Video/Audio Interfaces for TV and DVD Recorders

PAL Audio I/O Interface

BD3825FS

Pb Free
ROHM Electronic Components

●Description

BD3825FS is an audio signal switch IC used for PAL DVD-Recorders. BD3825FS supports six input lines which are controlled by the I^2C-BUS of video signal LSI BH7624KS2. In addition, BD3825FS has two built-in Function Switch features.

●Features

1) Vcc = ±5V (for Audio signal), +12V (for Function SW)
   Audio SW (C-MOS analog switch configuration)
2) 3 inputs - 1output SW, (2 circuits built-in with MUTE function)
3) 2 inputs - 1output SW, (2 circuits built-in with MUTE function)
4) THD (typ.) = 0.007%
5) S/N (typ.) = 90dB
6) Crosstalk (typ.) = 90dB
7) ON resistance (max.) = 300Ω
8) 2 Function Switch outputs

●Applications

DVD-Recorder, STB, etc.

●Absolute maximum ratings（Ta=25°C）

Parameter	Symbol	Limits	Unit
Power Supply Voltage1	V_1	±6.0	V
Power Supply Voltage2	V_2	+13.5	V
Power Dissipation	Pd	800 *1	mW
Operating Temperature Range	Topr	-25 ～ +75	°C
Storage Temperature Range	Tstg	-55 ～ +125	°C

*1 Reduced by 9 mW/°C over 25°C.

●Operating range (Ta=25°C)

Parameter	Symbol	Limits	Unit
Supply voltage1	Vcc1	±4.5～±5.5	V
Supply voltage2	Vcc2	11.5～12.5	V

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

●**Electrical characteristics** (Unless otherwise specified, Vcc1=±5.0V, Vcc2=12V, Ta=25°C)

Item	Symbol	Limit			Unit	Conditions
		MIN.	TYP.	MAX.		
＜whole＞						
Circuit Current 1	I_{ATYP1}	2.5	5.0	7.5	mA	Vcc1=±5V
Circuit Current 2	I_{ATYP2}	5.0	10.0	15.0	mA	Vcc2=12V
＜AUX, L1_R,L OUT＞						
Frequency Characteristic	F_{FC}	-1.0	0.0	1.0	dB	Vin=2Vrms, f=20Hz/100kHz R_L=47kΩ
Distortion	F_{DIS}	-	0.007	0.1	%	Vin=2.2Vrms, f=1kHz R_L=47kΩ
S/N	F_{SN}	80	90	-	dB	Vin=2Vrms, f=1kHz No Filter
ON Resistance	R_{ON}	-	200	300	Ω	Vin=0V
MUTE Attenuation	F_{MUTE}	-	-80	-75	dB	Vin=2Vrms, f=1kHz R_L=47kΩ
ASW1 SW Crosstalk	F_{SWCRS1}	-	-90	-85	dB	Vin=2Vrms, f=1kHz
ASW2 SW Crosstalk	F_{SWCRS2}	-	-90	-85	dB	Vin=2Vrms, f=1kHz
Between crosstalk channel (AUX_L ch⇔R ch)	F_{CHCRS1}	-	-90	-85	dB	Vin=2Vrms, f=1kHz
Between crosstalk channel (L1_L ch⇔R ch)	F_{CHCRS2}	-	-90	-85	dB	Vin=2Vrms, f=1kHz
FS_AUX,FS_L1 output voltage H	V_{FSOH}	10.0	11.0	12.0	V	R_L=10kΩ
FS_AUX,FS_L1 output voltage M	V_{FSOM}	5	5.75	6.5	V	R_L =10kΩ
FS_AUX,FS_L1 output voltage L	V_{FSOL}	0	0	1.5	V	R_L =10kΩ
ASW1,2,3,4 input voltage H	V_{ASWH}	2.0	-	+Vcc1	V	
ASW1,2,3,4 input voltage L	V_{ASWL}	0	-	1.0	V	
FS_AUX, FS_L1 input voltage H	V_{FSIH}	3.9	-	+Vcc1	V	
FS_AUX, FS_L1 input voltage M	V_{FSIM}	1.65	-	3.1	V	
FS_AUX, FS_L1 input voltage L	V_{FSIL}	0	-	0.85	V	

●Block diagram

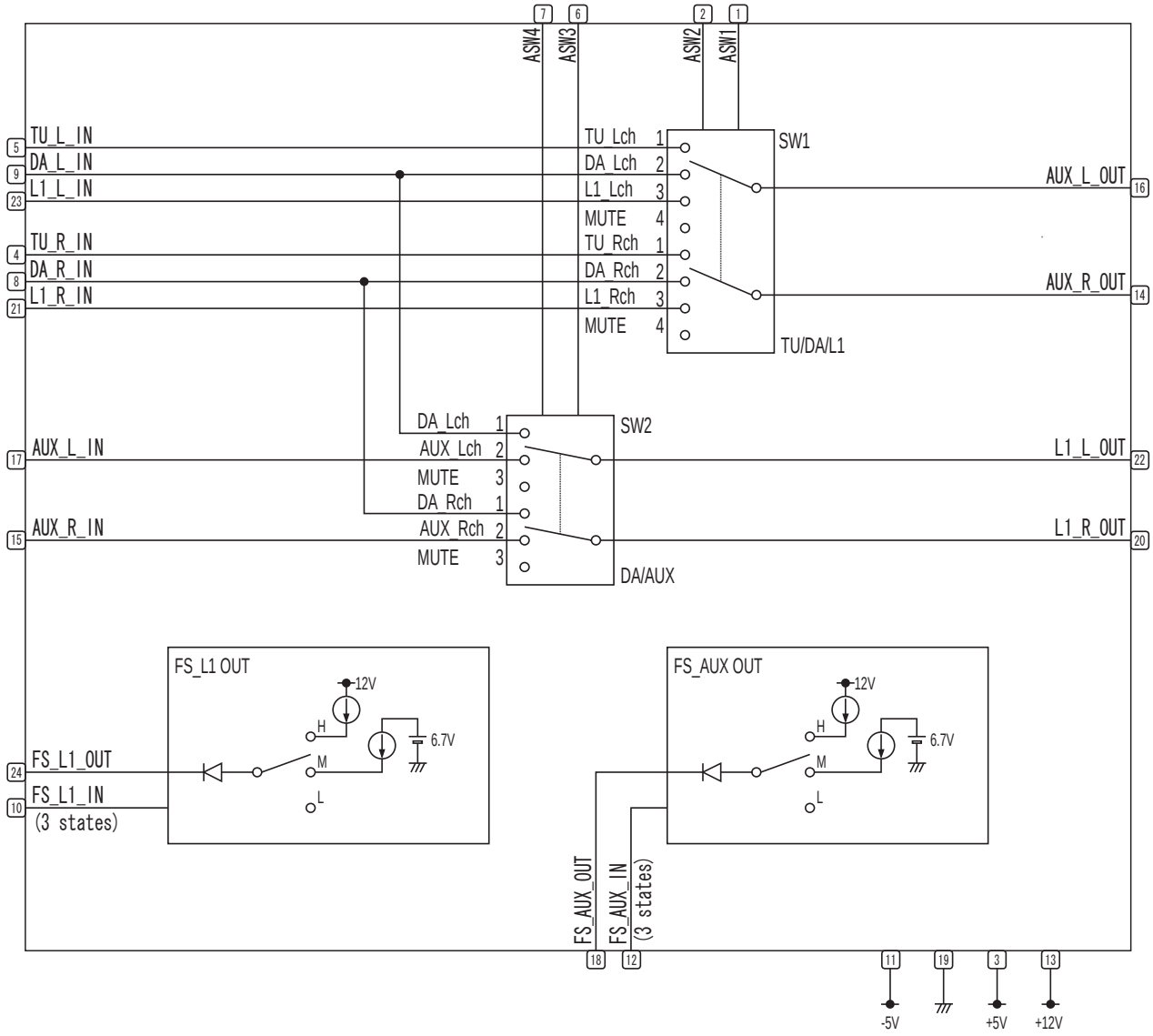
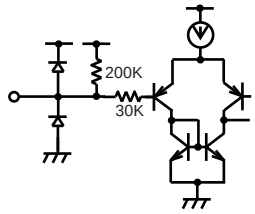
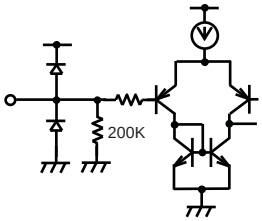
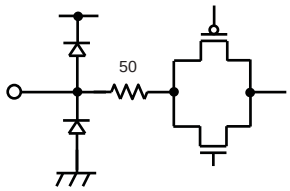
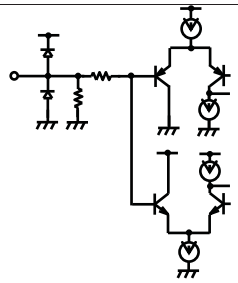
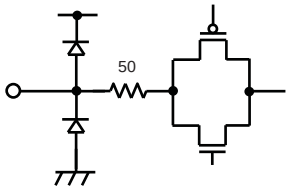
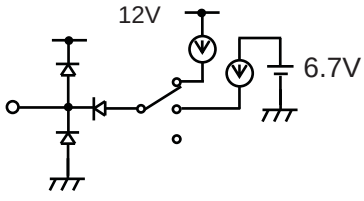
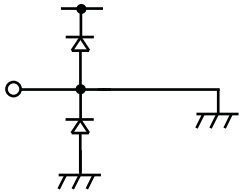


Fig.1 Block Diagram

●**Equivalent circuit**

PIN NO.	Pin name	IN	OUT	Referance Voltage	Equivalent Circuit	Function
1 7	ASW1 ASW4	○	—	Threshold 1.0～2.0V		SW control signal input terminal At Input open, input becomes “H” due to the pull up resistance. Input impedance is 200kΩ
2 6	ASW2 ASW3	○	—	Threshold 1.0～2.0V		SW control signal input terminal At input open, input becomes “L” due to the pull down resistance. Input Impedance is 200kΩ.
3 11 13	+5V -5V +12V	—	—	5V -5V 12V		Power supply terminal
4 5 8 9 15 17 21 23	TU_R_IN TU_L_IN DA_R_IN DA_L_IN AUX_R_IN AUX_L_IN L1_R_IN L1_L_IN	○	—	—		Audio signal input terminal The audio signal input terminal is connected to the analog switch inside.
10 12	FS_L1_IN FS_AUX_IN	○	—	Threshold 0.85～ 1.65V 3.1～ 3.9V		FS control signal input terminal It has two threshold voltages. At input open, it becomes “L” input due to the pull down resistance. Input impedance is 200kΩ
14 16 20 22	AUX_R_OUT AUX_L_OUT L1_R_OUT L1_L_OUT	—	○	—		Audio signal output terminal A chosen audio signal can be outputted using the input transfer switch.
18 24	FS_AUX_OUT FS_L1_OUT	—	○	H:11.0V M:5.75V L:0V		FS output terminal FS output circuit has 3 output states H, M & L. Load resistance above 10kΩ is used. Output becomes HiZ at “L” selection.
19	GND	—	—	0V		GND terminal

●Description of operations

① SW1, SW2
Audio input is controlled by I^2C-BUS of BH7624KS2.

② FS_L1_OUT, FS_AUX_OUT
The 3 states signal (HI, MID, LOW) of the 5V standard is input into FS_L1_IN (10pin), FS_AUX_IN (12pin).
Then FS_L1_OUT (24pin), FS_AUX_OUT (18pin) output standard signal of the 12V.
This output becomes a Function Switch of the scart connector.

●SW Control truth table

SW1

ASW1	ASW2	AUX_L_OUT	AUX_R_OUT
L	L	TU_L_IN	TU_R_IN
L	H	DA_L_IN	DA_R_IN
H	L	L1_L_IN	L1_R_IN
H	H	MUTE	MUTE

SW2

ASW3	ASW4	L1_L_OUT	L1_R_OUT
L	L	DA_L_IN	DA_R_IN
L	H	AUX_L_IN	AUX_R_IN
H	L	MUTE	MUTE
H	H	MUTE	MUTE

At power Activation

ASW1 : H
ASW2 : L
ASW3 : L
ASW4 : H

●Application circuit

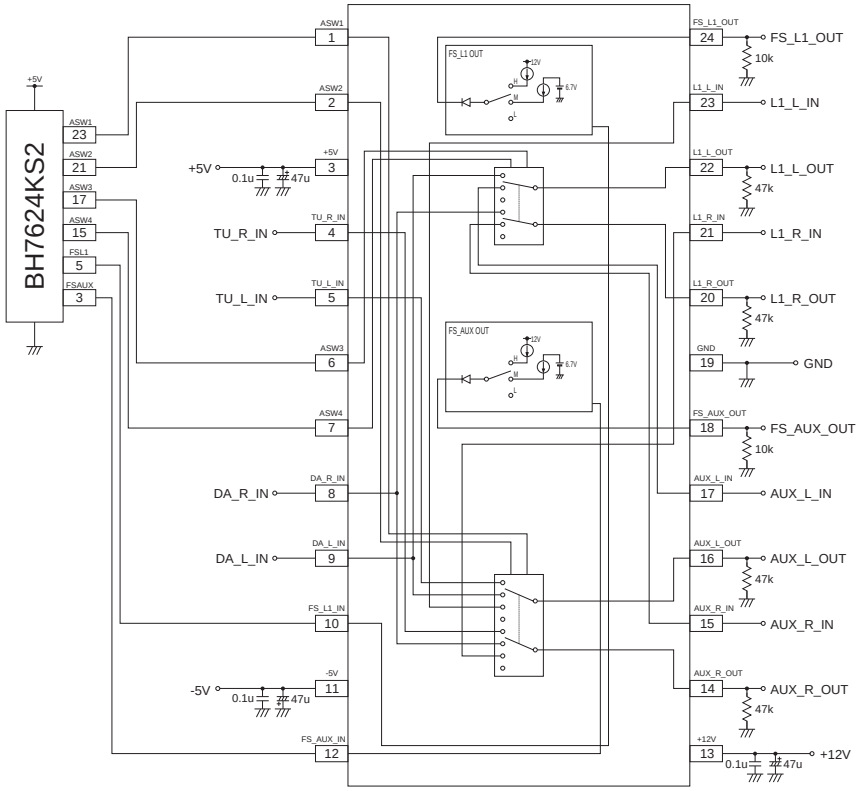


Fig.2

ASW1, 2, 3, 4, FS_L1_IN, FS_AUX_IN are controlled by I^2C-BUS of BH7624KS2.

●Reference data

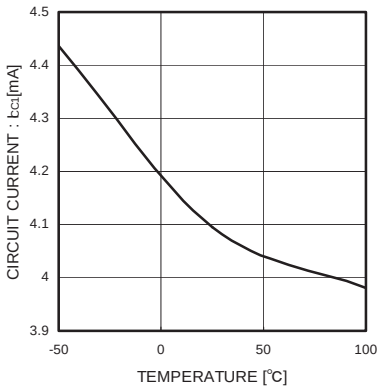


Fig3. Circuit Current1

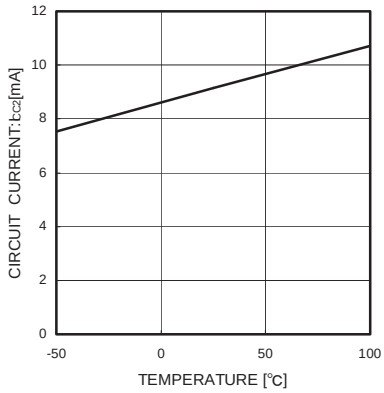


Fig4. Circuit Current2

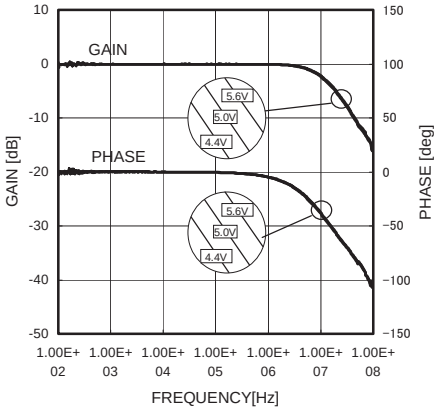


Fig5. Frequency characteristics
(Supply voltage dependence)

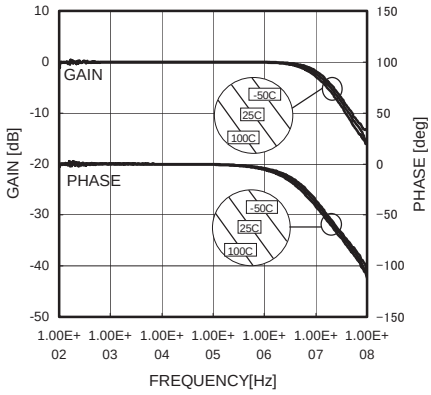


Fig6. Frequency characteristic
(Temperature dependence)

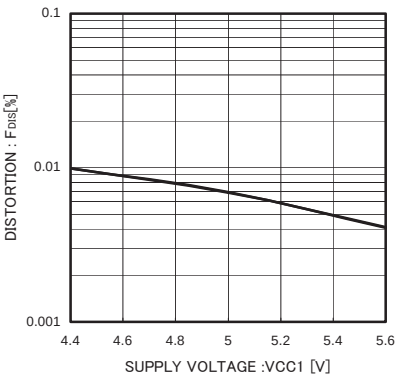


Fig7. Distortion
(Supply voltage dependence)

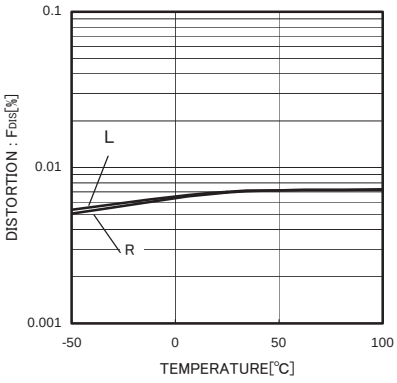


Fig8. Distortion
(Temperature dependence)

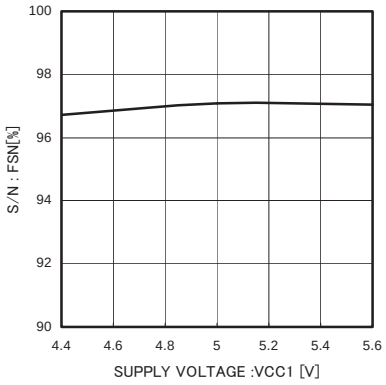


Fig9. S/N ratio
(Supply voltage Dependence)

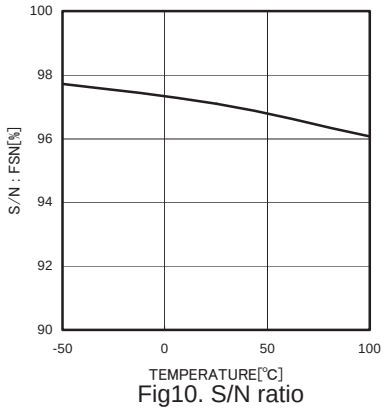


Fig10. S/N ratio
(Temperature dependence)

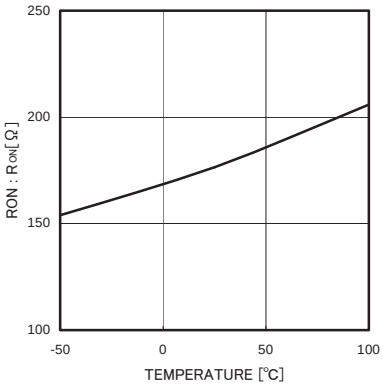


Fig11. ON Resistance

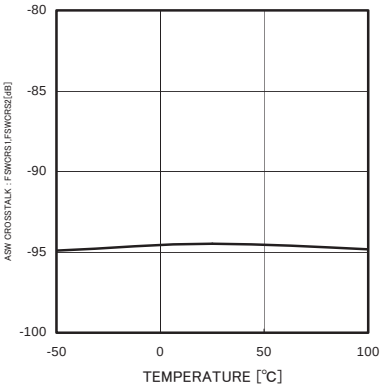


Fig12. MUTE Attenuation

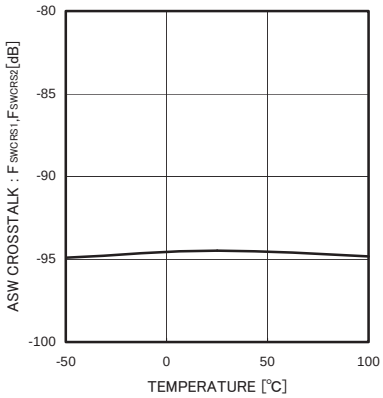


Fig13. ASW Crosstalk

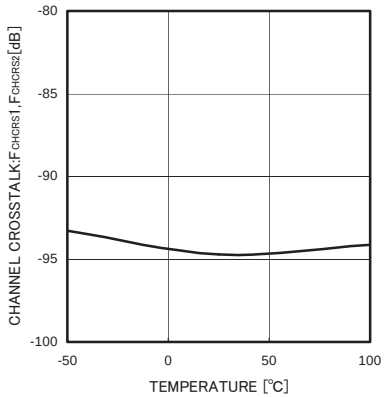


Fig14. Channel Crosstalk

●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. -5V pin potential

   Ensure a minimum -5V pin potential in all operating conditions. Make sure that no pins are at a voltage below the -5V pin at any time, regardless of whether it is a transient signal or not. <GND=0V>
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. Supply voltage

   Although basic circuit function is guaranteed under normal voltage operation (5V: ±4.5～5.5V, 12V: 11.5～12.5V), ensure each parameter complies with appropriate electrical characteristics, when using this device.
9. The application circuitry example

   SW and FS output are controlled by BD3825FS which in turn is controlled by BH7624KS2 and therefore, BD3825FS and BH7624KS2 should be used in conjunction. Pins 18 and 24 should be pulled down by 10kΩ resistor. Pins 1, 2, 6, 7, 10, 12 must be controlled by the microcontroller when using BD3825FS on its own.

● Selection of order type

B	D	3	8	2	5	F	S	—	E	2

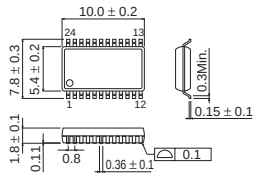
TYPE

BD3825FS

Package, Foaming specification

SSOP-A24

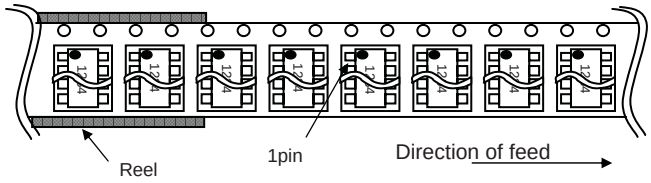
<Dimension>



(Unit:mm)

<<Tape and Reel information>

Tape	Embossed carrier tape
Quantity	2000pcs
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)



※Orders are available in complete units only.

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