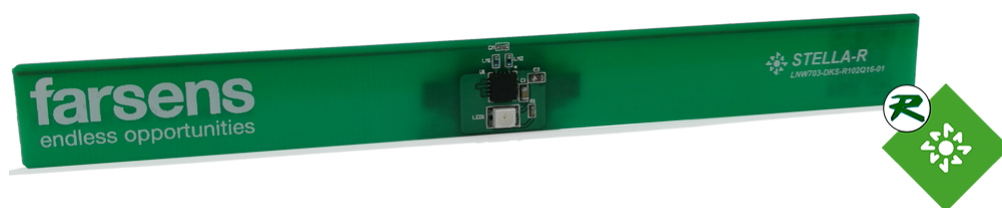## EPC C1G2 BATTERYLESS LED INDICATOR

Check for samples: EVAL01-STELLA-R

FEATURES

- **EPC C1G2 compliant**

- **ISO 18000-6 Type C compliant**

- **160-bit EPC Bank: Up to 128-bit EPC**

- **96-bit TID Bank: Up to 48-bit Serial Number**

- **Available User Memory: Up to 1008-bit Non Volatile User Data**

- **Long range in passive mode: 5m**

- **Extended range in battery assisted passive mode: 20m**

- **LED visual indicator**

DESCRIPTION

STELLA-R is an EPC Class-1 Generation-2 (C1G2) RFID tag based on Farsens' batteryless sensor technology. Built in a compact PCB format, the tag includes a LED indicator.

These RFID sensor tags are compatible with commercial UHF RFID readers (EPC C1G2). With a 2W ERP setup the battery-less resistance meter can communicate to over 5 meters - 16 feet.

The STELLA-R can be customized with different antenna design and sizes, depending on the specific application. It can be encapsulated in an IP67 or IP68 casing for usage in harsh environments. It may also be possible to customize the specifications of the LED upon request.

BLOCK DIAGRAM

The STELLA-R tag consists of a ROCKY100 IC for energy harvesting and wireless communication and an LED indicator.
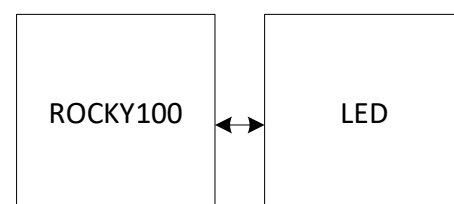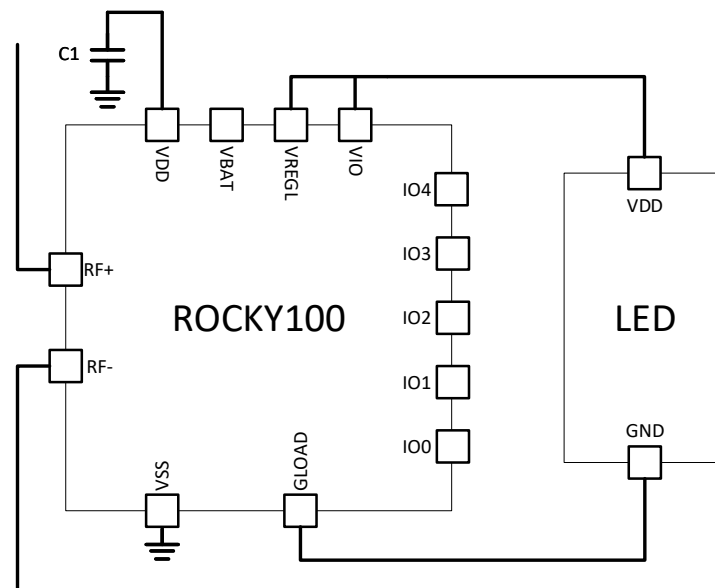
The ROCKY100 IC includes the RF frontend for UHF RFID power harvesting and communication, a power supply module to generate the required voltage levels, and an EPC C1G2/ISO18000-6C digital processor including a PWM module.

The capacitor C1 is included in the device in order to support the current peaks during blinks. Upon receiving a PWM directed read request from the UHF RFID reader, the ROCKY100 PWM module connects the negative supply of the LED to VSS through the GLOAD switch. STELLA-R will blink according to the configuration (duty-cycle, number of blinks...) set in the PWM configuration.

CHARACTERISTICS

SYMBOL	PARAMETER	MIN	TYP	MAX	UNIT
RFID					
$r_{operation}$	Operation range full passive		5		m
	Operation range BAP		15		m
	Operation range EBAP		20		m
OPERATING CONDITIONS					
T_{OP_TOP}	Operating temperature range	-40		85	°C
LED INDICATOR					
C	LED color		green		
λ_D	Dominant Wavelength		525		nm
$2\theta_{1/2}$	Viewing Angle		120		degrees

OPERATION

EPC READING

In order to read the EPC of the tag, commercial EPC C1G2 readers can be used. However, some considerations have to be taken into account.

As the tag has a significant supply capacitor connected to VDD, the power-up of the system will be slow. It can last several seconds. In order to speed up the charge process, the reader shall be configured to send power as continuously as possible.

Once the supply capacitor is charged, the tag will respond with its EPC. From this point on, memory access commands can be used to control additional functionalities via the SPI bridge.

BLINK TRIGGER

The blinking of STELLA-R can be triggered using standard EPC read commands. The command can be directed to a unique tag using its known EPC number.

Trigger blink	Operation: Write
	Memory bank: User Memory
	Word Pointer: 0x91
	Data: 0x01

Upon receiving a not-null value write command directed to the PWM trigger register, STELLA-R will generate the PWM signalling which will make the LED of the device blink according to the active configuration.

DEMO SOFTWARE

Demonstration software to read and control the STELLA-R is available in the web. Download the latest software and user guide at: http://www.farsens.com/software.php. Check the website for updated reader compatibility list. Up to the date of writing this document, this is the status of the compatibility list:

Fixed readers			
Manufacturer	**Model**	**Tested HW rev.**	**Tested FW rev.**
Impinj	R420	HLA: 1.00 | PCBA: 4.00	5.12.1
Impinj	R220	-	-
Impinj	R120	-	-
Nordic ID	Sampo	PWM00282	5.4 A
Nordic ID	Stix	PWM00226	5.10 A

REFERENCES

The next table shows the available references of the STELLA-R.

Ref.	Name	Description
40002	EVAL01-STELLA-R-DKWB	STELLA-R, dipole wideband antenna, PCB format

For custom references with other antennas and housings, please contact us at sales@farsens.com.
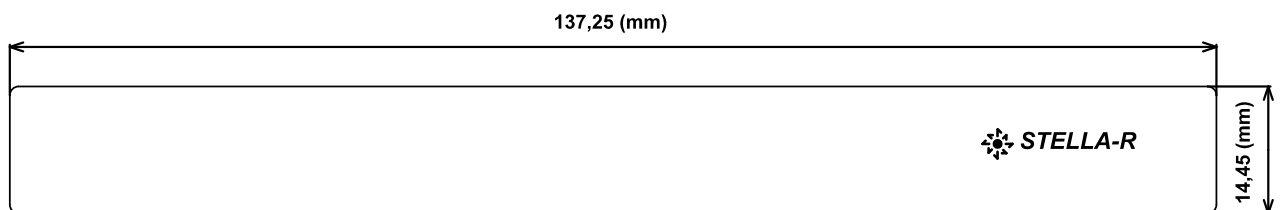
MECHANICAL DIMENSIONS

All dimensions are in millimeters.

DKWB

Valid for reference(s): 40002

2D VIEW

137,25 (mm)

STELLA-R

14,45 (mm)

Maximum height: 10mm

3D VIEW