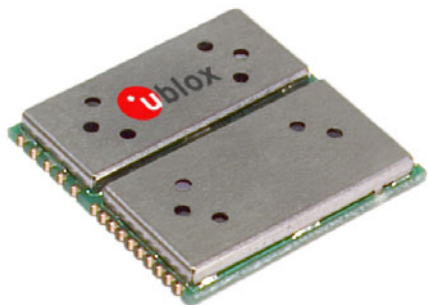# TIM-LF

GPS Receiver Macro Component
ANTARIS™ Positioning Engine

The **TIM-LF is an ultra-low power GPS receiver macro component for use with active antennas. Based on the ANTARIS™ GPS positioning engine jointly developed by Atmel and u-blox, it offers excellent GPS performance. The TIM-LF can run custom applications on the on-board processor and offers two 3V (5V TTL input compatible) serial ports and a set of configurable 1.8V input and output ports. With its innovative packaging technology the TIM-LF GPS receiver is the ideal solution for high-volume applications requiring a high degree of system integration.**

Overview

The TIM-LF GPS receiver macro component is another milestone in the miniaturization of GPS receiver modules. Innovative packaging technology has opened the door for a thin and compact GPS receiver unique to the market. The TIM-LF macro component is SMT solderable and can be handled by standard pick-and-place equipment. This allows a fully automatic assembly process. The height of 3mm (~120mil) and the size of 25.4 x 25.4 mm (1" x 1") make it the ideal GPS solution for applications with stringent space requirements.

Benefits

- Fully self-contained GPS receiver (PVT output)
- Ultra-low power consumption
- Excellent GPS performance
  - Excellent navigation accuracy
  - Fast Time-to-first-fix
- Macro component
  - Very compact design
  - Automatic pick and place assembly
  - Reflow solderable

- High Flexibility:
  - Extensively configurable
  - Integration of custom application code
- Fully EMI shielded
- Active antenna support

Features

- 16 channel GPS receiver
- 8192 simultaneous time-frequency search bins
- 4 Hz position update rate
- Based on the ANTARIS™ GPS Technology
  - ATR0600 RF front-end IC
  - ATR0620 Baseband IC with integrated ARM7TDMI
- 8 Mbit FLASH memory
- Available resources for custom applications
  - SRAM
  - FLASH
  - GPIOs
  - SPI
  - CPU power
- FixNOW™ power saving mode ideally suited for mobile and battery-driven tracking applications
- Operating voltage 2.7…3.3 V
- Battery supply pin for internal backup memory and real time clock
- Industrial operating temperature range –40…85°C
- Small size
  - Size   25.4mm x 25.4mm
  - Height   3mm
  - Weight   3g

Support Products

ANTARIS™ EvalKit

Use the ANTARIS™ EvalKit to experience the power of TIM-LF.

ANTARIS™ Software Customization Kit

The ANTARIS™ Software Customization Kit (SCKit) enables you to implement your own code on TIM-LF. The Application Link Layer (ALL) of the ANTARIS™ GPS software offers a powerful API (Application Programmer's Interface) for fast and safe integration of your application code.

your position is our focus

Specifications

Receiver Performance Data

Receiver Type	16 channel, L1 frequency, C/A code	
Max. Update Rate	4 Hz	
Accuracy	Position	3 m CEP
	DGPS	2 m CEP [1]
Start-up Times	Hot start	3.5 sec
	Warm start	33 sec
	Cold start	41.5 sec
Signal reacquisition	< 1 s	
Timing Accuracy	max. 100 ns typ. 50 ns (RMS)	
Dynamics	< 4 g	
Operational Limits	COCOM restrictions apply	

[1] Depending on accuracy of correction data

For more detailed information on the GPS performance check the *TIM-LF Data Sheet*.

Electrical Data

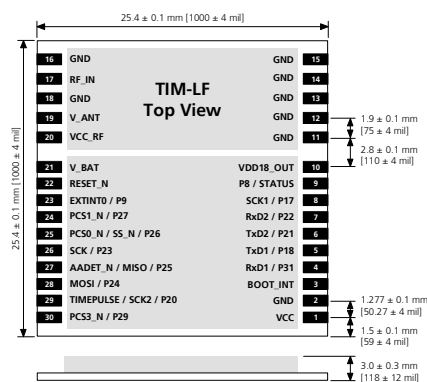|	
Power Supply	2.7 – 3.3 V
Power Consumption	typ. 159 mW @ 3.0 V typ. 143 mW @ 2.7 V
	Sleep mode: typ. 130 µA
Backup Power	1.95 V – 3.6 V
Serial Ports	2 USARTs @ 3 V levels 5V TTL compatible inputs
Digital IOs	TIMEPULSE @ 1.8 V
I/O Protocols	NMEA input/output UBX binary input/output RTCM in
	Interleaving multiple protocols via same serial interface is supported
Interface	30 pin leadless chip carrier reflow solderable
Antenna Power	External
Antenna Supervision	Integrated short-circuit detection and antenna shutdown
	Open circuit detection is supported with little external circuitry

Available Resources [2]

Processor	ARM7 @ 23MHz 3.75 – 9 MIPS [3] @ 1Hz Navigation update	
Memory	FLASH	500kB
	SRAM	8kB
Interfaces	SPI @ 1.8 V	
Digital IOs	10 GPIOs @ 1.8 V	

[2] To use these resources, the ANTARIS™ SCKit is required
[3] "VAX MIPS", calculated using Dhrystone, available for user code

Environmental Data

Operating Temperature	-40°C to 85°C
Storage Temperature	-40°C to 125°C
Vibration	5 Hz to 500 Hz, 5g (IEC 68-2-6)
Shock	Half sine 30g / 11ms (DIN 40046-7)

Mechanical Data

25.4 ± 0.1 mm [1000 ± 4 mil]

	TIM-LF Top View	
16 GND		GND 15
17 RF_IN		GND 14
18 GND		GND 13
19 V_ANT		GND 12
20 VCC_RF		GND 11
21 V_BAT		VDD18_OUT 10
22 RESET_N		P8 / STATUS 9
23 EXTINT0 / P9		SCK1 / P17 8
24 PCS1_N / P27		RxD2 / P22 7
25 PCS0_N / SS_N / P26		TxD2 / P21 6
26 SCK / P23		TxD1 / P18 5
27 AADET_N / MISO / P25		RxD1 / P31 4
28 MOSI / P24		BOOT_INT 3
29 TIMEPULSE / SCK2 / P20		GND 2
30 PCS3_N / P29		VCC 1

25.4 ± 0.1 mm [1000 ± 4 mil]

1.9 ± 0.1 mm [75 ± 4 mil]
2.8 ± 0.1 mm [110 ± 4 mil]
1.277 ± 0.1 mm [50.27 ± 4 mil]
1.5 ± 0.1 mm [59 ± 4 mil]
3.0 ± 0.3 mm [118 ± 12 mil]

Ordering Information

TIM-LF-0-000-0	TIM-LF - GPS Receiver Macro Component Single Samples
TIM-LF-0-000-1	TIM-LF - GPS Receiver Macro Component Tape on reel 100pcs
TIM-LF-0-000-5	TIM-LF - GPS Receiver Macro Component Tape on reel 500pcs
AEK-LS-0-000-0	ANTARIS™ EvalKit - Evaluation Kit
ASK-LS-0-000-0	ANTARIS™ SCKit - Software Customization Kit

Parts of this product are patent protected.