

PERFORMANCE SPECIFICATIONS

ABSOLUTE MAXIMUM RATINGS

| Parameter | Symbol | Conditions | Min | Max | Unit | Notes |
|---------------------|-----------------|-----------------------------------|------|-----|------|-------|
| Supply voltage | V _{DD} | T _a = 25 °C | -0.3 | 4 | V | |
| Storage temperature | T _S | | -40 | +85 | °C | 1 |
| Overpressure | P | T _a = 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_a = 25 °C, V_{DD} = 3.0 V unless noted otherwise)

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|--|--|-------------------------|--------|--------|--------|----------------|
| Operating pressure range | p | | 10 | | 1100 | mbar abs. |
| Supply voltage | V _{DD} | | 2.2 | 3.0 | 3.6 | V |
| Supply current, average (1) during conversion (2) standby (no conversion) | I _{avg} I _{sc} I _{ss} | V _{DD} = 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 _{conv} | 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 $T_a = 25\text{ }^\circ\text{C}$.