Sol Chip™
EVAL-101 Evaluation Board User Manual

(including on board Sol Chip™ Saturn100)

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1. Sol-Chip™ EVAL-101 (including Saturn100)

The Sol Chip™ EVAL-101 allows for simple configuration of the Sol Chip Energy Harvester (Saturn100), with a pre-soldered Sol Chip Saturn100 Photovoltaic chip on board and additional soldering pads.

Sol Chip Energy Harvester (Saturn100) is a unique Photo Voltaic (PV) cell which produces six selectable voltage levels: 0.75 volt, 1.5 volt, 2.25 volt, 3 volt, 4.5 volt, 9 volt.

Each selectable voltage delivers different current. See Table 1 below.

The maximum power which can be extracted in full daylight is ~3 mWatt and in office lighting the power extracted is up to 20 µWatt, dependent on ambient lighting intensity.

Additional voltage levels and also several voltage and power levels can be delivered simultaneously from separate pins of the device.

Saturn100 Product Specification

V_{OC}[(1)]:	0.75V, 1.5V, 2.25V, 3V, 4.5V, 9V
I_{SC}[(2)] at full daylight:	7 mAmp
Pmax at full daylight:	3 mWatt
Pmax at office light[(3)]:	up to 20 µWatt

(1) See Table 1
(2) For the case of V_{OC}=0.75v. See Table 1.
(3) Depends on light conditions.

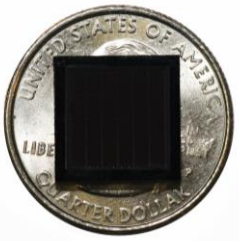

Figure 1: Solar Chip Photo (Saturn100)

2. Voltage/Current/Power & Pin-Out Selection

Table 1: Voltage/Current Pin List

Voc [Volts]	Isc [mAmp]	Max Power [mWatt]	Anode pin (+)	Cathode pin (-)	Required connections
9	0.6 (1)	3 (1) 0.018(2)	6	19	1-48, 2-3, 4-5, 20-21, 22-23, 24-25, 26-27, 28-29, 30-43, 44-45, 46-47
4.5	1.2(1)	3 (1) 0.018 (2)	6	19	1-48, 2-3, 4-5, 6-30, 19-43, 20-21, 22-23, 24-25, 26-27, 28-29, 44-45, 46-47
3	1.7(1)	3 (1) 0.018 (2)	6	19	1-48, 2-3, 4-5, 6-26-46, 19-27-47, 20-21, 22-23, 24-25, 28-29, 30-43, 44-45
2.25	2.4(1)	3 (1) 0.018 (2)	6	19	1-19-25-43, 2-3, 4-5, 6-24-30-48, 20-21, 22-23, 26-27, 28-29,44-45, 46-47
1.5	3.5(1)	3 (1) 0.018 (2)	6	19	1-48, 2-6-22-26-30-46, 3-19-23-27-43-47, 4-5, 20-21, 24-25, 28-29, 44-45
0.75	7(1)	3 (1) 0.018 (2)	6	19	1-3-5-19-21-23-25-27-29-43-45-47, 2-4-6-20-22-24-26-28-30-44-46-48

(1) At AM1.5 (120,000 Lm/m2)
(2) Estimated for office ambient lighting (1,200 Lm/m2)

3. EVAL-101 Board Diagram

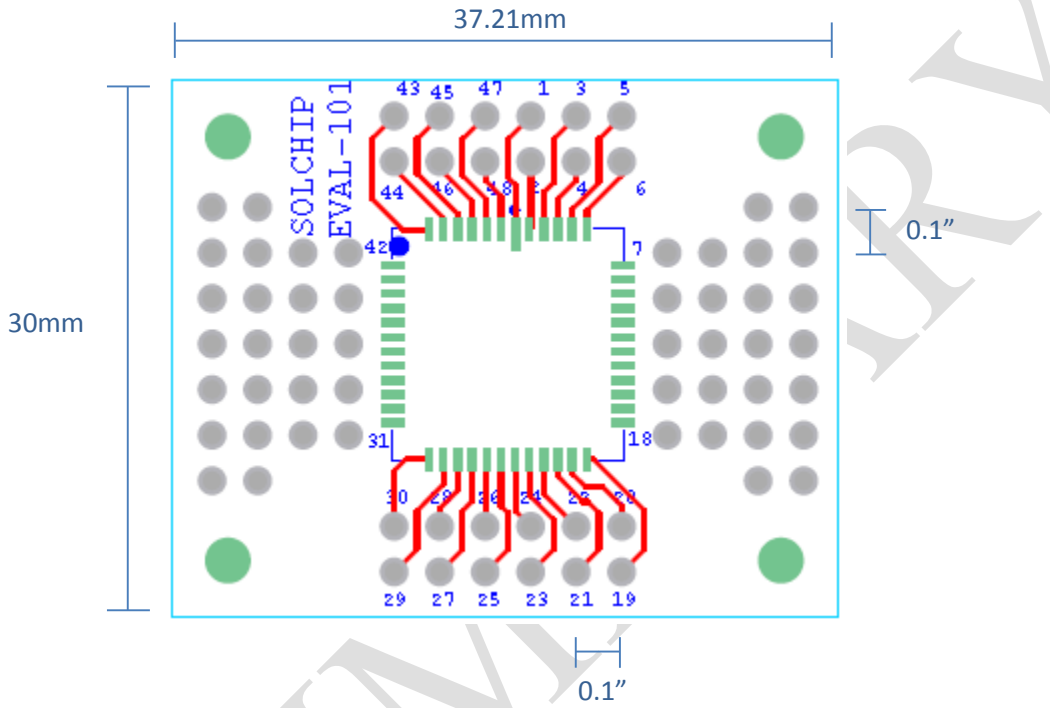

Figure 2: Sol Chip EVAL-101 Board Diagram

4. EVAL-101 Top View

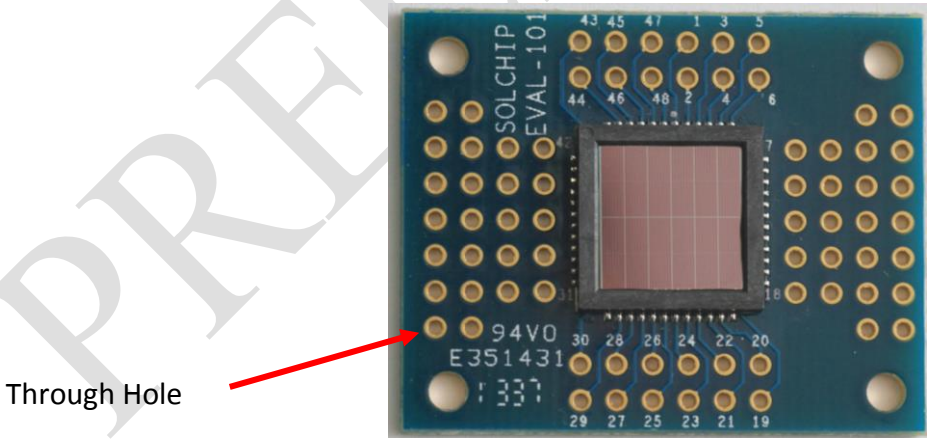

Figure 3: Sol Chip EVAL-101 Top View

5. System Schematic Diagram

5.1 No System Battery

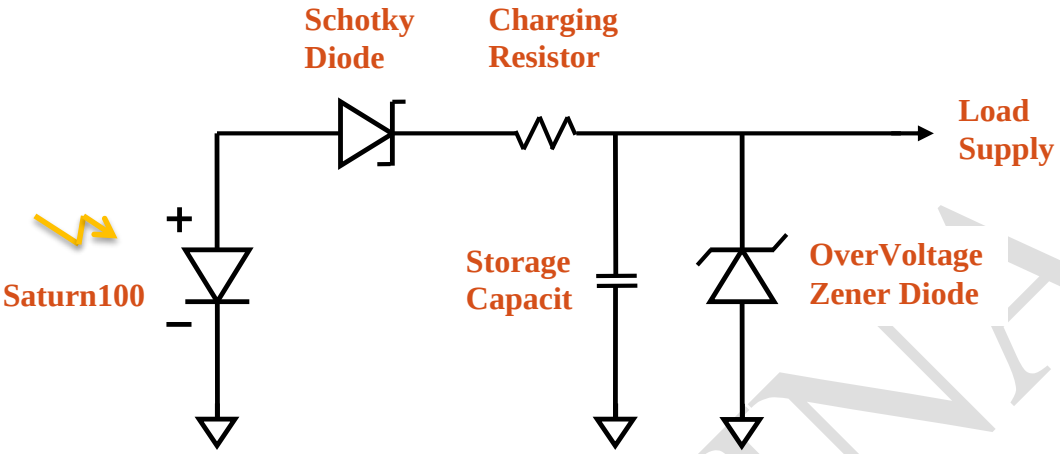

Figure 4: System schematic diagram: Example 1 - no system battery

5.2 With System Primary Battery*

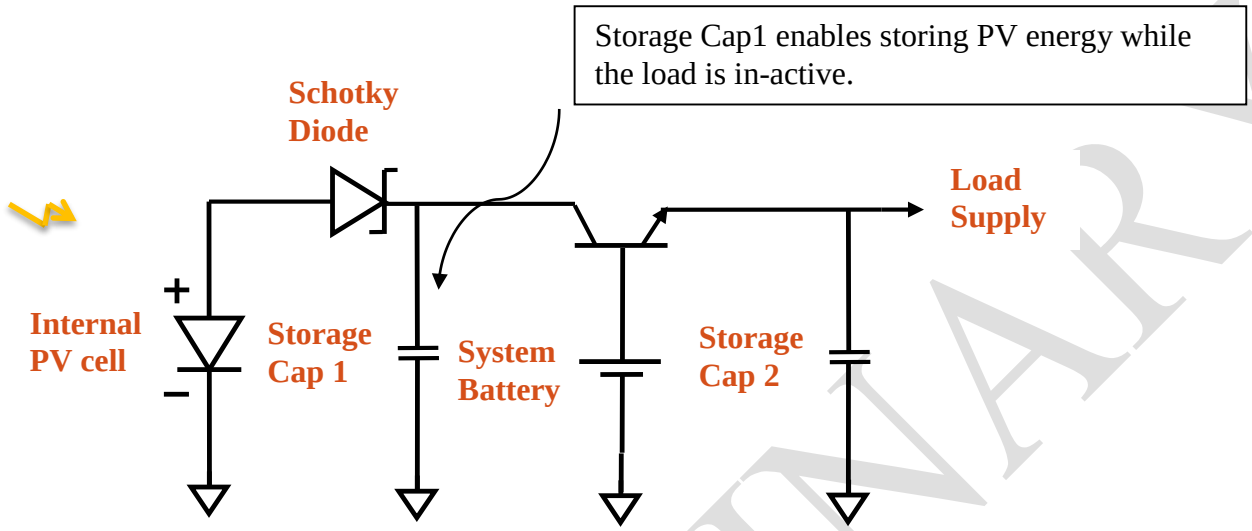

Figure 5: System schematic diagram: Example 2 – with system primary battery

Advantage:

Dual Charge Storage: When Load current < PV current, the Storage Cap 1 is charged and enables charge buffering. This will increase the energy efficiency.

Limitations:

1. Vbat defines Load voltage – Vload tracks Vbat voltage drop
2. Vload = Vbat-0.7v
3. During light condition, Ibat is not 0 Ampere.
   PV supplies current Ipv to load & Storage Cap 2 @ Ibat = Ipv / beta

* Primary Battery – Any "off the shelf" available non-rechargeable battery.