Product Description:

Sol Chip Power™ SCP-RX803

Solar Powered Battery Module

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1. Introduction

The **Sol Chip Power™** line of products, is a solar powered **Everlasting Battery™** module based on Sol Chip's LightChip™ - solar chip. The SCP module stores the harvested energy provided by 1, 2, or 3 Saturn803 LightChips, and provides a never ended DC regulated or unregulated output power. Ideal for applications such as outdoor IoT devices that require an ongoing 24/7 average current draw of up to 1mA.

2. Features

- Sol Chip **Everlasting Battery™**.
  - 1, 2, or 3 Saturn803 PV Solar chip
  - A rechargeable Energy Storage battery.
  - Power management and Protection circuitry.
  - Light Sensor (if using the SCP with "RL" option)
- Autonomous and continuous output power for at least 10 years.
- Indoor light operation capability.
- Output voltage – **4VDC** (Regulated) or **3.3VDC** (Non-Regulated).
- Constant average current of up to 1mA – see Table 2 below.
- Peak current: Up to 1.2Amp (Regulated output), 1.5Amp (Non-Regulated output).
- Small form factor
  - For up to 4 LightChips: 3.75 x 2.5 x 1.5 Inch (9.5 x 6.3 x 3.8 cm)
  - Optional for 1-2 LightChips: 1.5 x 1.0 x 0.75 Inch (3.8 x 2.6 x 1.9 cm)

3. Applications

Wireless Sensor Networks (WSN) and Wireless Sensors (WS) for:

- Infrastructure – gas / water / electric grid monitoring etc.
- Smart cities – smart waste bins, smart parking etc.
- Smart Buildings – outdoor and indoor security and access control
- Agriculture – drip irrigation, disease detection, vineyard monitoring etc.
- Asset positioning and tracking – equipment, containers (on ships and trains)
- Livestock positioning, monitoring and tracking, pets tracking
- Surveillances, security and safety
- Environmental monitoring – gas, fire, pollution and floods detectors
- Structural health monitoring
- Transportation – cars/tracks authentication, toll roads management (EZPass), bicycles alert, sports equipment on bicycles etc.

4. Description

Sol Chip Power™ includes all essential elements for Light Energy Harvesting and Storage to deliver a stable voltage to the Load:

1. Solar Energy Harvester – Convert Solar and Light Energy to Electric Power.
2. Battery Management – Manages the storage of Harvested electrical energy into a rechargeable battery.
3. Rechargeable Battery – Stores the harvested energy.
4. Voltage Regulator – Generates regulated output voltage.
5. Light Sensor – Provides indication of the light level.

Following is a block diagram of the SCP

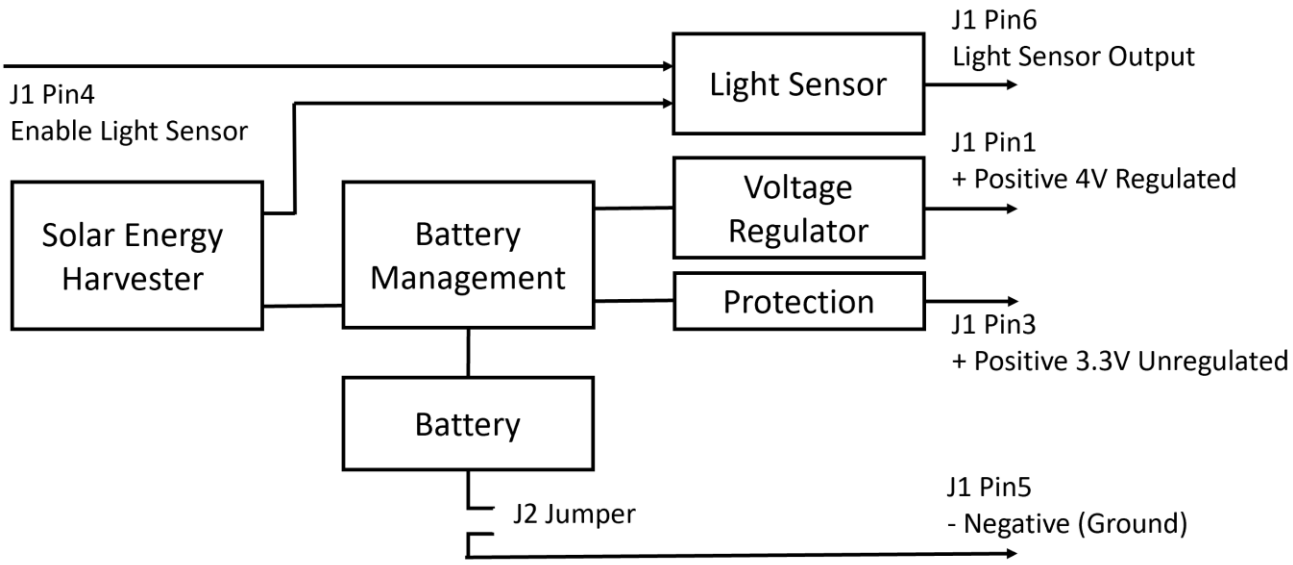


Figure 1: Sol Chip Power™ Block Diagram

5. Technical Information

Parameter	Regulated Output	Non-Regulated Output
Output Voltage*	4V ±5%**	3.3V (2.7 to 3.6V)
Average Continuous Output Current***	Up to 0.87 mA	Up to 1.05 mA
Max Continues Current	0.9 Amp	1.5 Amp
Max Peak Output Current	1.2 Amp	1.5 Amp
Output Short Protection	Yes	No
Dimensions - up to 4 LightChips	3.75 x 2.5 x 1.5 Inch , 9.5 x 6.3 x 3.8 cm	
Optional dimensions for 1-2 LightChips	1.5 x 1.0 x 0.75 Inch, 3.8 x 2.6 x 1.9 cm	

Table 1: Technical Information

* For more info regarding available other output voltage options please contact info@sol-chip.com.
** At minimum load current of 100uA
*** Yearly Average Output Current, depends on the daily average exposure to Sun Light – see table below.

Yearly SCP average current at typical outdoor conditions:

Location (examples)	Average Output Current		
	4VDC (Regulated)		
	SCP-R1803-4R	SCP-R2803-4R	SCP-R3803-4R
Tel Aviv, Israel	290 uA	580 µA	870 µA
San Francisco, CA, USA	235 uA	470 µA	705 µA
Singapore, Singapore	235 uA	470 µA	705 µA
Sidney, Australia	230 uA	460 µA	690 µA
Seoul, S. Korea	205 uA	410 µA	615 µA
Shanghai, China	195 uA	390 µA	585 µA
Tokyo, Japan	195 uA	390 µA	585 µA
Toronto, Canada	185 uA	370 µA	555 µA
Paris, France	160 uA	320 µA	480 µA
London, Great Britain	140 uA	280 µA	420 µA
Dublin, Ireland	125 uA	250 µA	375 µA

Table 2: Average Output Current from SCP Regulated Output per location

*For Average Output Current in more locations, please contact info@sol-chip.com

Location (examples)	Average Output Current		
	3.3VDC (Unregulated)		
	SCP-R1803-3.3	SCP-R2803-3.3	SCP-R3803-3.3
Tel Aviv, Israel	350 uA	700 uA	1,050 µA
San Francisco, CA, USA	285 uA	570 uA	855 µA
Singapore, Singapore	285 uA	570 uA	855 µA
Sidney, Australia	285 uA	570 uA	855 µA
Seoul, S. Korea	250 uA	500 uA	750 µA
Shanghai, China	240 uA	480 uA	720 µA
Tokyo, Japan	240 uA	480 uA	720 µA
Toronto, Canada	230 uA	460 uA	690 µA
Paris, France	200 uA	400 uA	600 µA
London, Great Britain	180 uA	360 uA	540 µA
Dublin, Ireland	150 uA	300 uA	450 µA

Table 3: Average Output Current from SCP Unregulated Output per location

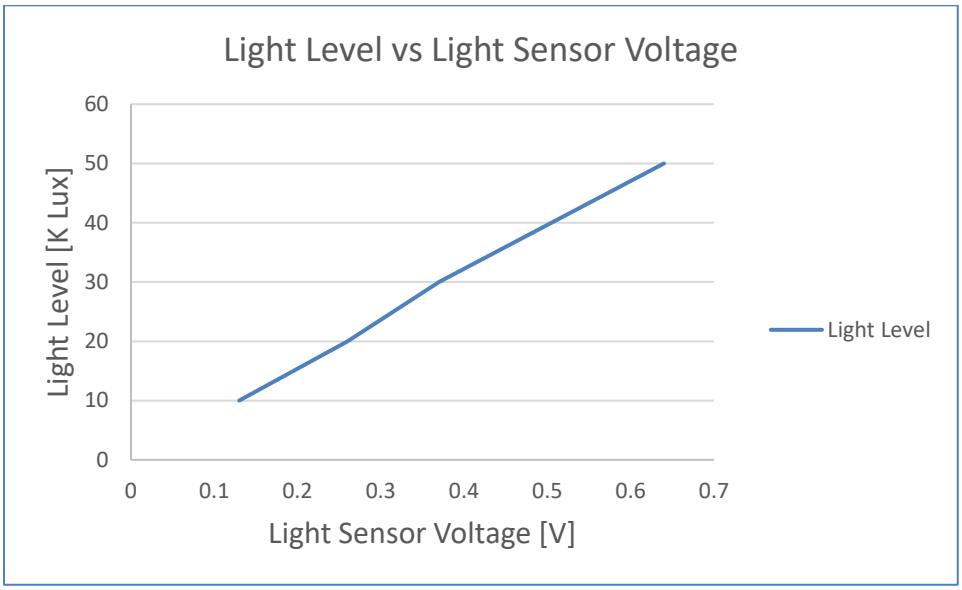
*For Average Output Current in more locations, please contact info@sol-chip.com

6. Light Sensor Operation Instructions and functionality

The SCP-RX803-4RL has internal Light Sensor.
In order to operate the Light Sensor you should take the following steps:

1. Connect the “Enable Light Sensor” input to Ground
2. Voltage relative to the light level will appear on the “Light Level Output”

Voltage		Light Level	
0.13	Volts	10	K Lux
0.26	Volts	20	K Lux
0.37	Volts	30	K Lux
0.64	Volts	50	K Lux



7. Ordering Information

Part #	Configuration Type
SCP-RX803-3.3	SCP with unregulated (3.3V) output
SCP-RX803-4R	SCP with regulated (4V) output
SCP-RX803-4RL	SCP with regulated (4V) output and Light Sensor

X – indicates number of LightChips – 1, 2 or 3
For example, SCP-R3803-4R – SCP with 3 LightChips, 4V regulated output

8. Revision Control

Revision	Date	Description	Authors	Approval
1.0	26-May-2020	Initial version base on SCP-RX802 Ver 2.0	Rami Friedlander	Rami Friedlander
1.1	22-Jun-2020	Update for 1-3 Saturn803 devices	Rami Friedlander	Rami Friedlander