

# DN6851

Switch type, Wide operating supply voltage range ( $V_{CC} = 3.6 \text{ V to } 16 \text{ V}$ )  
 Alternating magnetic field operation

## Overview

DN6851 is a semiconductor integrated circuit utilizing the Hall effect. It has been so designed as to operate in the alternating magnetic field especially at low supply voltage. This Hall IC is suitable for application to various kinds of sensors, contactless switches, and the like.

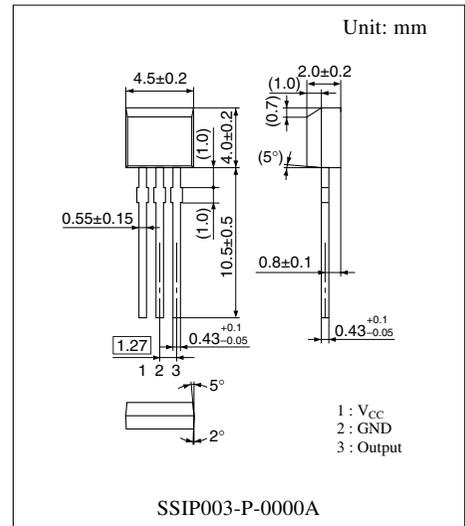
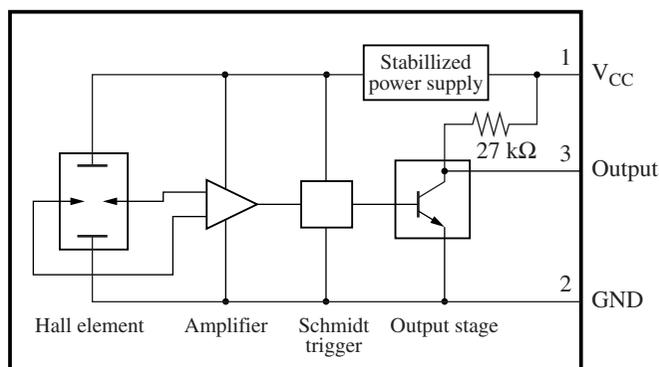
## Features

- Wide supply voltage range of 3.6 V to 16 V
- Alternating magnetic field operation
- TTL and MOS IC are directly drivable by the output.
- The life is semipermanent because it employs contactless parts.
- SSIP003-P-0000A package
- Equipped with an output pull-up resistor (typical 27 k $\Omega$ )

## Applications

- Speed sensor, position sensor, rotation sensor, keyboard switch, micro switch and the like

## Block Diagram



Note) The package of this product will be changed to lead-free type (SSIP003-P-0000H). See the new package dimensions section later of this datasheet.

### ■ Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage	$V_{CC}$	18	V
Supply current	$I_{CC}$	8	mA
Circuit current	$I_O$	20	mA
Power dissipation	$P_D$	100	mW
Operating ambient temperature	$T_{opr}$	-40 to +85	°C
Storage temperature	$T_{stg}$	-55 to +125	°C

Note) This IC is not suitable for car electrical equipment.

### ■ Recommended Operating Range

Parameter	Symbol	Range	Unit
Supply voltage	$V_{CC}$	3.6 to 16	V

### ■ Electrical Characteristics at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Operating magnetic flux density	$B_{1(L-H)}$	$V_{CC} = 12\text{ V}$	-30	—	—	mT
	$B_{2(H-L)}$	$V_{CC} = 12\text{ V}$	—	—	30	mT
Low-level output voltage	$V_{OL}$	$V_{CC} = 16\text{ V}, I_O = 12\text{ mA}, B = 30\text{ mT}$	—	—	0.4	V
		$V_{CC} = 3.6\text{ V}, I_O = 12\text{ mA}, B = 30\text{ mT}$	—	—	0.4	V
High-level output voltage	$V_{OH}$	$V_{CC} = 16\text{ V}, I_O = -30\text{ }\mu\text{A}, B = -30\text{ mT}$	14.6	—	—	V
		$V_{CC} = 3.6\text{ V}, I_O = -30\text{ }\mu\text{A}, B = -30\text{ mT}$	2.2	—	—	V
Output short circuit current	$-I_{OS}$	$V_{CC} = 16\text{ V}, V_O = 0\text{ V}, B = -30\text{ mT}$	0.4	—	0.9	mA
Supply current	$I_{CC}$	$V_{CC} = 16\text{ V}$	—	—	6	mA
		$V_{CC} = 3.6\text{ V}$	—	—	5.5	mA

Note) 1. An 'A' rank type which operating magnetic flux density is  $\pm 20\text{ mT}$  is also available.

2. The variation of operating magnetic flux density does not depend on supply voltage due to its built-in stabilized power source. ( $V_{CC}$  should be confined to the range of 3.6 V to 16 V.)

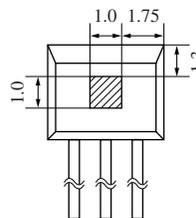
3. A supply current increases by approximately 1 mA when its output level varies from high to low.

### ■ Technical Data

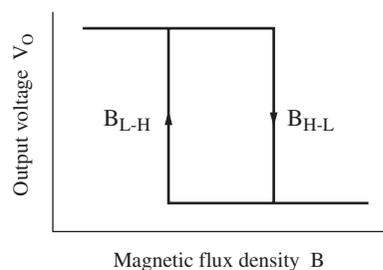
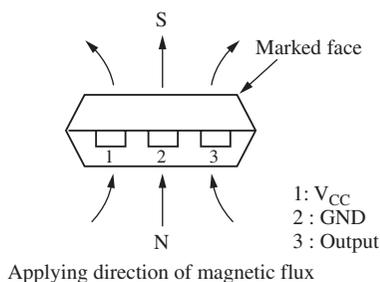
#### • Position of Hall element (unit: mm)

Distance from package surface to sensor part: 0.7 mm

A Hall element is placed on the shaded part in the figure.



#### • Magneto-electro conversion characteristics



## ■ Caution on Use of Hall ICs

The Hall ICs are often used to detect movement. In such cases, the position of the Hall IC may be changed by exposition to shock or vibration over a long period of time, and it causes the detection level change. To prevent this, fix the package with adhesives or fix it on a dedicated case.

### 1. A case using an adhesive

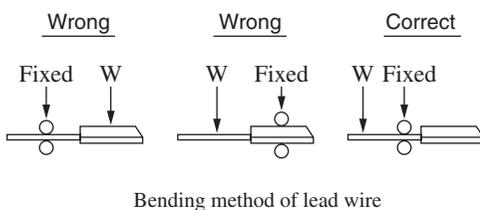
Some kinds of adhesive generate corrosive gas (such as chloric gas) during curing. This corrosive gas corrodes the aluminum on the surface of the Hall IC, and may cause a functional defect of disconnection.

If Hall IC is to be sealed after installation, attention should be given to the adhesive or resin used for peripherals and substrate cleaner, as well as to the adhesive used for Hall IC installation. Please confirm the above matter to those manufacturers before using.

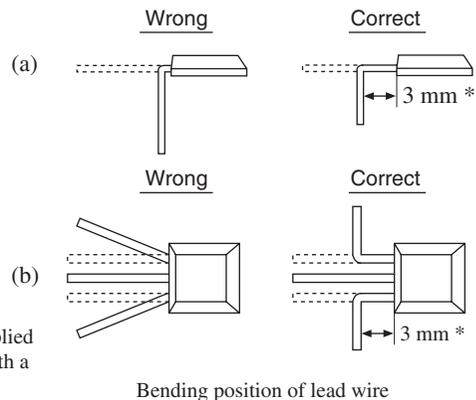
We could not select the specified adhesive, for we find it difficult to guarantee the ingredient of each adhesive.

### 2. A case bending lead wire

Bend the lead wire without stressing the package.



\*: The distance can be within 3 mm, if no stress is applied to the resin mold by tightly fixing the lead wires with a metallic mold or the like.



### 3. Power supply line/Power transmission line

If a power supply line/power transmission line becomes longer, noise and/or oscillation may be found on the line. In this case, set the capacitor of 0.1  $\mu\text{F}$  to 10  $\mu\text{F}$  near the Hall IC to prevent it.

If a voltage of 18 V or more is thought to be applied to the power supply line (flyback voltage from coil or the ignition pulse, etc.), avoid it with external components (capacitor, resistor, Zener diode, diode, surge absorbing elements, etc.).

### 4. $V_{CC}$ and GND

Do not reverse  $V_{CC}$  and GND. If the  $V_{CC}$  and GND pins are reversely connected, this IC will be destroyed. If the IC GND-pin voltage is set higher than other pin voltage, the IC configuration will become the same as a forward biased diode. Therefore, it will turn on at the diode forward voltage (approximately 0.7 V), and a large current will flow through the IC, ending up in its destruction. (This is common to monolithic IC.)

### 5. Cautions on power-on of Hall IC

When a Hall IC is turned on, the position of the magnet or looseness may change the output of a Hall IC, and a pulse may be generated. Therefore, care should be given whenever the output state of a Hall IC is critical when the supply power is on.

### 6. Fixing a Hall IC

When the Hall IC of an insertion type package installed by soldering the lead wire only is to be used under vibration, fix it firmly with a holder. Otherwise, vibration may cause metal fatigue in the lead wire of Hall IC, resulting in wire breakage.

### 7. On fixing a Hall IC to holder

When a Hall IC is mounted on the printed circuit board with a holder and the coefficient of expansion of the holder is large, the lead wire of the Hall IC will be stretched and it may give a stress to the Hall IC.

If the lead wire is stressed intensely due to the distortion of holder or board, the adhesives between the package and the lead wire may be weakened and cause a minute gap resulting in the deterioration of its resistance to moisture. Sensitivity may also be changed by this stress.

■ Caution on Use of Hall ICs (continued)

8. On using flux in soldering

Choose a flux which does not include ingredients from halogen group, such as chlorine, fluorine, etc. The ingredients of halogen group may enter where the lead frame and package resin joint, causing corrosion and the disconnection of the aluminum wiring on the surface of an IC chip.

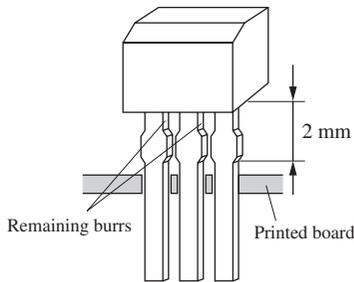
9. In case of the magnetic field of a magnet is too strong

Output may be inverted when applying a magnetic flux density of 100 mT or more. Accordingly, magnetic flux density should be used within the range of 100 mT.

10. On mounting , deburring and soldering of insertion type package

If the leads of a Hall IC in an insertion type package are inserted up to their root part through holes on the printed circuit board, abnormal stress is applied to the package and the reliability of the Hall IC is likely to deteriorate. So, when mounting each Hall IC of the insertion type, insert the leads in due degree at which the bottom face of the package is separated at least 2 mm from the top face of the PCB.

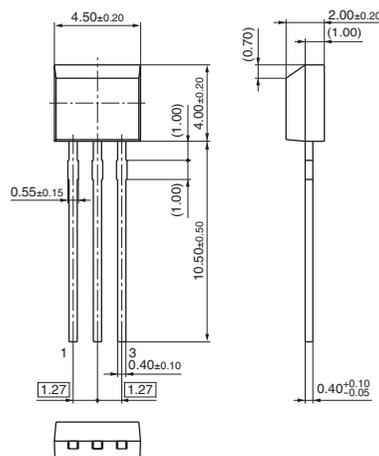
Also note that burrs of epoxy resin may be left sticking to the lead wires. (We are trying to remove such burrs as much as possible in the deburring process, but in some cases, they are not perfectly removable.)



When soldering the leads, remember to separate the soldering position by 2 mm or more from the resin part of the package.

■ New Package Dimensions (Unit: mm)

- SSIP003-P-0000H (Lead-free package)



## Request for your special attention and precautions in using the technical information and semiconductors described in this material

- (1) An export permit needs to be obtained from the competent authorities of the Japanese Government if any of the products or technologies described in this material and controlled under the "Foreign Exchange and Foreign Trade Law" is to be exported or taken out of Japan.
- (2) The technical information described in this material is limited to showing representative characteristics and applied circuit examples of the products. It does not constitute the warranting of industrial property, the granting of relative rights, or the granting of any license.
- (3) The products described in this material are intended to be used for standard applications or general electronic equipment (such as office equipment, communications equipment, measuring instruments and household appliances).  
Consult our sales staff in advance for information on the following applications:
  - Special applications (such as for airplanes, aerospace, automobiles, traffic control equipment, combustion equipment, life support systems and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body.
  - Any applications other than the standard applications intended.
- (4) The products and product specifications described in this material are subject to change without notice for reasons of modification and/or improvement. At the final stage of your design, purchasing, or use of the products, therefore, ask for the most up-to-date Product Standards in advance to make sure that the latest specifications satisfy your requirements.
- (5) When designing your equipment, comply with the guaranteed values, in particular those of maximum rating, the range of operating power supply voltage and heat radiation characteristics. Otherwise, we will not be liable for any defect which may arise later in your equipment.  
Even when the products are used within the guaranteed values, redundant design is recommended, so that such equipment may not violate relevant laws or regulations because of the function of our products.
- (6) When using products for which dry packing is required, observe the conditions (including shelf life and after-unpacking standby time) agreed upon when specification sheets are individually exchanged.
- (7) No part of this material may be reprinted or reproduced by any means without written permission from our company.

## Please read the following notes before using the datasheets

- A. These materials are intended as a reference to assist customers with the selection of Panasonic semiconductor products best suited to their applications.  
Due to modification or other reasons, any information contained in this material, such as available product types, technical data, and so on, is subject to change without notice.  
Customers are advised to contact our semiconductor sales office and obtain the latest information before starting precise technical research and/or purchasing activities.
- B. Panasonic is endeavoring to continually improve the quality and reliability of these materials but there is always the possibility that further rectifications will be required in the future. Therefore, Panasonic will not assume any liability for any damages arising from any errors etc. that may appear in this material.
- C. These materials are solely intended for a customer's individual use.  
Therefore, without the prior written approval of Panasonic, any other use such as reproducing, selling, or distributing this material to a third party, via the Internet or in any other way, is prohibited.

**SUNSTAR实业集团**是集研发、生产、工程、销售、代理经销、技术咨询、信息服务等为一体的高科技企业，是专业高科技电子产品生产厂家，是具有10多年历史的专业电子元器件供应商，是中国最早和最大的仓储式连锁规模经营大型综合电子零部件代理分销商之一，是一家专业代理和分销世界各大品牌IC芯片和电子元器件的连锁经营综合性国际公司。在香港、北京、深圳、上海、西安、成都等全国主要电子市场设有直属分公司和产品展示展销窗口门市部专卖店及代理分销商，已在全国范围内建成强大统一的供货和代理分销网络。我们专业代理经销、开发生产电子元器件、集成电路、传感器、微波光电元器件、工控机/DOC/DOM电子盘、专用电路、单片机开发、MCU/DSP/ARM/FPGA软件硬件、二极管、三极管、模块等，是您可靠的一站式现货配套供应商、方案提供商、部件功能模块开发配套商。专业以现代信息产业（计算机、通讯及传感器）三大支柱之一的传感器为主营业务，专业经营各类传感器的代理、销售生产、网络信息、科技图书资料及配套产品设计、工程开发。我们的专业网站——**中国传感器科技信息网（全球传感器数据库）www.SENSOR-IC.COM** 服务于全球高科技生产商及贸易商，为企业科技产品开发提供技术交流平台。欢迎各厂商互通有无、交换信息、交换链接、发布寻求代理信息。欢迎国外高科技传感器、变送器、执行器、自动控制产品厂商介绍产品到**中国**，共同开拓市场。本网站是关于各种传感器-变送器-仪器仪表及工业自动化大型专业网站，深入到工业控制、系统工程计 测计量、自动化、安防报警、消费电子等众多领域，把最新的传感器-变送器-仪器仪表买卖信息，最新技术供求，最新采购商，行业动态，发展方向，最新的技术应用和市场资讯及时的传递给广大科技开发、科学研究、产品设计人员。本网站已成功为石油、化工、电力、医药、生物、航空、航天、国防、能源、冶金、电子、工业、农业、交通、汽车、矿山、煤炭、纺织、信息、通信、IT、安防、环保、印刷、科研、气象、仪器仪表等领域从事科学研究、产品设计、开发、生产制造的科技人员、管理人员、和采购人员提供满意服务。 **我公司专业生产、代理、经销、销售各种传感器、变送器、敏感元器件、开关、执行器、仪器仪表、自动化控制系统：专门从事设计、生产、销售各种传感器、变送器、各种测控仪表、热工仪表、现场控制器、计算机控制系统、数据采集系统、各类环境监控系统、专用控制系统应用软件以及嵌入式系统开发及应用等工作。如热敏电阻、压敏电阻、温度传感器、温度变送器、湿度传感器、湿度变送器、气体传感器、气体变送器、压力传感器、压力变送、称重传感器、物（液）位传感器、物（液）位变送器、流量传感器、流量变送器、电流（压）传感器、溶氧传感器、霍尔传感器、图像传感器、超声波传感器、位移传感器、速度传感器、加速度传感器、扭距传感器、红外传感器、紫外传感器、火焰传感器、激光传感器、振动传感器、轴角传感器、光电传感器、接近传感器、干簧管传感器、继电器传感器、微型电泵、磁敏（阻）传感器、压力开关、接近开关、光电开关、色标传感器、光纤传感器、齿轮测速传感器、时间继电器、计数器、计米器、温控仪、固态继电器、调压模块、电磁铁、电压表、电流表等特殊传感器。同时承接传感器应用电路、产品设计和自动化工程项目。**

欢迎索取免费详细资料、设计指南和光盘；产品凡多，未能尽录，欢迎来电查询。

更多产品请看本公司产品专用销售网站：

中国传感器科技信息网：<http://www.sensor-ic.com/>工控安防网：<http://www.pc-ps.net/>

电子元器件网：<http://www.sunstare.com/>微波光电产品网：[HTTP://www.rfoe.net/](http://www.rfoe.net/)

消费电子产品网：<http://www.icasic.com/>军工产品网：<http://www.junpinic.com/>

实业科技产品网：<http://www.sunstars.cn/>传感器销售热线：

电话：0755-83607652 83376489 83376549 83370250 83370251

传真：0755-83376182 (0) 13902971329 MSN: SUNS8888@hotmail.com

邮编：518033 E-mail: [szss20@163.com](mailto:szss20@163.com) QQ: 195847376

技术支持：0755-83394033 13501568376