

# 5SC Low CO CiTiceL® Sensor

Low CO Sulfur Dioxide (SO<sub>2</sub>) Sensor Product Code: AD528-W00

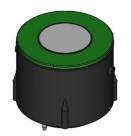
## **Document Purpose**

The purpose of this document is to present the performance specification of the 5SC sulfur dioxide gas sensor.

This document should be used in conjunction with Operating Principles (OP08) and the Product Safety Datasheet (PSDS 19).

The data provided in this document are valid at 20°C, 50% RH and 1013 mBar for 3 months from the date of sensor manufacture.

Output signal can drift below the lower limit over time. For guidance on the safe use of the sensor, please refer to the Operating Principles (OP20).



## KEY FEATURES & BENEFITS



Low cross sensitivity to CO



Wide measurement range and high maximum overload



Designed to meet HJ 57-2017 standard



Designed to meet EN 50379 standard

**RoHS** Ø

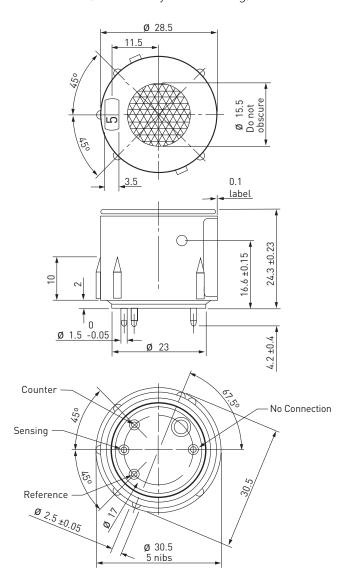
RoHS Compliant

Measurement   Operating Principle   3-electrode   electrochemical   Measurement Range   Operating Principle   Sou0 ppm SO2   Maximum Overload   Sou0 ppm SO2   To remove effects of H2S and HCl   Sensitivity*   O.1 μA ±0.02 μA/ppm   790 Response Time*   < 35 seconds   Baseline Offset (clean air)*   ± 2 ppm equivalent   Cross Sensitivity to 20,000 ppm CO*   without compensation   < 50 ppm SO2 equivalent   × 5 ppm SO2 equivalent   Maximum Zero Shift (20°C to 40°C)   5 ppm SO2 equivalent   1 ppm   1 ppm   Resolution (when using recommended electronics)   1 ppm		
Operating Principle       3-electrode electrochemical         Measurement Range       0 ppm to 2000 ppm SO₂         Maximum Overload       5000 ppm SO₂         Filter       To remove effects of H₂S and HCl         Sensitivity*       0.1 μA ±0.02 μA/ppm         T90 Response Time*       < 35 seconds         Baseline Offset (clean air)*       ± 2 ppm equivalent         Cross Sensitivity to 20,000 ppm C0*       < 60 ppm SO₂ equivalent         without compensation       < 5 ppm SO₂ equivalent*         Maximum Zero Shift (20°C to 40°C)       5 ppm SO₂ equivalent         Resolution (when using recommended electronics)       1 ppm         Repeatability       1% of signal         Linearity       Linear         Electrical       Recommended Load Resistor         Bias Voltage       Not required         Mechanical       Meight         Meight       10 g nominal         Housing Material       ABS         Orientation       Any         Environmental       Operating Temperature Range       -20°C to +50°C*         Recommended Storage Temp       0°C to 20°C         Operating Pressure Range       Atmospheric ±10%         Pressure Coeffcient       0.08% signal/mBar         Operating Humidity		S
Measurement Range   0 ppm to 2000 ppm SO <sub>2</sub>	Measurement	
Maximum Overload       5000 ppm SO₂         Filter       To remove effects of H₂S and HCl         Sensitivity*       0.1 μA ±0.02 μA/ppm         T90 Response Time*       < 35 seconds         Baseline Offset (clean air)*       ± 2 ppm equivalent         Cross Sensitivity to 20,000 ppm C0*       < 60 ppm SO₂ equivalent*         without compensation with compensation with compensation (some using recommended electronics)       1 ppm SO₂ equivalent*         Resolution (when using recommended electronics)       1 ppm         Repeatability       1% of signal         Linearity       Linear         Electrical       Recommended Load Resistor         Bias Voltage       Not required         Mechanical       Weight         Weight       10 g nominal         Housing Material       ABS         Orientation       Any         Environmental       Operating Temperature Range       -20°C to +50°C*         Recommended Storage Temp       0°C to 20°C         Operating Pressure Range       Atmospheric ±10%         Pressure Coeffcient       0.08% signal/mBar         Operating Humidity Range       15% to 90% RH noncondensing         Lifetime       Long-Term Sensitivity Condensing       2% signal loss/month         Expected Operating	Operating Principle	
Filter  To remove effects of H <sub>2</sub> S and HCl  Sensitivity*  0.1 µA ±0.02 µA/ppm  T90 Response Time*  Raseline Offset (clean air)*  Cross Sensitivity to 20,000 ppm C0*  without compensation with compensation with compensation with compensation with compensation Waximum Zero Shift (20°C to 40°C)  Resolution (when using recommended electronics)  Repeatability  Linear  Electrical  Recommended Load Resistor  Bias Voltage Not required  Mechanical  Weight  10 g nominal  Housing Material  Operating Temperature Range  Recommended Storage Temp  Operating Pressure Range  Pressure Coeffcient  Operating Humidity Range  Lifetime  Long-Term Sensitivity Drift  Two years in air	Measurement Range	0 ppm to 2000 ppm SO <sub>2</sub>
Sensitivity*	Maximum Overload	5000 ppm SO <sub>2</sub>
T90 Response Time*  Baseline Offset (clean air)*  Cross Sensitivity to 20,000 ppm CO*  without compensation with compensation with compensation with compensation with compensation with compensation with compensation  Maximum Zero Shift (20°C to 40°C)  Resolution (when using recommended electronics) Repeatability  Linearity  Linear  Electrical  Recommended Load Resistor  Bias Voltage Not required  Mechanical  Weight 10 g nominal  Housing Material ABS  Orientation Any  Environmental  Operating Temperature Range  Recommended Storage Temp  Operating Pressure Range  Atmospheric ±10%  Pressure Coeffcient  0.08% signal/mBar  Operating Humidity Range  Lifetime  Long-Term Sensitivity Drift  Expected Operating Life Two years in air	Filter	
Baseline Offset (clean air)* ± 2 ppm equivalent  Cross Sensitivity to 20,000 ppm CO*  without compensation	Sensitivity*	0.1 μA ±0.02 μA/ppm
air)*  Cross Sensitivity to 20,000 ppm CO* without compensation with compensation with compensation with compensation with compensation with compensation with compensation  Maximum Zero Shift (20°C to 40°C) Resolution (when using recommended electronics) Repeatability  Linearity  Linear  Electrical Recommended Load Resistor  Bias Voltage Not required  Mechanical  Weight 10 g nominal  Housing Material ABS  Orientation Any  Environmental  Operating Temperature Range  Recommended Storage Temp  Operating Pressure Range Pressure Coeffcient  Operating Humidity Range  Lifetime  Long-Term Sensitivity Drift  Expected Operating Life  Two years in air	T90 Response Time*	< 35 seconds
without compensation with compensation with compensation with compensation  Waximum Zero Shift (20°C to 40°C)  Resolution (when using recommended electronics)  Repeatability  Linearity  Linearity  Linear  Electrical  Recommended Load Resistor  Bias Voltage  Not required  Mechanical  Weight  10 g nominal  Housing Material  Operating Temperature Range  Recommended Storage Temp  Operating Pressure Range  Pressure Coeffcient  Operating Humidity Range  Lifetime  Long-Term Sensitivity Drift  Expected Operating Life  Two years in air		± 2 ppm equivalent
with compensation< 5 ppm SO2 equivalent*		
Maximum Zero Shift [20°C to 40°C]       5 ppm SO2 equivalent         Resolution (when using recommended electronics)       1 ppm         Repeatability       1% of signal         Linearity       Linear         Electrical       Recommended Load Resistor         Bias Voltage       Not required         Mechanical       Weight         Housing Material       ABS         Orientation       Any         Environmental       Operating Temperature Range         Recommended Storage Temp       0°C to 20°C         Operating Pressure Range       Atmospheric ±10%         Pressure Coeffcient       0.08% signal/mBar         Operating Humidity Range       15% to 90% RH non-condensing         Lifetime       Long-Term Sensitivity         Long-Term Sensitivity Drift       < 2% signal loss/month         Expected Operating Life       Two years in air	without compensation	< 60 ppm SO <sub>2</sub> equivalent
C20°C to 40°C   S ppm SO2 equivalent	with compensation	< 5 ppm SO <sub>2</sub> equivalent*
Repeatability 1% of signal Linearity Linear  Electrical Recommended Load Resistor 10 Ohm  Bias Voltage Not required  Mechanical  Weight 10 g nominal  Housing Material ABS  Orientation Any  Environmental  Operating Temperature Range -20°C to +50°C*  Recommended Storage Temp 0°C to 20°C  Operating Pressure Range Atmospheric ±10%  Pressure Coeffcient 0.08% signal/mBar  Operating Humidity Range  Lifetime  Long-Term Sensitivity Drift		5 ppm SO <sub>2</sub> equivalent
Linearity  Electrical  Recommended Load Resistor  Bias Voltage  Mechanical  Weight  10 g nominal  Housing Material  Operating Temperature Range  Recommended Storage Temp  Operating Pressure Range  Pressure Coeffcient  Operating Humidity Range  Lifetime  Long-Term Sensitivity Drift  Linear  Lone Atmosh  Linear  Linear  Lone Atmospheric  Linear  Linear  Linear  Lone Atmospheric  Linear  Linear  Lone Atmospheric  Linear  Linear  Lone Atmospheric  Linear  Linear  Linear  Linear  Lone Atmospheric  Linear  Linear  Linear  Linear  Lone Atmospheric  Linear  Linear  Linear  Lone Atmospheric  Linear  Linear  Lone Atmospheric  Linear  Linear  Lone Atmospheric  Lone		1 ppm
Recommended Load Resistor  Bias Voltage  Mechanical  Weight  Housing Material  Operating Temperature Range  Recommended Storage Temp  Operating Pressure Range  Pressure Coeffcient  Operating Humidity Range  Lifetime  Long-Term Sensitivity Drift  Not required  Any  Pont required  Any  10 g nominal  ABS  Orientation  Any  Environmental  Operating Temperature -20°C to +50°C*  Atmospheric ±10%  Pressure Coeffcient  0.08% signal/mBar  15% to 90% RH non-condensing  Lifetime  Long-Term Sensitivity Drift  Expected Operating Life  Two years in air	Repeatability	1% of signal
Recommended Load Resistor  Bias Voltage Not required  Mechanical  Weight 10 g nominal Housing Material ABS Orientation Any  Environmental  Operating Temperature Range Recommended Storage Temp Operating Pressure Range Atmospheric ±10%  Pressure Coeffcient 0.08% signal/mBar  Operating Humidity Range Lifetime Long-Term Sensitivity Drift  Two years in air	Linearity	Linear
Resistor  Bias Voltage  Not required  Mechanical  Weight  10 g nominal  Housing Material  ABS  Orientation  Any  Environmental  Operating Temperature Range  Recommended Storage Temp  Operating Pressure Range  Atmospheric ±10%  Pressure Coeffcient  0.08% signal/mBar  Operating Humidity Range  Lifetime  Long-Term Sensitivity Drift  Expected Operating Life  Not required  10 On minal  ABS  0°C to 20°C*  0°C to 20°C  15% to 90°C  2% signal loss/month	Electrical	
Weight 10 g nominal Housing Material ABS Orientation Any Environmental Operating Temperature Range -20°C to +50°C*  Recommended Storage Temp 0°C to 20°C Operating Pressure Range Atmospheric ±10% Pressure Coeffcient 0.08% signal/mBar Operating Humidity Range 15% to 90% RH noncondensing Lifetime Long-Term Sensitivity Drift < 2% signal loss/month Expected Operating Life Two years in air		10 Ohm
Weight 10 g nominal Housing Material ABS Orientation Any  Environmental Operating Temperature Range -20°C to +50°C* Recommended Storage Temp 0°C to 20°C Operating Pressure Range Atmospheric ±10% Pressure Coeffcient 0.08% signal/mBar Operating Humidity Range 15% to 90% RH non-condensing Lifetime Long-Term Sensitivity Drift < 2% signal loss/month Expected Operating Life Two years in air	Bias Voltage	Not required
Housing Material Orientation Any Environmental Operating Temperature Range Recommended Storage Temp Operating Pressure Range Atmospheric ±10% Pressure Coeffcient Operating Humidity Range Lifetime Long-Term Sensitivity Drift Any Any -20°C to +50°C*  0°C to 20°C  0.08% signal/mBar 15% to 90% RH non-condensing  Lifetime Long-Term Sensitivity Drift Two years in air	Mechanical	
Orientation Any  Environmental Operating Temperature Range -20°C to +50°C*  Recommended Storage Temp 0°C to 20°C  Operating Pressure Range Atmospheric ±10%  Pressure Coeffcient 0.08% signal/mBar  Operating Humidity Range 15% to 90% RH noncondensing  Lifetime  Long-Term Sensitivity Drift < 2% signal loss/month  Expected Operating Life Two years in air	Weight	10 g nominal
Environmental  Operating Temperature Range  Recommended Storage Temp  Operating Pressure Range  Pressure Coeffcient  Operating Humidity Range  Lifetime  Long-Term Sensitivity Drift  Expected Operating Life  -20°C to +50°C*  -20°C to 20°C  0.08% signal/mBar  15% to 90% RH non-condensing  -2% signal loss/month  Two years in air	Housing Material	ABS
Operating Temperature Range Recommended Storage Temp Operating Pressure Range Pressure Coeffcient Operating Humidity Range Lifetime Long-Term Sensitivity Drift  -20°C to +50°C*  -20°C to 20°C  0°C to 20°C  0.08% signal/mBar  15% to 90% RH non-condensing  -2% signal loss/month	Orientation	Any
Range Recommended Storage Temp  Operating Pressure Range Pressure Coeffcient  Operating Humidity Range Lifetime Long-Term Sensitivity Drift  Recommended Storage O°C to 20°C  O°C to 20°C  15% to 90°C  15% to 90% RH non-condensing  2% signal loss/month  Expected Operating Life Two years in air	Environmental	
Temp  Operating Pressure Range Atmospheric ±10%  Pressure Coeffcient 0.08% signal/mBar  Operating Humidity Range 15% to 90% RH noncondensing  Lifetime  Long-Term Sensitivity 2% signal loss/month  Expected Operating Life Two years in air		-20°C to +50°C*
Pressure Coeffcient 0.08% signal/mBar  Operating Humidity Range 15% to 90% RH non-condensing  Lifetime  Long-Term Sensitivity 2% signal loss/month  Expected Operating Life Two years in air		0°C to 20°C
Operating Humidity Range 15% to 90% RH non- condensing  Lifetime Long-Term Sensitivity Drift < 2% signal loss/month  Expected Operating Life Two years in air	Operating Pressure Range	Atmospheric ±10%
Operating Humidity Range 15% to 90% RH non- condensing  Lifetime Long-Term Sensitivity Drift < 2% signal loss/month  Expected Operating Life Two years in air	Pressure Coeffcient	0.08% signal/mBar
Long-Term Sensitivity Drift < 2% signal loss/month Expected Operating Life Two years in air	Operating Humidity Range	15% to 90% RH non-
Drift	Lifetime	
		< 2% signal loss/month
Storage Life 6 months in CTL container	Expected Operating Life	Two years in air
	Storage Life	6 months in CTL container

<sup>\*</sup> Specifications are valid at 20°C, 50% RH and 1013 mBar, using City Technology recommended circuitry. Performance characteristics outline the performance of sensors supplied within the first 3 months. Output signal can drift below the lower limit over time.

Note 1: CO cross sensitivity can be compensated for by use of the compensation coefficient quoted on the sensor label. See 5SC Characterisation Note or contact City Technology Ltd for further details.

## Product Dimensions (without bayonette fitting)



All dimensions in mm
All tolerances ±0.15 mm unless otherwise stated

IMPORTANT NOTE: Connection should be made via PCB sockets only. Soldering to the pins will seriously damage your sensor

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#### Poisoning

CiTiceLs are designed for operation in a wide range of environments and harsh conditions. However, it is important that exposure to high concentrations of solvent vapours is avoided, both during storage, fitting into instruments and operation.

When using sensors with printed circuit boards (PCBs), degreasing agents should be used before the sensor is fitted. Do not glue directly on or near the CiTiceL as the solvent may cause crazing of the plastic.

### Cross Senstivity Table

Whilst CiTiceLs are designed to be highly specific to the gas they are intended to measure, they will still respond to some degree to various other gases. The table below is not exclusive and other gases not included in the table may still cause a sensor to react.

IMPORTANT NOTE: The cross sensitivity data shown below does not form part of the product specification and is supplied for guidance only. Values quoted are based on tests conducted on a small number of sensors and any batch may show significant variation. For the most accurate measurements, an instrument should be calibrated using the gas under investigation.

Gas	Cross Interference %
Nitrogen Dioxide, NO <sub>2</sub>	~ -125
Hydrogen Chloride, HCl	0
Ethylene, C <sub>2</sub> H <sub>4</sub>	<50
Hydrogen, H <sub>2</sub>	<3
Hydrogen Sulfide, H <sub>2</sub> S	0
Nitric Oxide, NO	0

#### SAFETY NOTE

This sensor is designed to be used in safety-critical applications. To ensure that the sensor and/or instrument in which it is used, are operating properly, it is a requirement that the function of the device is confirmed by exposure to target gas (bump check) before each use of the sensor and/or instrument. Failure to carry out such tests may jeopardize the safety of people and property.

Every effort has been made to ensure the accuracy of this document at the time of printing. In accordance with the company's policy of continued product improvement City Technology reserves the right to make product changes without notice. The products are always subject to a programme of improvement and testing which may result in some changes in the characteristics quoted. As the products may be used by the client in circumstances beyond the knowledge and control of City Technology, we cannot give any warranty as to the relevance of these particulars to an application. City Technology warrants goods of its manufacture as being free of defective materials and faulty workmanship. City Technology's standard product warranty applies unless agreed to otherwise by City Technology in writing; please refer to your order acknowledgment or consult your local sales office for specific warranty details. If warranted goods are returned to City Technology during the period of coverage, City Technology will repair or replace, at its option, without charge those items it finds defective. The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall City Technology be liable for consequential, special, or indirect damages. Though City Technology provides application assistance personally, or through our literature and website, it is up to the customer to determine the suitability of the product in the application.

