

KStar50M-GNSS

GNSS Disciplined Oscillator Module

High Precision, Functional Flexible Oscillator



Holdover accuracy is better than $\pm 0.32\text{ppm}$ over 24 hours from -20 to $+70^\circ\text{C}$

The KStar50M-GNSS GNSSDO is time and frequency synchronized to GNSS and provides a low noise 10MHz and a 1PPS outputs. It receives GNSS signals with a sensitivity of down to -167dBm . With a long-term frequency stability that shows deviations of less than $1\text{E}-12$. The new KStar50M achieves the quality standards of Stratum 3 of the Network Time Protocol.

Key Features

- Support GPS, GLONASS, BeiDou & Galileo
- Better than $1\text{E}-12$ long term frequency stability
- Holdover of less than $\pm 0.32\text{ppm}$ over 24 hours at full operating temperature range
- Fast frequency locking time as Stratum 3 clock source
- Compact form factor in $72 \times 41 \times 14$ mm

Applications

- Stratum 3 Clock Source
- Precision Time Base Reference
- General Timing and Synchronization



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Unit C, 24/F, Shield Industrial Centre, 84 - 92 Chai Wan Kok Street, Tsuen Wan, ,New Territories, Hong Kong.



GNSS Receiver

GNSS Receiver				
Bands		GPS L1C/A, SBAS L1C/A, QZSS L1C/A, QZSS L1 SAIF, GLONASS L1OF, BeiDou B1, Galileo E1B/C		
Channels		32		
Sensitivity		GPS	Tracking	-166 dBm
			Acquisition	-157 dBm
		GLONASS	Tracking	-166 dBm
			Acquisition	-151 dBm
		BeiDou	Tracking	-159 dBm
			Acquisition	-146 dBm
		Galileo	Tracking	-159 dBm
			Acquisition	-142 dBm
Antenna Connector		SMA		
Antenna Impedance		50 Ω		
Antenna Bias Voltage		3.3 V		

GNSS Antenna (Optional)				
Bias Voltage			3.3	V
Gain			28	dBi
Cable Type			RG58	
Material			PVC	
Connector			SMA male	
Cable Length			10	meter
			Other length available upon request	
Dimensions		Antenna Diameter	95	mm
		Mount Diameter	105	mm
		Height	175	mm



	Parameters	Conditions	Min	Typ	Max	Unit	
Environment	Operating Temperature		-20		+70	°C	
	Storage Temperature		-40		+85	°C	
	Operation Humidity				+85	%R.H.	
Power	Supply Voltage		4.75	5.0	5.25	V (DC)	
	Supply Current	@ 25 °C			100	mA	
1PPS Output	Output voltage high	LVC MOS, I _{OH} = -12mA	2.4			V	
	Output voltage low	LVC MOS, I _{OL} = 12mA			0.7	V	
	Nominal output impedance			50		Ω	
	Programmable Duty Cycle		10		90	%	
	Rising / Falling Time	5pF load		0.7	1	ns	
	Accuracy	Locked to GNSS			± 10	ns	
	Stability	Locked to GNSS			± 4	ns	
	Holdover Accuracy		@ 4 hours Holdover (full operating temperature range)		± 4.1		ms
			@ 4 hours Holdover (constant temperature)		± 0.1		ms
			@ 24 hours Holdover (full operating temperature range)		± 27.6		ms
@ 24 hours Holdover (constant temperature)				± 3.5		ms	
10MHz Output	Output voltage high	LVC MOS, I _{OH} = -12mA	2.4			V	
	Output voltage low	LVC MOS, I _{OL} = 12mA			0.7	V	
	Nominal output impedance			50		Ω	
	Duty Cycle		45		55	%	
	Rising / Falling Time	5pF load		0.7	1	ns	
	Long Term Stability	Locked to GNSS, 24 hours average			±1E-12		
	Allan Deviation (ADEV)	Locked to GNSS, at τ=1sec.			1E-10		
	Holdover Accuracy		@ 24 hours Holdover (full operating temperature range)			±0.32	ppm
@ 24 hours Holdover (constant temperature)					±0.04	ppm	
Lock Time	Power On to Lock (≤ ±0.28 ppm)			< 5		min	
	Holdover to Lock (≤ ±0.28 ppm)			< 3		min	
Communication Interface	UART	115200-8-N-1					
Protocol	Proprietary ASCII Commands						
Compliances	Frequency Accuracy & Holdover	ITU-T G.812					

	Conditions	Offset Frequency (Hz)	Phase Noise max. (dBc/Hz)
Phase Noise at 10MHz Output	Locked to GNSS	10	-98
		100	-125
		1K	-143
		10K	-151
		100K	-152
		1M	-155



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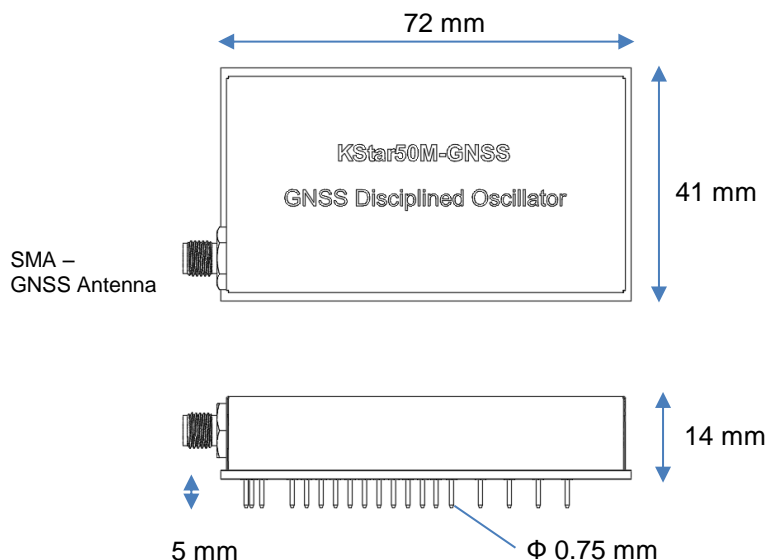
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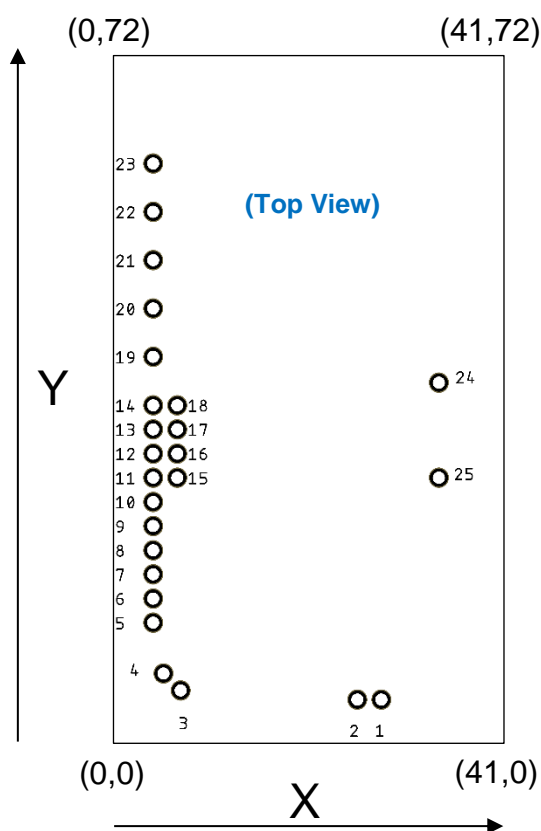
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Dimensions



Pin Coordinates



Pin	Signal Type	Function	X (mm)	Y (mm)
1	Gnd	GND	28.3	4.45
2	Supply Voltage	+5V	25.76	4.45
3	Gnd	GND	7.19	5.41
4	No Connection		5.4	7.2
5	Output	1PPS Output	4.3	12.53
6	Input	Reset	4.3	15.07
7	Output	UART Tx D	4.3	17.61
8	Input	UART Rx D	4.3	20.15
9	Output	PLL Locked	4.3	22.69
10	Input	Forced Holdover	4.3	25.23
11	Output	Holdover	4.3	27.77
12	Output	Alarm	4.3	30.31
13	Do Not Connect	Reserved for Factory Use	4.3	32.85
14	Do Not Connect	Reserved for Factory Use	4.3	35.39
15	Do Not Connect	Reserved for Factory Use	6.84	27.77
16	Do Not Connect	Reserved for Factory Use	6.84	30.31
17	No Connection		6.84	32.85
18	Gnd	GND	6.84	35.39
19	Output	10MHz Output #1	4.3	40.47
20	Do Not Connect	Reserved for Factory Use	4.3	45.55
21	Gnd	GND	4.3	50.63
22	Gnd	GND	4.3	55.71
23	Gnd	GND	4.3	60.79
24	Gnd	GND	34.34	37.77
25	Gnd	GND	34.34	27.77

All dimensions are in millimeter (mm)



Extension Board (Optional)

An Extension Board is available for easy evaluation of KSTAR modules. It extends the pin connections from the module to SMA connectors and headers on the extension board, and optionally provides additional features as below:



Programmable Frequency Dual Synthesizer Output (optional)

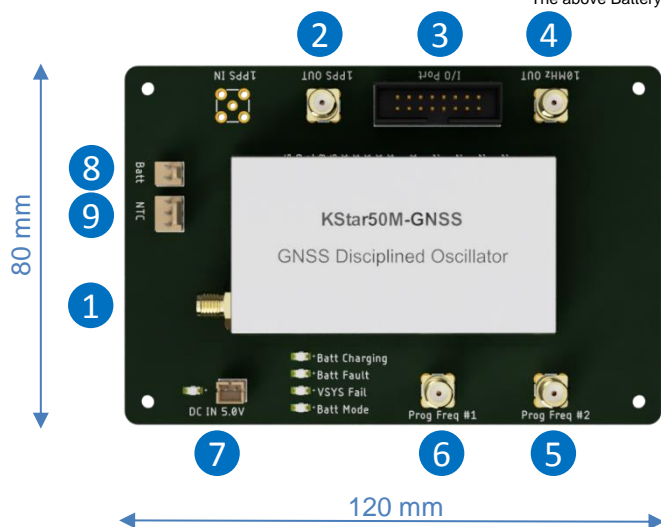
	Min	Typ	Max	Unit
Output #1	1		200	MHz
Output #2	1		200	MHz
Duty Cycle	40	50	60	%
VOH	2.4		3.3	V
VOL			0.45	V
Nominal Output Impedance		50		Ω
Accuracy			50	ppb
Phase Jitter (RMS)		0.5		ps



Batteries Backup (optional)

	Conditions	Min	Typ	Max	Unit
Battery type			Lithium		
Voltage	1. Connected USB, ref, 1PPS and 10MHz.		3.7		V
Capacity	2. Temperature at 25°C.		4.4		AH
Backup Time	3. Without synthesizer option.		3		Hours

The above Battery life test is used for reference information only, values not guaranteed.



- 1 SMA - GNSS Antenna
- 2 SMA - 1PPS Output
- 3 2 x 8 Header – User I/Os (UART)
- 4 SMA – 10MHz Output
- 5 SMA – Programming Freq. Output #1
- 6 SMA – Programming Freq. Output #2
- 7 2 x 1 Header – Power Input
- 8 2 x 1 Header – Li-Ion / LiFePO4 Battery
- 9 3 x 1 Header – Battery NTC Input

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.
ALL PICTURES SHOWN ARE FOR ILLUSTRATION PURPOSE ONLY.
ACTUAL PRODUCT MAY VARY DUE TO PRODUCT ENHANCEMENT.

