iS-BSM-D12 Battery Safety Sensor Module Datasheet





General Description

Based on MEMS gas sensor, the iS-BSM-D12 battery safety sensor monitoring module is used to monitor the gas production and temperature data during the thermal runaway process of the battery, and provides early warning signals. The data is available via I²C bus or UART series port.

The MEMS gas sensor can be protected by covering a PTFE filter membrane. The sensor module can be assembled by SMT or removable terminal plug connection.

The benefits and features of the module are listed below:

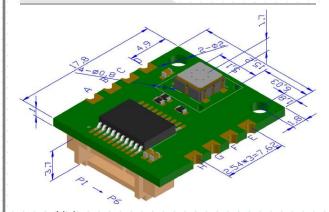
- Low-cost multi-factor output, provide reliable early warning for battery thermal runaway
- High sensitivity and fast response to CO/H₂, can eliminate the interference of VOCs by adding a filter cover
- Built-in Temp. compensation and external Humidity compensation available
- Low power consumption
- Small size for convenient installation
- > Automatic baseline correction
- ➤ The baseline settable, the storage state settable
- Robust design, excellent long-term stability
- Highly flexible assembly mode and communication interface

Performance parameter

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Item	Remark	
Sens. Principle	MEMS metal oxide sensor	
Sensing range	0-5000 ppm CO equivalents 0-5000 ppm H_2 equivalents -20 ~ +100 $^{\circ}$ C temperature	
Warm-up time	3 min.	
Communication	I ² C or UART	
Calibration	Automatic baseline correction, Baseline resettable, storage status settable (stored by default)	

Product Outline



Pitch: 2.54mm

P1: VDD P2: SCL P3:SDA P4:Rx P5:Tx P6:GND Pitch:1.25mm

Remark:

- 1, I²C interface needs 4.7-10k Ω pull-up res.
- 2, No socket by default

Electrical Characteristics

Item	Specification	
Voltage	Voltage 3.3V±0.1V, max. 20mV ripple	
Power Max. 66mW @3.3VDC (20m		
Interval 1 Sec. / measurement		

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Communication

UART Series port

Item	Specification	
Baud rate	9600 bits/s	
Data bit	8	
Parity bit	None	
Stop bit	op bit 1	
Protocol	 Master send 0xFF 52 01 01 AC to reset baseline to current value. Master send 0xFF 67 01 01 97 to automatic upload data packet once per Sec Send 0xFF 67 00 00 99 to restore to query mode. Master send 0xFF 61 02 01 9C in query mode to acquire 13 bytes data packet. 	

I²C bus

Item	Specification	
Frequency	Standard Mode:100kbits/s	
Slave Addr.	0xA2 (7 bit addr. mode, shift left by 0x51)	
Do Read	ead Acquire 13 bytes data packet by do read operation	
Do Write Reset baseline to current value by owrite 0xFF 52 01 01 AC operation		

Data Packet

Byte	Name	Description
0	Packet Head	0xFF
1-2	CO [ppm]	Data[1]*28+Data[2]
3	Status	0x00: OK 0x01: Heating 0x02: Error
4	Temp. return [°C]	(Data[4]*8-669)/10
5	Humi. Return [%RH]	(Data[5]*8-125)/10
6-7	H ₂ [ppm]	Data[6]*28+Data[7]
8	Environ. Temp. [$^{\circ}$ C]	Data[8]-20
9-11	Sensor Res. $[\Omega]$	Data[9]*2 ¹⁶ +Data[10]*2 ⁸ +Data[11]
12	Check Code	~(Sum(D[1]:D[11]))+1

Remarks: Data [4] and Data [5] are used for external humidity compensation

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Environmental Specifications

Item	Specification
Operating Temp.	-10 ~ +60 ℃
Operating Humidity	5 ~95 % RH, non-condensing
Storage Temp.	-40 ~ 85 ℃
Storage Humidity	5 ~95 % RH, non-condensing

Attentions

Please read the following terms carefully to avoid product data errors and prevent product damage.

- 1, The gas sensor must be reflow soldering in neutral atmosphere. The welding furnace should have sufficient flow of clean air to maintain the air clean. The maximum temperature is 260 °C. Manual soldering conditions are recommended for a maximum temperature of 350 °C for 5 seconds. . it is recommended that it should be aged for more than 4 hours to eliminate the influence of welding process on the gas sensor.
- 2, The products should not be exposed to high concentrations of organic solvent vapor, silicone vapor, in order to prevent sensitive material poisoning. The products should be placed in the filter protected space to prevent water and dust. The installation direction can be used to prevent dust deposition.
- 3, The sensor resistance will experience a continuous increase after power on. The time span of this process depends on the sensor heat history and storage environment. The longer time is needed when off time is long. It is recommended to preheat at least 60 min. to get a reliable results.
- 4, It is recommended to use ESD protection equipment when handling the products.
- 5, When a specific kind of gas needs to be measured, the chip operating temperature can be set to achieve better selectivity. Please consult for more information.
- 6, Reflow soldering is prohibited for the filter cover. Design the PCB mounting hole for filter cover.

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