

Enhanced Single-Cell Lithium-Ion Battery Protection IC EVM Using the UCC3952

User's Guide

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General Information

This chapter details the Texas Instruments (TI) UCC3952 enhanced single cell lithium-ion battery protection IC (EVM), SLUU075. It includes a list of EVM features, a brief description of the module illustrated with a pictorial and schematic diagrams and EVM specifications.

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1.1 Features

UCC3952EVM enhanced single cell lithium-ion battery protection IC EVM features include:

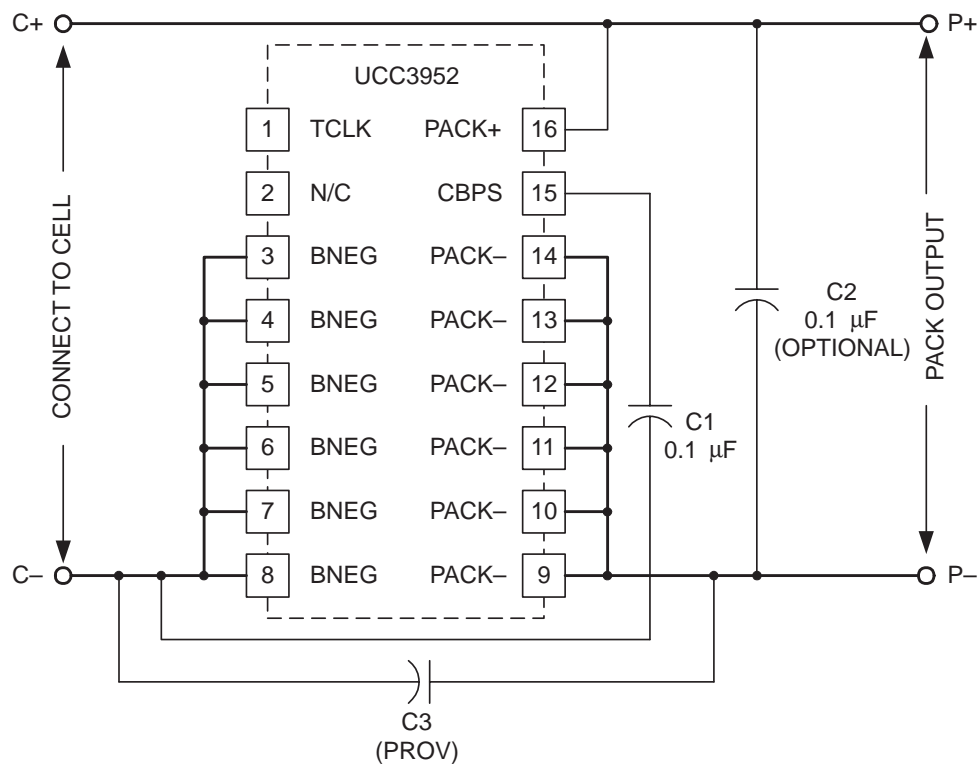
- Small (5.5mm x 22.5mm) two-sided board with only two components.
- Integrated low-impedance MOSFET switch and current sensor (50 mΩ typical)
- Overcharge protection, with built-in 1.5-second time delay (typical)
- High accuracy $\pm 1.0\%$ tolerance on overcharge threshold (over temperature)
- Four standard overcharge thresholds are available (4.20 V, 4.25 V, 4.30 V, or 4.35 V)
- Overdischarge protection, with built-in 15-ms time delay (typical)
- Overload/short-circuit protection with built-in 1.5-ms time delay (typical)
- Automatic recovery from short circuit when load is removed
- Reverse charger protection (up to -8 V)
- Runaway charger protection (up to $+16$ V)
- Overtemp protection
- Low operating current of 5 μ A (typical)
- Low sleep-mode current of 1.5 μ A (typical)

1.2 Description

The UCC3952 evaluation module provides complete protection for a single lithium-ion cell, including overcharge, overdischarge and short-circuit protection. The application schematic is shown in Figure 1 and a component placement is shown in Figure 2. A list of materials, giving the component part numbers and case sizes, is given in Table 1. Note that the UCC3952, using an internal MOSFET switch, requires only a single external decoupling capacitor to provide a complete protection solution.

Bypass capacitor C1 is the only required external component. However, an optional capacitor C2 (installed) provides an increased level of protection against ESD and short circuits. By delaying the recovery from a shorted pack output, C2 increases the level of protection under conditions of intermittent short circuits. Further protection against voltage transients may be added by installing provisional capacitor C3.

Figure 1-1. UCC3952 Evaluation Module Application Schematic





Reference

This chapter includes a parts list and PCB layout illustrations for the UCC3952 evaluation module.

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2.1 UCC3952 EVM Parts List

Table 2–1. UCC3952 EVM Parts List

Reference	Description	Size	Qty	Manufacturer/Distributor Part Number
C1	CAPACITOR, 0.1 μ F, 16V, CERAMIC, (X7R Type)	0603	1	(AVX) 0603YC104KAT2A
C2 (Optional)	CAPACITOR, 0.1 μ F, 16V, CERAMIC, (X7R Type) Optional, Installed	0603	1	(AVX) 0603YC104KAT2A
C3 (Provisional)	Provisional, not intalled	0603	1	
U1	UCC3952PW–x (x=Dash number 1, 2, 3, or 4)		1	(TI) UCC3952

† The values of these components are to be determined by the user in accordance with the application requirements.

2.2 UCC3952 EVM Board Layouts

The board layout examples of the UCC3952 EVM PCB are shown in the following illustrations. They are not to scale and appear here only as a reference.

2.2.1 Pin Descriptions

B–: Connects the negative terminal of the cell in the battery pack.

B+ : Connects to the positive terminal of the cell in the battery pack.

P–: This is the negative terminal of the battery pack.

P+ : This is the positive terminal of the battery pack.

Figure 2–1. UCC3952 EVM PC Board: Top Assembly

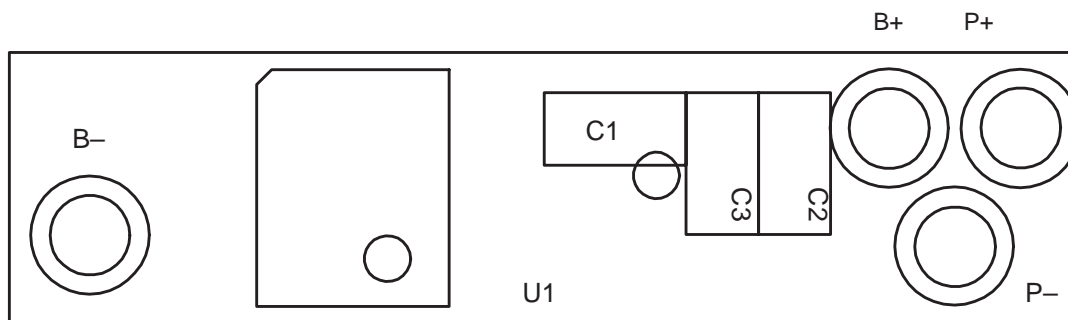
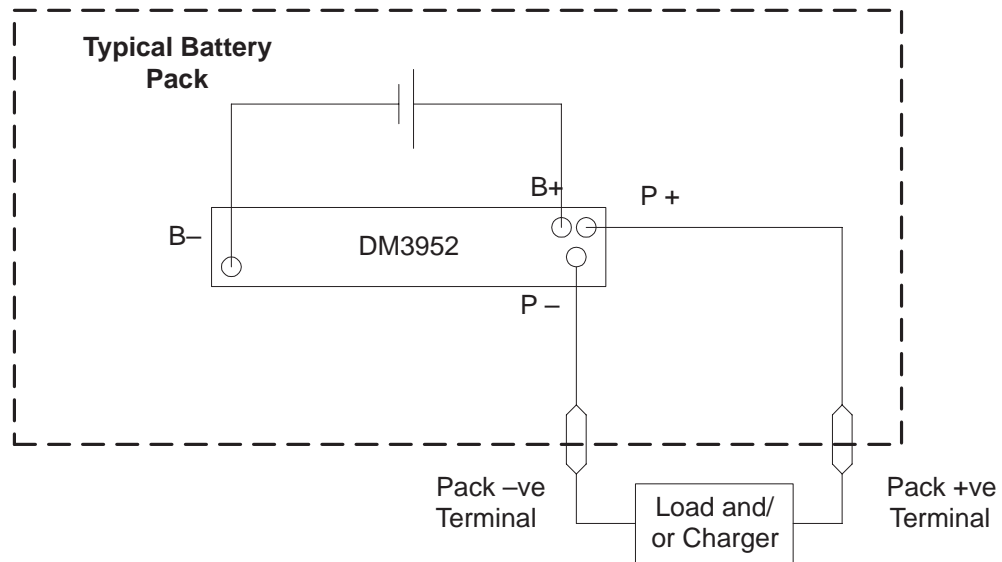


Figure 2–2. UCC3952 EVM PC Board: Top Assembly



2.3 References

- 1) UCC952 Enhanced Single Cell Lithium-Ion Battery Protection IC (EVM), Texas Instruments, revised 2000, Literature No. SLUS400.

