

STRUCTURE Silicon Monolithic Integrated Circuit

TYPE BN57Y

PRODUCT Hall effect Switch

FEATURES

- 1) Unipolar detection (S-pole)
- 2) High sensitivity ( $B_{OP}$  TYP 3.0mT)
- 3) Low supply current
- 4) Small package
- 5) CMOS output type
- 6) High ESD resistance 8kV(HBM)

●ABSOLUTE MAXIMUM RATINGS ( $T_a=25^{\circ}\text{C}$ )

| PARAMETERS                  | SYMBOL    | LIMIT               | UNIT               |
|-----------------------------|-----------|---------------------|--------------------|
| Power Supply Voltage        | $V_{DD}$  | $-0.1 \sim +4.5$ ※1 | V                  |
| Output Current              | $I_{OUT}$ | $\pm 0.5$           | mA                 |
| Power Dissipation           | $P_d$     | 2049 ※2             | mW                 |
| Operating Temperature Range | $T_{opr}$ | $-40 \sim +85$      | $^{\circ}\text{C}$ |
| Storage Temperature Range   | $T_{stg}$ | $-40 \sim +125$     | $^{\circ}\text{C}$ |

※1. Not to exceed  $P_d$

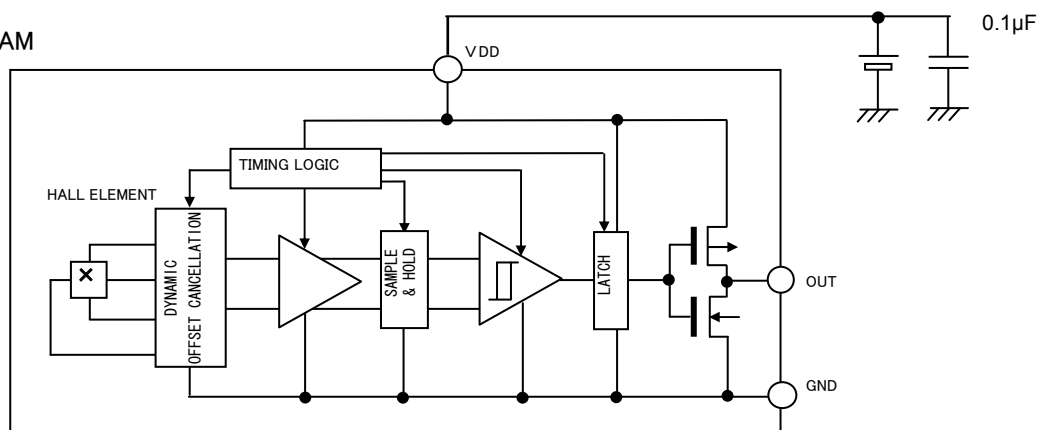
※2. Reduced by 20.49mW for each increase in  $T_a$  of  $1^{\circ}\text{C}$  over  $25^{\circ}\text{C}$   
(mounted on  $70\text{mm} \times 70\text{mm} \times 1.6\text{mm}$  Glass-epoxy PCB)

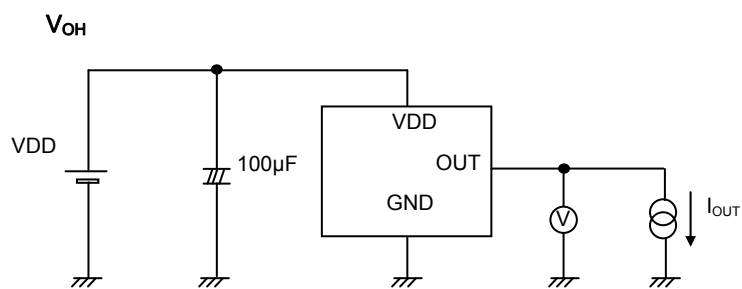
●OPERATING CONDITIONS ( $T_a=-40 \sim +85^{\circ}\text{C}$ )

| PARAMETERS           | SYMBOL   | MIN  | TYP  | MAX  | UNIT |
|----------------------|----------|------|------|------|------|
| Power Supply Voltage | $V_{DD}$ | 1.65 | 3.00 | 3.60 | V    |

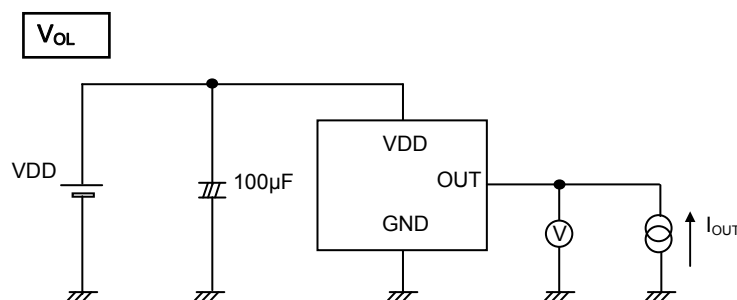
Radiation hardness is not designed.

●BLOCK DIAGRAM





$V_{OH}$  measurement circuit



$V_{OL}$  measurement circuit

● MAGNETIC, ELECTRICAL CHARACTERISTICS (Unless otherwise specified,  $V_{DD} = 3.00V$ ,  $T_a = 25^\circ C$ )

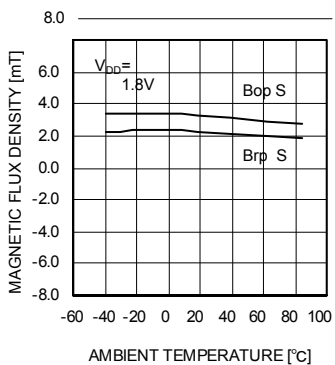
| PARAMETERS          | SYMBOL         | LIMIT            |     |      | UNIT    | CONDITIONS                                     |
|---------------------|----------------|------------------|-----|------|---------|--|
|                     |                | MIN              | TYP | MAX  |         |  |
| Operate Point       | $B_{opS}$      | —                | 3.0 | 5.0  | mT      |  |
| Release Point       | $B_{rpS}$      | 0.6              | 2.1 | —    | mT      |  |
| Period              | $T_p$          | —                | 50  | 100  | ms      |  |
| Output High Voltage | $V_{OH}$       | $V_{DD}$<br>-0.2 | —   | —    | V       | $B < B_{rpS} \text{ ※3}$<br>$I_{OUT} = -0.5mA$ |
| Output Low Voltage  | $V_{OL}$       | —                | —   | 0.2  | V       | $B_{opS} < B \text{ ※3}$<br>$I_{OUT} = +0.5mA$ |
| Supply Current1     | $I_{DD1(AVG)}$ | —                | 3.5 | 5.5  | $\mu A$ | $V_{DD} = 1.8V, \text{Average}$                |
| Supply Current2     | $I_{DD2(AVG)}$ | —                | 8.0 | 12.5 | $\mu A$ | $V_{DD} = 3.0V, \text{Average}$                |

※3. B=Magnetic Flux Density

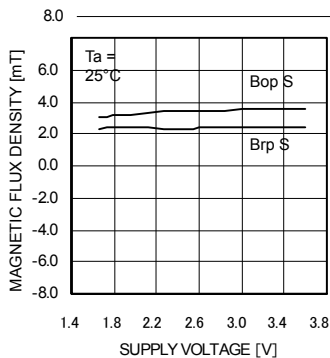
1mT=10Gauss

Positive (“+”) polarity flux is defined as the magnetic flux from south pole which is direct toward to the branded face of the sensor.

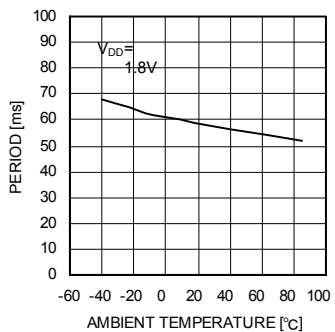
After applying power supply, it takes one cycle of period ( $T_p$ ) to become definite output.



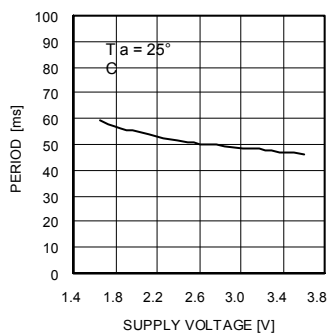
Bop, Brp – Ambient temperature



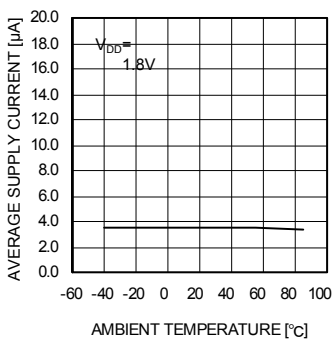
Bop, Brp – Supply voltage



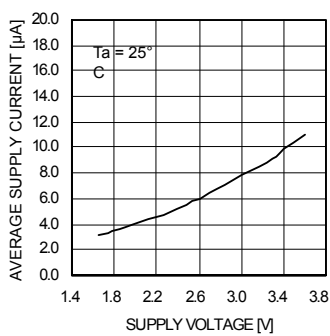
$T_P$  – Ambient temperature



$T_P$  – Supply voltage



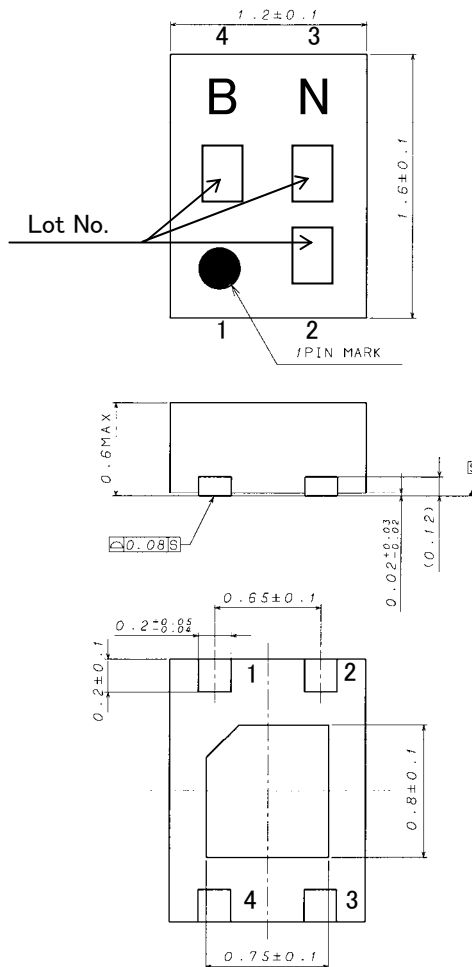
$I_{DD}$  – Ambient temperature



$I_{DD}$  – Supply voltage



●PACKAGE OUTLINES



SSON004X1216(UNIT:mm)

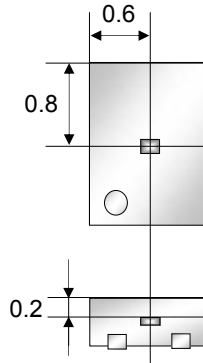
●PIN No.・PIN NAME

| PIN No. | PIN NAME | FUNCTION     | COMMENT               |
|---------|----------|--------------|-----------------------|
| 1       | OUT      | OUTPUT       |                       |
| 2       | GND      | GROUND       |                       |
| 3       | N.C.     |              | OPEN or Short to GND. |
| 4       | VDD      | POWER SUPPLY |                       |

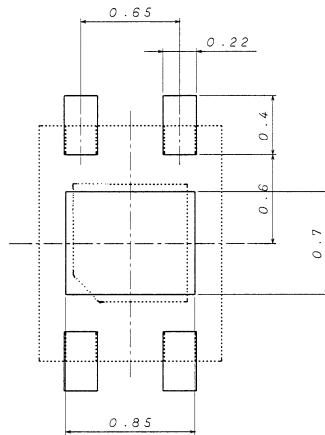


●Position of the Hall effect IC(Reference)

SSON004X1216



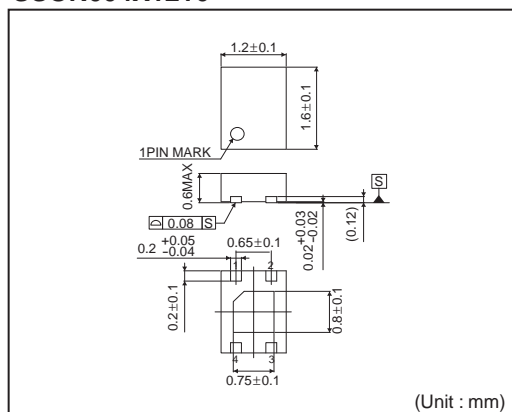
SSON004X1216



Please avoid having potential overstress from PCB material, strength, mounting positions. If you had any further questions or concerns, please contact us.

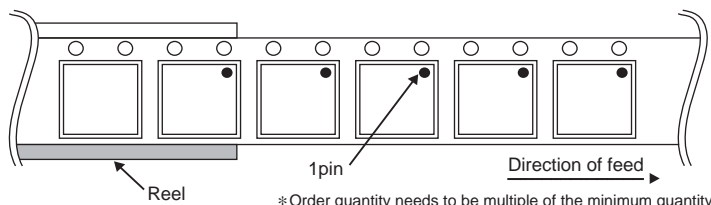
(UNIT: mm)

**SSON004X1216**



<Tape and Reel information>

|                   |  |
|-------------------|--|
| Tape              | Embossed carrier tape  |
| Quantity          | 5000pcs  |
| Direction of feed | ( The direction is the 1pin of product is at the upper right when you hold reel on the left hand and you pull out the tape on the right hand ) |



\*Order quantity needs to be multiple of the minimum quantity.



## ●CAUTIONS ON USE

### 1) Absolute Maximum Ratings

An excess in the absolute maximum ratings, such as supply voltage, temperature range of operating conditions, etc., can break down devices, thus making impossible to identify breaking mode such as a short circuit or an open circuit. If any special mode exceeding the absolute maximum ratings is assumed, consideration should be given to take physical safety measures including the use of fuses, etc.

### 2) GND voltage

Make setting of the potential of the GND terminal so that it will be maintained at the minimum in any operating state.

### 3) Thermal design

Perform thermal design in which there are adequate margins by taking into account the permissible dissipation (Pd) in actual states of use.

### 4) Pin short and mistake fitting

When mounting the IC on the PCB, pay attention to the orientation of the IC. If there is a placement mistake, the IC may be burned up.

### 5) Operation in strong electric field

Be noted that using ICs in the strong electric field can malfunction them.

### 6) Mutual impedance

Use short and wide wiring tracks for the power supply and ground to keep the mutual impedance as small as possible. Use a capacitor to keep ripple to a minimum.

### 7) Ground wiring pattern

If small-signal GND and large-current GND are provided, It will be recommended to separate the large-current GND pattern from the small-signal GND pattern and establish a single ground at the reference point of the set PCB so that resistance to the wiring pattern and voltage fluctuations due to a large current will cause no fluctuations in voltages of the small-signal GND. Pay attention not to cause fluctuations in the GND wiring pattern of external parts as well.

### 8) Power source design

Since the IC performs intermittent operation, it has peak current when it's ON. Please taking that into account and under examine adequate evaluations when designing the power source.