TCI Technical Customer Information – SMI330

Inertial sensor for non-safety applications

Product designation:	SMI330
Version:	V1.2
Date:	[2026-04-10]

This non-binding technical customer information represents the current status of the SMI330.
Please note, that the system performance depends on the performance of the SMI330 module, on its integration into the ECU / system, and on the ECU / system design.
In this sense, the parameters of this technical customer information do not reflect the actual system performance and are not intended to specify any system performance.
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1 Product identification

Product designation:	SMI330
Type designation:	Inertial Sensor
Application:	Navigation

The SMI330 is a combined three axis angular rate and three axis acceleration sensor module with a measurement range of up to +/- 2000°/s and 16g.

1.1 Main Functions and Properties

Table 1 - Key Features

Key Feature	Description
Small package	LGA, 14 pins 2.5 x 3 mm^2, height 0.83mm
Gyroscope	X / Y / Z (up to 2000°/s range)
Accelerometer	X / Y / Z (up to 16g range)
Operating temperature	-40°C ... 125°C
Communication interfaces	SPI / I3C / I^2C
Sample rates (ODR)	Selectable from 0.78125Hz ... 6.4kHz
Output filters	Selectable low pass filters
Ultra low current consumption	Typ. 790µA
On-chip temperature sensor	-40°C – 125°C
Smart operation and integration	On-chip interrupt engine
Mobility electronics suite	MSL1, RoHS compliant, halogen and lead free

1.2 Preliminary Disclaimer

Provided that SMI330 is used within the conditions (environment, application, installation, loads) as described in this TCI and the corresponding agreed upon documents, Bosch ensures that the product complies with the agreed properties. Agreements beyond this require the written approval from Bosch. The product is considered fit for the intended use when the product successfully has passed the tests in accordance with the TCI and agreed upon documents.
It is the responsibility of the customer to ensure the proper application of the product in the overall system/vehicle.
Bosch does not assume any responsibility for changes to the environment of the product that deviate from the TCI and the agreed upon documents as well all applications not released by Bosch.

2 General product description

The SMI330 is a highly integrated, low power inertial measurement unit (IMU) that combines precise acceleration and angular rate (gyroscopic) measurement with intelligent on-chip motion-triggered interrupt features. SMI330 integrates

· a 16 bit digital, triaxial accelerometer with range configurable to 2 g, 4 g, 8 g, 16 g
· a 16 bit digital, triaxial gyroscope with range configurable to ±125 °/s, ±250 °/s, ±500 °/s, ±1000 °/s, ±2000 °/s
· a 16 bit digital temperature sensor for an operating temperature range -40 °/C ... +125 °/C

2.1 Technical Description

The device includes the two sensors accelerometer and gyroscope. The accelerometer measures the direction and magnitude of the force applied to the sensor. In a free fall scenario, an accelerometer will report a vector of zeros. The gyroscope measures the rotational rate and is reporting a vector of zeros when the device is at rest. In addition, the device includes as auxiliary sensor a temperature sensor. All samples are reported synchronously with a unique time value.

2.2 Intended Use

The SMI330 is a combined triaxial accelerometer (ACC) and triaxial gyroscope (GYR), intended for use in non-safety related applications, e.g. for in-dash navigation in the passenger compartment. The product has been developed, validated, and released exclusively for use in these applications.

2.3 Block Diagram

The figure 1 details the signal view of the device from analog sensing through analog digital conversion, compensation filtering and feature computation to the data and the protocol interfaces.

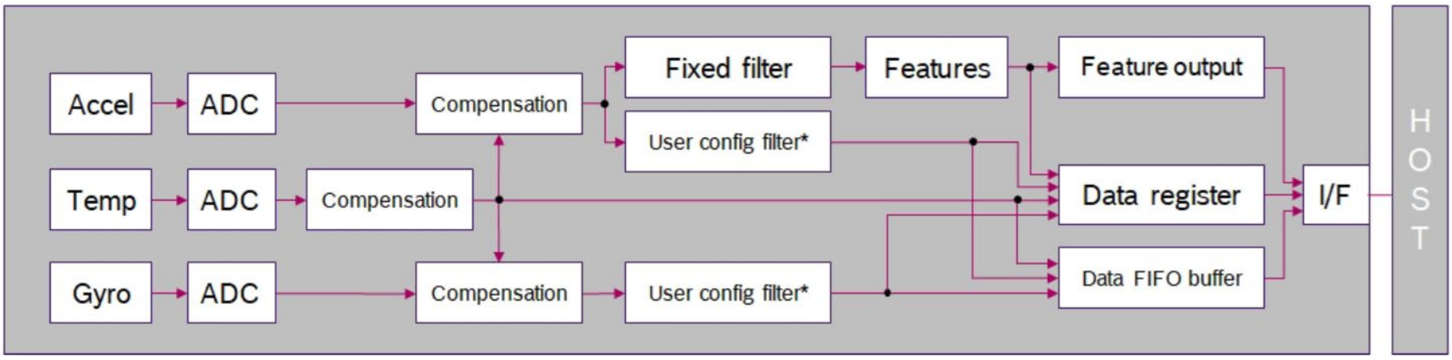

Figure 1 - Block Diagram

2.4 Orientation of Sensing Axes

If the sensor is accelerated and/or rotated in the indicated directions, the corresponding channels of the device will deliver a positive acceleration and/or yaw rate signal (dynamic acceleration). If the sensor is at rest without any rotation and the force of gravity is acting contrary to the indicated directions, the output of the corresponding acceleration channel will be positive and the corresponding gyroscope channel will be "zero" (static acceleration).
Example: if the sensor is at rest or at uniform motion in a gravity field according to the figure given below, the output signals are:

- ±0g for the ax accelerometer channel and 0°/s for the x gyroscope channel
- ±0g for the ay accelerometer channel and 0°/s for the y gyroscope channel
- +1g for the az accelerometer channel and 0°/s for the z gyroscope channel

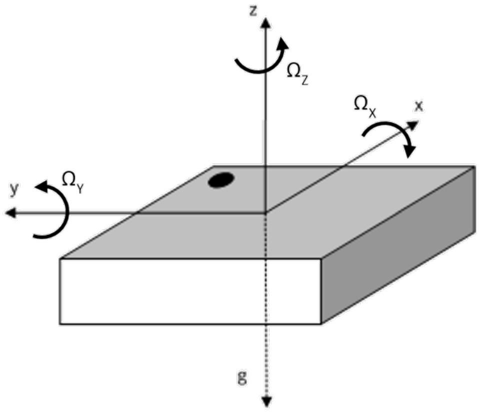

Figure 2 - Definition of the sensing axes

3 Hardware Interface Description and Packaging

3.1 Package Parameters

Table 2 - Package Parameters

Parameter	Typ	Unit
Physical dimensions of sensor (length x width height)	2.5x3x0.83	mm
Weight	11.4	mg

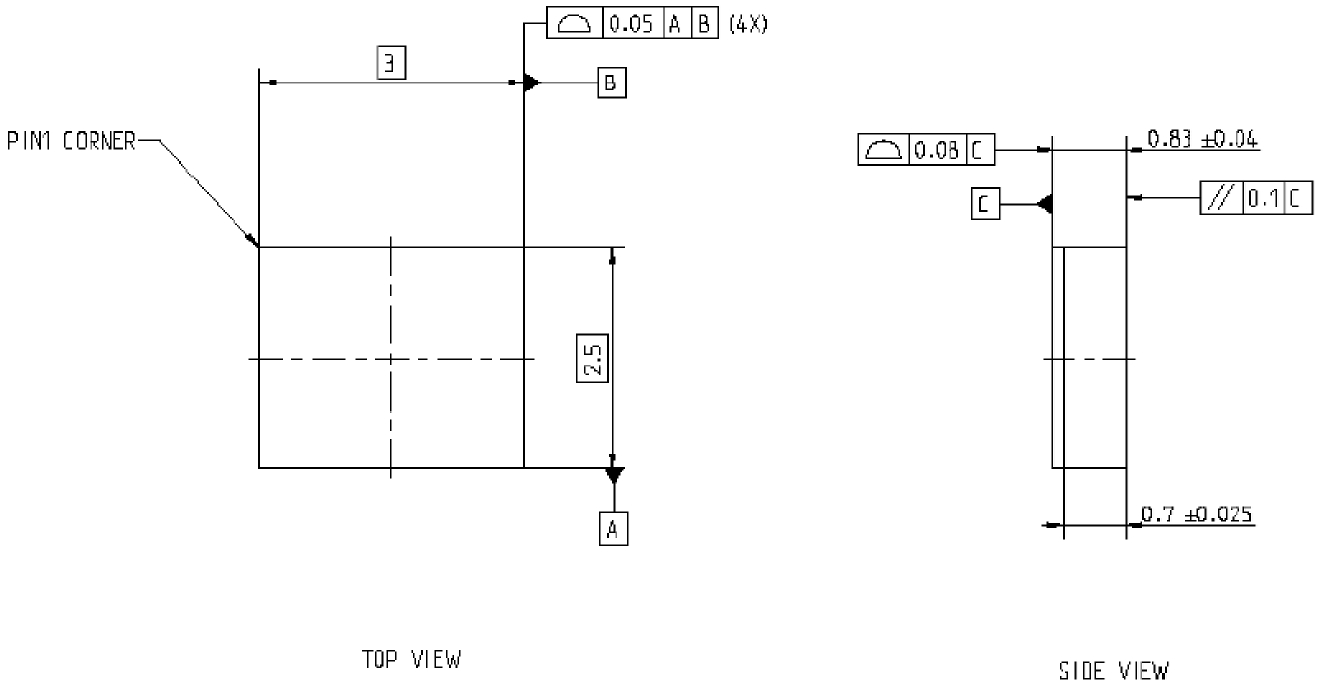

Figure 3 - Package Parameters

The development of the SMI330 complies with the requirements of the current edition of EU-RoHS. The use of the product SMI330 is not within the scope of EU-RoHS, therefore future changed requirements of EURoHS will not be considered.

Halogen content The device is halogen-free. For more details on the corresponding analysis results please contact your Bosch representative.
The product complies to the requirements of the EU-ELV regulation 2000/53/EG and the REACH regulation (EC) No 1907/2006

3.2 Transport Package

The SMI330 is shipped in a standard cardboard box. The box dimensions for one reel are L x W x H 35 x 35 x 5 [cm]. SMI330 quantity: 5000 pcs per reel. Please handle with care.

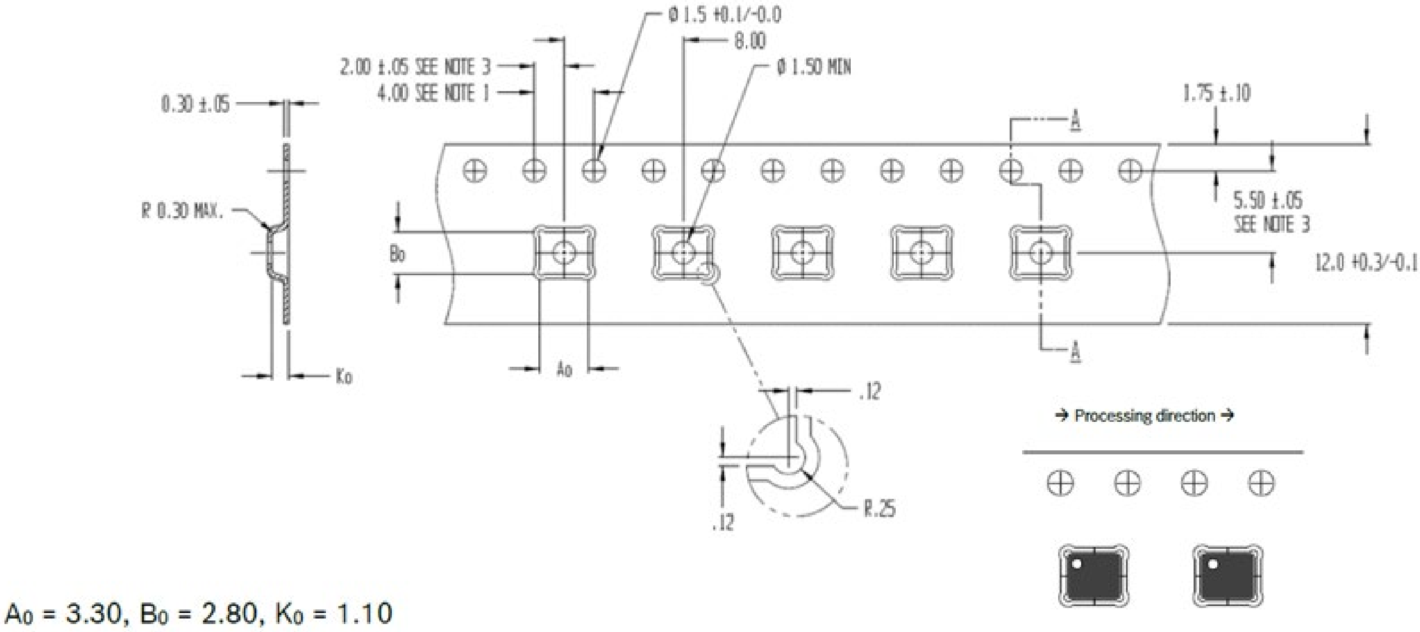

Figure 4 - Tape & Reel dimension in mm

Note:

- Tolerances unless noted: ±0.1
- Sprocket hole pitch cumulative tolerance ±0.1
- Camber in compliance with EIA481
- Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.
- A_0 and B_0 are calculated on a plane at a distance “R” above the bottom of the pocket.

3.3 Labelling of the Product

Table 3 - Labelling Information

Labeling	Sample	Marking	Subcon-ID	Trace Code
● E T C C C	Engineering Sample	E	T	CCC (without letter O)
	C - Sample	C	T	CCC (without letter O)
	Series	N	T	CCC (without letter O)
	● Pin1 Marking	-	-	-

3.4 Pinning

The figures 5 +6 show the pin-out of the device from top and bottom view, respectively.

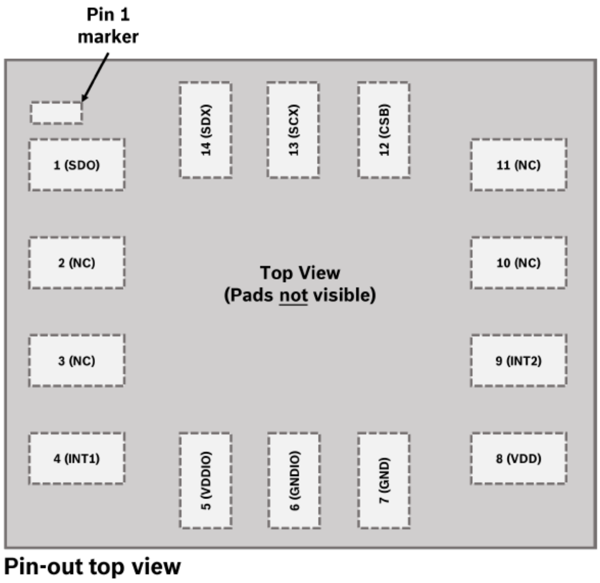

Figure 5 - Top View

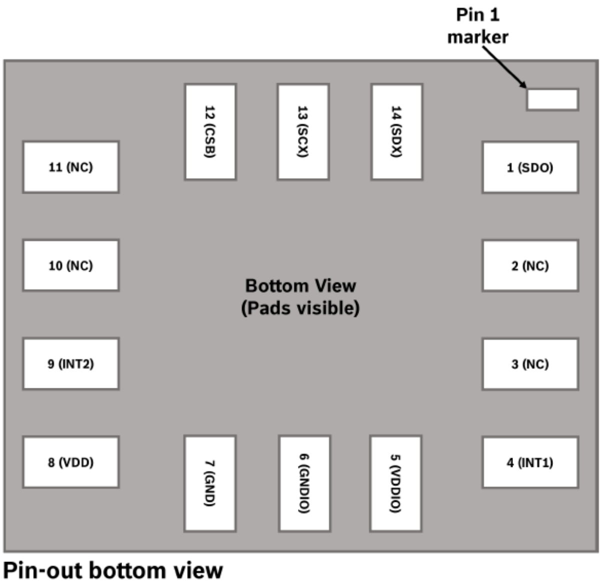

Figure 6 - Bottom View

Table 4 - SMI330 Pin description

Pin #	Name	I/O Type	Description	Connect to	
				in SPI	in I2C / I3C
1	SDO	Digital I/O	SDO Serial data output in SPI I2C address bit-0 select in I2C mode	SDO	GND for default i2C address
2	NC	Digital I/O		do not connect or GND	
3	NC	Digital I/O		do not connect or GND	
4	INT1	Digital I/O	Interrupt pin 1	INT1	INT1
5	VDDIO	Supply	Digital I/O supply voltage 1.08V … 3.63V	VDDIO	VDDIO
6	GNDIO	Ground	Ground for I/O	GNDIO	GNDIO
7	GND	Ground	Ground for digital & analog	GNDIO	GND
8	VDD	Supply	Power supply analog & digital domain 1.71V … 3.63V	VDD	VDD
9	INT2	Digital I/O	Interrupt pin 2	INT2	INT2
10	NC			do not connect	
11	NC			do not connect	
12	CSB	Digital in	Chip select for SPI mode	CSB	VDDIO
13	SCx	Digital in	SCK for SPI serial clock SCL for I2C serial clock	SCK	SCL
14	SDx	Digital I/O	SDA serial data I/O in I2C SDI serial data input in SPI	SDI	SDA

3.5 Soldering

The sensor is designed for a Pb-free solder process. The sensor is suitable for double sided soldering. The moisture sensitivity level is MSL 1 according to IPC/JEDEC J-STD-020E.
The sensor is designed for mounting the device on a PCB using a lead-free reflow-soldering profile with a peak temperature of up to 260°C. When soldering the sensor, the manufacturing temperature profile must stay below the peak temperature and may not exceed the specified limits (e. g. ramp up, ramp down) of this qualification reflow profile.
The sensor module withstands up to 3 reflow solder cycles (2 for double sided soldering, 1 for analysis). Repair and manual soldering of the sensor is not permitted.
Note: Ultrasonic cleaning and welding is not recommended.

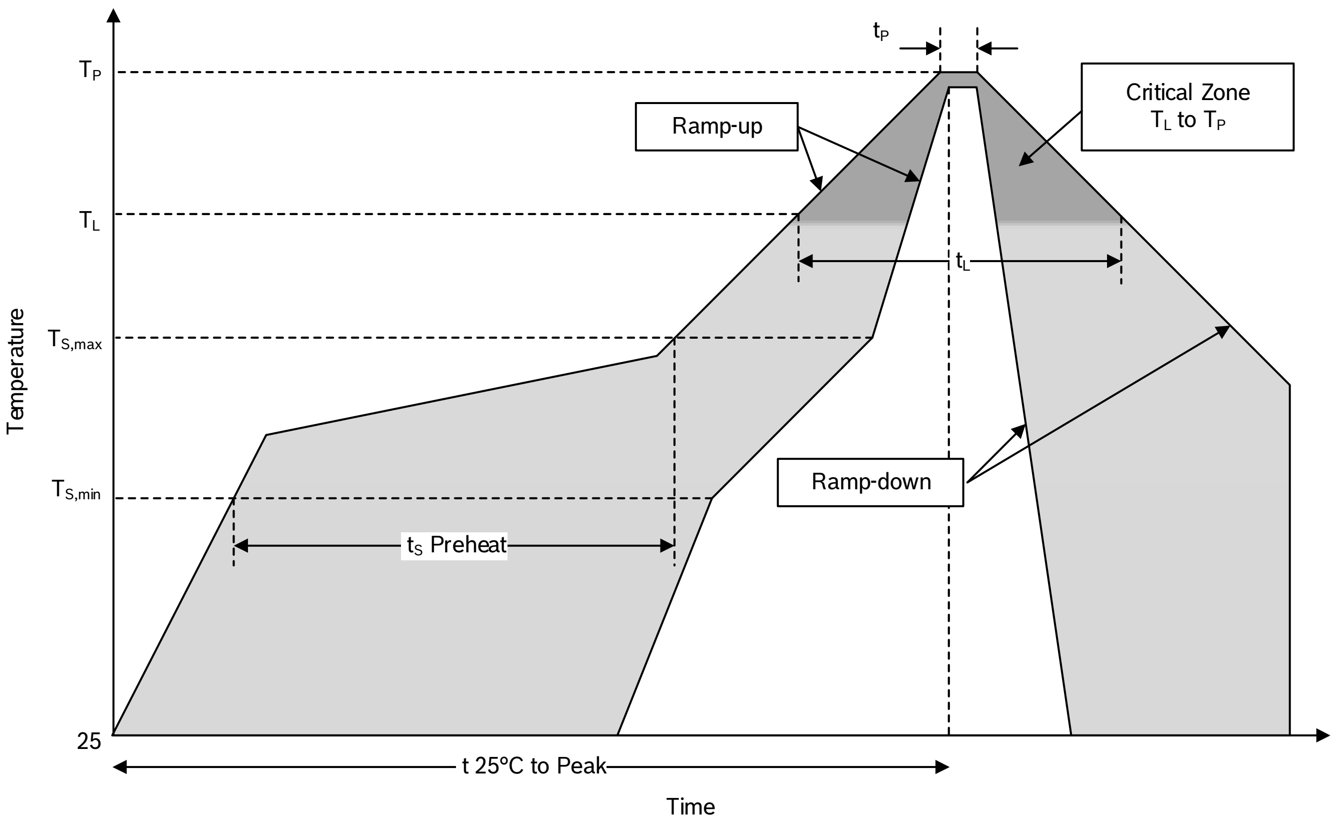

Figure 7 - Reflow Profile

Table 5 - Reflow Soldering Limits

Profile Feature	Pb-Free Assembly
Average ramp-up rate (T_{Smax} to T_p)	3 °C/s max.
Preheat Temperature min (T_{Smin}) Temperature max (T_{Smax}) Time (t_{Smin} to t_{Smax})	 150 °C 200 °C 60 – 180 s
Time maintained above: Temperature (T_L) Time (t_L)	 217 °C 60 s – 150 s
Peak classification temperature (T_P)	260 °C
Time within 5 °C of actual peak temperature (t_p)	20 s – 40 s
Ramp-down rate	6 °C/s max.
Time 25°C to peak temperature	8 min max.

3.6 Landing Pattern

Figure 8 provides the recommendation for the landing pads to ensure maximum stability of the solder connections. The Pin 1 marker must not be electrically connected. Vias underneath the package have to be avoided.

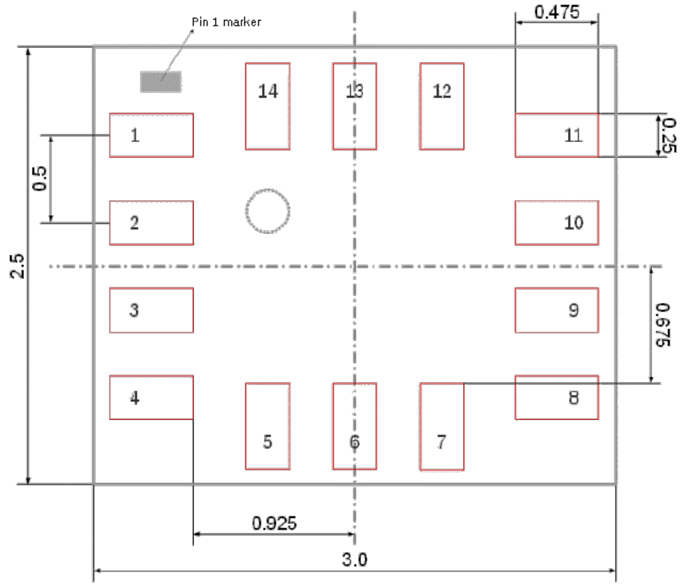

Figure 8 - Landing Pattern

3.7 Recommendation for PCB Layout

The following recommendations only represent one possible solution for the layout of the PCB based on Bosch experience and evaluation results. The PCB layout and its qualification lie in the responsibility of the customer and therefore other suitable solutions can be implemented.
MEMS sensors, however, are sensitive to mechanical stress. Please note that any measure on application level that influences the mechanical connection between the sensor and the PCB such as for example dip or spray or partial coating might potentially affect the sensor performance (e.g. shift of the package resonance frequencies) and board level reliability and therefore have to be chosen with care by and in responsibility of the PCB designer or manufacturer. It is known that some solder fluxes tend to mechanical cracking during temperature cycling. Since this may lead to short signal spikes in the angular rate signal, it is recommended to choose the solder flux carefully regarding cracking behaviour.

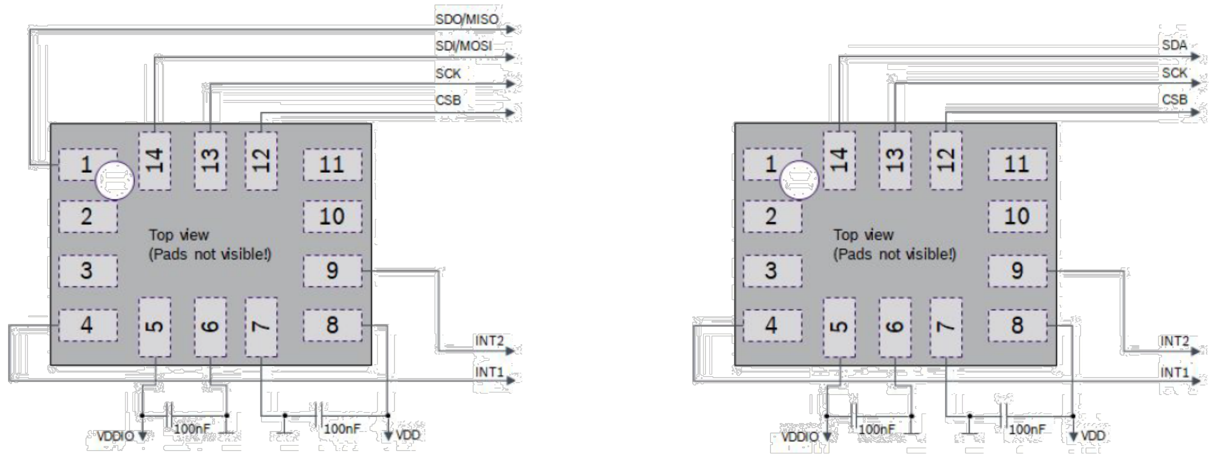

Figure 9 -SPI 4 wire and SPI 3 wire connection

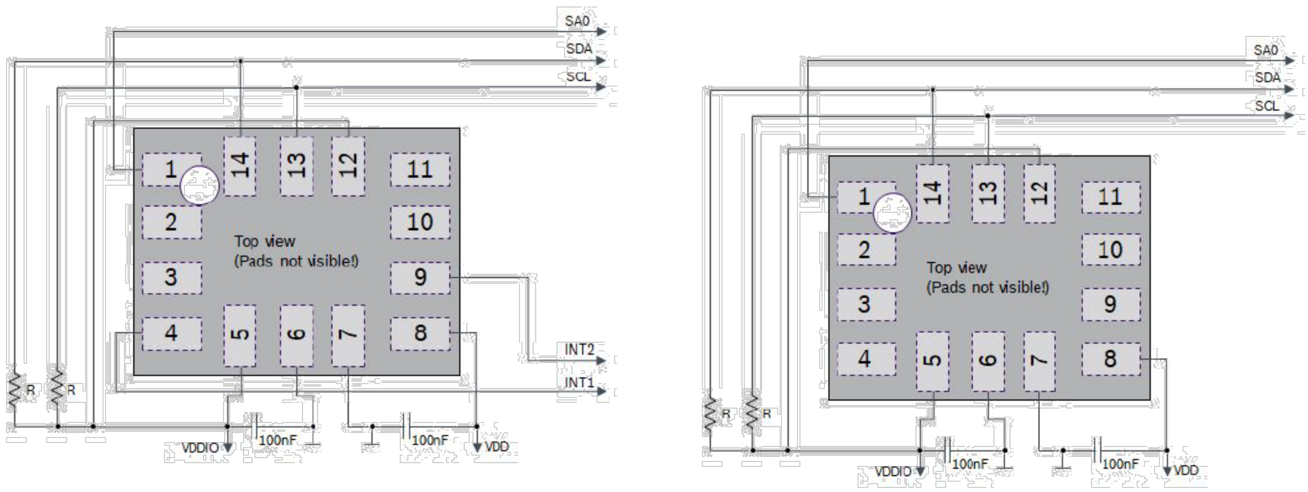

Figure 10 - I2C- and I3C- connection

4 Environment Specification

4.1 Maximum Ratings

Values within the specified maximum conditions will not damage the sensor. No specification value is guaranteed at or above these maximum conditions.
Any values beyond the given ratings may seriously damage the device. The sensor must be discarded when exceeding these limits. A proper ESD environment during handling and processing of the sensor has to be in place.

Table 6 - Maximum Ratings

Parameter	Condition	Min	Max	Unit
Voltage at Supply Pin	V_{DD} Pin	-0.3	4	V
Voltage at Supply Pin	V_{DDIO} Pin	-0.3	4	V
Voltage at any Logic Pin	Non-Supply Pin-out	-0.3	V_{DDIO}+0.3 and < 4	V
Passive Storage Temperature Range	≤65%rH	-50	150	°C
OTP Non-Volatile Memory Data Retention	T= 125°C	15	-	y
Mechanical Shock	tbd			
ESD	HBM at any Pin CDM MM	- - -	2000 500 200	V

4.2 Passive Storage Duration

Table 7 - Passive storage duration of SMI when soldered on PCB

Duration[h]	At [°C]
50	70 ... 30
130800	30 ... 10
500	10 ... -40
50	-40 ... -50
Total: 131 400h / 15a	

Table 8 - Passive storage duration of unsoldered SMI

Duration[h]	At [°C]
24	150 ... 70
50	70 ... 40
8660	40 ... 10
50	10 ... -50
Total: 8784h / 1a	

4.3 Operating Conditions

Table 9 - Operating Conditions

Parameter	Min	Typ	Max	Unit
Operating ambient temperature range	-40	-	125	°C

4.4 Lifetime Conditions

Lifetime conditions will be checked according to AEC-Q100 grade 1 requirements, please see also chapter 9 “Functional and Lifetime Qualification Test Plan”.
The commercial warranty and liability is not affected by this and is governed separately by the delivery conditions.

4.5 Electrical Pins Specification

4.5.1 Electrical Specification for Input Pins

Table 10 - Specification for Input Pins

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Voltage input low level	V_{IL}	SPI, I^2C, I3C			$0.3*V_{DDIO}$	V
Voltage input high level	V_{HL}	SPI, I^2C, I3C	$0.7*V_{DDIO}$			V

4.5.2 Electrical Specification for output Pins

Table 11 - Specification for Output Pins

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Voltage output low level	V_{OL}	SPI			$0.2*V_{DDIO}$	V
Voltage output high level	V_{OH}	SPI	$0.8*V_{DDIO}$			V

4.5.3 Electrical Specification for VDD

Table 12 - Specification for Supply Pins

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Supply voltage core domain	V_{DD}		1.71	1.8	3.63	V
Supply voltage I/O domain	V_{DDIO}		1.08	1.2	3.63	V

5 Parameter Specification

The data in the following section, unless otherwise noted, apply for the valid operation conditions given in chapter 4. All following figures include voltage, temperature and lifetime effects if not noted otherwise. All figures except sensitivity are only valid without external stimulus applied. All figures except the noise itself exclude noise effects.

5.1 Power Supply

Table 13 - Specification Sensor Supply

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Supply voltage core domain	V_{DD}		1.71	1.8	3.63	V
Supply voltage I/O domain	V_{DDIO}		1.08	1.2	3.63	V
Voltage input low level	V_{IL}	SPI, I^2C, I3C			0.3*V_{DDIO}	V
Voltage input high level	V_{HL}	SPI, I^2C, I3C	0.7*V_{DDIO}			V
Voltage output low level	V_{OL}	SPI			0.2*V_{DDIO}	V
Voltage output high level	V_{OH}	SPI	0.8*V_{DDIO}			V
Current consumption	I_{DD}	A+G suspend mode A_{only} LPM, $f_{A,lp}$=25Hz A_{only} HPM, $f_{A,hp}$=max A+G HPM, $f_{A,hp}$= $f_{G,hp}$ = max A+G NM, $f_{A,nm}$= $f_{G,nm}$ = max A+G LPM, $f_{A,lp}$= $f_{G,lp}$ = 25Hz		100 130 230 870 780 530		µA

5.2 Technical Data

This chapter provides the specifications for the SMI330.
Unless stated otherwise, the specifications provide the characteristics for a nominal supply voltage of VDD = VDDIO = 1.8V, gyr 250 dps range, acc 8g range and an ODR = 800Hz. Either at an ambient temperature of T_A = 25°C or, if the characteristic is specified with respect to temperature. Potential life time effects will be added once the validation has been completed.

Table 14 - Technical Data

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Power on time	Δt_{PO}	Time from supply on to serial I/F operational		1.5		ms
Accuracy of the output data rate	Δf_A Δf_G Δf_T	Any mode with gyroscope enabled in any mode		2		%

5.2.1 Performance Gyroscope

Table 15 - Characteristic Gyroscope

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Angular rate range	ω_{FS}	Selectable via serial digital interface		±125 ±250 ±500 ±1000 ±2000		°/s
Start up time	$t_{G,SU}$	Suspend to high performance mode $f_{A,hp}$=max including filter settling		30		ms
Resolution				16		Bit
Sensitivity	S_G	ω_{FS} = 125°/s ω_{FS} = 250°/s ω_{FS} = 500°/s ω_{FS} = 1000°/s ω_{FS} = 2000°/s		262.144 131.072 65.536 32.768 16.384		LSB/°/s
Sensitivity error	$S_{G,er}$ $S_{G,err(CRT)}$	Soldered, over temp and life time Soldered, over temp and life time w triggered CRT (@RT)		±4 ±3.5		%
Zero-rate offset	O_G $O_{G(comp)}$	Soldered, over temp and life time Soldered over temp and life time w/ zeroing on pcb level		±1.2 ±1		°/s
Zero-rate offset change over temperature	TCO_G	Best fit straight line		±0.01		°/s/K
Noise density	$ND_{(oT)}$	Over temperature		0.015		°/s/rt(Hz)
Nonlinearity error	$S_{G,NL}$	Over temperature		±0.1		°/s
Output data rate	$f_{G,hp}$, $fo_{G,n}$ $f_{G,lpm}$	High performance and normal mode Low power mode	12.5 0.78125			Hz
Bandwidth (BW) in high performance and normal mode	B_{fG} = 12.5Hz B_{fG} = 25Hz B_{fG} = 50Hz B_{fG} = 100Hz B_{fG} = 200Hz B_{fG} = 400Hz B_{fG} = 800Hz B_{fG} = 1600Hz B_{fG} = 3200Hz B_{fG} = 6400Hz	0Hz ≤ f ≤ $f_{3dB\text{-}cutoff}$ of the gyroscope		6.2 12.4 24.9 49.7 99.5 198.9 397.6 689.1 1275.2 2012.4		Hz
Cross axis sensitivity:	$S_{G,YX}$ $S_{G,ZX}$ $S_{G,ZY}$	Over temperature (Non-orthogonality and alignment error)		±1		%
Cross axis sensitivity: Non-orthogonality		Over temperature				%
Angular random walk	ARW	@RT		0.32		dps/rt(h)
Bias instability	BI(X; Y; Z)	@RT for [X; Y; Z]		(3.7;4.5:3)		°/h

5.2.2 Performance Accelerometer

Table 16 - Characteristic Accelerometer

Parameter	Symbol	Condition	Min	Typ			Max	Unit
Range	a_{FS}	Selectable via serial digital interface		±2 ±4 ±8 ±16				g
Start up time	$t_{A,SU}$	Suspend to high performance mode f_A=max		2				ms
Resolution				16				Bit
Sensitivity	S_A	a_{FS} = 2g a_{FS} = 4g a_{FS} = 8g a_{FS} = 16g		16384 8192 4096 2048				LSB/g
Sensitivity error	$S_{A,err}$	Soldered over temperature and life time		±0.5				%
Zero-g offset	O_A	d		±60				mg
Zero-g offset change over temperature	TCO_A	Full T_P range, best fit straight line		±0.1				mg/K
Noise density	$ND_{(oT)}$	HP mode, over temperature		190				µg/rt(Hz)
Nonlinearity error	$S_{A,NL}$	Over temperature		±5				mg
Output data rate	$f_{A,hp}$, $f_{A,n}$ $f_{A,lpm}$	High performance and normal mode Low power mode	12.5 0.78125				6400 400	Hz
Bandwidth (BW) in high performance and normal mode	Axis	$0Hz \leq f \leq f_{3dB\text{-}cutoff}$ of the accelerometer		X	Y	Z		Hz
	$B_{fA = 12.5Hz}$			6	6	6		
	$B_{fA = 25Hz}$			12	12	12		
	$B_{fA = 50Hz}$			24	24	24		
	$B_{fA = 100Hz}$			49	49	49		
	$B_{fA = 200Hz}$			99	99	99		
	$B_{fA = 400Hz}$			197	197	195		
	$B_{fA = 800Hz}$			387	387	375		
	$B_{fA = 1600Hz}$			622	627	563		
	$B_{fA = 3200Hz}$			961	977	787		
	$B_{fA = 6400Hz}$			1192	1222	908		
Cross axis sensitivity:	$S_{A,YX}$ $S_{A,ZX}$ $S_{A,ZY}$	Over temperature (Non-orthogonality and alignment error incl)		±1				%
Cross axis sensitivity: Non-orthogonality		Over temperature						%
Velocity random walk	VRW	@RT		125				µg/rt(Hz)
Bias instability	BI	@RT		50				µg

5.2.3 Performance Temperature Sensor

Table 17 - Characteristic Temperature Sensor

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Resolution				16		Bits
Measurement range	T_S		-105		151	°C
Output at 23°C				0		LSB
Sensitivity	S_T			256		LSB/K
Temperature offset	O_T	After soldering		±3		K
Temperature sensitivity error		After soldering, T_P		2.2		%
Output data rate	$f_{T,G}$, $f_{T,combo}$	Any power operation mode with gyro in high performance mode or normal mode			50	Hz
	$f_{T,other}$	Any power operation mode with gyro either disabled, in low power mode or drive only enabled			12.5	
	$f_{T,A\text{-}only.lp}$	Accelerometer in low power mode, gyro disabled			6.25	

6 Software Interface Description

The device provides one serial interface to the host. It acts as a slave to the host. The serial interface is configurable to the interface protocols SPI, I3C and I2C. By default, the device operates in I^2C mode. The interface of the device can be configured to operate in a SPI 4-wire configuration as well. It can also be re-configured by software to work in 3-wire mode.

Table 18 - Common Specifications

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Clock frequency	f_{I3C} f_{SPI} f_{I3C}, f_{SPI}	Max. load on SDI or SDO 30pF, V_{DDIO}≥1.62V V_{DDIO}≤1.62V			12.5 10 8	MHz
Idle time after any access in any mode	$t_{IDLE,rd}$		2			µs

7 Application Details

7.1 Power Modes

The main power operation modes of the sensor are

Suspend mode:	Lowest possible power consumption, while the sensor still maintains its configuration. All device register are accessible at full digital interface speed.
Low power mode:	Motion sensing at lowest possible power consumption
High performance mode:	Motion sensing at maximum performance

7.2 FIFO Data Buffer

The FIFO data buffer collects and stores data from selected sensors to minimize transfers between device and host. The device supports the following FIFO operating modes for the FIFO data buffer:

- **Streaming mode:**
- **Stop-on-full mode:**

7.2.1 FIFO Interrupts

The FIFO buffer supports two kinds of interrupts

- **Buffer full interrupt**

This interrupt is issued when the FIFO fill level is above the full threshold.

- **Watermark level interrupt**

This interrupt is triggered when the fill level of the data buffer is equal or above a defined watermark level.

7.3 Sensor motion features

7.3.1 Any-motion Detection

The feature any-motion detects changes in motion of one axis. It uses the slope between adjacent samples of the acceleration signal to trigger this event.

7.3.2 No motion Detection

The feature no-motion detection evaluates the slope between adjacent samples of the acceleration signal in all selected axes to detect a stationary state.

7.3.3 Tilt Detection

The function and behaviour of the tilt detector is derived from the Android specification. A tilt interrupt is reported when the attitude angle of the device changes by a value greater than configured angle threshold.

7.4 Self Calibration (CRT)

The device offers self-calibration for the gyroscope sensitivity error and the gyroscope offset. Self-calibration to reduce the gyroscope sensitivity error is also known as component re-trim.

7.5 Self Test

The self-test of the device checks for a correct function of the accelerometer as well as the gyroscope. The execution of the self-test expects the following prerequisites to be fulfilled:

7.6 Soft Reset

The soft reset performs a fundamental reset to the device which is largely equivalent to a power cycle. Following a delay, all user configuration settings are overwritten with their default state wherever applicable.

8 Product Safety

8.1 Functional Safety

N.A.

8.1.1 Saftey Concept

N.A.

8.1.2 Dedicated Measures

N.A.

8.2 Data Protection, Cyber Security and Over-the-Air Aspects

N.A.

9 Functional and Lifetime Qualification Text Plan

The SMI330 is tested according to the qualification plan AEC-Q100 rev H grade 1.
Any mission profile applied to the sensor must be verified if it is covered by the qualification.

10 Disclaimer

In order to ensure proper functionality during operation, it is the responsibility of the customer to evaluate:

- The proper function of the sensor in the overall system
- The mechanical stability of each system design including the sensor
- The electrical stability, e.g. power supply and EMC, of each system design including the sensor

Target market: The product is released based on the regulatory requirements directly applicable to the product at the time of TCI creation in the following target market(s):
AR,AT,AU,BE,BG,BR,CA,CH,CN,CY,CZ,DE,DK,EE,ES,FI,FR,GB,GR,HK,HR,HU,IE,ID,IN,IL,IT,IS,JP,KR,LT,LU,LV,MT,MX,MY,NL,PH,NZ,PL,PT,RO,SE,SG,SI,SK,TR,TW,TH,US,VN,ZA
(nomenclature according to ISO-3166-1, ALPHA-2 Code).

The product can be used in a released target market in the aforementioned applications, subject to the limits, conditions and other specifications described in this TCI ("intended use").

Deliveries and services (fulfilment of contract) shall be subject to the provision that there are no obstacles to performance due to national or international (re-) export control regulation, in particular embargoes or other sanctions.

Functional Safety: Bosch points out that the SMI330 has been developed according to QM and does not implement any ASIL-classified requirements (in the sense of ISO 26262). It is therefore not approved by Bosch for applications in which one or more requirements with an ASIL classification (above QM) are assigned to the Bosch scope of supply.

The customer has to ensure that the SMI330 is suitable to be used within the overall system regarding any functional safety requirements assigned to the SMI330 in the overall system.
This implies the following limitations:

- The SMI330 must not be used if it influences safety goals with ratings higher than ASIL QM. Safety goals are defined in the overall system.
- Bosch cannot provide any quantitative failure analysis (e.g. FTA or FMEDA) for the SMI330.
- The SMI330 does not provide a CRC to check communication errors within a SPI/I2C/I3C frame.
- The SMI330 does not provide error flags to detect malfunctions of the ASIC.

Repair of the product is not permitted. Manual soldering of sensors is not permitted.
Sensors must not be handled as bulk goods.
Sensors with visible damages (housing, connectors, pins, etc.) and sensors which might have exceeded the absolute maximum ratings must not be mounted in the vehicle. These sensors must be scrapped.
Products are considered good if they fulfill the specifications / test data for 0-mileage and field listed in the TCI.

Data Security: The sensor only contains the explicitly stated characteristics for product, data and information security. It is the responsibility of the system integrator to verify and validate on system level, if the stated characteristics comply with and fulfil the requirements of the product.

Assessment of Products Returned from Field: Returned products are considered good if they fulfill the specifications / test data for 0-mileage and field listed in this document.
Due to the measurement principle, the sensor is sensitive to mechanical disturbances, such as shocks, vibrations or stress. Therefore, the printed circuit board (PCB) has to be designed in such a way, as to suppress any of these influences and ensure the proper functionality in each application. The sensor elements have to be protected against extreme shock loads such as e.g. hammer blows on or next to the sensor elements, vibrations of a power wrench when fixing bolts, dropping of the sensor elements onto hard surfaces, etc..

Sensor modules which have been dropped must not be used and have to be scrapped. We recommend the avoidance of g-forces beyond the maximum rating during transport, handling and mounting of the sensors resulting in a defined and qualified installation process. As the sensor is sensitive to mechanical stress, any bending or torsion of the PCB close to the sensor, e.g during forcing in, has to be avoided.

Engineering Samples: Engineering samples are marked with (e) or (E). Samples may vary from the valid technical specifications of the series product contained in this data sheet. Therefore, they are not intended or fit for resale to third parties or for use in end products.

Their sole purpose is internal client testing. The testing of an engineering sample may in no way replace the testing of a series product. Bosch assumes no liability for the use of engineering samples.

The purchaser shall indemnify Bosch from all claims arising from the use of engineering samples.

10.1 Safety and Warning Notes

Please note that the sensor may be seriously damaged or sensor performance might be influenced by:

- Exceeding the maximum operating conditions. The sensor must be discarded when exceeding these limits.
- Electrostatic discharge. A proper ESD environment during handling and processing of the sensor has to be in place.
- Exceeding the qualification reflow profile. The maximum soldering profile as well as the maximum number of reflow cycles must be observed.
- Exceeding the mission profile: In case a different mission profile than the referred one shall be applied, it needs to be verified whether this profile is still covered by the qualification.
- Improper mechanical connection between the sensor and the PCB and any measure that alters the mechanical stress imposed on the sensor (such as, e.g. soldering, potting, coating, overmolding, etc.). Any measure on application level is considered to be application specific and has to be chosen with care by and in responsibility of the customer.

11 Terms and Definitions

12 Table of Figures

13 Contact Person

- Contact person: [ME-SE/PAE-I - Anstett]

Robert Bosch GmbH

ME-SE/PAE-I