



# MAX-M10N-10B

**Standard precision GNSS module**

**Professional grade**

**Data sheet**



## **Abstract**

This Data sheet describes the MAX-M10N-10B module, a GNSS receiver for high-performance tracking applications featuring upgradeable firmware. MAX-M10N-10B is optimized for the highest RF immunity.

# Document information

<b>Title</b>	<b>MAX-M10N-10B</b>	
<b>Subtitle</b>	Standard precision GNSS module	
<b>Document type</b>	Data sheet	
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<b>Functional sample</b>	Draft	For functional testing. Revised and supplementary data will be published later.
<b>In development / prototype</b>	Objective specification	Target values. Revised and supplementary data will be published later.
<b>Engineering sample</b>	Advance information	Data based on early testing. Revised and supplementary data will be published later.
<b>Initial production</b>	Early production information	Data from product verification. Revised and supplementary data may be published later.
<b>Mass production / End of life</b>	Production information	Document contains the final product specification.

This document applies to the following products:

<b>Product name</b>	<b>Type number</b>	<b>FW version</b>	<b>IN/PCN reference</b>	<b>Product status</b>
MAX-M10N	MAX-M10N-10B-00	EXT SPG 5.30	UBXDOC-304424225-20429	Engineering sample

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# 1 Functional description

## 1.1 Overview

MAX-M10N features the u-blox M10 standard precision GNSS platform and provides exceptional sensitivity and acquisition time for L1 GNSS signals. MAX-M10N supports concurrent reception of three major GNSS constellations (GPS, Galileo, and BeiDou).

The firmware upgradeable MAX-M10N integrates a flash memory for the firmware image. The integrated flash memory also offers additional functionality including extended AssistNow™ data storage.

MAX-M10N grants lifetime access to AssistNow Live Orbits. This premium assistance service does not only offer improved time-to-first-fix (TTFF), but also improves position accuracy, especially in typical IoT applications with integrated antennas.

The u-blox low energy accurate position (LEAP) technology reduces the power consumption while retaining superior position accuracy.

The u-blox Super-Signal (Super-S) technology improves the dynamic position accuracy with small antennas.

The MAX-M10N product variants offer an optimized RF front-end either for the highest immunity or the best sensitivity in passive antenna designs. The MAX-M10N variants are summarized in [Table 1](#).

Product name	RF front-end	Description
MAX-M10N-00B	LNA-SAW	Best sensitivity for designs with small antennas
MAX-M10N-10B (this product)	SAW-LNA-SAW	Highest immunity e.g. for designs with a cellular modem

**Table 1: MAX-M10N product variants**

MAX-M10N offers backwards pin-to-pin compatibility with products from the previous u-blox generations saving the designer's effort and reducing cost when upgrading designs to the advanced low-power u-blox M10 GNSS technology.

## 1.2 Performance

Parameter	Specification	Value
Receiver type		u-blox M10 receiver
Accuracy of time pulse signal <sup>1</sup>	RMS	30 ns
	99%	60 ns
Frequency of time pulse signal <sup>1</sup>		Default 1PPS (0.25 Hz to 10 MHz configurable)
Operational limits <sup>2</sup>	Dynamics	≤ 4 g
	Altitude	80,000 m
	Velocity	500 m/s
Velocity accuracy <sup>3</sup>	Full-power mode	0.05 m/s
	LEAP mode	0.05 m/s

<sup>1</sup> Time pulse is supported only in full-power mode.

<sup>2</sup> Assuming Airborne 4 g platform.

<sup>3</sup> Median at 30 m/s for dynamic operation.

Parameter	Specification	Value
Dynamic heading accuracy <sup>3</sup>	Full-power mode	0.3 deg
	LEAP mode	5 deg

**Table 2: MAX-M10N-10B specifications**

Table 3 shows typical performance values in multi-GNSS configurations. QZSS is enabled in all measurements. SBAS is enabled only in the full-power mode.

Parameter		GPS+GAL	GPS+GAL +BDS B1I (default)	GPS+GAL +BDS B1C
<b>Full-power mode (default)</b>				
Max navigation update rate <sup>4</sup>		20 Hz	10 Hz	10 Hz
Position accuracy (CEP) <sup>5, 6</sup>		1.5 m	1.5 m	1.5 m
Time To First Fix (TTFF) <sup>5, 7, 8</sup>	Cold start	28 s	27 s	28 s
	Hot start	2 s	2 s	2 s
	AssistNow Live Orbits <sup>9</sup>	2 s	2 s	2 s
	AssistNow Predictive Orbits <sup>10</sup>	3 s	3 s	3 s
	AssistNow Autonomous <sup>11</sup>	4 s	4 s	4 s
Sensitivity <sup>12</sup>	Tracking and navigation <sup>13</sup>	−167 dBm	−167 dBm	−167 dBm
	Reacquisition	−160 dBm	−160 dBm	−160 dBm
	Cold Start	−148 dBm	−148 dBm	−148 dBm
	Hot start <sup>7</sup>	−159 dBm	−159 dBm	−159 dBm
<b>LEAP mode</b>				
Max navigation update rate <sup>4</sup>		1 Hz	1 Hz	1 Hz
Position accuracy (CEP) <sup>6</sup>		2 m	2 m	2 m
Time To First Fix (TTFF) <sup>5, 7, 8</sup>	Cold start	28 s	27 s	28 s
	Hot start	2 s	2 s	2 s
	AssistNow Live Orbits <sup>9</sup>	2 s	2 s	2 s
	AssistNow Predictive Orbits <sup>10</sup>	3 s	3 s	3 s
	AssistNow Autonomous <sup>11</sup>	4 s	4 s	4 s
Sensitivity <sup>12</sup>	Tracking and navigation	−159 dBm	−159 dBm	−159 dBm
	Reacquisition	−158 dBm	−158 dBm	−158 dBm
	Cold Start	−148 dBm	−148 dBm	−148 dBm

<sup>4</sup> Minimum 98% fix rate under typical conditions.

<sup>5</sup> GPS is always in combination with SBAS and QZSS.

<sup>6</sup> CEP, 50%, 24 hours static, −130 dBm, > 6 SVs for each GNSS system.

<sup>7</sup> Commanded starts.

<sup>8</sup> All satellites at −130 dBm. Measured at room temperature.

<sup>9</sup> Dependent on the speed and latency of the aiding data connection, commanded starts.

<sup>10</sup> Using seven days old AssistNow Predictive Orbits data. External memory may be required.

<sup>11</sup> Using two days old orbital predicted data. External memory may be required.

<sup>12</sup> Demonstrated with a good external LNA. Measured at room temperature.

<sup>13</sup> Ultra-high sensitivity mode

Parameter	GPS+GAL	GPS+GAL +BDS B1I (default)	GPS+GAL +BDS B1C
Hot Start <sup>7</sup>	-159 dBm	-159 dBm	-159 dBm

**Table 3: MAX-M10N-10B typical performance in multi-constellation GNSS modes.**

Table 4 shows typical performance values in single-GNSS configurations.

Parameter	GPS	BDS B1I	GAL	BDS B1C
<b>Full-power mode (default)</b>				
Max navigation update rate <sup>4</sup>	25 Hz	25 Hz	25 Hz	25 Hz
Position accuracy (CEP) <sup>5, 6</sup>	1.5 m	2 m	3 m	2 m
Time To First Fix (TTFF) <sup>5, 7, 8</sup>	Cold start	29 s	30 s	41 s
	Hot start	2 s	2 s	2 s
	AssistNow Live Orbits <sup>9</sup>	2 s	2 s	6 s
Sensitivity <sup>12</sup>	Tracking and navigation <sup>13</sup>	-167 dBm	-160 dBm	-161 dBm
	Reacquisition	-160 dBm	-158 dBm	-154 dBm
	Cold Start	-148 dBm	-146 dBm	-141 dBm
	Hot start <sup>7</sup>	-159 dBm	-159 dBm	-155 dBm

**Table 4: MAX-M10N-10B typical performance in single-GNSS modes**

## 1.3 Supported GNSS constellations

MAX-M10N-10B is a concurrent GNSS receiver that can receive and track multiple GNSS systems. To achieve lower power consumption, the receiver can be configured for a subset of GNSS constellations.

The default configuration on MAX-M10N-10B is concurrent reception of GPS, Galileo, and BeiDou B1I with QZSS and SBAS enabled.

The following GNSS and their signals are supported:

System	Signals
GPS / QZSS	L1C/A (1575.42 MHz)
Galileo	E1-B/C (1575.42 MHz)
BeiDou <sup>14</sup>	B1I (1561.098 MHz), B1C (1575.42 MHz)

**Table 5: Supported GNSS and signals on MAX-M10N-10B**

The following GNSS assistance services are supported:

Service	Support
AssistNow Live Orbits	GPS L1C/A, Galileo E1, QZSS L1C/A, BeiDou B1I
AssistNow Predictive Orbits	GPS L1C/A, Galileo E1
AssistNow Autonomous	GPS L1C/A, Galileo E1, QZSS L1C/A, BeiDou B1I

**Table 6: Supported Assisted GNSS (A-GNSS) services**

The following augmentation systems are supported:

<sup>14</sup> BeiDou B1I cannot be enabled simultaneously with BeiDou B1C.

System	Support
SBAS	EGNOS, GAGAN, MSAS, WAAS, BDSBAS, KASS and SouthPAN
QZSS	L1S (SLAS), L1Sb (SBAS)

**Table 7: Supported augmentation systems**


The SBAS and QZSS augmentation systems can be enabled only if GPS operation is also enabled.

## 1.4 Supported protocols

MAX-M10N-10B supports the following interface protocols:

Protocol	Type
UBX	Input/output, binary, u-blox proprietary
NMEA versions 2.1, 2.3, 4.0, 4.10 and 4.11 (default)	Input/output, ASCII
RTCM 3.4	Input, binary

**Table 8: Supported protocols**

## 1.5 Firmware features

Feature	Description
Upgradeable firmware	Firmware in flash memory can be upgraded
Antenna supervisor <sup>15</sup>	Antenna supervisor for active antenna control and short detection
External LNA control (LNA_EN signal)	Automatic enable/disable of external LNA or active antenna to save power
CloudLocate GNSS	Extends the life of energy-constrained IoT applications. Small payload messages supported.
Assisted GNSS	AssistNow Live Orbits lifetime access, AssistNow Predictive Orbits lifetime access, and AssistNow Autonomous
Backup modes	Hardware backup mode and software standby mode
Power save mode	Low energy accurate positioning (LEAP) reduces the power consumption while retaining superior position accuracy
Super-S	Improved accuracy with small antennas
Galileo return link messages	Galileo search and rescue (SAR) return link messages (RLM) via Galileo satellite signal
Data batching	Stores position/velocity/time information over up to 10 min in RAM without host interaction
Odometer	Measures traveled distance with support for different user profiles
Data logging	Stores position/velocity/time information on the embedded flash memory without host interaction
Geofencing	Up to 4 circular areas; GPIO for waking up external CPU

**Table 9: Firmware features**

Feature	Description
Anti-jamming	RF interference and jamming detection and reporting
Anti-spoofing	Spoofing detection and reporting
Configuration lockdown	Receiver configuration can be locked by command
Message integrity	All messages can be cryptographically signed

<sup>15</sup> External components required, some pins need to be reconfigured.

Feature	Description
Secure boot	Only signed firmware images are executed

**Table 10: Security features**

## 2 Block diagram

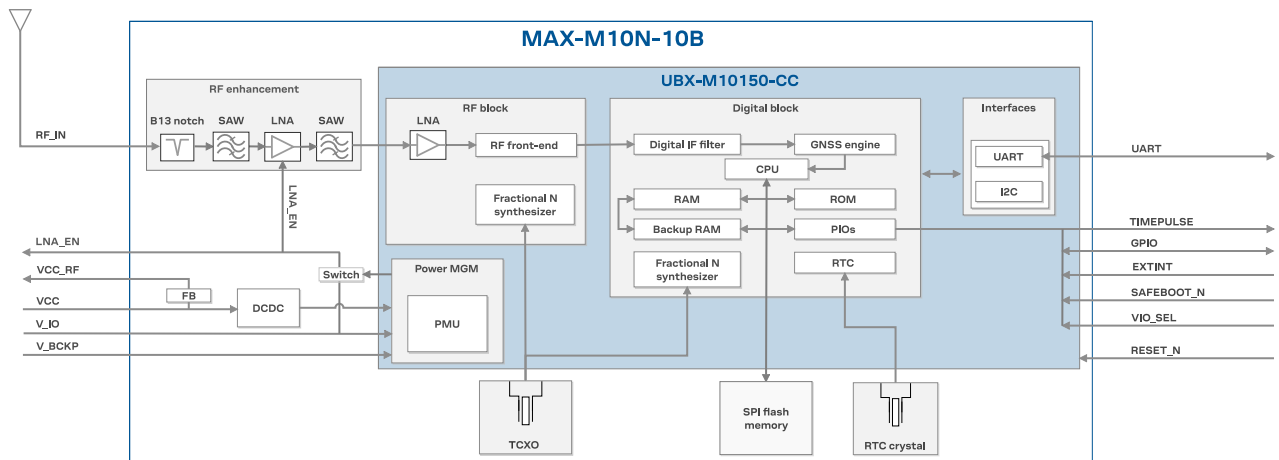


Figure 1: MAX-M10N-10B block diagram

## 3 Pin definition

### 3.1 Pin assignment

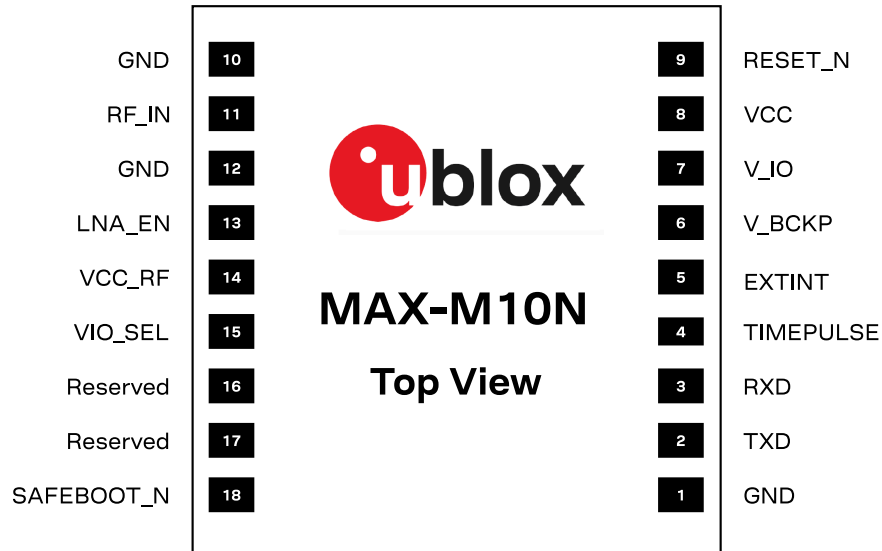


Figure 2: MAX-M10N-10B pin assignment

Pin no.	Name	PIO no.	I/O	Description
1	GND	-	-	Connect to GND
2	TXD	1	O	UART TX. Leave open if not used.
3	RXD	0	I	UART RX. Leave open if not used.
4	TIMEPULSE	4	O	Time pulse signal (shared with SAFEBOOT_N pin) <sup>16</sup>
5	EXTINT	5	I	External interrupt. Leave open if not used.
6	V_BCKP	-	I	Backup voltage supply
7	V_IO	-	I	IO voltage supply
8	VCC	-	I	Main voltage supply
9	RESET_N	-	I	System reset (active low). Has to be low for at least 1 ms to trigger a reset.
10	GND	-	-	Connect to GND
11	RF_IN	-	I	GNSS signal input
12	GND	-	-	Connect to GND
13	LNA_EN	-	O	On/Off external LNA or active antenna <sup>17</sup>
14	VCC_RF	-	O	Output voltage RF section
15	VIO_SEL	-	I	Voltage selector for V_IO supply. Connect to GND for 1.8 V supply, or leave open for 3.3 V supply.
16	Reserved	-	-	Not connected
17	Reserved	-	-	Not connected
18	SAFEBOOT_N	-	I	Safeboot mode (active low). Leave open if not used. <sup>16</sup>



Table 11: MAX-M10N-10B pin assignment

<sup>16</sup> The receiver enters safeboot mode if this pin is low at start up. The SAFEBOOT\_N pin is internally connected to TIMEPULSE pin through a 1 kΩ series resistor.

<sup>17</sup> LNA\_EN is connected to the V\_IO supply voltage through a transistor switch.

## 4 Electrical specifications

### 4.1 Absolute maximum ratings


-  CAUTION. Risk of device damage. Exceeding the absolute maximum ratings may affect the lifetime and reliability of the device or permanently damage it. Do not exceed the absolute maximum ratings.
-  This product is not protected against overvoltage or reversed voltages. Use appropriate protection to avoid device damage from voltage spikes exceeding the specified boundaries.


Symbol	Parameter	Min	Max	Unit
VCC	Main supply voltage	−0.3	6	V
V <sub>IO</sub>	IO supply voltage, VIO_SEL = GND	−0.3	1.98	V
	IO supply voltage, VIO_SEL = open	−0.3	3.6	V
	Voltage ramp on V <sub>IO</sub> <sup>18</sup>	25	35000	μs/V
V <sub>BCKP</sub>	Backup supply voltage	−0.3	3.6	V
V <sub>PIO</sub>	Input voltage on RESET_N and digital pins VIO_SEL = GND	−0.3	V <sub>IO</sub> + 0.3 (max 1.98)	V
	Input voltage on RESET_N and digital pins VIO_SEL = open	−0.3	V <sub>IO</sub> + 0.3 (max 3.6)	V
I <sub>PIO</sub>	Max source / sink current, digital pins <sup>19</sup>	−10	10	mA
ICC <sub>RF</sub>	Max source current, VCC <sub>RF</sub>		250	mA
V <sub>DC<sub>rfin</sub></sub>	DC voltage at RF_IN	−5.5	+5.5	V
P <sub>rfin</sub>	RF input power at RF_IN <sup>20, 21</sup>		0	dBm
T <sub>amb</sub>	Ambient temperature	−40	+85	°C
T <sub>s</sub>	Storage temperature	−40	+85	°C

**Table 12: Absolute maximum ratings**

### 4.2 Operating conditions

Table 13 shows the general operating conditions. Table 14 shows the electrical parameters for digital I/O.

-  The V<sub>IO</sub> voltage range is selected with the VIO\_SEL pin.

-  For designs with 1.8 V supply at V<sub>IO</sub> and V<sub>BCKP</sub> supplied, switch off the V<sub>IO</sub> supply 100 ms before VCC when transitioning to the hardware backup mode. Alternatively, put the receiver to software standby mode by sending the UBX-RXM-PMREQ message before switching off V<sub>IO</sub> and VCC. For designs with 3 V supplies, both supplies can be switched off simultaneously. Alternatively, switch off V<sub>IO</sub> before VCC.

Symbol	Parameter	Min	Typical	Max	Unit
VCC	Main supply voltage	1.76	1.8, 3.3	5.5	V
V <sub>IO</sub>	IO supply voltage, VIO_SEL = GND	1.76	1.8	1.98	V

<sup>18</sup> Exceeding the voltage ramp speed may permanently damage the device.

<sup>19</sup> The SAFEBOOT\_N pin has an internal 1 kΩ series resistor.

<sup>20</sup> Test conditions: source impedance = 50 Ω, continuous wave.

<sup>21</sup> +15 dBm for outband; 0 dBm for inband

Symbol	Parameter	Min	Typical	Max	Unit
	IO supply voltage, VIO_SEL = open	2.7	3.3	3.6	V
V_BCKP	Supply voltage, backup domain	1.65		3.6	V
V_IOSWITCH	V_IO voltage threshold to switch an internal supply for the backup domain from V_IO to V_BCKP		1.45		V
VCC_RF	VCC_RF output voltage		VCC - 0.1		V
ICC_RF	VCC_RF output current			50	mA
Z <sub>in</sub> <sup>22</sup>	Input impedance at RF_IN		50		Ω
NF <sub>tot</sub>	Receiver chain noise figure		3		dB
Ext_gain <sup>23</sup>	External gain at RF_IN, low gain mode (default)			30	dB
	External gain at RF_IN, bypass mode	10	25	40	dB
T <sub>opr</sub>	Operating temperature	-40		+85	°C

**Table 13: General operating conditions**

Symbol	Parameter	Min	Typical	Max	Unit
I <sub>leak</sub>	Leakage current input pins <sup>24</sup>		25		nA
V <sub>in</sub>	Input pin voltage range	0		V_IO	V
V <sub>il</sub>	Low-level input voltage			0.63	V
V <sub>ih</sub>	High-level input voltage	0.68 x V_IO			V
V <sub>ol</sub>	Low-level output voltage, I <sub>out</sub> = -2 mA <sup>17, 25</sup>			0.4	V
V <sub>oh</sub>	High-level output voltage, I <sub>out</sub> = 2 mA <sup>17, 25</sup>	V_IO - 0.4			V
R <sub>pu, IO</sub>	Pull-up resistance, Digital IO <sup>26</sup> . VIO_SEL = GND	6	17	72	kΩ
R <sub>pu, IO</sub>	Pull-up resistance, Digital IO <sup>26</sup> . VIO_SEL = open	8	18	40	kΩ
R <sub>pd, IO</sub>	Pull-down resistance, Digital IO	21	80	180	kΩ
R <sub>pu, SAFEBOOT_N</sub>	Pull-up resistance, SAFEBOOT_N <sup>27</sup>	6	17	72	kΩ
R <sub>pu, RESET_N</sub>	Pull-up resistance, RESET_N	7	10	13	kΩ

**Table 14: Digital IO**

## 4.3 Indicative power requirements

This section provides examples of typical current requirements. They are characterized on samples using a cold start command. The actual power requirements may vary depending on the firmware version used, the external circuitry, the number of satellites tracked, the signal strength, the type and time of start, duration, internal LNA gain mode, and the test conditions.

All values in [Table 15](#), [Table 16](#) and [Table 17](#) have been measured at 25 °C ambient temperature with the default configuration unless otherwise stated. SBAS and QZSS are active in all measurements in full-power mode.

[Table 15](#) shows indicative current consumption for VCC and V\_IO with a 3.0 V supply.

<sup>22</sup> The RF\_IN input integrates a built-in DC block.

<sup>23</sup> The internal LNA gain is configurable.

<sup>24</sup> V<sub>in</sub> = V\_IO, at room temperature.

<sup>25</sup> TIMEPULSE (PIO4) has 4 mA current drive/sink capability.

<sup>26</sup> TXD, RXD, TIMEPULSE, and EXTINT.

<sup>27</sup> The SAFEBOOT\_N pin has an additional 1 kΩ series resistor.

Symbol (Parameter)	Conditions	GPS	GPS+GAL	GPS+GAL +BDS B1I (default)	GPS+GAL +BDS B1C	Unit
$I_{VCC}^{28, 29}$ (Current at VCC)	Acquisition <sup>30</sup>	6	7.5	9.5	9.5	mA
	Tracking	5	6	7	7	mA
	Power-optimized tracking (LEAP) <sup>31</sup>	2.5	2.7	3.0	2.9	mA
$I_{V_{IO}}^{28}$ (Current at V <sub>IO</sub> )	Acquisition and Tracking	3.7	3.7	3.7	3.7	mA
	Power-optimized tracking	2.6	2.6	2.6	2.6	mA
	(LEAP) <sup>31</sup>	2.6	2.6	2.6	2.6	mA

**Table 15: Typical currents for 3.0 V supply at VCC and V<sub>IO</sub>**

Table 16 shows indicative current consumption for VCC and V<sub>IO</sub> with a 1.8 V supply.

Symbol (Parameter)	Conditions	GPS	GPS+GAL	GPS+GAL +BDS B1I (default)	GPS+GAL +BDS B1C	Unit
$I_{VCC}^{28, 29}$ (Current at VCC)	Acquisition <sup>30</sup>	9	12.5	16	16	mA
	Tracking	8.5	10	11.5	11.5	mA
	Power-optimized tracking (LEAP) <sup>31</sup>	4.2	4.5	5	4.9	mA
$I_{V_{IO}}^{28}$ (Current at V <sub>IO</sub> )	Acquisition and Tracking	3.7	3.7	3.7	3.7	mA
	Power-optimized tracking	2.6	2.6	2.6	2.6	mA
	(LEAP) <sup>31</sup>	2.6	2.6	2.6	2.6	mA

**Table 16: Typical current consumption for 1.8 V supply at VCC and V<sub>IO</sub>**


The inrush current can go up to 100 mA at startup. Ensure that the external power supply is able to deliver up to 100 mA.

Table 17 shows current consumption for the backup modes.

Symbol	Parameter	Conditions	Typ.	Unit
$I_{V_{BCKP}}^{32}$	Total current in hardware backup mode	V <sub>BCKP</sub> = 3.3 V, V <sub>IO</sub> = VCC = 0 V	34	μA
$I_{V_{IO}}$	V <sub>IO</sub> current in software standby mode	V <sub>IO</sub> = 1.8 V	37	μA
		V <sub>IO</sub> = 3.3 V	46	μA
$I_{VCC}$	VCC current in software standby mode	VCC = 3.3 V	3.6	μA

**Table 17: Backup currents**


Extreme operating temperatures can significantly impact the specified values. If an application operates near the min or max temperature limits, ensure the specified values are not exceeded.

<sup>28</sup> 1 Hz navigation update rate.

<sup>29</sup> Internal LNA set to low gain. Simulated signal using power levels of -130 dBm.

<sup>30</sup> Average current from start-up until the first fix.

<sup>31</sup> The power-optimized tracking state is only supported in LEAP mode.

<sup>32</sup>  $I_{V_{BCKP}}$  current in normal operation (V<sub>BCKP</sub> = 3.3 V, V<sub>IO</sub> = VCC = 3.3V) is ~3 μA.

## 5 Communication interfaces

The receiver supports communication over the UART only.

All the inputs have an internal pull-up resistor in normal operation and can be left open if not used. The voltage level at the PIO pins is related to the V<sub>IO</sub> supply voltage.

### 5.1 UART

The UART interface supports configurable baud rates. Hardware flow control is not supported. UART specifications are described in [Table 18](#).

Symbol	Parameter	Min	Max	Unit
R <sub>u</sub>	Baud rate	9600	921600	bit/s
Δ <sub>Tx</sub>	Tx baud rate accuracy	-1%	+1%	-
Δ <sub>Rx</sub>	Rx baud rate tolerance	-2.5%	+2.5%	-

**Table 18: UART specifications**

### 5.2 Default interface settings

Interface	Settings
UART	<ul style="list-style-type: none"> <li>9600 baud, 8 bits, no parity bit, 1 stop bit.</li> <li>Input messages: NMEA, UBX and RTCM.</li> <li>Output messages: NMEA GGA, GLL, GSA, GSV<sup>33</sup>, RMC, VTG and TXT</li> </ul>

**Table 19: Default interface settings**

<sup>33</sup> In the default configuration, the NMEA-GSV messages are sent at 5-second intervals to avoid overflow in the TX buffer.

## 6 Mechanical specifications

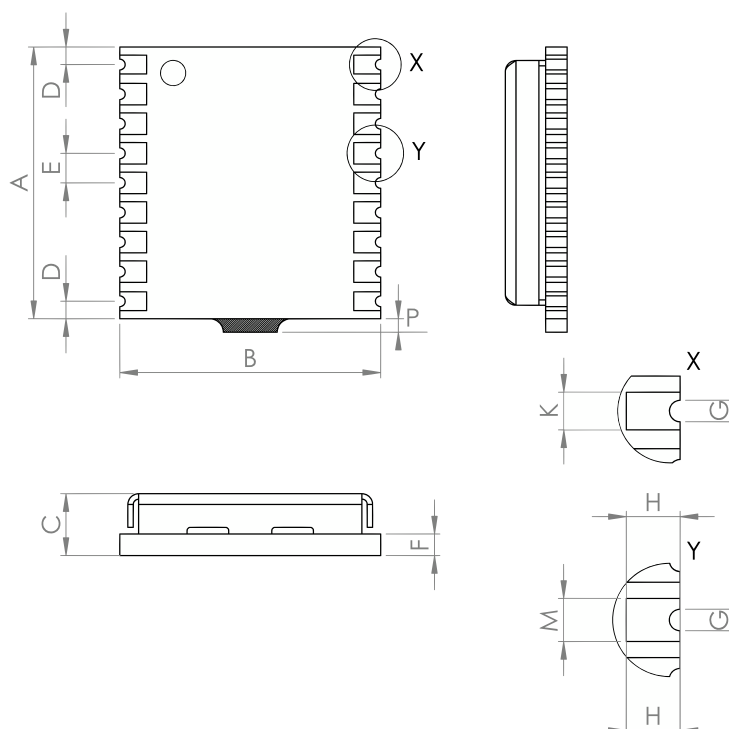


Figure 3: MAX-M10N-10B mechanical drawing

Symbol	Min (mm)	Typical (mm)	Max (mm)
A	10.0	10.1	10.7
B	9.6	9.7	9.8
C	2.2	2.5	2.7
D	0.55	0.65	0.95
E	1.0	1.1	1.2
F	-	0.76	-
G	0.3	0.4	0.5
H	0.9	1.0	1.1
K	0.6	0.7	0.8
M	0.7	0.8	0.9
P	0.0	0.3	0.6
Weight		0.5 g	

Table 20: MAX-M10N-10B mechanical dimensions

- The mechanical picture of the de-paneling residual tab (P) is an approximate representation, shape and position may vary.
- Take the size of the de-paneling residual tabs into account when designing the component keepout area.
- The width (K) applies to all four corner pins.
- The pitch (E) applies to all pins.

## 7 Qualifications and approvals

Type	Description
<b>Quality and reliability</b>	
Manufacturing	Manufactured at IATF 16949 certified sites
<b>Environmental</b>	
Moisture sensitivity level (MSL) <sup>34, 35</sup>	4

**Table 21: Qualifications and approvals**

<sup>34</sup> For MSL standard see IPC/JEDEC J-STD-020 and J-STD-033 [5].

<sup>35</sup> For more information regarding moisture sensitivity levels, labeling, storage, and drying, see the Product packaging reference guide [4].

## 8 Product handling

### 8.1 Packaging

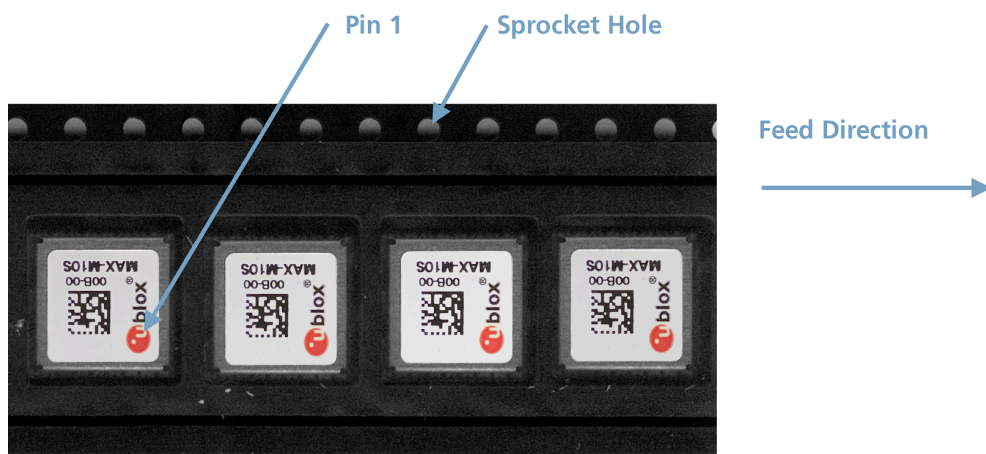
The MAX-M10N-10B modules are delivered as hermetically sealed, reeled tapes to enable efficient production, production lot set-up and tear-down. For more information, see the Product packaging reference guide [4].

#### 8.1.1 Reels

MAX-M10N-10B modules are deliverable in quantities of 500 pieces on a reel. They are shipped on reel type B1, as specified in the Product packaging reference guide [4].

#### 8.1.2 Tapes

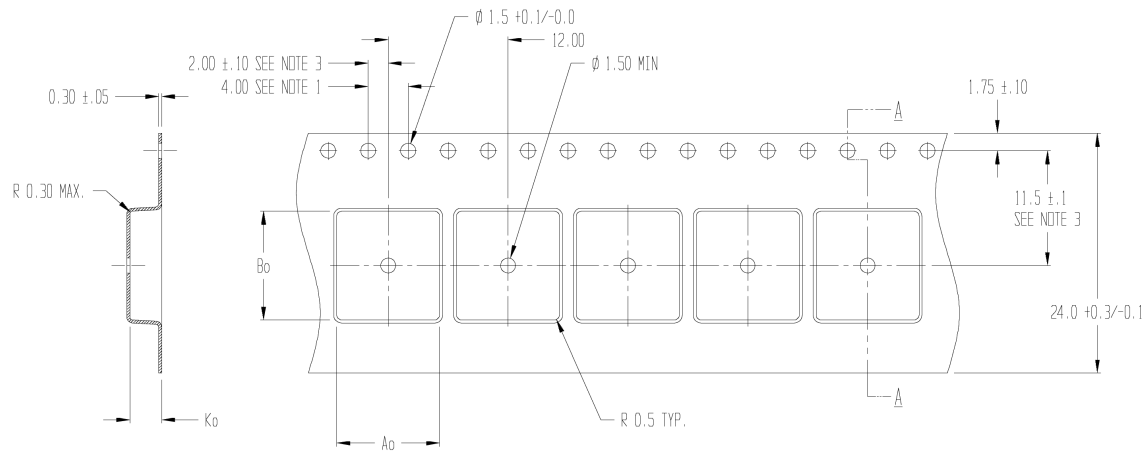
Figure 4 shows the feed direction and illustrates the orientation of the components on the tape.



**Figure 4: Orientation of the components on the tape**

The feed direction into the pick and place pick-up is from the reel (located on the left of the figure) towards right, and the tape is fed to the right.

The dimensions of the tape are specified in Figure 5 (measurements in mm).



SECTION A - A

$A_0 = 10.30$   
 $B_0 = 10.90$   
 $K_0 = 3.20$

Measurements in mm.

Tolerances unless noted: 1Pl  $\pm 0.2$  2Pl  $\pm 0.10$

#### Notes:

1. 10 sprocket hole pitch cumulative tolerance  $\pm 0.2$
2. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.
3.  $A_0$  and  $B_0$  are calculated on a plane at a distance "R" above the bottom of the pocket.

**Figure 5: Tape specification**

## 8.2 Soldering

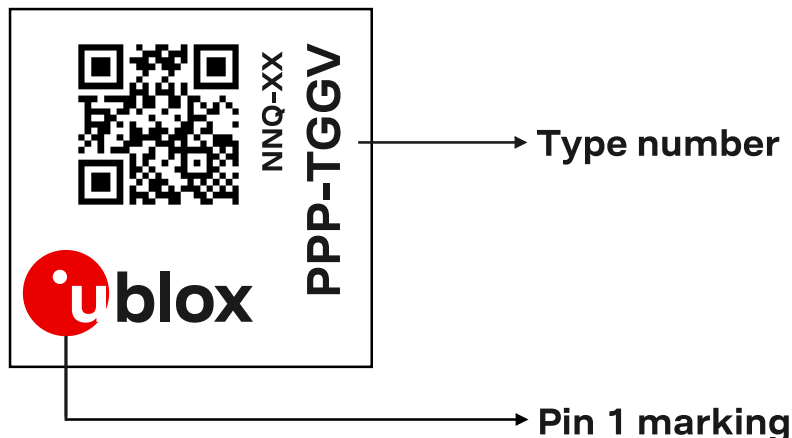
Reflow soldering is described in the IPC/JEDEC J-STD-020 standard [5].

## 9 Product marking and ordering information

This section provides information about product marking and ordering.

### 9.1 Product marking

The product marking provides information on MAX-M10N-10B and its revision, as in [Figure 6](#). For a description of the product marking, see [Table 22](#)



**Figure 6:** Example of MAX-M10N-10B product marking

Code	Meaning	Example
PPP	Form factor	MAX
TGG	Platform	M10 = u-blox M10
V	Variant	N = Standard precision, flash, TCXO, SAW filter, and LNA
NN	Major product version	00, 01, 02, ...
Q	Product grade	A = Automotive, B = Professional
XX	Revision	Hardware and firmware versions

**Table 22:** Description of product marking

### 9.2 Product identifiers

The MAX-M10N-10B marking features three product identifiers: product name, ordering code and type number. The product name identifies all u-blox products, independent of packaging and product grade, and it is used in documentation such as this data sheet. The ordering code includes the major product version and product grade, while the type number additionally includes the hardware and firmware versions.

[Table 23](#) describes the three different product identifiers used in the MAX-M10N-10B module product marking.

Identifier	Format	Example
Product name	PPP-TGGV	MAX-M10N
Ordering code	PPP-TGGV-NNQ	MAX-M10N-10B
Type number	PPP-TGGV-NNQ-XX	MAX-M10N-10B-00

**Table 23:** Product identifiers

## 9.3 Ordering codes

Ordering code	Product	Remark
MAX-M10N-10B	u-blox M10 GNSS receiver module, professional grade	SAW-LNA-SAW RF front-end for the highest RF immunity in cellular designs

**Table 24: Product ordering codes**

u-blox provides information on product changes affecting the form factor, size or function of the product. For the Product change notifications (PCNs), see our website at: <https://www.u-blox.com/en/product-resources>.

## Related documents

- [1] MAX-M10N Integration manual, [UBXDOC-304424225-19802](#)
- [2] u-blox M10 SPG 5.30 Interface description, [UBXDOC-304424225-20395](#)
- [3] u-blox M10 SPG 5.30 Release note, [UBXDOC-304424225-20393](#)
- [4] Product packaging reference guide, [UBX-14001652](#)
- [5] Joint IPC/JEDEC standard, [www.jedec.org](http://www.jedec.org)



For regular updates to u-blox documentation and to receive product change notifications please register on our homepage <https://www.u-blox.com>.

## Revision history

Revision	Date	Status / comments
R01	09-Jan-2025	Initial release
R02	15-May-2025	Prototype Updated sections <ul style="list-style-type: none"><li>• Supported protocols</li><li>• Firmware features</li><li>• Block diagram</li><li>• Default interface settings</li></ul>
R03	17-Sep-2025	Engineering sample Updated sections <ul style="list-style-type: none"><li>• Performance</li><li>• Supported protocols</li><li>• Firmware features</li><li>• Indicative power requirements</li></ul>
R04	14-Oct-2025	Updated sections <ul style="list-style-type: none"><li>• Performance</li></ul>

## Contact

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