

## DC to Breadboard Power Adapter PCB

### FEATURES

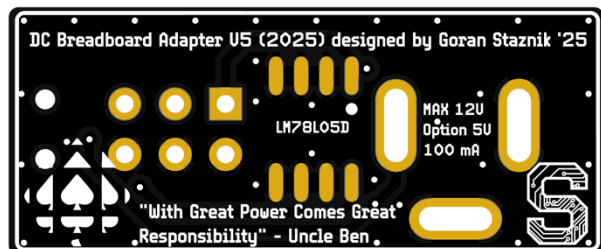
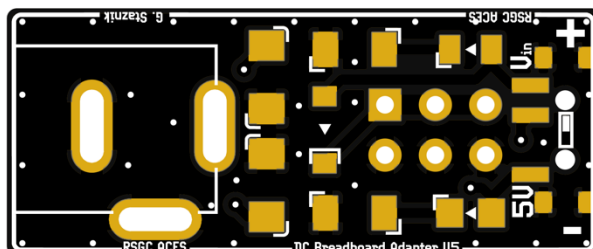
- **Selectable 5 V Regulated Output**
- **Accepts Inputs Up To 12 V**
- **Up To 100 mA Output Current**
- **Internal Short-Circuit Protection**
- **Integrated Thermal Shutdown Protection**
- **Integrated Decoupling Capacitors**
- **Low Resistance (Under 10 mΩ)**
- **Life Span of 10 000 Switches**
- **Compact 12.5x30 mm Size**
- **Manually Manufacturable**

### DESCRIPTION

The SPA1051B is a compact power adapter designed to connect a DC barrel jack to the power rails of a standard breadboard.

It provides selectable output between the input voltage of up to 12V and regulated 5V using a physical slide switch. The compact 12.5x30 mm form allows it to fit in non-intrusively. It is ideal for powering circuits during prototyping on breadboards.

The 5 V regulator integrates thermal shutdown protection, allowing it to be left on for extended periods of time at high power demands without risk of damage. In addition, the device has been designed with thermals in mind, featuring a high thermal mass, resulting in smaller temperature rises.



See device information for dimensions

## Device Overview

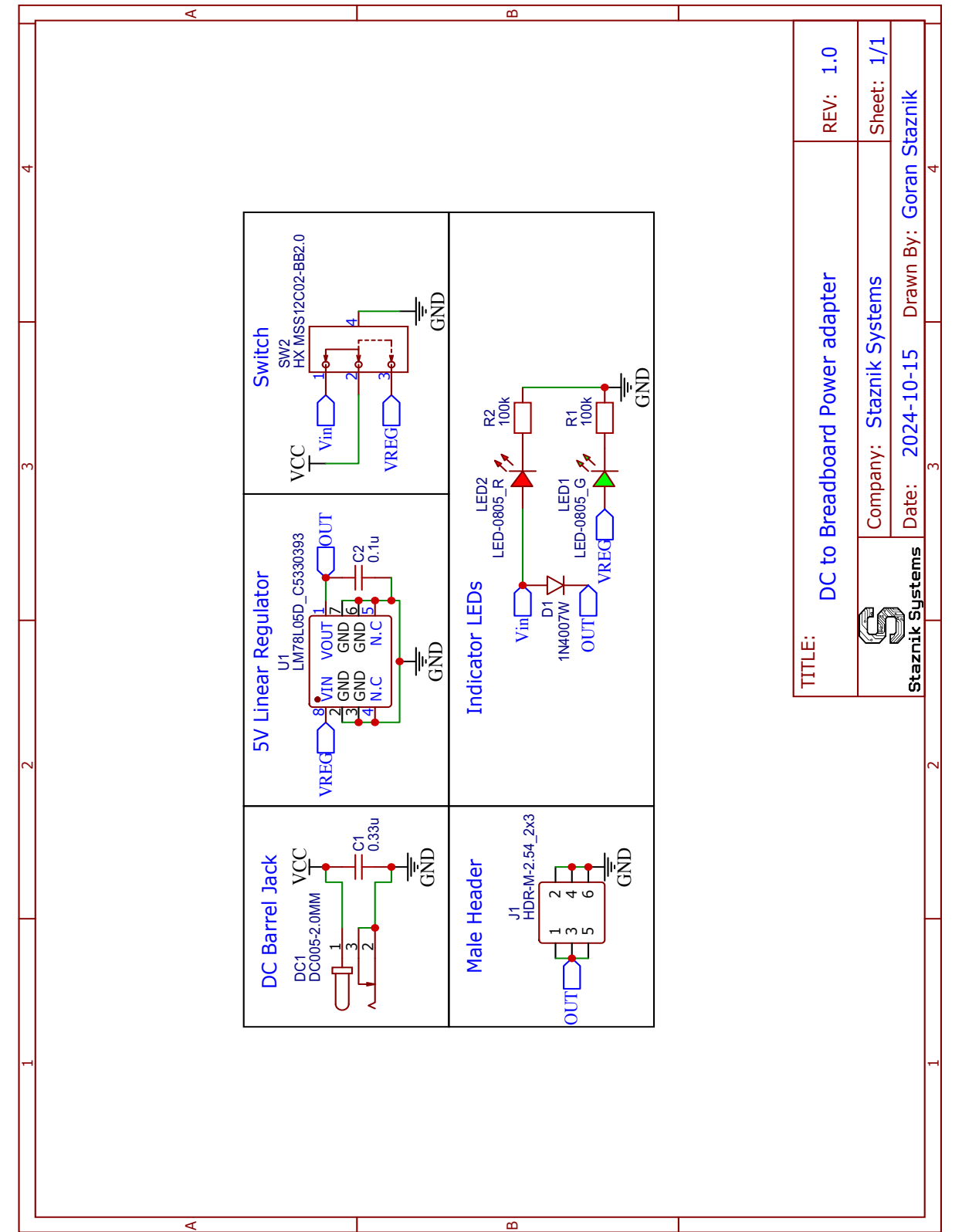
- hanxia HX MSS12C02-BB2.0 Slide Switch  
[https://www.lcsc.com/datasheet/lcsc\\_datasheet\\_2410121534\\_hanxia-HX-MSS12C02-BB2-0\\_C25168817.pdf](https://www.lcsc.com/datasheet/lcsc_datasheet_2410121534_hanxia-HX-MSS12C02-BB2-0_C25168817.pdf)
- Slkor (SLKORMICRO Elec.) LM78L05D 5V Linear Regulator  
[https://www.lcsc.com/datasheet/lcsc\\_datasheet\\_2401051154\\_Slkor-SLKORMICRO-Elec--LM78L05D\\_C5330393.pdf](https://www.lcsc.com/datasheet/lcsc_datasheet_2401051154_Slkor-SLKORMICRO-Elec--LM78L05D_C5330393.pdf)

When choosing capacitors and resistors, ensure power ratings are adequate for their functions on the device. The 12 V limit is due to the slide switch, the linear regulator is capable up to 30 V.

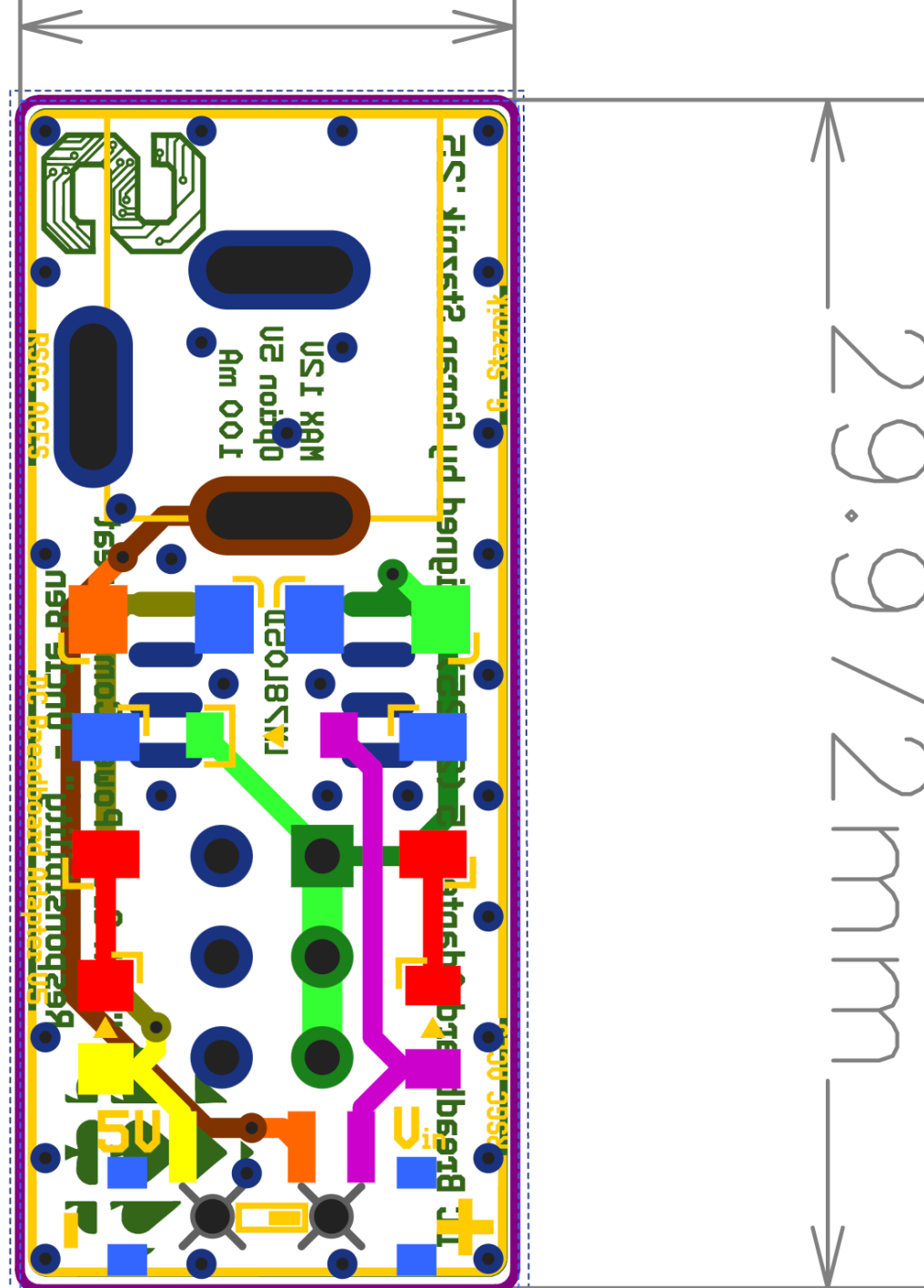
## Electrical Characteristics

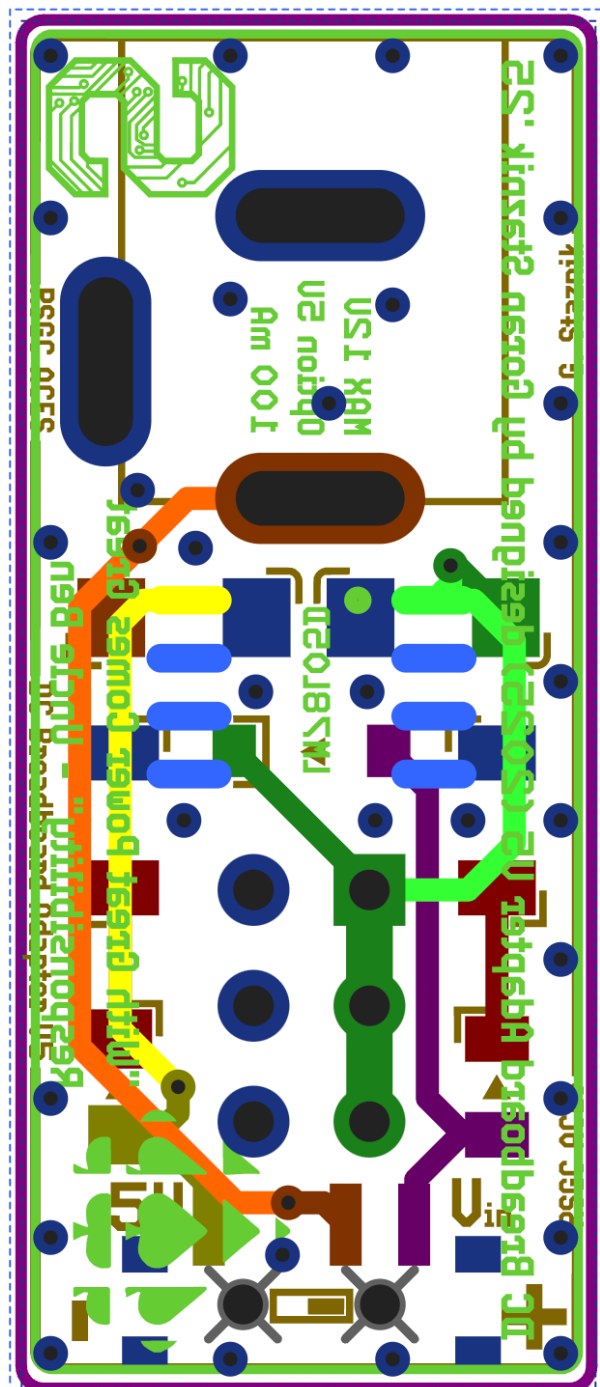
	Min	Typ.	Max	Unit
V <sub>in</sub> Input Voltage (V <sub>in</sub> selected)	0	9	12	V
V <sub>in</sub> Input Voltage (5 V selected)	7	9	12	V
V <sub>out</sub> Output Voltage (when 5 V selected)	4.8	5	5.2	V
V <sub>D</sub> Dropout Voltage (when 5 V selected)		1.7		V
I <sub>out</sub>	10	50	100	mA
Resistance (25°C)	10	20	50	mΩ
Operating Temperature	-40	35	150 (T <sub>j</sub> )	°C

Schematics & Technical Diagrams



12.471mm







Note that a 3D model for the slide switch was not found, and does not appear in the rendering.

## Ordering Information

The SPA1051B was designed with the express purpose of ease and low cost of manufacture. All parts were ensured to be available on LCSC. Additionally, it was elected to use parts of 1206 package for easy of manual assembly.

Below are the specifications that are required to produce the SPA1051B PCB:

	<b>Spec.</b>	<b>Unit</b>
Minimum Trace clearance	0.6	mm
Minimum Trace Width	20	mil
Minimum Via Drill Size	0.3	mm
Via Hole to Hole Spacing	0.6	mm
Trace/Via to Copper Pour Clearance	0.6	mm
Minimum Character Width	6	mil

Here are the specifications when producing or ordering the PCB:

	<b>Spec.</b>	<b>Unit</b>
PCB Layers	2	
Board Material	FR-4	
Board Thickness*	1.6	mm
Board Dimensions	12.5x30	mm
Colour	--	
Surface Finish**	--	
Outer Copper Weight	1	oz
Via Coverings	--	

\*Other thicknesses are acceptable, though it is recommended to keep the board thin for better grounding with the ground pours.

\*\*Surface finish can be determined by the user, however, ENIG is recommended for applications requiring stocking the un-manufactured PCB for long periods of time. Tough HASL is acceptable in most cases.

When manufacturing the PCB, ensure that all components are correctly placed, and the direction of the diode, LEDs and linear voltage regulator IC are correct. Also ensure that the chosen parts match the specifications.

## Important Notice

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