

BUS Interface for car audio

BA8272AFV

BA8272AFV is a BUS interface IC (slave side) developed for car audio systems. Communication system of BUS ON, DATA, CLOCK, and RESET can be constructed in combination with BA8270F / BA8270FV (master side). This IC can be used for communication between the audio system and other applications such as power amplifier, CD, MD changer, navigation and TV.

●Applications

Car audio

●Features

- 1) It can be used for 3V Interface system.
- 2) It can build up the communication system of BUS ON, DATA, CLOCK and RESET in combination with BA8270FV (IC at a master side) in pairs.
- 3) Suitable for car audio.

●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Supply voltage	V _{cc}	7.0	V
Power dissipation	P _d	400 *	mW
Operating temperature range	T _{opr}	-40~+85	°C
Storage temperature range	T _{stg}	-55~+125	°C
Range of voltage applied to an inter terminal	-	-0.3~+7.0	V

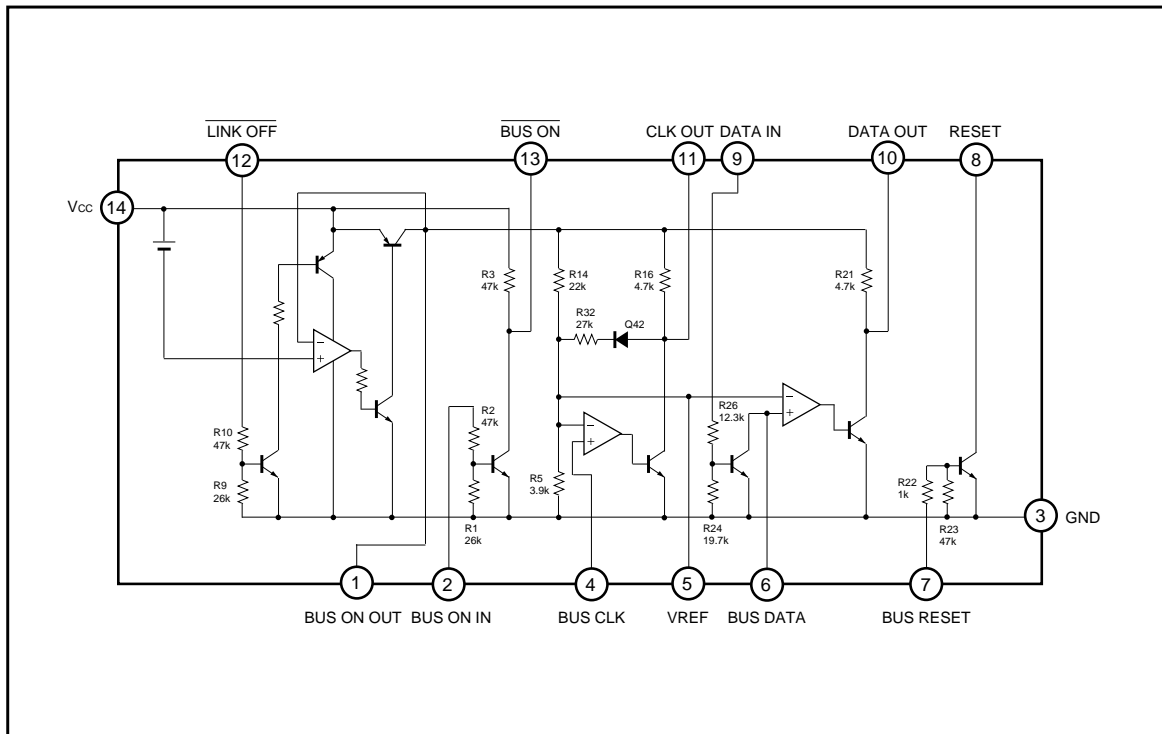
* Reduced by 4mW for each increase in Ta of 1°C over 25°C. (Board size 50×50×1.6mm)
The operating temperature range shall be within I_L=50mA.

●Recommended operating conditions (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	V _{cc}	2.8	-	7.0	V

Audio ICs



●Block diagram



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●Electrical characteristics

(unless otherwise noted, Ta=25°C, Vcc=5.5V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Circuit current 1	I _{cc1}	–	–	10	μA	Upon no load, all the terminals turn OFF.
Circuit current 2	I _{cc2}	–	1.1	3.0	mA	Upon no load $\overline{\text{LINK OFF}}=5.5\text{V}$
Circuit current 3	I _{cc3}	–	5.0	13.0	mA	I _L =50mA
V _{cc} -BUS ON OUT voltage 1	V _{LOSS1}	–	0.15	0.35	V	I _L =100mA
V _{cc} -BUS ON OUT voltage 2	V _{LOSS2}	–	0.09	0.2	V	I _L =40mA
Input terminal current 1	I _{IN1}	75	100	140	μA	$\overline{\text{BUS ON}}$ input terminal 5.5V input
Input terminal current 2	I _{IN2}	75	100	140	μA	$\overline{\text{LINK OFF}}$ terminal 5.5V input
Input terminal current 3	I _{IN3}	10	25	40	μA	BUS CLK terminal 5.5V input
Input terminal current 4	I _{IN4}	10	25	40	μA	BUS DATA terminal 5.5V input
Input terminal current 5	I _{IN5}	330	395	500	μA	DATA IN terminal 5.5V input
Input terminal current 6	I _{IN6}	3.5	4.8	6.4	mA	BUS RESET terminal 5.5V input
Output internal resistor 1	R ₃	35.2	47	58.8	kΩ	$\overline{\text{BUS ON}}$ terminal
Output internal resistor 2	R ₂₁	3.52	4.7	5.88	kΩ	DATA OUT terminal
Output saturation voltage 1	V _{SAT1}	–	0.2	0.4	V	$\overline{\text{BUS ON}}$, CLK OUT, DATA OUT
Output saturation voltage 2	V _{SAT2}	–	0.1	0.25	V	BUS DATA pull up resistance 1kΩ
Reset output voltage	V _{BON}	–	0.2	0.4	V	I _B =1mA, BUS RESET terminal 5.5V
CLK OUT output "H" level	V _{HBA}	V _{H1} –0.3	V _{H1} –0.5	V _{H1} –0.7	V	0V inputted into the BUS CLOCK terminal. "H" level of the BUS ON OUT terminal shall be V _{H1} . V _{HBA} =V _{H1} –V _{H3}
BUS CLK input threshold level	V _{TH}	0.75	0.80	0.85	V	 CLK OUT terminal observation
BUS CLK input hysteresis width	V _{HYS}	300	400	500	mV	 CLK OUT terminal observation

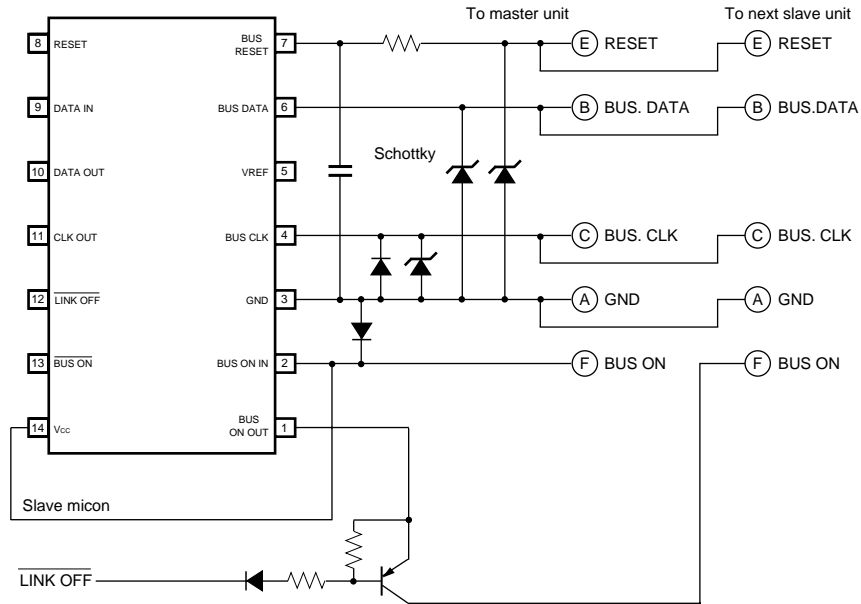
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SW operation table of measurement circuit diagram

Parameter	Symbol	S 1	S 2	S 3	S 4	S 5	S 6	S 7	S 8	S 9	S 10	S 11	S 12	Measurement terminal	Conditions
Circuit current 1	Icc1	2	1	1	1	1	1	1	1	1	1	1	1	Pin14	
Circuit current 2	Icc2	2	1	1	1	1	1	1	1	2	1	1	1	Pin14	E12=5.5V
Circuit current 3	Icc3	2	2	1	1	1	1	1	1	2	1	1	1	Pin14	E12=5.5V, I _L =50mA
Vcc-BUS ON OUT voltage 1	Vloss1	2	2	1	1	1	1	1	1	2	1	1	1	Pin1-Pin14	E12=5.5V, I _L =100mA
Vcc-BUS ON OUT voltage 2	Vloss2	2	2	1	1	1	1	1	1	2	1	1	1	Pin1-Pin14	E12=5.5V, I _L =40mA
Input terminal current 1	Iin1	2	1	2	1	1	1	1	1	1	1	1	1	Pin2	E2=5.5V
Input terminal current 2	Iin2	2	1	1	1	1	1	1	1	2	1	1	1	Pin12	E12=5.5V
Input terminal current 3	Iin3	2	1	1	2	1	1	1	1	1	1	1	1	Pin4	E4=5.5V
Input terminal current 4	Iin4	2	1	1	1	2	1	1	1	1	1	1	1	Pin6	E6=5.5V
Input terminal current 5	Iin5	2	1	1	1	1	1	1	2	1	1	1	1	Pin9	E9=5.5V
Input terminal current 6	Iin6	2	1	1	1	1	2	1	1	1	1	1	1	Pin7	E7=5.5V
Output internal resistor 1	R3	1	1	1	1	1	1	1	1	1	2	1	1	Pin13-Pin14	
Output internal resistor 2	R21	1	1	1	1	1	1	1	1	1	1	2	1	Pin1-Pin10	
Output saturation voltage 1	Vsat1	2	1	2	1	1	1	1	1	1	1	1	1	Pin13	E2=5.5V, BUS ON terminal
Output saturation voltage 1	Vsat1	2	1	1	2	2	1	1	1	2	1	1	1	Pin11	E4=5.5V, CLK OUT terminal, E12=5.5V
Output saturation voltage 1	Vsat1	2	1	1	1	1	1	1	1	2	1	1	1	Pin10	E6=5.5V, DATA OUT terminal, E12=5.5V
Output saturation voltage 2	Vsat2	2	1	1	1	1	1	1	1	1	1	1	2	Pin6	E9=5.5V, BUS DATA terminal
Reset output voltage	Vbon	2	1	1	1	1	2	2	1	2	1	1	1	Pin8	E7=5.5V, RESET terminal
CLK OUT output "H" level	Vhba	2	1	1	2	2	1	1	1	2	1	1	1	Pin1-Pin11	E4=0V, E12=5.5V
BUS CLK input threshold level	Vth	2	1	1	2	2	1	1	1	2	1	1	1	Pin4	E4=0-3V, sweep, E12=5.5V
BUS CLK input hysteresis width	Vhys	2	1	1	2	2	1	1	1	2	1	1	1	Pin4	E4=0-3V, sweep, E12=5.5V

●Application example



- Establish a protection circuit with Schottky diode to prevent an error in operation due to noise of GND potential or less of BUS ON and BUS CLK.
- Establish a protection circuit with Zener diode to prevent over-voltage.

Fig.2

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●Operation notes

1. About operation voltage supply range

Within operation voltage supply range, basic circuit function operation is guaranteed within operation ambient temp. But please confirm set up of constant and element, voltage set up and temp set up on use.

2. About operation temp range

If it within recommended operation voltage range, circuit function operation is guaranteed within operation temp. It corralled to conditions of power dissipation to temp.

Please watch out except condition stipulated by electrical characteristics within the range, it cannot guarantee standard value of electrical characteristics. But it retains original function.

3. About application circuit

Example of application circuit drawing is convinced as recommendable, but please confirm characteristic including above mentioned noticed.

At use with modification of external constant, please decide with enough margin considering distribution, ETC of this IC, external parts including quiescence characteristics and excessive characteristics.

Please note that we have not yet confirmed any concerned patent rights completely.

4. In this model, the resistance R24 and R26 shown into Block diagram were changed from previous model (BA8272FV) as follows.

BA8272FV : R24=10k Ω , R26=22k Ω

BA8272AFV : R24=19.7k Ω , R26=12.3k Ω

5. Electrostatic destruction withstanding voltage of Pin4, Pin5 and Pin12 must be 200V or less according to EIAJ stand (C=200pF, R=0 Ω).

Take above into consideration when in use.

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6. When supply voltage is changed then the threshold voltage is also changed. Please refer to the standard value (reference) of threshold voltage of each input terminal as shown below.

Make sure to confirm the characteristics adequately and leave an adequate margin for noise.

Unless specified particularly, switches of MEASUREMENT CIRCUIT DIAGRAM shown Fig.1 are switched the side of 1. The threshold voltage is value at room temperature.

Input terminal	Standard value of threshold voltage (reference) [V]	Measurement conditions		
		Supplu voltage [V]	SW operation and circuit conditions	Definition of the threshold voltage
Pin2	1.9	2.8	S ₁ =2, S ₃ =2, S ₉ =2, E ₁₂ =V _{CC}	Value of E ₂ when the output voltage of Pin13 becomes 0.1 V _{CC} .
	1.9	3.3		
	2.0	5.5		
	2.1	7.0		
Pin4	0.5	2.8	S ₁ =2, S ₉ =2, S ₄ =2, E ₁₂ =V _{CC}	Value of E ₄ when the output voltage of Pin11 becomes 0.1 V _{CC} .
	0.7	3.3		
	1.2	5.5		
	1.6	7.0		
Pin6	0.5	2.8	S ₁ =2, S ₅ =2, S ₉ =2, E ₁₂ =V _{CC}	Value of E ₆ when the output voltage of Pin10 becomes 0.1 V _{CC} .
	0.7	3.3		
	1.2	5.5		
	1.6	7.0		
Pin7	0.8	–	S ₁ =2, S ₆ =2, S ₈ =2, I ₈ =1mA	Value of E ₇ when the output voltage of Pin8 becomes 0.1 V _{CC} .
Pin9	1.3	2.8	S ₁ =2, S ₈ =2, S ₉ =2, S ₁₂ =2, E ₁₂ =V _{CC}	Value of E ₉ when the output voltage of Pin6 becomes 0.1 V _{CC} .
	1.4	3.3		
	1.6	5.5		
	1.8	7.0		
Pin12	1.8	–	S ₁ =2, S ₉ =2	Value of E ₁₂ when the output voltage of Pin1 becomes 0.9 V _{CC} .

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● External dimensions (Units : mm)

