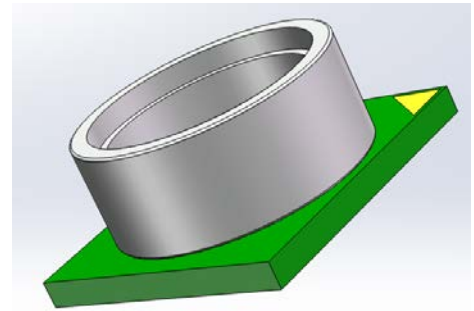


PRECISION BAROMETER AND ALTIMETER SENSOR

Features

- Supply voltage: 1.7 – 3.6 V.
- Relative accuracy: ± 0.1 mBar.
- Absolute accuracy: ± 1 mBar.
- Temperature accuracy: Typ $\pm 0.5^{\circ}\text{C}$.
- Operation temperature: $-40 - 85^{\circ}\text{C}$.
- Pressure range: 300mbar~1200mbar.
- Standby current: Typ $0.5\mu\text{A}$.
- Size: 6.8 x 6.2 x 3.1mm.
- Water proof design.
- High-speed I2C digital output interface.



6.8 x 6.2 x 3.1mm

Application Examples

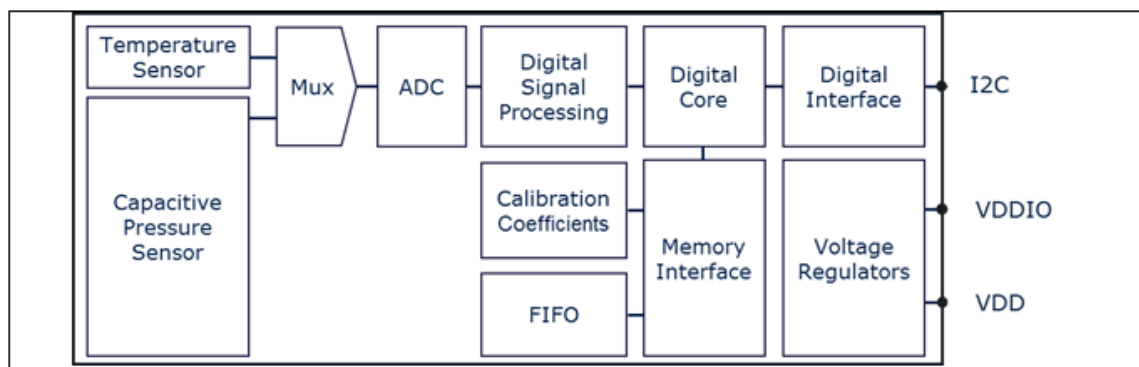
- Mobile Altimeter / Barometer
- Industrial Pressure and Temperature Sensor System
- Adventure and Sports watches
- Weather Station Equipment
- Indoor Navigation and Map Assist
- Data loggers for pressure, temperature.
- Gas meter
- Contact with oils

Descriptions

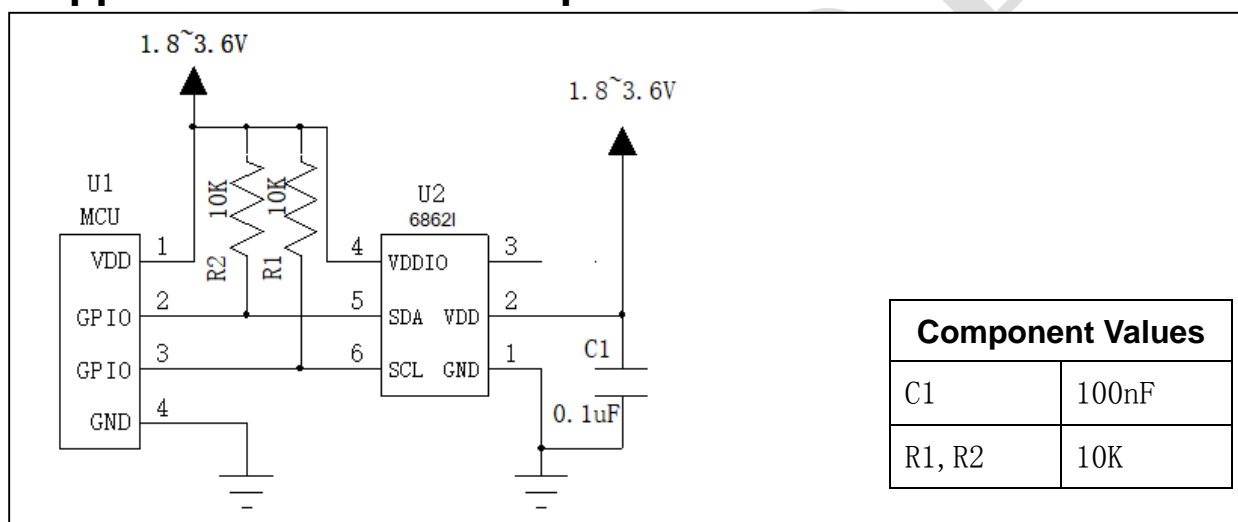
The 6862I is a miniaturized Digital Barometric Air Pressure Sensor with a high accuracy and a low current consumption, capable of measuring both pressure and temperature. The pressure sensor element is based on a capacitive principle which guarantees high precision during temperature changes. The small package makes the 6862I ideal for mobile applications and wearable devices.

The 6862I is internal signal processor converts the output from the pressure and temperature sensor elements to 24 bit results. Each unit is individually calibrated. The calibration coefficients calculated during this process are stored in the calibration registers. The coefficients are used in the application to convert the measurement results to high accuracy pressure and temperature values. The 6862I result FIFO can store up to 32 measurement results, allowing for a reduced host processor polling rate.

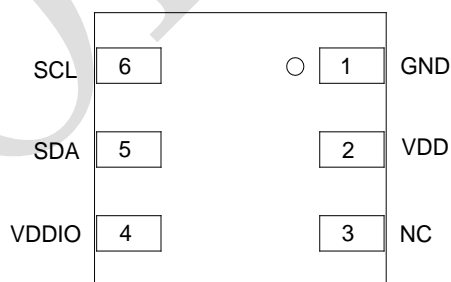
1. Block Diagram



2. Application Circuit Example



3. Pin Configuration



Bottom view

Table 1 Pin Descriptions

Pin	Name	Function
1	GND	Ground
2	VDD	Supply voltage for analog blocks
3	NC	NO Connect
4	VDDIO	Digital supply voltage for digital blocks and I/O interface
5	SDA	I2C serial bi-directional data pin
6	SCL	I2C serial clock input pin

4. Definitions, acronyms and abbreviations

An explanation of terms and definitions used in this datasheet

Table 2 definitions

Term	Definition/explanation
Absolute accuracy	The absolute measurement accuracy over the entire measurement range.
Digital bit depth	The total bit depth used for conversion of the sensor input to the digital output. Measured in bits.
Digital resolution	The pressure value represented by the LSB change in output. This value should be much smaller than the sensor noise.
Full Scale Range (FSR)	The peak-to-peak measurement range of the sensor.
LSB	Least Significant Bit
Measurement time	The time required to acquire one sensor output result. This value determines the maximum measurement rate.
MSB	Most Significant Bit
Non-linearity	The deviation of measured output from the best-fit straight line, relative to 1000 mBar and 25 °C.
Output compensation	The process of applying an algorithm to the sensor output to improve the absolute accuracy of the sensor across temperature and to minimize unit to unit output variation. This algorithm makes use of both the temperature sensor readings and the individual calibration coefficients.
Precision (noise)	The smallest measurable change, expressed as rms, after sensor oversampling.
Pressure temperature coefficient	The pressure measurement deviation, after compensation, from expected measurement value due to temperature change from 25 °C. Measured in Pa/K.
Sensor calibration	The process, during the production test, where the sensor's measurement results are compared against reference values, and a set of calibration coefficients are calculated from the deviation. The coefficients are stored in the sensor's memory and are used in the output compensation.
Sensor oversampling rate (OSR)	Specifies the number of sensor measurements used internally to generate one sensor output result.

5. Specifications

5.1 Operating Range

The following operating conditions must not be exceeded in order to ensure correct operation of the device. All parameters specified in the following sections refer to these operating conditions, unless noted otherwise.

Table 3 Operating Range

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Pressure	P_a	300		1200	mBar	
Temperature	T_a	-40		85	°C	
Supply voltage	V_{DD}	1.7		3.6	V	
Supply voltage IO	V_{DDIO}	1.2		3.6	V	
Supply voltage ramp-up time	t_{vddup}	0.001		5	ms	Time for supply voltage to reach 90% of final value.
Long term stability			0.5	1	mBar	12 months

5.2 Absolute Maximum Ratings

Table 4 Absolute Maximum Ratings

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
V_{DD} and V_{DDIO}	V_{DDxx_max}			4	V	
Voltage on any pin	V_{max}			4	V	
Storage temperature	T_s	-40		125	°C	
Pressure	P_{max}			10	Bar	
ESD	V_{ESD_HBM}	-2		2	KV	HBM

Note: Parameter above those listed as “absolute maximum ratings” may cause permanent damage to the device.

Exposure to maximum rating conditions for extended periods may affect device reliability.

5.3 Current Consumption

Test conditions (unless otherwise specified in the table): VDD= 1.8V and VDDIO=1.8V. Typ. values (PA=1000mBar and TA=25°C). Max./Min. values (PA= 950-1050mBar and TA=0...+65°C).

Table 5 Current Consumption

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Peak Current Consumption	I_{peak}		345		μA	during Pressure measurement
			280		μA	during Temperature measurement
Standby Current Consumption	I_{stb}		0.5		μA	
Current Consumption. (1 measurement per second.)	I_{1Hz}		2.1		μA	Low precision
			11			Standard precision
			38			High precision

5.4 Temperature Transfer Function

Test conditions (unless otherwise specified in the table): VDD= 1.8V and VDDIO=1.8V. Typ. values (PA=1000mBar and TA=25°C). Max./Min. values (PA= 950-1050mBar and TA=0...+65°C)

Table 6 Temperature Transfer Function

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Temperature accuracy	A_t		+/-0.5		°C	@ 25°C
Temperature data resolution	A_{t_res}		0.01		°C	
Temperature measurement rate	f	1		128	Hz	

5.5 Pressure Transfer Function

Table 7 Pressure Transfer Function

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Absolute pressure accuracy	A _{p_abs}		±0.5		mBar	P _A =400-1050mBar T _A =25...+60°C
			±1.0		mBar	P _A =400-1050mBar T _A =0...+60°C
			±1.7		mBar	P _A =400-1050mBar T _A =-40...85°C
Relative pressure accuracy	A _{p_rel}		±0.1		mBar	P _A =400-1050mBar T _A =20...+60°C
Pressure precision	A _{p_prc}		5.0		Pa _{RMS}	Low Power
			1.2			Standard
			0.5			High Precision

Note: Pressure precision is measured as the average standard deviation. Please refer to the Pressure Configuration (PRS_CFG) register description for all precision mode options.

Power supply rejection	A _{p_psr}			0.063	Pa _{RMS}	Measured with 217Hz square wave and broad band noise, 100mV _{pp}
Pressure temperature sensitivity of calibrated measurements	A _{p_tmp}			0.5	Pa/K	1000mBar, 25...+40°C.
Pressure data resolution	A _{p_res}			0.06	Pa _{RMS}	
Pressure measurement rate	f	1		128	Hz	
Pressure measurement time	t		5.2		ms	Low Power
			27.6			Standard
			105			High Precision

6. Functional Description

6.1 Operating Modes

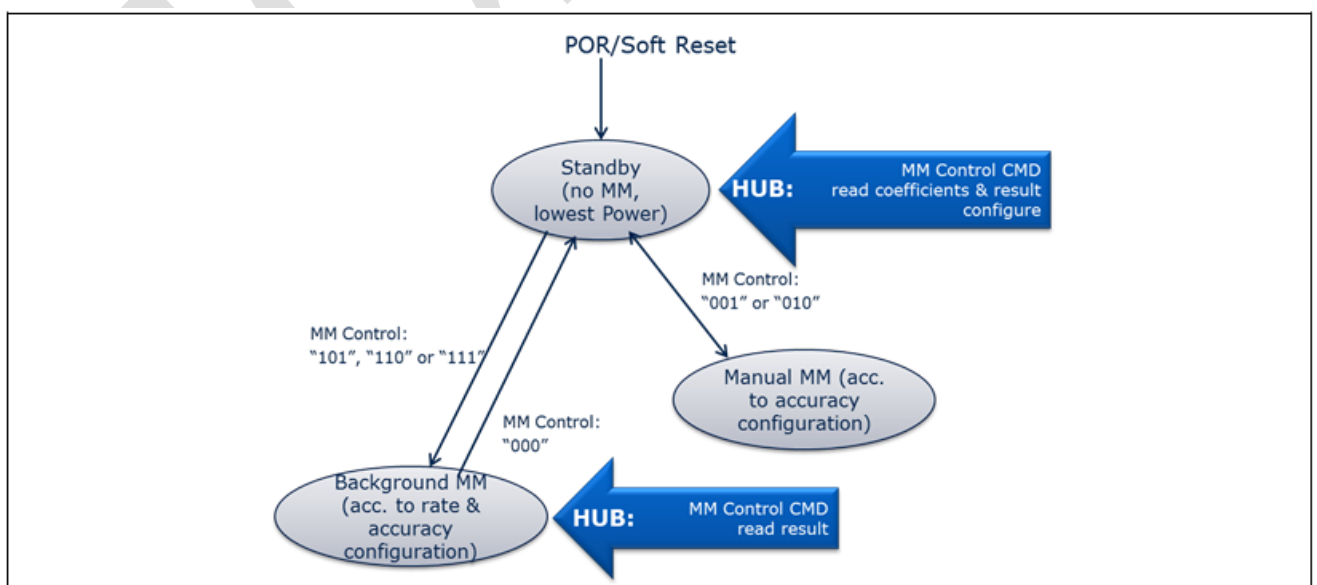
The 6862I supports 3 different modes of operation: Standby, Command, and Background mode.

- **Standby Mode**
 - Default mode after power on or reset. No measurements are performed.
 - All registers and compensation coefficients are accessible.
- **Command Mode**
 - One temperature or pressure measurement is performed according to the selected precision.
 - The sensor will return to Standby Mode when the measurement is finished, and the measurement result will be available in the data registers.
- **Background Mode**
 - Pressure and/or temperature measurements are performed continuously according to the selected measurement precision and rate. The temperature measurement is performed immediately after the pressure measurement.
 - The FIFO can be used to store 32 measurement results and minimize the number of times the sensor must be accessed to read out the results.

6.2 Mode transition diagram

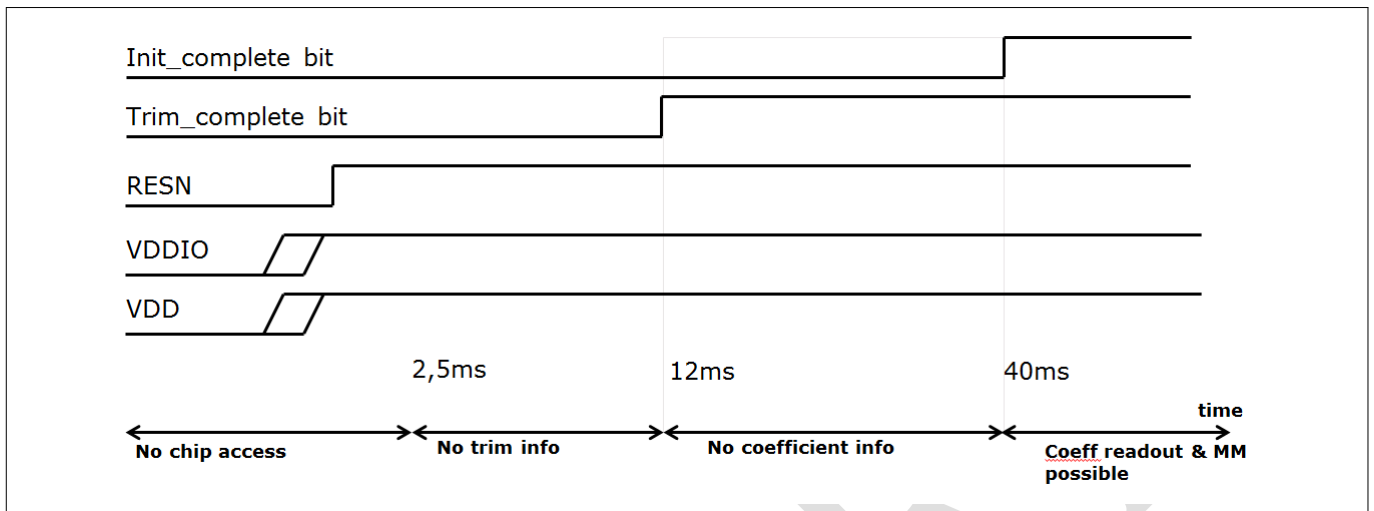
The mode transition diagram is shown below.

Functional Description



6.3 Start-up sequence

The star-up sequence of the 6862I is shown below. This diagram shows when the registers are accessible for read and/or write and also when the Pressure/Temperature measurements can start.



6.4 Measurement Precision and Rate

Different applications require different measurement precision and measurement rates. Some applications, such as weather stations, require lower precision and measurement rates than for instance indoor navigation and sports applications.

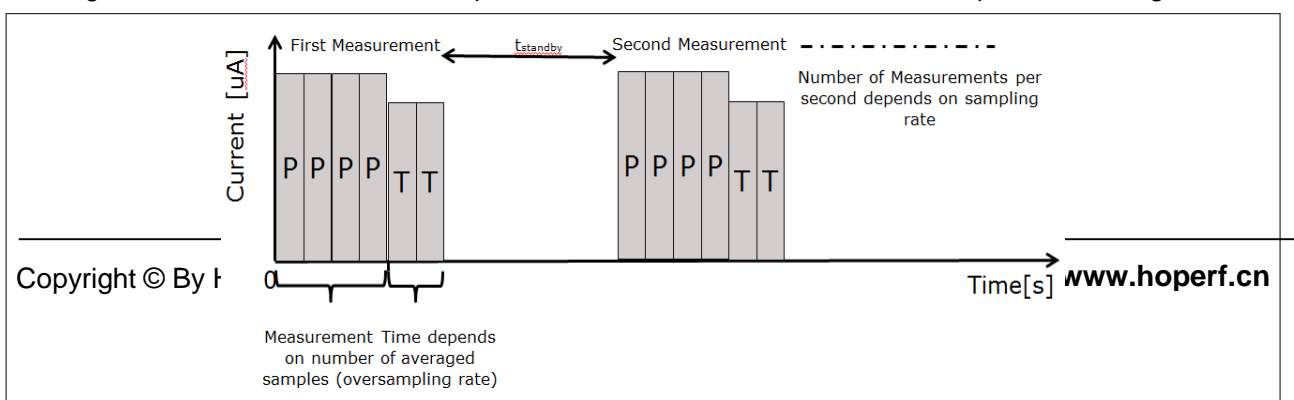
When the 6862I is in Background Mode, the measurement precision and rate can be configured to match the requirements of the application. This reduces current consumption of the sensor and the system.

In order to achieve a higher precision, the 6862I will read the sensor multiple times (oversampling), and combine the readings into one result. This increases the current consumption and also the measurement time, reducing the maximum possible measurement rate. It is necessary to balance the accuracy and data rate required for each application with the allowable current consumption.

The measurement precision, rate and time is set in the Pressure Configuration (PRS_CFG) and Temperature Configuration (TMP_CFG) registers. The register descriptions contain information about the current consumption and the possible combinations of measurement precision, time, and rate.

Enabling temperature measurements allows for compensation of temperature drift in the pressure measurement. The rates of these measurements can be set independently, but temperature compensation is more accurate when temperature and pressure measurements are taken together. This reduces the maximum pressure measurement rate, since: $\text{Rate}_{\text{temperature}} \cdot \text{Time}_{\text{temperature}} + \text{Rate}_{\text{pressure}} \cdot \text{Time}_{\text{pressure}} < 1 \text{ second}$. Measurement Settings and Use Case Examples contains a table with examples of combinations of pressure and temperature precision and rates for different use cases.

In the figure below is described the Temperature and Pressure measurements sequence in background mode.



6.5 I2C Interface

- I2C interface
 - The sensor's default interface.
 - The sensor's address is 0x77.

6.6 Calibration and Measurement Compensation

Compensation Scale Factors

Table 9

Oversampling Rate	Scale Factor (kP or kT)
1 (single)	524288
2 times (Low Power)	1572864
4 times	3670016
8 times	7864320
16 times (Standard)	253952
32 times	516096
64 times (High Precision)	1040384
128 times	2088960

Pressure Steps

- Read the pressure calibration coefficients (c00, c10, c20, c30, c01, c11, and c21) from the calibration Coefficient register
 Note: c00 and c10, read from the coefficient register are 20 bit 2's complement numbers.
 c20, c30, c01, c11, and c21, read from the coefficient register are 16 bit 2's complement numbers.
- Choose scaling factors kT (for temperature) and kP (for pressure) based on the chosen precision rate. The scaling factors are listed in [Table 9](#).
- Read the pressure and temperature result from the registers or FIFO.
 Note: The measurements read from the result registers (or FIFO) are 24 bit 2's complement numbers.
 Depending on the chosen measurement rates, the temperature may not have been measured since the last pressure measurement.
- Calculate scaled measurement results.

$$T_{raw_sc} = T_{raw}/kT$$

$$P_{raw_sc} = P_{raw}/kP$$
- Calculate compensated measurement results.

$$P_{comp}(Pa) = c00 + P_{raw_sc} * (c10 + P_{raw_sc} * (c20 + P_{raw_sc} * c30)) + T_{raw_sc} * c01 + T_{raw_sc} * P_{raw_sc} * (c11 + P_{raw_sc} * c21)$$

Temperature Steps

- Read the temperature calibration coefficients (c0 and c1) from the Calibration Coefficients (COEF) register.
Note: The coefficients read from the coefficient register are 12 bit 2's complement numbers.
- Choose scaling factor kT (for temperature) based on the chosen precision rate. The scaling factors are listed in [Table 9](#)

- Read the temperature result from the temperature register or FIFO.
Note: The temperature measurements read from the temperature result register (or FIFO) are 24 bit 2's complement numbers.

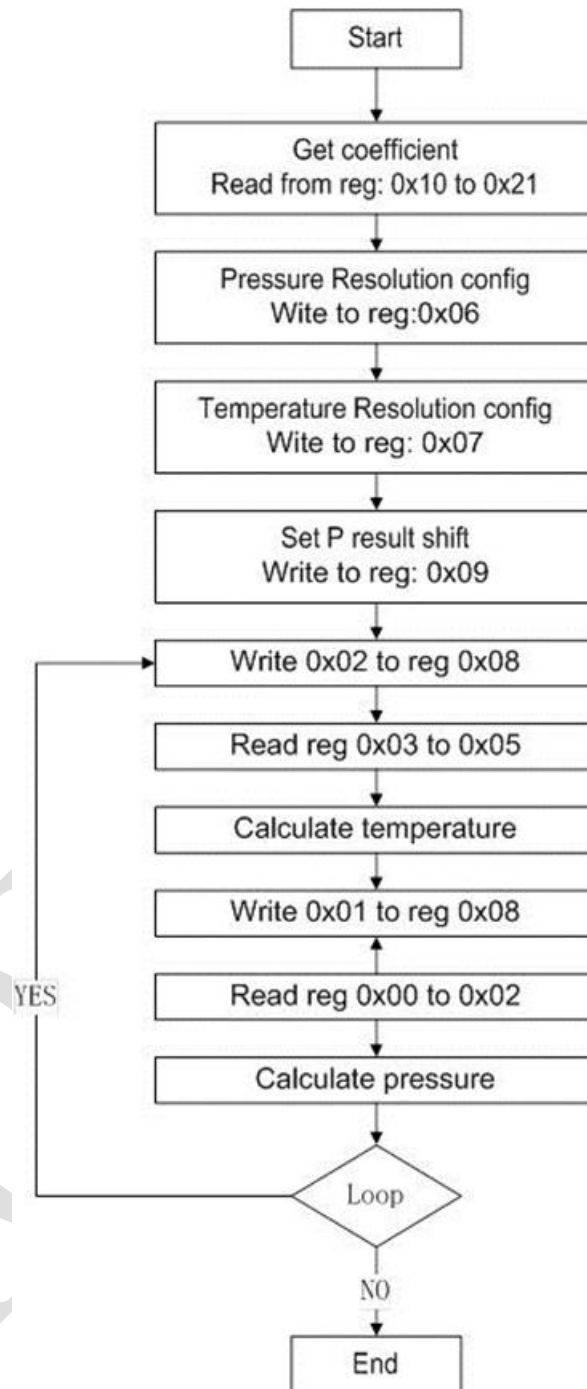
- Calculate scaled measurement results.

$$T_{\text{raw_sc}} = T_{\text{raw}}/kT$$

- Calculate compensated measurement results.

$$T_{\text{comp}} (^{\circ}\text{C}) = c0*0.5 + c1*T_{\text{raw_sc}}$$

6.7 Flow chart

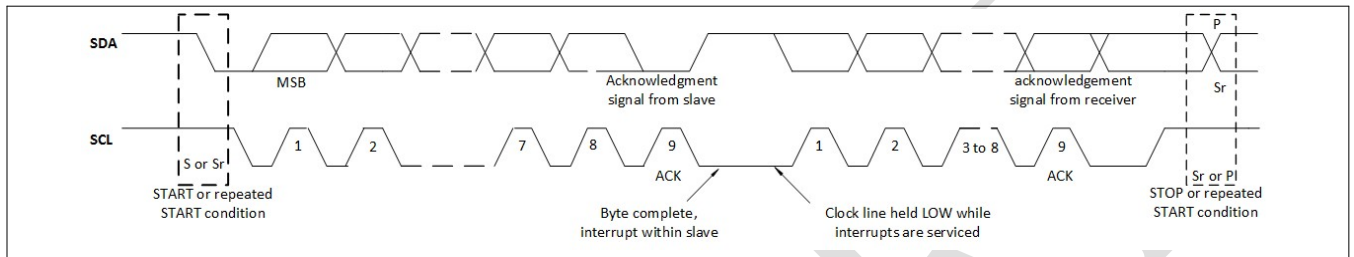


7. I2C Interface

The I2C slave interface is compatible with Philips I2C Specification version 2.1. The I2C interface supports standard, fast and high speed mode.

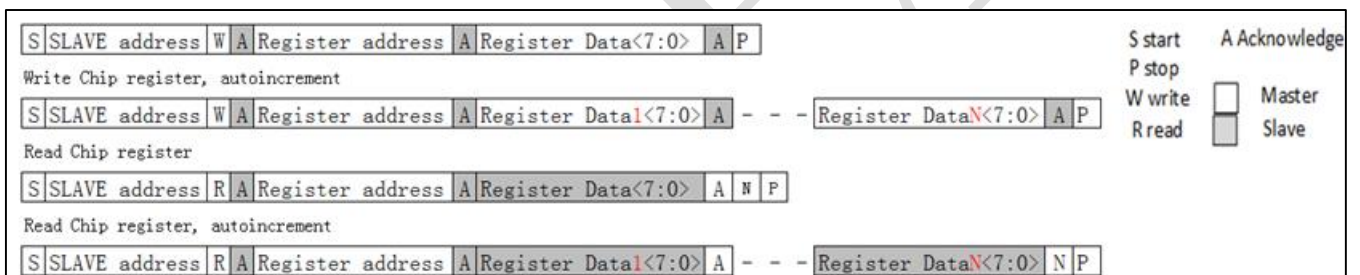
The basic timing is shown in the diagram below:

Digital interfaces



I2C timing diagram

In one access, without stop, incremental read (address is auto increment) and auto-incremental write is supported. The read and write access is described below:

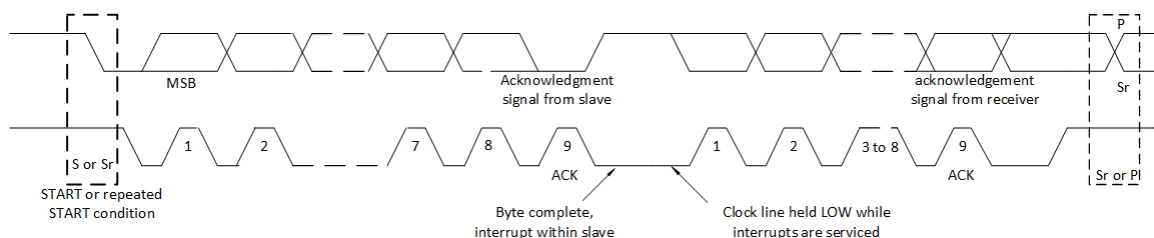


I2C write and read commands

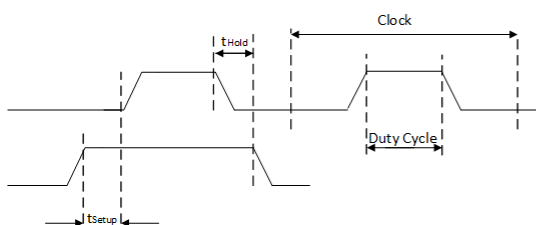
7.1 I2C timings

The I²C timing is shown in the diagram below and corresponding values are given in the table below. The naming refers to I²C Specification version 2.1, the abbreviations used "S&F mode" = standard and fast mode, "HS mode" = high speed mode, C_b = bus capacitance on SDA line.

I²C timing diagram



Data transfer on the I2C-bus



able 10 I2C timings

Parameter	Symbol	Values			Unit	Note or Test Condition
		Min.	Typ.	Max.		
Data setup time on SDI pin	t _{Setup}	20			ns	S&F mode
		5			ns	HS mode
Data hold time on SDI pin	t _{Hold}	0			ns	S&F&HSmode,
Duty Cycle	DC			70	%	S&F mode,
				55	%	HS mode,

8. Register Map

Table 11 Register Map (Continued)

Register Name	Addr.	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	Reset State
PSR_B2	0x00	PSR[23:16] (r)								00 _h
PSR_B1	0x01	PSR[15:8](r)								00 _h
PSR_B0	0x02	PSR[7:0](r)								00 _h
TMP_B2	0x03	TMP[23:16] (r)								00 _h
TMP_B1	0x04	TMP[15:8] (r)								00 _h
TMP_B0	0x05	TMP[7:0] (r)								00 _h
PRS_CFG	0x06	-	PM_RATE [2:0] (rw)			PM_PRC [3:0] (rw)			00 _h	
TMP_CFG	0x07	TMP_EXT (rw)	TMP_RATE [2:0] (rw)			TM_PRC [3:0] (rw)			00 _h	
MEAS_CFG	0x08	COEF_RDY (r)	SENSOR_RDY (r)	TMP_RDY (r)	PRS_RDY (r)	-	MEAS_CRTL [2:0] (rw)			00 _h
CFG_REG	0x09	-	-			TMP_SHIFT_EN (rw)	PRS_SHIFT_EN (rw)	FIFO_EN (rw)	-	00 _h
FIFO_STS	0x0B	-	-	-	-	-	-	FIFO_FULL(r)	FIFO_EMPTY(r)	00 _h
RESET	0x0C	FIFO_FLUSH (w)	-	-	-	SOFT_RST [3:0] (w)				00 _h
Product ID	0x0D	REV_ID [3:0] (r)				PROD_ID [3:0] (r)				10 _h
COEF	0x10-0x21	< see register description >								XX _h
Reserved	0x22-0x27	Reserved								XX _h
COEF_SRCE	0x28	TMP_COEF_SRCE (r)	Reserved							XX _h

9. Register description

9.1. Pressure Data (PRS_Bn)

The Pressure Data registers contains the 24 bit (3 bytes) 2's complement pressure measurement value.

If the FIFO is enabled, the register will contain the FIFO pressure and/or temperature results (please see [FIFO operation](#)). Otherwise, the register contains the pressure measurement results and will not be cleared after read.

9.1.1 PRS_R2

The highest b of the three bytes measured pressure value.yte

PRS_B2
Pressure (MSB data)

Address: 00H
Reset value: 00H

7	6	5	4	3	2	1	0
PRS23	PRS22	PRS21	PRS20	PRS19	PRS18	PRS17	PRS16

Field	Bits	Type	Description
PRS[23:16]	7:0	r	MSB of 24 bit 2's complement pressure data.

9.1.2 PRS_B1

The middle byte of the three bytes measured pressure value.

PRS_B1
Pressure (LSB data)

Address: 01H
Reset value: 00H

7	6	5	4	3	2	1	0
PRS15	PRS14	PRS13	PRS12	PRS11	PRS10	PRS9	PRS8-

Field	Bits	Type	Description
PRS[15:8]	7:0	r	LSB of 24 bit 2's complement pressure data.

9.1.3 PRS_B0

The lowest byte of the three bytes measured pressure value.

PRS_B0	Address:	02H
Pressure (XLSB data)	Reset value:	00H

7	6	5	4	3	2	1	0
PRS7	PRS6	PRS5	PRS4	PRS3	PRS2	PRS1	PRS0

r

Field	Bits	Type	Description
PRS[7:0]	7:0	r	XLSB of 24 bit 2's complement pressure data.

9.2. Temperature Data (TMP_Tn)

The Temperature Data registers contain the 24 bit (3 bytes) 2's complement temperature measurement value

(Unless the FIFO is enabled, please see FIFO operation) and will not be cleared after the read.

9.2.1 TMP_B2

The highest byte of the three bytes measured temperature value.

TMP_B2	Address:	03H
Temperature (MSB data)	Reset value:	00H

7	6	5	4	3	2	1	0
TMP23	TMP22	TMP21	TMP20	TMP19	TMP18	TMP17	TMP16

r

Field	Bits	Type	Description
TMP[23:16]	7:0	r	MSB of 24 bit 2's complement temperature data.

9.2.2 TMP_B1

The middle byte of the three bytes measured temperature value.

TMP_B1
Temperature (LSB data)

Address: 04H
Reset value: 00H

7	6	5	4	3	2	1	0
TMP15	TMP14	TMP13	TMP12	TMP11	TMP10	TMP9	TMP8

r

Field	Bits	Type	Description
TMP[15:8]	7:0	r	LSB of 24 bit 2's complement temperature data.

9.2.3 TMP_B0

The lowest part of the three bytes measured temperature value.

TMP_B0
Temperature (XLSB data)

Address: 05H
Reset value: 00H

7	6	5	4	3	2	1	0
TMP7	TMP6	TMP5	TMP4	TMP3	TMP2	TMP1	TMP0

r

Field	Bits	Type	Description
TMP[7:0]	7:0	r	XLSB of 24 bit 2's complement temperature data.

9.3. Pressure Configuration (PRS_CFG)

Configuration of pressure measurement rate (PM_RATE) and resolution (PM_PRC)

PRS_CFG

Address:

06H

Pressure measurement configuration

Reset value:

00H

7	6	5	4	3	2	1	0
-	PM_RATE[2:0]			PM_PRC[3:0]			

Field	Bits	Type	Description
-	7	-	Reserved.
PM_RATE[2:0]	6:4	rw	Pressure measurement rate: 000 - 1 measurements pr. sec. 001 - 2 measurements pr. sec. 010 - 4 measurements pr. sec. 011 - 8 measurements pr. sec. 100 - 16 measurements pr. sec. 101 - 32 measurements pr. sec. 110 - 64 measurements pr. sec. 111 - 128 measurements pr. sec. <i>Applicable for measurements in Background mode only</i>
PM_PRC[3:0]	3:0	rw	Pressure oversampling rate: 0000 - Single. (Low Precision) 0001 - 2 times (Low Power). 0010 - 4 times. 0011 - 8 times. 0100 *) - 16 times (Standard). 0101 *) - 32 times. 0110 *) - 64 times (High Precision). 0111 *) - 128 times. 1xxx - TBD

* Note: Use in combination with a bit shift. See [FIFO configuration \(CFG_REG\)](#) register

Table 12 Precision (PaRMS) and pressure measurement time (ms) versus oversampling rate

Oversampling (PRC[3:0])	Single (0000)	2 times (0001)	4 times (0010)	8 times (0011)	16 times (0100)	32 times (0101)	64 times (0110)	128 times (0111)
Measurement time (ms)	3.6	5.2	8.4	14.8	27.6	53.2	104.4	206.8
Precision (Pa _{RMS})	5		2.5		1.2	0.9	0.5	

Table 13 Estimated current consumption (uA)

Oversampling (PRC[3:0]) Measurements pr sec. (PM_RATE([2:0])	Single (0000)	2 times (0001)	4 times (0010)	8 times (0011)	16 times (0100)	32 times (0101)	64 times (0110)	128 times (0111)
1 (000)	2.1	2.7	3.8	6.1	11	20	38	75
2 (001)								
4 (010)								
8 (011)	Note: The current consumption can be calculated as the Measurement Rate * Current Consumption of 1 measurement per. sec.							n.a.
16 (100)							n.a.	n.a.
32 (101)						n.a.	n.a.	n.a.
64 (110)					n.a.	n.a.	n.a.	n.a.
128 (111)			n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Note: The table shows the possible combinations of Pressure Measurement Rate and oversampling when no temperature measurements are performed. When temperature measurements are performed the possible combinations are limited to $Rate_{temperature} \times Measurement\ Time_{temperature} + Rate_{pressure} \times Measurement\ Time_{pressure} < 1\ second$.								

9.4. Temperature Configuration (TMP_CFG)

Configuration of temperature measurement rate (TMP_RATE) and resolution (TMP_PRC)

TMP_CFG

Address:

07H

Temperature measurement configuration

Reset value:

00H

7	6	5	4	3	2	1	0
TMP_EXT	TMP_RATE[6:4]			-	TMP_PRC[2:0]		
rw	rw			-	rw		

Field	Bits	Type	Description
TMP_EXT	7	rw	<p>Temperature measurement</p> <p>0 - Internal sensor (TBD)</p> <p>1 - External sensor (in pressure sensor MEMS element)</p> <p><i>Note: It is highly recommended to use the same temperature sensor as the source of the calibration coefficients. Please see the Coefficient Source register</i></p>
TMP_RATE[2:0]	6:4	rw	<p>Temperature measurement rate:</p> <p>000 - 1 measurement pr. sec.</p> <p>001 - 2 measurements pr. sec.</p> <p>010 - 4 measurements pr. sec.</p> <p>011 - 8 measurements pr. sec.</p> <p>100 - 16 measurements pr. sec.</p> <p>101 - 32 measurements pr. sec.</p> <p>110 - 64 measurements pr. sec.</p> <p>111 - 128 measurements pr. sec..</p> <p><i>Applicable for measurements in Background mode only</i></p>
TMP_PRC[2:0]	2:0	rw	<p>Temperature oversampling (precision):</p> <p>000 - single. (Default) - Measurement time 3.6 ms.</p> <p><i>Note: Following are optional, and may not be relevant:</i></p> <p>001 - 2 times.</p> <p>010 - 4 times.</p> <p>011 - 8 times.</p> <p>100 - 16 times.</p> <p>101 - 32 times.</p> <p>110 - 64 times..</p> <p>111 - 128 times.</p> <p>1xxx - TBD.</p>

9.5 Sensor Operating Mode and Status (MEAS_CFG)

Setup measurement mode

MEAS_CFG

Address:

08H

Measurement configuration

Reset value:

00H

7	6	5	4	3	2	1	0
COEF_RDY	SENSOR_RDY	TEM_RDY	PRS_RDY	–	MEAS_CTRL		
r	r	r	r	–	rw		

Field	Bits	Type	Description
COEF_RDY	7	r	Coefficients will be read to the Coefficients Registers after start-up: 0 - Coefficients are not available yet. 1 - Coefficients are available.
SENSOR_RDY	6	r	The pressure sensor is running through self-initialization after start-up. 0 - Sensor initialization not complete 1 - Sensor initialization complete It is recommended not to start measurements until the sensor has completed the self-initialization.
TMP_RDY	5	r	Temperature measurement ready 1 - New temperature measurement is ready. Cleared when temperature measurement is read.
PRS_RDY	4	r	Pressure measurement ready 1 - New pressure measurement is ready. Cleared when pressure measurement is read.
–	3	–	Reserved.
MEAS_CTRL	2:0	rw	Set measurement mode and type: <i>Standby Mode</i> 000 - Idle / Stop background measurement <i>Command Mode</i> 001 - Pressure measurement 010 - Temperature measurement 011 - na. 100 - na. <i>Background Mode</i> 101 - Continuous pressure measurement 110 - Continuous temperature measurement 111 - Continuous pressure and temperature measurement

9.6. FIFO configuration (CFG_REG)

Configuration of interrupts, measurement data shift, and FIFO enable.

CFG_REG

Address:

09H

Configuration register

Reset value:

00H

7	6	5	4	3	2	1	0
—				T_SHIFT	P_SHIFT	FIFO_EN	—
—				rw	rw	rw	—

Field	Bits	Type	Description
—	7	—	Reserved
—	6	—	Reserved
—	5	—	Reserved
—	4	—	Reserved
T_SHIFT	3	rw	Temperature result bit-shift 0 - no shift. 1 - shift result right in data register. <i>Note: Must be set to '1' when the oversampling rate is >8 times.</i>
P_SHIFT	2	rw	Pressure result bit-shift 0 - no shift. 1 - shift result right in data register. <i>Note: Must be set to '1' when the oversampling rate is >8 times.</i>
FIFO_EN	1	rw	Enable the FIFO: 0 - Disable. 1 - Enable.
—	0	—	Reserved

9.7 FIFO Status (FIFO_STS)

FIFO status register

FIFO_STS

Address:

0BH

FIFO status register

Reset value:

00H

7	6	5	4	3	2	1	0
-						FIFO_FULL	FIFL_EMPTY
-						r	r

Field	Bits	Type	Description
-	7:2	-	Reserved.
FIFO_FULL	1	r	0 - The FIFO is not full 1 - The FIFO is full
FIFO_EMPTY	0	r	0 - The FIFO is not empty 1 - The FIFO is empty

9.8 Soft Reset and FIFO flush (RESET)

Flush FIFO or generate soft reset.

RESET Address: 0CH
FIFO flush and soft reset Reset value: 00H

7	6	5	4	3	2	1	0
FIFO_FLUSH	-			SOFT_RST			
w	-			w			

Field	Bits	Type	Description
FIFO_FLUSH	7	w	FIFO flush 1 - Empty FIFO After reading out all data from the FIFO, write '1' to clear all old data.
-	6:4	-	Reserved.
SOFT_RST	3:0	w	Write '1001' to generate a soft reset. A soft reset will run through the same sequences as in power-on reset.

9.9 Product and Revision ID (ID)

Product and Revision ID

ID Address: 0DH
Product and revision ID Reset value: 0x10H

7	6	5	4	3	2	1	0
REV_ID				PROD_ID			
r				r			

Field	Bits	Type	Description
REV_ID	7:4	r	Revision ID
PROD_ID	3:0	r	Product ID

9.10 Calibration Coefficients (COEF)

The Calibration Coefficients register contains the 2's complement coefficients that are used to calculate the compensated pressure and temperature values.

Table 14 Calibration Coefficients

Coefficient	Addr.	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
c0	0x10	c0 [11:4]							
c0/c1	0x11	c0 [3:0]				c1 [11:8]			
c1	0x12	c1[7:0]							
c00	0x13	c00 [19:12]							
c00	0x14	c00 [11:4]							
c00/c10	0x15	c00 [3:0]				c10 [19:16]			
c10	0x16	c10 [15:8]							
c10	0x17	c10 [7:0]							
c01	0x18	c01 [15:8]							
c01	0x19	c01 [7:0]							
c11	0x1A	c11 [15:8]							
c11	0x1B	c11 [7:0]							
c20	0x1C	c20 [15:8]							
c20	0x1D	c20 [7:0]							
c21	0x1E	c21 [15:8]							
c21	0x1F	c21 [7:0]							
c30	0x20	c30 [15:8]							
c30	0x21	c30 [7:0]							

Note: Generate the decimal numbers out of the calibration coefficients registers data:

$C20 := \text{reg0x1D} + \text{reg0x1C} * 2^8$

if ($C20 > (2^{15} - 1)$)

$C20 := C20 - 2^{16}$

end if

$C0 := (\text{reg0x10} * 2^4) + ((\text{reg0x11} / 2^4) \& 0x0F)$

if ($C0 > (2^{11} - 1)$)

$C0 := C0 - 2^{12}$

end if

9.11 Coefficient Source

States which internal temperature sensor the calibration coefficients are based on: the ASIC temperature

Sensor or the MEMS element temperature sensor, the coefficients are only valid for one sensor and it is highly recommended to use the same temperature sensor in the application. This is set-up in the Temperature Configuration register

TMP_COEF_SRCE

Temperature Coefficients Source

Address:

28H

Reset value:

XXH

7

6

5

4

3

2

1

0

TMP_COEF_SRCE

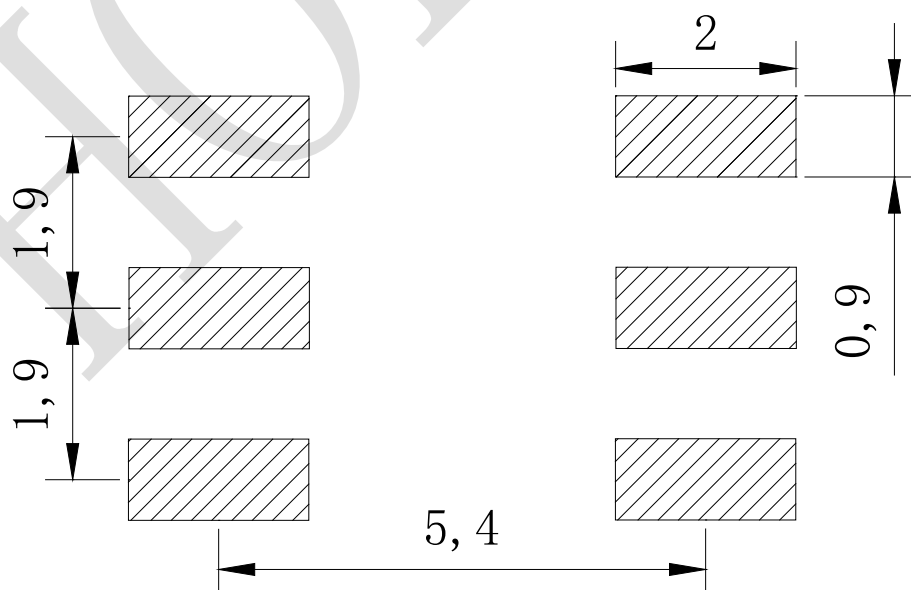
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r

-

Field	Bits	Type	Description
TMP_COEF_SRCE	7	r	Temperature coefficients are based on: 0 - Internal temperature sensor (TBD) 1 - External temperature sensor (of pressure sensor MEMS element)
-	6:0	-	Reserved

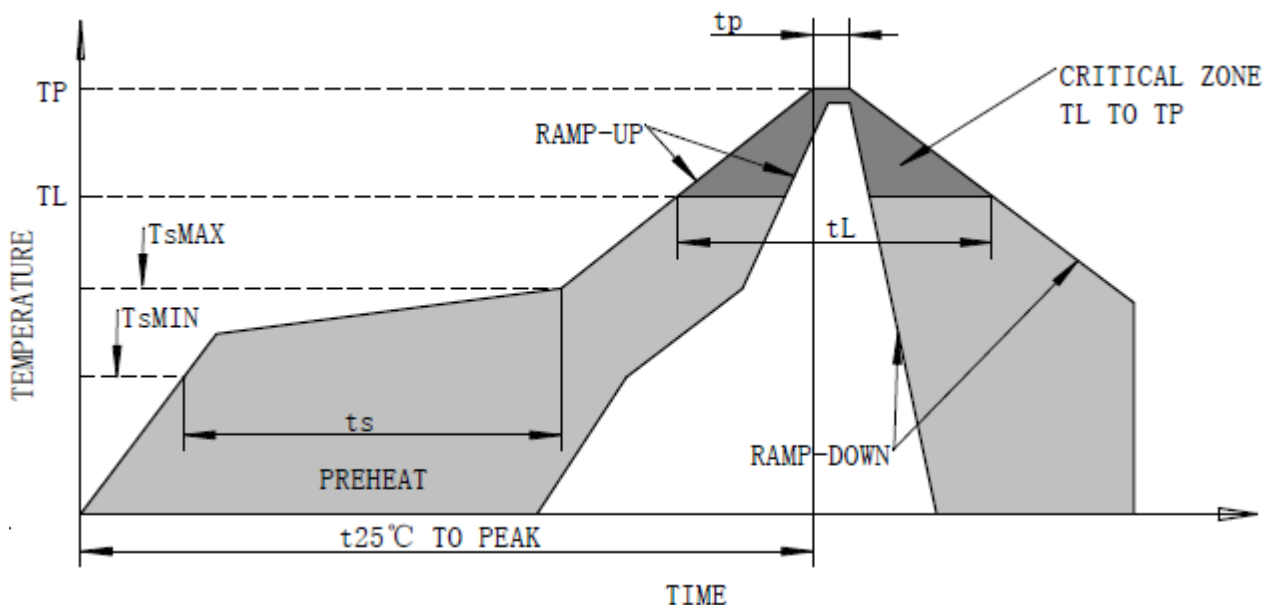
10. Recommended PAD Layout



Unit: mm

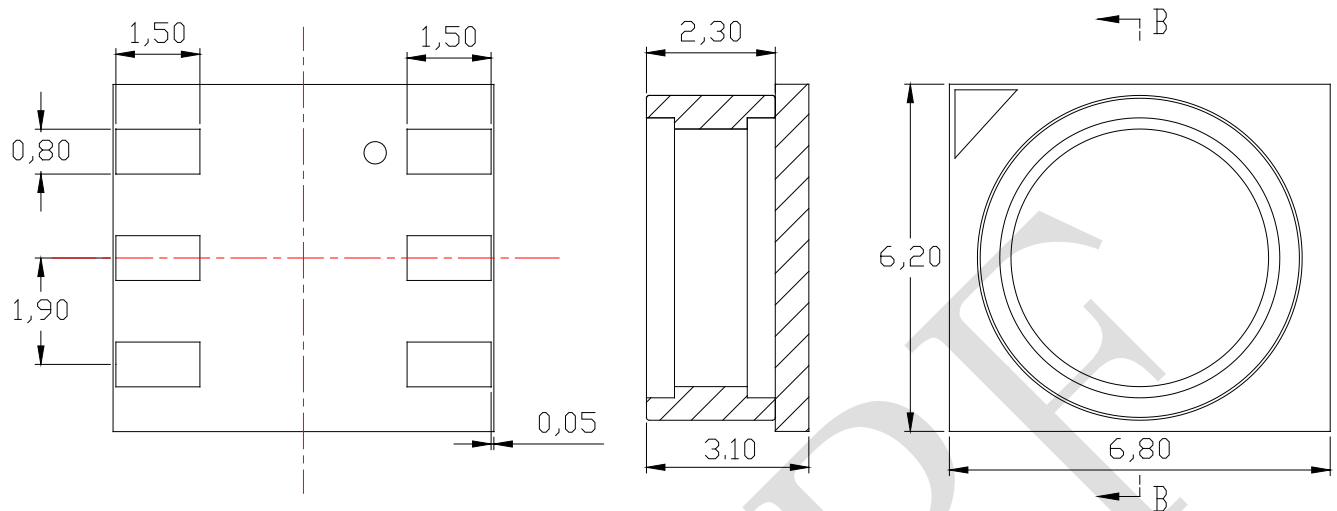
11. Soldering recommendation

Recommend Solder Reflow



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate(TsMAX to TP)	2°C/seconds max	2°C/seconds max
Preheat		
-Temperature Min.(TsMIN)	80°C	150°C
- Temperature Max.(TsMAX)	160°C	180°C
-Time (TsMIN to TsMAX)(Ts)	60~120 seconds	60~120 seconds
Time maintained above:		
-Temperature(TL)	183°C	217°C
-Time(tL)	20~40 seconds	30~90 seconds
Time 25°C to peak temperature	360 seconds max	480 seconds max
Peak temperature(TP)	220~230°C	230~245°C
Ramp-down rate(peak to 217°C)	2~4°C/seconds	2~4°C/seconds

12. Package information

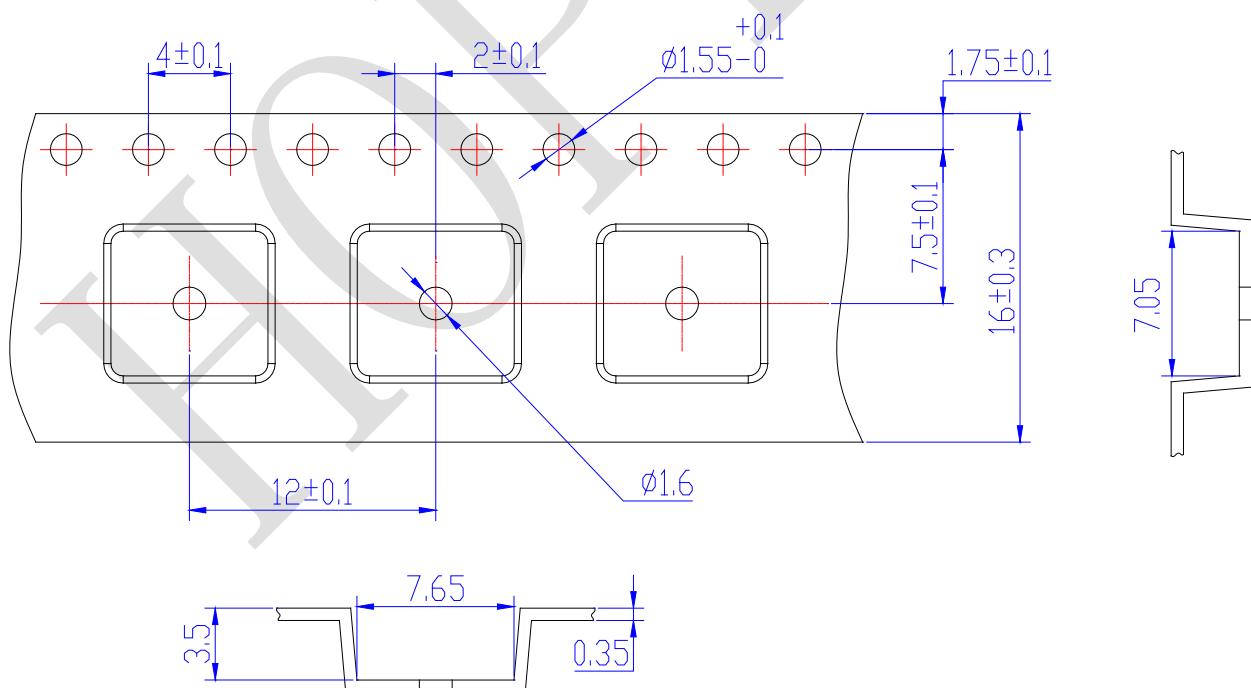


Notes:

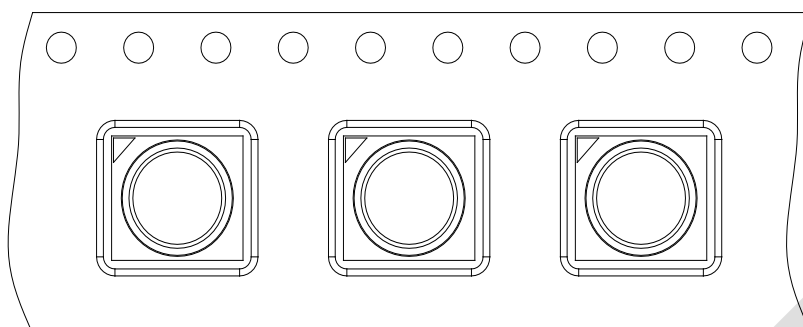
- (1) Mechanical Dimension (unit: mm)
- (2) General tolerance (0.15mm)

13. Tape and reel Specification

Carrier Tape Dimension (unit: mm)



Orientation within carrier tape



Quantity per reel: 1000pcs

14. Publication history

Version	Date	Description
V1.0	2021.4.27	New release
V1.1	2021.6.24	Update Package
V1.2	2021.10.23	Update Application Circuit Example

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