KH2102

Ultra-sensitivity Micropower Omnipolar Hall-effect Switch

General Description

The KH2102 is an ultra-sensitivity Hall-effect switch with digital latched output, special designed for battery-operation, handheld equipments etc.

A Chopper stabilized amplifier improves stability of magnetic switch points. Either sufficient south or north pole magnetic field strength will turn the output on. If the magnetic flux density is larger than operating point (B_{OP}), the output will be turned on; if it is less than releasing point (B_{RP}), the output will be turned off. The output structure is an open-drain type with a pull-up resistor to VDD. Such output design allows simple connectivity with TTL or CMOS logic. Moreover, a sleep-awake logic controls the IC in sleep time or awake time. This function will reduce the power dissipation of the IC to some uA.

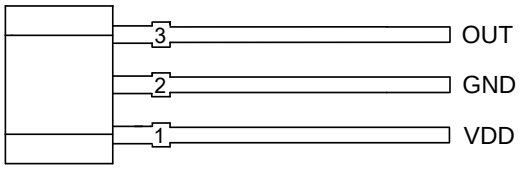
The KH2102 is available in TO-92S and SOT23-3 packages which are optimized for most applications.

Features

- Micropower Operation
- High Magnetic Sensitive
- 2.2V to 5.5V Wide Operating Voltage
- Switching for Both Poles of a Magnet (Omnipolar)
- Stabilized Chopper
- Superior Temperature Stability
- Digital Output Signal
- Built-in Pull-up Resistor

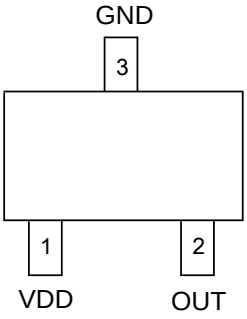
Pin Assignments

(Front View)



TO-92S

(Top View)

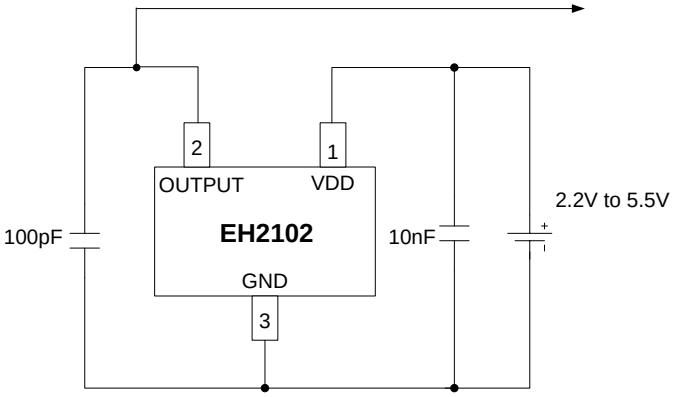


SOT23-3

Applications

- Cover Switch in Notebook PC/PDA
- Handheld Wireless Application Awake Switch
- Magnet Switch in Low Duty Cycle Applications
- Power meter

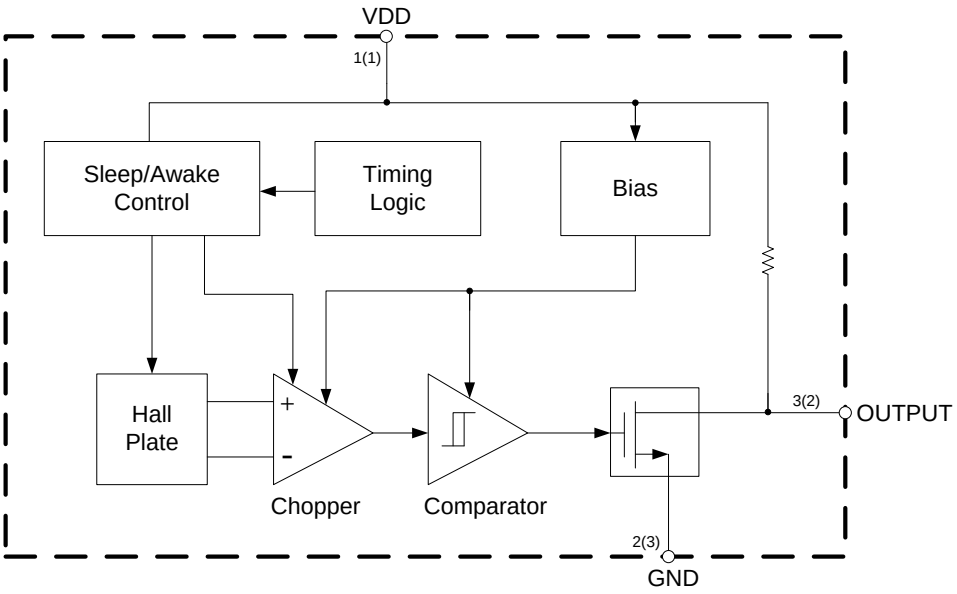
Typical Applications Circuit



Pin Descriptions

Pin Number		Pin Name	Function
TO-92S	SOT23-3		
1	1	VDD	Power supply pin
2	3	GND	Ground pin
3	2	OUTPUT	Output pin

Functional Block Diagram



A (B)
A for TO-92S
B for SOT23-3

Absolute Maximum Rates (@TA=+25°C, Note 1&2)

Symbol	Parameter	Rating		Unit
V_{DD}	Supply Voltage	7		V
I_{DD}	Supply Current (Fault)	5		mA
V_{OUT}	Output Voltage	7		V
I_{OUT}	Output Current	5		mA
B	Magnetic Flux Density	Unlimited		Gauss
R_{TH}	Power Dissipation	TO-92S	230	°C/W
		SOT23-3	301	
T_{STG}	Storage Temperature	-55 to +150		°C
T_J	Junction Temperature	+150		°C

Notes: 1. Stresses greater than those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “Recommended Operating Conditions” is not implied. Exposure to “Absolute Maximum Ratings” for extended periods may affect device reliability.
2. Electronic semiconductor products are sensitive to Electro Static Discharge (ESD). Always observe Electro Static Discharge control procedures whenever handling semiconductor products.

Ultra-sensitivity Micropower Omnipolar Hall-effect Switch

Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
V_{DD}	Supply Voltage	2.2	5.5	V
T_{OP}	Operating Temperature	-40	+85	°C

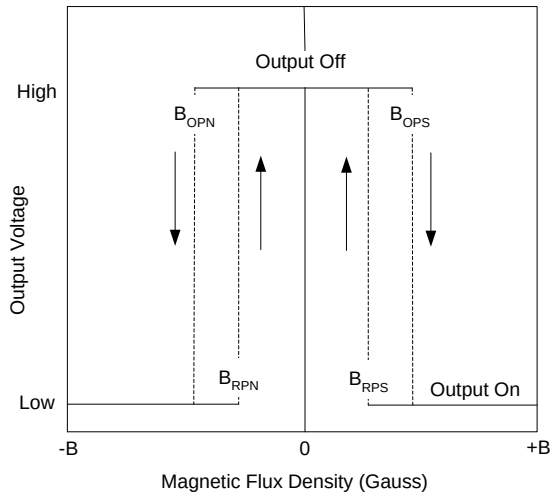
Electrical Characteristics (@TA=+25℃, V_{DD}=3V, unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{DD}	Supply Voltage	Operating	2.2	3	5.5	V
I_{AW}	Supply Current	Awake	–	1.2	1.8	mA
I_{SL}		Sleep	–	1	2	μA
I_{AVG}		Average	–	4	8	μA
I_{OUT}	Output Current	–	–	–	5	mA
V_{SAT}	Saturation Voltage	I_{OUT}=1.0mA	–	0.05	0.2	V
t_{AW}	Awake Mode Time	Operating	30	50	70	μs
t_{SL}	Sleep Mode Time	Operating	20	30	40	ms
D	Duty Cycle	–	–	0.2	–	%

Magnetic Characteristics ($@T_A$=+25°C, V_{DD}=3V, unless otherwise specified. Note 3)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
B_{OPS} (south pole to part marking side)	Operating Point	South pole to branded side B>B_{OPS},V_{OUT}=low(output on)	–	16	25	Gauss
B_{OPN} (north pole to part marking side)		North pole to branded side B>B_{OPN},V_{OUT}=low(output on)	-25	-16	–	Gauss
B_{RPS} (south pole to part marking side)	Releasing Point	South pole to branded side B<B_{RPS},V_{OUT}=high(output off)	5	10	15	Gauss
B_{RPN} (north pole to part marking side)		North pole to branded side B<B_{RPN},V_{OUT}=high(output off)	-15	-10	-5	Gauss
B_{HYS}	Hysteresis	| B_{OPX} - B_{RPX} | (Note 4)	3	6	9	Gauss

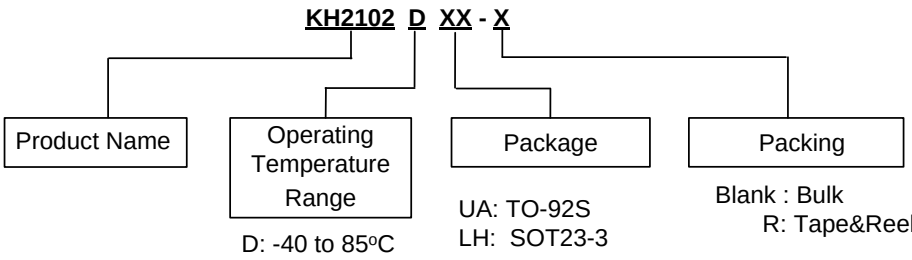
Notes: 3. The specifications stated here are guaranteed by design. 1 Gauss=0.1mT
4. B_{OP}=operating point (output turns on); B_{RP}=releasing point (output turns off)



Output Voltage vs. Magnetic Flux Density

Ultra-sensitivity Micropower Omnipolar Hall-effect Switch

Ordering Information



Package	Part Number	Marking ID	Packing Type
TO-92S	KH2102BUA	2102	1000/Bulk
SOT23-3	KH2102BLH-R	2102	3000/Tape&Reel

Marking Informaiton

Package Type: TO-92S

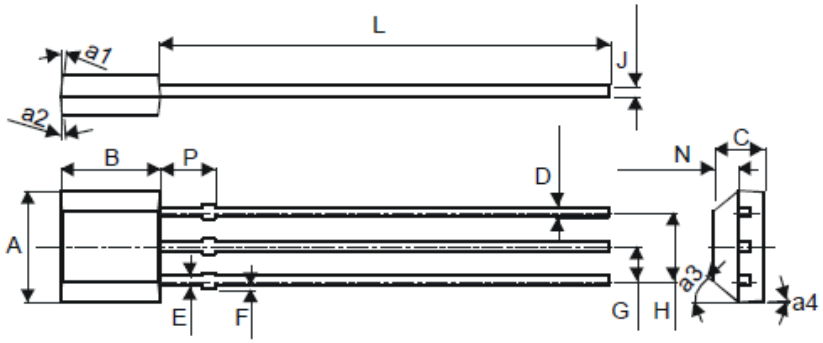
First lines: Marking ID
Second line: Date Code
Y: Year 0 to 9
WW: Week 00 to 52 (Work week of molding)
X: Internal Code

Package Type: SOT23-3

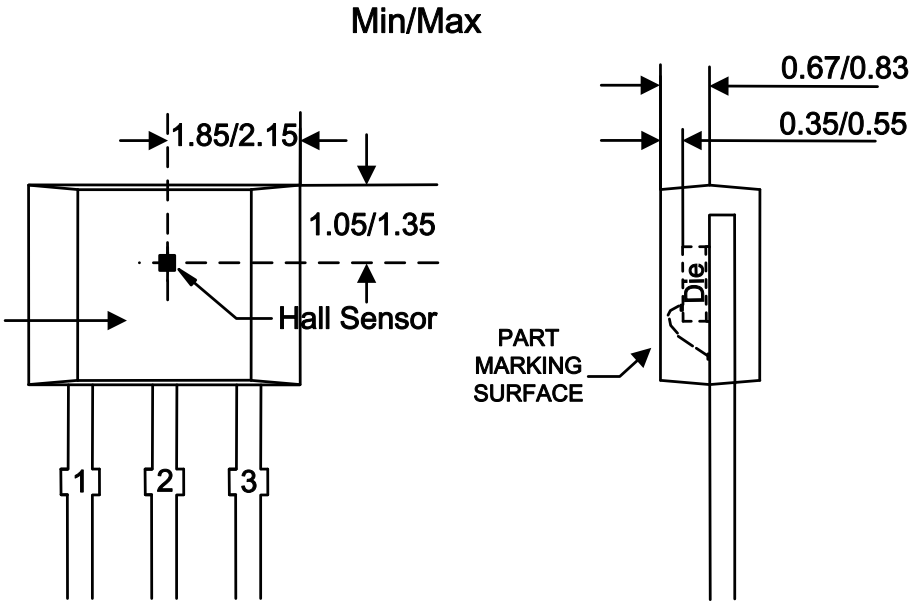
First lines: Marking ID

Package Outline Demension

Package Type: TO-92S



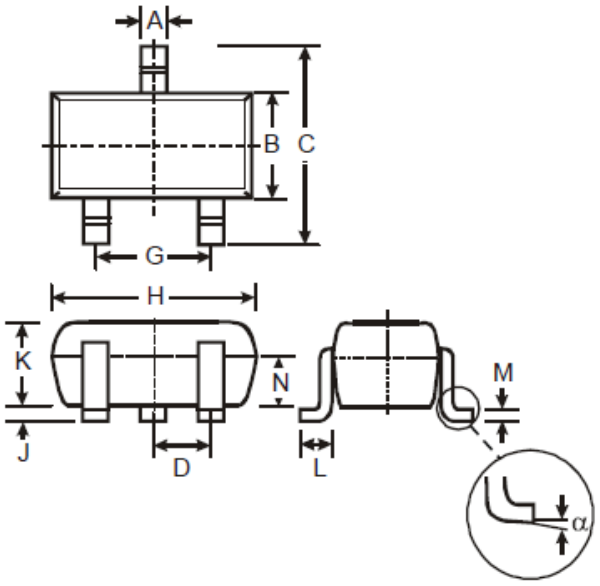
TO-92S		
Dim	Min	Max
A	4.0	4.2
a1	3° Typ	
a2	6° Typ	
a3	45° Typ	
a4	3° Typ	
B	3.08	3.28
C	1.48	1.68
D	0.36	0.56
E	0.44 Typ	
F	-0.05	0.20
G	1.27 Typ	
H	2.54 Typ	
J	0.38 Typ	
L	13.5	14.5
N	0.71	0.81
P	2.60	3.00
All Dimensions in mm		



Sensor Location

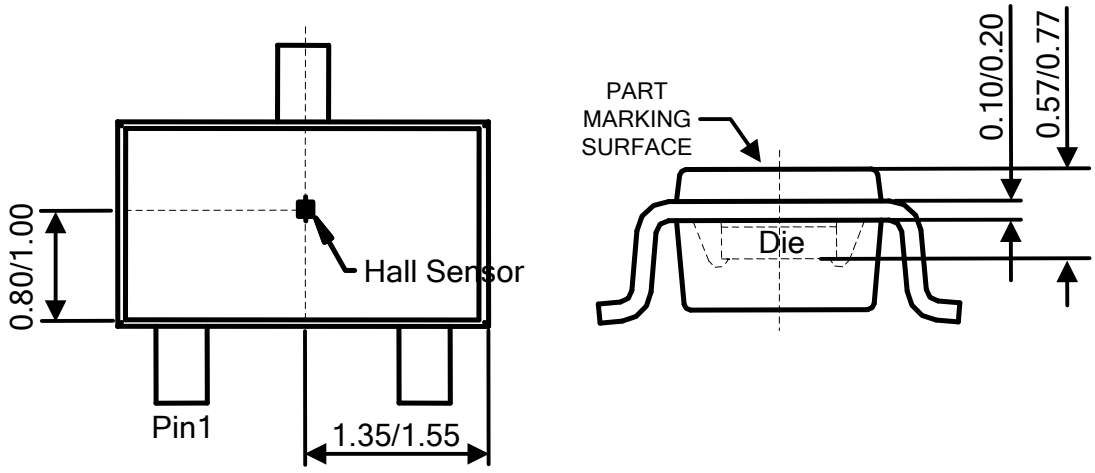
Ultra-sensitivity Micropower Omnipolar Hall-effect Switch

Package Type: SOT23-3



SOT23-3			
Dim	**Min**	**Max**	**Typ**
A	0.35	0.50	0.38
B	1.50	1.70	1.60
C	2.70	3.00	2.80
D	-	-	0.95
G	-	-	1.90
H	2.90	3.10	3.00
J	0.013	0.10	0.05
K	1.00	1.30	1.10
L	0.35	0.55	0.40
M	0.10	0.20	0.15
N	0.70	0.80	0.75
α	0°	8°	-
All Dimensions in mm			

Min/Max



Sensor Location

IMPORTANT NOTICE

THE KOMPASS SYSTEM MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).THE INFORMATION AND DATA CONTAINED IN THIS DOCUMENT ARE BELIEVED TO BE ACCURATE AND RELIABLE. THE SOFTWARE AND PROPRIETARY INFORMATION CONTAINED HEREIN MAY BE PROTECTED BY COPYRIGHT, PATENT TRADEMARK AND/OR OTHER INTELLECTUAL PROPERTY RIGHTS OF KOMPASS SYSTEM. ALL RIGHTS NOT EXPRESSLY GRANTED REMAIN RESERVED BY KOPASS SYSTEM.

KOMPASS SYSTEM AND ITS SUBSIDIARIES RESERVE THE RIGHT TO REVIEW THIS DOCUMENT AND TO MAKE MODIFICATIONS, ENHANCEMENTS, IMPROVEMENTS, CORRECTIONS OR OTHER CHANGES AT ANY TIME WITHOUT OBLIGATION TO NOTIFY ANY PERSON OR ENTITY OF SUCH REVISION OR CHANGES DESCRIBED HEREIN. FOR FURTHER ADVICE PLEASE CONTACT US DIRECTLY.

KOMPASS SYSTEM DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF THIS DOCUMENT OR ANY PRODUCT DESCRIBED HEREIN; NEITHER DOES KOMPASS SYSTEM CONVEY ANY LICENSE UNDER ITS PATENT OR TRADEMARK RIGHTS, NOR THE RIGHTS OF OTHERS. ANY CUSTOMER OR USER OF THIS DOCUMENT OR PRODUCTS DESCRIBED HEREIN IN SUCH APPLICATIONS SHALL ASSUME ALL RISKS OF SUCH USE AND WILL AGREE TO HOLD KOMPASS SYSTEM AND ALL THE COMPANIES WHOSE PRODUCTS ARE REPRESENTED ON KOMPASS SYSTEM WEBSITE, HARMLESS AGAINST ALL DAMAGES.

ANY INFORMATION AND DATA WHICH MAY BE PROVIDED IN THE DOCUMENT CAN AND DO VARY IN DIFFERENT APPLICATIONS, AND ACTUAL PERFORMANCE MAY VARY OVER TIME. ALL OPERATING PARAMETERS MUST BE VALIDATED FOR EACH CUSTOMER APPLICATION BY CUTOMERS' TECHNICAL EXPERTS. ANY NEW ISSUE OF THIS DOCUMENT INVALIDATES PREVIOUS ISSUES.

KOMPASS SYSTEMS DOES NOT WARRANT OR ACCEPT ANY LIABILITY WHATSOEVER IN RESPECT OF ANY PRODUCTS PURCHASED THROUGH UNAUTHORIZED SALES CHANNEL.
SHOULD CUSTOMERS PURCHASE OR USE KOMPASS SYSTEM PRODUCTS FOR ANY UNINTENDED OR UNAUTHORIZED APPLICATION, CUSTOMERS SHALL INDEMNIFY AND HOLD KOMPASS SYSTEM AND ITS REPRESENTATIVES HARMLESS AGAINST ALL CLAIMS, DAMAGES, EXPENSES, AND ATTORNEY FEES ARISING OUT OF, DIRECTLY OR INDIRECTLY, ANY CLAIM OF PERSONAL INJURY OR DEATH ASSOCIATED WITH SUCH UNINTENDED OR UNAUTHORIZED APPLICATION.

PRODUCTS DESCRIBED THEREIN MAY BE COVERED BY ONE OR MORE UNITED STATES, INTERNATIONAL OR FOREIGN PATENTS PENDING. PRODUCT NAMES AND MARKINGS NOTED THEREIN MAY ALSO BE COVERED BY ONE OR MORE UNITED STATES, INTERNATIONAL OR FOREIGN TRADEMARKS.

THIS DOCUMENT IS WRITTEN IN ENGLISH BUT MAY BE TRANSLATED INTO MULTIPLE LANGUAGES FOR REFERENCE. ONLY THE ENGLISH VERSION OF THIS DOCUMENT IS THE FINAL AND DETERMINATIVE FORMAT RELEASED BY KOMPASS SYSTEM.

LIFE SUPPORT

DO NOT USE OUR PRODUCTS IN LIFE-SUPPORTING SYSTEMS, MILITARY, AVIATION, OR AEROSPACE APPLICATIONS! UNLESS EXPLICITLY AGREED TO OTHERWISE IN WRITING BETWEEN THE PARTIES, KOMPASS SYSTEM'S PRODUCTS ARE NOT DESIGNED, INTENDED OR AUTHORIZED FOR USE AS COMPONENTS IN SYSTEMS INTENDED FOR SURGICAL IMPLANTS INTO THE BODY, OR OTHER APPLICATIONS INTENDED TO SUPPORT OR SUSTAIN LIFE, OR FOR ANY OTHER APPLICATION IN WHICH THE FAILURE OF THE PRODUCT COULD CREATE A SITUATION WHERE PERSONAL INJURY OR DEATH COULD OCCUR.

CUSTOMERS REPRESENT THAT THEY HAVE ALL NECESSARY EXPERTISE IN THE SAFETY AND REGULATORY RAMIFICATIONS OF THEIR LIFE SUPPORT DEVICES OR SYSTEMS, AND ACKNOWLEDGE AND AGREE THAT THEY ARE SOLELY RESPONSIBLE FOR ALL LEGAL, REGULATORY AND SAFETY-RELATED REQUIREMENTS CONCERNING THEIR PRODUCTS AND ANY USE OF KOMPASS SYSTEM PRODUCTS IN SUCH SAFETY-CRITICAL, LIFE SUPPORT DEVICES OR SYSTEMS, NOTWITHSTANDING ANY DEVICES- OR SYSTEMS-RELATED INFORMATION OR SUPPORT THAT MAY BE PROVIDED BY KOMPASS SYSTEM. FURTHER, CUSTOMERS MUST FULLY INDEMNIFY KOMPASS SYSTEM AND ITS REPRESENTATIVES AGAINST ANY DAMAGES ARISING OUT OF THE USE OF KOMPASS SYSTEM PRODUCTS IN SUCH SAFETY-CRITICAL, LIFE SUPPORT DEVICES OR SYSTEMS.

www.kompassys.com