

EVIX-LED SolarBIT Evaluation Board

Introduction

The EVIX-LED Evaluation Board combines IXOLAR Bits, a supercapacitor, a DC/DC converter, and a high-brightness LED to demonstrate solar energy harvesting without the limited lifetime, replacement, and disposal issues surrounding batteries.



Ten series-connected SolarBITs convert sunlight to a current that charges a supercapacitor to 5V. A buck/boost converter uses the energy stored in the supercap to drive the LED with a constant current of 1A for several seconds, even as the voltage across the supercap decreases below the LED's forward voltage requirement.

To operate, press the pushbutton. The LED will illuminate brightly.

SolarBIT Description

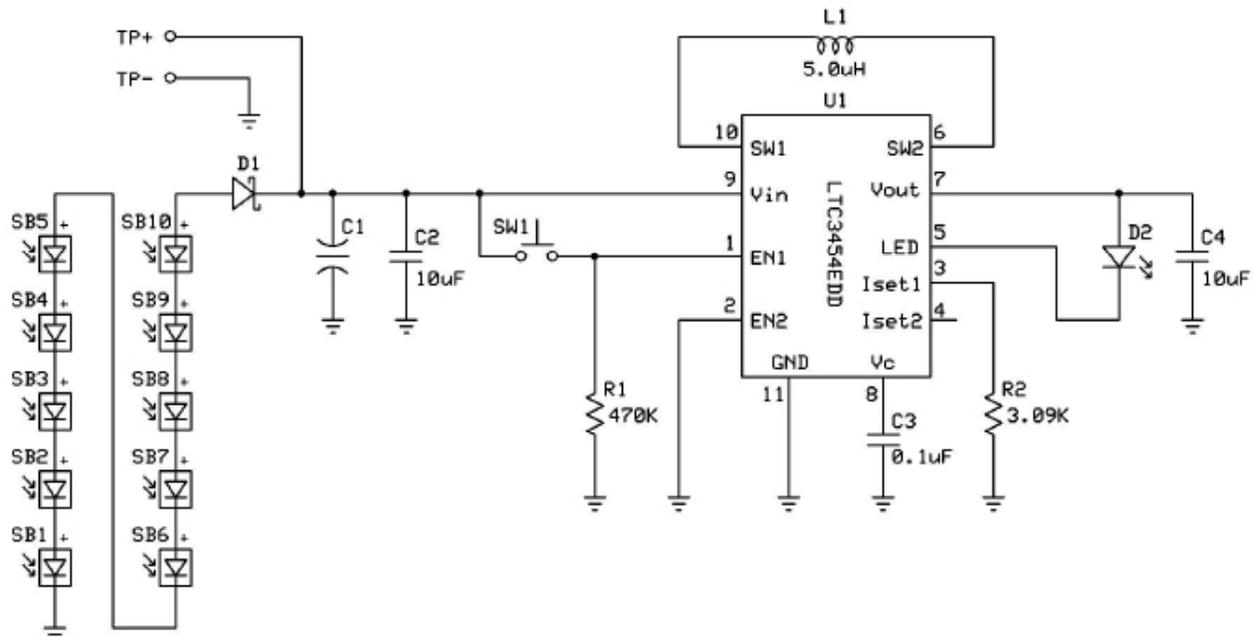
XOB17-12x1 SolarBITs are monocrystalline, high-efficiency solar cells in a surface mount package that can be reflow soldered. They're extremely robust and can be used in harsh environments.

SolarBITs have a very high (17%) power conversion efficiency, which means that 17% of the light energy is converted into electrical energy. They're extremely useful in applications requiring solar power generation in a limited space.

IXYS cells can be used in indoor and outdoor applications because they have a wide spectral sensitivity, 300 to 1100 nm. However, the output power of a solar cell is proportional (over a wide range) to the incoming light energy, and irradiance is generally much higher outdoors. The values in the data sheet are measured at "standard condition" of 1 sun, which is equal to 1000W per square meter sunlight irradiance at a defined light spectrum (air mass of 1.5) and 25°C cell temperature.

The SolarBIT comes in several different voltage and current configurations. Please see the website for further information. www.ixys.com

Schematic



Bill of Materials

Qty	Designator	Part Description	Part Number
1	D1	Schottky diode	MBR0520LT1 (Digi-Key MBR0520LT1GOSTR-ND)
1	D2	White LED	Lumileds LXX2-PW14-T00
10	SB1 - SB10	SolarBIT	IXYS XOB17-12x1
1	C1	Supercapacitor, 1F	Maxcap LP055105A, LJ055105A, etc.
2	C2, C4	Ceramic capacitor, 10 uF, 10 V, X7R, 0805	Murata GRM21BR71A106KE51L (Digi-Key 490-3905-1-ND)
1	C3	Ceramic capacitor, 0.1 uF, X7R, 0805	Kemet C0805C104K5RAC (Digi-Key 399-1170-x-ND)
1	R1	Resistor, 470K, 0805	
1	R2	Resistor, 3.09K, 0805	
1	L1	Inductor, 5.0 uH	Sumida CDRH6D28NP-5R0NC
1	U1	Buck-boost LED driver IC	Linear Technology LTC3454EDD
1	SW1	Pushbutton switch	E-Switch TL6700AF160QG (Digi-Key EG4385CT-ND)
1		PC board	

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