DV2056L/TL/VL

Li-Ion Charger Development System
Control of Onboard Linear Regulator

Features

- bq2056 charge-control evaluation and development system for one, two, or multi-cell Li-Ion packs
- Adjustable AutoComp™ charge-rate compensation
- Trickle charge for conditioning deeply discharge batteries
- Regulated charge current and voltage
- Direct battery connection

General Description

The DV2056L/DV2056TL/DV2056VL are complete development and evaluation environments for bq2056, bq2056T, and bq2056V Lithium-Ion charge-control ICs. The DV2056L supports a single-cell 4.1V pack and the DV2056TL supports a two-cell 8.2V pack. The DV2056VL can be programmed to support any 1- to 4-cell Li-Ion pack voltage.

Full charge is preceded by charge qualification. During qualification, full-charge current is inhibited if the battery voltage is below an internal threshold, indicating a deeply discharged or shorted pack. Consequently, the IC applies a low-current trickle charge in an attempt to revive the battery or to close the pack protector's discharge switch.

Once the battery voltage reaches the internal threshold, full charge begins. The DV2056L/TL/VL complete the charge cycle in two phases. While the pack is below the regulation voltage, a constant-current phase replenishes approximately 70% of battery capacity. An accurate voltage-regulation phase completes the charge.

These boards feature the proprietary AutoComp technique to compensate safely for the internal impedance of the battery and any voltage drop in the protection circuitry. The AutoComp potentiometer (R7 in DV2056L/TL and R12 in DV2056VL) must be set according to the characteristics of the battery. To disable this feature, the AutoComp potentiometer should be turned completely counter clock wise.

Before using these development boards, please review the bq2056 data sheet.

Connection Descriptions

J1

BAT+	Positive battery terminal
BAT-	Negative battery terminal

J2

DC+	Charger supply positive
DC-	Charger supply ground

Configuration

DV2056L and DV2056TL

The DV2056L and DV2056TL have the following characteristics:

- DV2056L interfaces directly to a single-cell 4.1V Li-Ion battery pack.
- DV2056TL interfaces directly to a two-cell 8.2V Li-Ion battery pack.
- Supply connector J2 accepts a maximum of 16VDC. (See the limitation on power dissipation below.)
- Charge begins on the later application of:
  - The battery
  - Supply voltage

The onboard regulator supplies a charging current of 300mA. This current is controlled by the value of the sense resistor, R1 in the following equation:

$$I_{CHG} = \frac{0.100}{R_1}$$

The value of R1 at shipment is 0.33Ω. This resistor can be changed depending on the application. However, the maximum power dissipation in Q1 should not exceed 2W.

DV2056VL

The DV2056VL has the following characteristics:

- DV2056VL interfaces directly with up to four Li-Ion cells, as selected by jumpers JP1 through JP4 and the setting of potentiometer R13.

No. Of Cells	JP1	JP2	JP3	JP4
1	**Short**	Open	Open	Open
2	Open	**Short**	Open	Open
3	Open	Open	**Short**	Open
4	Open	Open	Open	**Short**

R13 is the fine adjustment for setting the desired charge voltage for any given cell combination. **DO NOT EXCEED MANUFACTURER'S RECOMMENDED VALUES**. Note that the resistive divider network scales the desired battery regulation voltage so that the voltage on pin BAT is equal to 3.35V.

- Supply connector J2 accepts a maximum of 25VDC. (See the limitation on power dissipation below.)
- Charge begins on the later application of
  - The battery
  - Supply voltage

The onboard regulator supplies a charging current of 300mA. This current is controlled by the value of the sense resistor, R1 in the following equation:

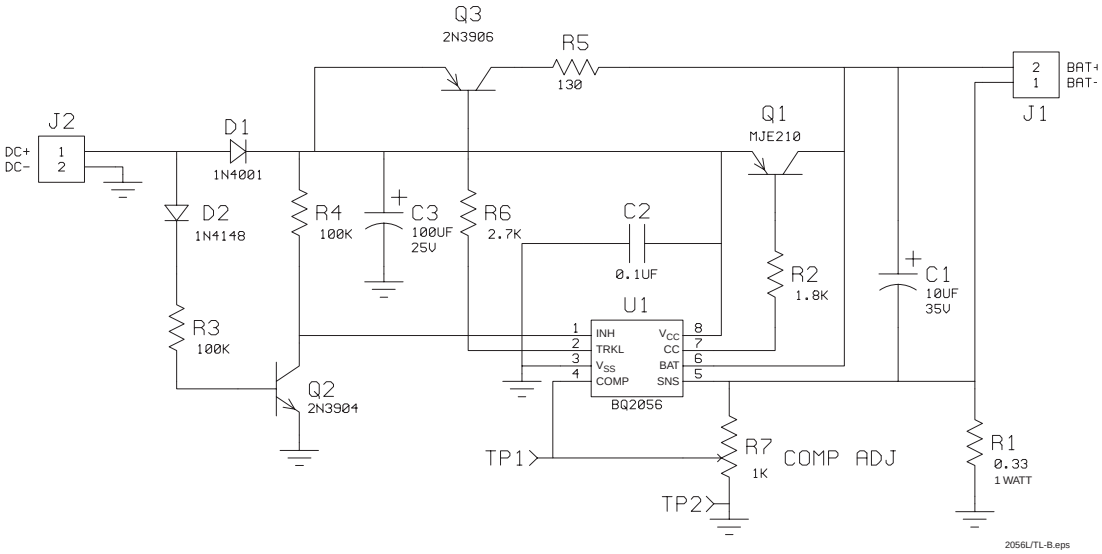
$$I_{CHG} = \frac{0.100}{R_1}$$

The value of R1 at shipment is 0.33Ω. This resistor can be changed depending on the application. However, the maximum power dissipation in Q3 should not exceed 2W.

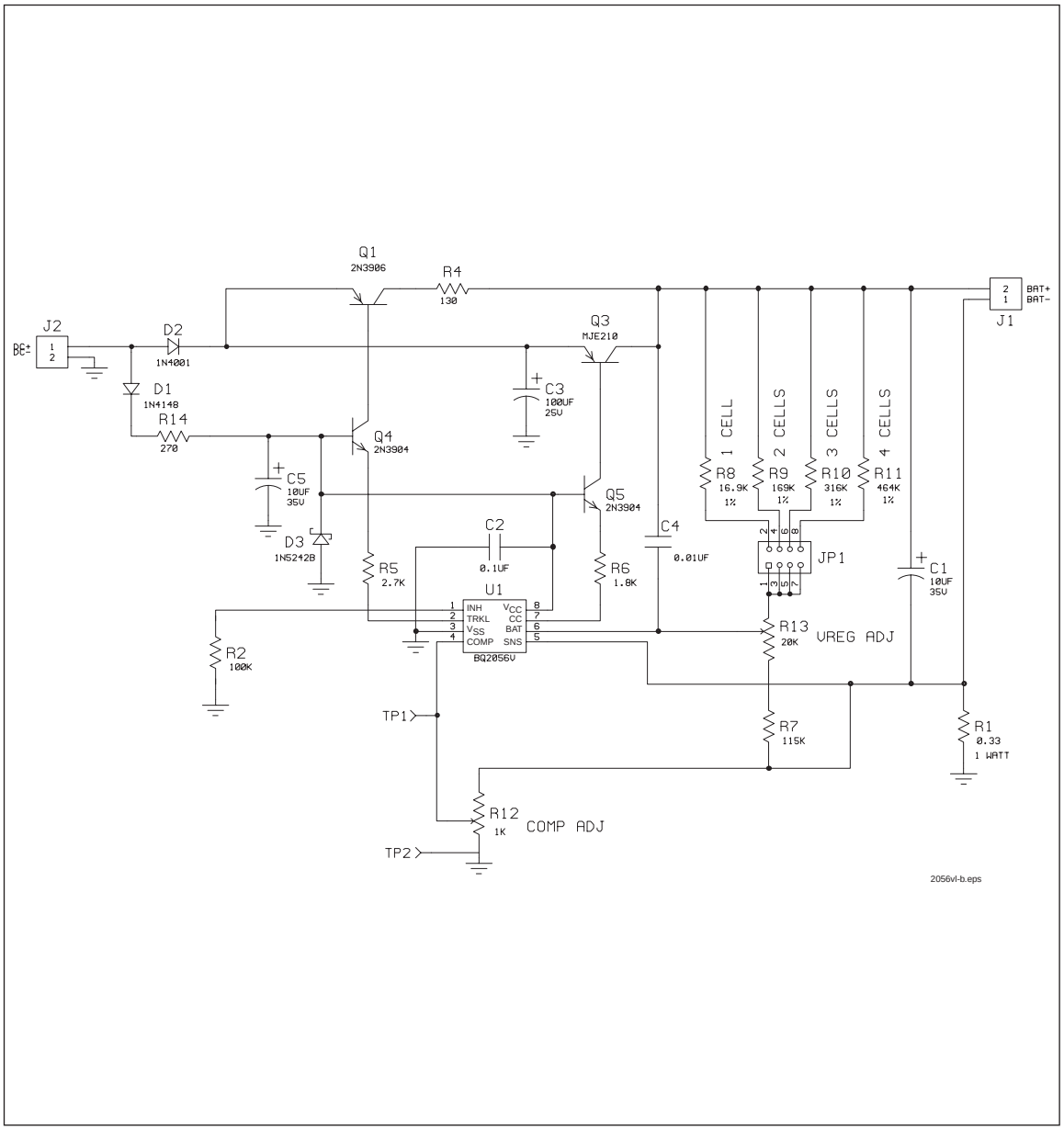
Setup Procedure

1. Configure the board for the number of cells and charging voltage **(applies only to the DV2056VL).**
2. Set the AutoComp compensation level potentiometer fully counterclockwise to the stop.
3. Connect the battery pack to J1.
4. Connect the charging supply to J2.
5. With a digital voltmeter connected between the wiper of the Comp Adj potentiometer (R7 in DV2056L and DV2056TL or R12 in DV2056VL) and GND, set the desired compensation level at pin 4 of the IC while the charge current is at maximum.

DV2056L/TL Schematic



DV2056VL Schematic



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