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Sound Processors for Home Theater Systems

6ch / 9ch Stereo Input Selectors


BD3843FS, BD3841FS

No.10081EAT07

●Description

BD3843FS is a function switch IC with two 6ch (9ch for BD3841FS) inputs. It can independently control outputs of 2 systems: 2ch REC output (3ch for BD3841FS) and 1ch line output. Therefore, it can be used for 2nd room entertainment and 2nd source recording. BD3843FS has excellent cross-talk characteristics between channels and selectors. Low distortion, and low noise are realized by a basic pattern layout.

●Features

- 1) 2 room entertainment / 2 source recording.
- 2) 6ch volume LSI BD3813KS/BD3815KS can be controlled simultaneously by the serial control bus.
- 3) 7ch volume LSI BD3816K1, BD3817KS with BD3843FS can be controlled simultaneously by the serial control bus.
- 4) 14ch input is available by combining 2chips (BD3843FS and BD3841FS).
- 5) Excellent cross-talk characteristics between channels by basic pattern layout.
- 6) Built-in buffer amplifier.
- 7) 2-line serial control bus (for both 3.3V and 5V).
- 8) Operated by single and dual power sources.

●Applications

AV receivers, home theater systems, mini-audio systems, and TVs.

●Product lineup

Parameter	BD3843FS	BD3841FS
Input selector	6	9
REC output	2	3
Package	SSOP-A24	SSOP-A32

●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Ratings	Unit
Power Supply Voltage	VCC	7.5 *1	V
	VEE	-7.5	
Input signal voltage	VIN	VCC+0.3~VEE-0.3	V
Power Dissipation	Pd	800 (BD3843FS) 950 (BD3841FS)	*2 mW
Operating temperature	Topr	-20~+75	°C
Storage temperature	Tastg	-55~+125	°C

*1 Even in the specified range of Power Supply Voltage, applying voltage only to the VCC side may cause an excessive current may cause permanent damage to the IC.

When starting up power supplies, VEE and VCC should be powered on simultaneously, or VEE first followed by VCC.

*2 Reduced by 8 mW/°C over 25°C (BD3843FS), when installed on the standard board (size: 70 x 70 x 1.6mm).
Reduced by 7.7 mW/°C over 25°C (BD3841FS), when installed on the standard board (size: 70 x 70 x 1.6mm).

● Operating range

Must function normally at $T_a = 25^\circ\text{C}$,

Part No.	Parameter	Symbol	Ratings			Unit
			Min.	Typ.	Max.	
BD3843FS	Action power source voltage (both power sources)	VCC	4	7	7.3	V
		VEE	-7.3	-7	-4	
	Action power source voltage (single power source)	VCC- VEE	8	14	14.6	
BD3841FS	Action power source voltage (both power sources)	VCC	5	7	7.3	V
		VEE	-7.3	-7	-5	
	Action power source voltage (single power source)	VCC- VEE	10	14	14.6	

● Electrical characteristics

$T_a=25^\circ\text{C}$, $V_{CC}=7\text{V}$, $V_{EE}=7\text{V}$, $f=1\text{kHz}$, $V_{in}=1\text{V}_{rms}$, $R_L=10\text{k}\Omega$, $R_g=600\Omega$, unless otherwise noted.

	Parameter		Symbol	Limits			Unit	Conditions
				Min.	Typ.	Max.		
	Circuit current	VCC	IQ	—	3	10	mA	No signal
		VEE		-10	-3	—		
Output	Output voltage gain 1ch		Gv1	-2	0	2	dB	
	Output voltage gain 2ch		Gv2	-2	0	2	dB	
	Total harmonic distortion ratio 1ch		THD1	—	0.004	0.05	%	BW=400~30kHz
	Total harmonic distortion ratio 2ch		THD2	—	0.004	0.05	%	BW=400~30kHz
	Maximum output voltage 1ch		Vomax1	3.4	4.2	—	Vrms	THD=1%
	Maximum output voltage 2ch		Vomax2	3.4	4.2	—	Vrms	THD=1%
	Output noise voltage 1ch		Vno1	—	1	5	μV_{rms}	$R_g=0\Omega$, BW=IHF-A
	Output noise voltage 2ch		Vno2	—	1	5	μV_{rms}	$R_g=0\Omega$, BW=IHF-A
	Cross-talk between channels 1ch→2ch		CTC12	—	-95	-80	dB	$R_g=0\Omega$, BW=IHF-A
	Cross-talk between channels 2ch→1ch		CTC21	—	-95	-80	dB	$R_g=0\Omega$, BW=IHF-A
	Cross-talk between selectors 1ch		CTS1	—	-95	-80	dB	$R_g=0\Omega$, BW=IHF-A
Cross-talk between selectors 2ch		CTS2	—	-95	-80	dB	$R_g=0\Omega$, BW=IHF-A	
REC output	R voltage gain 1ch		GVR1	-2	0	2	dB	$R_L=47\text{k}\Omega$,
	R voltage gain 2ch		GVR2	-2	0	2	dB	$R_L=47\text{k}\Omega$,
	R Total harmonic distortion ratio 1ch		THDR1	—	0.01	0.09	%	$R_L=47\text{k}\Omega$, BW=400~30kHz
	R Total harmonic distortion ratio 2ch		THDR2	—	0.01	0.09	%	$R_L=47\text{k}\Omega$, BW=400~30kHz
	R output noise voltage 1ch		VnoR1	—	1	5	μV_{rms}	$R_g=0\Omega$, BW=IHF-A
	R output noise voltage 2ch		VnoR2	—	1	5	μV_{rms}	$R_g=0\Omega$, BW=IHF-A
	R output impedance 1ch		RoutR1	—	50	100	Ω	
	R output impedance 2ch		RoutR2	—	50	100	Ω	

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

●Timing chart

1. Signal timing standards

- Data is read at the rise of clock.
- Latch is read at the fall of clock.
- End latch signal at LOW.
- * To avoid malfunctions, clock and data signals must terminate with the LOW state.

1byte=17bit

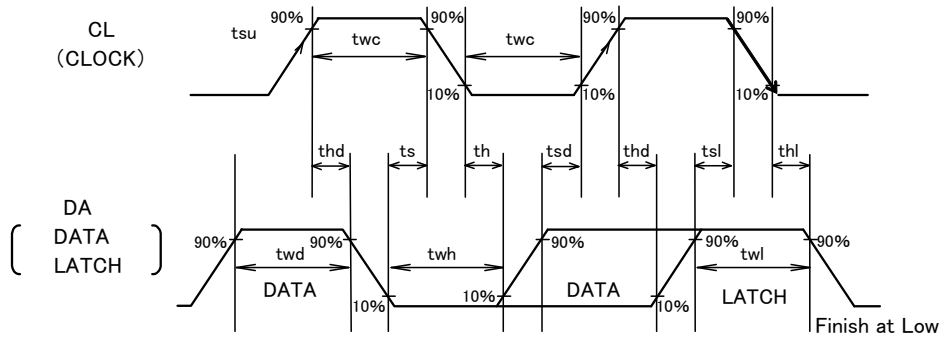


Fig.1

Parameter	Symbol	Limit			Unit
		Min.	Typ.	Max.	
Minimum clock width	twc	2.0	—	—	μs
Minimum data width	twd	2.0	—	—	μs
Minimum latch width	twl	2.0	—	—	μs
LOW hold width	twh	2.0	—	—	μs
Data setup time (DATA→CLK)	tsd	1.0	—	—	μs
Data hold time (CLK→DATA)	thd	1.0	—	—	μs
Latch setup time (CLK→LATCH)	tsl	1.0	—	—	μs
Latch hold time (DATA→LATCH)	thl	1.0	—	—	μs
Latch low setup time	ts	1.0	—	—	μs
Latch low hold time	th	1.0	—	—	μs

2. Voltage standards of control signal

Parameter	Conditions	Limits			Unit
		Min.	Typ.	Max.(≤Vcc)	
“H” input voltage	Vcc=5~7.3V	2.2	—	5.5	V
“L” input voltage	VEE=-5~-7.3V	0	—	1.0	V

3. Control data format list

(1) BD3843FS control data format

← Data input direction

	MSB																LSB
	D16	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
Data	INPUT FUNCTION 1				INPUT FUNCTION 2				RECA 0:OFF 1:ON	RECB 0:OFF 1:ON	*	0	0	0	Select Address		

(2) BD3841FS control data format

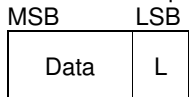
← Data input direction

	MSB																LSB
	D16	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
Data	INPUT FUNCTION 1				INPUT FUNCTION 2				RECA 0:OFF 1:ON	RECB 0:OFF 1:ON	RECC 0:OFF 1:ON	*	*	*	1	0	1

*:Don't care.

(Ex.)

← Data input direction



"L" represents latch.

● Block diagram, application circuit

1)BD3843FS)
(both power sources)

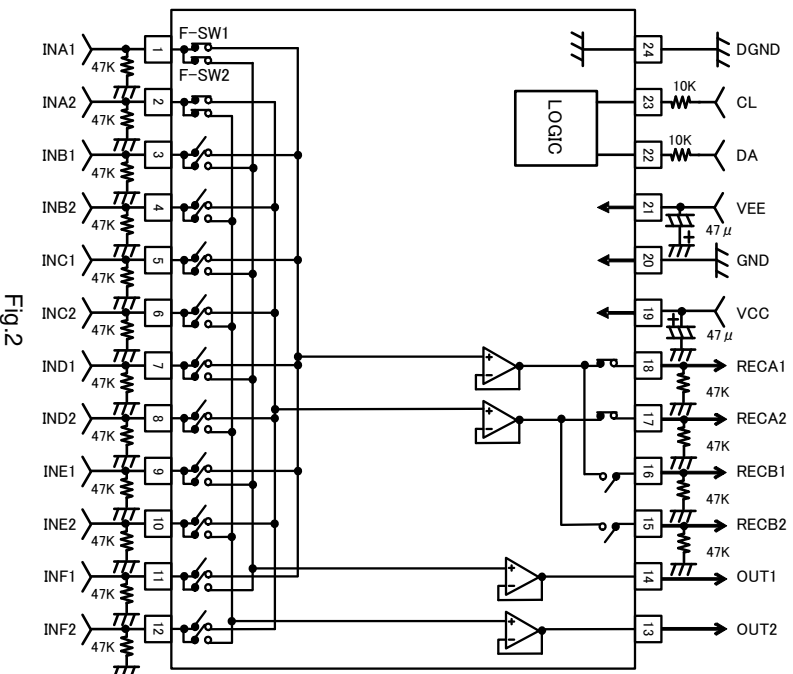


Fig.2

2)BD3841FS
(both power sources)

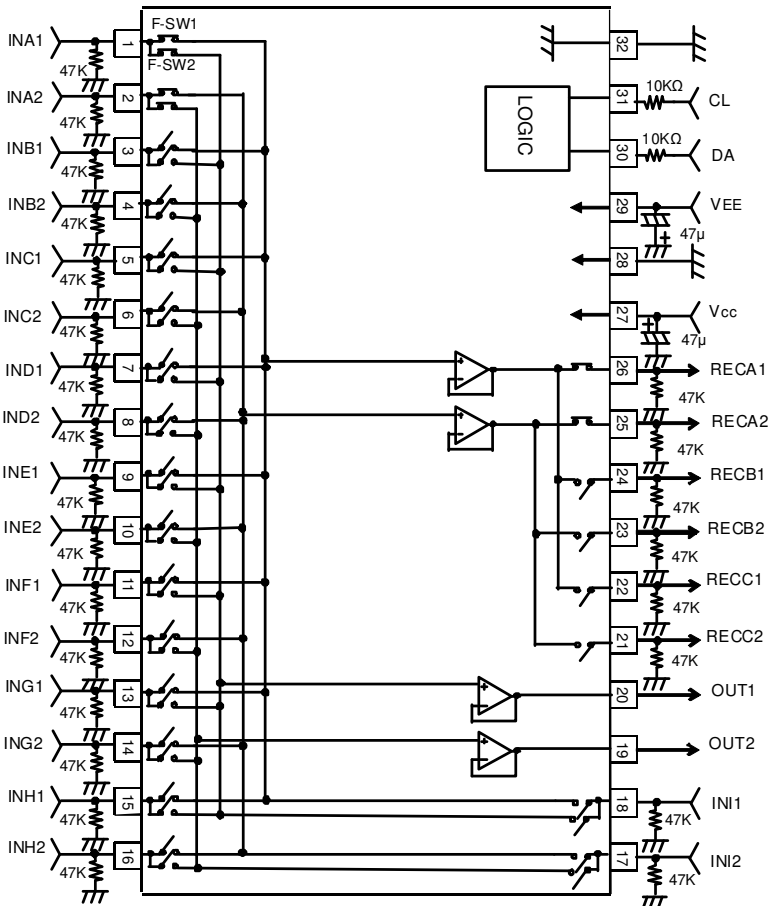


Fig.3

UNIT
RESISTANCE : Ω
CAPACITOR : F
* F-SW1 : INPUT FUNCTION1
F-SW2 : INPUT FUNCTION2

3)BD3843FS
(single power source)

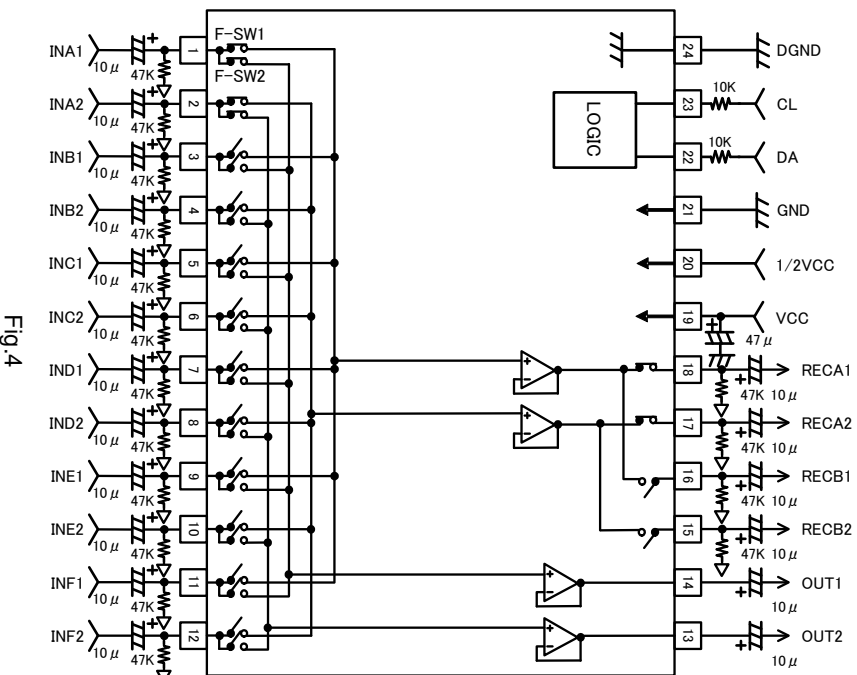


Fig.4

4)BD3841FS
(single power source)

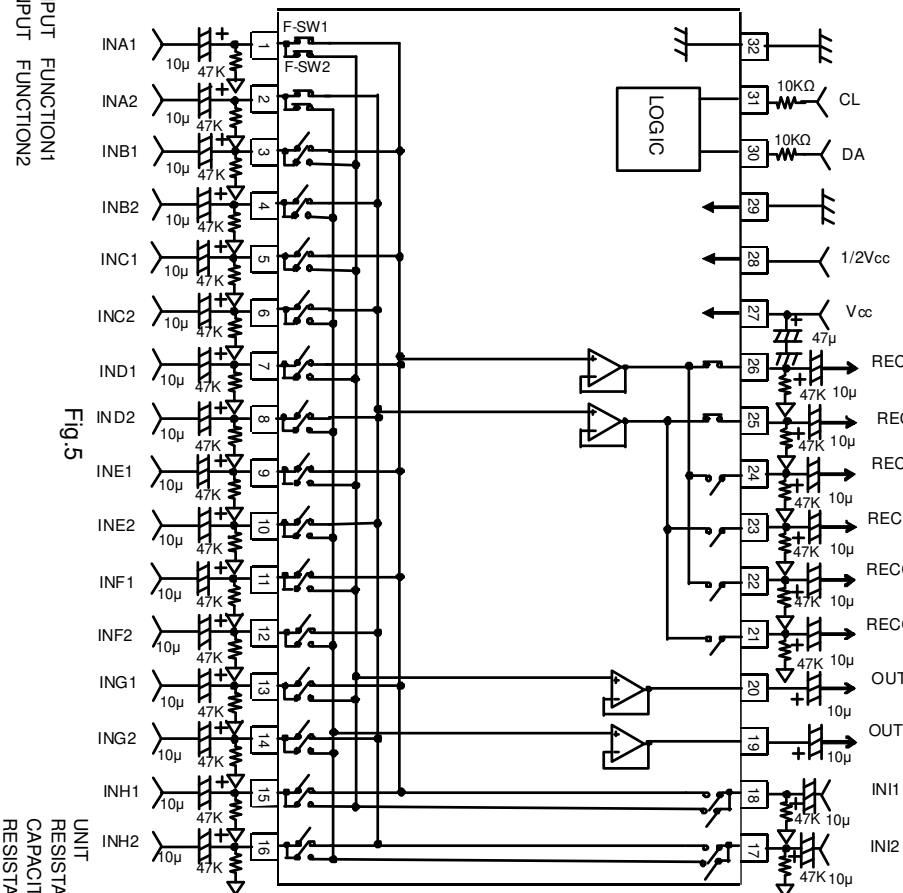


Fig.5

* F-SW1 : INPUT FUNCTION1
F-SW2 : INPUT FUNCTION2

UNIT
RESISTANCE : Ω
CAPACITOR : F
RESISTANCE : Ω

● Reference data

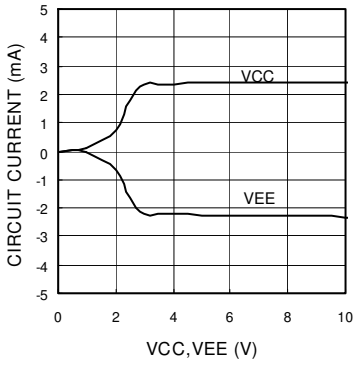


Fig.6 Circuit Current - Supply Voltage

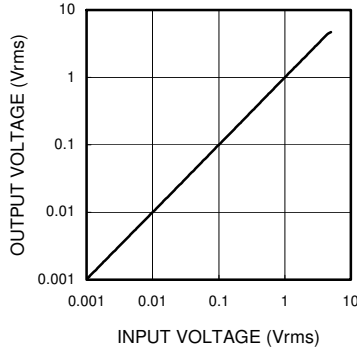


Fig.7 Output Voltage - Input Voltage

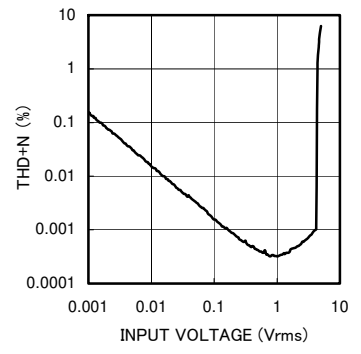


Fig.8 Total Harmonic Distortion - Input Voltage

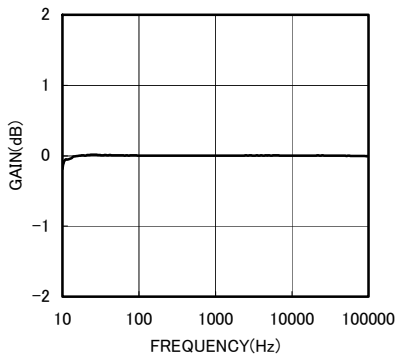


Fig.9 Voltage Gain - Frequency

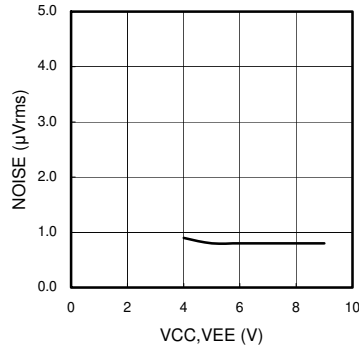


Fig.10 Output Noise Voltage - Supply Voltage

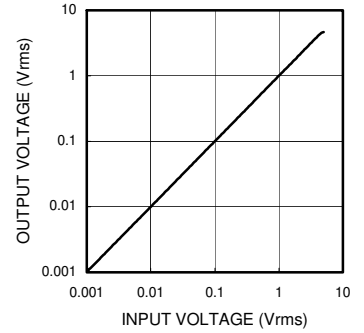


Fig.11 REC Output Voltage - Input Voltage

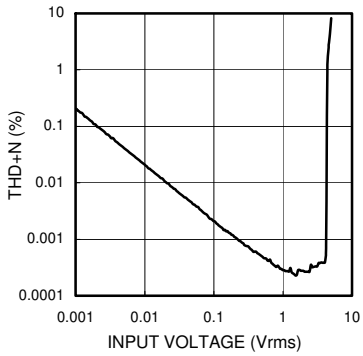


Fig.12 REC Total Harmonic Distortion - Input Voltage

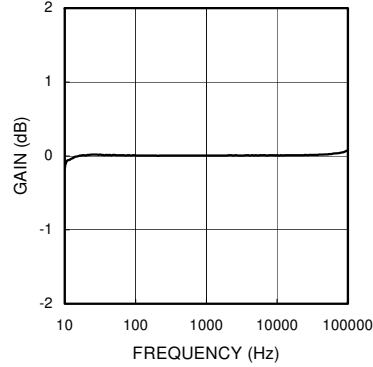


Fig.13 REC Voltage Gain - Frequency

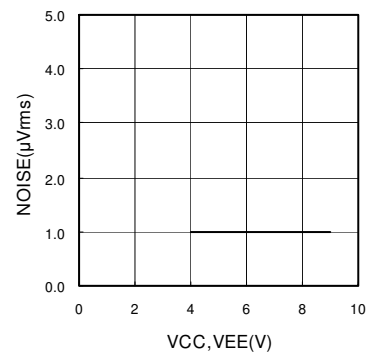


Fig.14 REC Output Noise - Supply Voltage

● 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 (T_{opr}), 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. VEE potential
Make the VEE 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 VEE pin, including transient phenomena.
5. Thermal design
Perform thermal design, in which there are adequate margins, by taking into account the power dissipation (P_d) 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. Operating Voltage Range and Operating Temperature Range
Circuit function actions are guaranteed within the action voltage range and the action temperature range. However, the specific values of the electrical characteristics are guaranteed under the specified conditions of the electrical characteristics. Therefore, carry out set considerations in sufficient consideration of IC characteristic fluctuations..
9. Power ON/OFF
 - (a) At power ON/OFF, a shock sound will be generated. Therefore, use MUTE on the set.
 - (b) When turning on power supplies, VEE and VCC should be powered on simultaneously, or VEE first followed by VCC. If the VCC side is started up first, an excessive current may flow from VCC to VEE.
10. Serial control
For the CL and DA terminals, the patterned and other wirings should be routed as not to cause interference with the analog-signal-related lines.
11. Function switching
For all functions, other than Master Volume, Treble, and Bass Gain Settings, use MUTE on the set.

● Ordering part number

B	D
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Part No.

3	8	4	3
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Part No.
3843
3841

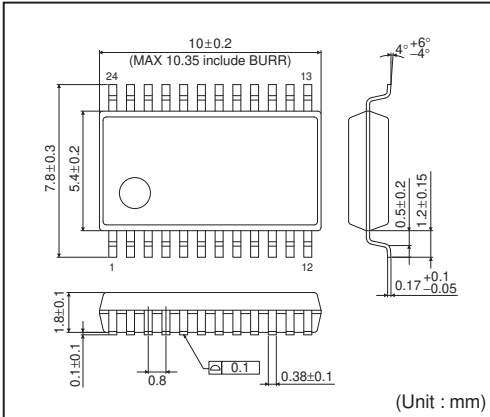
F	S
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Package
FS: SSOP-A24
SSOP-A32

E	2
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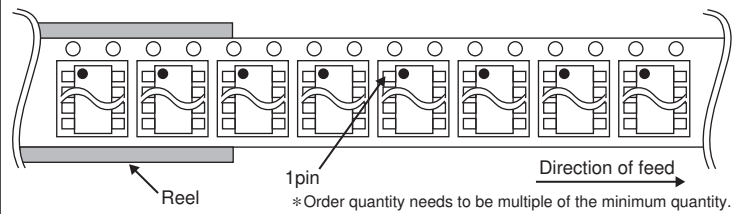
Packaging and forming specification
None: Tray

SSOP-A24

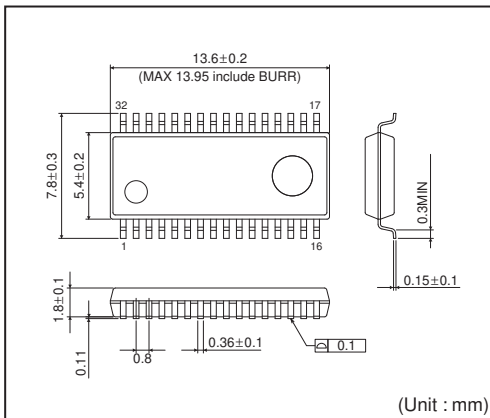


<Tape and Reel information>

Tape	Embossed carrier tape
Quantity	2000pcs
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)

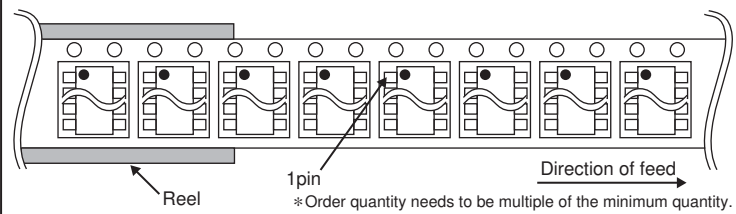


SSOP-A32



<Tape and Reel information>

Tape	Embossed carrier tape
Quantity	2000pcs
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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