Magnetometer

4 Functionality

4.1 Power modes

The LIS2MDL provides two different power modes: high-resolution and low-power modes.

The tables below summarize the RMS noise values and current consumption in different product configurations.

When the low-pass filter is enabled, the bandwidth is reduced while noise performance is improved without any increase in power consumption.

Table 10. RMS noise of operating modes

CFG_REG_B[LPF] or CFG_REG_B[OFF_CANC]	(CFG_REG_A[LP = 0]) high-resolution mode		(CFG_REG_A[LP = 1]) low-power mode	
	BW [Hz]	Noise RMS [mg]	BW [Hz]	Noise RMS [mg]
0 (disable)	ODR/2	4.5	ODR/2	9
1 (enable)	ODR/4	3	ODR/4	6

Table 11. Current consumption of operating modes

ODR (Hz)	Current consumption (µA) (CFG_REG_A [LP] = 0) high-resolution CFG_REG_B [OFF_CANC] = 0	Current consumption (µA) (CFG_REG_A [LP] = 1) low-power CFG_REG_B [OFF_CANC] = 0	Current consumption (µA) (CFG_REG_A [LP] = 0) high-resolution CFG_REG_B [OFF_CANC] = 1	Current consumption (µA) (CFG_REG_A [LP] = 1) low-power CFG_REG_B [OFF_CANC] = 1
10	100	25	120	50
20	200	50	235	100
50	475	125	575	235
100	950	250	1130	460

Accelerometer

POWER SUPPLY					
Operating Voltage Range (V_S)		2.0	2.5	3.6	V
Interface Voltage Range ($V_{DD I/O}$)		1.7	1.8	V_S	V
Supply Current	ODR ≥ 100 Hz		140		µA
	ODR < 10 Hz		30		µA
Standby Mode Leakage Current			0.1		µA
Turn-On and Wake-Up Time[7]	ODR = 3200 Hz		1.4		ms

Microcontroller

27.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings (†)

Ambient temperature under bias ..... -40°C to +125°C
Storage temperature ..... -65°C to +150°C
Voltage on any pin with respect to VSS (except VDD and $\overline{MCLR}$) ..... -0.3V to (VDD + 0.3V)
Voltage on VDD with respect to VSS ..... -0.3V to +7.5V
Voltage on $\overline{MCLR}$ with respect to VSS **(Note 2)** ..... 0V to +13.25V
Total power dissipation **(Note 1)** 1.0W
Maximum current out of VSS pin ..... 300 mA
Maximum current into VDD pin ..... 250 mA
Input clamp current, IIK (VI < 0 or VI > VDD) ..... ±20 mA
Output clamp current, IOK (VO < 0 or VO > VDD) ..... ±20 mA
Maximum output current sunk by any I/O pin ..... 25 mA
Maximum output current sourced by any I/O pin ..... 25 mA
Maximum current sunk by all ports ..... 200 mA
Maximum current sourced by all ports ..... 200 mA

Note 1: Power dissipation is calculated as follows:
Pdis = VDD x {IDD – ∑ IOH} + ∑ {(VDD – VOH) x IOH} + ∑(VOL x IOL)

2: Voltage spikes below VSS at the $\overline{MCLR}$/VPP pin, inducing currents greater than 80 mA, may cause latch-up. Thus, a series resistor of 50-100Ω should be used when applying a "low" level to the $\overline{MCLR}$/VPP/RE3 pin, rather than pulling this pin directly to VSS.

GPS Module

Electrical Specification

Absolute Maximums Ratings

Parameter	Min.	Typ.	Max.	Conditions	Unit
POWER Supply					
Main power supply(VCC)	4.5	5.0	6.5		V
Main power supply Current	45	50	55	GPS is not 3D Fixed.	mA
	33	34	38	GPS is 3D Fixed.	mA
RF					
Operating Frequency		1.575			Ghz

DC Electrical characteristics

Parameter	Symbol	Min.	Typ.	Max.	Conditions	Units
I/O Low Level Output Voltage	V_{OL}			0.4		V
I/O High Level Output Voltage	V_{OH}		3.3			V
I/O Low Level Input Voltage	V_{IL}	-0.4		0.45		V
I/O High Level Input Voltage	V_{IH}	1.26		3.6		V
High Level Output Current	I_{OH}		2			mA
Low Level Output Current	I_{OL}		2			mA