

Test Procedure for the LC05111C05MTGEVB Evaluation Board

1. Test Setup

1.1 Test Equipment

- Voltage Current Source: ADVANTEST R6243 x 2
- Electronic LOAD: FUJITSU DENSO EUL-150αXL
- Synthesized Function Generator: YOKOGAWA FG120
- Oscilloscope: LeCroy WaveRunner LT374
- Operating Temperature: 25°C
- Current probe :Lecroy AP015
- Battery: Which are commercially available.

1.2 Recommended Test Setup

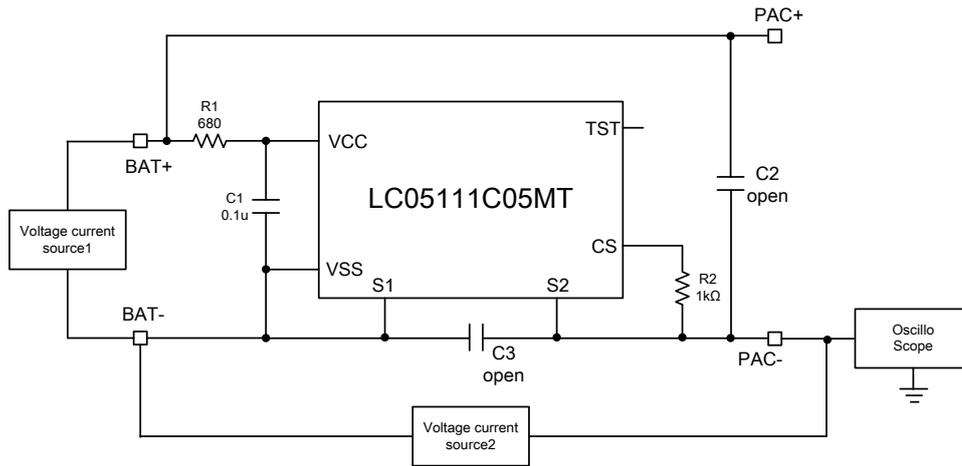


Figure1. LC05111C05MTGEVB Recommended Test Set Up for Charge/Discharge Voltage detection

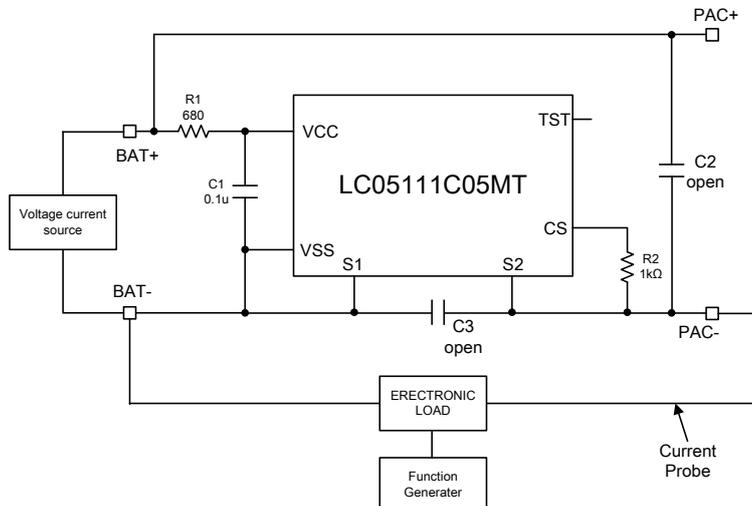


Figure2. LC05111C05MTGEVB Recommended Test Set Up for Charge/Discharge Current detection

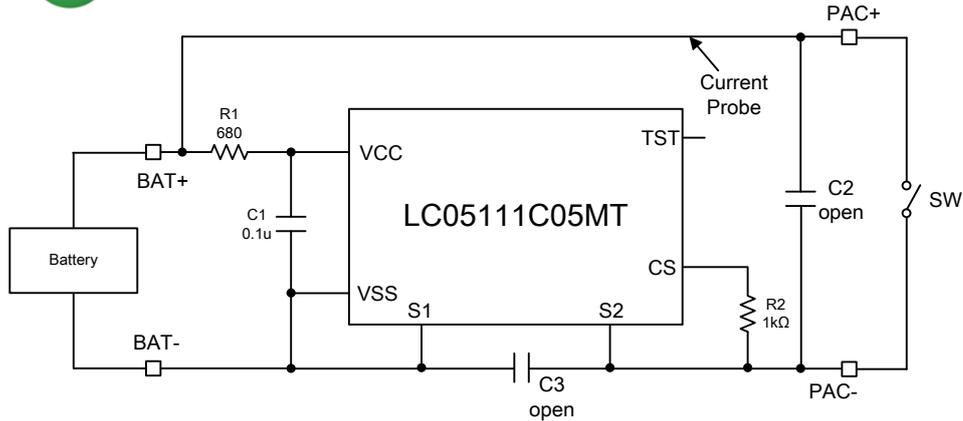


Figure3. LC05111C05MTGEVB Recommended Test Set Up for Discharge Current2(short current)detection

1.3 List of Test Points

Table1. Test Points Functions

TEST POINTS NAME	DESCRIPTION
BAT+ or PAC+	Battery Voltage
PAC-	Detection state of Battery Voltage and discharge current and charge current

2. Test Procedure

1. Connect LC05111C05MTGEVB like upper Figure1.
2. Set to 3.7V Voltage Current Source1. Set to 10mA at Current limit.
3. Set to -10mA Voltage Current Source2. Set to 2V at Voltage limit.
4. Monitor the voltage of the PAC-terminal with increasing voltage.
5. The PAC- voltage is cramped at the overcharge detection voltage.
6. Set to +10mA Voltage Current Source2. Set to 2V at Voltage limit.
7. Monitor the voltage of the PAC-terminal with decreasing voltage.
8. The voltage at the PAC- is clamped at the overcharge release voltage detection.

2.2 Over-discharge detection/release voltage Procedure

1. Connect LC05111C05MTGEVB like upper Figure1.
2. Set to 3.7V Voltage Current Source1. Set to 10mA at Current limit.
3. Set to 10mA Voltage Current Source2. Set to 2V at Voltage limit.
4. It monitors the voltage of the PAC-terminal with decreasing voltage.
5. The PAC- voltage is clamped at the over-discharge detection voltage.
6. Set to -10mA Voltage Current Source2. Set to 2V at Voltage limit.
7. Monitor the increasing voltage of the PAC-terminal.
8. The PAC- voltage increase to about 0V at the over-discharge release voltage.



2.3 Over-discharge release voltage2 Procedure

1. Connect LC05111C05MTGEVB like upper Figure1.
2. Set to 3.7V Voltage Current Source1. Set to 10mA at Current limit.
3. Set to 10mA Voltage Current Source2. Set to 2V at Voltage limit.
4. Monitors the decreasing voltage of the PAC-terminal.
5. The PAC- is clamped at the over-discharge detection voltage.
6. PAC- is opened.
7. Monitor the increasing voltage of the PAC-terminal.
8. When the current becomes 3.0uA, the status is changed into the over-discharge releasing voltage2.

2.4 Over-discharge current detection/release Procedure

1. Connect LC05111C05MTGEVB like upper Figure2.
2. Set to 3.7V Voltage Current Source1. Set to 10mA at Current limit.
3. Synthesized Function Generator set1 shot pulse of 25ms.
4. Electronic LOAD set Over-discharge current at A, set 0A at B.
5. Monitor the current through BAT- to PAC- with current probe.
6. When the protection IC detects the discharge overcurrent, the current pulse width becomes (TYP) 12ms.
7. When the protection IC releases the discharge overcurrent, the pulse width becomes 25ms.

2.5 Over-charge current detection/release Procedure

1. Connect LC05111C05MTGEVB like upper Figure2.
2. Set to 3.7V Voltage Current Source1. Set to 10mA at Current limit.
3. Synthesized Function Generator set1 shot pulse of 25ms.
4. Electronic LOAD set Over-charge current at A, set 0A at B.
5. Monitor the current through BAT- to PAC- with current probe.
6. When the protection IC detects the charge overcurrent, the pulse width becomes (TYP) 16ms.
7. When the protection IC releases the charge overcurrent, the pulse width becomes 25ms.

2.6 Over-discharge current2(short current) detection Procedure

1. Connect LC05111C05MTGEVB like upper Figure3.
2. Connects the Battery between BAT- and BAT +.
3. Monitors the current through the BAT+ and PAC- with current probe.
4. Turns on the short circuit SW.
5. At this moment, We can measure the short circuit detection delay time and the short circuit current.

3. Performance Data (It substitutes the characteristics of LC05111C05MTG.)

