

UCC3952A Single-Cell Lithium-Ion or Lithium-Polymer Battery Protection IC EVM

User's Guide

IMPORTANT NOTICE

Texas Instruments and its subsidiaries (TI) reserve the right to make changes to their products or to discontinue any product or service without notice, and advise customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgment, including those pertaining to warranty, patent infringement, and limitation of liability.

TI warrants performance of its semiconductor products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

Customers are responsible for their applications using TI components.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards must be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance or customer product design. TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used. TI's publication of information regarding any third party's products or services does not constitute TI's approval, warranty or endorsement thereof.

Mailing Address:

Texas Instruments
Post Office Box 655303
Dallas, Texas 75265

Contents

1	General Information	1-1
1.1	Features	1-2
1.2	Description	1-2
1.3	Available Options for the UCC3952AEVM	1-3
2	Reference	2-1
2.1	UCC3952A EVM Parts List	2-2
2.2	UCC3952A EVM Board Layouts	2-2
	2.2.1 Pin Descriptions	2-2
2.3	References	2-3

Figures

1-1	UCC3952A Evaluation Module Application Schematic	1-3
2-1	UCC3952A EVM PC Board: Top Assembly	2-2
2-2	UCC3952A EVM PC Board: Layer 1	2-3
2-3	UCC3952 EVM PC Board: Layer 2	2-3
2-4	UCC3952A EVM PC Board Connection Diagram	2-3

Tables

1-1	EVM Options	1-3
2-1	UCC3952A EVM Parts List	2-2



General Information

This chapter details the Texas Instruments (TI) UCC3952A single-cell lithium-ion and lithium-polymer battery-protection IC (EVM), SLUU080. It includes a list of EVM features, a brief description of the module illustrated (with a pictorial and schematic diagrams), and EVM specifications.

Topic	Page
1.1 Features	1-2
1.2 Description	1-2
1.3 Available Options for the UCC3952AEVM	1-3

1.1 Features

UCC3952AEVM single cell lithium-ion or lithium-polymer battery protection IC EVM features include:

- Small (40.64 mm x 17.78 mm) two-sided board with only two components
- Integrated, low-impedance MOSFET switch and current sensor (60 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 available standard overcharge thresholds (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)
- Overtemperature protection
- Low operating current of 5 μ A (typical)
- Low sleep-mode current of 1.5 μ A (typical)

1.2 Description

The UCC3952A evaluation module provides complete protection for a single lithium-ion or lithium-polymer cell, including overcharge, overdischarge, overtemperature, and short-circuit protection. The application schematic is shown in Figure 1–1 and a component placement is shown in Figure 2–1. A list of materials, giving the component part numbers and case sizes, is given in Table 1–1. Note that the UCC3952A, 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 increased 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.

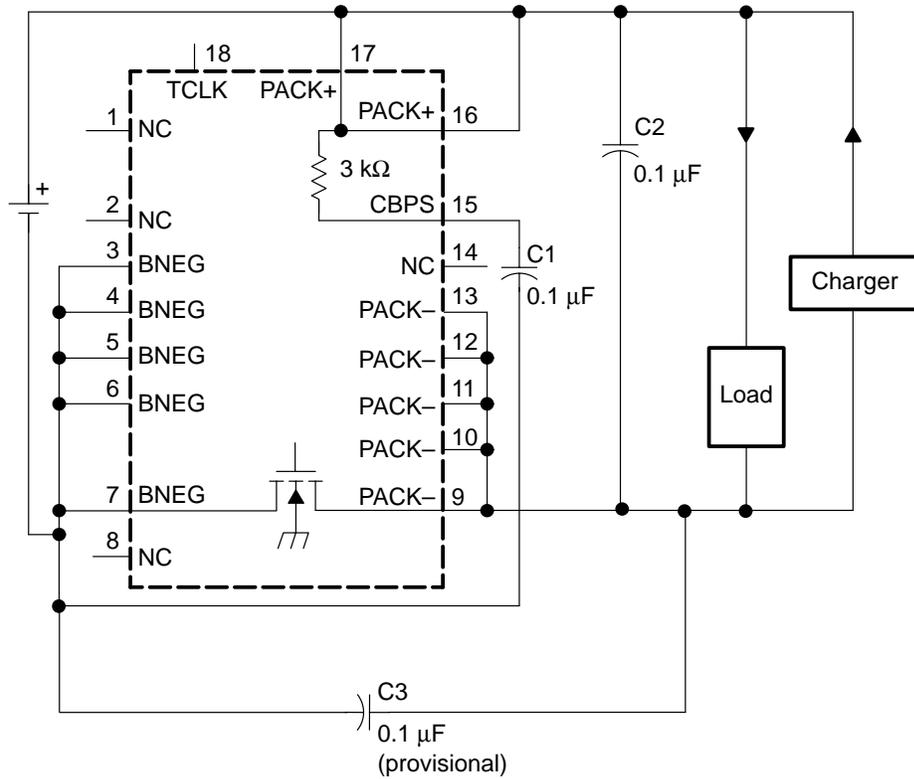
1.3 Available Options for the UCC3952AEVM

Each EVM option differs according to Table 1–1.

Table 1–1. EVM Options

EVM Part Number	IC Part Number	Overvoltage Threshold $V_{(OV)}$
UCC3952AEVM-001	UCC3952AGSH-1	4.20 V
UCC3952AEVM-002	UCC3952AGSH-2	4.25 V
UCC3952AEVM-003	UCC3952AGSH-3	4.30 V
UCC3952AEVM-004	UCC3952AGSH-4	4.35 V

Figure 1–1. UCC3952A Evaluation Module Application Schematic





Reference

This chapter includes a parts list and PCB layout illustrations for the UCC3952A evaluation module.

Topic	Page
2.1 UCC3952A EVM Parts List	2-2
2.2 UCC3952A EVM Board Layouts	2-2
2.3 References	2-3

2.1 UCC3952A EVM Parts List

Table 2–1. UCC3952A EVM Parts List

Reference Designator	Qty	Description	Part Number	MFG	Size
C1	1	0.1 μ F, 16V ceramic cap (X7R Type)	AVX 0603YC104KAT2A	AVX	603
C2	1	0.1 μ F, 16V ceramic cap (X7R Type)	AVX 0603YC104KAT2A	AVX	603
C3	0	0.1 μ F, 16V ceramic cap (X7R Type) Part is provisional, not installed.	AVX 0603YC104KAT2A	AVX	603
U1	1	x = dash number 1, 2, 3, or 4	UCC3952AGSH-x	TI	BCC–18

2.2 UCC3952A EVM Board Layouts

The board layout examples of the UCC3952A 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. UCC3952A EVM PC Board: Top Assembly

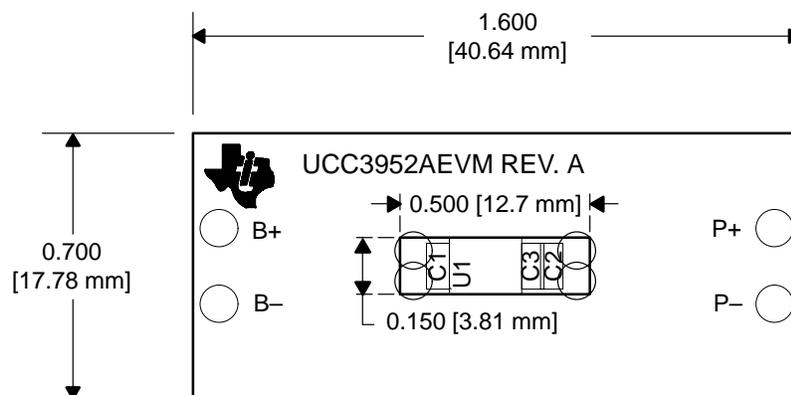


Figure 2–2. UCC3952A EVM PC Board: Layer 1

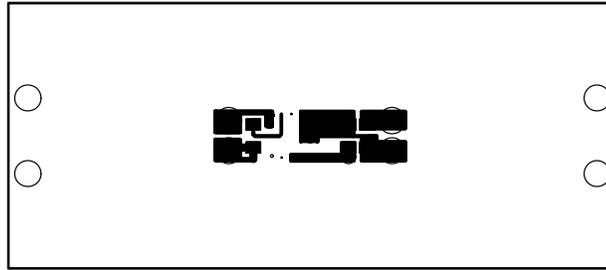


Figure 2–3. UCC3952 EVM PC Board: Layer 2

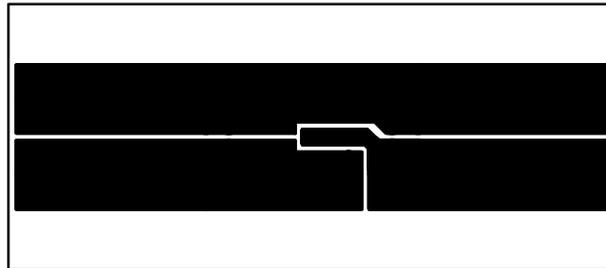
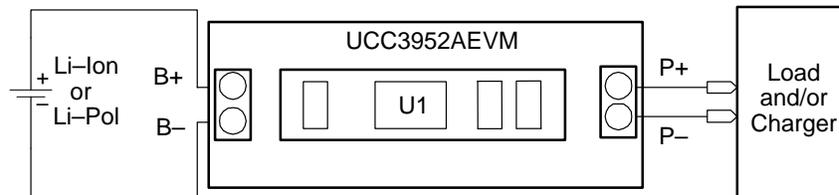


Figure 2–4. UCC3952A EVM PC Board Connection Diagram



2.3 References

- 1) UCC3952A Single-Cell Lithium-Ion or Lithium-Polymer Battery Protection IC (EVM), Texas Instruments, Literature No. SLUS463.

