

ACTIVE GNSS

CENTAURI

Active GNSS SMD Antenna

SZA-C-0G01

BAND
1559 to 1610 MHz

LNA GAIN
18.5 dB

SUPPLY
1.5 to 3.1 V

SIZE
9.0 × 7.0 × 1.5 mm

GNSS

1559 to 1610 MHz

Covers GPS, GLONASS, Galileo, BeiDou

Key Features

- For GNSS applications 1559 to 1610 MHz
- Highly resistant to detuning
- Supply voltage 1.5 V to 3.1 V
- SMD component supplied in tape and reel
- High performance comparable to large ceramic patch type
- Ideal for wearable or smaller designs
- Gain = 18.5 dB
- High input 1 dB compression point of -7 dB
- Self-shielding package concept
- Patent pending design

1 Introduction

A highly compact yet high-performance solution for embedded designs. Synzen have created the optimal solution for GNSS applications that simplify the design in process and allows you to focus on the product.

This active antenna provides a high performing antenna combined with an amplifying front end to boost this signal as well as provide out of band filtering to prevent receiver saturation.

— Features

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- ◆ Highly resistant to detuning
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- ◆ High performance comparable to large ceramic patch type
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— Applications

- | | |
|--------------------|--------------|
| ◆ Asset Tracking | ◆ Healthcare |
| ◆ M2M Industrial | ◆ Drones |
| ◆ Tablets | ◆ Telematics |
| ◆ Wearable Devices | ◆ OBD-II |
| ◆ Headsets | |

2 Mechanical Specifications

Part Number	SZA-C-0G01
Name	CENTAURI
Dimensions (mm)	9.0 × 7.0 × 1.5
Required Clearance Area (mm)	6.0 × 5.0
Weight	<0.5 g
Antenna Type	Surface Mount Device

3 RF Specifications

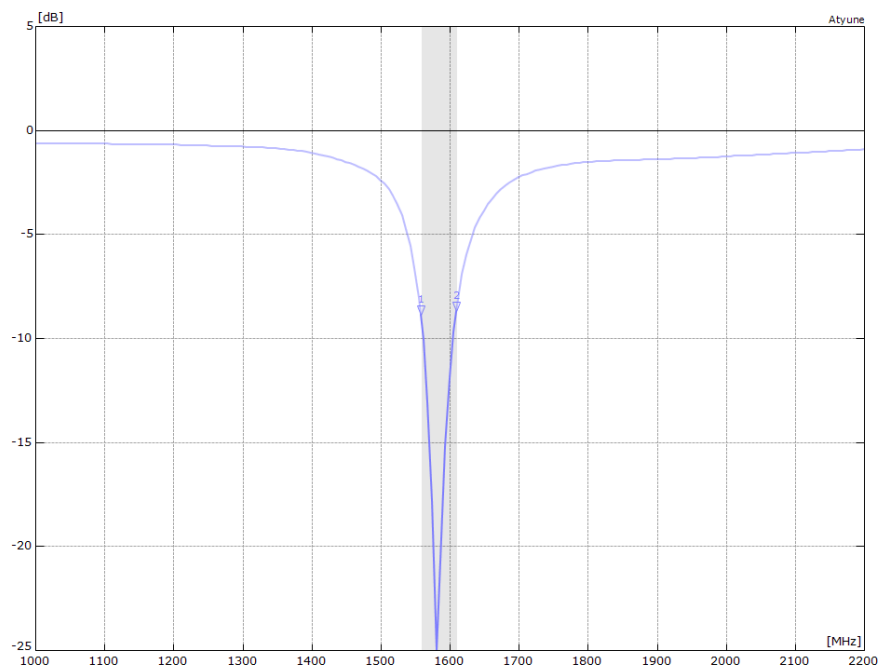
Frequency Range	1559 to 1610 MHz
Gain (LNA)	18.5 dB
Polarization	Linear
Average Efficiency (Linear)	>60%
Average Efficiency (RHCP)	>30%
Peak Gain	0.1 dBi
S11 (max)	<-7.0 dB
VSWR (max)	1.90:1
Impedance	50 Ω

4 Environmental

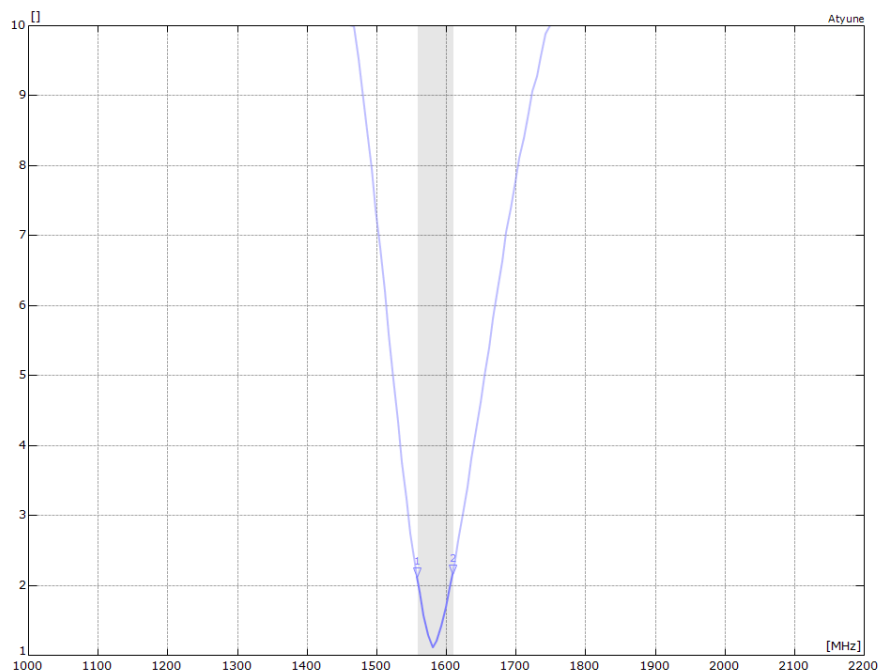
Operational Temperature	-40 to +125°C
Storage Temperature	-10 to +40°C
Relative Humidity	≤75%

5 RF Characteristics

S11 Parameter



VSWR



6 Absolute Maximum Ratings

Symbol	Parameter	Min	Max	Unit
VCC	Supply Voltage	-0.5	5.0	V
VI(RF_IN)	Input voltage on pin 3	-0.5	5.0	V
VI(RF_OUT)	Input voltage on pin 3	-0.5	5.0	V
VESD	Electrostatic discharge voltage, Human Body Model (HBM) according to ANSI/ESDA/JEDEC standard JS-001		±2	kV
VESD	Electrostatic discharge voltage, Charged Device Model (CDM) according to JEDEC standard JESD22-C101C		±1	kV

7 Recommended Operating Conditions

Symbol	Parameter	Min	Typ	Max	Unit
VCC	Supply Voltage	1.5		3.1	V
TAMB	Ambient Temperature	-40.0	+25	85.0	°C

8 Characteristics at VCC = 1.8 V

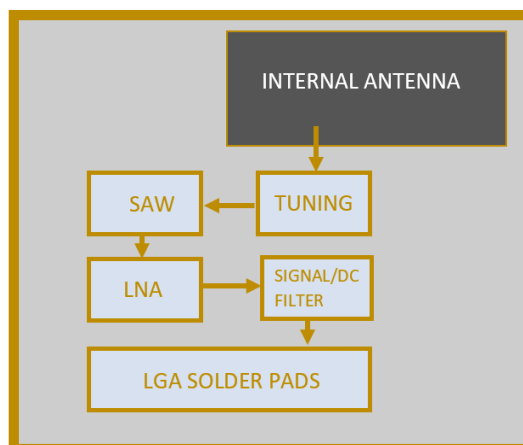
Symbol	Parameter	Min	Typ	Max	Unit
ICC	Supply Current		4.4	6.4	mA
GP	Power Gain		18.0	20.0	dB
NF	Noise Figure		1.9		dB
TON	Turn on time, to 90% of gain			2	μs
TOFF	Turn off time, to 10% of gain			1	μs

9 Characteristics at VCC = 2.8 V

Symbol	Parameter	Min	Typ	Max	Unit
ICC	Supply Current		4.6		mA
GP	Power Gain		18.5		dB
NF	Noise Figure		1.9		dB
TON	Turn on time, to 90% of gain			2	μs
TOFF	Turn off time, to 10% of gain			1	μs

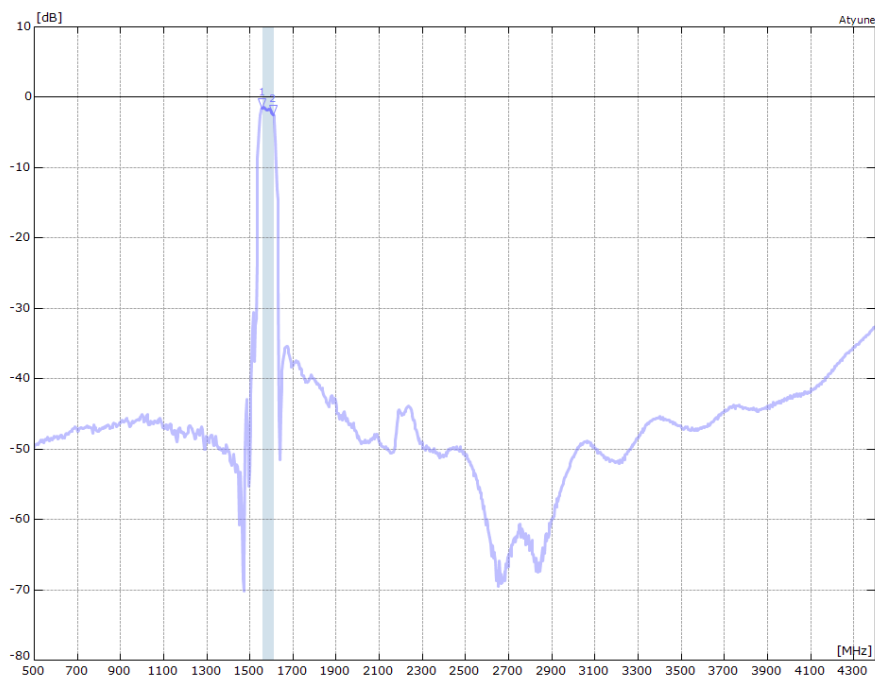
10 Block Diagram

The SZA-C-0G01 utilizes a high-performance antenna (comparable to ceramic patch) within an active module to produce a high quality amplified and filtered signal for your GNSS receiver.



11 Input Rejection S21

The band rejection for CENTAURI is critical to prevent saturation of the on board LNA. The SAW filter is designed in to prevent this. The band rejection for CENTAURI is shown below covering all low band 5G / 4G LTE / 3G / 2G bands.

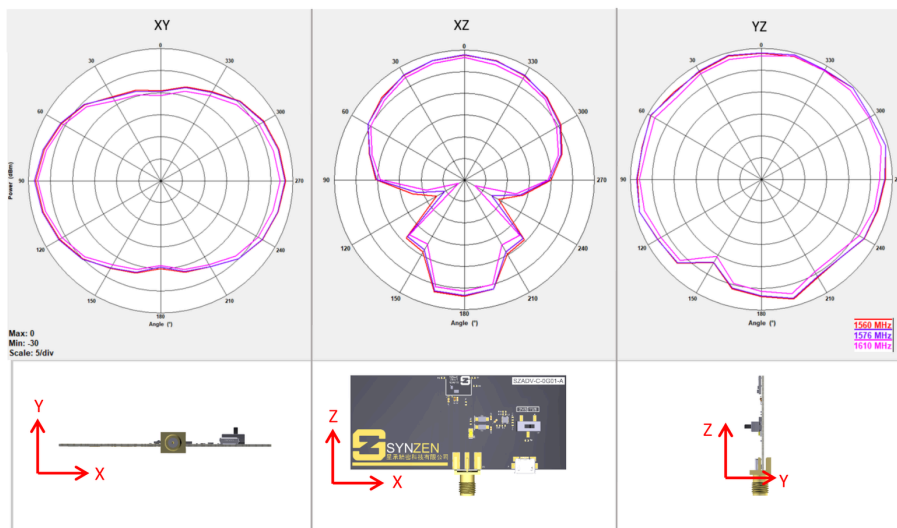


Frequency Range (MHz)	Band	Typical Rejection (dB)
698 to 798	4G LTE 700	47
824 to 960	CDMA / GSM850 / GSM900	45
1710 to 1910	GSM1800 / GSM1900	38
1920 to 2200	WCDMA	45
2300 to 2500	WCS / WLAN / ISM	49
2500 to 2690	LTE 2600	50

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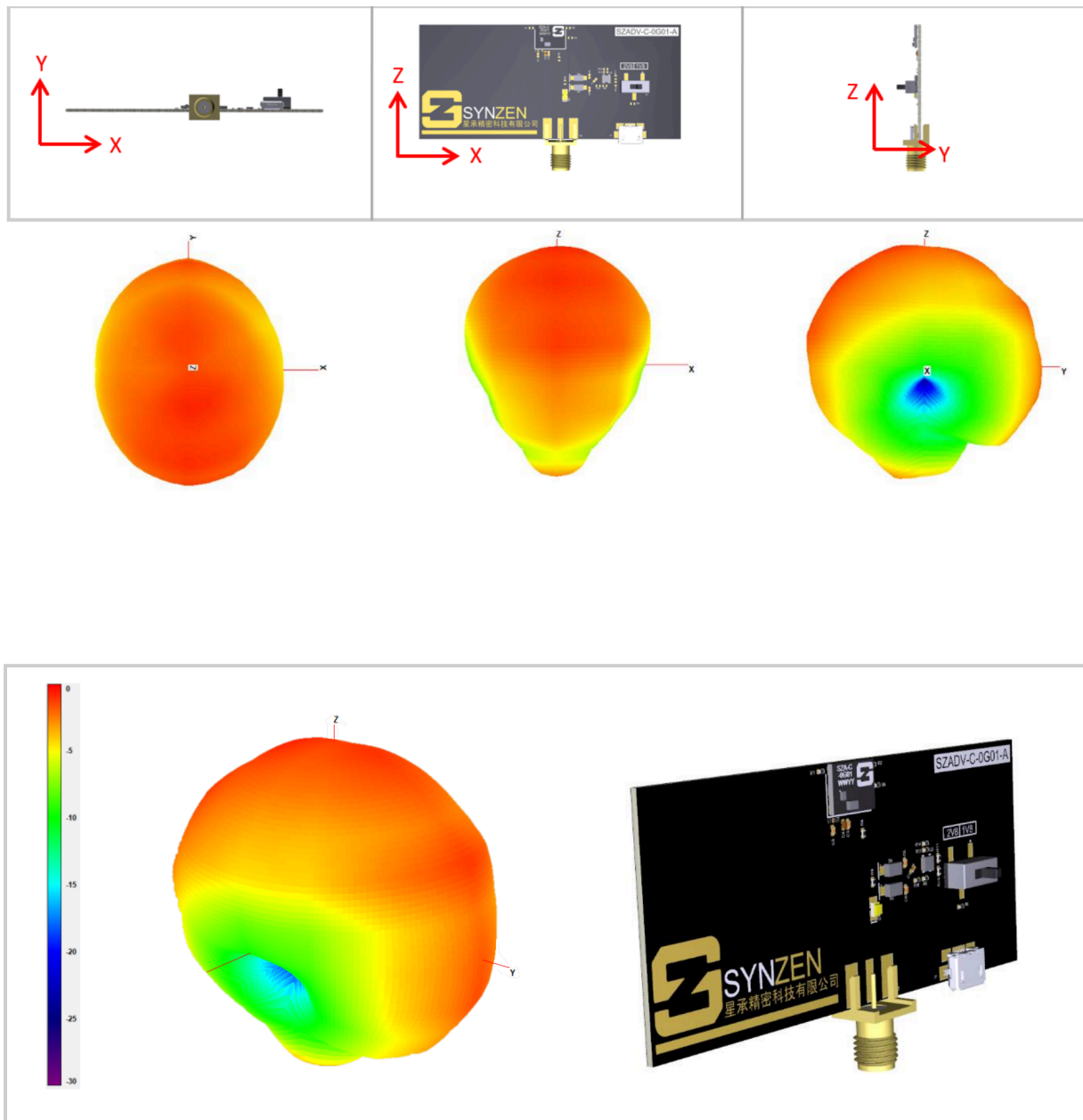
2D Polar Plot

MEASURED ON SYNZEN EVK (SZADV-C-0G01)



13 3D Radiation Pattern at 1575.42 MHz

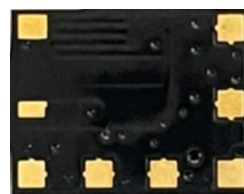
MEASURED ON SYNZEN EVK (SZADV-C-0G01), FREQUENCY POINT 1575.42 MHz



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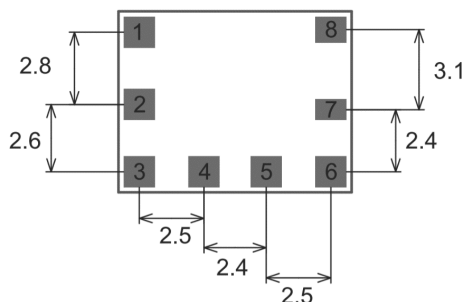
L

15



16 Required Host PCB Footprint

The host PCB requires the footprint shown below. PCB library files and DXF are available from our website www.synzen.com.tw/products. The required clearance for the host PCB is 6 × 5 mm on all layers (see Clearance).



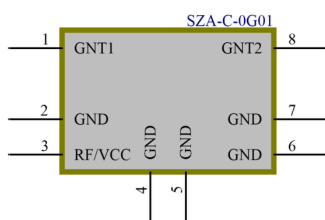
Pins 1, 2, 3, 4, 6 = 1.0 × 1.0 mm

Pin 7 = 1.0 × 0.6 mm

Pin 8 = 1.0 × 0.8 mm

17 SZA-C-0G01 Schematic Symbol

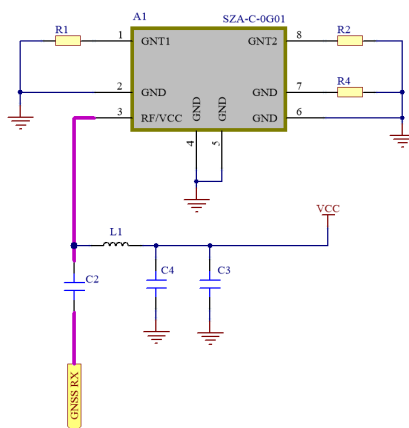
The schematic symbol for the antenna is shown below with a description of each pin.



Pin	Name	Description
1, 8	GNT1, GNT2	Tuning pins
2, 4, 5, 6, 7	GND	Ground pins
3	RF/VCC	RF out and VCC in

18 Host PCB Required Circuit

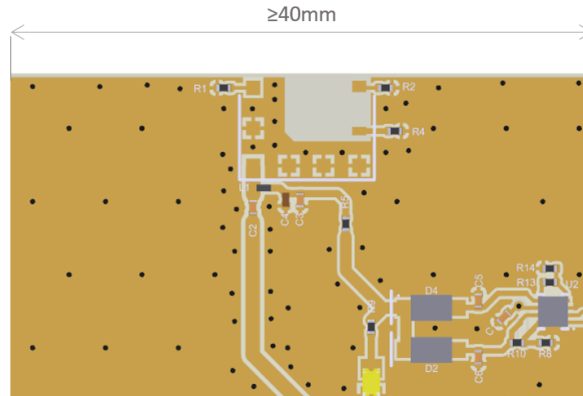
The active GNSS antenna requires a bias (VCC) supplied to the same pin as the RF out. As such, a filter circuit is used to isolate the GNSS signal from the VCC line (L1) and also to block the VCC from the RF trace to the receiver (C2). The VCC has additional decoupling capacitors to prevent noise from entering the receiver.



Item	Designator	Description	Value	Footprint	Qty	Comment
1	A1	Active GNSS antenna (SZA-C-0G01)	Antenna	SZA-C-0G01	1	Antenna
2	C2	C5%_22p_0402_50V_NP0	22p_50V	0402	1	DC Block
3	C3	C10%_1u_0402_25V_X5R	1u_25V	0402	1	Decoupling Capacitor
4	C4	C10%_100n_0402_50V_X7R	100n_50V	0402	1	Decoupling Capacitor
5	L1	Chip Inductor Murata LQG15	47nH	0402	1	RF Choke
6	R1, R2, R4	R1%_0R0_0402_1W	0R	0402	5	Tuning components

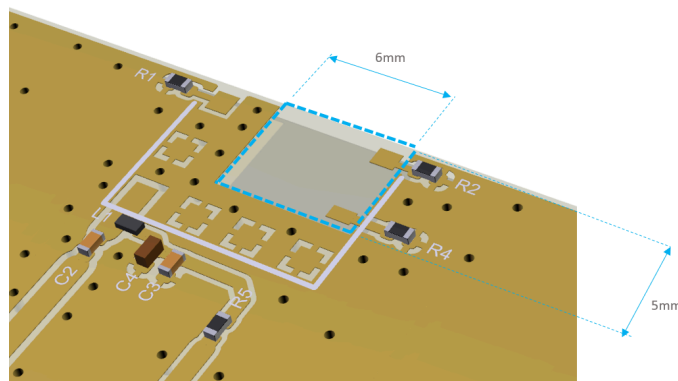
19 Placement

The antenna is designed to function placed at the center of the longest PCB edge, equidistant from either side as shown here. Where possible the top and bottom side of the PCB should be flooded with GND. This optimizes the antenna performance but also assists in preventing noise that GNSS systems are sensitive to.



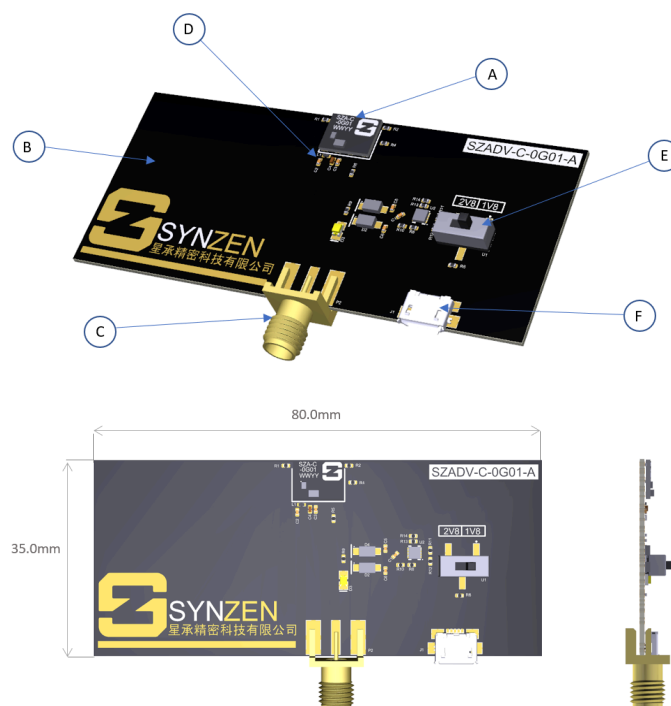
20 Clearance

A clearance is required through all PCB layers for the precise area shown at the top right of the module. Also, any components such as battery or display must also avoid this area. The rest of the area under the antenna should be filled GND.



21 SZADV-C-0G01 Evaluation Kit

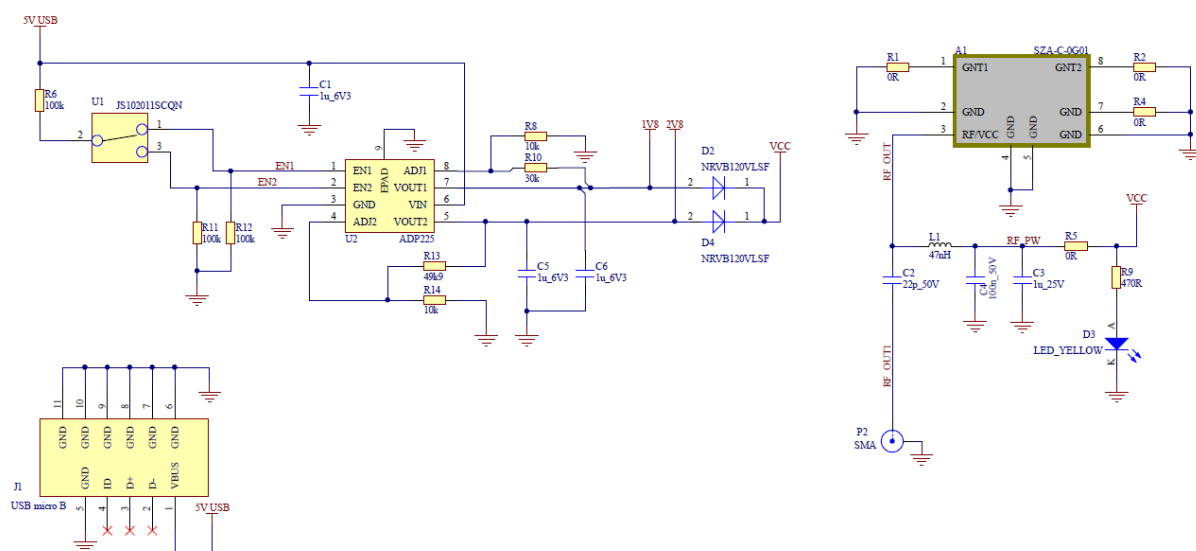
The SZADV-C-0G01 evaluation kit is a PCBA with the active GNSS antenna (SZA-C-0G01) fitted and optimized with a matching network. Connection to the antenna is made using the fitted female SMA connector.



Item	Description
A	SZA-C-0G01 (Active GNSS Antenna)
B	Host PCB
C	SMA Connector
D	Filter Circuit
E	VCC Selection (1.8 V or 2.8 V)
F	USB Micro B for external power source (5 V)

22 Evaluation Kit Schematic

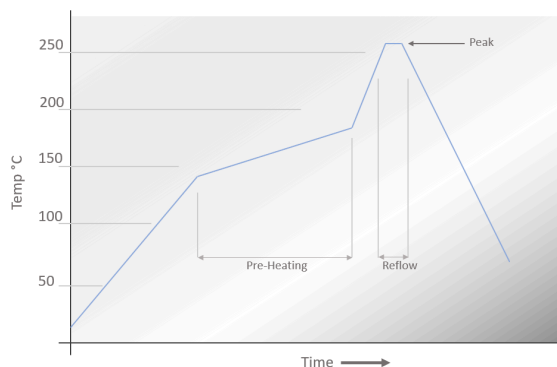
The circuit of the EVK along with the BOM is shown below.



23 Evaluation Kit BOM

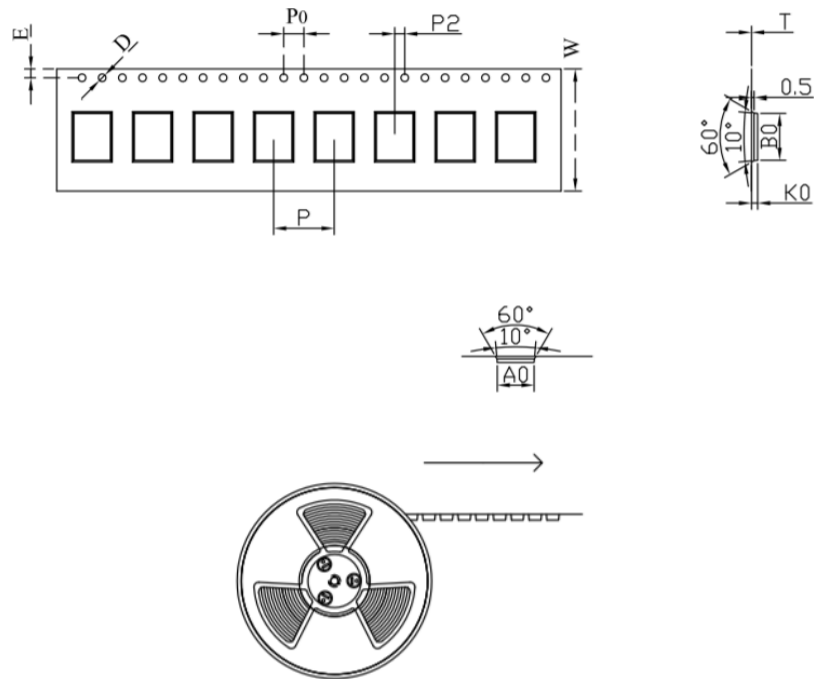
Item	Designator	Description	Value	Footprint	Qty
1	A1	Active GNSS antenna (SZA-C-0G01)	Antenna	SZA-C-0G01	1
2	C1, C5, C6	C10%_1u_0402_6V3_X7R	1u_6V3	0402	3
3	C2	C5%_22p_0402_50V_NP0	22p_50V	0402	1
4	C3	C10%_1u_0402_25V_X5R	1u_25V	0402	1
5	C4	C10%_100n_0402_50V_X7R	100n_50V	0402-HIGH	1
6	D2, D4	Diode Schottky 20V 1A Surface Mount SOD-123FL	NRVB120VLSF	SOD-123	2
7	D3	LED YELLOW DIFFUSED 0805 SMD, CMD17-21VYD/TR8	LED_YELLOW	LED	1
8	J1	USB micro B connector	USB micro B	USB	1
9	L1	Chip Inductor Murata LQG15	47nH	0402-(0.5×0.5)	1
10	P2	SMA Jack, Straight PCB Mount	SMA	SMA edge connector	1
11	R1, R2, R3, R4, R5	R1%_0R0_0402_1W	0R	0402	5
12	R6, R11, R12	R1%_100k_0402_63mW	100k	0402	3
13	R8, R14	R1%_10k0_0402_63mW	10k	0402	2
14	R9	R1%_470R_0402_63mW	470R	0402	1
15	R10	R5%_30k_0402_63mW	30k	0402	1
16	R13	R1%_49k9_0402_63mW	49k9	0402	1
17	U1	Slide Switch SPDT Surface Mount	JS102011SCQN	JS102011SCQN	1
18	U2	Linear Voltage Regulator ADP225ACPZ-R7	ADP225	LFCSP-8	1

24 Reflow Profile



Stage	Temperature	Time
Pre-Heating	130 to 180°C	50 to 190 seconds
Reflow	>220°C	50 to 160 seconds
Peak Temperature	260°C	15 to 45 seconds

25 Tape and Reel



Arrow shows the feed direction

Item	W	A0	B0	K0	P	E	F	D	P0	P2
Dim (mm)	24 ±0.3	7.3 ±0.1	9.3 ±0.1	1.2 ±0.1	12 ±0.1	1.75 ±0.1	11.5 ±0.1	1.5 +0.1 / -0.0	4.0 ±0.1	2.0 ±0.1

26 Tape Notes

- ◆ 10 sprocket hole pitch cumulative tolerance ± 0.2
- ◆ Carrier camber is 1 mm in 100 mm
- ◆ A0 and B0 measured on a plane 0.3 mm above the bottom of the pocket
- ◆ K0 measured from a plane on the inside bottom of the pocket to the top surface of the carrier
- ◆ All dimensions meet EIA-481-3 requirements
- ◆ 13" reel = 49 m, 4000 pcs

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Compliance

ROHS

Compliant

Conforms to EU RoHS Directive 2011/65/EU as amended by Delegated Directive (EU) 2015/863.

REACH

Compliant

Conforms to EU REACH Regulation (EC) No 1907/2006.

CERTIFICATE

On request

A certificate of conformance is available upon request from sales@synzen.com.tw.

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