

Shock Sensor Signal Processor

BU3892FV

The BU3892FV is an IC that processes the signals from shock sensors like those used in HDD and CD-ROM drives. This IC receives the faint signals output by shock sensors in response to vibration, and output a shock detection signal when they exceed a certain level.

●Applications

HDD and CD-ROM drives

●Features

- 1) Single 5V power supply
- 2) Low-input bias current (CMOS)
- 3) Low power consumption mode
- 4) SSOP-B 16 pin package

●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage	V _{DD}	-0.3~7.0	V
Power dissipation	P _D	300*	mW
Storage temperature	T _{STG}	-55~125	°C
Input voltage	V _{IN}	-0.3~V _{DD} +0.3	V
Output voltage	V _{OUT}	-0.3~V _{DD} +0.3	V

* Reduced by 3mW for each increase in Ta of 1°C over 25°C.

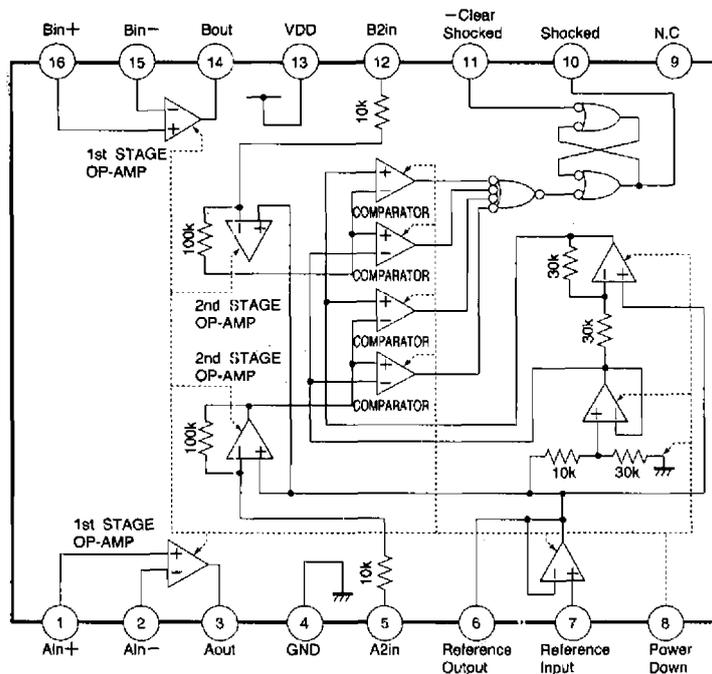
●Recommended operating conditions (Ta=25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage	V _{DD}	4.5~5.5	V
Input voltage, LOW level	V _{IL}	-0.3~1.5	V
Input voltage, HIGH level	V _{IH}	3.5~V _{DD} +0.3	V
Operating temperature	T _{OPR}	0~70	°C

HDD shock sensor

FDD/HDD

●Block diagram



●Pin descriptions

Pin No.	Name	Function
1	Ain+	Forward input of 1st stage operational amplifier A
2	Ain-	Reverse input of 1st stage operational amplifier A
3	Aout	Output of 1st stage operational amplifier A
4	GND	Ground
5	A2in	Input of 2nd stage reversing amplifier
6	Reference Output	Reference voltage output (typically 2 V)
7	Reference Input	Reference voltage input (typically 2 V)
8	Power Down	Power-down signal input (The IC enters the power-down mode when the high-level signal is input.)
9	N.C	Not connected inside the IC.
10	Shocked	Shock detection output. Outputs the high level when a shock is detected. (The high level is maintained until pin 11 input changes to the low level.)
11	-Clear Shocked	Shocked clear input Shocked output is cleared when the level changes to low.
12	B2in	2nd stage reversing amplifier input
13	VDD	Power supply
14	Bout	1st stage operational amplifier B output
15	Bin-	1st stage operational amplifier B reverse input
16	Bin+	1st stage operational amplifier B forward input

●Electrical characteristics (unless otherwise noted, Ta=25°C, VDD=4.5 ~ 5.5V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement Circuit	
<1st STAGE>								
Input bias current	Ta=25°C	IIB1ST	—	1	20	pA	Measured at Ain+, Ain-, Bin+, Bin- and GND*2	Fig.1
	Ta=75°C		—	—	2000			
Maximum output current	IO1ST	0.5	—	—	mA		Fig.1	
Supply voltage rejection ratio	SVR1ST	65	—	—	dB	*2	Fig.1	
Voltage gain bandwidth	GB1ST	—	1.4	—	MHz		Fig.1	
High-amplitude voltage gain	AV1ST	10	—	—	V/mV		Fig.1	
<REFERENCE INPUT>								
Input current	IREF	—	—	10	μA	Reference Input=2V	Fig.1	
Output impedance	ROREF	—	—	30	Ω	Reference Input=2V	Fig.1	
<2nd STAGE>								
Input current (A2in, B2in)	Ii2nd	-11	-16	-22	μA	Reference Input=2V A2in, B2in=1.8V	Fig.1	
Threshold voltage, high level (A2in, B2in)	DVH2nd	+0.04	+0.05	+0.06	V	Reference Input=2V -Clear Shocked=0V Value relative to reference input	Fig.1	
Threshold voltage, low level (A2in, B2in)	DVH2nd	-0.06	-0.05	-0.04				
<TOTAL>								
Recovery time from power down	TRCVRY	—	—	1	mS	Time required for operation within specifications*2,3	Fig.2	
Supply current	IDD	—	4	6.5	mA	Input at power down low level	Fig.1	
		—	15	100	μA	Input at power down high level	Fig.1	

*2 Guaranteed performance

*3 Shocked: The high level is output during transition in the power down low level.

●Measurement circuit

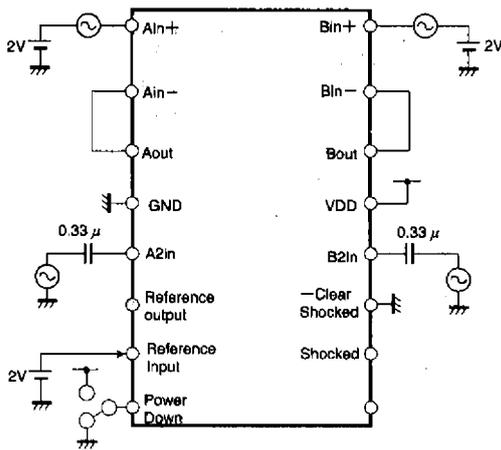


Fig. 1

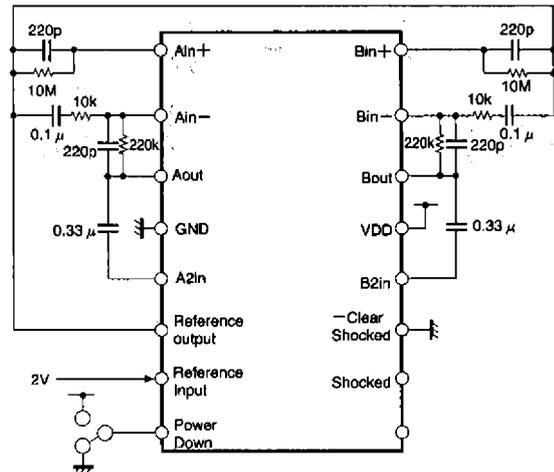
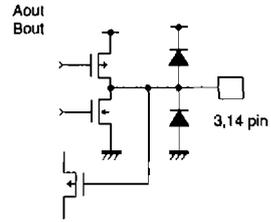
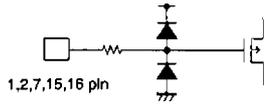


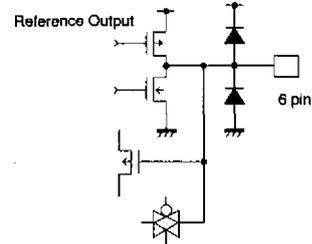
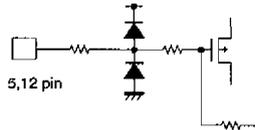
Fig. 2

●Input/output circuits

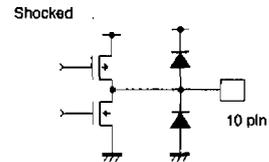
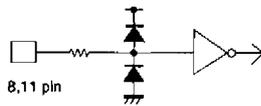
Ain+
Ain-
Bin+
Bin-
Reference Input



A2in
B2in



Power Down
-Clear Shocked



●Circuit operation

Broadly speaking, the BU3892FV comprises 1st and 2nd stage operational amplifiers, which amplify the shock sensor signal; a comparator, which monitors the output level; and a latch circuit, which outputs and retains the shock detection signal.

(1) The 1st stage operational amplifier amplifies the shock sensor signal; gain and frequency characteristic can be set with external components. The 2nd stage operational amplifier also amplifies the shock sensor signal, but its gain is internally fixed at 20dB. The capacitor between the 1st and 2nd stage operational am-

plifier cuts the DC level to prevent adverse effects on the application device.

(2) The comparator receives the signal from the 2nd stage operational amplifier and compares it to the comparator level, which depends on the DC level input from the reference input pin (the higher the DC level, the lower sensitivity becomes).

(3) Signals detected by the comparator are latched by the latch circuit and output via the SHOCKED pin until reset input is received from the Clear Shocked pin.

● Operation notes

(1) Because the high impedance around the shock sensor makes it susceptible to noise (which can cause malfunctioning), design patterns carefully.

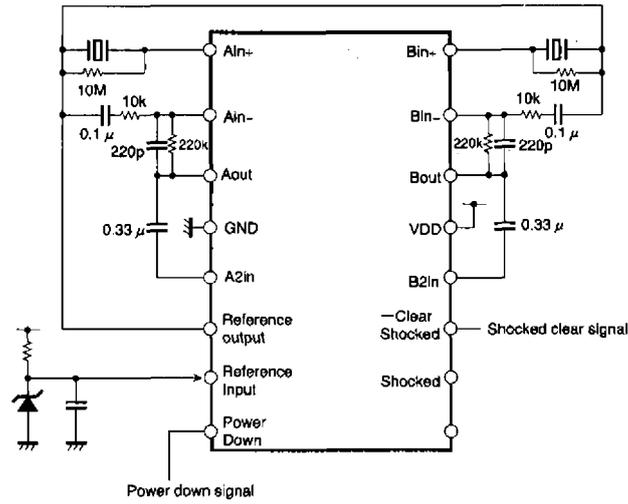
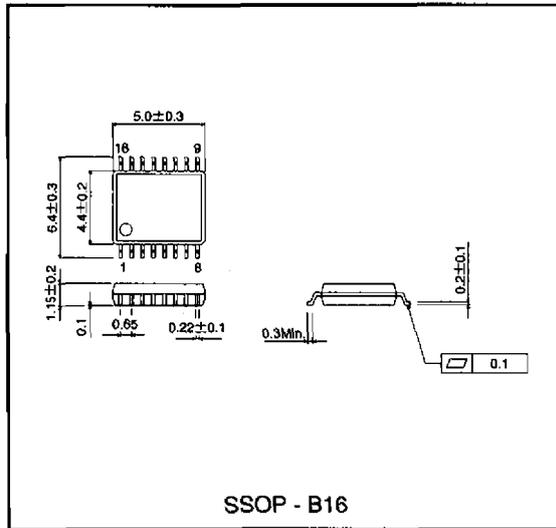


Fig. 3

● External dimensions (Units: mm)



HDD shock sensor
FDD/HDD

Notes

- The contents described in this catalogue are correct as of March 1997.
- No unauthorized transmission or reproduction of this book, either in whole or in part, is permitted.
- The contents of this book are subject to change without notice. Always verify before use that the contents are the latest specifications. If, by any chance, a defect should arise in the equipment as a result of use without verification of the specifications, ROHM CO., LTD., can bear no responsibility whatsoever.
- Application circuit diagrams and circuit constants contained in this data book are shown as examples of standard use and operation. When designing for mass production, please pay careful attention to peripheral conditions.
- Any and all data, including, but not limited to application circuit diagrams, information, and various data, described in this catalogue 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 device shall be free from infringement of any third party's intellectual property rights or other proprietary rights, and further, assumes absolutely no liability 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 the 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.
- The products in this manual are manufactured with silicon as the main material.
- The products in this manual are not of radiation resistant design.

The products listed in this catalogue 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 which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers, or other safety devices) please be sure to consult with our sales representatives in advance.

- Notes when exporting
 - It is essential to obtain export permission when exporting any of the above products when it falls under the category of strategic material (or labor) as determined by foreign exchange or foreign trade control laws.
 - Please be sure to consult with our sales representatives to ascertain whether any product is classified as a strategic material.