

JS-AP08-PR

Mini Size Single Frequency GNSS Module

Datasheet

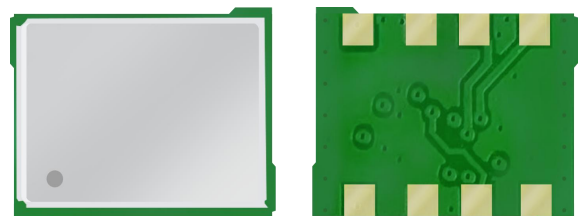


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Revision History

Version	Date	Contents changes and modifications	Modified by
V1.0	2025-8-13	First Release	HJX
V1.1	2026-1-23	1. Modified V_BACKP operation 2. Added recommended reflow parameters and application circuit	HJX

1 Product Introduction

1.1 Overview

The JS-AP08-PR is a high-performance GNSS positioning module featuring compact size, low power consumption, and strong endurance. It integrates RF front-end and baseband processing in a single ultra-compact package, supporting concurrent reception of GPS/QZSS (L1C/A) and BDS (B1I, B1C) signals. Built with a ROM-based chip and built-in search engine, it achieves fast positioning even in dense urban environments. The module is suitable for wearable devices, vehicle management, car navigation, and portable tracking equipment.

1.2 Product Features

- High-performance SOC architecture
- Intelligent interference detection and suppression
- Adopts ARM Cortex-M4F processor
- Supports GPS/QZSS (L1C/A) and BDS (B1I,B1C)
- Advanced low-power design
- Smart power management
- Wide operating voltage range
- 88 tracking channels with dedicated search engine
- Mini size: 8mm × 6mm × 2.3mm ±0.1mm, weight < 1g
- Supports standard NMEA 0183 protocol V4.10

1.3 Performance Metrics

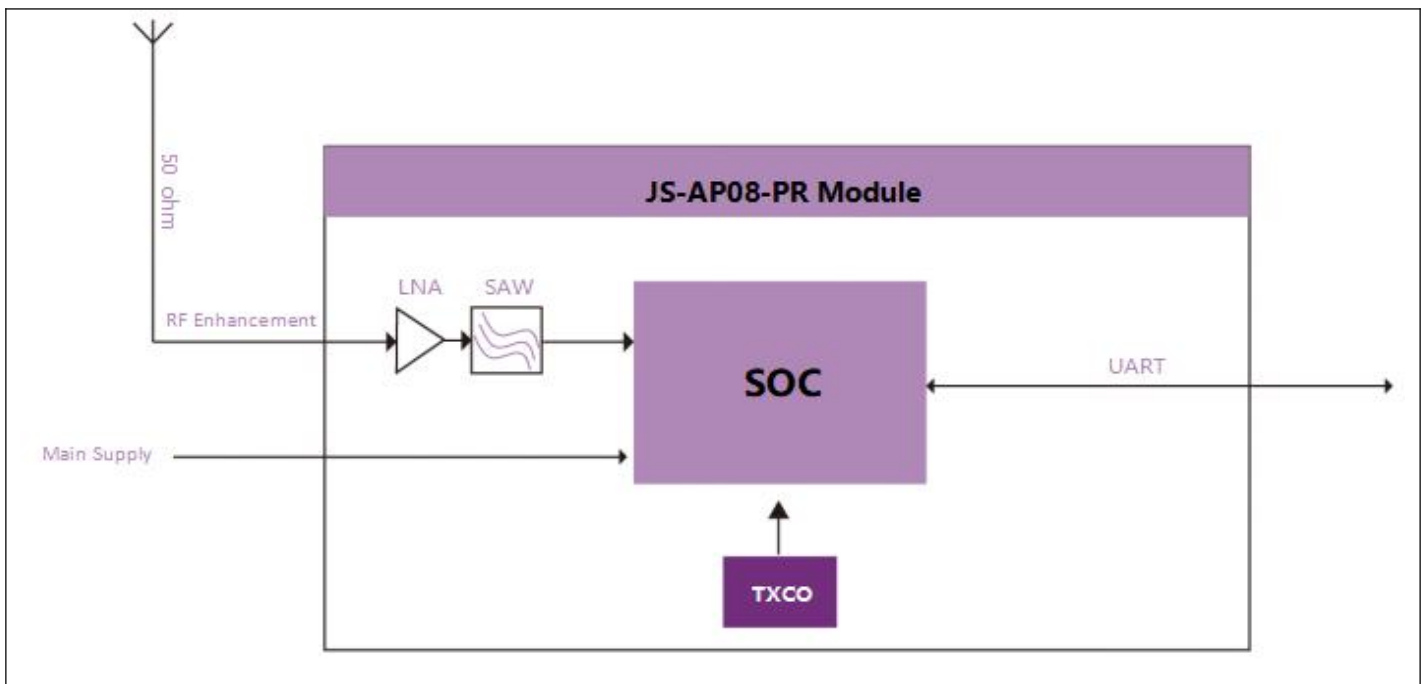
Category	Specifications	
Constellations & Bands	■GPS/QZSS L1C/A	■BDS B1I B1C
Sensitivity	Tracking & Navigation	-161dBm
	Reacquisition	-158dBm
	Cold Start	-148dBm
	Hot Start	-156dBm
Time to First Fix(TTFF) ¹	Cold Start	29s
	Hot Start	1s
Positioning Accuracy ²	GNSS	2.5m CEP
Velocity & Time Accuracy ³	1PPS	20ns
	GNSS	0.1m/s CEP
Operating Limits	Altitude	18000m
	Velocity	515m/s
Baud Rate	9600 bps	
Max Update Rate	Default 1Hz, configurable up to 5Hz	

✌️1 All satellites $\geq -130\text{dBm}$

✌️2 CEP 50%, 24h static, $\geq -130\text{dBm}$, > 6SVs

✌️3 50% dynamic at 30m/s

1.4 Block Diagram



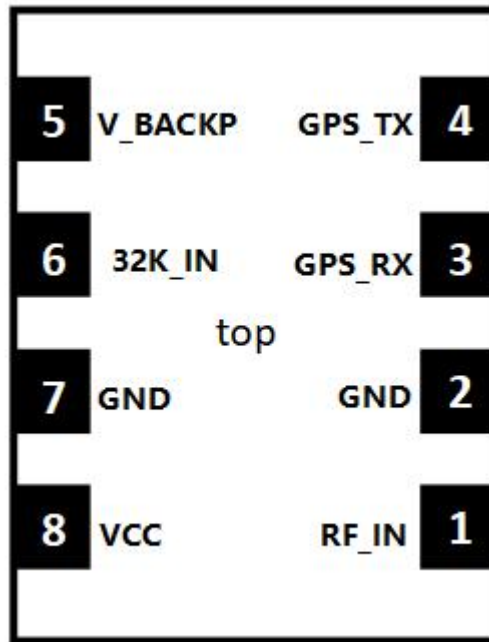
1.5 Protocol

Protocol	Type
NMEA 0183 V4.10	Input/Output ASCII Output sentences: GGA, GSA, GSV, RMC, ZDA, TXT

1.6 Product Applications

- Smart Wearable devices
- Portable Positioning Devices
- Vehicle Navigation
- Fleet Management
- Tracker
- Personnel Location

2 Pin Definitions



No.	Pin Name	Input/Output	Description
1	RF-IN	Input	RF signal input
2	GND	-	Ground
3	GPS_RX	Input	GPS data input
4	GPS_TX	Output	GPS data output
5	V_BACKP ¹	Input	Backup power (non-isolated)
6	32K_IN	Input	External 32kHz clock input
7	GND	-	Ground
8	VCC	Input	Main power supply

✎1 V_BACKP must be connected for module operation:

If connected to a permanent power source/supercapacitor, hot start remains available after VCC power loss.

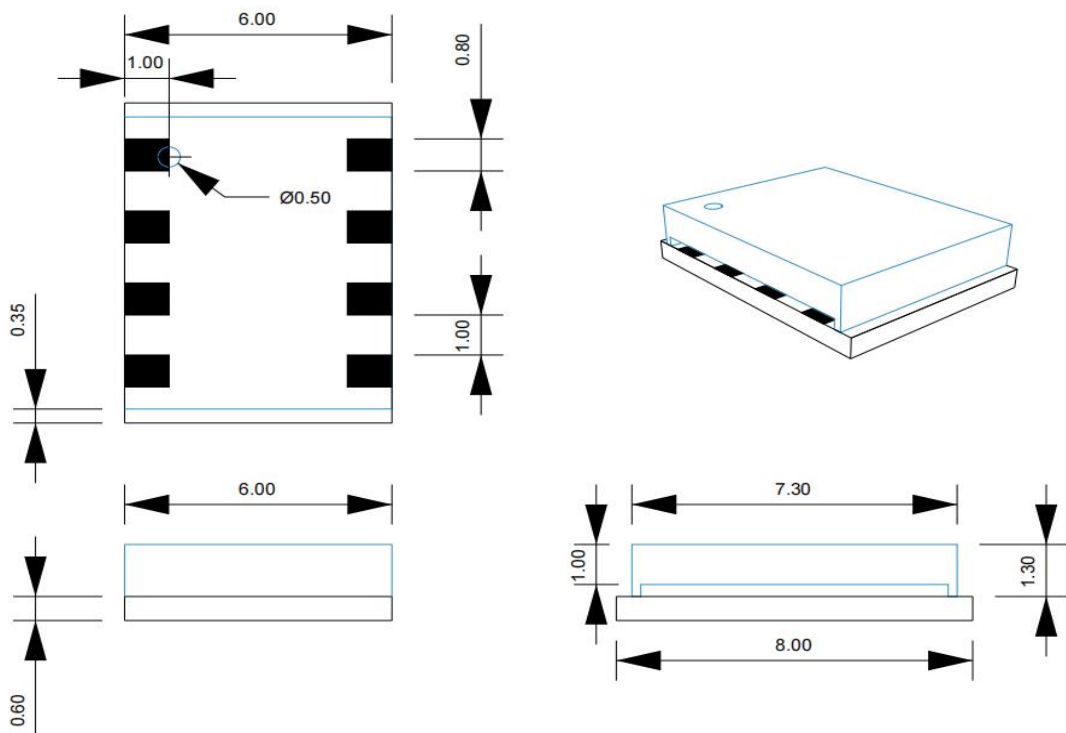
If connected directly to VCC, hot start is unavailable after VCC power loss.

3 Electrical Characteristics

Parameters	Symbol	Min	Typical	Max	Unit
Power supply voltage	VCC	1.9	3.3	3.6	V
Average current	I	20mA@3.3V	21mA@3.3V	25mA@3.3V	mA
Backup voltage	V_BACK	-	3.3	-	V

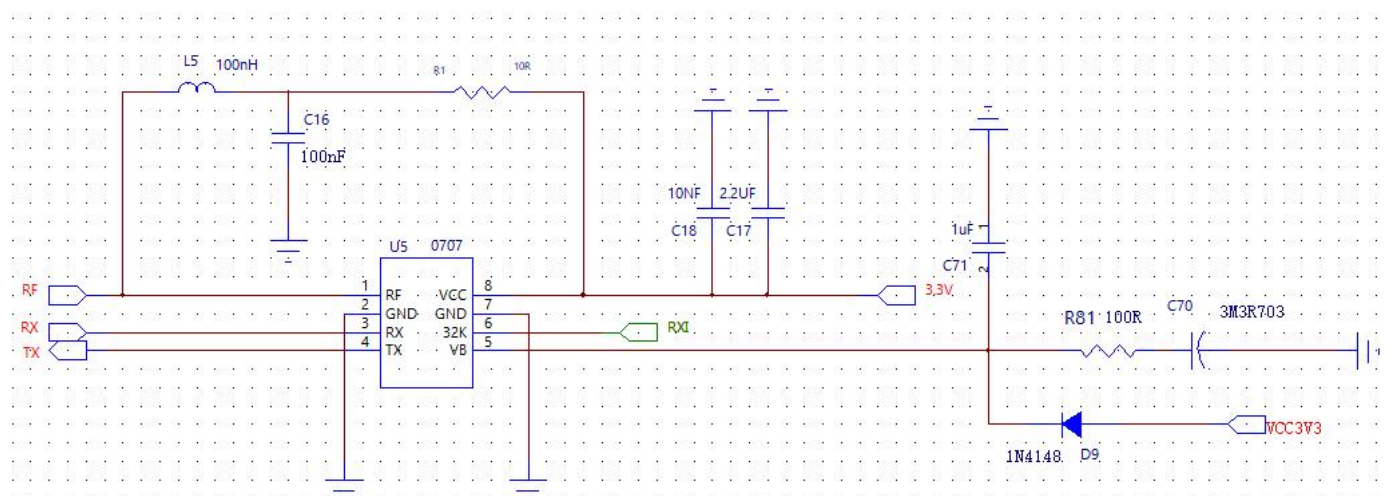
IO voltage	Div	1.8	-	3.6	V
Storage Temperature	Tstg	-40	-	85	°C
Operating Temperature	Topr	-40	-	85	°C
Humidity	RH	-	-	95	%

4 Product Dimensions



UNIT: mm Tolerance: $\pm 0.1\text{mm}$

5 Application Circuit



6 RoHS Compliance

This product complies with RoHS standards.

7 Recommended reflux curve

7.1 Pre-SMT Notes

7.1.1 Stencil opening should extend 0.7mm beyond module outline at a 1:1 ratio, with a thickness of 0.12 mm.

7.1.2 Handle modules with gloves and anti-static wrist straps.

7.1.3 Reflow temperature typically $250 \pm 5^{\circ}\text{C}$ (up to $260 \pm 5^{\circ}\text{C}$) depending on PCB size.

7.2 Storage & Using of GNSS Module

7.2.1 Shelf life: 12 months at $<40^{\circ}\text{C}$, $<90\%$ RH.

7.2.2 After opening the bag, devices intended for infrared reflow, vapor phase reflow, or similar processes must be inspected.

7.2.3 Check the humidity indicator card: Storage environment shall have a relative humidity $\leq 20\%$.

If the indicator shows 30%–40% (pink) or above 40% (red), the module label indicates that the component is moisture-sensitive.

7.2.4 Installation must be completed within 168 hours under factory conditions: temperature $\leq 30^{\circ}\text{C}$, relative humidity $\leq 60\%$.

7.2.5 Once opened, the allowable storage time in the workshop environment is 168 hours.

7.3 If baking is required, the device may be baked as follows:

7.3.1 The moisture content within the module must be removed.

7.3.2 Baking temperature: 125°C , 8 hours.

7.3.3 After baking, the module shall be sealed and packaged with an appropriate amount of desiccant.

7.4 The actual quantity of modules in vacuum packaging is determined by the customer's specific packaging requirements.

7.5 The tape-and-reel packaging specifications for the modules are as follows:

7.5.1 Shelf life: 12 months. Storage conditions: $< 40^{\circ}\text{C}$, relative humidity $< 90\%$ RH.

7.5.2 If more than 168 hours have passed after unpacking the module, baking is required before SMT mounting to remove moisture absorption. Baking conditions: 125°C for 8 hours.

7.5.3 The actual quantity of modules in tape-and-reel packaging is based on the customer's specific

packaging requirements.

7.6 Tray packaging specifications are as follows:

7.6.1 Shelf life: 3 months. Storage conditions: $< 40^{\circ}\text{C}$, relative humidity $< 90\%$ RH.

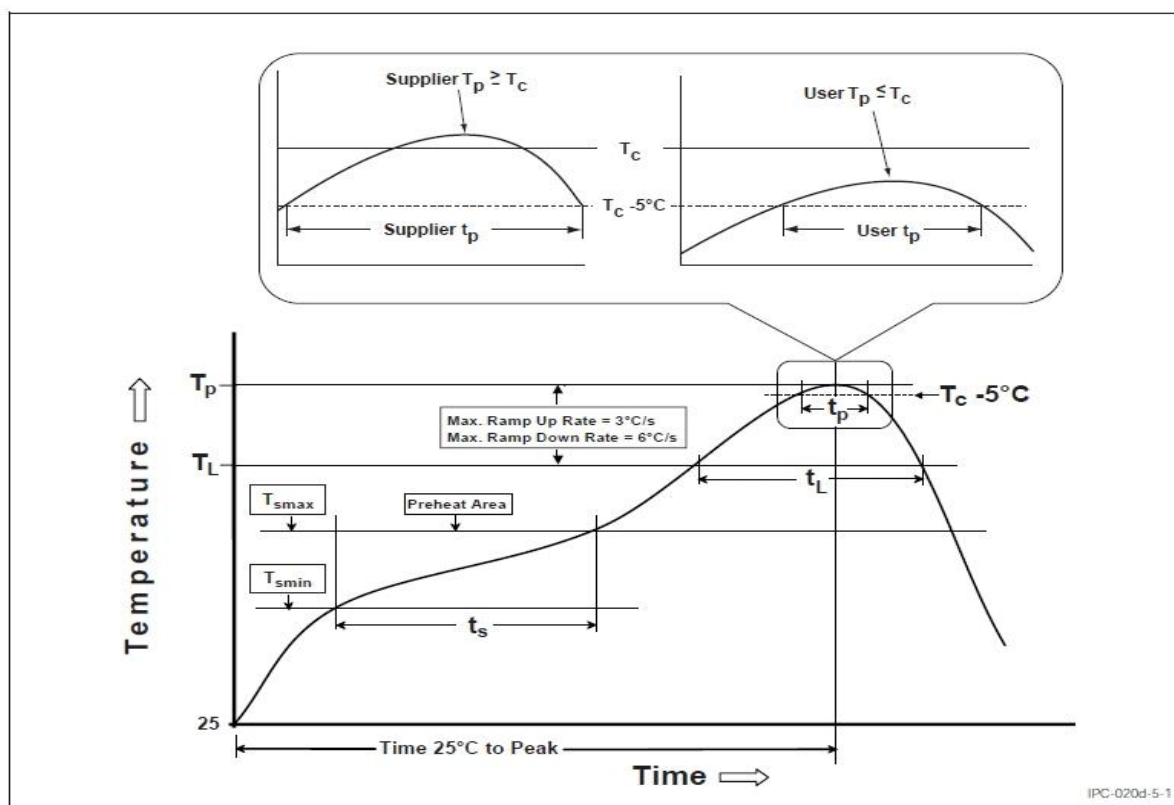
7.6.2 If the module is not used within 48 hours, baking is required before starting operations. Baking conditions: 125°C for 8 hours.

7.6.3 Tray packaging contains 100 pieces per tray. The actual quantity of modules in tray packaging is based on the customer's specific packaging requirements.

7.6.4 Lead-free process – temperature classification (T_a)

Package Thickness	Volume $< 350\text{ mm}^3$	Volume $350\text{--}2000\text{ mm}^3$	Volume $> 2000\text{ mm}^3$
$< 1.6\text{mm}$	260°C	260°C	260°C
$1.6\text{mm}-25\text{mm}$	260°C	250°C	245°C
$> 2.5\text{mm}$	250°C	245°C	245°C

7.6.5 Temperature Curve



Contour features	Lead-Free Assembly
Preheat/Soak	
Minimum Temperature (T_{smin})	150 °C
Maximum Temperature (T_{amax})	200 °C
Time t_s (from T_{smin} to T_{amax})	60-120 Seconds
Rate of ascent (T_L to T_p)	Maximum 3°C/Second
Liquidus Temperature (T_L)	217 °C
Time t_L ((time above T_L)	60-150s
Peak Package Body Temperature (T_p)	It must not exceed T_c ($T_c=260^\circ\text{C}$)
Duration (t_p) ♦ within the specified temperature (T_c) $\pm 5^\circ\text{C}$	30*Seconds
Rate of descent (T_p to T_L)	Maximum 6°C/second
Time from 25°C to peak temperature	Maximum 8minutes
♦The tolerance for peak temperature (T_p) is defined as the supplier's minimum and the user's maximum.	

*Time above 255°C must not exceed 30 seconds.