REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	Add Mode of transportation and quantity column under paragraph 6.3. Update document paragraphs to current requirements. - ro	20-02-13	J. ESCHMEYER

Prepared in accordance with ASME Y14.24

Vendor item drawing

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PMIC N/A

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YY-MM-DD

14-06-02

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TITLE

MICROCIRCUIT, LINEAR, HIGH STABILITY, LOW NOISE VIBRATION REJECTING YAW RATE GYROSCOPE, MONOLITHIC SILICON

SIZE	CODE IDENT. NO.	DWG NO.
A	16236	V62/14618

REV A

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DISTRIBUTION STATEMENT A. Approved for public release. Distribution is unlimited.

AMSC N/A

5962-V132-19

1. SCOPE

1.1 Scope. This drawing documents the general requirements of a high performance high stability, low noise vibration rejecting Yaw rate gyroscope microcircuit, with an operating temperature range of -55°C to +105°C.

1.2 Vendor Item Drawing Administrative Control Number. The manufacturer's PIN is the item of identification. The vendor item drawing establishes an administrative control number for identifying the item on the engineering documentation:

V6214618	-	01	X	B
Drawing number		Device type (See 1.2.1)	Case outline (See 1.2.2)	Lead finish (See 1.2.3)

1.2.1 Device type(s).

Device type	Generic	Circuit function
01	ADXRS646-EP	High stability, low noise vibration rejecting yaw rate gyroscope

1.2.2 Case outline(s). The case outline(s) are as specified herein.

Outline letter	Number of pins	Package style
X	32	Lead Ceramic Ball Grid Array (CBGA)

1.2.3 Lead finishes. The lead finishes are as specified below or other lead finishes as provided by the device manufacturer:

Finish designator	Material
A	Hot solder dip
B	Tin-lead plate
C	Gold plate
D	Palladium
E	Gold flash palladium
F	Tin-lead alloy (BGA/CGA)
Z	Other

1.3 Absolute maximum ratings. 1/

Acceleration (Any Axis, 0.5 ms):
- Unpowered ..... 10,000 *g*
- Powered ..... 10,000 *g*

V_{DD}, AV_{CC} ..... -0.3 V to +6.6 V

V_{RATIO} ..... AV_{CC}

ST1, ST2 ..... AV_{CC}

Output short circuit duration (Any pin to common) ..... Indefinite

Operating temperature range ..... -65°C to +125°C

Storage temperature range ..... -65°C to 150°C

2. APPLICABLE DOCUMENTS

There are no applicable documents.

3. REQUIREMENTS

3.1 Marking. Parts shall be permanently and legibly marked with the manufacturer's part number as shown in 6.3 herein and as follows:

A. Manufacturer's name, CAGE code, or logo
B. Pin 1 identifier
C. ESDS identification (optional)

3.2 Unit container. The unit container shall be marked with the manufacturer's part number and with items A and C (if applicable) above.

3.3 Electrical characteristics. The maximum and recommended operating conditions and electrical performance characteristics are as specified in 1.3, 1.4, and table I herein.

3.4 Design, construction, and physical dimension. The design, construction, and physical dimensions are as specified herein.

3.5 Diagrams.

3.5.1 Case outline. The case outline shall be as shown in 1.2.2 and figure 1.

3.5.2 Pin function description. The pin function description shall be as shown in figure 2.

3.5.3 Functional block diagram. The functional block diagram shall be as shown in figure 3.

1/ Stresses beyond those listed under "absolute maximum rating" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

TABLE I. Electrical performance characteristics. 1/

Test	Test conditions 2/	Limits			Unit
		Min	Typ	Max	
SENSITIVITY 3/					
	Clockwise rotation is positive output				
Measurement Range 4/	Full-scale range over specifications range	±250	±300		°/sec
Initial		8.5	9	9.5	mV/°/sec
Temperature Drift 5/			±3		%
Nonlinearity	Best fit straight line		0.01		% of FS
NULL 3/					
Null	−40°C to +105°C	2.7	3.0	3.3	V
Temperature Drift 5/			±3		°/sec
Linear Acceleration Effect	Any axis		0.015		°/sec/*g*
Vibration Rectification	25 *g* rms, 50 Hz to 5 kHz		0.0001		°/sec/*g* 4/
NOISE PERFORMANCE					
Rate Noise Density	$T_A \leq 25°C$		0.01		°/sec/√Hz
Rate Noise Density	$T_A \leq 105°C$		0.015		°/sec/√Hz
Resolution Floor	$T_A = 25°C$, 1 minute to 1 hour in-run		12		°/hr
FREQUENCY RESPONSE					
Bandwidth 6/	±3 dB user adjustable up to specification		1000		Hz
Sensor Resonant Frequency		15.5	17.5	20	kHz
SELF-TEST 3/					
ST1 RATEOUT Response	ST1 pin from Logic 0 to Logic 1		-50		°/sec
ST2 RATEOUT Response	ST2 pin from Logic 0 to Logic 1		50		°/sec
ST1 to ST2 Mismatch 7/		-5	±0.5	+5	%
Logic 1 Input Voltage	ST1 pin or ST2 pin	4			V
Logic 0 Input Voltage				2	V
Input Impedance	ST1 pin or ST2 pin to common	40	50	100	kΩ
TEMPERATURE SENSOR 3/					
V_{OUT} at 25°C	Load = 10 MΩ	2.8	2.9	3.0	V
Scale Factor 8/	25°C, V_{RATIO} = 6 V		10		mV/°C
Load to V_S			25		kΩ
Load to Common			25		kΩ
TURN-ON TIME 8/	Power on to ±0.5°/sec of final with CP5 = 100 nF			50	ms
OUTPUT DRIVE CAPABILITY					
Current Drive	For rated specifications			200	µA
Capacitive Load Drive				1000	pF
POWER SUPPLY					
Operating Voltage (VS)		5.75	6.00	6.25	V
Quiescent Supply Current			4		mA

See footnote at end of table.

TABLE I. Electrical performance characteristics - Continued. 1/

Test	Test conditions 2/	Limits			Unit
		Min	Typ	Max	
TEMPERATURE RANGE					
Specified Performance		-55		+105	°C

1/ Testing and other quality control techniques are used to the extent deemed necessary to assure product performance over the specified temperature range. Product may not necessarily be tested across the full temperature range and all parameters may not necessarily be tested. In the absence of specific parametric testing, product performance is assured by characterization and/or design.

2/ All minimum and maximum specifications are guaranteed. Typical specifications are not guaranteed. T_A = 25°C, V_S = AV_{CC} = V_{DD} = 6 V, V_{RATIO} = AV_{CC}, angular rate = 0°/sec, bandwidth = 80 Hz (C_{OUT} = 0.01 µF), I_{OUT} = 100 µA, ±1 *g*, unless otherwise noted.

3/ Parameter is linearly ratio metric with V_{RATIO}.

4/ Measurement range is the maximum range possible, including output swing range, initial offset, sensitivity, offset drift, and sensitivity drift at 5 V supplies.

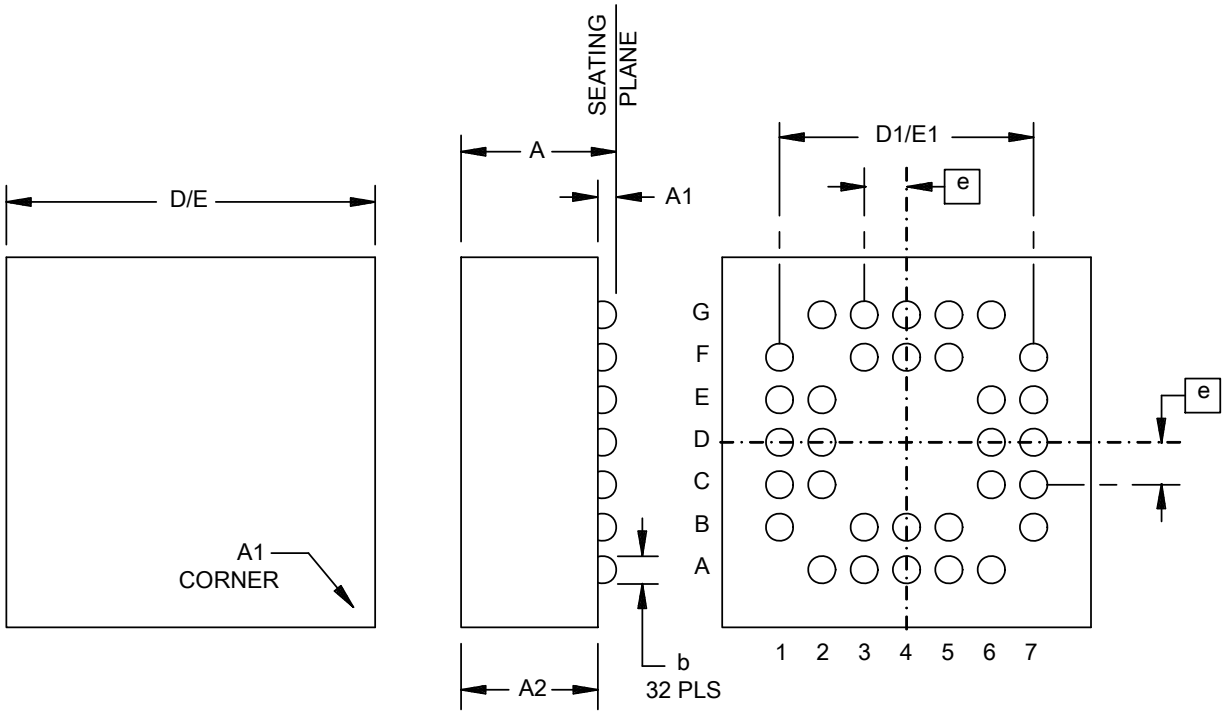
5/ From +25°C to −40°C or +25°C to +105°C.

6/ Adjusted by external capacitor, C_{OUT}. Reducing bandwidth below 0.01 Hz does not result in further noise improvement.

7/ Self-test mismatch is described as (ST2 + ST1)/((ST2 − ST1)/2).

8/ Based on characterization.

Case X



Dimensions					
Symbol	Millimeters		Symbol	Millimeters	
	Min	Max		Min	Max
A		3.80	D/E	6.70	7.05
A1	0.25	0.60	D1/E1	4.80 BSC	
A2	2.50	3.20	e	0.80 BSC	
b	0.50	0.60			

NOTES:
1. All linear dimensions are in millimeters.
2. Ball A1 identifier is gold plated and connected to the D/A PAD internally via holes.

FIGURE 1. Case outline.

Pin No.	Mnemonic	Description
6D, 7D	CP5	HV Filter Capacitor, 100nF (±5%).
6A, 7B	CP4	Charge Pump Capacitor, 22 nF (±5%).
6C, 7C	CP3	Charge Pump Capacitor, 22 nF (±5%).
5A, 5B	CP1	Charge Pump Capacitor, 22 nF (±5%).
4A, 4B	CP2	Charge Pump Capacitor, 22 nF (±5%).
3A, 3B	V_{CC}	Positive Analog Supply.
1B, 2A	RATEOUT	Rate Signal Output.
1C, 2C	SUMJ	Output Amp Summing Junction.
1D, 2D	DNC	Do Not Connect to this Pin.
1E, 2E	V_{RATIO}	Reference Supply for Ratiometric Output.
1F, 2G	AGND	Analog Supply Return.
3F, 3G	TEMP	Temperature Voltage Output.
4F, 4G	ST2	Self-Test for Sensor 2.
5F, 5G	ST1	Self-Test for Sensor 1.
6G, 7F	PGND	Charge Pump Supply Return.
6E, 7E	V_{DD}	Positive Charge Pump Supply.

FIGURE 2. Pin function descriptions.

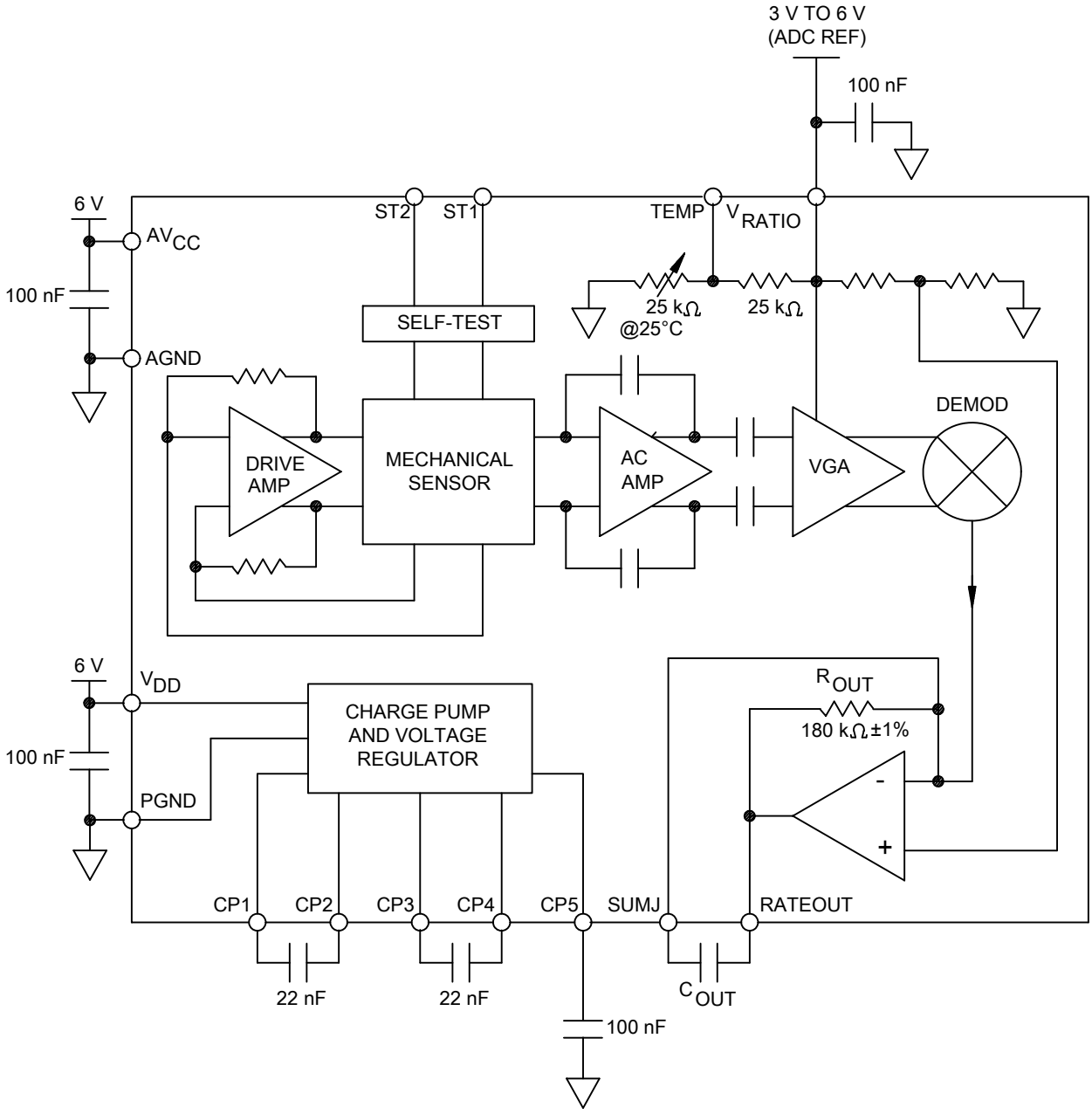


FIGURE 3. Functional block diagram.

4. VERIFICATION

4.1 Product assurance requirements. The manufacturer is responsible for performing all inspection and test requirements as indicated in their internal documentation. Such procedures should include proper handling of electrostatic sensitive devices, classification, packaging, and labeling of moisture sensitive devices, as applicable.

5. PREPARATION FOR DELIVERY

5.1 Packaging. Preservation, packaging, labeling, and marking shall be in accordance with the manufacturer's standard commercial practices for electrostatic discharge sensitive devices.

6. NOTES

6.1 ESDS. Devices are electrostatic discharge sensitive and are classified as ESDS class 1 minimum.

6.2 Configuration control. The data contained herein is based on the salient characteristics of the device manufacturer's data book. The device manufacturer reserves the right to make changes without notice. This drawing will be modified as changes are provided.

6.3 Suggested source(s) of supply. Identification of the suggested source(s) of supply herein is not to be construed as a guarantee of present or continued availability as a source of supply for the item. DLA Land and Maritime maintains an online database of all current sources of supply at https://landandmaritimeapps.dla.mil/programs/smcr/.

Vendor item drawing administrative control number 1/	Device manufacturer CAGE code	Mode of transportation and quantity	Vendor part number
V62/14618-01XB	24355	Tray, 20 units	ADXRS646TBGZ-EP
		Reel, 500 units	ADXRS646TBGZ-EP-RL

1/ The vendor item drawing establishes an administrative control number for identifying the item on the engineering documentation.

CAGE code	Source of supply
24355	Analog Devices Route 1 Industrial Park P.O. Box 9106 Norwood, MA 02062 Point of contact: 20 Alpha Road Chelmsford, MA 01824-4123