MA1000A

High Performance Single Axis Closed Loop MEMS Capacitive Accelerometer

Main Features

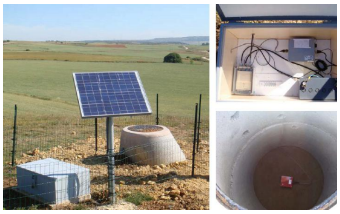
- Range:±2g~±30g, Excellent Bias Stability
- Output: Differential Output / Single-Ended Output
- Very Low Noise: 0.9μg/√Hz for ±2g Range (typ)
- Input Power Supply: 4.75~5.25V
- Embedded Self-Test Function and Temperature Sensor
- Embedded Precision Reference Voltage
- Shock Survivability: 6000g, Vibration Resistance
- Wide Operating Temperature Range: -40~+125°C

MA1000A MEMS accelerometer is the best high performance capacitive accelerometer adopting closed loop structure, it uses high performance ASIC and MEMS sensor to build closed-loop system, and it enjoys exercellent performance with low noise, dynamic range, non linearity, repeatability, temperature drift and shock resisitance. MA1000A guarantees confident and accurate vibration measurement in rugged environments.

MA1000A accelerometer also has embedded self test function, temperature sensor for compensation and built-in high precision reference voltage, which ensures MA1000A to be the top level of accelerometer around the world. Using tiny sealed LCC20 encapsulation (9*9mm), MA1000A has been widely used in Seismic Monitor, Inertial Navigation, Industrial Contorl, Platform Stabilization, Avionics, UAV systems, and Motion Control, etc. Each accelerometer is fully tested and qualified, and its super reliability and excellent performance gains customers' high praise.

- ✓ **12-Step Quality Control, Super Reliability, More Functions**
- ✓ **Adopting Original Big Brand Component, High-class Material, Competitive Price**
- ✓ **Real Actual Precise after Calibration, Perfect Performance**
- ✓ **Successful Applications in Tens of Fields, More than 1000 Customers are Using**

Typical Applications



Seismic Monitor

Railway Technology

Monitoring & Control

Structure Health Monitor

Super Reliability & Performance

www.SkyMEMS.com Mobile: +86 133 7203 8516
Skype: skymems

Copy Right Reserved © 2019 Nanjing Sky MEMS Technology co., ltd.

Focus on MEMS Measurement & Control Technologies, Products include:

MEMS Acc | MEMS Gyro | IMU | Vertical Gyro | AHRS
INS | GNSS/INS | E-compass | Inclinometer | FOG

MA1000A

High Performance Single Axis Closed Loop MEMS Capacitive Accelerometer

General Specifications

MA1000A Technical Specs						
Parameters (typical value)	MA1002A	MA1003A	MA1005A	MA1010A	MA1030A	Unit
Range	±2	±3	±5	±10	±30	g
Nonlinearity (Full Range Typical Value)	0.1	0.1	0.1	0.1	0.1	%
Frequency Response (±5% bandwidth)	>100	>100	60	60	60	Hz
Frequency Response (±3dB bandwidth)	>1000	>1000	200	200	200	Hz
Noise Spectral Density	0.9	1.0	1.5	3.2	2.5	μg/√Hz
Zero Bias Temperature Coefficient (Maximum)	0.2	0.2	0.2	0.2	0.2	mg/℃
Zero Bias Stability	0.03	0.03	0.03	0.03	0.03	mg
Scale Factor	1800	1200	720	360	120	mV/g
Scale Factor Temperature Coefficient	50	50	50	50	50	ppm/℃
Scale Factor Reliability	50	50	50	50	50	ppm

Copy Right Reserved © 2019 Nanjing Sky MEMS Technology co., ltd.
Focus on MEMS Measurement & Control Technologies, Products include:
MEMS Acc MEMS Gyro IMU Vertical Gyro AHRS
INS GNSS/INS E-compass Inclinometer FOG

MA1000A

High Performance Single Axis Closed Loop MEMS Capacitive Accelerometer

MA1002A Technical Specifications

Technical Specs (Test condition: Vcc=5V, 25°C, Differential Output)					
Parameter	**Comments**	**Min**	**Typ.**	**Max**	**Unit**
Accelerometer					
Range		-	±2	-	g
Non linearity	IEEE Norm , % of full scale		0.1	0.3	%
Frequency Response	±5% bandwidth	100	-	-	Hz
	±3dB bandwidth	1000	-	-	Hz
Resonant Frequency		-	3.0	-	kHz
Resolution	1Hz		7	-	μg
Noise Spectral Density	In band [0.1Hz~100Hz]	-	10.1	-	μgrms
	@0.1Hz	-	3.0	-	μg/√Hz
	@1Hz	-	1.7	-	
	@10Hz	-	1.0	-	
	@100Hz	-	0.9	-	
Bias					
Zero Calibration		-8	-	+8	mg
Temperature Coefficient		-0.2	-	0.2	mg/°C
Stability	1 hour, 1σ	-	0.03	0.08	mg
Repeatability		-	0.15	0.40	mg
Scale Factor					
Scale Factor		1782	1800	1818	mV/g
Temperature Coefficient		-	50	80	ppm/°C
Stability	1σ#1	-	50	120	ppm
Repeatability		-	50	120	ppm
Axis Misalignment					
Input Axis Misalignment (Kp,Ko)		-	-	10	mrad
Self Test					
Frequency	Square wave output	-	19	-	Hz
Duty Cycle		-	50	-	%
Amplitude	Peak to peak	-	0.28	-	g
STEN Input Threshold Voltage	High level is valid	0.8	-	-	Vcc

#1 The test method of scale factor stability: after power on the chip for 1 minute, then start to test the scale factor, and then test the scale factor every half hour, and test 7 times, and calculate the standard deviation for these 7 scale factors.

Copy Right Reserved © 2019 Nanjing Sky MEMS Technology co., ltd.
Focus on MEMS Measurement & Control Technologies, Products include:
MEMS Acc MEMS Gyro IMU Vertical Gyro AHRS
INS GNSS/INS E-compass Inclinometer FOG

MA1000A

High Performance Single Axis Closed Loop MEMS Capacitive Accelerometer

MA1002A Technical Specifications

Technical Specs (Continued)					
Parameter	**Comments**	**Min**	**Typ.**	**Max**	**Unit**
Temperature Sensor					
Output Voltage	@25°C	-	2.47	-	V
Sensitivity		-	8.3	-	mV/°C
Output Current Load		-	-	20	uA
Output Capacitive Load		-	-	30	pF
Reset					
RSTN Input Threshold Voltage	Low level valid	-	-	0.2	Vcc
Power Supply (Vcc)					
Input Voltage		4.75	5	5.25	V
Running Current Consumption		-	5.4	-	mA
Startup Time	Turn on or RSTN pull-up	-	10	-	ms
Accelerometer Output					
Output Voltage	Full range differential output	-	±3.6	-	V
Resistance Load		10	-	-	kΩ
Capacitive Load		-	-	30	pF

Copy Right Reserved © 2019 Nanjing Sky MEMS Technology co., ltd.
Focus on MEMS Measurement & Control Technologies, Products include:
MEMS Acc MEMS Gyro IMU Vertical Gyro AHRS
INS GNSS/INS E-compass Inclinometer FOG

MA1000A

High Performance Single Axis Closed Loop MEMS Capacitive Accelerometer

MA1003A Technical Specifications

Technical Specs (Test condition: Vcc=5V, 25°C, Differential Output)					
Parameter	**Comments**	**Min**	**Typ.**	**Max**	**Unit**
Accelerometer					
Range		-	±3	-	g
Non linearity	IEEE Norm , % of full scale		0.1	0.3	%
Frequency Response	±5% bandwidth	100	-	-	Hz
	±3dB bandwidth	1000	-	-	Hz
Resonant Frequency		-	3.0	-	kHz
Resolution	1Hz	-	7	-	μg
Noise Spectral Density	In band [0.1Hz~100Hz]	-	11.4	-	μgrms
	@0.1Hz	-	2.8	-	μg/√Hz
	@1Hz	-	1.5	-	
	@10Hz	-	1.2	-	
	@100Hz	-	1.0	-	
Bias					
Zero Calibration		-12	-	+12	mg
Temperature Coefficient		-0.2	-	0.2	mg/°C
Stability	1 hour, 1σ	-	0.03	0.08	mg
Repeatability		-	0.15	0.40	mg
Scale Factor					
Scale Factor		1188	1200	1212	mV/g
Temperature Coefficient		-	50	80	ppm/°C
Stability	1σ	-	50	120	ppm
Repeatability		-	50	120	ppm
Axis Misalignment					
Input Axis Misalignment (Kp,Ko)		-	-	10	mrad
Self Test					
Frequency	Square wave output	-	19	-	Hz
Duty Cycle		-	50	-	%
Amplitude	Peak to peak	-	0.55	-	g
STEN Input Threshold Voltage	High level is valid	0.8	-	-	Vcc

Copy Right Reserved © 2019 Nanjing Sky MEMS Technology co., ltd.
Focus on MEMS Measurement & Control Technologies, Products include:
MEMS Acc MEMS Gyro IMU Vertical Gyro AHRS
INS GNSS/INS E-compass Inclinometer FOG

MA1000A

High Performance Single Axis Closed Loop MEMS Capacitive Accelerometer

MA1003A Technical Specifications

Technical Specs (Continued)					
Parameter	**Comments**	**Min**	**Typ.**	**Max**	**Unit**
Temperature Sensor					
Output Voltage	@25°C	-	2.47	-	V
Sensitivity		-	8.3	-	mV/°C
Output Current Load		-	-	20	uA
Output Capacitive Load		-	-	30	pF
Reset					
RSTN Input Threshold Voltage	Low level valid	-	-	0.2	Vcc
Power Supply (Vcc)					
Input Voltage		4.75	5	5.25	V
Running Current Consumption		-	5.4	-	mA
Startup Time	Turn on or RSTN pull-up	-	10	-	ms
Accelerometer Output					
Output Voltage	Full range differential output	-	±3.6	-	V
Resistance Load		10	-	-	kΩ
Capacitive Load		-	-	30	pF

Copy Right Reserved © 2019 Nanjing Sky MEMS Technology co., ltd.
Focus on MEMS Measurement & Control Technologies, Products include:
MEMS Acc MEMS Gyro IMU Vertical Gyro AHRS
INS GNSS/INS E-compass Inclinometer FOG

MA1000A

High Performance Single Axis Closed Loop MEMS Capacitive Accelerometer

MA1005A Technical Specifications

Technical Specs (Test condition: Vcc=5V, 25°C, Differential Output)					
Parameter	**Comments**	**Min**	**Typ.**	**Max**	**Unit**
Accelerometer					
Range		-	±5	-	g
Non linearity	IEEE Norm , % of full scale		0.1	0.3	%
Frequency Response	±5% bandwidth	-	60	-	Hz
	±3dB bandwidth	-	200	-	Hz
Resonant Frequency		-	6.0	-	kHz
Resolution	1Hz	-	10	-	μg
Noise Spectral Density	In band [0.1Hz~100Hz]	-	17.2	-	μgrms
	@0.1Hz	-	3.8	-	μg/√Hz
	@1Hz	-	2.5	-	
	@10Hz	-	1.8	-	
	@100Hz	-	1.5	-	
Bias					
Zero Calibration		-20	-	+20	mg
Temperature Coefficient		-0.2	-	0.2	mg/°C
Stability	1 hour, 1σ	-	0.03	0.08	mg
Repeatability		-	0.15	0.40	mg
Scale Factor					
Scale Factor		712.8	720.0	727.2	mV/g
Temperature Coefficient		-	50	80	ppm/°C
Stability	1σ	-	50	120	ppm
Repeatability		-	50	120	ppm
Axis Misalignment					
Input Axis Misalignment (Kp,Ko)		-	-	10	mrad
Self Test					
Frequency	Square wave output	-	19	-	Hz
Duty Cycle		-	50	-	%
Amplitude	Peak to peak	-	0.55	-	g
STEN Input Threshold Voltage	High level is valid	0.8	-	-	Vcc

Copy Right Reserved © 2019 Nanjing Sky MEMS Technology co., ltd.
Focus on MEMS Measurement & Control Technologies, Products include:
MEMS Acc MEMS Gyro IMU Vertical Gyro AHRS
INS GNSS/INS E-compass Inclinometer FOG

MA1000A

High Performance Single Axis Closed Loop MEMS Capacitive Accelerometer

MA1005A Technical Specifications

Technical Specs (Continued)					
Parameter	**Comments**	**Min**	**Typ.**	**Max**	**Unit**
Temperature Sensor					
Output Voltage	@25°C	-	2.47	-	V
Sensitivity		-	8.3	-	mV/°C
Output Current Load		-	-	20	uA
Output Capacitive Load		-	-	30	pF
Reset					
RSTN Input Threshold Voltage	Low level valid	-	-	0.2	Vcc
Power Supply (Vcc)					
Input Voltage		4.75	5	5.25	V
Running Current Consumption		-	5.4	-	mA
Startup Time	Turn on or RSTN pull-up	-	10	-	ms
Accelerometer Output					
Output Voltage	Full range differential output	-	±3.6	-	V
Resistance Load		10	-	-	kΩ
Capacitive Load		-	-	30	pF

Copy Right Reserved © 2019 Nanjing Sky MEMS Technology co., ltd.
Focus on MEMS Measurement & Control Technologies, Products include:
MEMS Acc MEMS Gyro IMU Vertical Gyro AHRS
INS GNSS/INS E-compass Inclinometer FOG

MA1000A

High Performance Single Axis Closed Loop MEMS Capacitive Accelerometer

MA1010A Technical Specifications

Technical Specs (Test condition: Vcc=5V, 25°C, Differential Output)					
Parameter	**Comments**	**Min**	**Typ.**	**Max**	**Unit**
Accelerometer					
Range		-	±10	-	g
Non linearity	IEEE Norm , % of full scale		0.1	0.3	%
Frequency Response	±5% bandwidth	-	60	-	Hz
	±3dB bandwidth	-	200	-	Hz
Resonant Frequency		-	6.0	-	kHz
Resolution	1Hz	-	20	-	μg
Noise Spectral Density	In band [0.1Hz~100Hz]	-	37.4	-	μgrms
	@0.1Hz	-	8.6	-	μg/√Hz
	@1Hz	-	6.6	-	
	@10Hz	-	3.8	-	
	@100Hz	-	3.2	-	
Bias					
Zero Calibration		-40	-	+40	mg
Temperature Coefficient		-0.2	-	0.2	mg/°C
Stability	1 hour, 1σ	-	0.03	0.08	mg
Repeatability		-	0.15	0.40	mg
Scale Factor					
Scale Factor		356.4	360.0	363.6	mV/g
Temperature Coefficient		-	50	80	ppm/°C
Stability	1σ	-	50	120	ppm
Repeatability		-	50	120	ppm
Axis Misalignment					
Input Axis Misalignment (Kp,Ko)		-	-	10	mrad
Self Test					
Frequency	Square wave output	-	19	-	Hz
Duty Cycle		-	50	-	%
Amplitude	Peak to peak	-	0.55	-	g
STEN Input Threshold Voltage	High level is valid	0.8	-	-	Vcc

Copy Right Reserved © 2019 Nanjing Sky MEMS Technology co., ltd.
Focus on MEMS Measurement & Control Technologies, Products include:
MEMS Acc MEMS Gyro IMU Vertical Gyro AHRS
INS GNSS/INS E-compass Inclinometer FOG

MA1000A

High Performance Single Axis Closed Loop MEMS Capacitive Accelerometer

MA1010A Technical Specifications

Technical Specs (Continued)					
Parameter	**Comments**	**Min**	**Typ.**	**Max**	**Unit**
Temperature Sensor					
Output Voltage	@25°C	-	2.47	-	V
Sensitivity		-	8.3	-	mV/°C
Output Current Load		-	-	20	uA
Output Capacitive Load		-	-	30	pF
Reset					
RSTN Input Threshold Voltage	Low level valid	-	-	0.2	Vcc
Power Supply (Vcc)					
Input Voltage		4.75	5	5.25	V
Running Current Consumption		-	5.4	-	mA
Startup Time	Turn on or RSTN pull-up	-	10	-	ms
Accelerometer Output					
Output Voltage	Full range differential output	-	±3.6	-	V
Resistance Load		10	-	-	kΩ
Capacitive Load		-	-	30	pF

Copy Right Reserved © 2019 Nanjing Sky MEMS Technology co., ltd.
Focus on MEMS Measurement & Control Technologies, Products include:
MEMS Acc MEMS Gyro IMU Vertical Gyro AHRS
INS GNSS/INS E-compass Inclinometer FOG

MA1000A

High Performance Single Axis Closed Loop MEMS Capacitive Accelerometer

MA1030A Technical Specifications

Technical Specs (Test condition: Vcc=5V, 25°C, Differential Output)					
Parameter	**Comments**	**Min**	**Typ.**	**Max**	**Unit**
Accelerometer					
Range		-	±30	-	g
Non linearity	IEEE Norm , % of full scale		0.1	0.3	%
Frequency Response	±5% bandwidth	-	60	-	Hz
	±3dB bandwidth	-	200	-	Hz
Resonant Frequency		-	6.0	-	kHz
Resolution	1Hz	-	30	-	μg
Noise Spectral Density	In band [0.1Hz~100Hz]	-	43.8	-	μgrms
	@0.1Hz	-	18.9	-	μg/√Hz
	@1Hz	-	10.6	-	
	@10Hz	-	3.7	-	
	@100Hz	-	2.3	-	
Bias					
Zero Calibration		-60	-	+60	mg
Temperature Coefficient		-0.2	-	0.2	mg/°C
Stability	1 hour, 1σ	-	0.03	0.08	mg
Repeatability		-	0.15	0.40	mg
Scale Factor					
Scale Factor		118.8	120.0	121.2	mV/g
Temperature Coefficient		-	50	80	ppm/°C
Stability	1σ	-	50	120	ppm
Repeatability		-	50	120	ppm
Axis Misalignment					
Input Axis Misalignment (Kp,Ko)		-	-	10	mrad
Self Test					
Frequency	Square wave output	-	19	-	Hz
Duty Cycle		-	50	-	%
Amplitude	Peak to peak	-	0.55	-	g
STEN Input Threshold Voltage	High level is valid	0.8	-	-	Vcc

Copy Right Reserved © 2019 Nanjing Sky MEMS Technology co., ltd.
Focus on MEMS Measurement & Control Technologies, Products include:
MEMS Acc MEMS Gyro IMU Vertical Gyro AHRS
INS GNSS/INS E-compass Inclinometer FOG

MA1000A

High Performance Single Axis Closed Loop MEMS Capacitive Accelerometer

MA1030A Technical Specifications

Technical Specs (Continued)					
Parameter	**Comments**	**Min**	**Typ.**	**Max**	**Unit**
Temperature Sensor					
Output Voltage	@25°C	-	2.47	-	V
Sensitivity		-	8.3	-	mV/°C
Output Current Load		-	-	20	uA
Output Capacitive Load		-	-	30	pF
Reset					
RSTN Input Threshold Voltage	Low level valid	-	-	0.2	Vcc
Power Supply (Vcc)					
Input Voltage		4.75	5	5.25	V
Running Current Consumption		-	5.4	-	mA
Startup Time	Turn on or RSTN pull-up	-	10	-	ms
Accelerometer Output					
Output Voltage	Full range differential output	-	±3.6	-	V
Resistance Load		10	-	-	kΩ
Capacitive Load		-	-	30	pF

Copy Right Reserved © 2019 Nanjing Sky MEMS Technology co., ltd.
Focus on MEMS Measurement & Control Technologies, Products include:
MEMS Acc MEMS Gyro IMU Vertical Gyro AHRS
INS GNSS/INS E-compass Inclinometer FOG

MA1000A

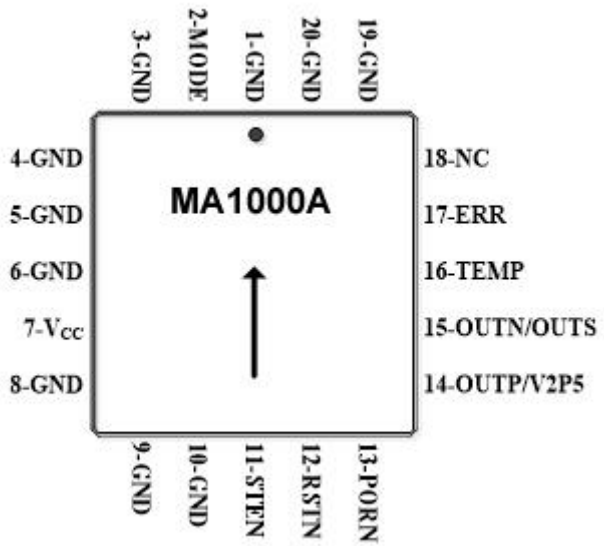
High Performance Single Axis Closed Loop MEMS Capacitive Accelerometer

Pins Definition

Pins Definition of MA1000A

Pins No.	Pins Name	Definition	Description
1, 3, 4, 5, 6, 8, 9, 10, 19, 20	GND	connect to ground	power ground
2	MODE	digital input	select output mode (low level is differential output mode, high level is single-ended output mode, default is inner drop down mode)
7	Vcc	power	5V power input
11	STEN	digital input	self test input, default inner drop down, seft test is valid when it is high level
12	RSTN	digital input	external reset input, default inner pull up, low level reset is valid
13	PORN	digital output	power on reset output, the output is high when the power voltage is stable
14	OUTP/V2P5	analog output	differential output positive/2.5V reference voltage output
15	OUTN/OUTS	analog output	differential output negative/Single-Ended output
16	TEMP	analog output	temperature sensor output
17	ERR	digital output	self test output or system fault output
18	NC	-	no connection

Pins Figure



Pins Output of MA1000A

Copy Right Reserved © 2019 Nanjing Sky MEMS Technology co., ltd.
Focus on MEMS Measurement & Control Technologies, Products include:
MEMS Acc MEMS Gyro IMU Vertical Gyro AHRS
INS GNSS/INS E-compass Inclinometer FOG

MA1000A

High Performance Single Axis Closed Loop MEMS Capacitive Accelerometer

Absolute Max. Ratings

Absolute Maximum Ratings			
Parameter	**Minimum**	**Maximum**	**Description**
Power Supply	-0.3V	5.8V	
Pins' voltage	-0.3V	Vcc+0.3V	
Working Temperature	-40°C	+125°C	
Storage Temperature	-55°C	+150°C	
Vibration Resistance	-	6.06g	MA1002A/MA1003A, random, with power on [20, 2000Hz], X, Y, Z axis, each axis 15minutes
	-	20g	MA1005A/MA1010A/MA1030A,random, with power on [20, 2000Hz], X, Y, Z axis, each axis 15minutes
Shock Resistance	-	6000g	3 times/axis, 0.15ms, half sine wave, ±X, ±Y, ±Z axis
	-	1500g	3 times/axis, 0.5ms, half sine wave, ±X, ±Y, ±Z axis
ESD Level	-2kV	2kV	HBM mode

Remarks: the accelerometer that works long time in absolute maximum ratings may influence the reliability.

Handling Precautions

MA1002A accelerometer is encapsulated in a hermetic ceramic housing to protect the sensor from the ambient environment. However, poor handling of the product can induce damage to the hermetic seal (Glass frit) or to the ceramic package made of brittle material (alumina). It can also induce internal damage to the MEMS accelerometer that may not be visible and cause electrical failure or reliability issues. Handle the component with caution: shocks, such as dropping the accelerometer on hard surface, may damage the product.

The component is susceptible to damage due to electrostatic discharge (ESD). Therefore, suitable precautions shall be employed during all phases of manufacturing, testing, packaging, shipment and handling.

Accelerometer will be supplied in antistatic bag with ESD warning label and they should be left in this packaging until use. The following guidelines are recommended:

- Always manipulate the devices in an ESD-controlled environment
- Always store the devices in a shielded environment that protects against ESD damage (at minimum
- an ESD-safe tray and an antistatic bag)
- Always wear a wrist strap when handling the devices and use ESD-safe gloves

ESD caution 	**This product can be damaged by electrostatic discharge (ESD). Handle with appropriate precautions.**

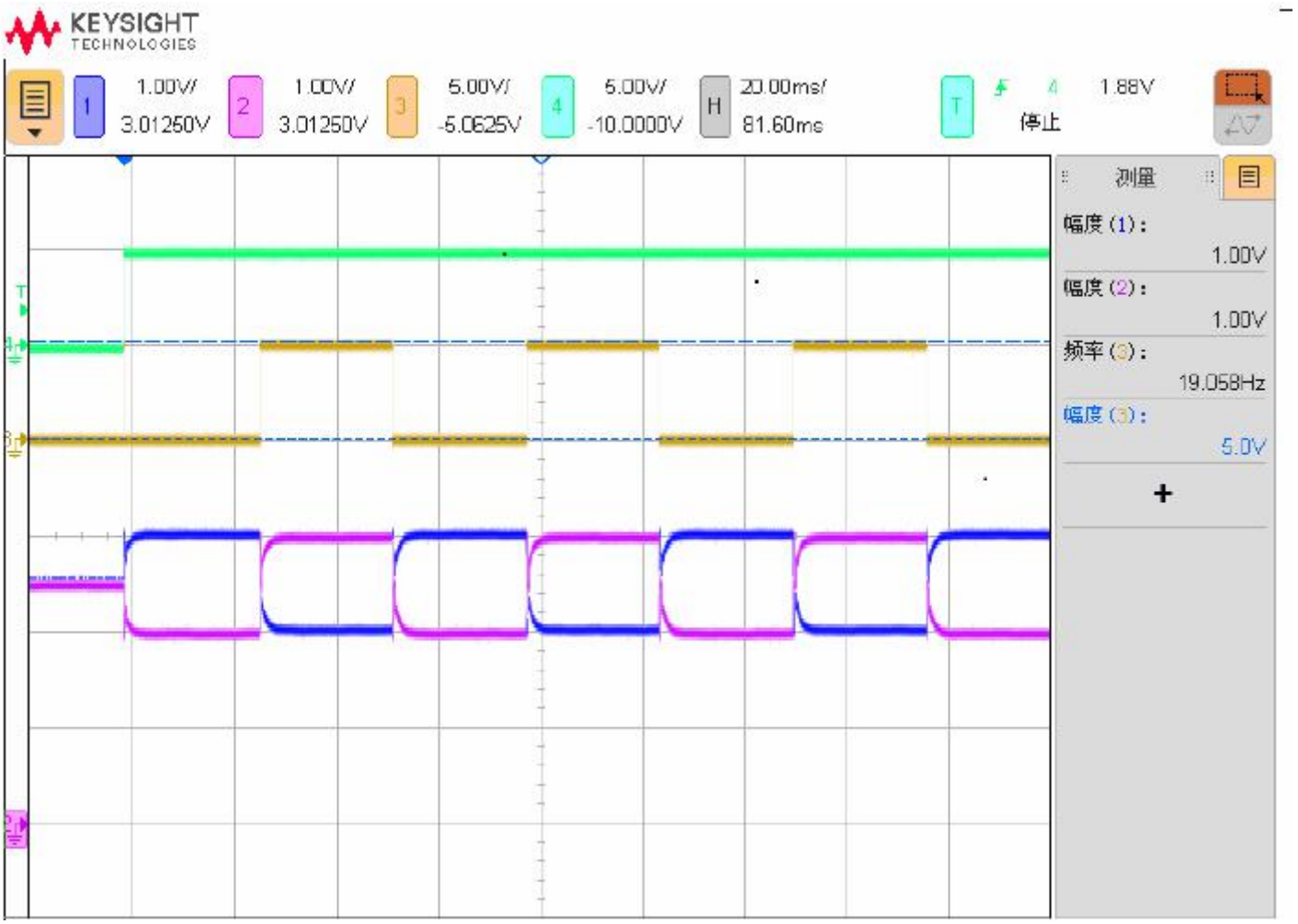
Copy Right Reserved © 2019 Nanjing Sky MEMS Technology co., ltd.
Focus on MEMS Measurement & Control Technologies, Products include:
MEMS Acc MEMS Gyro IMU Vertical Gyro AHRS
INS GNSS/INS E-compass Inclinometer FOG

MA1000A

High Performance Single Axis Closed Loop MEMS Capacitive Accelerometer

Self-test Function

MA1000A accelerometer has self test function. During self test, pull up STEN (pin 11) voltage into 5V. In self test mode, if the accelerometer works normally, self test output pin ERR and differential output pin OUTP/OUTN will output around 19Hz periodic square wave signal, see as following picture. In other mode, self test output pin ERR will be low level.



Channel 1: OUTP, Channel 2: OUTN, Channel 3: ERR, Channel 4: STEN

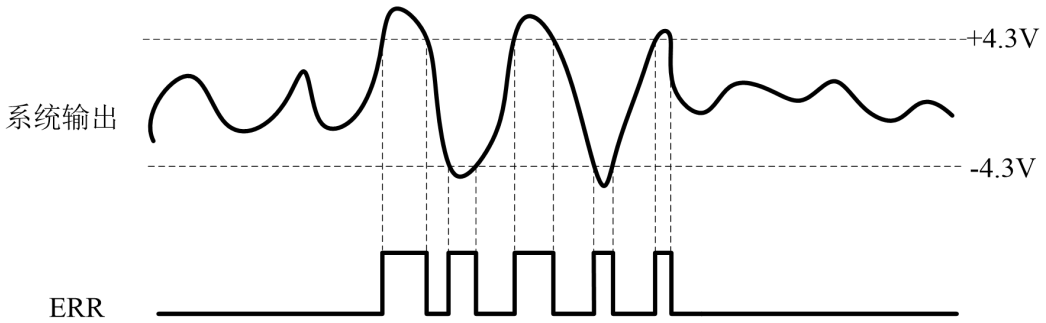
Copy Right Reserved © 2019 Nanjing Sky MEMS Technology co., ltd.
Focus on MEMS Measurement & Control Technologies, Products include:
MEMS Acc MEMS Gyro IMU Vertical Gyro AHRS
INS GNSS/INS E-compass Inclinometer FOG

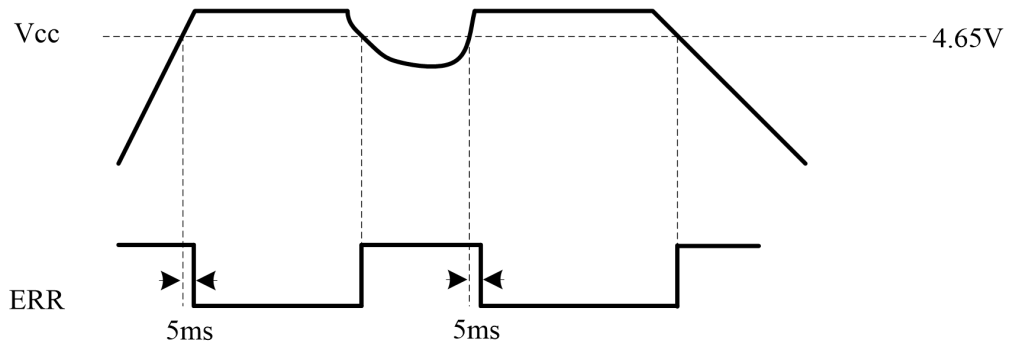
MA1000A

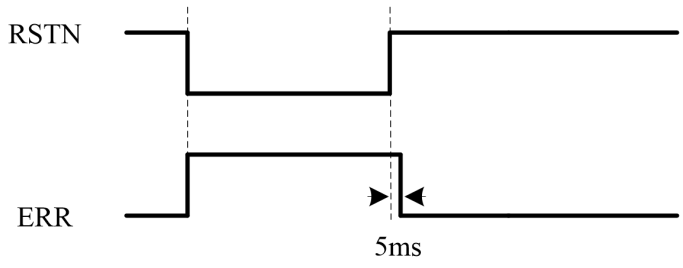
High Performance Single Axis Closed Loop MEMS Capacitive Accelerometer

Fault Report Function

MA1000A accelerometer has fault report function. If there is overload during working, and the power supply is lower than 4.65V or the accelerometer is under resetting, the output of ERR pin will pull up, which means that the system has fault. the following picture is the system fault report function graph.







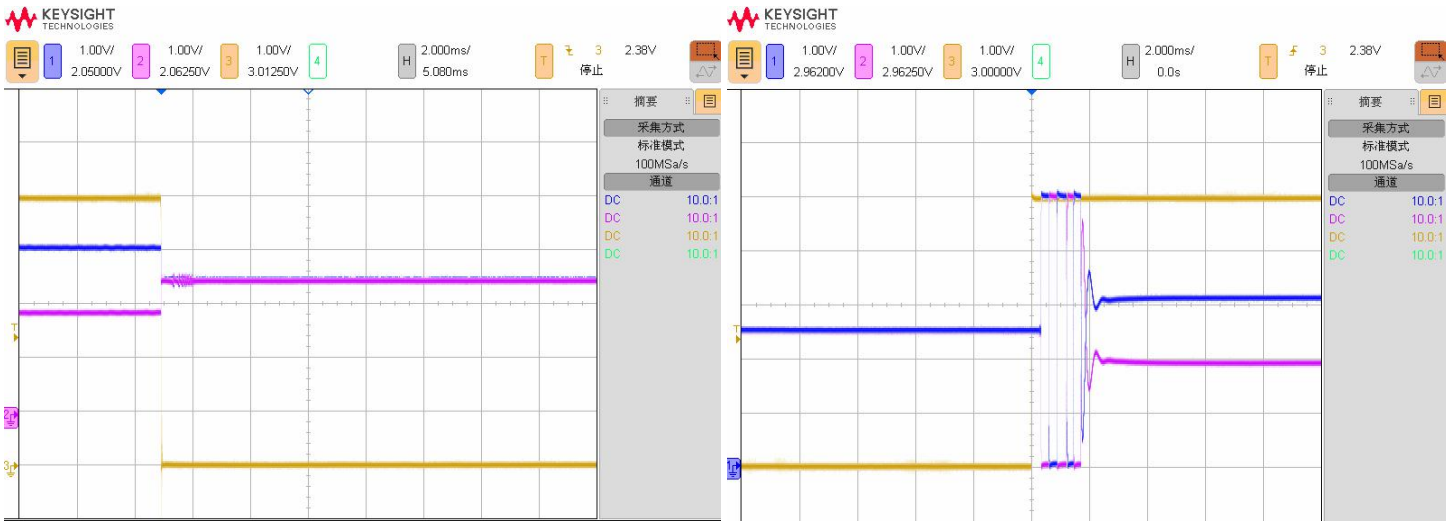
Copy Right Reserved © 2019 Nanjing Sky MEMS Technology co., ltd.
Focus on MEMS Measurement & Control Technologies, Products include:
MEMS Acc MEMS Gyro IMU Vertical Gyro AHRS
INS GNSS/INS E-compass Inclinometer FOG

MA1000A

High Performance Single Axis Closed Loop MEMS Capacitive Accelerometer

Reset Function

MA1000A accelerometer has reset function. During reset, pull down RSTN (pin 12). In reset mode, the accelerometer output (OUTP, OUTN): differential mode is 0, and common mode is 2.5V. After cancelling reset, the accelerometer output will enter stable working status after 4ms. the following picture is the output wave graph under reset mode (the accelerometer in the picture is in 1g status).



Channel 1: OUTP, Channel 2: OUTN, Channel 3: RSTN

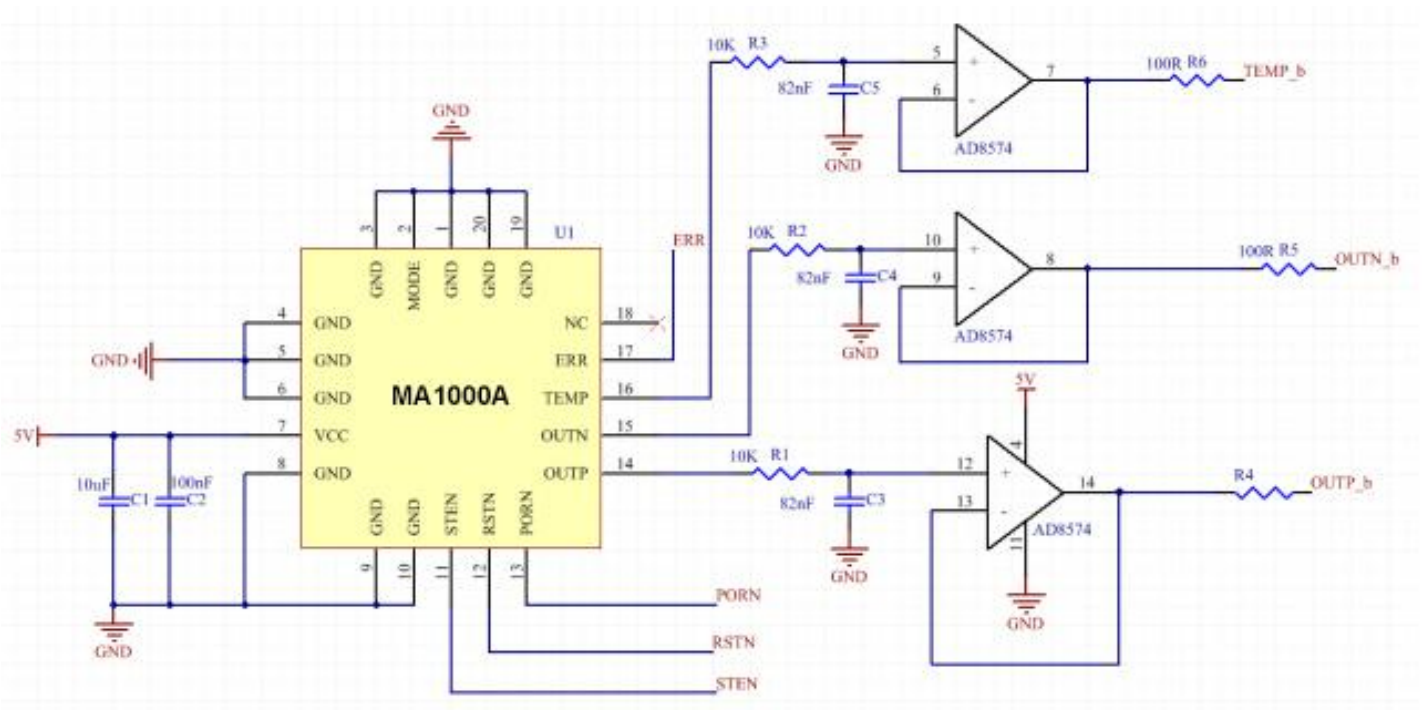
Copy Right Reserved © 2019 Nanjing Sky MEMS Technology co., ltd.
Focus on MEMS Measurement & Control Technologies, Products include:
MEMS Acc MEMS Gyro IMU Vertical Gyro AHRS
INS GNSS/INS E-compass Inclinometer FOG

MA1000A

High Performance Single Axis Closed Loop MEMS Capacitive Accelerometer

Recommended Circuit

In order to obtain the best MA1000A accelerometer, please use MA1000A accelerometer according to the following application circuit.



Copy Right Reserved © 2019 Nanjing Sky MEMS Technology co., ltd.
Focus on MEMS Measurement & Control Technologies, Products include:
MEMS Acc MEMS Gyro IMU Vertical Gyro AHRS
INS GNSS/INS E-compass Inclinometer FOG

MA1000A

High Performance Single Axis Closed Loop MEMS Capacitive Accelerometer

Soldering Method

MA1000A accelerometer is high precise MEMS accelerometer, in order to keep MA1000A excellent working performance and reliability, please pay attention during soldering: put the component in stable, don't vibrate it, and assure every pin to be soldered well, and make the component parallelled with the application circuit, and make the whole accelerometer bear averaged force.

MA1000A is suitable for Sn/Pb and Pb-Free soldering and ROHS compliant. the melting point can't be higher than 220°C

the recommened typical temperature profiles settings are as fillows:

Prehear--temperature: normal temperature~145°C, ramp-up of 1~2°C/second;

Fusion--temperature: 145~165°C, duration: 100seconds;

Peak--temperature: 220°C, duration: 45seconds;

Cold--temperature: 220°C~normal temperature, ramp-down: natural temperature reduction;

In actual usage, the above parameters can be adjustable according to the selected solder matermial (the peak temperature can't exceed 220°C

The cleaning process of electronic boards sometimes involves ultrasounds. This is strongly prohibited on our sensors. Ultrasonic cleaning will have a negative impact on silicon elements which generally causes damages.

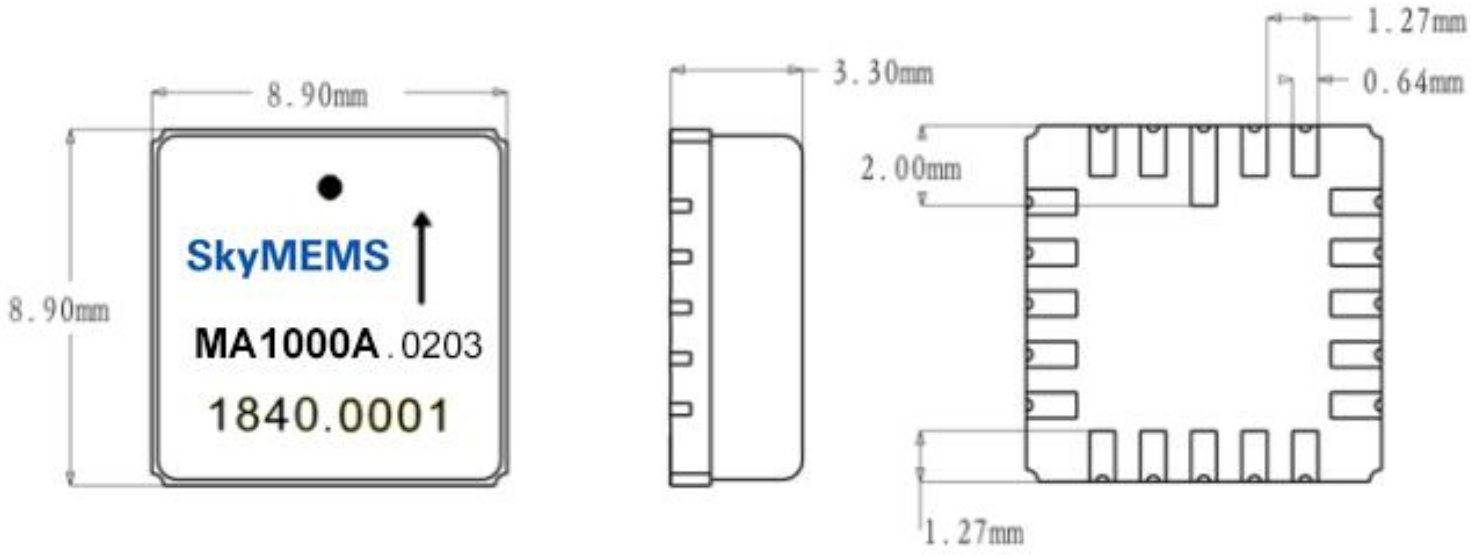
Forbidden Ultrasonic Cleaning	Note: Ultrasonic cleaning is forbidden in order to avoid damage of the MEMS accelerometer

Copy Right Reserved © 2019 Nanjing Sky MEMS Technology co., ltd.
Focus on MEMS Measurement & Control Technologies, Products include:
MEMS Acc MEMS Gyro IMU Vertical Gyro AHRS
INS GNSS/INS E-compass Inclinometer FOG

MA1000A

High Performance Single Axis Closed Loop MEMS Capacitive Accelerometer

Dimension & Package



MA1000A Package					
Parameter	**Comments**	**Min**	**Typical**	**Max**	**Unit**
Lead Finishing	Au plating	0.5	-	-	um
	Ni Plating	2	-	-	um
	W (tungsten)	16	-	-	um
Weight		0.63	0.639	0.645	grams
Size	X	8.95	9	9.07	mm
	Y	8.92	9.01	9.1	mm
	Z	3.3	3.38	3.45	mm
Packaging	LCC20 pin housing				
Proximity effect	The sensor is sensitive to external parasitic capacitance. Moving metallic objects with large mass or parasitic effect in close proximity of the accelerometer (mm range) must be avoided to ensure best product performances. A ground plane below the accelerometer is recommended as a shielding.				
Reference plane for axis alignment	LCC must be tightly fixed to the circuit board, using the bottom of the housing as the reference plane for axis alignment. Using the lid as reference plane or for assembly may affect specifications and product reliability (i.e. axis alignment and/or lid soldering integrity)				

Copy Right Reserved © 2019 Nanjing Sky MEMS Technology co., ltd.
Focus on MEMS Measurement & Control Technologies, Products include:
MEMS Acc MEMS Gyro IMU Vertical Gyro AHRS
INS GNSS/INS E-compass Inclinometer FOG

MA1000A

High Performance Single Axis Closed Loop MEMS Capacitive Accelerometer

Order Information

MA10XXA: MEMS accelerometer MA1000A series
XX: Measurement Range:

- 02 = ± 2g
- 03 = ± 3g
- 05 = ± 5g
- 10 = ± 10g
- 30 = ± 30g

For example, MA1002A means that the accelerometer is MA1000A series ± 2g range

Copy Right Reserved © 2019 Nanjing Sky MEMS Technology co., ltd.
Focus on MEMS Measurement & Control Technologies, Products include:
MEMS Acc MEMS Gyro IMU Vertical Gyro AHRS
INS GNSS/INS E-compass Inclinometer FOG