

3 ELECTRICAL CHARACTERISTICS

3.1 GYROSCOPE SPECIFICATIONS

Typical Operating Circuit of section 4.2, VDD = 1.8 V, VDDIO = 1.8 V, T_A=25°C, unless otherwise noted.

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS	NOTES
GYROSCOPE SENSITIVITY						
Full-Scale Range	GYRO_FS_SEL=0		±2000		°/s	2
	GYRO_FS_SEL =1		±1000		°/s	2
	GYRO_FS_SEL =2		±500		°/s	2
	GYRO_FS_SEL =3		±250		°/s	2
	GYRO_FS_SEL =4		±125		°/s	2
	GYRO_FS_SEL =5		±62.5		°/s	2
	GYRO_FS_SEL =6		±31.25		°/s	2
	GYRO_FS_SEL =7		±15.625		°/s	2
Gyroscope ADC Word Length	Output in two's complement format		16		bits	2, 5
Sensitivity Scale Factor	GYRO_FS_SEL=0		16.4		LSB/(°/s)	2
	GYRO_FS_SEL =1		32.8		LSB/(°/s)	2
	GYRO_FS_SEL =2		65.5		LSB/(°/s)	2
	GYRO_FS_SEL =3		131		LSB/(°/s)	2
	GYRO_FS_SEL =4		262		LSB/(°/s)	2
	GYRO_FS_SEL =5		524.3		LSB/(°/s)	2
	GYRO_FS_SEL =6		1048.6		LSB/(°/s)	2
	GYRO_FS_SEL =7		2097.2		LSB/(°/s)	2
Sensitivity Scale Factor Initial Tolerance	Component and Board-level, 25°C		±0.5		%	1
Sensitivity Scale Factor Variation Over Temperature	0°C to +70°C		±0.005		%/°C	3
Nonlinearity	Best fit straight line; 25°C		±0.1		%	3
Cross-Axis Sensitivity	Board-level		±1.25		%	3
ZERO-RATE OUTPUT (ZRO)						
Initial ZRO Tolerance	Board-level, 25°C		±0.5		°/s	3
ZRO Variation vs. Temperature	0°C to +70°C		±0.005		°/s/°C	3
OTHER PARAMETERS						
Rate Noise Spectral Density	@ 10 Hz		0.0028		°/s /√Hz	1
Total RMS Noise	Bandwidth = 100 Hz		0.028		°/s-rms	4
Gyroscope Mechanical Frequencies		25	27	29	KHz	1
Low Pass Filter Response	ODR < 1kHz	5		500	Hz	2
	ODR ≥ 1kHz	42		3979	Hz	2
Gyroscope Start-Up Time	Time from gyro enable to gyro drive ready		30		ms	3
Output Data Rate		12.5		32000	Hz	2

Table 1. Gyroscope Specifications

Notes:

1. Tested in production.
2. Guaranteed by design.
3. Derived from validation or characterization of parts, not tested in production.
4. Calculated from Rate Noise Spectral Density.
5. 20-bits data format supported in FIFO, see section 6.1.

3.2 ACCELEROMETER SPECIFICATIONS

Typical Operating Circuit of section 4.2, VDD = 1.8 V, VDDIO = 1.8 V, T_A=25°C, unless otherwise noted.

PARAMETER	CONDITIONS		MIN	TYP	MAX	UNITS	NOTES
ACCELEROMETER SENSITIVITY							
Full-Scale Range	ACCEL_FS_SEL =0			±16		g	2
	ACCEL_FS_SEL =1			±8		g	2
	ACCEL_FS_SEL =2			±4		g	2
	ACCEL_FS_SEL =3			±2		g	2
ADC Word Length	Output in two's complement format			16		bits	2, 5
Sensitivity Scale Factor	ACCEL_FS_SEL =0			2,048		LSB/g	2
	ACCEL_FS_SEL =1			4,096		LSB/g	2
	ACCEL_FS_SEL =2			8,192		LSB/g	2
	ACCEL_FS_SEL =3			16,384		LSB/g	2
Sensitivity Scale Factor Initial Tolerance	Component and Board-level, 25°C			±0.5		%	1
Sensitivity Change vs. Temperature	-40°C to +85°C			±0.005		%/°C	3
Nonlinearity	Best Fit Straight Line, ±2g			±0.1		%	3
Cross-Axis Sensitivity	Board-level			±1		%	3
ZERO-G OUTPUT							
Initial Tolerance	Board-level, all axes			±20		mg	3
Zero-G Level Change vs. Temperature	-40°C to +85°C			±0.15		mg/°C	3
OTHER PARAMETERS							
Power Spectral Density	@ 10 Hz	X and Y-axis		65		μg/√Hz	1
		Z-axis		70		μg/√Hz	1
RMS Noise	Bandwidth = 100 Hz	X and Y-axis		0.65		mg-rms	4
		Z-axis		0.70		mg-rms	4
Low-Pass Filter Response	ODR < 1kHz		5		500	Hz	2
	ODR ≥ 1kHz		42		3979	Hz	2
Accelerometer Startup Time	From sleep mode to valid data			10		ms	3
Output Data Rate			1.5625		32000	Hz	2

Table 2. Accelerometer Specifications

Notes:

1. Tested in production.
2. Guaranteed by design.
3. Derived from validation or characterization of parts, not tested in production.
4. Calculated from Power Spectral Density.
5. 20-bits data format supported in FIFO, see section 6.1.