



Integrated IR Propane Datasheet

INIR-PR-01, ISSUE 1

Copyright © SGX Sensortech 2012-2019



Integrated IR FEATURES

- Gas Sensor with **Automatic Switchover** between ranges,
- **High Resolution** up to 10ppm,
- **Detectivity Level** at 100ppm,
- **Multi-sensor mode**,
- Analog Output of gas concentration,
- Serial port communication,
- **Internal Temperature** sensor
- Active & Reference **Signals Monitored**
- Full **Faults Diagnostics & Error Generation**
- Cyclic Redundancy Check (**CRC**)
- **Typical Low power** consumption < 100mW (Average)
- **Factory calibrated** for Propane or Carbon Dioxide
- **Evaluation Kit** available including **PC software** for easy testing and production calibration functions
- Easy implementation into **Sensors Network**
- Design for use in Hazardous Areas
- **Certified Sensor** for use in Explosive Atmospheres (EX)

GENERAL DESCRIPTION

The Integrated IR (INIR) sensor has been designed with the latest technology, using a microcontroller with an ARM7 core and via software design the necessary techniques have been implemented to increase the reliability of the device therefore minimize the probability of faults.

The INIR is a user friendly digital Gas Sensor, which is designed to use the latest SGX Sensortech's Infrared technology.

The sensor is designed to decrease the implementation time therefore increase productivity. The Integrated IR sensor incorporates the necessary electronics and embedded software to operate from a low voltage DC power supply. The sensor will process the raw signals to output a linear, temperature compensated signal proportional to the gas concentration applied. The output signal is available in digital and analogue forms.

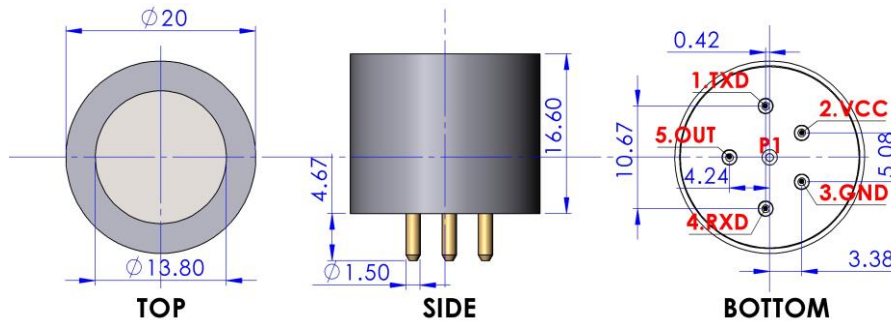
The SGX Sensortech Integrated IR Gas Sensor provides users with a simple method of incorporating an Infrared Sensor into their gas detection instrument which will significantly reduce the development time and expertise required during the design and implementation phase. The Integrated IR can also be factory calibrated to allow installation without the need for recalibration.

RECOMMENDED APPLICATIONS

- **Automation & Control**
- **Indoor Air Quality**
- **Industrial Health & Safety**

TECHNICAL SPECS

Whilst SGX Europe Sp. z o.o. has taken care to ensure the accuracy of the information contained herein it accepts no responsibility for the consequences of any use thereof and also reserves the right to change the specification of goods without notice. SGX Europe accepts no liability beyond the set out in its standard conditions of sale in respect of infringement of third party patents arising from the use of tubes or other devices in accordance with information contained herein. In case of modification of the product, SGX disclaims all liability.



ABSOLUTE MAXIMUM RATINGS

Power Supply	Min	Typical	Max
Supply Voltage	3.2 VDC	3.3 VDC	5.25 VDC
Average Current Consumption	30mA	32mA	35 mA*
*Inrush Current can be up to 65mA			
Logic Outputs Level	LOW Voltage Level(VOL) : 0.6V Maximum HIGH Voltage Level(VOH): 2.0V Minimum 1.6mA source current maximum		
Logic Inputs Level	LOW Voltage Level(VINL): 0.4V Maximum HIGH Voltage Level(VINH): 2.0V Minimum		
Humidity			
Operating Humidity	0%	50%	99%
Storage Humidity	0%	50%	90%
Condensation (>100% Humidity)	Sensor’s Detection Limit, Stability & Linearity would be affected, algorithms are implemented to minimize as the effect.		
Temperature			
Operating Temp.	-40 °C	+20 °C	+75 °C
Storage Temp.	-20 °C	+20 °C	+55 °C
Temp. Cycle Limits		0.8°C/min	1.3°C/min
Pressure (Compensation will be required)			
Operating Pressure	80kPa	-	120kPa
Storage Pressure	80kPa	-	120kPa
Performance			
DAC Resolution	12-Bit at 0.0-2.5 Volts DC Max Scalable according to Gas Conc. Operating Range		
Digital signal format	8 data bits, 1 stop bit, no parity		
Standard baud rate	38400 as default, 115200, 19200, 9600		
Dimensions			
Diameter (D)	19.9mm	20mm	20.1mm
Height (H)	16.50mm	16.60mm	16.70mm
Pins Height (pH)	4.0mm	4.8mm	5.6mm
Body Material	Stainless Steel		
Weight	25 g	29 g	33 g
Gas Sensor Sockets			
S1	5-Pin , Polygon Topology		

Pin	Name	Description
1	TXD	Data transmitted from the Integrated IR.
2	+VCC	3.2 Volts – 5.25 Volts DC input to Integrated IR
3	GND	GND Plane, 0 Volts reference for Integrated IR
4	RXD	Data received by the Integrated IR.
5	OUT	Analog Output. Scalable range, see Application Note 1 Integrated IR Protocol & Calibration for details.
Pad	Pad	Bootloader Pad. Not used by the customer.

NOTE1: All Dimensions in mm. All tolerances Linear +/- 0.1mm and Angular 0.5° unless otherwise stated.

NOTE2: Do not solder pins. Customer needs to make sure to find the correct “sockets” for the Gas Sensor to firmly “push fit” plug into their instrument so correct electrical connection is achieved, also see handling precautions in [page 2](#).

PIN CONFIGURATION

DESIGN CONSIDERATIONS & APPLICATIONS

Warm-Up Time

The Warm-Up Time for the INIR sensor is 45 seconds after each power “ON” or every time when we are changing from Configuration to Normal/Engineering Mode. During this time data are not valid. Please read Fault codes in Application Note 1, “Integrated IR Protocol & Calibration”

The Warm-Up time is not including the period that the sensor needs to reach the ambient temperature. The sensor though is capable of producing readings during the Warm-Up but with a much higher error than specifications.

Calibration

For calibration process please read the appropriate Application Note 1, “Integrated IR Protocol & Calibration”. For optimum performance please use following cylinders:

INIR-PR2.1% (Propane)
100% Nitrogen for Zero calibration
1.05% C ₃ H ₈ for High Span Cal.

Always do Zero Calibration first followed by High Span.

Gas Flow Rate

For valid evaluation and to keep tests consistent it is recommended to use 450 – 500 cc/min. flow rate to minimize any effects due to pressure variations in the INIR.

Digital Interface/Communication

In terms of the Software implementation, we will need a way to read the Digital Output by using a Microcontroller (MCU) or a Personal Computer (PC) is required. The Software with the Evaluation Kit is compatible with Windows Operating System only and at the moment is not possible to read the Analogue output by using the Evaluation Software.

Faults Monitoring/Error States

The Error monitoring and Fault generation happens every second transmitted by the UART. Regularly check all the Faults generated from the INIR to ensure errorless communication and rise appropriate alarms depending on the Fault code. For further information on the different Faults and how to translate them, please read the Application Note 1, “Integrated IR Protocol & Calibration”.

Analogue Output

The Analogue Output is updated every one second. Analogue voltage is directly related with the Concentration.

Condensation, Dust & Extreme Conditions

Using the INIR in extreme environmental conditions may affect its performance. Typically, the module has a high corrosion resistance and temperature compensated linearized output. The INIR implements an Condensation Compensation Algorithm to minimize the effect especially after power “ON”, eliminating the problem with false alarm. The Sensor can withstand multiple thermal shocks that don’t exceed 1.3°C/min temperature slopes. In applications like mining where dust or other particles are present is recommended to use a dust filter firmly attached to the inlet of the INIR Gas Sensor. The filter tends to increase response times T90, T10 and T50 therefore ensure correct installation and evaluation to comply with regulations in your country. If your device is intended to be used in a hazardous environment, please seek advice from a certification body.

Pressure Compensation

The INIR will definitely need pressure compensation irrelevant if the pressure is within the operating pressure. Re-Zero the INIR Gas Sensor under operating conditions is recommended; this will minimize the pressure effects, temperature differential effects but will not eliminate the weather effects like extreme wind velocity, rain or lighting.

ROHS COMPLIANCE

Under the EU Directives, compliance testing is necessary for Pb, Cd, Hg, Cr (VI) and Br. The RoHS directive is effective since July 1, 2006. The regulations prohibit the use of these hazardous substances in new products sold after July 2003.



WEEE DIRECTIVE

WEEE (Waste from Electrical and Electronic Equipment) is a directive that controls how electric and electronic equipment is handled and recycled effective since August 13, 2005. INIR clustered as component and SGX do not need to have a recycling scheme in place but manufacturers may need to ensure WEEE compliance for their systems.



ATEX/IECEx CERTIFICATIONS

The ATEX directive consists of two EU directives describing what equipment is allowed in an environment with an explosive atmosphere. The Integrated IR is certified for ATEX (Sira 99ATEX1121U) and IECEx (Sira 04.0031U), see page 5 for more details.

II 2G

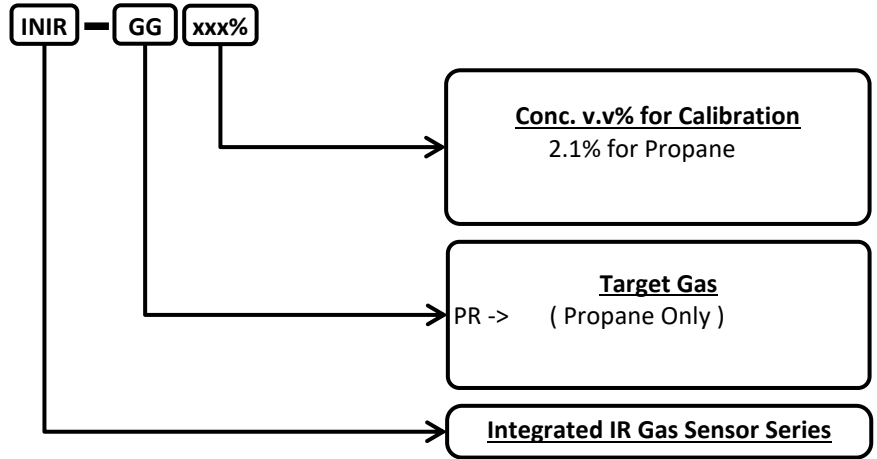
Ex db IIC Gb

Ta -40°C to +75°C



Appendix A

Ordering Information



Copyright©2012-2019 SGX Sensortech All rights reserved.

Trademarks and registered trademarks are the property of their respective owners.

No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of the publisher, except in the case of brief quotations embodied in critical reviews and certain other non-commercial uses permitted by copyright law.

For permission requests or technical support please contact or write to the publisher, addressed "Attention: Permissions Coordinator," at the address below:



SGX Europe Sp. z o.o.
 103 Ligocka Str.
 40-568 Katowice
 Poland
<http://www.sgxsensortech.com>
 Tel. +48 737 759 839
 Author : Grzegorz Konieczny

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели,
кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: ocean@oceanchips.ru

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А