

## Description

The ISL6293EVAL1 is an evaluation tool for the ISL6293 dual-input, single-cell Li-ion battery charger. The evaluation tool provides a complete evaluation platform addressing all datasheet specifications and functionalities. The jumpers on the board facilitate the programming of the charge current, different charging conditions, and can be used to make other necessary connections, such as current measurement.

The ISL6293 is a fully integrated single-cell Li-ion battery charger that accepts two input sources: one from a USB port and the other from a desktop cradle. Since the cradle input is rated for 28V maximum input voltage, the components associated with the cradle input on the evaluation board are good for a 28V supply. The charger's USB input and the associated components on the evaluation board are good for a 5V input.

The components assembled in the center square constitute a complete charger, suggesting the space saving advantage of the typical ISL6293 assembly in space-limited applications.

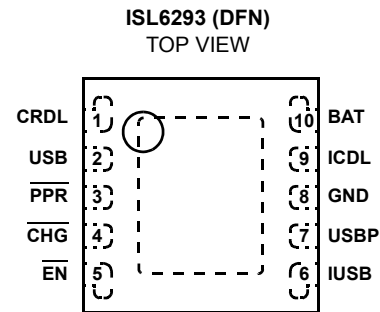
## Ordering Information

PART NUMBER	DESCRIPTION
ISL6293EVAL1	Evaluation Board for ISL6293

## Features

- A Complete Evaluation Platform for ISL6293 Charger
- The Center Square Suggesting the Space Saving Advantage of the Typical Components Assembly
- Cradle Input Accepts Voltage up to 28V
- Flexible Power Connectors Each with a Hook and a Solder Pad Providing Variety to Users
- Convenient Jumpers for Programming the Charge Current, Charge Mode, and for Current Measurement
- Exposed Solder Pads Connected to  $\overline{\text{CHG}}$ ,  $\overline{\text{ICDL}}$ ,  $\overline{\text{USBP}}$ ,  $\overline{\text{IUSB}}$  and  $\overline{\text{PPR}}$ , and  $\overline{\text{EN}}$  Pins Accommodating Extra Connections to those Pins
- 3.5x2.5 Square Inches Board Size Handy for Evaluation
- USB Port On Board Accepts Power Directly From USB Cable
- Eight Thermal Vias in the Thermal Pad Similar to Customers' Thermally Enhanced Environment

## Pinout



### **What Is Needed**

The following instruments will be needed to perform testing:

- Power supplies:
  - 1) PS1: DC 30V/5A
  - 2) PS2: DC 20V/5A
- DC Electronic load: 20V/5A
- Multimeters
- Function generator
- Oscilloscope
- Cables and wires

### **Quick Setup Guide (Refer to Figure 1)**

#### **DO NOT APPLY POWER UNTIL STEP 5**

##### **For Cradle Input:**

- Step 1: Connect a 5V supply PS1 to CRDL with the current limit set at 1.3A
- Step 2: Connect a 3.7V supply PS2 to VBAT with the current limit set at 1.3A
- Step 3: Connect the DC electronic load of 1.2A to BAT
- Step 4: Verify that no jumper shunt is inserted
- Step 5: Turn on power supplies and DC electronic load
- Step 6: The green LED should be on, indicating normal charging operation
- Step 7: The red LED should be on, indicating input power-on
- Step 8: The current meter I2 in series with PS2 should read about 0.33A as the charging current
- Step 9: Insert a jumper shunt on JP3 and the current meter I2 should read about 0.67A
- Step 10: Insert a jumper shunt on both JP3 and JP4 and the current meter I2 should read 1.1A

##### **For USB Input:**

- Step 1: Connect a 5V supply PS1 to USB with the current limit set at 0.7A
- Step 2: Connect a 3.7V supply PS2 to VBAT with the current limit set at 0.7A
- Step 3: Connect the DC electronic load of 0.6A to BAT
- Step 4: Insert a jumper to USBP = HIGH
- Step 5: Turn on power supplies and DC electronic load
- Step 6: The green LED should be on, indicating normal charging operation
- Step 7: The red LED should be on, indicating input power-on
- Step 8: The current meter I2 in series with PS2 should read about 0.45A as the charging current

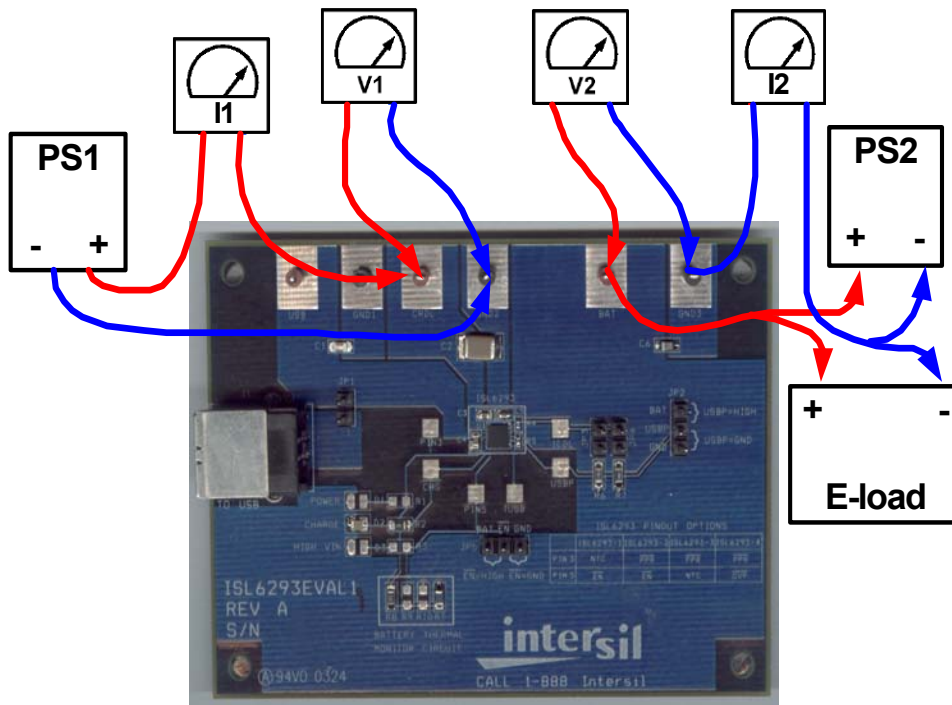


FIGURE 1. CONNECTION OF INSTRUMENTS

### Detailed Description

The ISL6293EVAL1 is a complete evaluation platform addressing all datasheet specifications and functionalities.

The jumpers on the board facilitate the programming of the charge current, different charging conditions, and can be used to make other necessary connections, such as current measurement.

#### Jumpers:

**JP1** - Connects the USB connector to the USB pin on the charger. A shunt must be installed if a real USB connector input is being used. To measure the USB input current, a current meter can replace the shunt.

**JP2** - Can connect the USBP to HIGH (BAT pin) or GND. If there is no shunt installed on JP2, the USBP pin is internally pulled down to logic LOW for a low-power mode USB port, where the USB charge current is maximum 100mA. If a shunt is installed across USBP = GND, USBP is driven to logic LOW, same as floating. If the shunt is installed across USBP = HIGH, with a battery of 2V or higher present on BAT pin, the USBP pin is driven to logic HIGH, which sets the USB input port in the high-power mode where the maximum USB charge current is 500mA.

**JP3** - Connects an additional 4.2K resistor to the ICDL pin, such that the Cradle charge current will be increased by 0.33A.

**JP4** - Connects an additional 4.2K resistor to the ICDL pin, such that the Cradle charge current will be increased by 0.33A.

**JP5** - Can connect the  $\overline{\text{EN}}$  pin to HIGH (BAT) or GND. If there is no shunt installed on JP2, the  $\overline{\text{EN}}$  pin is internally pulled down to logic LOW, which enables the charger. If a shunt is installed across  $\overline{\text{EN}} = \text{GND}$ , the  $\overline{\text{EN}}$  pin is driven to logic LOW, the charger is enabled, same as floating. If the shunt is installed across  $\overline{\text{EN}} = \text{HIGH}$ , with a battery of 2V or higher present on BAT pin, the  $\overline{\text{EN}}$  pin is driven to logic HIGH, which disables the charger.

TABLE 1. JUMPER SETTINGS

JUMPER	POSITION	FUNCTION
JP1	Shunt installed	USB port connected to USB pin
JP2	USB = HIGH	USB high-power mode
	USB = GND	USB low-power mode
	Shunt not installed	USB low-power mode
JP3	Shunt installed	Add 0.33A to charging current
JP4	Shunt installed	Add 0.33A to charging current
JP5	$\overline{\text{EN}} = \text{HIGH}$	Charger disabled
	$\overline{\text{EN}} = \text{GND}$	Charger enabled
	Shunt not installed	Charger enabled

Board Layout Information

Schematic of PCB Board

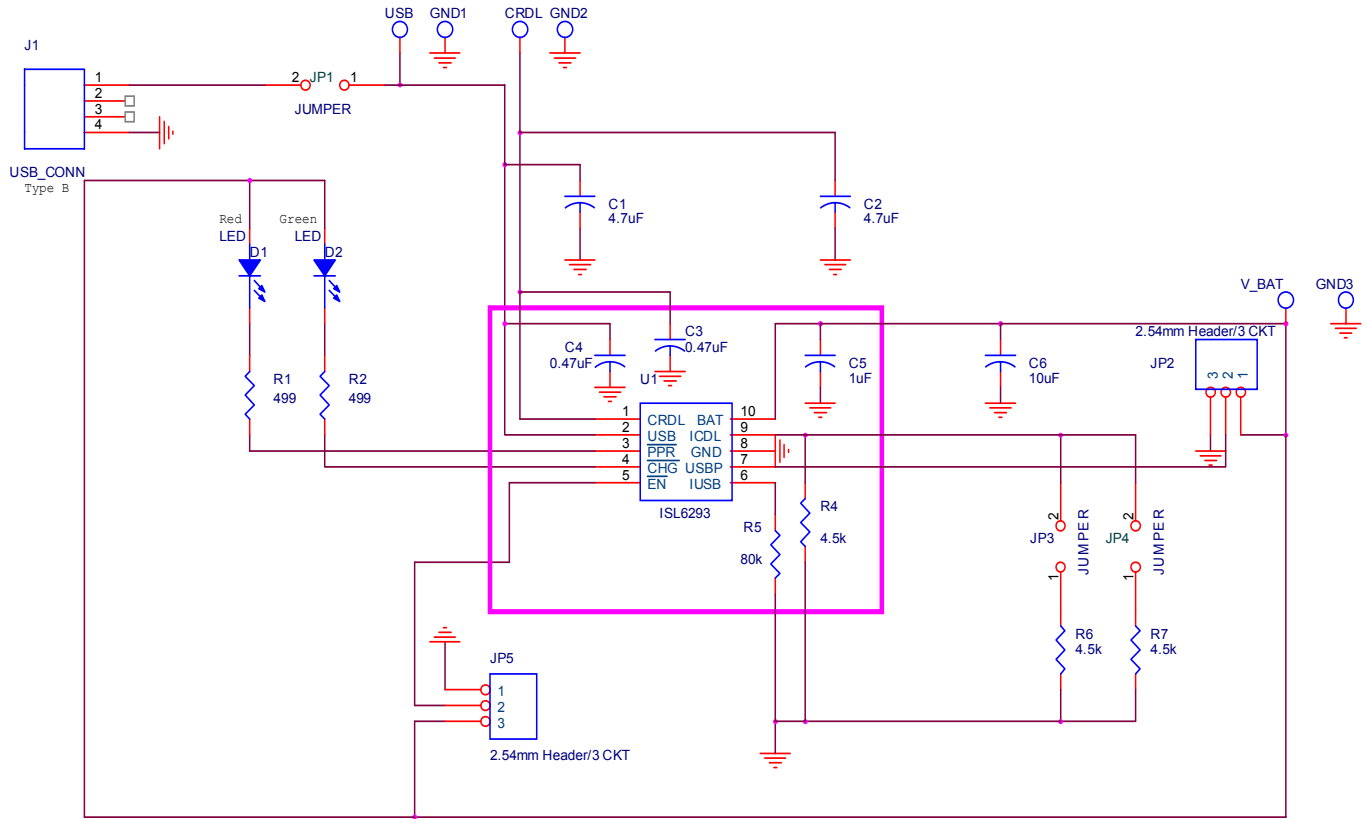


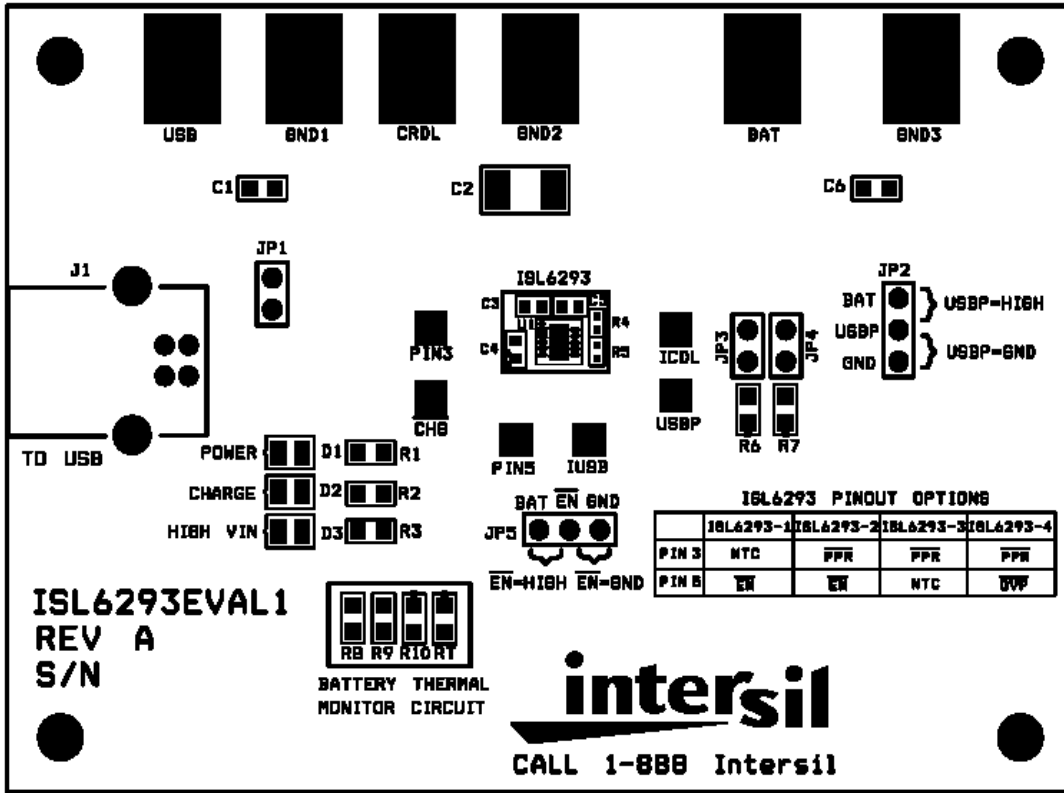
FIGURE 2. BOARD LAYOUT INFORMATION SCHEMATIC

## Application Note 1065

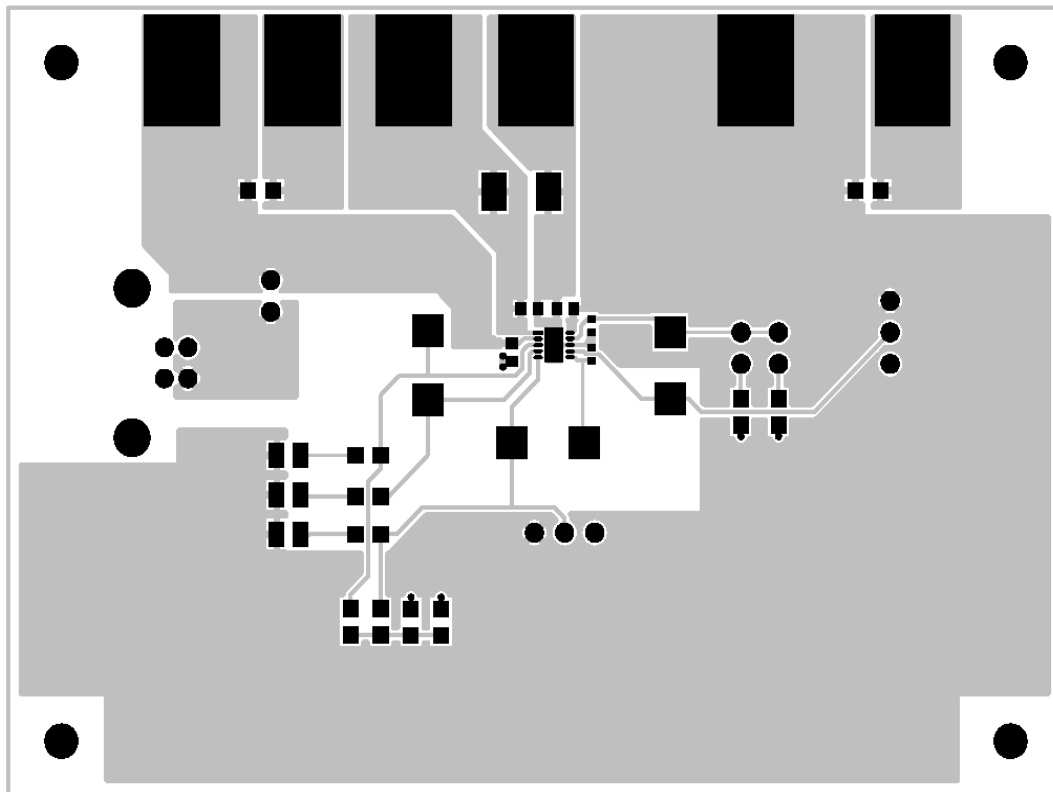
**TABLE 2. ISL6293EVAL1 BILL OF MATERIALS (BOM)**

ITEM	QTY	REFERENCE	PART DESCRIPTION	PCB FOOTPRINT	PART NUMBER	VENDOR
1	1	U1	ISL6293 Charger	DFN	ISL6293	Intersil
2	2	R1, R2	0805, 499Ω, 1% Resistor	0805		Various
3	1	R4	0402, 4.22K, 1% Resistor	0402	P4.22KLCT-ND	Digikey
4	1	R5	0402, 80K, 1% Resistor	0402	P80.6KLCT-ND	Digikey
5	2	R6, R7	0805, 4.22K, 1% Resistor	0805	P4.22KCCT-ND	Digikey
6	1	C1	4.7μF, 6.3V, X7R Ceramic	0805	C2012X7R0J475K	TDK
7	1	C2	4.7μF, 50V, X7R Ceramic	1812	C4532X7R1H475K	TDK
8	1	C3	0.47μF, 50V, X7R Ceramic	0603	C1608X7R1H474K	TDK
9	1	C4	0.47μF, 6.3V, X7R Ceramic	0603	C1608X7R0J474K	TDK
10	1	C5	4.7μF, 6.3V, X7R Ceramic	0603	C1608X7R0J475K	
11	1	C6	10μF, 6.3V, Tantalum	0805	P11337CT-ND	Digikey
12	3	USB, CRDL, BAT	Test point, Red		5000K-ND	Digikey
13	3	GND1, GND2, GND3	Test point, Black		5001K-ND	Digikey
14	3	JP1, JP3, JP4	2.54mm header, 2ckt		WM6402-ND	Digikey
15	2	JP2, JP5	2.54mm header, 3ckt		WM6403-ND	Digikey
16	1	J1	Type B, Female USB	Type B	787780-1-ND	Digikey
17	1	D1	Red LED	0805	67-1552-1-ND	Digikey
18	1	D2	Green LED	0805	67-1553-1-ND	Digikey

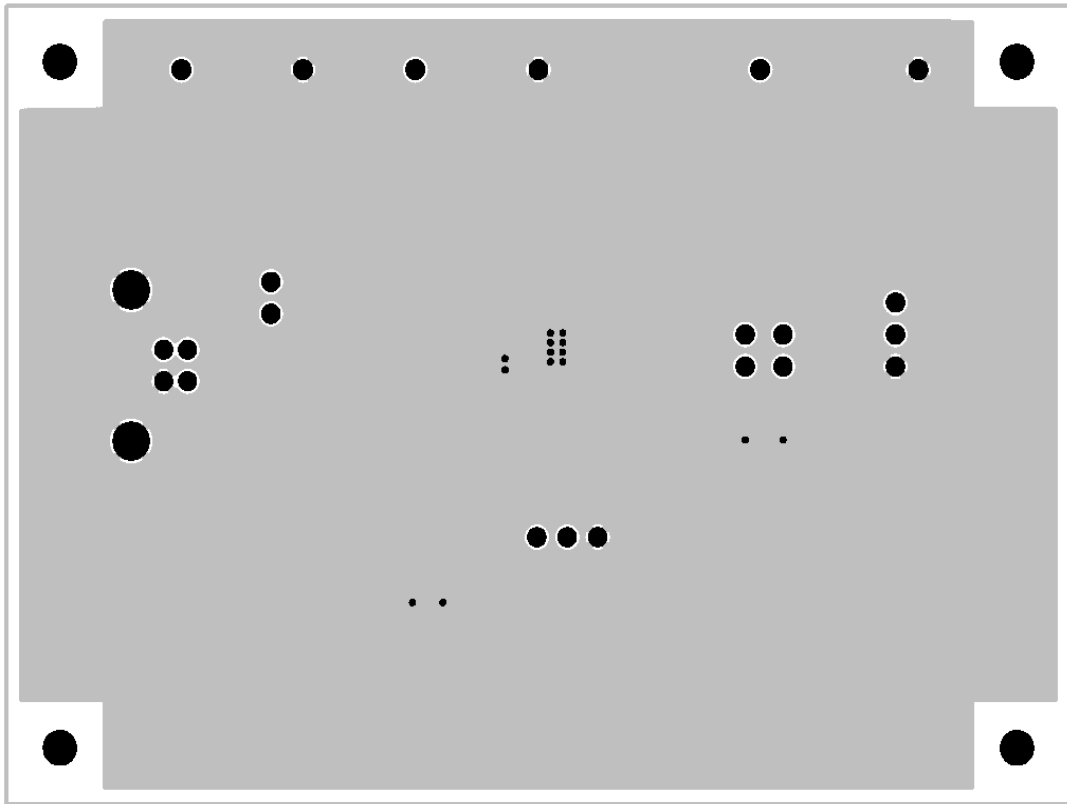
PCB Layout



SILK LAYER



TOP LAYER



BOTTOM LAYER

*Intersil Corporation reserves the right to make changes in circuit design, software and/or specifications at any time without notice. Accordingly, the reader is cautioned to verify that the Application Note or Technical Brief is current before proceeding.*

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