

## PERFORMANCE SPECIFICATIONS

## ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Conditions	Min	Max	Unit	Notes
Supply voltage	V <sub>DD</sub>	T <sub>a</sub> = 25 °C	-0.3	4	V	
Storage temperature	T <sub>S</sub>		-40	+85	°C	1
Overpressure	P	T <sub>a</sub> = 25 °C (ISO22810)		10	bar	2

## NOTES

- Storage in an environment of dry and non-corrosive gases.
- The MS5540C is qualified referring to the ISO 22810 standard and can withstand an absolute pressure of 10 bar in salt water or 100 m water respectively.

## ELECTRICAL CHARACTERISTICS

(T<sub>a</sub> = 25 °C, V<sub>DD</sub> = 3.0 V unless noted otherwise)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Operating pressure range	p		10		1100	mbar abs.
Supply voltage	V <sub>DD</sub>		2.2	3.0	3.6	V
Supply current, average (1) during conversion (2) standby (no conversion)	I <sub>avg</sub> I <sub>sc</sub> I <sub>ss</sub>	V <sub>DD</sub> = 3.0 V		4 1	0.1	μA mA μA
Current consumption into MCLK (3)		MCLK = 32.768 kHz			0.5	μA
Operating temperature range	T		-40		+85	°C
Conversion time	t <sub>conv</sub>	MCLK = 32.768 kHz			35	ms
External clock signal (4)	MCLK		30.000	32.768	35.000	kHz
Duty cycle of MCLK			40/60	50/50	60/40	%
Serial data clock	SCLK				500	kHz

## NOTES

- Under the assumption of one conversion every second. Conversion means either a pressure or a temperature measurement started by a command to the serial interface of MS5540C.
- During conversion the sensor will be switched on and off in order to reduce power consumption; the total on time within a conversion is about 2 ms.
- This value can be reduced by switching off MCLK while MS5540C is in standby mode.
- It is strongly recommended that a crystal oscillator be used because the device is sensitive to clock jitter. A square-wave form of the clock signal is a must.

## PERFORMANCE SPECIFICATIONS (CONTINUED)

## PRESSURE OUTPUT CHARACTERISTICS

With the calibration data stored in the interface IC of the MS5540C, the following characteristics can be achieved:  
( $V_{DD} = 3.0\text{ V}$  unless noted otherwise)

Parameter	Conditions	Min	Typ	Max	Unit	Notes
Resolution			0.1		mbar	1
Absolute Pressure Accuracy	$p = 750 \dots 1100\text{ mbar}$ $T_a = 25^\circ\text{C}$	-1.5		+1.5	mbar	2, 6
Relative Pressure Accuracy	$p = 750 \dots 1100\text{ mbar}$ $T_a = 25^\circ\text{C}$	-0.5		+0.5	mbar	3, 6
Relative Pressure Error over Temperature	$T = 0 \dots +50^\circ\text{C}$ $p = 300 \dots 1000\text{ mbar}$	-1		+1	mbar	4, 6
	$T = -40 \dots +85^\circ\text{C}$ $p = 300 \dots 1000\text{ mbar}$	-2		+5	mbar	4
Long-term Stability	12 months		-1		mbar	5
Maximum Error over Supply Voltage	$V_{DD} = 2.2 \dots 3.6\text{ V}$ $p = \text{const.}$	-1.6		1.6	mbar	

## NOTES

- 1) A stable pressure reading of the given resolution requires taking the average of 2 to 4 subsequent pressure values due to noise of the ADC.
- 2) Maximum error of pressure reading over the pressure range.
- 3) Maximum error of pressure reading over the pressure range after offset adjustment at one pressure point.
- 4) With the second-order temperature compensation as described in Section "FUNCTION". See next section for typical operating curves.
- 5) The long-term stability is measured with non-soldered devices.
- 6) Wet/dry cycle: sensor must be dried typically once a day.

## TEMPERATURE OUTPUT CHARACTERISTICS

This temperature information is not required for most applications, but it is necessary to allow for temperature compensation of the output.

( $V_{DD} = 3.0\text{ V}$  unless noted otherwise)

Parameter	Conditions	Min	Typ	Max	Unit	Notes
Resolution		0.005	0.01	0.015	$^\circ\text{C}$	
Accuracy	$T = 20\text{ }^\circ\text{C}$	-0.8		0.8	$^\circ\text{C}$	
	$T = -40 \dots + 85^\circ\text{C}$	-2		+2	$^\circ\text{C}$	1
Maximum Error over Supply Voltage	$V_{DD} = 2.2 \dots 3.6\text{ V}$	-0.2		+0.2	$^\circ\text{C}$	2

## NOTES

- 1) With the second-order temperature compensation as described in Section "FUNCTION". See next section for typical operating curves.
- 2) At  $T_a = 25\text{ }^\circ\text{C}$ .