UNISONIC TECHNOLOGIES CO., LTD

UH8109   Preliminary   *CMOS IC*

LOW CURRENT CONSUMPTION OMNIPOLAR DETECTION TYPE HALL EFFECT SWITCH IC

SOT-23
(EIAJ SC-59)
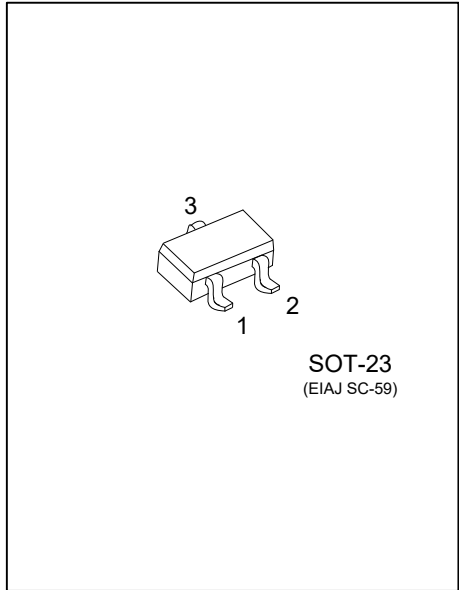
■ **DESCRIPTION**

The UTC **UH8109**, developed by CMOS technology, is a high-accuracy Hall effect switch IC that operates with low current consumption.

The output voltage changes when this IC detects the intensity level of magnetic flux density. Using this IC with a magnet makes it possible to detect the open / close in various devices.

Due to its high-accuracy magnetic characteristics, this IC can make operation's dispersion in the system combined with magnet smaller.

■ **FEATURES**

* Power supply voltage range: V_{DD} = 2.7V ~ 5.5V
* Pole detection: Detection of omnipolar
* Output logic: Active "L"
* Output form: CMOS output
* Magnetic sensitivity: B_{OP} = 7.0mT typ.
* Operating cycle (Current consumption):
  Product with omnipolar detection
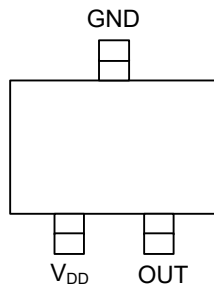 t_{CYCLE} = 30.50ms (I_{DD} = 4.0µA) typ.

■ **ORDERING INFORMATION**

Ordering Number		Package	Packing
Lead Free	Halogen Free		
UH8109L-AE3-R	UH8109G-AE3-R	SOT-23	Tape Reel

UH8109G-AE3-R

- (1)Packing Type
- (2)Package Type
- (3)Green Package

(1) R: Tape Reel

(2) AE3: SOT-23

(3) G: Halogen Free and Lead Free, L: Lead Free

■ **MARKING**

09□ → L: Lead Free
→ G: Halogen Free
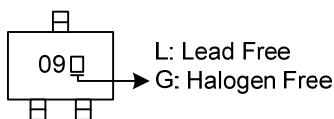
■ **PIN CONFIGURATION**

GND

V_{DD} OUT

■ **PIN DESCRIPTION**

PIN NO.	PIN NAME	DESCRIPTION
1	V_{DD}	Power supply
2	OUT	Output
3	GND	Ground

■ **BLOCK DIAGRAM**

V_{DD}

Sleep / Awake logic

Note

Note

Chopper Stabilized Amplifier

Note

OUT

GND
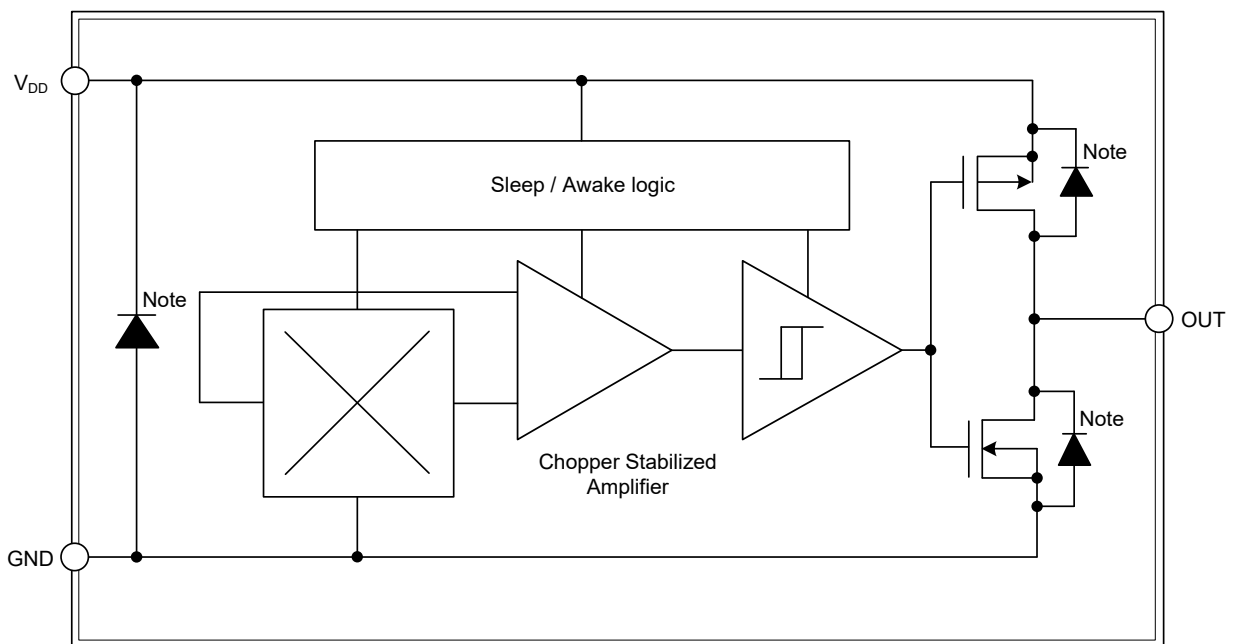
Note: Parasitic Diode.

ABSOLUTE MAXIMUM RATING (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Power Supply Voltage	V_{DD}	7.0	V
Output Current	I_{OUT}	±2.0	mA
Output Voltage	V_{OUT}	V_{DD}	V
Operating Temperature	T_{OPR}	-40 ~ +85	°C
Storage Temperature	T_{STG}	-40 ~ +125	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ ELECTRICAL CHARACTERISTICS (V_{DD}=5.0V,-T_A=25°C unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Power Supply Voltage	V_{DD}			2.7	5.0	5.5	V
Current Consumption	I_{DD}	Average Value			4.0	8.0	µA
Output Voltage	V_{OUT}	CMOS Output Product	Output Transistor N-CH, I_{OUT} = 2mA			0.4	V
			Output Transistor P-CH, I_{OUT} = -2mA	V_{DD}-0.4			V
Awake Mode Time	t_{AW}				0.10		ms
Sleep Mode Time	t_{SL}				30.4		ms
Operating Cycle	t_{CYCLE}	t_{AW} + t_{SL}			30.5	60	ms

■ MAGNETIC CHARACTERISTICS (V_{DD}=5.0V, T_A=25°C unless otherwise specified)

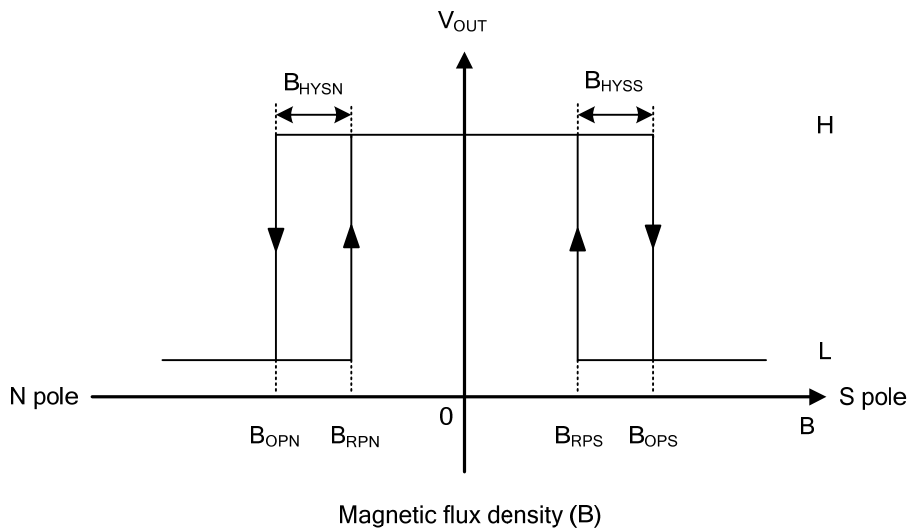**Product with omnipolar detection**

Product with B_{OP} = 7.0mT typ.

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Operation Point (Note 1)	S pole	B_{OPS}		5.0	7.0	8.5	mT
	N pole	B_{OPN}		-8.5	-7.0	-5.0	mT
Release Point (Note 2)	S pole	B_{RPS}		3.7	5.2	7.2	mT
	N pole	B_{RPN}		-7.2	-5.2	-3.7	mT
Hysteresis Width (Note 3)	S pole	B_{HYSS}	$B_{HYSS} = B_{OPS} - B_{RPS}$		1.8		mT
	N pole	B_{HYSN}	$B_{HYSN} = |B_{OPN} - B_{RPN}|$		1.8		mT

Notes: 1. B_{OPN}, B_{OPS}: Operation points B_{OPN} and B_{OPS} are the values of magnetic flux density when the output voltage (V_{OUT}) is inverted after the magnetic flux density applied to this IC by the magnet (N pole or S pole) is increased (by moving the magnet closer). Even when the magnetic flux density exceeds B_{OPN} or B_{OPS}, V_{OUT} retains the status.

        2. B_{RPN}, B_{RPS}: Release points B_{RPN} and B_{RPS} are the values of magnetic flux density when the output voltage (V_{OUT}) is inverted after the magnetic flux density applied to this IC by the magnet (N pole or S pole) is decreased (the magnet is moved further away). Even when the magnetic flux density falls below B_{RPN} or B_{RPS}, V_{OUT} retains the status.

        3. B_{HYSN}, B_{HYSS}: Hysteresis widths B_{HYSN} and B_{HYSS} are the difference between B_{OPN} and B_{RPN}, and B_{OPS} and B_{RPS}, respectively.

■ **STANDARD CIRCUIT**

V_DD

C_IN
0.1μF

OUT

GND

■ **MAGNETIC FLUX**

V_{OUT}

B_{HYSN} B_{HYSS}

H

L

N pole   0   S pole

B_{OPN} B_{RPN} B_{RPS} B_{OPS} B

Magnetic flux density (B)