DV2902

Rechargeable Alkaline Development System

Features

➤ bq2902 evaluation and development system for two rechargeable alkaline cells.

➤ Battery holder for AA or AAA cells

➤ Charge status LED

➤ Direct connection for external voltage source or external current source

➤ Onboard current source for charging

➤ Terminates pulsed charge with maximum voltage limit

➤ Selectable End-of-Discharge voltage

➤ Selectable charging rates:
100mA, 200mA, or 300mA

General Description

The DV2902 Development System provides a development environment for the bq2902 Charge/Discharge Controller IC used for managing two rechargeable alkaline cells. The user provides the charging source, the load, and two AA or AAA rechargeable alkaline cells.

The user provides either a voltage source such as an AC/DC wall adapter and then use the on-board current source, or can provide an external voltage limited current source of their own design.

Fast charge is terminated by a maximum voltage limit. The status LED will remain on when charging has been terminated while the charging source is still supplied.

The DV2902 also provides for a selectable end-of-discharge voltage (EDV). This is configured using a jumper. When EDV is met, the bq2902 disconnects the battery stack from the load.

For a better understanding of the operation of the DV2902, please review the bq2902 datasheet.
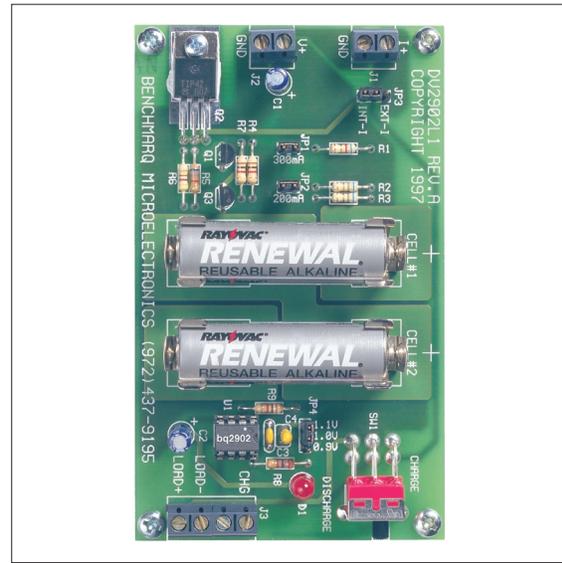
Connection Descriptions

J1 I+/GND Connection for external current source

J2 V+/GND Connection for external voltage source

J3 CHG Connection to charge output status pin of bq2902

LOAD- Negative side of Load

LOAD+ Positive side of Load

JP1, JP2 Jumpers to configure current source

JP3 Jumper to select external or on-board current source

JP4 Jumper to select EDV

SW1 Switch controlling charger/discharge action

Setup Procedure

1. Configure Jumper JP1 selecting the end-of-discharge voltage (EDV) desired.

Jumper Setting	EDV
[2 3]	0.9V
Floating	1.0V
[1 2]	1.1V

2. Insert either two AA or AAA rechargeable alkaline cells. If AAA cells are used, replace and solder in place the connector provided for the smaller cells.

3. Set Jumper JP3 to INT-I if using a voltage source connected to J2. Set JP3 to EXT-I if using an external current source connected to J1.

4. If JP3 is set for INT-I (onboard current source), configure jumpers JP1 and JP2 for charging rate desired:

5. Connect the charging source to either J1 or J2.

Jumper Configuration	Current Source Setting
JP1 and JP2 in place	300mA
JP1 only	200mA
No jumpers	100mA

   J1 Connect to an external current source. This current source must not exceed 300mA and be voltage limited to 7V.

   J2 Connect to an external voltage source such as an AC/DC wall adapter. This source must provide at least 350mA of current at 5V.

6. Connect the load to J3

Operation

Charging

With the batteries in place, charging will take place when the charging source is connected to either J1 or J2, and switch SW1 is set to the charge position. The LED should blink three times per second indicating charging is taking place.

The load may still be connected to J3 while charging. With switch SW1 in the charge position, the load is disconnected from the battery stack.

Charge Termination

The bq2902 will continue to charge the rechargeable alkaline cells until the termination criteria is met. Please refer to the bq2902 data sheet. When charge termination is met, the red LED will remain on as long as the charging supply is still provided at connector J1 and switch SW1 is in the charge position.

Discharging

To discharge the batteries, set switch SW1 to the discharge position. The load is connected across the LOAD-/LOAD+ connectors on J3. Switch SW1 is a break-before make switch, allowing charge/discharge control without having to remove the charging source and the load from their respective connectors.

When EDV is met on any cell, the bq2902 will disconnect the battery from the load by turning off the internal discharge FET. Please refer to the functional block diagram in the bq2902 data sheet for further illustration.

Fault Conditions

A fault condition is recognized when the flashing rate of the LED is much slower than the rate when the batteries are charging. A fault will occur, for example, when a cell is removed while charging is taking place. To remove the fault condition, the charging source must be disconnected, the battery replaced, and then the charging source reconnected. Please refer to the bq2902 data sheet for all fault conditions.

Charging with less than 300mA

As discussed in the bq2902 datasheet, the bq2902 takes the 300mA current source and pulse charges the battery stack. Sometimes it is desired to charge at less than 300mA, even though this will take longer for the batteries to reach full capacity.

Jumpers JP1 and JP2 allow the onboard current source to be configured to the different charging rates as discussed above. If rates other than what is configureable are desired, then the use of the external current source connector must be used.

Charge Output

The CHG (charge output) is brought out on connector J3. The charge output blinks when charging, and for fault condition. When the bq2903 terminates charge, the charge output is low when the charging source is still present.
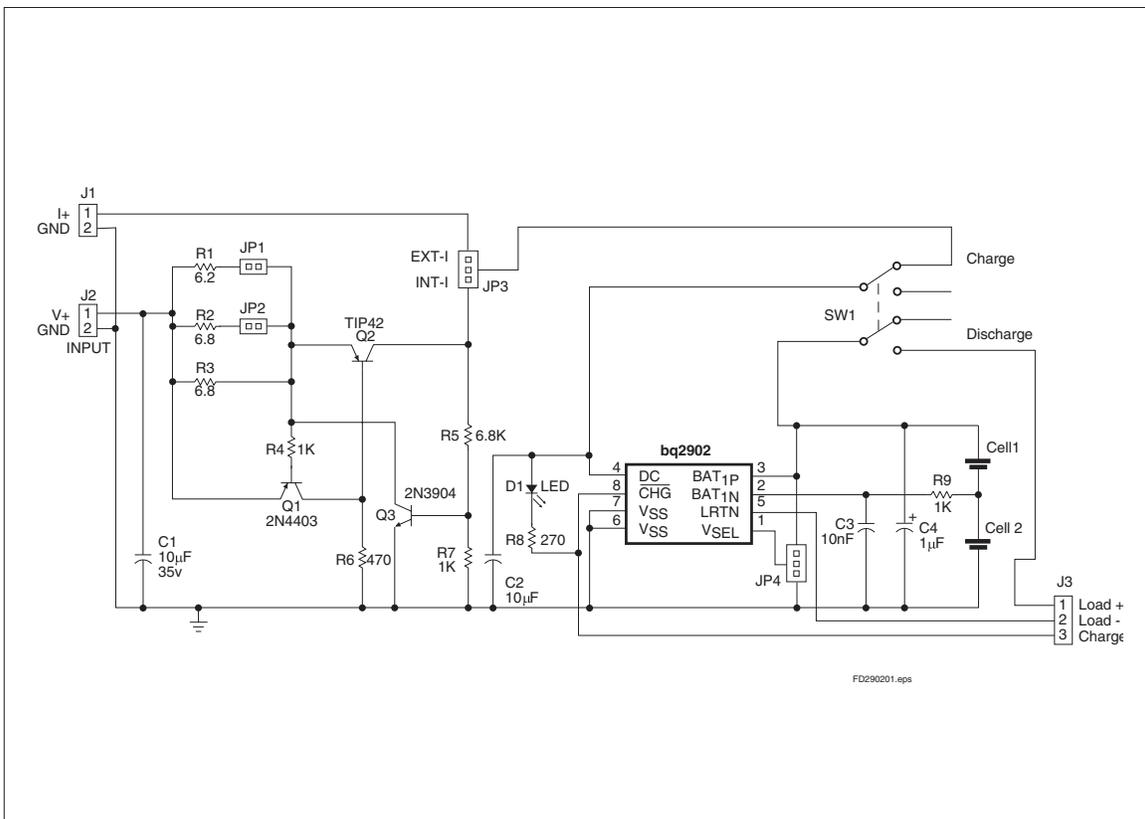
This output may be monitored externally to report charge status.

Recommended DC Operating Conditions

Symbol	Description	Minimum	Typical	Maximum	Unit	Notes
V_{DC}	DC voltage	4.5	-	7.0	V	Note 1
		5.5	-	12.0	V	Note 2
I_{DC}	DC current	-	-	300	mA	Note 1
		350	-		mA	Note 2
I_{DSCHG}	Discharge load current	-	-	400	mA	Note 3

Notes: 1. Through I+ and GND on connector J1.
2. Through V+ and GND on connector J2.
3. Discharge load present to the batteries through connector J3.

DV2902 Board Schematic

FD290201.eps

IMPORTANT NOTICE