

# AK8788A

Shipped in packet-tape reel(5000pcs/Reel)

AK8788A is ultra-small Hall effect IC of a single silicon chip composed of Hall element and a signal processing IC.

Omnipolar Hall Effect Switch

Supply Voltage 1.6~5.5V

Hall Element Pulse Excitation

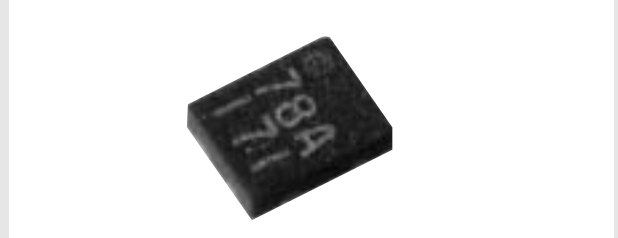
High Sensitivity Bop:3mT

Output CMOS

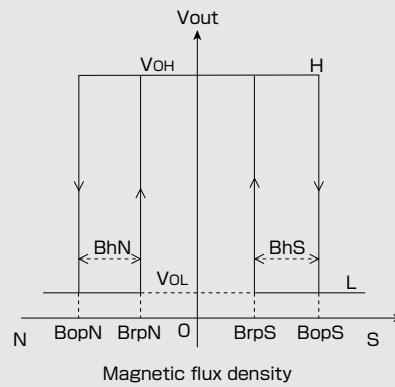
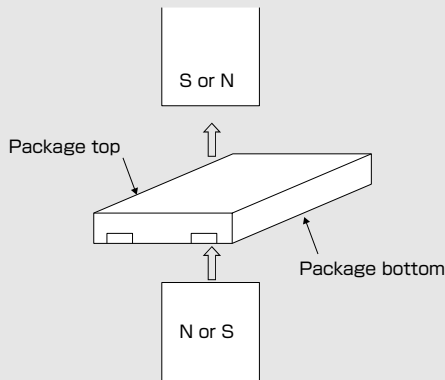
SON

### ●Features

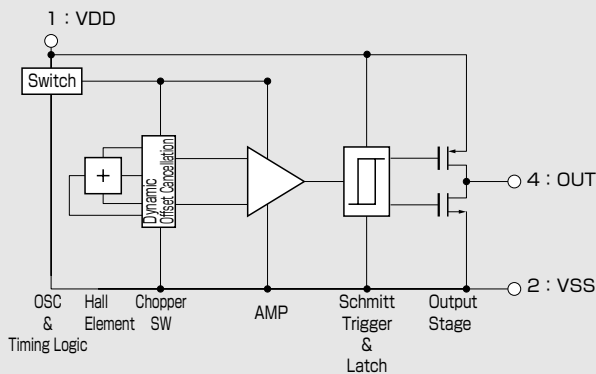
- High sensitive omnipolar operation
- Micropower operation  
Typ.4.5μA (average : VDD=1.85V)
- Ultra small SON package : 1.1×1.4×t0.37mm  
Halogen free



### ●Operational Characteristics



### ●Functional Block Diagram



Item	Function
OSC	Generates operating clock
Timing logic	Generates timing signal requires for Chopper SW, AMP and COMP
Hall Element	Hall element fabricated by CMOS process
Chopper SW	Performs chopping in order to cancel the offset voltage of Hall sensor
AMP	Reduce offset voltage and amplifies Hall output voltage
Schmitt Trigger	Hysteresis comparator
Output Stage	CMOS output, During the power down mode, output is latched in its previous state

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●Absolute Maximum Ratings

Item	symbol	Min.	Max.	Unit
Power supply voltage	V <sub>DD</sub>	-0.3	+6.5	V
Output current	I <sub>OUT</sub>	-0.5	+0.5	mA
Storage temperature	T <sub>STG</sub>	-55	+125	°C

Note) Stresses beyond these listed values may cause permanent damage to the device.

●Recommended Operating Conditions

Item	symbol	Min.	Typ.	Max.	Unit
Power supply voltage	V <sub>DD</sub>	1.6	1.85	5.5	V
Operating temperature	T <sub>a</sub>	-40		+85	°C

●Electrical Characteristics① (T<sub>a</sub>=25°C V<sub>DD</sub>=1.85V Unless otherwise noted)

Item	symbol	Min.	Typ.	Max.	Unit	Note
Current consumption	I <sub>DD</sub>		4.5	9	μA	Average
	I <sub>DD2</sub>		7.5	12	μA	Average, V <sub>DD</sub> =5.5V
High level output voltage	V <sub>OH</sub>	V <sub>DD</sub> -0.4			V	I <sub>out</sub> =-0.5mA
Low level output voltage	V <sub>OL</sub>			0.4	V	I <sub>out</sub> =+0.5mA
Pulse drive period	T <sub>PD1</sub>	25	50	100	ms	
Pulse drive time	T <sub>PD2</sub>	43	85.4	170	μs	

●Electrical Characteristics② (T<sub>a</sub>=-40°C~85°C V<sub>DD</sub>=1.6~5.5V)

Item	symbol	Min.	Typ.	Max.	Unit	Note
Current consumption	I <sub>DD</sub>		4.5	15	μA	
High level output voltage	V <sub>OH</sub>	V <sub>DD</sub> -0.4			V	I <sub>out</sub> =-0.5mA
Low level output voltage	V <sub>OL</sub>			0.4	V	I <sub>out</sub> =+0.5mA
Pulse drive period	T <sub>PD1</sub>	25	50	100	ms	
Pulse drive time	T <sub>PD2</sub>	43	85.4	170	μs	

Note) The specifications in Electrical Characteristics ② are design targets.

●Magnetic Characteristics① (T<sub>a</sub>=25°C V<sub>DD</sub>=1.85V)

Item	symbol	Min.	Typ.	Max.	Unit
Operating points	B <sub>op</sub> S	*1.9	3.0	3.7	mT
	B <sub>op</sub> N	-3.7	-3.0	*-1.9	mT
Releasing points	B <sub>rp</sub> S	1.6	2.2	*3.4	mT
	B <sub>rp</sub> N	*-3.4	-2.2	-1.6	mT
Hysteresis	B <sub>h</sub> S,B <sub>h</sub> N	*0.3	0.8	*1.5	mT

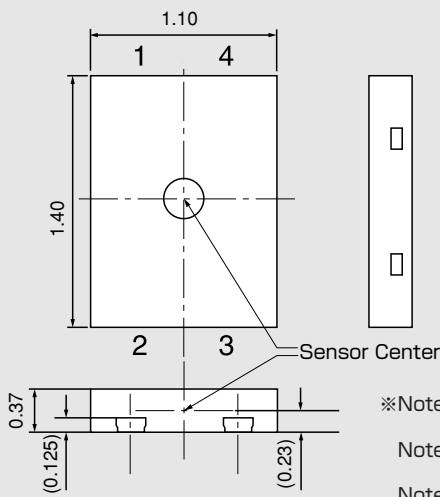
Note) The characteristics with \* mark are design targets.

●Magnetic Characteristics② (T<sub>a</sub>=-40°C~85°C V<sub>DD</sub>=1.6~5.5V)

Item	symbol	Min.	Typ.	Max.	Unit
Operating points	B <sub>op</sub> S	1.7	3.0	4.1	mT
	B <sub>op</sub> N	-4.1	-3.0	-1.7	mT
Releasing points	B <sub>rp</sub> S	1.4	2.2	3.8	mT
	B <sub>rp</sub> N	-3.8	-2.2	-1.4	mT
Hysteresis	B <sub>h</sub> S,B <sub>h</sub> N	0.1	0.8	1.7	mT

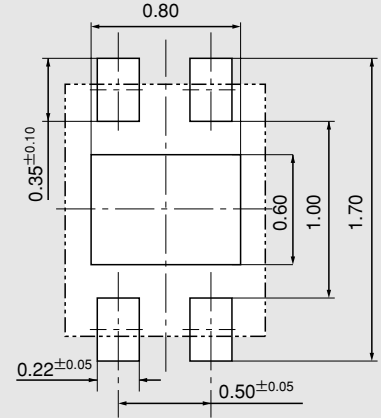
Note) The specifications in Magnetic Characteristics ② are design targets.

●Package (Unit:mm)



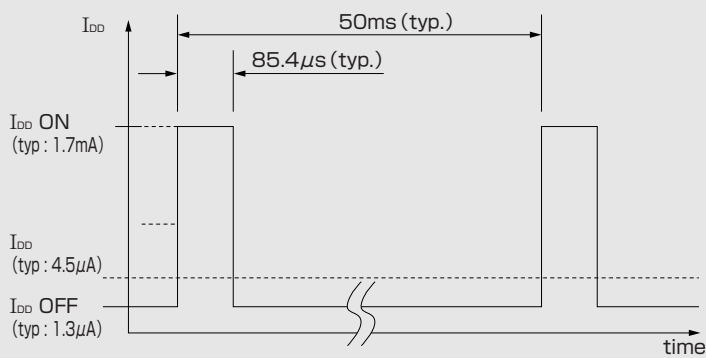
- ※Note 1) Sensitive area position referenced to the center of package within  $\phi 0.3\text{mm}$  circle.
- Note 2) Tolerances of dimension otherwise noted is  $\pm 0.05\text{mm}$ .
- Note 3) Hatched area is plated.
- Note 4) Center pad area (TAB) should be tied to the VSS or floating

●Footprint (for reference)

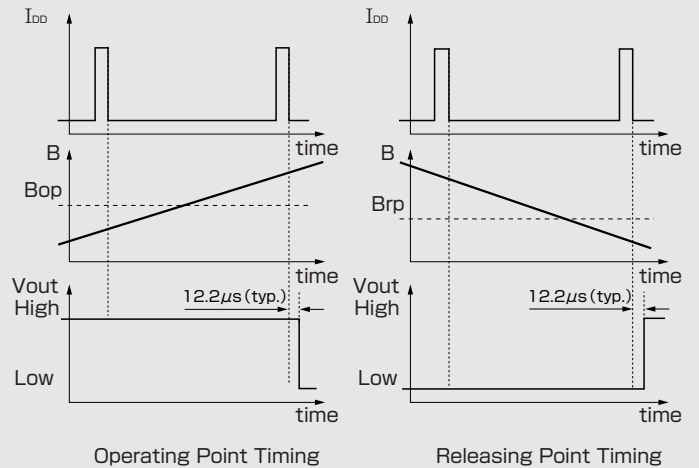


Pin No.	Pin name	Function	Note
1	VDD	Power supply pin	
2	VSS	Ground pin	
3	N.C.	(No internal connection)	Connect to VSS externally
4	OUT	Output pin	CMOS output

●IDD Timing Chart

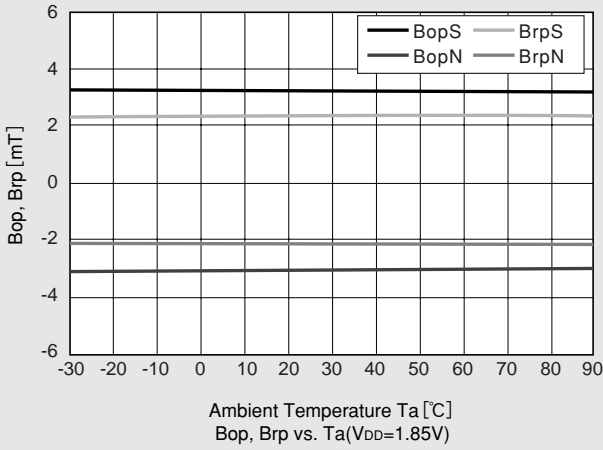


●Functional Timing Chart

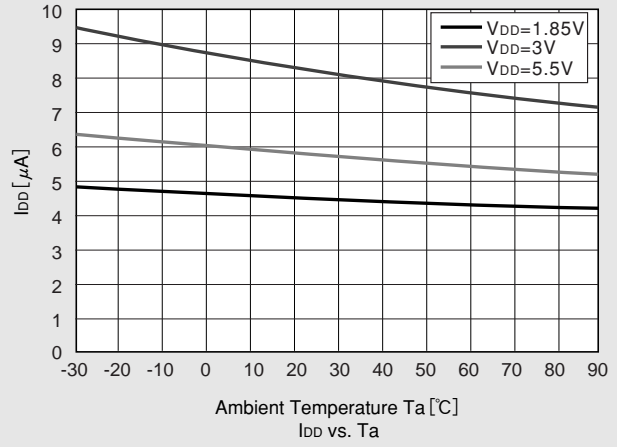


Note: Hall IC's output is held as internal data just before the internal circuit turns off. And after 12.2µs (typ.) the output changes.

● Typical Characteristics Data (for reference)

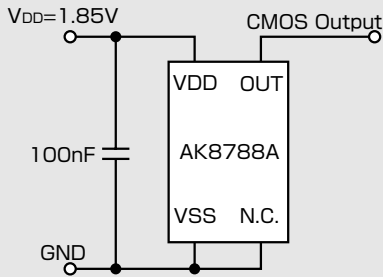


Temperature dependence of sensitivity



Temperature dependence of current consumption (Average)

● Application Circuit



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April 4, 2012