USB 48V EPR Port Protector for CC & SBU

EVAL Kit Physical Contents

Item #	Description	Quantity
1	KTU1133 EVAL fully assembled PCB	1
2	Anti-static bag	1
3	Quick Start Guide, printed (A4 or US Letter)	1
4	EVAL Kit box	1

QR Links for Documents

IC Landing Page	EVAL Kit Landing Page
https://www.kinet-ic.com/ktu1133/	https://www.kinet-ic.com/ktu1133euaj-mmev01

User-Supplied Equipment

Required Equipment

1. Bench Power Supply for VCC: 3.0V with 0.5A current limit.
2. Digital Current Meter for VCC: set range for 0.001mA or 0.0001mA resolution.
3. Bench Power Supply for CC1C: adjustable 0 to 9V with 0.5A current limit.
4. Digital Current Meter for CC1C: set range for 0.001mA or 0.0001mA resolution.
5. Digital Voltmeter for CC1S: set range for 0.001V or 0.0001V resolution.
6. Bench Power Supply for VBUS: adjustable 0 to 54V with 0.5A current limit.
7. Digital Voltmeter for VBUS_LV: set range for 50.0V or 100.0V resolution.
8. Test Leads:
    a. VCC/GND Input Power: 1x (red) banana-to-banana & pair (red/black) banana-to-clip
    b. CC1C/GND Input Voltage/Current: 1x (red) banana-to-banana & pair (red/black) banana-to-clip
    c. CC1S/GND Output Voltage: pair (red/black) banana-to-clip

Optional Equipment

1. Load: either an e-Load, power resistors, or an actual system load.
2. Oscilloscope: for dynamic testing of voltages (and currents with a current probe, if available).
3. Function Generator: for dynamic testing of on/off & fault response, debounce, and recovery times.
4. Digital Multimeter: Measure Output Voltage (CC1S/2S, SBU1/2S, VBUS_LV).

Quick Start Procedures

1. Before connecting the EVAL Kit to the Bench Power Supplies, turn on the supplies and adjust their voltages as close to 0V as possible. Also set both current limits to 0.5A.
2. Using the Test Leads, wire up the two Bench Supplies, two Current Meters, and one Voltage Meter as indicated in the *Typical Test Setup Diagram* section of this document.
3. Start slowly ramping the VCC Bench Supply to V_{CC} = 3.0V while monitoring the VCC Current Meter. If the current becomes high, quickly reduce the voltage to prevent damage. Then inspect the setup for any wiring errors.
4. Test the No-Load Supply Current at V_{CC} = 3.0V. It should measure about 0.040mA.
5. Keep VCC at 3.0V. Start slowly ramping the CC1C Bench Supply to V_{CC1C} = V_{CC1S} = 5.0V while monitoring the CC1C Current Meter. If the current becomes high, quickly reduce the voltage to prevent damage. Then inspect the setup for any wiring errors. Observe the CC1C Switch is ON by checking that the CC1S voltage is 5.0V.
6. Adjust the CC1C Bench Supply to V_{CC1C} > 6.3V. Observe the CC1C Switch turns OFF due to OVP fault by checking that the CC1S voltage falls to 0V.
7. Adjust the CC1 Bench Supply to V_{CC1C} = 2.6V. Observe the CC1C Switch is ON after OVP Recovery by checking that the CC1S voltage is also 2.6V.
8. Keep CC1C at 2.6V. Adjust the VCC Bench Supply as close to 0V as possible. Observe the CC1C Switch is OFF due to VCC in UVLO by checking that the CC1S voltage falls to 0V.
9. Check the CC1C Dead Battery Pull-Down Current. With CC1C voltage between 2.5V and 2.7V, the CC1C input current is 0.41mA minimum, 0.51mA typical, and 0.66mA maximum.
10. Check VBUS Level shifter. Adjust the VBUS Bench Supply to V_{BUS} = 0 to 48V. In EPR Mode (EPR_EN = High), the VBUS_LV output is proportionally scaled to 0.42x VBUS. Therefore, 48V at the VBUS input is shifted to 20V at VBUS_LV output. In SPR Mode (EPR_EN = Low), the VBUS level shifter enters 1x VBUS “pass through” operation.