

Introduction

The AAT3681 evaluation board demonstrates single-cell lithium-ion/polymer battery charging from either a USB or ADP port. The AAT3681 precisely regulates battery charge voltage and current for 4.2V (4.375V option) lithium-ion/polymer battery cells. This device operates at an input voltage range from 4V to 6.5V. The charging current can be set up to 300mA by an external resistor.

This document describes the evaluation board and the value for the set resistor. In addition, a schematic of the complete evaluation board's circuit (Figure 1) and the board layout (Figures 2 and 3) are provided. For additional information, please refer to the AAT3681 product datasheet.

Schematic

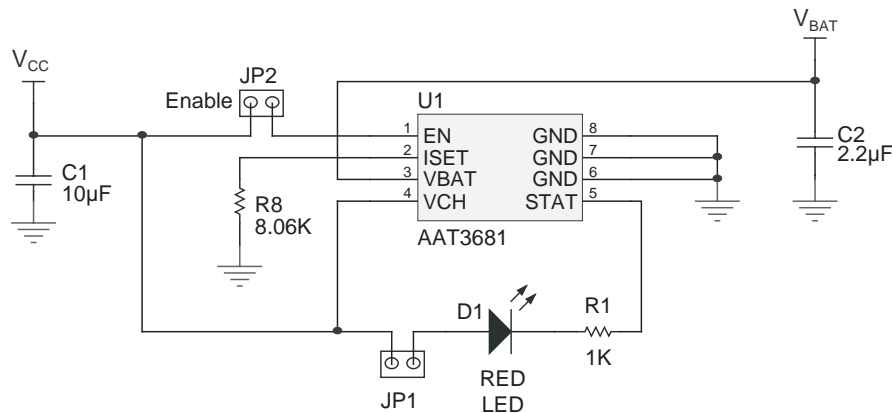


Figure 1: Evaluation Board Schematic.

Printed Circuit Board

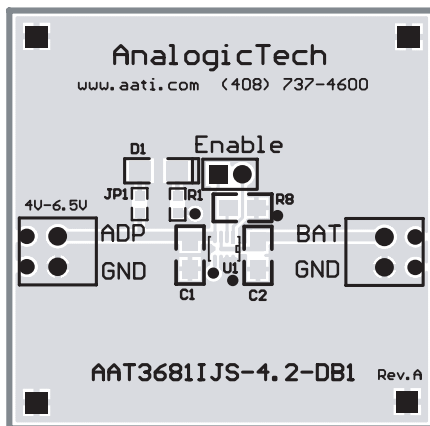


Figure 2: Top Layer (not to scale).

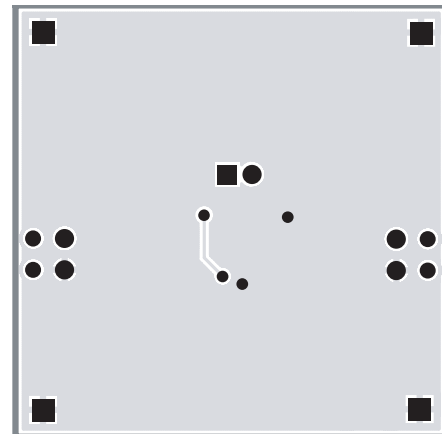


Figure 3: Bottom Layer (not to scale).

Programming Charge Current

The charging current level is programmed with a resistor placed between the I_{SET} pin and ground. The accuracy of the constant charge current and preconditioning trickle charge current is dominated by the resistor tolerance. A 1% tolerance resistor is recommended.

The constant charge current can be programmed from 15mA to 300mA. Table 1 provides resistor values for commonly used constant charge current levels. Figure 4 shows the relationship between I_{CC} and R_{SET} .

I_{CC} (mA)	Set Resistor Value R_{SET} (k Ω)
300	5.36
250	6.49
200	8.06
150	10.7
100	16.2
50	31.6
40	38.3
30	53.6
20	78.7
15	105

Table 1: Recommended R_{SET} Values.

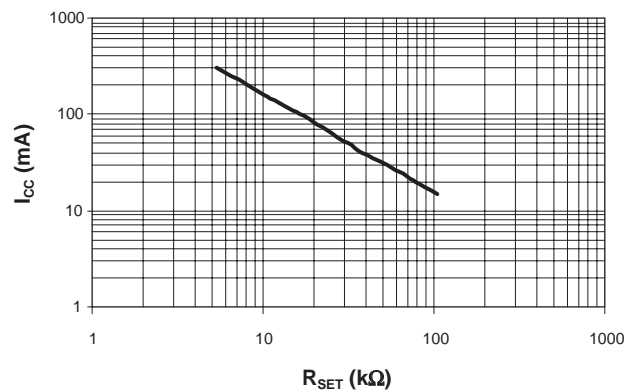


Figure 4: I_{CC} vs. R_{SET} .

LED Status Output

The AAT3681 status pin function provides a visual indication of the status of a battery under charge. The status LED is turned on by an internal MOSFET switch which connects the status pin to ground when the AAT3681 is in the pre-conditioning trickle charge, constant current charge, or constant voltage charge modes. The LED status indicator is turned off when there is no battery charging or when the charge cycle is complete.

A series resistor (R1) is placed with the status indicator LED (D1) to limit the forward current through the LED. The nominal value of R1 is 1k Ω ; this value may be adjusted by the following formula:

$$I_{LED} = \frac{V_{CC} - V_F}{R_1}$$

Use of the LED status indicator is optional. To disable this function, remove jumper JP1 which connects the LED to the input supply.

Enable

The AAT3681 enable pin should be pulled to a logic high level to turn on the device.

AAT3681 EVAL Component Listing

Component	Part#	Description	Manufacturer
U1	AAT3681IJS-T1	USB/ADP Battery Charger; SC70JW-8 Package	AnalogicTech
R1	Chip Resistor	1K Ω , 5%, 1/4W; 0603	Vishay
R8	Chip Resistor	8.06K Ω , 1%, 1/4W; 0805	Vishay
JP1	Chip Resistor	0 Ω , 5%, 1/4W; 0603	Vishay
C1	GRM21BR61A106KE19L	CER 10 μ F 10V 10% X5R 0805	Murata
C2	GRM21BR71A225KA01L	CER 2.2 μ F 10V 10% X7R 0805	Murata
JP2	PRPN401PAEN	Connecting Header, 2mm zip	Sullins Electronics
LED1	CMD15-21SRC/TR8	Red LED; 1206	Chicago Miniature Lamp

Table 3: Component Listing.

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