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SPP (Japan) originated**

# Product Specification

for

**CRS03-04-PS**

**Rev 6**

(Commercial Rate Sensor)

&

CRS03-04R-PS

CRS03-04S-PS



2006.8.3

SSS UK

TITLE	DOC. NUMBER	REV.
<b>PRODUCT SPECIFICATION FOR SINGLE AXIS SILICON VIBRATING STRUCTURE GYRO CRS03-04/CRS03-04R /CRS03-04S</b>	SST - 0016	6

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6		P2 : Add an alternate ASIC model(CRS03-04S). P2 : Mechanical Description revised P6 : Fig.3 added	'06.08.01	小 山 山 川 卷 口 科 淵	
5		P2 : Model Number revised (RoHS compliance) P2 : Mechanical Description revised P4 : Fig.1 amended P5 : Fig.2 added	'05.11.14	小 山 山 卷 南 科 口	
4		P1 : Notice revised P2 : 4.Performance Current dissipation revised P4 : Fig.1 amended	'04.04.20	小 山 山 中 山 卷 南 科 村 口 卓	
3		P4 : Fig.1 amended	'02.10.17	德 北 坂 中 江 村 本 村 卓	
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A	SCN-0150	SCN-0150 All pages	'01.02.05	RT TK KS KY MT	
REV.	MODIFY No.	REVISED PAGES	DATE	CHECKED	
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## 1. DESCRIPTION/概要

The silicon vibrating structure gyroscope (Si-VSG) is a solid state single axis rate sensor. It is a stand alone unit and dc output is proportional to the rate of rotation and supply voltage.

The new concept ring-shaped micro-machined resonator shows distinguished resistance against external shocks and vibrations over a wide range of temperature.

本シリコン振動ジャイロは1軸ソリッドステート角速度センサであり角速度と供給電圧に比例した直流電圧を出力する。マイクロマシニングのリング型振動子により広い温度範囲で外部衝撃や振動に対し優れた耐性を発揮するものである。

## 2. MODEL NUMBER/製品型名

CRS03 – 04 Connector output range 200deg/sec コネクタ出力タイプ  
 CRS03 – 04R Connector output range 200deg/sec コネクタ出力タイプ (RoHS Compliance / RoHS対応品)  
 CRS03 – 04S Connector output range 200deg/sec コネクタ出力タイプ (GOA ASIC対応品)

CRS03 Basic Model Number 基本製品番号  
 -xx Design Number タイプ識別番号  
 -xxR Design Number タイプ識別番号 (RoHS Compliance / RoHS対応品)  
 -xxS Design Number タイプ識別番号 (GOA ASIC対応品)

## 3. MECHANICAL DESCRIPTION/外形

The nominal dimensions are shown in Fig.1,2 ,3.(Fig2 RoHS compliance, Fig3 GOA ASIC model)

図 1 参照。(図 2 RoHS対応品、図 3 GOA ASIC対応品)

## 4. PERFORMANCE/性能

	Parameter 項目	Min	Typ	Max	Unit 単位	Notes 備考
Absolute Maximum Ratings 絶対最大定格	Supply voltage 電源	0.00	5.00	6.00	V	
	Storage temperature 保存温度	- 40		85	deg C	
	Operatable acceleration 使用限界加速度			981.0	m/sec <sup>2</sup>	
Operating conditions 動作環境	Supply voltage 電源電圧	4.75	5.00	5.25	V	
	Power supply noise 電源ノイズ			15.00	mVrms	0.5 to 100Hz
	Temperature 温度	- 40	23	85	deg C	
	Humidity 湿度	5		95	%RH	Non-condensing 結露無

The following specifications apply for Vdd=5.00V and Temp=23deg C unless otherwise specified.  
特に指定無き場合下記はVdd=5.00V、温度23℃を条件とする。

Parameter 項目	Limit 限度	Unit 単位	Notes 備考
Rate range 測定範囲	+/- 200	deg/sec	Reference 参考値
Rate range 測定範囲	+/- 3.491	rad/sec	
Scale Factor 感度	10	mV/(deg/sec) typ.	Reference 参考値
Scale Factor 感度	11.46	% of Vdd/(rad/sec) typ.	
Initial Scale Factor accuracy 感度初期設定確度	+/- 1	% typ.	
Initial Scale Factor accuracy 感度初期設定確度	+/- 3	%	
Scale Factor variation with temp.感度温度変動	+/- 3	% typ.	Op temp. range 動作温度範囲
Scale Factor variation with temp.感度温度変動	+/- 5	%	Op temp. range 動作温度範囲
Scale Factor ratiometric error 感度電源電圧変動誤差	+/- 1	%	Op voltage range動作電圧範囲
Bias ゼロ点	50	% typ. of Vdd	
Bias initial error ゼロ点初期設定誤差	+/- 60	mV	
Bias variation with temp.ゼロ点温度変動	+/- 60	mV	Op temp. range 動作温度範囲
Bias ratiometric error ゼロ点電源電圧変動誤差	+/- 20	mV	Op voltage range動作電圧範囲
Non linearity 非直線性	< 0.5	% of FS typ.	
Non linearity 非直線性	< 3	% of FS	
Quiescent noise 静止ノイズ	< 1	mVrms typ. (3~10Hz)	
Bandwidth 帯域	> 10	Hz	Gain (-3dB)
Cross axis sensitivity 他軸感度	< 5	%	
Power up time 起動時間	< 0.5	sec	From Vdd = 4.50V
Current dissipation 電流消費	< 50	mA	170mA when initializing(起動時)
Output Impedance 出力インピーダンス	100	Ω typ.	
Available output current 保証最小出力電流	> 0.5	mA	

## 5. TYPICAL RATE OUTPUT 出力電圧

$$V_o = \frac{1}{2} \times V_{dd} + \left( R_a \times S_F \times \frac{V_{dd}}{5} \right) ; \text{ (Unit: Volt typ. 単位V typ.)}$$

where: V<sub>o</sub>: Rateout (V), V<sub>dd</sub>: Supply voltage (V), R<sub>a</sub>: Applied rate (deg/s), S<sub>F</sub>: Scale Factor (V/ (deg/s))  
ここで: V<sub>o</sub>: ジャイロ出力(V), V<sub>dd</sub>: 電源電圧(V), R<sub>a</sub>: 角速度(deg/s), S<sub>F</sub>: 感度(V/(deg/s))

## 6. RATIOMETRIC ERROR レシオメトリック・エラー (電源電圧による変動の誤差)

### 6.1 Bias ratiometric error ゼロ点電源電圧変動誤差

Bias ratiometric error are calculated as follows; ゼロ点電源電圧変動誤差は次の式で表される

$$Err_b = V_b - \left( V_{b_5} \times \frac{V_{dd}}{5} \right) \text{ (V)}$$

where Err<sub>b</sub>: Bias ratiometric error (V), V<sub>b</sub>: Bias at V<sub>dd</sub> (V), V<sub>b<sub>5</sub></sub>: Bias at 5.00V (V), V<sub>dd</sub>: Supply voltage (V)  
ここで Err<sub>b</sub>: ゼロ点レシオメトリックエラー(V), V<sub>b</sub>: V<sub>dd</sub>でのゼロ点(V), V<sub>b<sub>5</sub></sub>: 5.00V時のゼロ点 (V), V<sub>dd</sub>: 電源電圧(V)

### 6.2 Scale Factor ratiometric error 感度電源電圧変動誤差

Scale Factor ratiometric error are calculated as follows; 感度電源電圧変動誤差は次の式で表される

$$Err_s = \left[ S_F - \left( S_{F_5} \times \left( \frac{V_{dd}}{5} \right) \right) \right] \times \frac{100}{S_F} \text{ (%)}$$

where

Err<sub>s</sub>: Scale Factor ratiometric error (%), S<sub>F</sub>: Scale Factor at V<sub>dd</sub> (V/ (deg/s))

S<sub>F<sub>5</sub></sub>: Scale Factor at 5.00V (V/ (deg/s)), V<sub>dd</sub>: Supply voltage (V)

ここで

Err<sub>s</sub>: 感度レシオメトリックエラー(%), S<sub>F</sub>: V<sub>dd</sub>時の感度 (V/ (deg/s)) S<sub>F<sub>5</sub></sub>: 5.00V時の感度(V/ (deg/s)), V<sub>dd</sub>: 電源電圧(V)

## 7. SOLDERING / 半田付け

The product may not be subjected to beyond the maximum storage temperature (e.g. solder reflow chamber) at any time. Hand soldering is recommended.

本製品は何時も最高保存温度以上の環境（たとえば半田リフロー内）に置かれてはならない。従い手半田が推奨される。

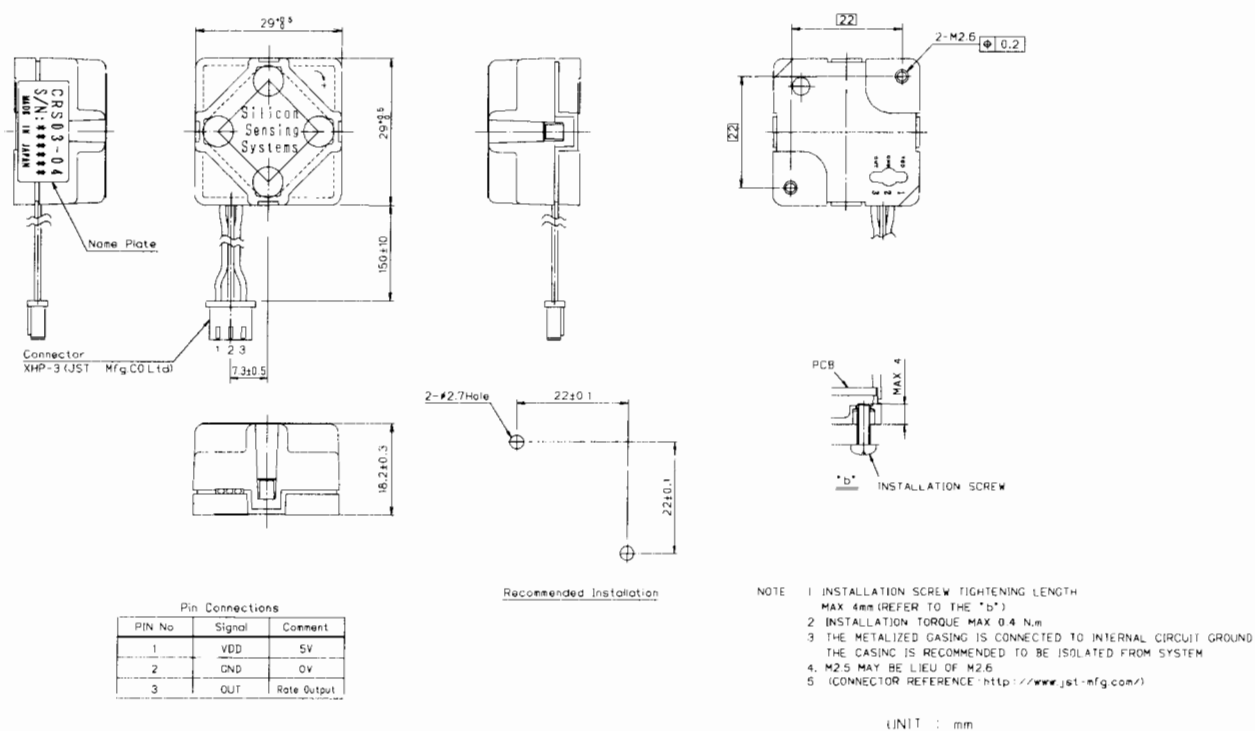


Fig.1 CRS03-04

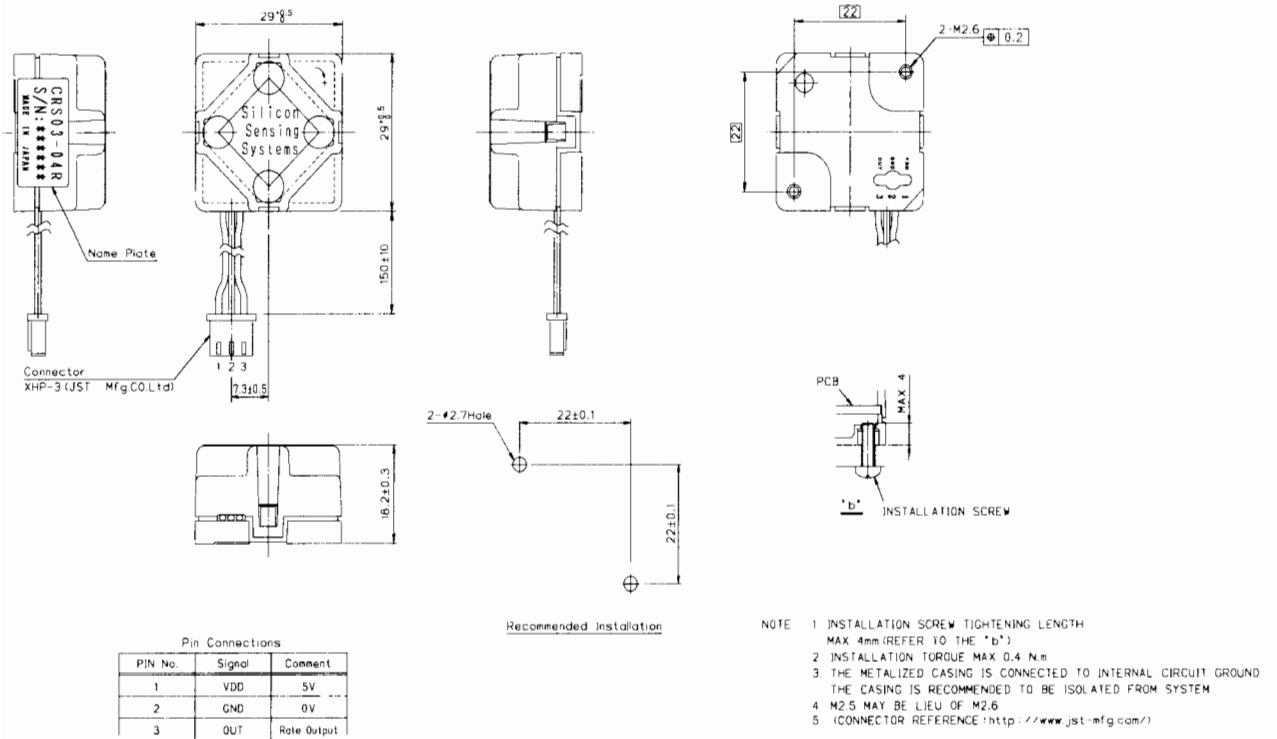
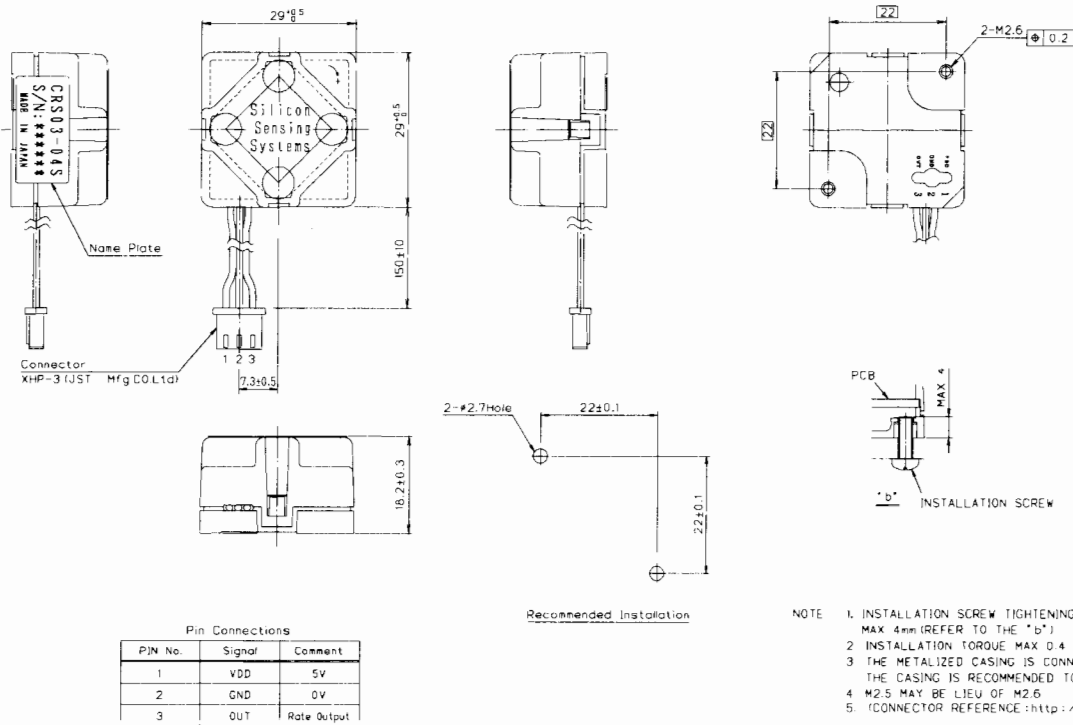


Fig.2 CRS03-04R

UNIT : mm



- NOTE
1. INSTALLATION SCREW TIGHTENING LENGTH  
MAX 4mm(REFER TO THE "b")
  2. INSTALLATION TORQUE MAX 0.4 N.m
  3. THE METALIZED CASING IS CONNECTED TO INTERNAL CIRCUIT GROUND  
THE CASING IS RECOMMENDED TO BE ISOLATED FROM SYSTEM
  4. M2.5 MAY BE LIEU OF M2.6
  5. (CONNECTOR REFERENCE: <http://www.jst-mfg.com/>)

UNIT : mm

Fig.3 CRS03-04S