

ANN-MS

Active GPS antenna

Data Sheet

Abstract

The ANN active GPS antenna with integrated low-noise amplifier (LNA) is the perfect match to the u-blox GPS receivers.



48 x 40 x 13 mm

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Document status information	
Objective Specification	Document contains target values. Revised and supplementary data will be published later.
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1 Functional description

1.1 Overview

The ANN-MS is a high performance Active Antenna that enables the full capabilities of u-blox GPS receivers. This compact and easy to use antenna is simple to integrate and can be operated at a supply voltage of 2.7 V to 5.5 V.

1.2 Benefits

- Easy to use
- Compact size
- High performance
- Fast and easy integration
- No antenna know-how necessary

1.3 Features

- Built-in low noise amplifier with 29 dB gain and 0.9 dB noise figure
- 5 m coaxial cable
- Magnetic base suitable for mounting on car roof
- Industrial temperature range: -40 °C to +85 °C
- Wide range of supply voltage: 2.7 V to 5.5 V

2 Mechanical specification

2.1 Dimensions

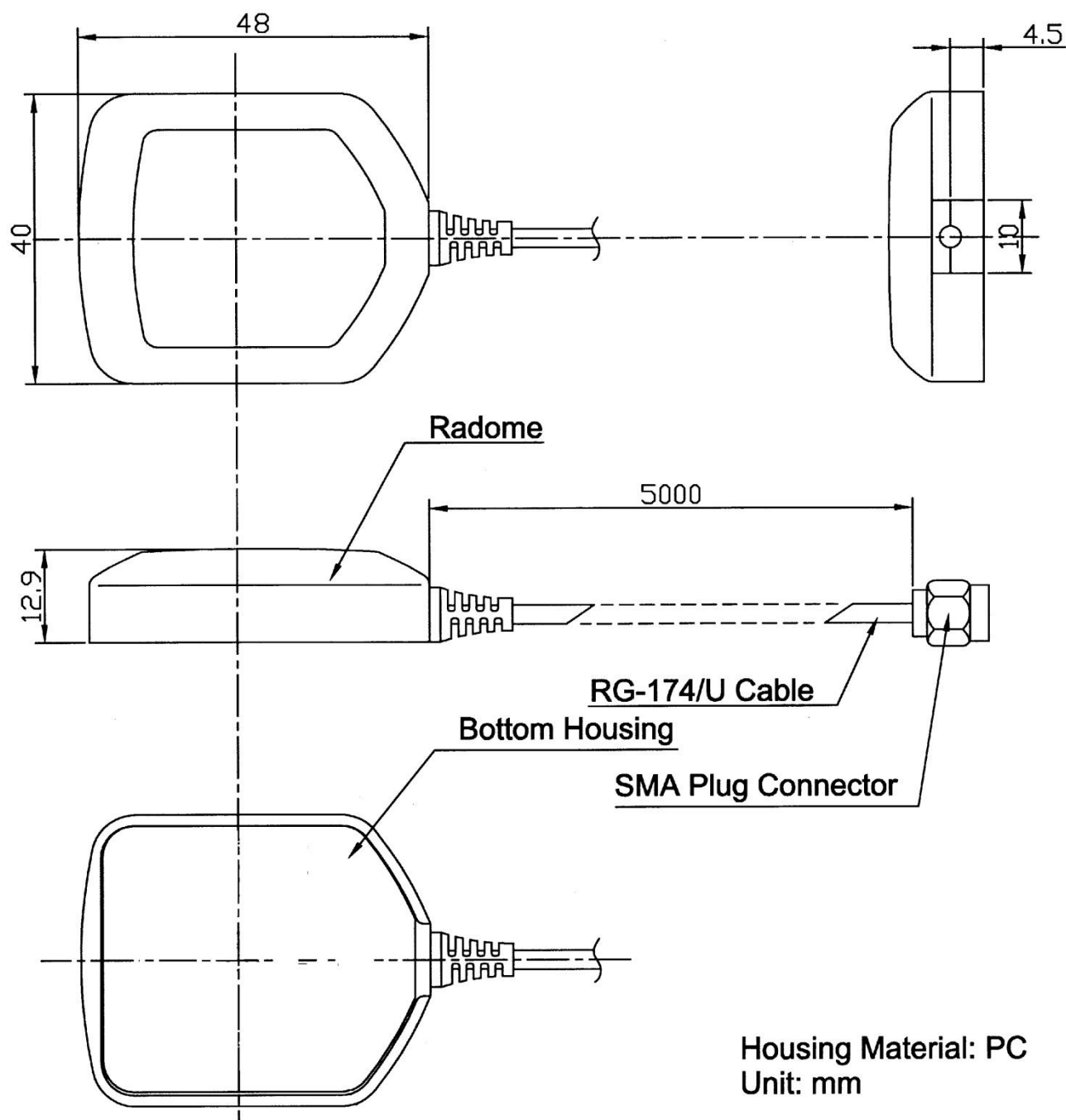


Figure 1: Mechanical outline

2.2 Mechanical data

Parameter	Specification
Weight	≤ 105 g
Size	48 x 40 x13 mm
Cable	5m RG174 standard
Connectors	SMA, SMB, MCX, FAKRA
Mounting	Magnetic base
Housing color	Black

Table 1: Mechanical specifications

2.3 Connectors

Connector types overview



SMA Plug (MB): ANN-MS-0



SMB Plug (MC): ANN-MS-1



MCX Plug (ME): ANN-MS-2

Table 2: Connector types

2.3.1 SMA connector specification

Parameter	Specification
Impedance	50 Ω
Frequency range	0 – 12.4 GHz on flexible cable
Dielectric withstanding voltage	RG-316: 250 V _{RMS} max. at sea level
VSWR	Straight: 1.3 max.
Contact resistance	Center contact: 6 m Ω max. Outer contact: 2 m Ω max.
Insulator resistance	5000 M Ω min.

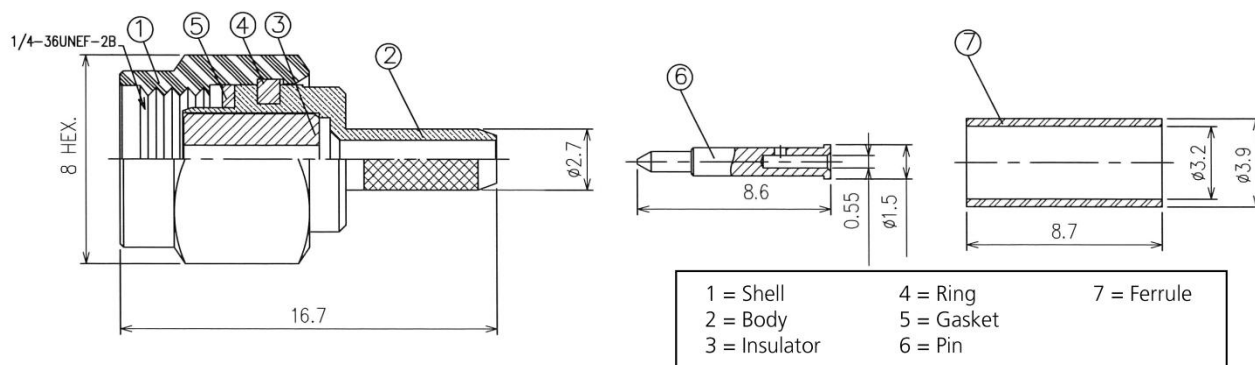
Table 3: SMA connector electrical specifications

Parameter	Material	Finish
Connector body	Brass per JIS-C3604BD	Nickel or gold plating
Center contact male	Brass per JIS-C3604BD	Gold plating
Insulator	PTFE	None
Crimp ferrule	Annealed copper	Same as body

Table 4: SMA connector material specifications

Parameter	Specification
Engage force	0.23 Nm max.
Disengage force	0.23 Nm max.
Contact retention	2.7 kg min.
Durability	500 cycles min.

Table 5: SMA connector mechanical specifications



measurements in mm

Figure 2: SMA connector

2.3.2 SMB connector

Parameter	Specification
Impedance	50 Ω
Frequency range	0-4 GHz
Dielectric withstanding voltage	350 V _{RMS} max. at sea level
VSWR	Straight: 1.3 max. Right angle 1.5 max.
Contact resistance	Center contact: 6 m Ω max. Outer contact: 2.5 m Ω max.
Insulator resistance	1000 M Ω min.

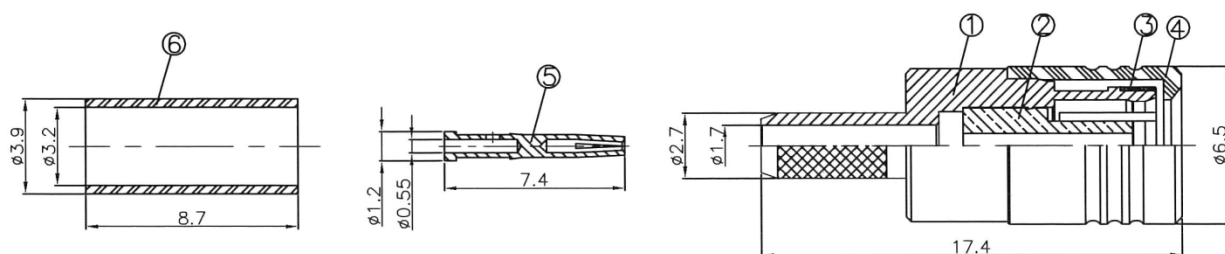
Table 6: SMB electrical specifications

Parameter	Material	Finish
Connector body	Brass per JIS-C3604BD	Nickel or gold plating
Insulator	PTFE	None
Crimp ferrule	Annealed copper	Nickel or gold

Table 7: SMB connector material specifications

Parameter	Specification
Engage force	6.4 kg max.
Disengage force	6.4 kg max.
Coupling nut retention	n/a
Coupling proof torque	n/a
Contact retention	1.8 kg min.
Durability	500 cycles min.

Table 8: SMB connector mechanical specifications



measurements in mm

1 = Body	3 = C Ring	5 = Center Pin
2 = Insulator	4 = Shell	6 = Ferrule

Figure 3: SMB connector

2.3.3 MCX connector

Parameter	Specification
Impedance	50 Ω
Frequency range	0-6 GHz
Dielectric withstanding voltage	335 V _{RMS} max. at sea level
VSWR	Straight: 1.3 max. Right angle: 1.5 max.
Contact resistance	Center contact: 5 m Ω max. Outer contact: 2.5 m Ω max.
Insulator resistance	1000 M Ω min.

Table 9: MCX connector electrical specifications

Parameter	Material	Finish
Connector body	Brass per JIS-C3604BD	Nickel or gold plating
Insulator	PTFE	None
Crimp ferrule	Annealed copper	Nickel or gold

Table 10: MCX connector material specifications

Parameter	Specification
Engage force	1.5 kg max.
Disengage force	2.0 kg max.
Contact retention	2.7 kg min.
Durability	500 cycles min.

Table 11: MCX connector mechanical specifications

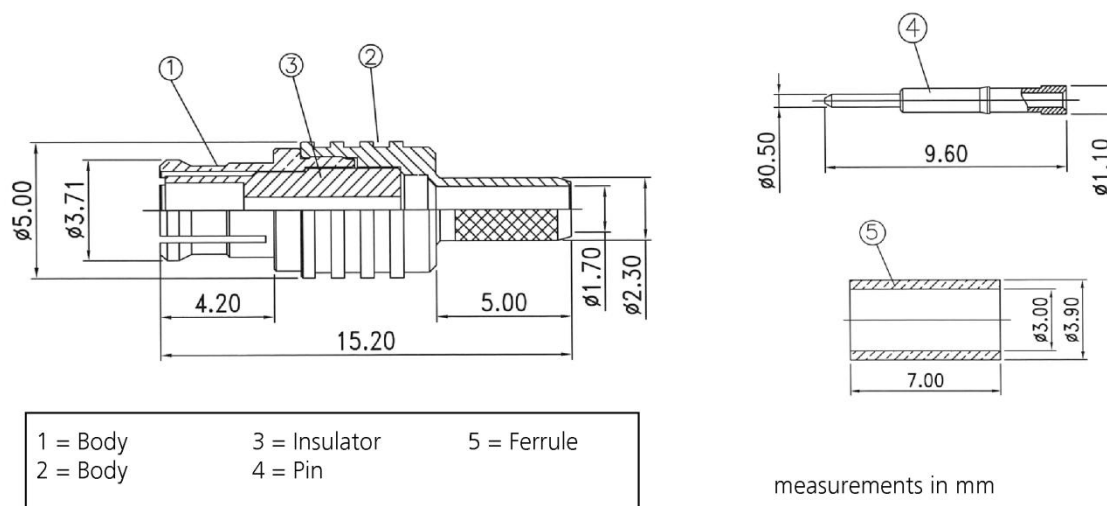


Figure 4: MCX connector

3 Electrical specification

The antenna electrical specifications are provided in Table 12.

Parameter	Specification
Frequency	1575 ± 3 MHz
VSWR	max. 2
Bandwidth	min. 20 MHz
Impedance	50 Ω
Peak gain	4 dBiC min. (on 7cm x 7cm ground plane)
Gain coverage	≥ -4 dBiC at -90° ≤ θ ≤ 90° (over 75% volume)
Polarization	RHCP
Amplifier gain	typ. 29 dB (without cable)
Noise figure	typ. 0.9 dB
Output VSWR	max. 2.0
DC Voltage	2.7 V _{DC} to 5.5 V _{DC}
DC Current	typ 8.5 mA, ± 4.5 mA

Table 12: Antenna electrical specifications

4 Environmental specification

The antenna environmental specification is provided in Table 13.

Parameter	Specification
Operating temperature	-40 °C to +85 °C
Storage temperature	-40 °C to +85 °C
Vibration	Sine sweep, 1G (0-P), 10-150-10 Hz each axis
Humidity	40%~95% RH
IP code (IP protection rating)	IP56: protected against dust and powerful water jets

Table 13: Antenna environmental specifications

5 Product labeling

The product information label is found on the underside of the ANN-MS GPS antenna (see Figure 5). The label includes the product type number, which provides important information about the product.

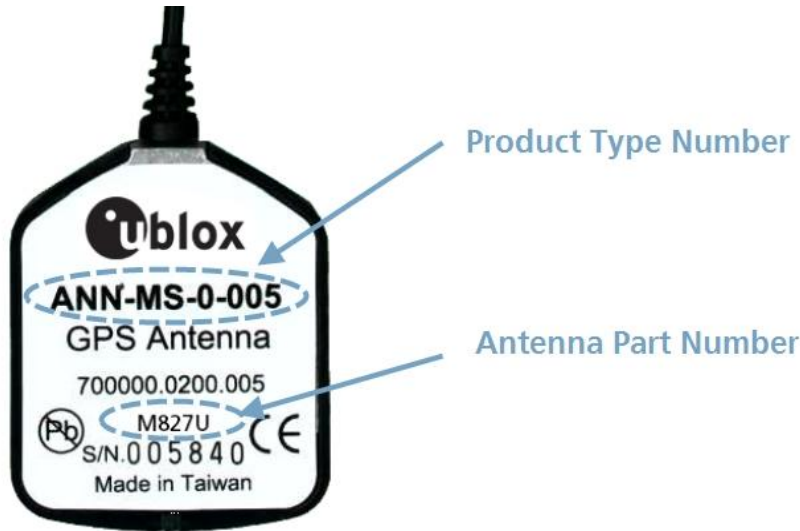


Figure 5: ANN-MS GPS antenna label(Antenna Part Number:M827U).

5.1 Explanation of codes

3 different product code formats are used. The **Product Name** is used in general communications about product families and variants. The **Ordering Code** includes options and quality, while the **Type Number** includes the hardware versions. Table 14 below details these 3 different formats:

Format	Structure
Product name	PPP-GV
Ordering code	PPP-GV-T
Type number	PPP-GV-T-XXX

Table 14: Product code formats

The parts of the product code are explained in Table 15.

Code	Meaning	Example
PPP	Product family	ANN
G	Product generation	M
V	Variant	S
T	Option	Defines connector type: 0 = SMA connector 1 = SMB connector 2 = MCX connector
XXX	Product Detail	Describes cable length 005 = 5 m cable

Table 15: Product code parts

6 Ordering information

Ordering No.	Product
ANN-MS-0-005-0	Active Antenna, 5m cable, SMA connector Single units
ANN-MS-1-005-0	Active Antenna, 5m cable, SMB connector Single units
ANN-MS-2-005-0	Active Antenna, 5m cable, MCX connector Single units

Table 16: Product ordering codes

Revision history

Revision	Date	Name	Status / Comments
-	4. Apr. 2003	gzur	Initial Release
A	30. Oct. 2003	gzur	New support address in Asia
B	02. Feb. 2006	gzur	RoHS Statement, table 2 (wider supply voltage range, lower power consumption)
C	20. Jul 2006	gzur	Section 2.3 and 5: New ANN-MS-3 with FAKRA connector
D	13. Dec. 2007	tgri	Connectors, CI
D1	16. Jan 2008	tgri	Connectors
D2	29 May 2008	tgri	Electrical Specification
D3	16 Jan 2009	tgri	IP Code
E	5 May 2010	tgri	New CI, info FAKRA connector
E1	28 Oct. 2010	tgri	Corrected voltage range in overview
F	8 Aug 2011	tgri	Added labeling information
F1	6 Sept. 2011	tgri	Added connector information Last revision with document number GPS-X-02021.
R13	14 Oct 2015	julu	Updated humidity specification in section 4 and u-blox contact information
R14	24 Nov 2017	rmak	Updated antenna specification in Section 1, Table 12, and u-blox India office contact information. FAKRA connector variant: ANN-MS-3 removed (EOL).

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