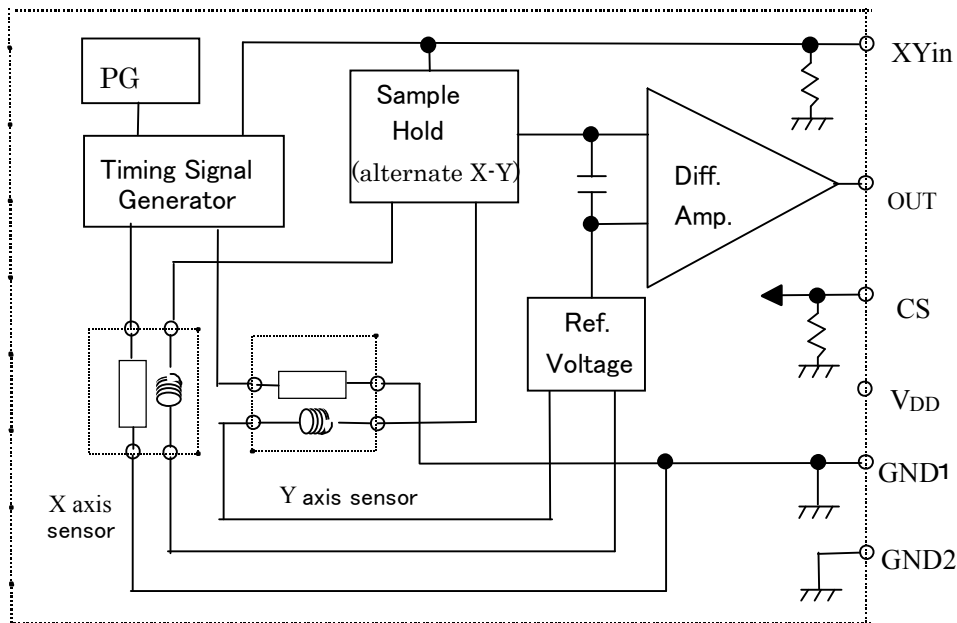


[1] General Description

The AMI204 is a magnetic sensor for use in electronic compasses that integrates two perpendicularly positioned Magneto-Impedance sensors with their controller IC in a single small package. The AMI204 outputs linear voltages corresponding to the magnetic field strength in the direction of each of the two sensors.

[2] Block Diagram



[3] Terminal Description

Name	Pin #	I / O	Description	Reference
VDD	3	Power	Power input (+2.60 V to +3.60 V)	-
GND1	1	Power	Power ground	-
OUT	5	Output	Linear DC output proportional to magnetic fields	-
CS	2	Input	Chip Standby	"L" or open = Shut down.
XYin	4	Input	X axis / Y axis output switching	"H" = X axis, "L" = Y axis
GND2	6	Power	Power ground	-

[4] Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Supply Voltage	V _{DD}	-0.3 to +6.5	V
Storage Temperature	T _{STG}	-40 to +125	°C
Input Voltage	V _{IN}	-0.3V to V _{DD} +0.3	V

[5] Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	V _{DD}	2.60	3.00	3.60	V
Operation Temperature	T _{OPR}	-20		+85	°C

[6] Electrical Characteristics

(Operating Conditions: T_a = +25 °C; V_{DD} = +3.00 V; 10μF ceramic capacitor between V_{DD} and GND1)

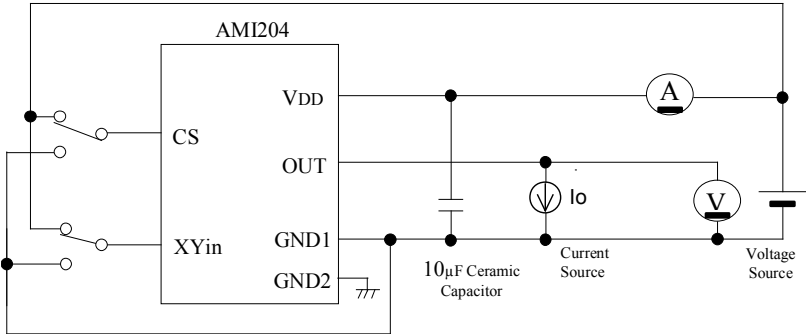
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output Voltage	V _{O1}	I _{O1} = +10 μA, +1.0 mT	2.7			V
	V _{O2}	I _{O2} = -10 μA, -1.0 mT			0.03	V
Power Supply Current	I _{DD1}	CS = "H"		2.3	3.0	mA
	I _{DD2}	CS = open, XY _{in} = open			1	μA
High Level Voltage Input	V _H	For XY _{in} and CS	80% V _{DD}			V
Low Level Voltage Input	V _L	For XY _{in} and CS			20% V _{DD}	V
Input Resistance	R _{IN}	XY _{in} to GND1, CS to GND1		2		Mohm

[7] Magnetic Characteristics

(Operating Conditions: T_a = +25 °C; V_{DD} = +3.00 V; 10μF ceramic capacitor between V_{DD} and GND1)

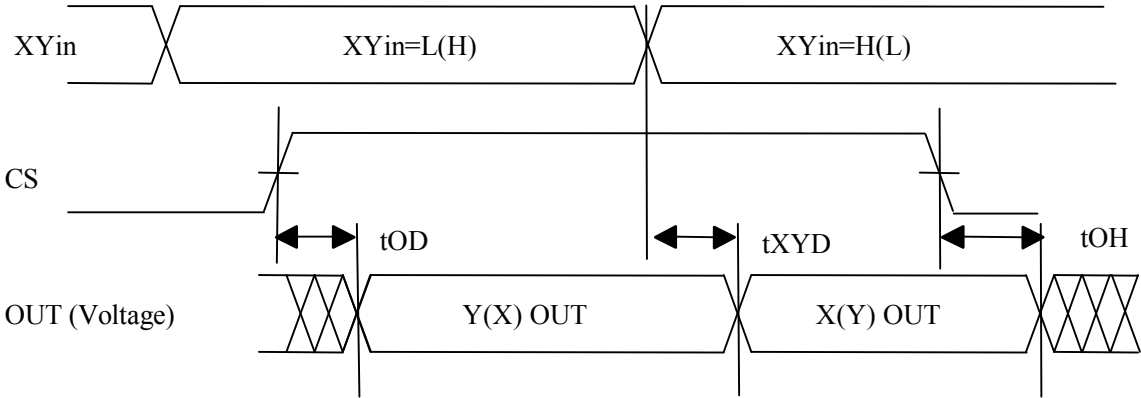
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Dynamic Range	R _m	CS = H	±0.2			mT
Linearity	L _{in}	CS = H, within +/-0.2mT		1.6		%FS
Output Offset Voltage at Zero Gauss	V _{ofs}	CS = H	800	1350	1900	mV
Sensitivity	deltaV	CS = H	1.6	2.4	3.8	mV / μT
Frequency Range of Magnetic field	Fr	CS = H			1	kHz

[8] Test Circuit



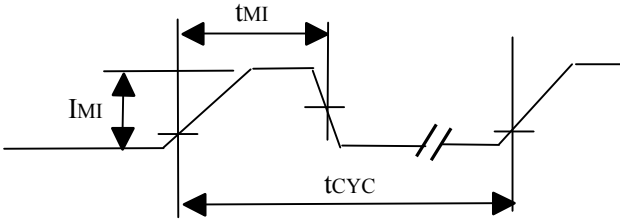
[9] Timing Chart

9-1. OUT pin



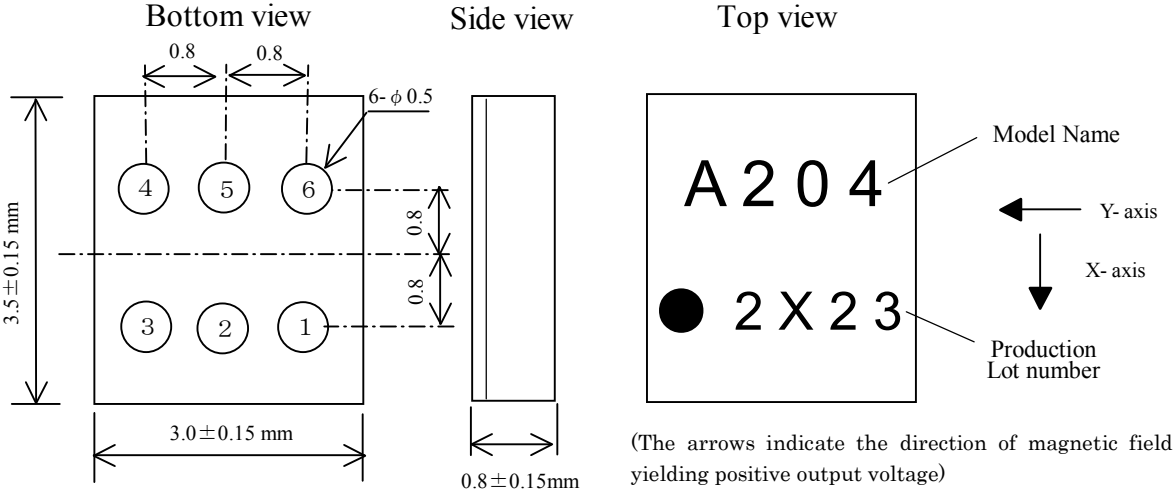
Parameter	Symbol	Min	Max	Unit
CS to active output delay	tOD	-	1.0	ms
XYin to OUT switch delay	tXYD	-	1.0	ms
Output hold time	tOH	-	0	ns

9-2. Power Supply Current for MI element



Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Sensor current time	t _{MI}		-	40	-	ns
Sensor current	I _{MI}	V _{DD} =+3.00V	-	200	-	mA
Sensor current cycle	t _{CYC}		-	5000	-	ns

[10] Dimensions and Marking Layout



[11] Environmental and Mechanical Characteristics

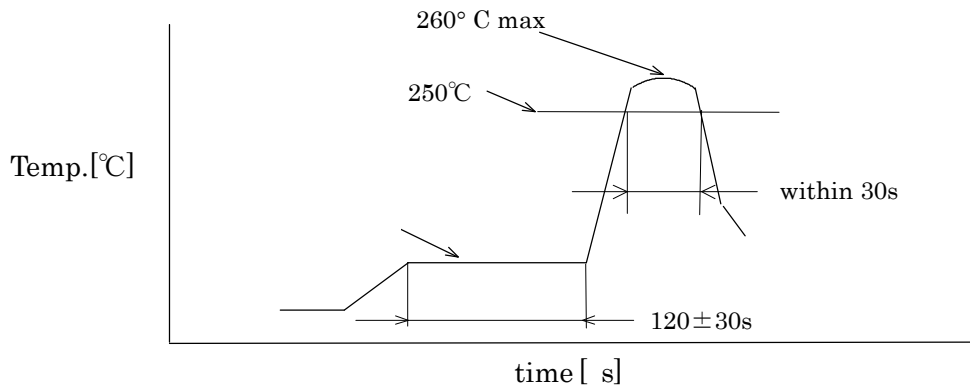
No.	Test Item	Test Conditions [based on EIAJ ED-4701]	Preparation	Duration	Judgment
1	High temperature storage	Ta= +125°C	----	1000 hours	Satisfies [6] Electrical Characteristics and [7] Magnetic Characteristics after testing.
2	Low temperature storage	Ta= -55°C	----	1000 hours	
3	Temperature humidity storage	Ta= +85°C, RH= 85%	I + II	1000 hours	
4	High temperature bias	Ta= +125°C, VDD= +3.6V	----	1000 hours	
5	Temperature humidity bias	Ta=+85°C, RH=85%, VDD=+3.6V	I + II	1000 hours	
6	Temperature cycle (air)	-40°C ↔ +125°C (30min – 5min – 30min)	I + II	100 cycles	
7	Thermal shock (liquid)	-40°C ↔ +125°C (5min – 10s – 5min)	I + II	100 cycles	
8	USPCT	Ta=+125°C, RH=85%, 2×10^5 Pa	I + II	100 hours	
9	Solder heat resistance	Infrared reflow (See next page: high temp reflow peak less than 260°C)	I	2 times	
10	ESD sensitivity (1)	C= 200pF, R= 0 ohm, ±150V	----	5 times	
	ESD sensitivity (2)	C= 100pF, R= 1.5 kohm, ±1kV	----	3 times	
11	Latch up	C= 200pF, R= 0 ohm, ±150V	----	1 time	
12	Solderability	Ta= +235°C	III	3 seconds	Covered with solder more than 95% of the dipped portion of the terminal.

Preparation (based on EIAJ ED4701-2 B101A)

The following preparations, related to moisture during storage and heat stress during mounting, were carried out prior to the abovementioned test items as noted in the preparation column.

- I. Saturation humidification treatment
(Ta = +85°C, RH = 30%, t= 168 hours + Ta=+30°C, RH = 70%, t= 168 hours)
- II. IR Reflow (twice)
- III. Steam aging (4 hours)

IR Reflow heat conditions



[12] Notes

- 1) This device is made with C-MOS IC. Please take precautions to prevent damage due to electrostatic discharge.
- 2) We recommend placing a capacitor (the capacity is more than 10 μF) between VDD and GND1 to obtain stable operation.
- 3) The wiring pattern to VDD and GND1 should be as wide as possible in order to reduce high frequency impedance.
- 4) We recommend placing a RC or LC lowpass filter between OUT and GND1 to reduce output ripple voltage.
- 5) Storage (Moisture Proof Packaging)
 - ① Please do not leave the device in the following environments:
 - * High temperature and high humidity
 - * Places with direct sun light
 - * Places with extreme temperature changes
 - * Dusty places
 - * In corrosive gas
 - ② Recommended storage temperature and humidity:
 - * $+5^{\circ}\text{C}\sim+30^{\circ}\text{C}$, below 70%RH, please use device within one year.
- 6) Usage after Opening the Moisture Proofed Packaging
 - ① After opening the moisture proof packaging, please store device in a temperature range of $+5^{\circ}\text{C}\sim+30^{\circ}\text{C}$ and humidity conditions below 70%RH. Apply device within 7 days.
However, we recommend keeping the device in a moisture proof storage ($+5^{\circ}\text{C}\sim+30^{\circ}\text{C}$, below 30%RH).
 - ② In case 7 days have exceeded after opening, please keep in a moisture proof storage ($+5^{\circ}\text{C}\sim+30^{\circ}\text{C}$, below 30%RH). Apply device within 14 days.
 - ③ However, we recommend using the device directly after the first opening.