Audio digital potentiometers

BH3532FS

The BH3532FS is a digital potentiometer designed for use in audio devices. Its built-in 22kΩ resistance systems can be used to set the data from the microcomputer in 256 steps.

●Applications

Volume of recording and playing

●Features

1) Resistance can be set to any of 256 steps using digital codes (serial data).
2) Two built-in channels (Lch, Rch)
3) SSOP-A20 package

●Absolute maximum ratings (Ta = 25°C)

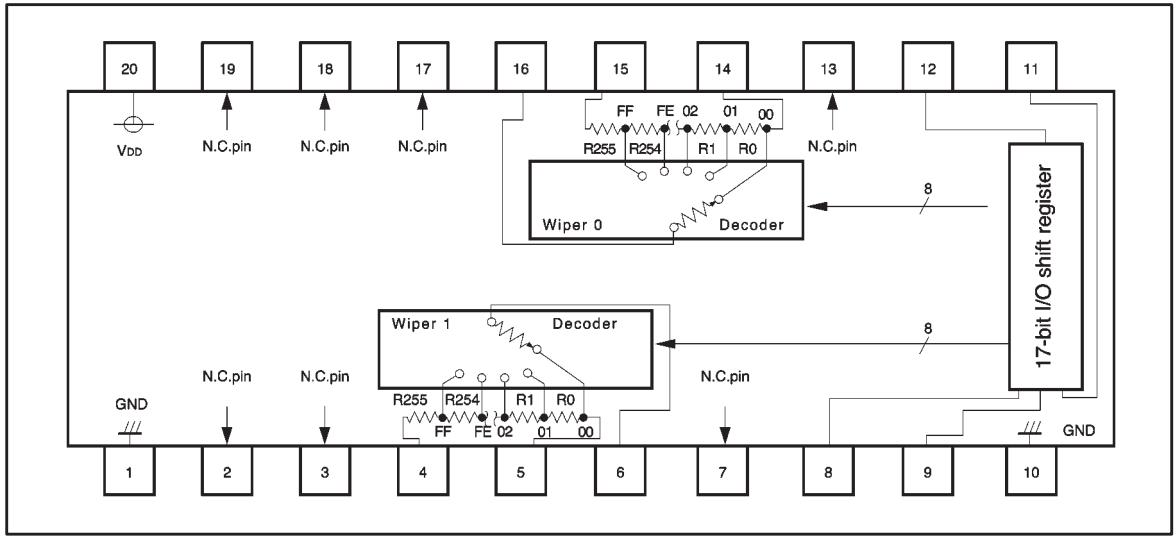
Parameter	Symbol	Limits	Unit
Power supply voltage	V_{CC}	7	V
Power dissipation	Pd	600*	mW
Operating temperature	Topr	−25～+75	℃
Storage temperature	Tstg	−55～+125	℃

* Reduced by 6mW for each increase inTa of 1℃ over 25℃

●Recommended operating conditions (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power supply voltage	V_{DD}	3	—	5.5	V

●Block diagram

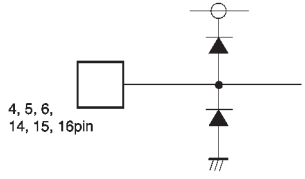


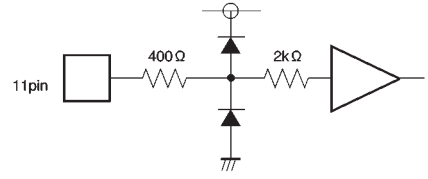
●Pin descriptions

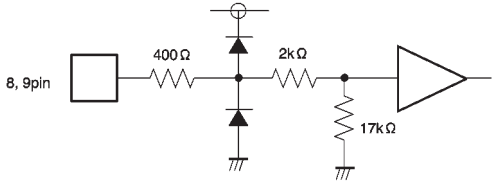
Pin No.	Pin name	Function	Pin No.	Pin name	Function
1	GND	GND	11	DIN	Serial data input
2	N.C.	N.C.	12	DOUT	Serial data output
3	N.C.	N.C.	13	N.C.	N.C.
4	H1	Ch 1 high position resistance	14	L0	Ch 0 low position resistance
5	L1	Ch 1 low position resistance	15	H0	Ch 0 high position resistance
6	W1	Pin for ch 1 wiper	16	W0	Pin for Ch 0 wiper
7	N.C.	N.C.	17	N.C.	N.C.
8	EN	Overwrite authorization input	18	N.C.	N.C.
9	CLK	Clock input	19	N.C.	N.C.
10	GND	GND	20	V_{DD}	V_{DD}

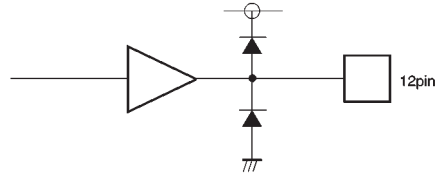
✻ Do not connect anything to the N.C. pin.

●Input/output circuits









●Electrical characteristics (unless otherwise noted, Ta = 25°C, V_{CC} = 3.5V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
〈DC characteristics〉						
Quiescent current	I_Q	50	100	150	μA	
Input leakage current	I_{LI}	−1.0	—	1.0	μA	*1
Input high level voltage	I_{IH}	3.0	—	—	V	
Input low level voltage	I_{IL}	—	—	0.5	V	
Output high level voltage	I_{OH}	3.0	—	—	V	I_{OH}=−100 μA
Output low level voltage	I_{OL}	—	—	0.5	V	I_{OL}=100 μA
Total resistance	R_T	17.6	22	26.4	kΩ	
Wiper resistance	R_W	0.4	0.8	1.6	kΩ	I_{OP}=500 μA
〈AC characteristics〉 *2						
Clock frequency	F_{CLK}	—	—	1	MHz	
Clock pulse width	T_W	500	—	—	ns	
Data setup time	T_{SU}	300	—	—	ns	
Data hold time	T_H	100	—	—	ns	
Transmission lag time CLK→DOUT	T_{OLH} T_{OHL}	— —	— —	500 500	ns	
Transmission lag time EN→CLK	T_{CLH} T_{CHL}	500 500	— —	— —	ns	

◎Not designed for radiation resistence

*1 CLK input and EN input are pulled down when internal resistance is 17 kΩ.

*2 V_{DD}=3.5V

*3 Input capacity (reference value): 5 pF (Max.) Output capacity (reference value): 7 pF (Max.)

●Measurement circuit

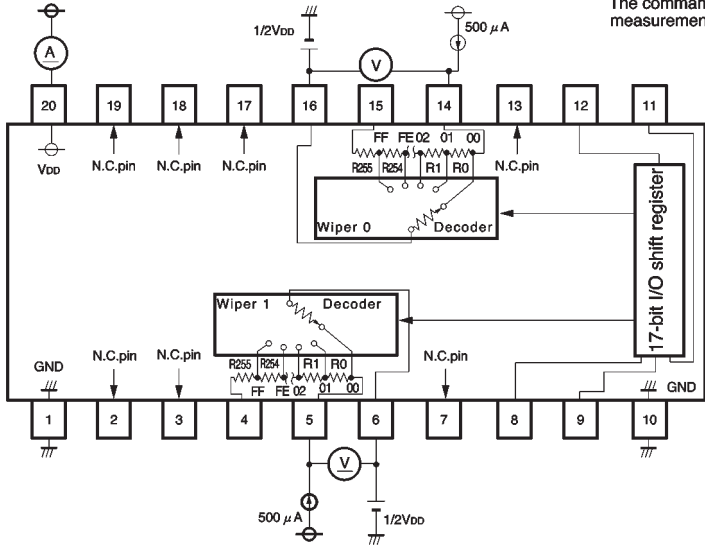


Fig. 1

●Circuit operation

The BH3532FS has two 22kΩ variable resistance systems which can be set in 256 steps (86Ω intervals). Resistance can be set in 256 steps using the MSB first 8-bit data.

Input data is 17-bit serial data. The first bit is always “L”. The next eight bits set the resistance for wiper 1. The last eight bits set the resistance for wiper 0.

Input data is effective when the EN terminal is set to “H”, and is put on hold when the EN terminal is set to “L”. Also, the reading of the data is performed when CLK rises. When input data is effective, the previous output data is output serially to the DOUT terminal.

See the figures below for more details.

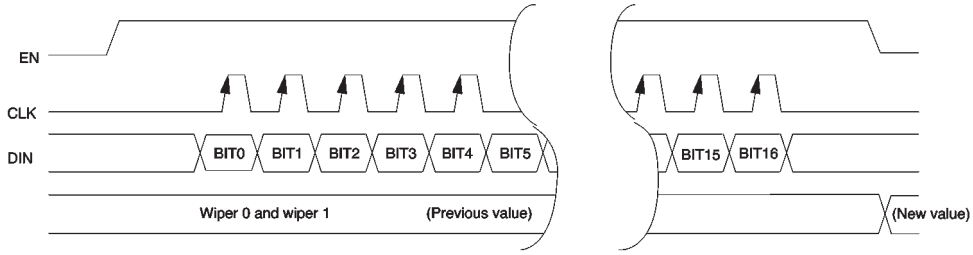


Fig. 2 Timing chart 1

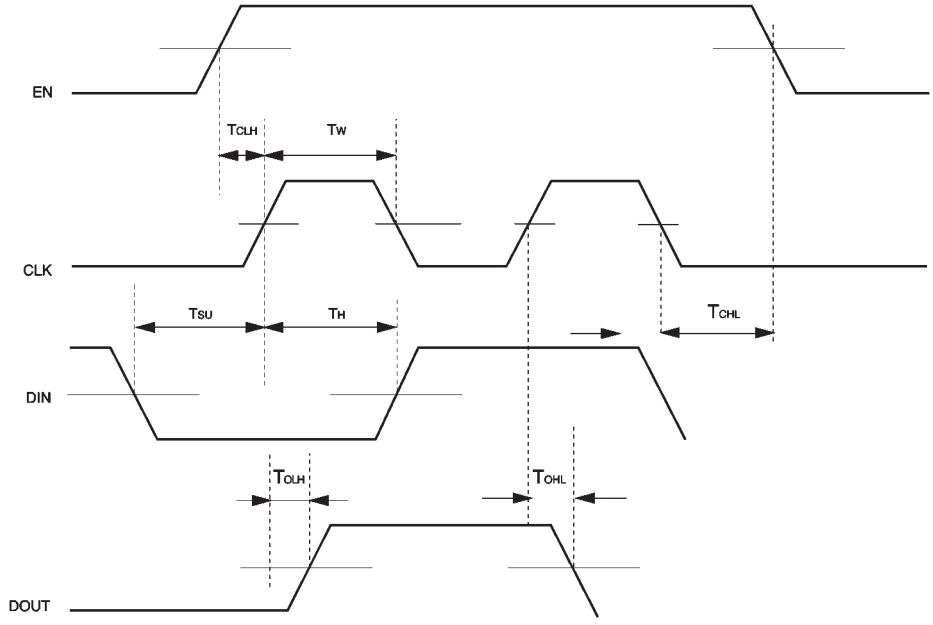


Fig. 3 Timing chart 2

●Electrical characteristic curves

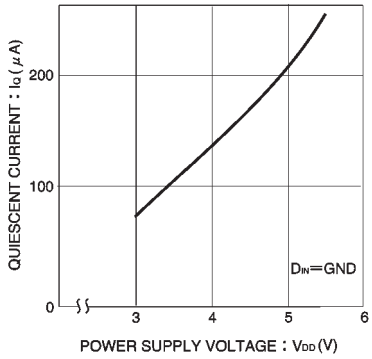


Fig. 4 Power supply voltage vs. quiescent curve

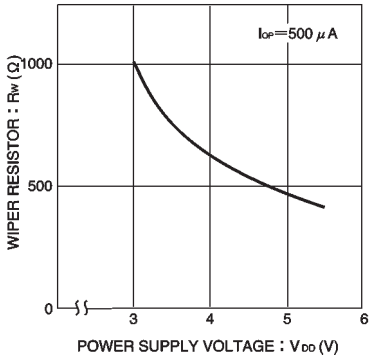
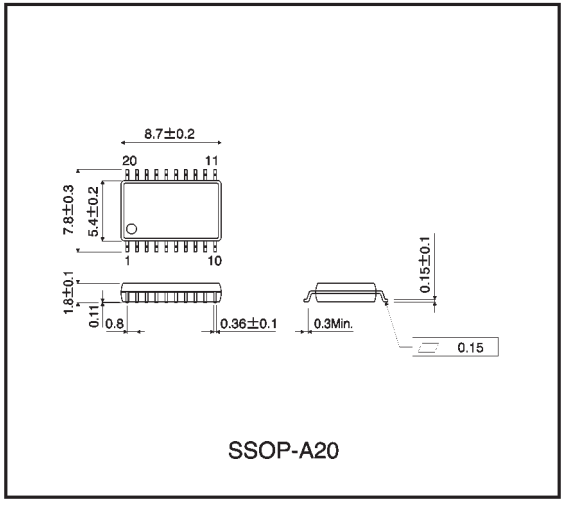


Fig. 5 Power supply voltage vs. wiper resistance

●External dimensions (Units: mm)



SSOP-A20

Notes

- No technical content pages of this document may be reproduced in any form or transmitted by any means without prior permission of ROHM CO.,LTD.
- The contents described herein are subject to change without notice. The specifications for the product described in this document are for reference only. Upon actual use, therefore, please request that specifications to be separately delivered.
- Application circuit diagrams and circuit constants contained herein are shown as examples of standard use and operation. Please pay careful attention to the peripheral conditions when designing circuits and deciding upon circuit constants in the set.
- Any data, including, but not limited to application circuit diagrams information, described herein are intended only as illustrations of such devices and not as the specifications for such devices. ROHM CO.,LTD. disclaims any warranty that any use of such devices shall be free from infringement of any third party's intellectual property rights or other proprietary rights, and further, assumes no liability of whatsoever nature in the event of any such infringement, or arising from or connected with or related to the use of such devices.
- Upon the sale of any such devices, other than for buyer's right to use such devices itself, resell or otherwise dispose of the same, no express or implied right or license to practice or commercially exploit any intellectual property rights or other proprietary rights owned or controlled by
- ROHM CO., LTD. is granted to any such buyer.
- Products listed in this document use silicon as a basic material.
  Products listed in this document are no antiradiation design.

The products listed in this document are designed to be used with ordinary electronic equipment or devices (such as audio visual equipment, office-automation equipment, communications devices, electrical appliances and electronic toys).
Should you intend to use these products with equipment or devices which require an extremely high level of reliability and the malfunction of with would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), please be sure to consult with our sales representative in advance.

About Export Control Order in Japan

Products described herein are the objects of controlled goods in Annex 1 (Item 16) of Export Trade Control Order in Japan.
In case of export from Japan, please confirm if it applies to "objective" criteria or an "informed" (by MITI clause) on the basis of "catch all controls for Non-Proliferation of Weapons of Mass Destruction.