ZMD31035

ZMD31035

Automotive Sensor Signal Conditioner

Datasheet PRELIMINARY

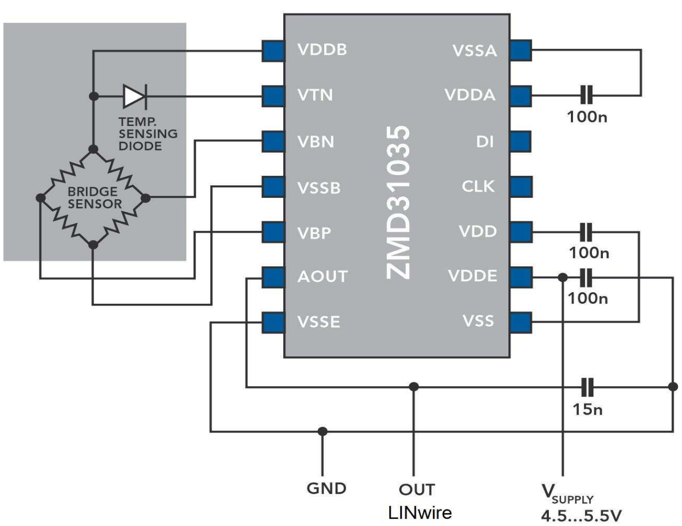
Features

- Digital compensation of sensor offset, sensitivity, temperature drift and non-linearity
- Adjustable to nearly all piezo-resistive bridge sensors types
- Digital one-shot calibration: quick and precise
- Selectable temperature compensation reference: internal or external diode
- Output: analog voltage (0 to 5V) and LINwire-Interface (one-wire-interface with LIN compatible protocol)
- Digital sensor calibration via one-wire-interface
- Sampling rate typically 125 Hz (comparable with an analog bandwidth of approx. 400 Hz)
- High voltage protection
- Reverse polarity and short circuit protection
- Operation temperature –40 to +135°C
- Supply voltage 4.5 to 5.5V

Benefits

- No external trimming components required
- PC-controlled configuration and calibration via one-wire interface - simple, low cost
- High accuracy (±0.1% FSO @ -25 to 85°C; ±0.25% FSO @ -40 to 135°C)

Application Circuit (Example)



Brief Description

The ZMD31035 is a CMOS integrated circuit for highly-accurate amplification and sensor-specific correction of bridge sensor signals. Digital compensation of sensor offset, sensitivity, temperature drift and non-linearity is accomplished via a 16-bit RISC micro-controller running a correction algorithm with calibration coefficients stored in an EEPROM.
The ZMD31035 is adjustable to nearly all piezo-resistive bridge sensors. Measured values are provided at the analog voltage output or at the one-wire-interface.
The digital one-wire-interface can be used for a simple PC-controlled calibration procedure, in order to program a set of calibration coefficients into an on-chip EEPROM. Thus a specific sensor and a ZMD31035 are mated digitally: fast, precise and without the cost overhead associated with trimming by external devices or laser.
The ZMD31035 is optimized for automotive environments by it’s protection circuitry and excellent electromagnetic compatibility.

- **Samples available**
- **Evaluation kit available, containing PCBs, software, documentation**
- **Support for industrial mass calibration avail.**
- **Quick circuit customization possible for large production volumes**

Fig.1: Ratiometric measurement with voltage output, temperature compensation via external diode (pinning right-left reversed)

CHAPTER **PAGE**

1. Circuit Description

1.1 Signal Flow

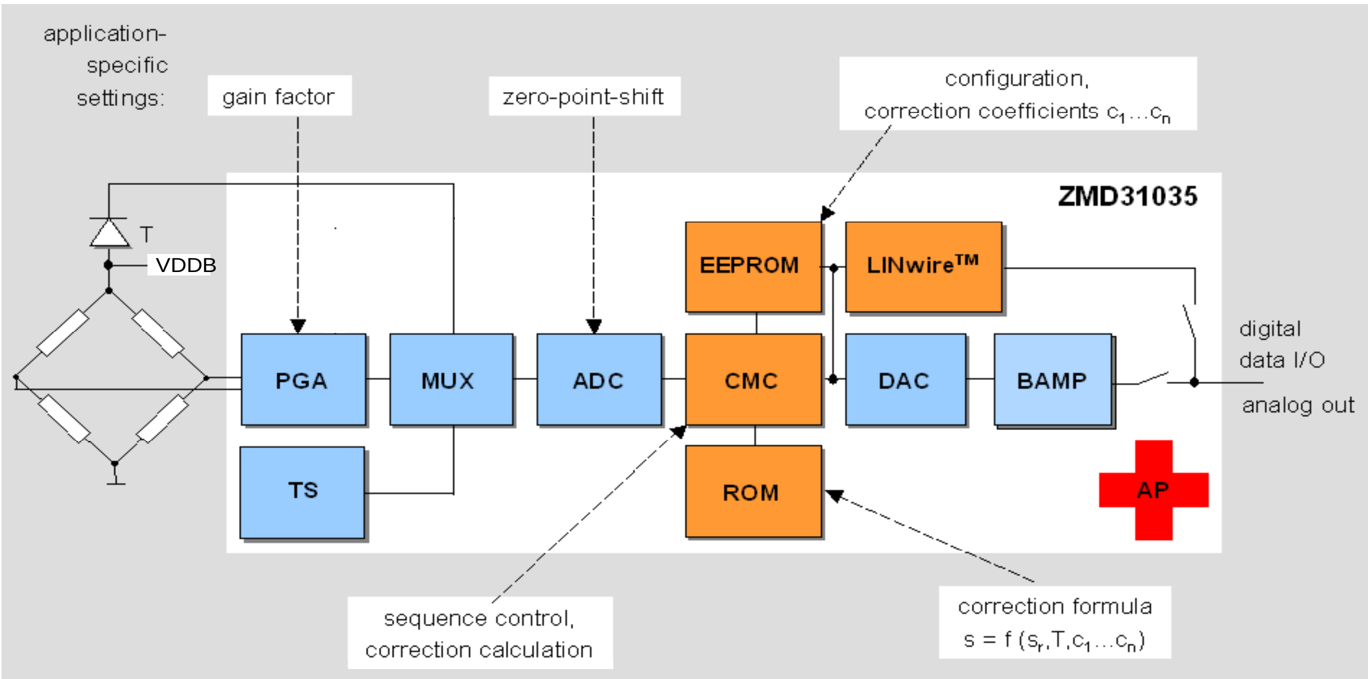


Fig.2: ZMD31035 block diagram

PGA	programmable gain amplifier
MUX	multiplexer
ADC	analog-to-digital converter
CMC	calibration micro-controller
DAC	digital-to-analog converter
BAMP	buffer amplifier
EEPROM	for configuration and calibration coefficients
LINwire™	one wire interface with 5V-swing, using LIN protocol
TS	on-chip temperature sensor (pn-junction)
ROM	for correction formula and –algorithm
AP	automotive protection circuitry (against high voltage, short circuit and reverse polarity)

ZMD31035's signal path is partly analog (blue) and partly digital (orange).
The differential voltage signal from the bridge sensor is pre-amplified by the programmable gain amplifier (PGA) which provides 4 different adjustable gain factors. The Multiplexer (MUX) transmits the signals from bridge sensor, internal or external diode temperature sensor to the ADC in a certain sequence, controlled by the calibration micro-controller (CMC). The ADC converts these signals into digital values and allows to adjust a 4-step zero-point-shift for coarse offset compensation.

The digital signal fine-tuning takes place in the 16-bit CMC and covers the accurate correction of offset, sensitivity, temperature-dependency and non-linearity. This operation is based on a special correction formula and –algorithm located in the ROM and on a couple of sensor-specific coefficients (stored into the EEPROM during calibration). In addition, the EEPROM contains the configuration data, e.g. PGA gain factor, PGA chopper stabilization, ADC zero-point-shift, bridge polarity, temperature reference, output configuration (see section 1.2).
Depending on the programmed output configuration the corrected sensor signal is either output as analog voltage or as digital value with 5V-swing and LIN data transmission protocol.
The LINwire™ interface is also used to program the configuration data and the correction coefficients into the EEPROM. Since both, the analog output signal and the LINwire™ access the same pin, an "end-of-manufacturing-calibration" at the assembled sensor module is possible. This option enables highest flexibility in sensor production and a demanding sensor accuracy since mechanical tensions from the sensor case can be considered during calibration.

1.2 Configuration

For each application a configuration set has to be established (generally prior to calibration) by programming the on-chip EEPROM. The following configuration settings can be chosen:

<u>Input Settings</u>

– *Input range*: The gain of the analog front end has to be set stepwise with respect to the maximum sensor signal span including the sensor offset.
– *Chopper stabilization*: The chopper stabilization reduces the PGA's inherent offset voltage and the influence of the PGA's input bias currents by multiple cross-switching the input lines of each PGA stage during every measurement cycle. As a disadvantage this cross-switching causes additional noise at the output signal.
– *Zero point shift*: The zero point shift of the ADC has to be adjust stepwise in order to compensate for the bridge sensor offset coarsely.
– *Bridge polarity:* maintains or inverts the sensor bridge polarity.
– *Temperature reference:* chooses between the chip-internal pn-junction type temperature sensor or an external diode for temperature compensation

<u>Output Settings</u>

– *Clamp function:* sets a lower and an upper limit for the analog output signal
– *Output mode:* chooses between analog output or bi-directional data transfer via the LINwire™ interface for the AOUT pin
– *LINwire™ mode:* chooses between interface initialisation and configuration/calibration

1.3 Analog Front End (AFE)

The analog front end consists of the programmable gain amplifier (PGA), the multiplexer (MUX) and the analog-to-digital converter (ADC).
The AFE is fully differential. That means that the digital bridge signal value generated by the ADC behaves proportional to the supply voltage for bridge sensor and ZMD31035. This is realized by using the supply voltage as reference for the ADC.

The differential sensor signal is handled via two signal lines, which are arranged symmetrically around a common mode voltage potential (VDDA/2). Consequently it is possible to amplify positive and negative input signals, as far as inside the common mode range.

1.3.1. Programmable Gain Amplifier

Table 1 shows the adjustable PGA gains in combination with the processable sensor signal spans ("input ranges") and the allowed common mode ranges.

Mode	effective PGA Gain a_{IN}	Input Span [mV/V]	Input Range @ 5V supply [mV]	Sensitivity [µV/LSB]	Input range in % VDDA
A	10,55	90	450	108	9,0
B	15,82	60	300	72	6,0
C	26,39	36	180	43	3,6
D	47,5	20	100	24	2,0

Table 1: Adjustable gains, spans and common mode ranges

Hint: A bridge supply voltage of typ. 4.8 V is generated at 5V VDDA, anyhow the output is ratiometric.

1.3.2. Temperature Measurement

The temperature is directly measured by the ADC by using a voltage reference for absolute measurement. The current source for the temperature measurement is a constant reference current source (non-ratiometric to VDDA). The current source for the bridge temperature sensor is only activated during the temperature measurement cycle to reduce the influence of leakage current during the pressure measurement.

1.3.3. Measurement Cycle Realized by Multiplexing the Signal Sources

The Multiplexer selects, depending on EEPROM settings, the following inputs in a certain sequence.

- Bridge temperature signal measured by external diode
- Bridge temperature signal measured by internal pn-junction
- Internal offset of the input channel measured by input short circuiting
- Pre-amplified bridge sensor signal

The complete measurement cycle is controlled by the CMC. The cycle diagram at the right shows its principle structure.

After Power ON the start routine is called. It contains the pressure and auto zero measurement. When enabled it measures the temperature and its auto zeros.

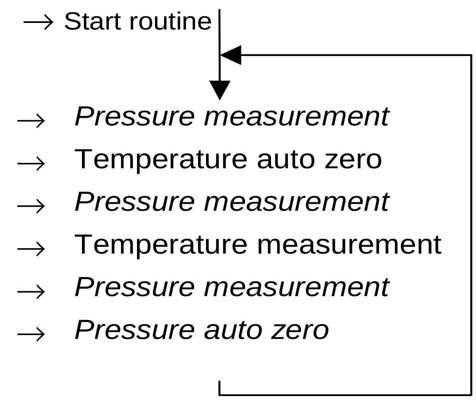


Fig. 3: Measurement cycle ZMD31035

1.3.4. Analog-to-Digital Converter

The ADC is a charge balancing converter in full differential switched capacitor technique.

The result of the AD conversion is a relative count result corresponding to the following equation:

$$ZOUT = N * ((VIN / VREF) + OFF)$$

ZOUT:	number of counts (result of the conversion)
N:	number of clock pulses during one measurement
VIN:	differential input voltage of ADC (VIN=VINP-VINN)
VREF:	differential reference voltage (VREF=VREFP-VREFN)
OFF:	offset value (OFF=$^1/_{16}$, $^1/_8$, $^1/_4$, $^1/_2$, controlled by the CMC)

With the OFF value a asymmetric sensor input signal can be shifted in the optimal input range of the ADC. The CMC controls the gain value of the preamplifier and the offset value of the ADC.
This values are stored in the EEPROM.

1.4 Digital/ Analog Converter (DAC) with Output Buffer

A resistor string type converter followed by a rail to rail buffer is used to convert the result of the CMC to an analog output voltage. The DAC has an monotonic behaviour, the signal is ratiometric to the power supply. The output current is limited to reduce the power dissipation in case of short circuit.
An offset correction circuit is integrated to reduce the offset voltage of the output buffer.
This correction circuit can be disabled by a EEPROM bit to reduce the failure risk of the design.
The DAC minimal and maximal values can be adjusted with the same resolution as the output signal (2560 steps) and will be stored in the EEPROM.

1.5 Digital Part (CMC, ROM, EEPROM, Interface, …)

The digital parts control the working modes of the ZMD31035 and calculate the result of the measurement by use of the actual input data of pressure and temperature and the stored calibration coefficients.
The ASIC includes a LINwire interface (LIN protocol compatible interface, based on LIN Specification, Revision 1.2. from 17.11.2000) for test and calibration. An external master device can read out the auto zero corrected values of the temperature and pressure measurements and the digital DAC value and store the values for modes, gain and offset, the calibration data and the customer specific data over the AOUT pin (LINwire).
The CMC, the calibration procedure, the LINwire protocol are described in detail in ZMD31035 Functional Description. The digital calculation done by the CMC compensate the following influences of the pressure output signal:
- Linear and quadratic pressure failure
- Linear and quadratic offset failure of the pressure signal over temperature
- Linear and quadratic sensor sensitivity failure over temperature.

In the normal operation mode (NOM) the output signal is the digital calibrated pressure value converted to an analog output voltage at the pin AOUT.
In the LINwire command mode (CM) the communication occurs using LIN protocol. A LIN slave with reduced functionality is implemented in the ASIC. In LINwire CM a master device can test and calibrate the ASIC in the real application circuit (i.e. the pressure sensor device in the automotive package) over the AOUT pin. The IDs for NOM and CM are fixed by metal wires in the digital part of the ASIC.
To switch the ASIC in the LINwire CM a defined pulse cycle (valid LIN command) must be generated at the pin AOUT during switch on the power supply. During this switched on time the ASIC analog output is switched “tri state” to allow the detection of the start pulses of this LINwire CM.
Additional is implemented a 3 wire test interface for ZMD internal tests only.

1.6 High voltage protection (HV), short circuit protection and reverse polarity protection

The ZMD31035 is directly supplied from the 5V power line. Protection against over-voltage at the supply line is provided by a voltage limiter. This limiter is a voltage regulator with a nominal output voltage of about 5V. During nominal operation the regulator works in its linear range, that means, only the drop-out voltage (< 200mV) is lost over the series transistor.
Protection of the external pins is achieved with the help of parallel voltage regulators, internal protection resistors and high voltage switches. Reverse polarity protection is achieved with a current limiting circuit together with external components (see Fig. 2). It limits the current through the external pins to a safe value. These circuits allow a reverse polarity protection of the power supply pin and the output pin without time limits.

Appendix A1 describes the behaviour of the ZMD31035 in the several cases of protection.

2. Application Circuits

The figure 2 shows the circuit diagram for application of the ZMD31035. The correct function of the ZMD31035 in application has to be checked by the customer.

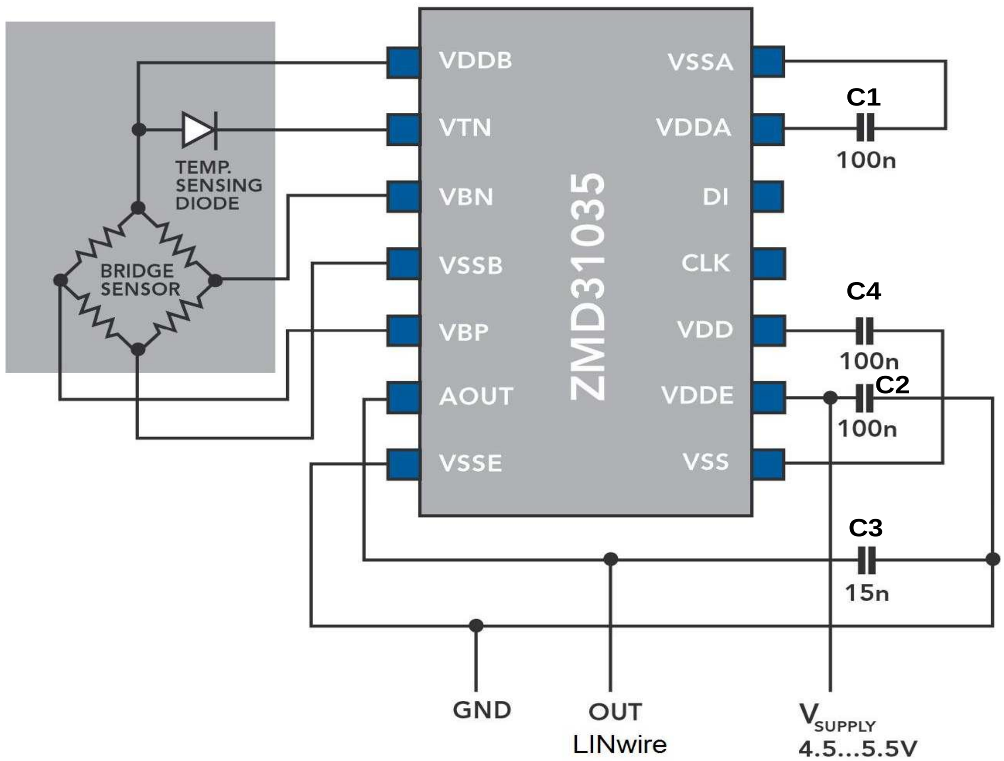


Fig. 4: ZMD31035 Application Circuit

2.1 Sizing of the external elements in application circuit

NR.	PARAMETER	CONNECTION	CONDITIONS	MIN.	TYP.	MAX.	UNITS
2.1.1	Capacitance	VDDA-VSSA			100		nF
2.1.2	Capacitance	VDDE-GND			100		nF
2.1.3	Capacitance	AOUT-GND		4		25	nF
2.1.4	Capacitance	VDD-VSS	[1]		100		nF

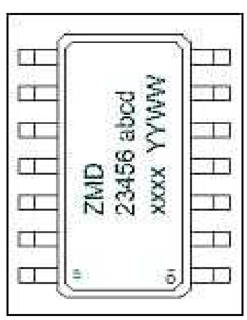
[1] The pins VDD/VSS allow the connection of an external capacitance (VDD-VSS) in case of EMV problems.

3. Pin Configuration and Package

Pin-No.	Name	Description	Remarks
1	VSSA	negative internal supply voltage analog part	Ground
2	VDDA	positive analog supply voltage	Supply
3 & 4	DI & CLK	no customer use	connect pins to VSSA
5	VDD	positive internal supply voltage digital part	Supply
6	VDDE	positive supply voltage	CMOS, HV input/ output
7	VSS	negative internal supply voltage digital part	Ground
8	VSSE	negative supply voltage	Ground
9	AOUT	Analog Output & LINwire one wire interface I/O	Analog output & dig. IO
10	VBP	positive input sensor bridge	Analog input
11	VSSB	negative supply voltage sensor bridge	Ground
12	VBN	negative input sensor bridge	Analog input
13	VTN	Temperature measurement diode input	Analog in/out
14	VDDB	positive supply voltage sensor bridge	Supply

The standard package of the ZMD31035 is a SSOP14 (lead-free "green package" / 5.3mm body width) with lead-pitch 0.65mm:

Pin-Nr	Pin-Name	Pin-Name	Pin-Nr
8	VSSE	VSS	7
9	AOUT	VDDE	6
10	VBP	VDD	5
11	VSSB	CLK	4
12	VBN	DI	3
13	VTN	VDDA	2
14	VDDB	VSSA	1



4. Electrical Specification

4.1 Absolute Maximum Ratings

all voltages referred to VSSA/ VSS							
NR.	**PARAMETER**	**SYMBOL**	**CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
4.1.1	Supply voltage	V_{VDDE}	Normal Mode, to VSSE	-18		18	V
4.1.2	Supply voltage	V_{VDDE_OWI}	OWI mode, to VSSE	-0.3V		5.5V	V
4.1.3	Supply voltage	V_{VDDE_EEP}	EEPROM Programming, to VSSE	-0.3V		5.5V	V
4.1.4	Voltage at pin AOUT	V_{OUT}	to VSSE	-18		18	V
4.1.5	Voltage at all digital inputs	V_{IND}, V_{OUTD}	to VSS	-0.3V		V_{DDA}+ 0.3V	
4.1.6	Voltage at all analog inputs and outputs	V_{INA}, V_{OUTA}	to VSSA	-0.3V		V_{DDA}+ 0.3V	
4.1.7	Storage temperature	T_{STG}		-40		155	℃
4.1.8	Storage temperature	T_{STG}	t < 10h	-40		170	℃

4.2 Operating conditions

all voltages referred to VSSA/ VSS							
NR.	**PARAMETER**	**SYMBOL**	**CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
4.2.1	Supply voltage	V_{VDDE}	to VSSE	4.5	5	5.5	V
4.2.2	Ambient temperature	T_A		-40		135	℃
4.2.3	Ambient temperature EEPROM Programming	T_{A_PROG}		10		70	℃
4.2.4	Extended Ambient temperature EEPROM Programming	$T_{A\_PROG\ EXT}$	max. 10 programming cycles	10		85	℃
4.2.5	Bridge Resistance	R_{BRIDGE}		2.4		10 [2]	kΩ

[2] Recommended, caused by noise conditions and sampling behaviour of the circuit at the bridge, no primary limitations to 10k

4.3 Electrical Parameters

all voltages referred to VSSA/ VSS, T_A=-40℃ ... +135℃							
NR.	**PARAMETER**	**SYMBOL**	**CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
4.3.1 Supply Voltage/ Supply Current							
4.3.1.1	Supply Current	I_S	without I_{BRIDGE} without I_{AOUT}			4.75	mA
4.3.2 Analog Output Parameters							
4.3.2.1	Output Current	I_{SOURCE}		2			mA
5.3.2.2	Input Current	I_{SINK}		2			mA
4.3.2.3	Short Circuit	I_{SHORT}		-20		20	mA
4.3.2.4	Offset Voltage	V_{OFF}	uncalibrated	-10		10	mV
4.3.2.5	TK of Offset Voltage	TK_{OFF}		-10		10	µV / K
4.3.2.6	Resolution	Res	Reference to VDDE/VSSE, 1/22 ... 21/22 V_D	2560			Steps
4.3.2.7	Differential Nonlinearity	DNL_{OUT}	no missing codes	-0.9		0.9	LSB
4.3.2.8	Integral Nonlinearity	INL_{OUT}	referred to best fit straight line	-8		8	LSB
4.3.2.9	lower Output Voltage	V_{OUTMIN}	ratiometric to VDDE/VSSE			1/22	V_D
4.3.2.10	upper Output Voltage	V_{OUTMAX}	ratiometric to VDDE/VSSE	21/22			V_D
4.3.2.11	Adjustment of V_{OUTMIN}		2560 Counts	1/22		21/22	V_D
4.3.2.12	Adjustment of V_{OUTMAX}		2560 Counts	1/22		21/22	V_D
4.3.2.13	max. Load Capacity	C_{LVOUT}				125 [5)]	nF
4.3.3 Analog Inputs VBP, VBN (Pressure Sensor Bridge, PSB)							
Polarity of Input Voltage							
4.3.3.1	Input Voltage PSB Measurement	V_{INPSB}	BIT REVIN=0		VBP-VBN		
4.3.3.2	Input Voltage PSB Measurement	V_{INPSB}	BIT REVIN=1		VBN-VBP		
Input Mode A							
4.3.3.3	Span	$V_{IN\_SP\_A}$		0.09			VDDA
4.3.3.4	Mode A1 Input Range	V_{PSB_A1}	OFF=1/16	-0.005625		0.084375	VDDA
4.3.3.5	Mode A2 Input Range	V_{PSB_A2}	OFF=1/8	-0.01125		0.07875	VDDA
4.3.3.6	Mode A3 Input Range	V_{PSB_A3}	OFF=1/4	-0.0225		0.0675	VDDA
4.3.3.7	Mode A4 Input Range	V_{PSB_A4}	OFF=1/2	-0.045		0.045	VDDA
4.3.3.8	Sensitivity	S_{PSB_A}	V_{DDA}=4.8V		111		µV/LSB

Input Mode B							
4.3.3.9	Span	$V_{IN\_SP\_B}$		0.06			VDDA
4.3.3.10	Mode B1 Input Range	V_{PSB_B1}	OFF=1/16	-0.00375		0.05625	VDDA
4.3.3.11	Mode B2 Input Range	V_{PSB_B2}	OFF=1/8	-0.0075		0.0525	VDDA
4.3.3.12	Mode B3 Input Range	V_{PSB_B3}	OFF=1/4	-0.015		0.045	VDDA
4.3.3.13	Mode B4 Input Range	V_{PSB_B4}	OFF=1/2	-0.03		0.03	VDDA
4.3.3.14	Sensitivity	S_{PSB_B}	V_{DDA}=4.8V		74		µV/LSB
Input Mode C							
5.3.3.15	Span	$V_{IN\_SP\_C}$		0.036			VDDA
5.3.3.16	Mode C1 Input Range	V_{PSB_C1}	OFF=1/16	-0.002		0.034	VDDA
5.3.3.17	Mode C2 Input Range	V_{PSB_C2}	OFF=1/8	-0.004		0.032	VDDA
5.3.3.18	Mode C3 Input Range	V_{PSB_C3}	OFF=1/4	-0.009		0.027	VDDA
5.3.3.19	Mode C4 Input Range	V_{PSB_C4}	OFF=1/2	-0.018		0.018	VDDA
5.3.3.20	Sensitivity	S_{PSB_C}	V_{DDA}=4.8V		44,4		µV/LSB
Input Mode D							
5.3.3.21	Span	$V_{IN\_SP\_D}$		0.02			VDDA
5.3.3.22	Mode D1 Input Range	V_{PSB_D1}	OFF=1/16	-0.001		0.019	VDDA
5.3.3.23	Mode D2 Input Range	V_{PSB_D2}	OFF=1/8	-0.002		0.018	VDDA
5.3.3.24	Mode D3 Input Range	V_{PSB_D3}	OFF=1/4	-0.005		0.015	VDDA
5.3.3.25	Mode D4 Input Range	V_{PSB_D4}	OFF=1/2	-0.01		0.01	VDDA
5.3.3.26	Sensitivity	S_{PSB_D}	V_{DDA}=4.8V		24,7		µV/LSB
All Input Modes							
5.3.3.27	Input Leakage Current	I_{INL}	differential, 1)	-40		40	nA
5.3.4 Analog Inputs VTN (External Temperature Sensor, TSE1)							
5.3.4.1	Input Voltage Range	V_{IN_TSE}	to VDDB	-810		-210	mV
5.3.4.2	Sensitivity	S_{TSE}			0.85		mV/ LSB
5.3.5 Internal Temperature Sensor (TSI)							
5.3.5.1	Sensitivity (to Temperature)	S_{TTSI}	1)	1.9	2.1	2.3	mV/K
5.3.5.2	Sensitivity	S_{TSI}	1)		0.85		mV/ LSB
5.3.6 Current Source for External Temperature Sensor							
5.3.6.1	Output Current	I_{TSE}	sink	20	40	65	µA
5.3.6.2	Temperature Coefficient	TC_{ITSE}	1)	-1000		1000	ppm/K

5.3.7 Analog to Digital Conversion							
5.3.7.1	Resolution Pressure Signal Bridge	RES_{PSB}	1)	4096			Counts
5.3.7.2	Differential Nonlinearity	DNL_{PSB}	1)	-0.5		0.5	Bit
5.3.7.3	Integral Nonlinearity	INL_{PSB}	referred to best-fit straight line, 1)	-0.5		0.5	Bit
5.3.7.4	Resolution Temperature Sensor	RES_{TS}	1)	1024			Counts
5.3.7.5	Differential Nonlinearity(TS)	DNL_{TS}	1)	-0.5		0.5	Bit
5.3.7.6	Integral Nonlinearity(TS)	INL_{TS}	referred to best-fit straight line, 1)	-0.5		0.5	Bit
5.3.8 Serial 3 wire Interface (all voltages referred to VSS)							
5.3.8.1	Input High Level	V_{IH}	Pins DI and CLK	0.9		1	VDDE
5.3.8.2	Input Low Level	V_{IL}	Pins DI and CLK	0		0.1	VDDE
5.3.8.3	Output Low Level	$V_{OL\ AOUT}$	Pin AOUT, Low side switch, I_sink = 4mA	0		0.2	VDDE
5.3.8.6	Pull down Current	I_{OL}	I_sink, Pins DI and CLK	5		30	µA
5.3.8.7	Load Capacitance AOUT	C_{L_AOUT}				100	pF
5.3.8.8	Clock Frequency CLK	f_{CLK}	C_{L_AOUT} = 100pF			250	kHz
5.3.8.9	Duration Programming Impulse	t_{VPP}	generated internally (2 pulses per register)		10		ms
5.3.9 LINwire One Wire Interface (all voltages referred to VSS, see Appendix A3)							
5.3.9.1	Output low voltage	$V_{OL\ AOUT}$	I_{SINK} = 4mA 1)			0.2	VDDE
5.3.9.2	Input low level	I_{OWI_IL}	driver off, 1)	0		0.1	VDDE
5.3.9.3	Input high level	I_{OWI_IH}	driver off, 1)	0.9		1	VDDE
5.3.9.4	Capacitance of slave	C_{L_AOUT}	1)			25	nF
5.3.10 Total System							
5.3.10.1	Startup time	t_{STUP}	Power up to first output value 3) 4)			20	ms
5.3.10.2	Response Time	t_R	3)			10	ms
5.3.10.3	Cycle Time	t_C	Complete cycle 3)			9	ms
5.3.10.4	Nonlinearity	NL	referred to best-fit straight line 2)	-2000		+2000	ppm
5.3.10.5	Temperature dependency PSB Measurement	t_{CPSBM}	1)			40	ppm/K
5.3.10.6	Temperature dependency TS Measurement	t_{CTSM}	1)			150	ppm/K

Remarks:

1) No measurement in mass production, parameter is guarantied by design or will be tested within the product qualification.

2) Analog Signal Conditioning and Analog Digital Conversion for Measurement of the Pressure Sensor Bridge

3) With calibrated oscillator

4) Switch on time of the supply voltage (0% -> 90% of nominal value) max. 0.5ms, to initialize the test and calibration mode with the LIN compatible protocol a defined pulse stream must be generated at the AOUT pin during the first 12ms after switching on the power supply

5) maximal capacitive load at the analog output incl. the application circuitry's capacitances out of the module (this value decreases in case of LINwire communication during calibration and NOM – see 5.3.9.4)

5. Test

The test program is based on this data sheet.
The fulfilment of the test specification is obligatory to deliver and obligates to purchase.

6. Customization

For high-volume applications, which require an up- or downgraded functionality compared to the ZM31035, ZMD can customize the circuit design by adding or removing certain functional blocks. For it ZMD has a considerable library of sensor-dedicated circuitry blocks. Thus ZMD can provide a custom solution quickly. Please contact ZMD for further information.

7. Related Documents

- ZMD31035 Feature Sheet
- ZMD31035 Functional Description
- Appendix A1: Description of the high voltage protection circuit (V2.0)
- ZMD31035 Application note “Response Time”

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