{TH}	2.5						V	H: IN1 L: IN2
Clamp input level		V_{ct}	L≦0.75			H≧2.2			V	Only BA7606F, BA7606FS

● Block diagram

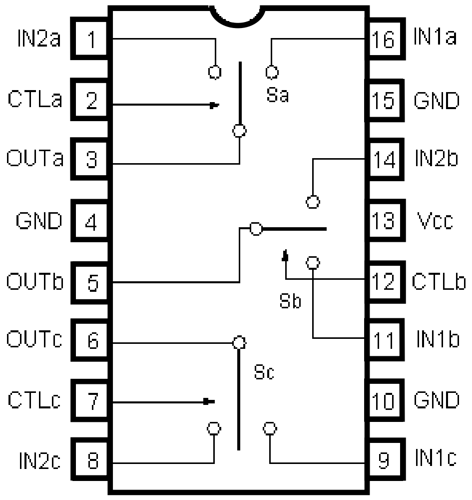


Fig.1 BA7602F

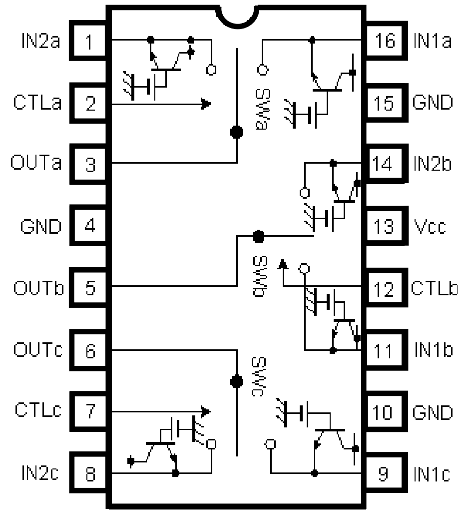


Fig.2 BA7603F

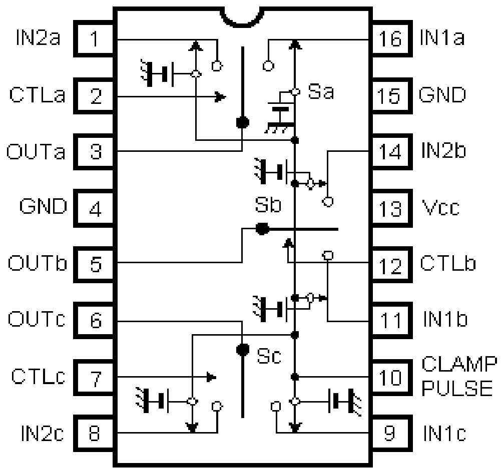


Fig.3 BA7606F, BA7606FS

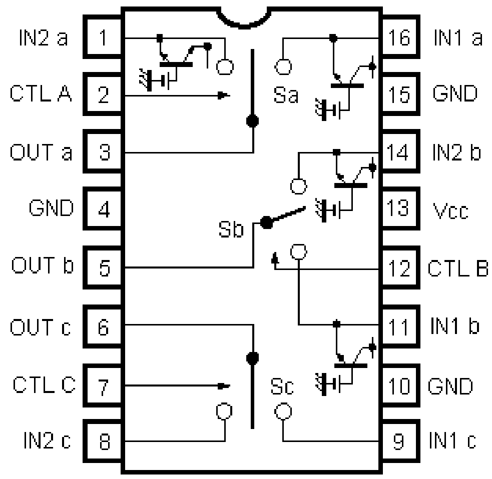


Fig.4 BA7607F, BA7627FV

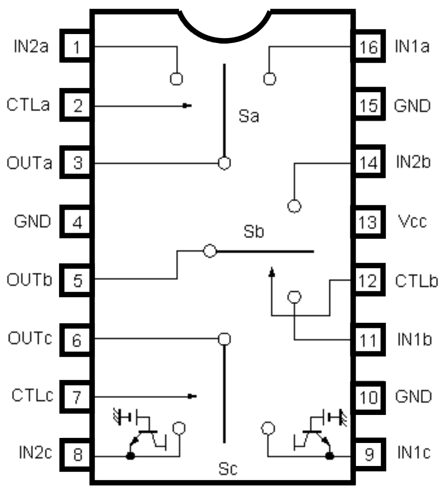


Fig.5 BA7609F

CTL pin settings

CTL	OUTPUT
L	IN2
H	IN1

● Reference data

Pin DC voltage(VCC=5V, Ta=25℃)

Pin No.	Pin DC voltage (V)				
	BA7602F	BA7603F	BA7606F BA7606FS	BA7607F BA7627FV	BA7609F
1	3.27	2.05	2.96	2.05	2.48
2	4.91	4.91	4.91	4.91	4.91
3	1.84	0.65	1.54	0.65	1.76
4	0	0	0	0	0
5	1.84	0.65	1.54	0.65	1.76
6	1.84	0.65	1.54	1.76	0.65
7	4.91	4.91	4.91	4.91	4.91
8	3.27	2.05	2.96	2.48	2.05
9	3.27	2.05	2.96	2.48	2.05
10	0	0	4.97	0	0
11	3.27	2.05	2.96	2.05	2.48
12	4.91	4.91	4.91	4.91	4.91
13	5.00	5.00	5.00	5.00	5.00
14	3.27	2.05	2.96	2.05	2.48
15	0	0	0	0	0
16	3.27	2.05	2.96	2.05	2.48

Input/Output impedance

<table>
<tr><th colspan="2" rowspan="2">Parameter</th><th colspan="5">Limits (Typ.)</th><th rowspan="2">Unit</th></tr>
<tr><th>02F</th><th>03F</th><th>06F/FS</th><th>07F/27FV</th><th>09F</th></tr>
<tr><td>Input impedance</td><td>Bias</td><td>20k</td><td>—</td><td>—</td><td colspan="2">20k</td><td>Ω</td></tr>
<tr><td>Input impedance</td><td>Clamp</td><td>—</td><td colspan="4">1.7M</td><td>Ω</td></tr>
<tr><td colspan="2">Output impedance</td><td colspan="2">30</td><td>30※</td><td colspan="2">30</td><td>Ω</td></tr>
</table>

※The 6pin output impedance in the BA7606F/FS is 130Ω.

●Measurement circuit 1/2 (BA7602F, BA7603F, BA7607F, BA7609F)

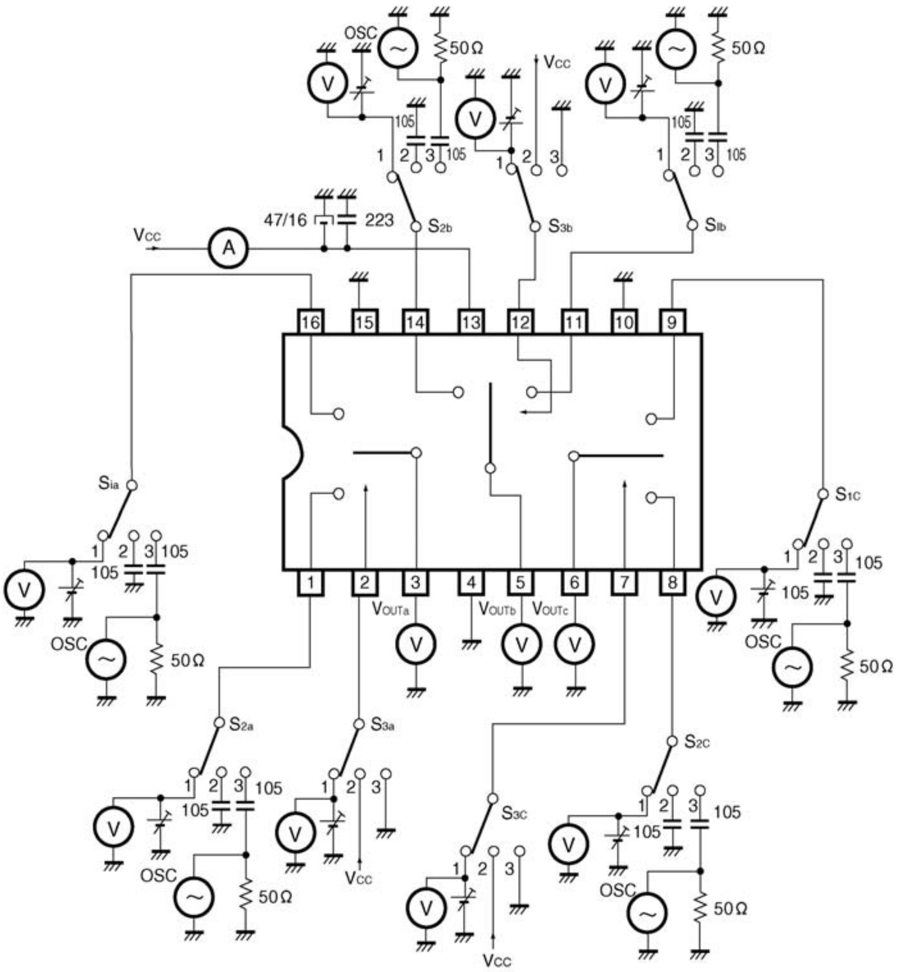


Fig.6 BA7602F, BA7603F, BA7607F, BA7609F, BA7627FV

●Measurement circuit 2/2 (BA7606F/FS)

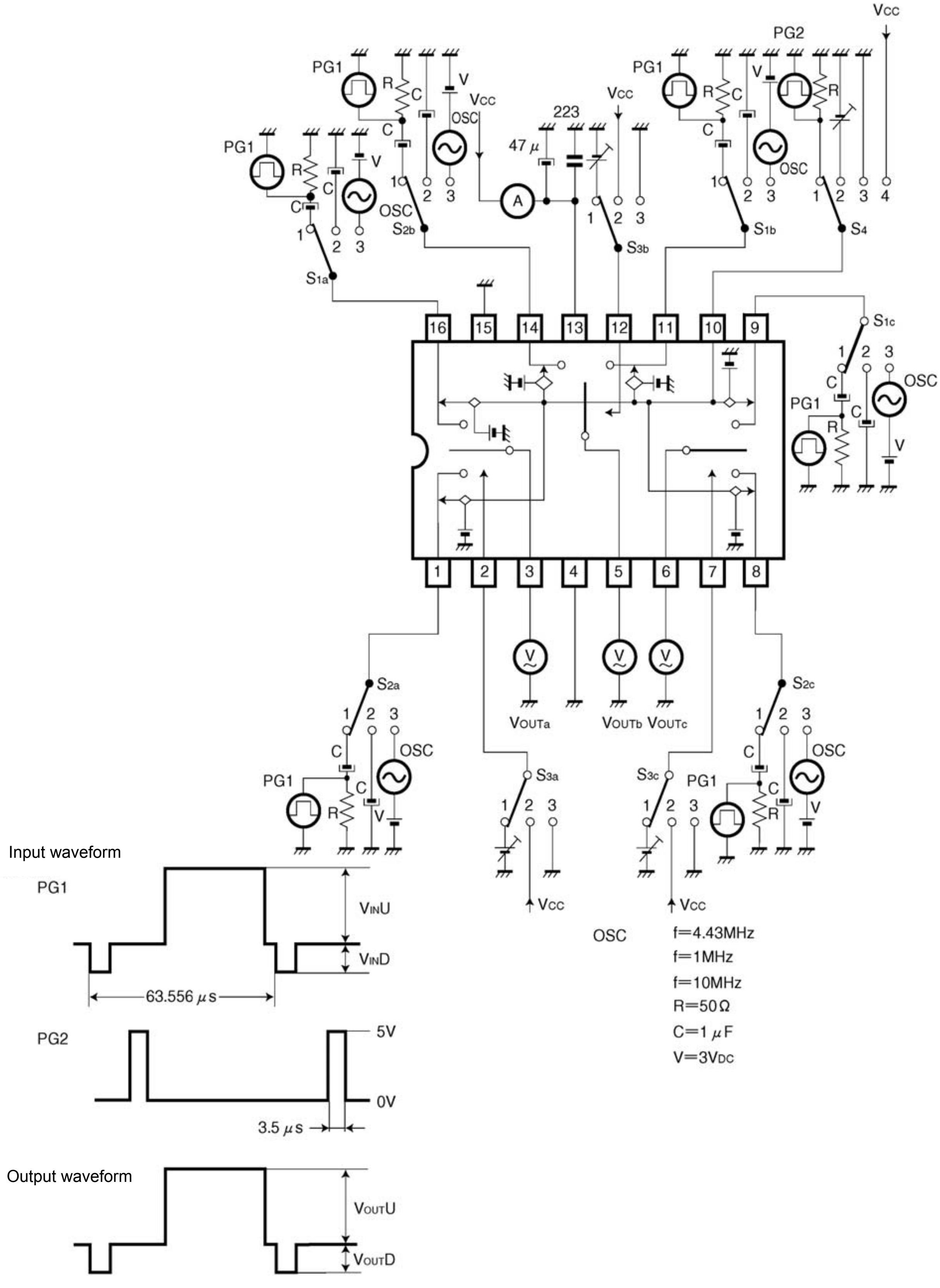


Fig.7 BA7606F, BA7606FS

●Reference data

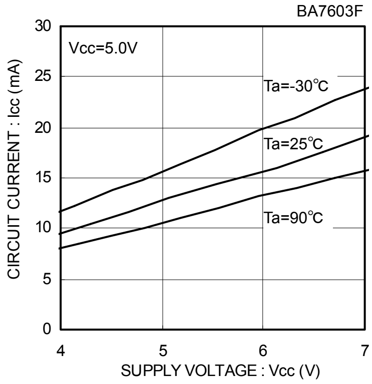


Fig.8 Circuit current vs. Supply voltage

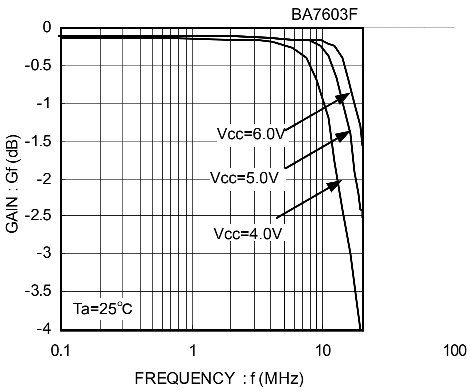


Fig.9 Frequency characteristics vs. Supply voltage

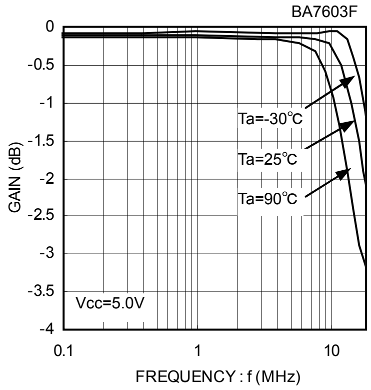


Fig.10 Frequency characteristics vs. temperature

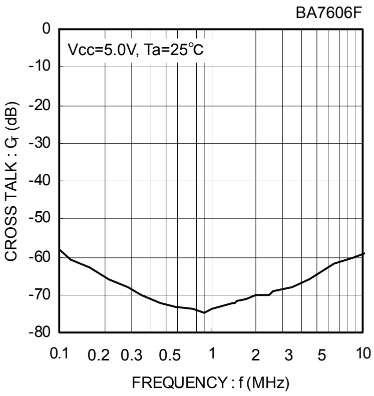


Fig.11 Interchannel crosstalk

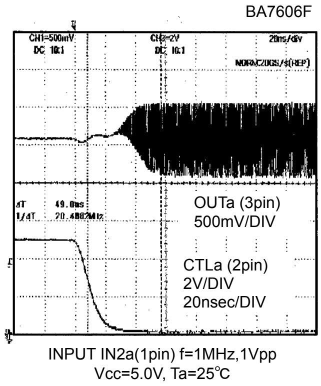


Fig.12 Switching characteristics1 OFF→ON

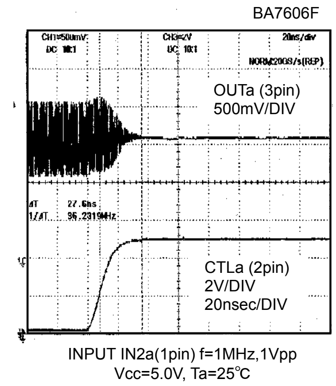


Fig.13 Switching characteristics2 ON→OFF

●Notes for use

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

2) Although we are confident in recommending the sample application circuits, carefully check their characteristics further when using them. When modifying externally attached component constants before use, determine them so that they have sufficient margins by taking into account variations in externally attached components and the Rohm LSI, not only for static characteristics but also including transient characteristics.

3) Absolute maximum ratings
If applied voltage, operating temperature range, or other absolute maximum ratings are exceeded, the LSI may be damaged. Do not apply voltages or temperatures that exceed the absolute maximum ratings. If you think of a case in which absolute maximum ratings are exceeded, enforce fuses or other physical safety measures and investigate how not to apply the conditions under which absolute maximum ratings are exceeded to the LSI.

4) GND potential
Make the GND pin voltage such that it is the lowest voltage even when operating below it. Actually confirm that the voltage of each pin does not become a lower voltage than the GND pin, including transient phenomena.

5) Thermal design
Perform thermal design in which there are adequate margins by taking into account the allowable power dissipation in actual states of use.

6) Shorts between pins and misinstallation
When mounting the LSI on a board, pay adequate attention to orientation and placement discrepancies of the LSI. If it is misinstalled and the power is turned on, the LSI may be damaged. It also may be damaged if it is shorted by a foreign substance coming between pins of the LSI or between a pin and a power supply or a pin and a GND.

7) Operation in strong magnetic fields
Adequately evaluate use in a strong magnetic field, since there is a possibility of malfunction.

8) A bias input coupling capacitor on the order of 10 μF~33 μF is appropriate.

9) A clamp input coupling capacitor on the order of 0.1 μF~1 μF is appropriate.

10) Make the clamp pulse width of the BA7606F/FS at least 1 μs.

●Ordering part number

B	A		7	6	0	2		F		-	E	2

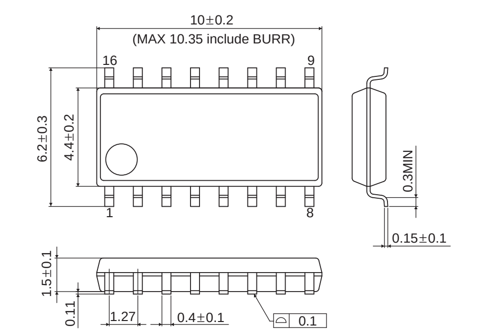
Part No.

Part No.
7602
7603
7606
7607
7609
7627

Package
F: SOP16
FS: SSOP-A16
FV:SSOP-B16

Packaging and forming specification
E2: Embossed tape and reel

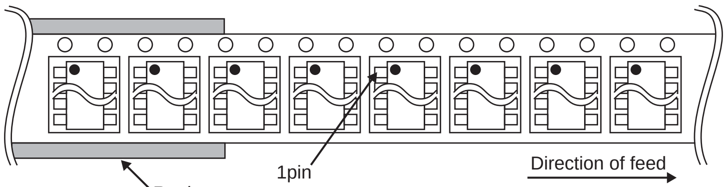
SOP16



(Unit : mm)

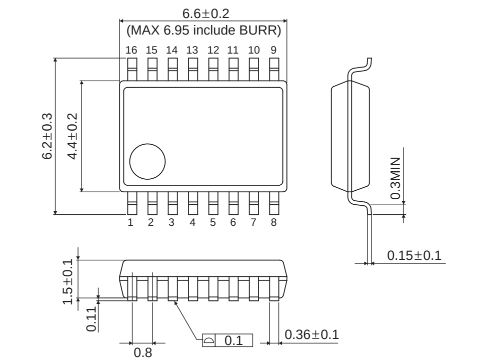
<Tape and Reel information>

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)



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

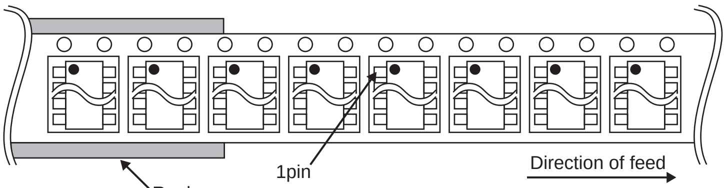
SSOP-A16



(Unit : mm)

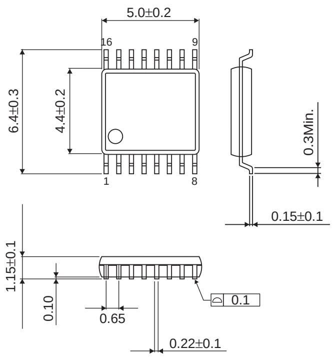
<Tape and Reel information>

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)



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

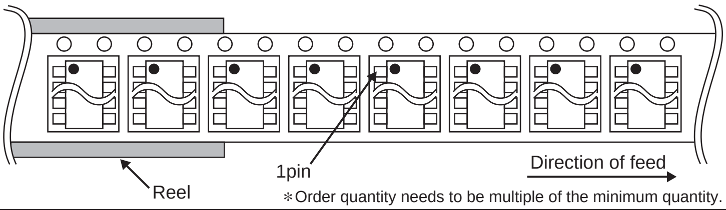
SSOP-B16



(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)



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

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