

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		30	bar	2

NOTES

- Storage and operation in an environment of dry and non-corrosive gases.
- The MS5541C is qualified referring to the ISO 6425 standard and can withstand an absolute pressure of 30 bar in salt water.

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		0		14	bar
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 MS5541C.
- 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 MS5541C 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.

ANALOG DIGITAL CONVERTER (ADC)

(T = -40 °C .. 85 °C V_{DD} = 2.2 V .. 3.6 V)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Resolution				16		Bit
Linear Range			4'000		40'000	LSB
Conversion Time		MCLK = 32.768 kHz			35	ms
INL		Within linear range	-5		+5	LSB

PERFORMANCE SPECIFICATIONS (CONTINUED)

PRESSURE OUTPUT CHARACTERISTICS

With the calibration data stored in the interface IC of the MS5541C, the following characteristics can be achieved:
($V_{DD} = 3.0\text{ V}$ unless noted otherwise)

Parameter	Conditions	Min	Typ	Max	Unit	Notes
Resolution			1.2		mbar	1
Absolute Pressure Accuracy (Temperature range 0 .. +40 °C)	p = 0 .. 5 bar p = 0 .. 10 bar p = 0 .. 14 bar	-20 -40 -100		+20 +20 +20	mbar	2
Absolute Pressure Accuracy (Temperature range -40 .. +85 °C)	p = 0 .. 5 bar p = 0 .. 10 bar p = 0 .. 14 bar	-40 -60 -160		+100 +180 +200	mbar	3
Error over Temperature (p = const. relative to 20 °C)	Ta = -40 .. +85 °C	-10		+100	mbar	
Long-term Stability	6 months		20		mbar	4
Maximum Error over Supply Voltage	$V_{DD} = 2.2 \dots 3.6\text{ V}$ p = const.	-16		16	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) With the second-order temperature compensation as described in Section "FUNCTION". See next section for typical operating curves.
- 4) The long-term stability is measured with non-soldered devices.

TEMPERATURE OUTPUT CHARACTERISTICS

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

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

Parameter	Conditions	Min	Typ	Max	Unit	Notes
Resolution		0.005	0.01	0.015	°C	
Accuracy	T = 20 °C P = 0 .. 10bar	-0.8		0.8	°C	
	T = -40 .. + 85°C	-2		+6	°C	1
Maximum Error over Supply Voltage	$V_{DD} = 2.2 \dots 3.6\text{ V}$	-0.2		+0.2	°C	2

NOTES

- 1) With the second-order temperature compensation as described in Section "FUNCTION". See next section for typical operating curves.
- 2) At Ta = 25 °C.