

# 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
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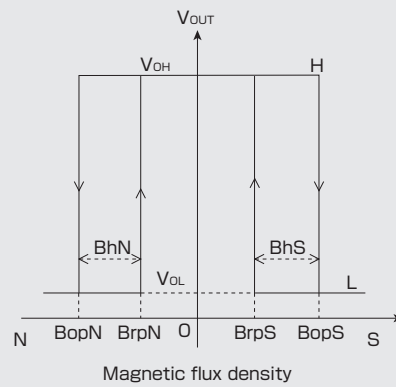
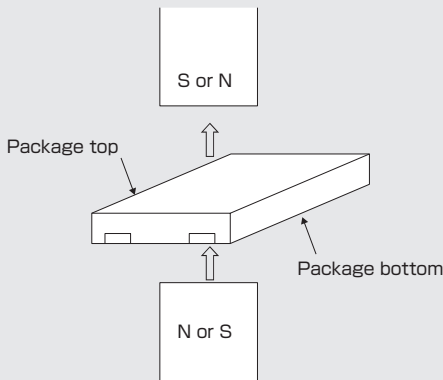
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### ●Features

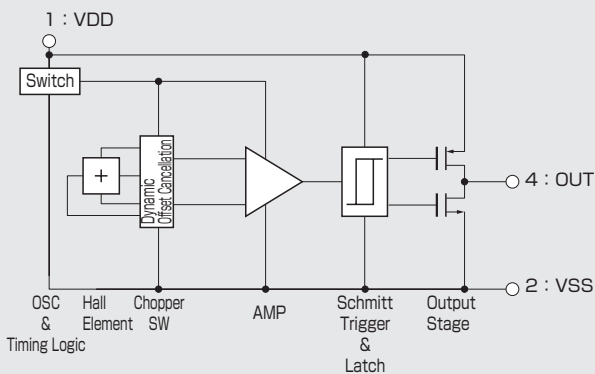
- High sensitive omnipoler operation
- Micropower operation  
Typ.4.5μA (average : V<sub>DD</sub>=1.85V)
- Ultra small SON package : 1.1 × 1.4 × t0.37mm  
Halogen free



### ●Operational Characteristics



### ●Functional Block Diagram



Item	Function
OSC	Generates operating clock
Timing Logic	Generates timing signal requires for Chopper SW, AMP and other circuits
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
Latch Logic 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~+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	Average
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	BopS	*1.9	3.0	3.7	mT
	BopN	-3.7	-3.0	*-1.9	mT
Releasing points	BrpS	1.6	2.2	*3.4	mT
	BrpN	*-3.4	-2.2	-1.6	mT
Hysteresis	BhS,BhN	*0.3	*0.8	*1.5	mT

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

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

Item	symbol	Min.	Typ.	Max.	Unit
Operating points	BopS	1.7	3.0	4.1	mT
	BopN	-4.1	-3.0	-1.7	mT
Releasing points	BrpS	1.4	2.2	3.8	mT
	BrpN	-3.8	-2.2	-1.4	mT
Hysteresis	BhS,BhN	0.1	0.8	1.7	mT

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

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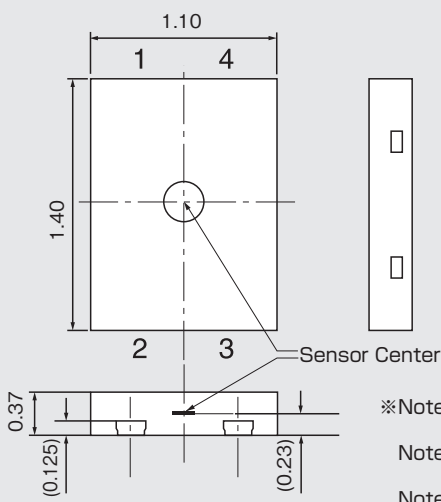
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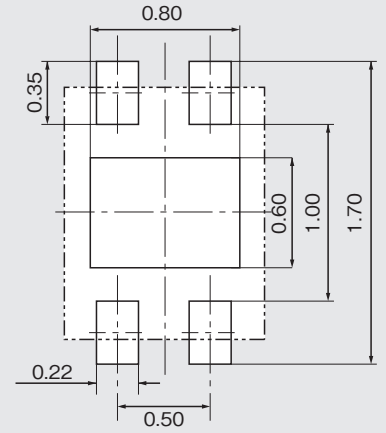
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●Package (Unit:mm)



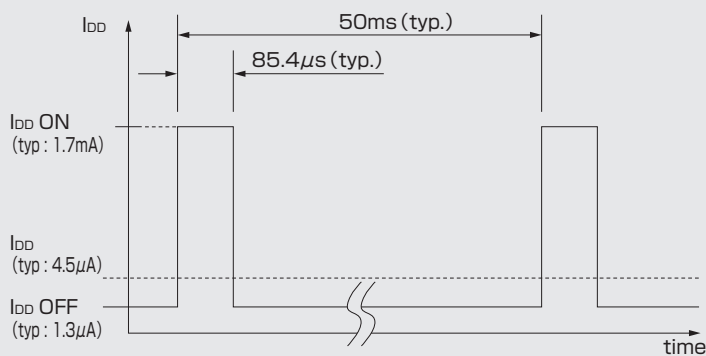
- ※Note 1) Sensitive area position referenced to the center of package within  $\phi 0.3\text{mm}$  circle.
- Note 2) Tolerances of dimension otherwise noted is  $\pm 0.05\text{mm}$ .
- Note 3) Hatched area is plated.
- Note 4) Center pad area (TAB) should be tied to the VSS or floating

●Footprint (for reference)

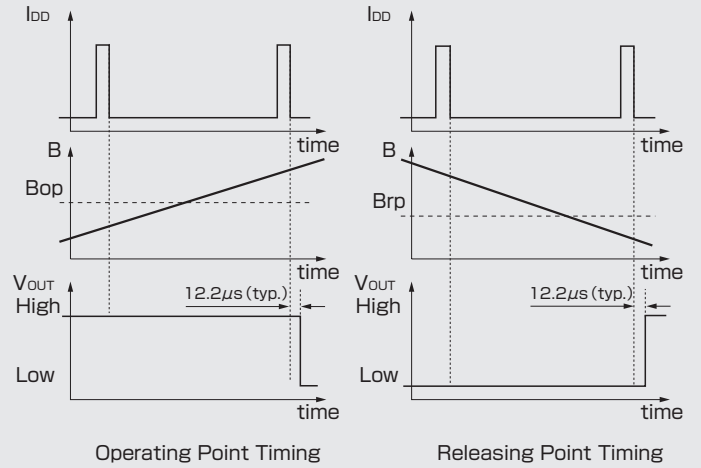


Pin No.	Pin name	Function	Note
1	VDD	Power supply	
2	VSS	Ground	
3	N.C.	(No internal connection)	Connect to VSS externally
4	OUT	Output	CMOS output

●I<sub>DD</sub> Timing Chart

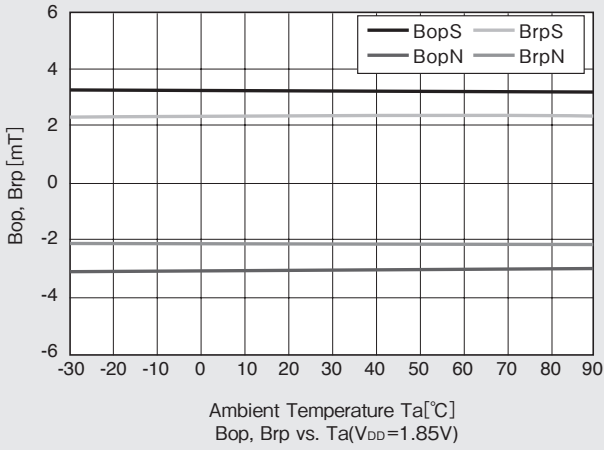


●Functional Timing Chart

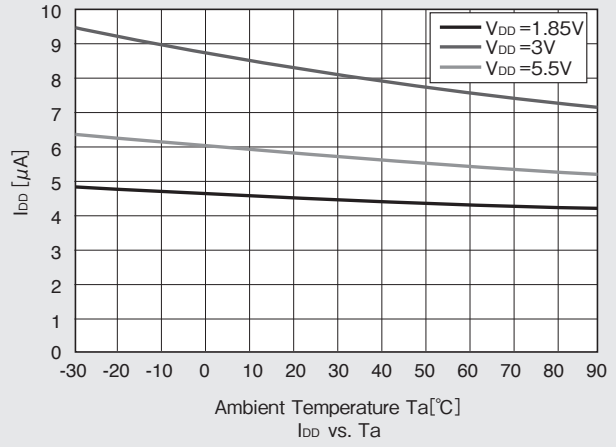


Note) Hall effect IC's output is held as internal data just before the internal circuit turns off. And after 12.2  $\mu\text{s}$  (typ.) the output changes.

● Typical Characteristics Data (for reference)

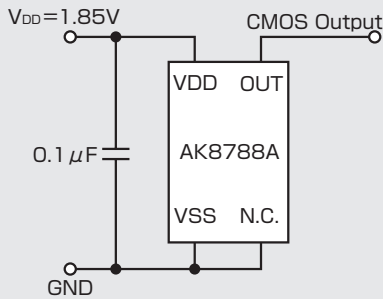


Temperature dependence of sensitivity



Temperature dependence of current consumption (Average)

● Application Circuit



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February 21, 2013

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