Data Sheet

TAG201N1030

R E V I S I O N S

No.	DATE	P A G E	DESCRIPTION	DS'D	CH'D	APP'D

ED'N No. . .

DS' D A.Abe	DATE '12.08.02	MODEL No. TAG201N1030	TITLE Data Sheet
CH' D T.Imamura			
APP' D M.Yachi			

DWG NO.	3	4	5	6	7	8	9	10	11	12	SHEET
S P	C	0	0	4	9	6	1	W	0	0	1/8

Data Sheet

1. Scope

2. Parts number

3. Mechanical characteristics

4. Ratings

5. Electrical characteristics

6. Measurement circuit

7. Assembly recommendation

8. Instructions

ED'N No.	. .

DWG NO.	3	4	5	6	7	8	9	10	11	12	SHEET
SPC00496	1	W	0	0							2/8

1. Scope

This specification is applied to the angular rate sensor.

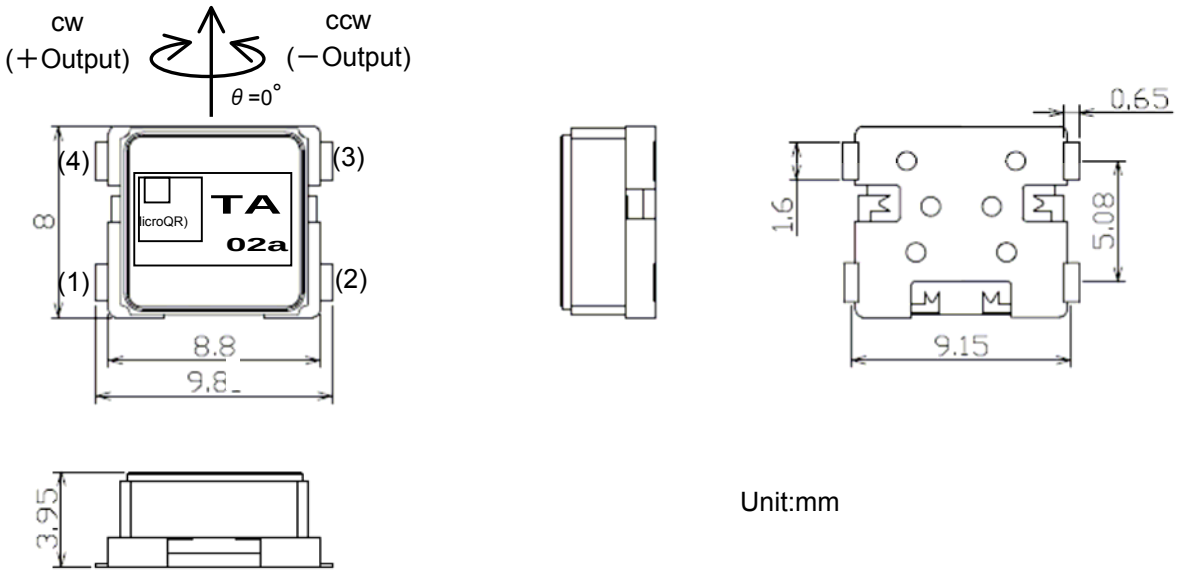
2. Parts number

2-1. Tamagawa Seiki parts number

TAG201N1030

3. Mechanical characteristics

3-1. Dimension



Unit:mm

Figure-1. Dimension

3-2. Terminal Configurations

Table-1. Terminal Configurations

No	Terminal name	Description
(1)	Vout	Rate sensor output
(2)	Vcc	Power supply voltage
(3)	TS	Temperature sensor output (Not connected in case of nonuse)
(4)	GND	Ground

3-3. Marking

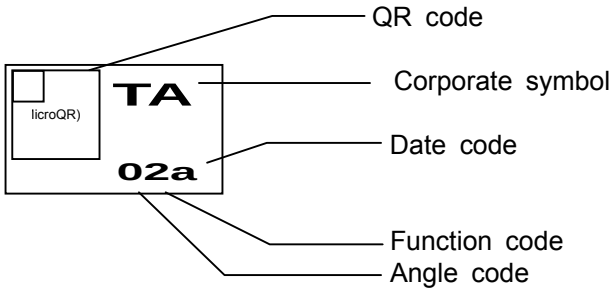


Figure-2. Marking

4. Ratings

4-1. Absolute maximum ratings

Table-2. Absolute maximum ratings

No.	Parameter	Specification	Unit	Note.
1	Supply voltage	-0.3 to +7.0	V	
2	Operating temperature range	-40 to +85	°C	
3	Storage temperature range	-40 to +85	°C	
4	Mechanical shock	200	G	1 time to X-, Y-, Z-axis each, unpowered.

4-2. Operating conditions

Table-3. Operating conditions

No.	Parameter	Specification			Unit	Conditions
		MIN	TYP	MAX		
1	Supply voltage range	4.75	5	5.25	V	
2	Measurement range	-200		200	°/sec	
3	Frequency response	-7		-2	dB	f=30Hz
4	Start up time			0.7	sec	25°C ± 2°C

5. Electrical characteristics

5-1. Rate sensor output

The following conditions are adopted, unless otherwise specified.

① Temperature：25°C±2°C

② Vcc：5V±0.01V

Table-4. Electrical characteristics

No.	Parameter	Specification			Unit	Conditions
		MIN	TYP	MAX		
1	Supply current			6	mA	
2	Maximum output voltage	Vcc - 0.3			V	
3	Minimum output voltage			0.3	V	
4	Nominal bias	2.4	2.5	2.6	V	
		2.35	2.5	2.65	V	Ta= -40 to +85°C
5	Bias drift after power on	-15		15	mV	0.7sec to 15minutes
6	Scale factor	9.5	10.0	10.5	mV/° /sec	
		9.0	10.0	11.0	mV/° /sec	Ta= -40 to +85°C
7	Scale factor symmetry	-1.0		1.0	%	
8	Linearity	-0.5		0.5	%Fs	
9	Cross axis sensitivity	-5		5	%	Ta= -40 to +85°C
10	Output noise			5	mVpp/5s	Ta= -40 to +85°C
11	Ratiometric error for bias	-20	0	20	%	Start-up from 0.7s～ Vcc:4.75V to 5.25V
12	Ratiometric error for scale factor	-20	0	20	%	Start-up from 0.7s～ Vcc:4.75V to 5.25V

Table-5. Electrical characteristics (Variation with temperature)

No.	Parameter	Specification			Unit	Conditions
		MIN	TYP	MAX		
13	Bias variation with temperature（Max-Min）			8	° /sec	Ta= -40 to +85°C
14	Bias variation with temperature	-6		6	mV/2.5°C	Ta= -40 to +85°C
		-13		13	mV/7.5°C	Ta= -40 to +85°C
15	Scale factor variation with temperature	-3.0		3.0	%	Ta= -40 to +85°C

Note:

・Bias variation with temperature assumes it the measurement at case of the temperature rise.

・Load impedance of 100kΩ and 0.1μF to be connected between terminals Vout and GND in parallel.

5-2. Temperature sensor output

Table-6. Temperature sensor output

No.	Parameter	Specification			Unit	Conditions
		MIN	TYP	MAX		
1	Temperature sensor output	1.33	1.4	1.47	V	Ta=25°C
2	Temperature sensor scale factor	-3.6	-3.8	-4.0	mV/°C	Ta= -40 to +85°C

Note:

・Temperature sensor output is not ratiometric on supply voltage.

＜Definition of the term＞

① Measurement range ; Angular rate measuring range for guarantee of performance
② Maximum output voltage ; Output voltage at input angular rate of +500 ° /sec
③ Minimum output voltage ; Output voltage at input angular rate of -500 ° /sec
④ Nominal bias ; Output voltage at input angular rate of 0 ° /sec
⑤ Bias drift after power on ; Maximum value of drift of bias during turned on state of applying electric power supply, where noise under 10mV is excluded.
⑥ Scale factor ; Ratio of the output voltage versus the rotating angular rate being applied.
⑦ Scale factor symmetry ; A typical value of asymmetry of sensitivity defined as a ratio of the sensitivity applying plus value of a specified input voltage to minus value of a specified input voltage.
⑧ Linearity ; ((Svω-Svmax)/(Svmax×ωmax))×ω×100 Linearity of CW direction, in the same as CCW direction.
Svω ; Scale factor when angular rate is ω
ωmax ; Maximum angular rate
Svmax ; Scale factor at ω_{max}
⑨ Cross axis sensitivity ; Maximum value of sensitivity of cross axis
⑩ Output noise ; Output noise at stable state operation.
⑪ Ratiometric error for bias ; Maximum value of error of bias applying voltage fluctuation caused by operating instability of applying electric power supply.
{V0(Vcc)/V0(5V)-(Vcc/5)}/(Vcc/5-1) ×100 (%)
⑫ Ratiometric error for scale factor ; Maximum value of error of sensitivity applying voltage fluctuation caused by operating instability of applying electric power supply.
{Sv(Vcc)/Sv(5V)–(Vcc/5)}/(Vcc/5-1) ×100 (%)
⑬ Bias variation with temperature ; Maximum value of standard bias under a specified variation in temperature.
⑭ Scale factor variation with temperature ; Minimum and maximum value of standard s ensitivity under a specified variation in temperature

6. Measurement circuit

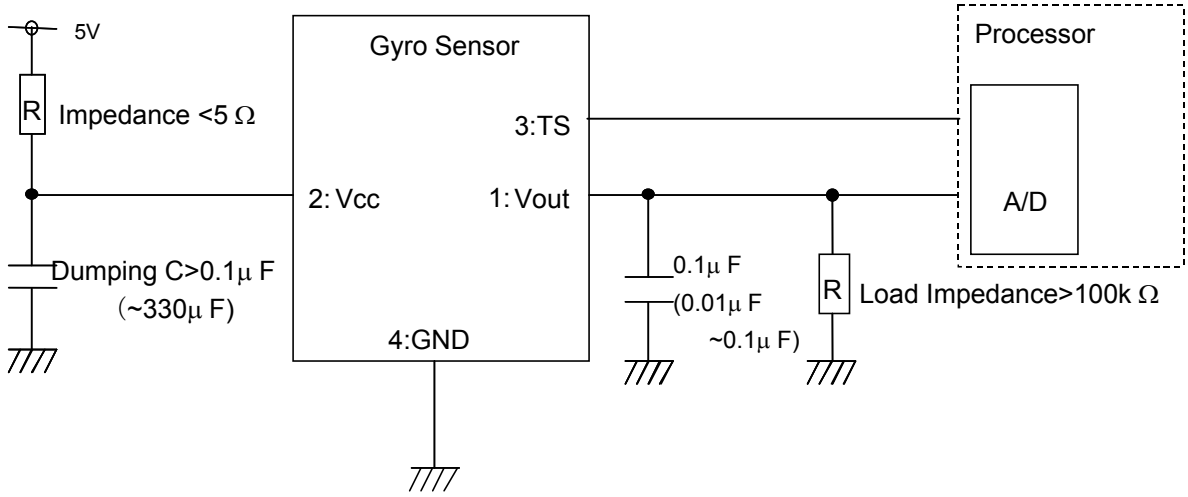


Figure-3. Measurement circuit

Note:

・To decrease the ripple voltage of the supply voltage, recommend to use the capacitor of large capacitance in order to avoid such phenomena.

・High impedance of Vout and TS terminal is needed.
(Please attach the load resistance more than 100kΩ if needed.)

7. Assembly recommendation

7-1. Assembly recommendation

7-1-1. Soldering temperature profile of reflow

(1)170～190℃：within 120sec
(2)200℃ or higher：within 80sec
(3)220℃ or higher：within 60sec
(4)Peak temperature：245℃, within 40sec
Where used solder is Sn-3Ag-0.5Cu
[Measurement point: Board surface]

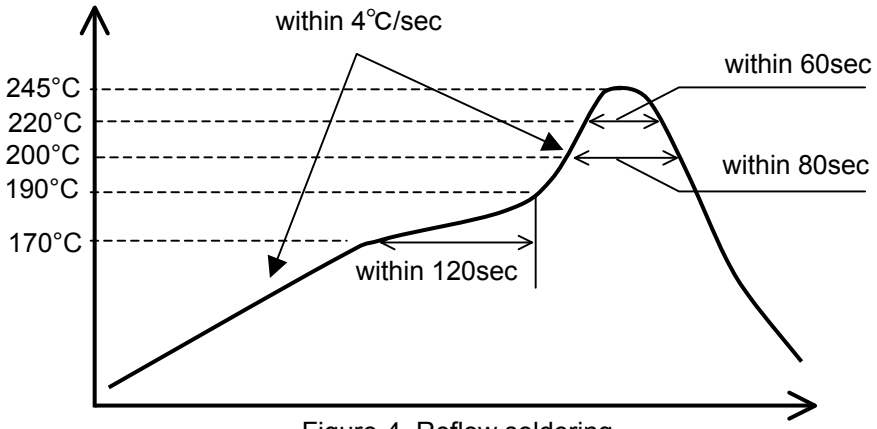


Figure-4. Reflow soldering

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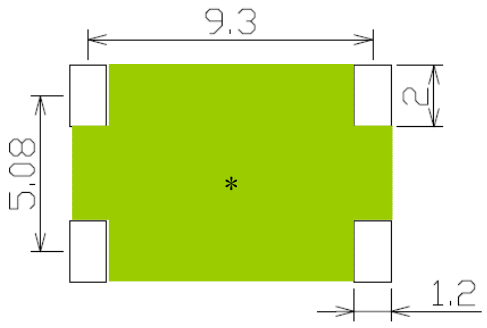
7-1-2. Soldering temperature profile of iron

At 1 lead Temperature: Lower than 300°C Time: within 3s

7-2. Recommended footprint



*)Solder resist

Figure-5. Recommended footprint

8. Instructions

8-1. This product uses Bi-CMOS IC inside. Against static electricity discharge is needed.

8-2. Connected correctly is needed.

8-3. Reflow soldering applied only once.

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