PMP11670 Test Results

1 General

1.1 Purpose

This test report is to provide the detailed data for evaluating and verifying the PMP11670 which employs one Buck Converter ---- LM73605 and two USB Charging Port Controllers ---- TPS2549-Q1.

1.2 Reference Documentation

Schematic: PMP11670_Sch.pdf

Gerber: PMP11670_GerberNCdrills.zip

Layer Plot: PMP11670_PCBlayers.pdf

Assembly Drawing: PMP11670_Assy.pdf

CAD File: PMP11670_CAD.zip

BOM: PMP11670_BOM.pdf

1.3 Test Equipment

Multi-meter (current): Fluke 287C

Multi-meter (voltage): Fluke 287C

DC Source: Chroma 62012P-600-8

E-Load: Chroma 63105A module

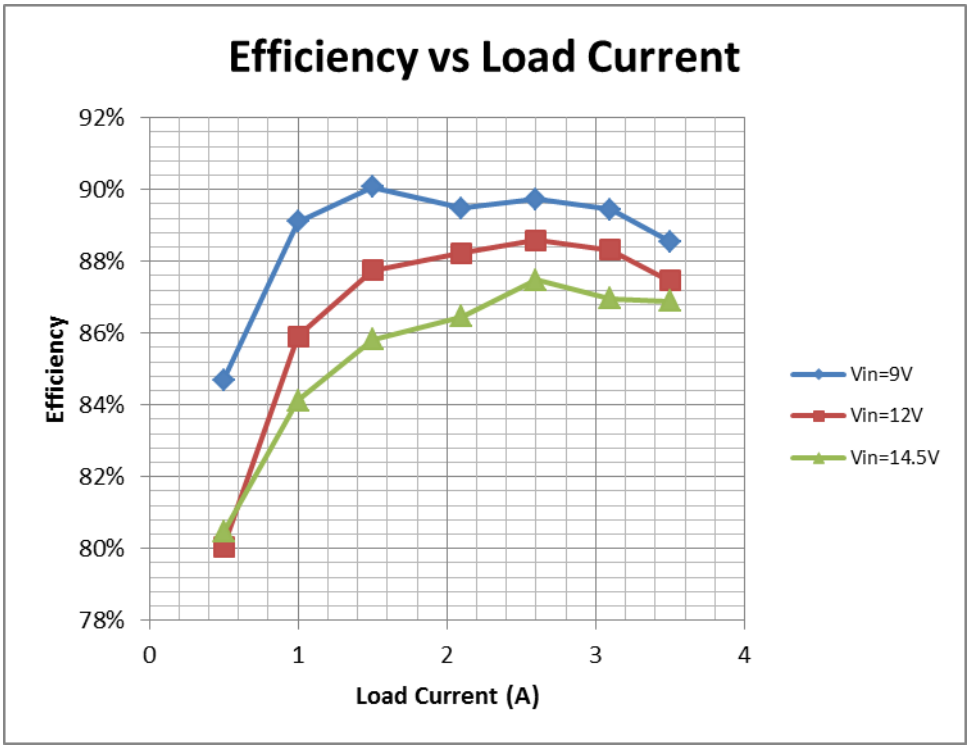
Oscilloscope: Tektronix DPO3054

Electrical Thermography: Fluke Ti9

2 Performance Data and Waveform

2.1 Efficiency

Vin (V)	Iin (A)	Vo1 (V)	Io1 (A)	Vo2 (V)	Io2 (A)	Efficiency
8.98	0.01	5.22	0.01	5.22	0.00	56.99%
8.97	0.34	5.13	0.50	5.17	0.00	84.70%
8.94	0.64	5.09	1.00	5.17	0.00	89.10%
8.91	0.94	5.05	1.50	5.17	0.00	90.06%
8.87	1.32	5.00	2.10	5.16	0.00	89.48%
8.84	1.65	5.00	2.10	5.13	0.50	89.74%
8.81	1.98	4.99	2.10	5.10	1.00	89.45%
8.78	2.25	4.96	2.40	5.08	1.10	88.54%
12.01	0.01	5.22	0.01	5.22	0.00	49.96%
12.00	0.27	5.13	0.50	5.16	0.00	80.06%
11.97	0.50	5.09	1.00	5.16	0.00	85.90%
11.94	0.72	5.05	1.50	5.16	0.00	87.75%
11.90	1.00	5.00	2.10	5.16	0.00	88.24%
11.89	1.24	5.00	2.10	5.12	0.50	88.58%
11.87	1.49	5.00	2.10	5.09	1.00	88.33%
11.85	1.69	4.97	2.40	5.08	1.10	87.46%
14.50	0.01	5.21	0.01	5.22	0.00	49.22%
14.49	0.22	5.13	0.50	5.16	0.00	80.46%
14.47	0.42	5.10	1.00	5.16	0.00	84.12%
14.45	0.61	5.06	1.50	5.16	0.00	85.83%
14.43	0.85	5.02	2.10	5.16	0.00	86.46%
14.40	1.04	5.02	2.10	5.12	0.50	87.49%
14.39	1.25	5.01	2.10	5.07	1.00	86.96%
14.37	1.40	4.96	2.40	5.07	1.10	86.89%

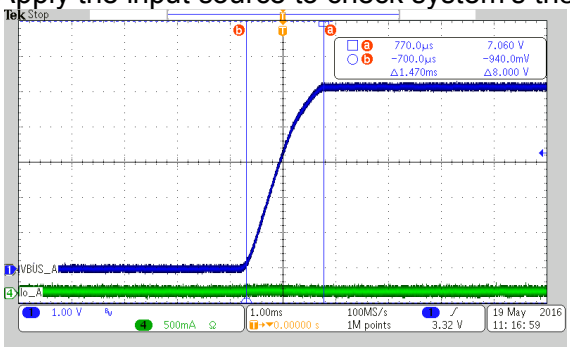


2.2 Standby Current

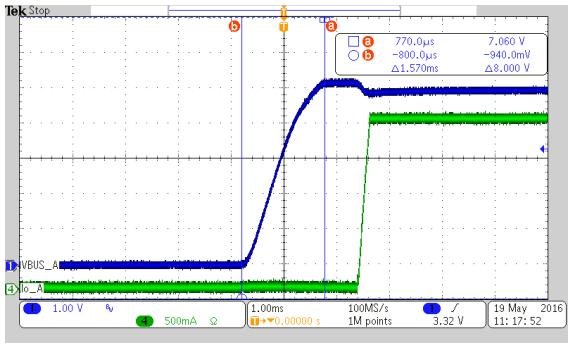
PARAMETER		TEST CONDITION	MIN	TYP	MAX	UNIT
I_{STD}	Standby current	Vin=9V, All ports unattached		346		uA
	Standby current	Vin=12V, All ports unattached		297		uA
	Standby current	Vin=14.5V, All ports unattached		258		uA

2.2 Start Up

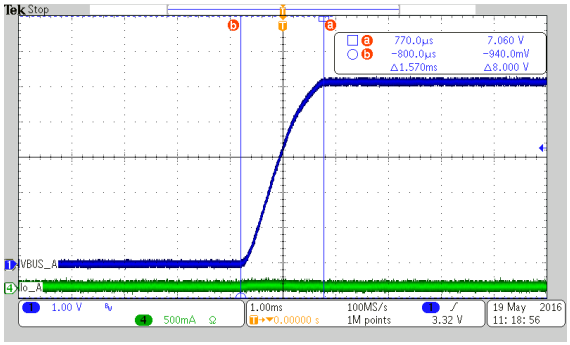
Apply the input source to check system's the soft start.



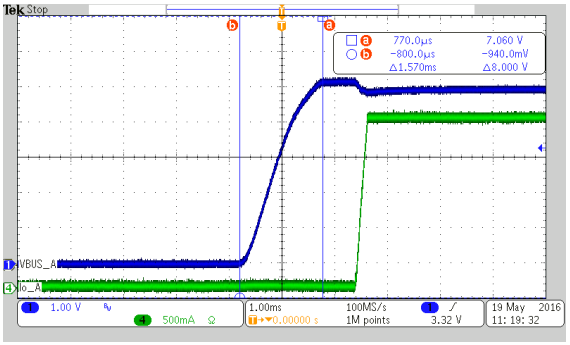
Vin=9V and No Load
CH1: VBUS_A 1V/Div
CH4: Io_A 0.5A/Div



Vin=9V and Full Load
CH1: VBUS_A 1V/Div
CH4: Io_A 0.5A/Div



Vin=12V and No Load
CH1: VBUS_A 1V/Div
CH4: Io_A 0.5A/Div



Vin=12V and Full Load
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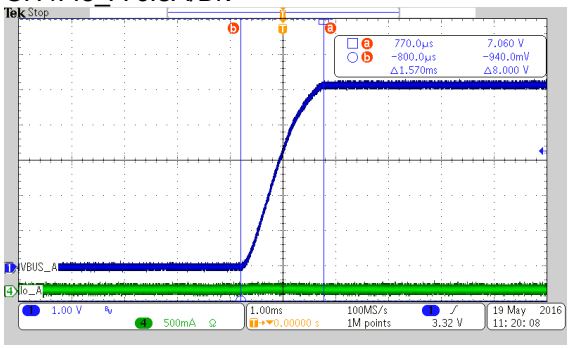
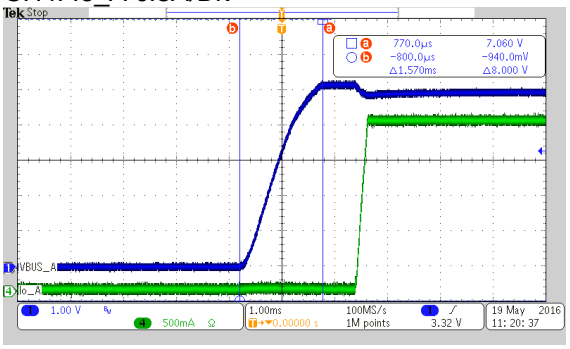


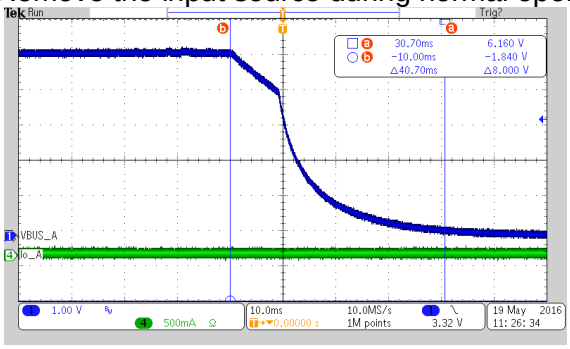
Vin=14.5V and No Load
CH1: VBUS_A 1V/Div
CH4: Io_A 0.5A/Div



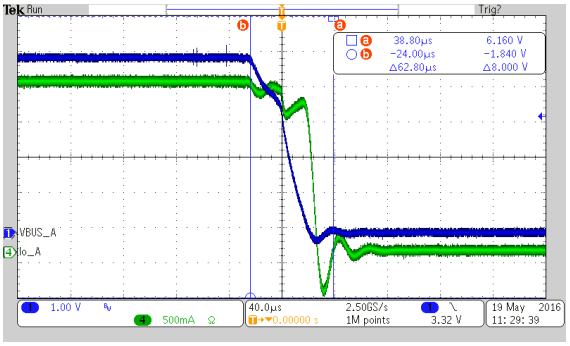
Vin=14.5V and Full Load
CH1: VBUS_A 1V/Div
CH4: Io_A 0.5A/Div

2.3 Shut Down

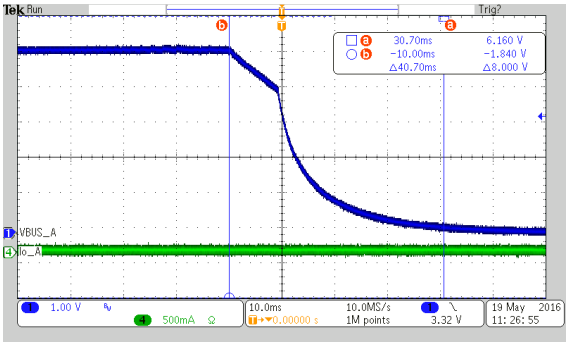
Remove the input source during normal operation.



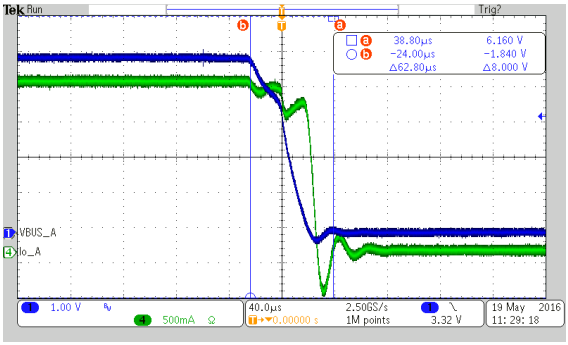
Vin=9V and No Load
CH1: VBUS_A 1V/Div
CH4: Io_A 0.5A/Div



Vin=9V and Full Load
CH1: VBUS_A 1V/Div
CH4: Io_A 0.5A/Div



Vin=12V and No Load
CH1: VBUS_A 1V/Div
CH4: Io_A 0.5A/Div



Vin=12V and Full Load
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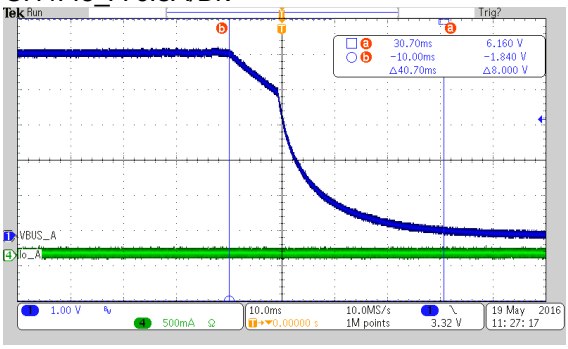
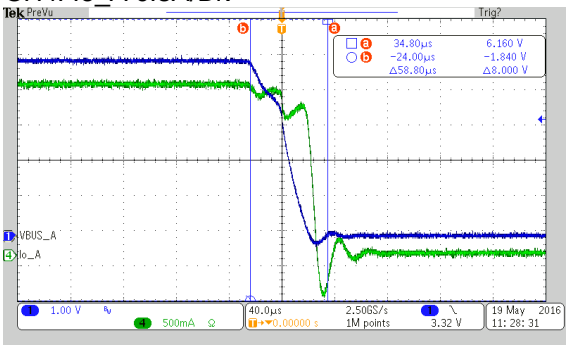
CH4: Io_A 0.5A/Div

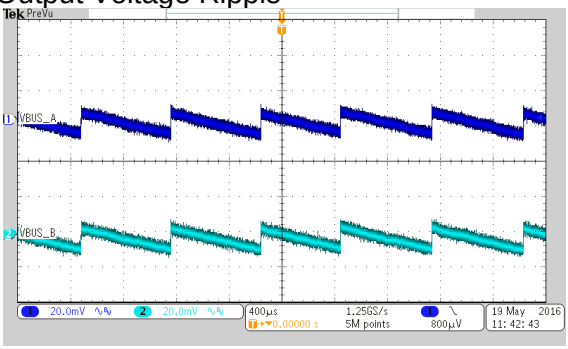


Vin=14.5V and No Load
CH1: VBUS_A 1V/Div
CH4: Io_A 0.5A/Div

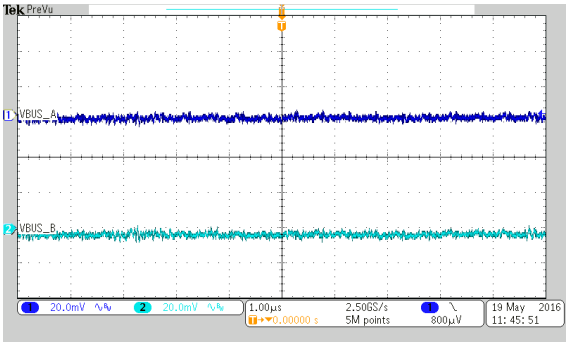


Vin=14.5V and Full Load
CH1: VBUS_A 1V/Div
CH4: Io_A 0.5A/Div

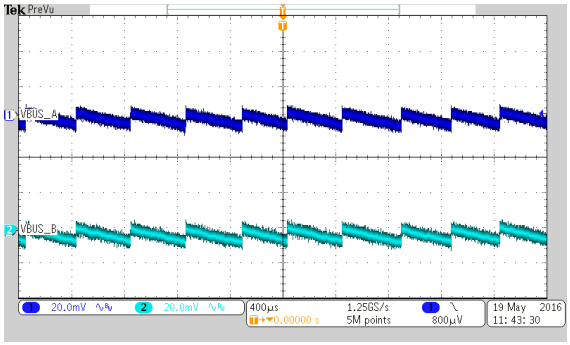
2.4 Output Voltage Ripple



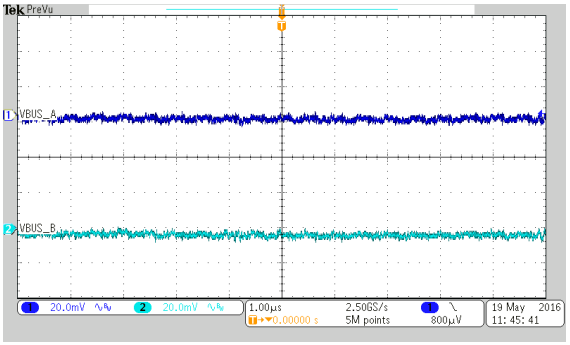
Vin=9V and No Load
CH1: VBUS_A (AC Coupled) 20mV/Div
CH2: VBUS_B (AC Coupled) 20mV/Div



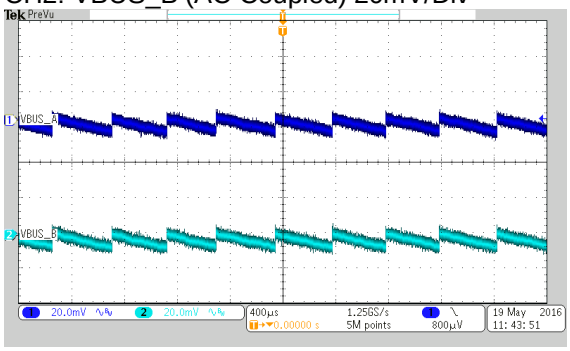
Vin=9V and Full Load
CH1: VBUS_A (AC Coupled) 20mV/Div
CH2: VBUS_B (AC Coupled) 20mV/Div



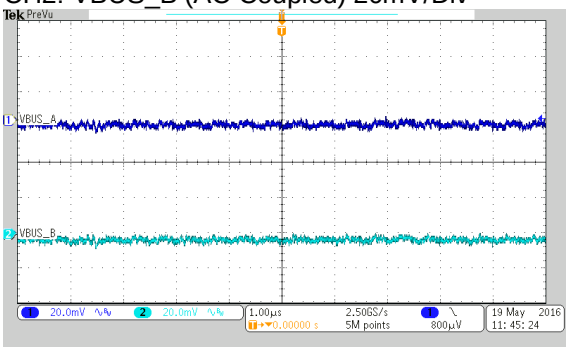
Vin=12V and No Load
CH1: VBUS_A (AC Coupled) 20mV/Div
CH2: VBUS_B (AC Coupled) 20mV/Div



Vin=12V and Full Load
CH1: VBUS_A (AC Coupled) 20mV/Div
CH2: VBUS_B (AC Coupled) 20mV/Div



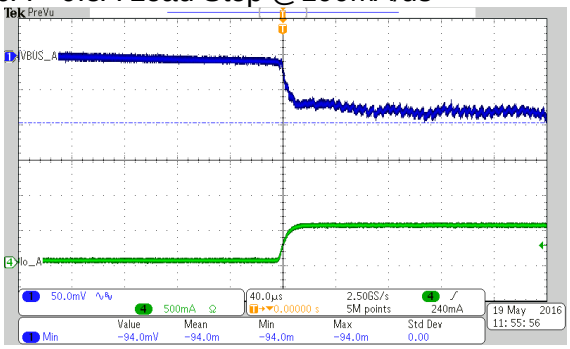
Vin=14.5V and No Load
CH1: VBUS_A (AC Coupled) 20mV/Div
CH2: VBUS_B (AC Coupled) 20mV/Div



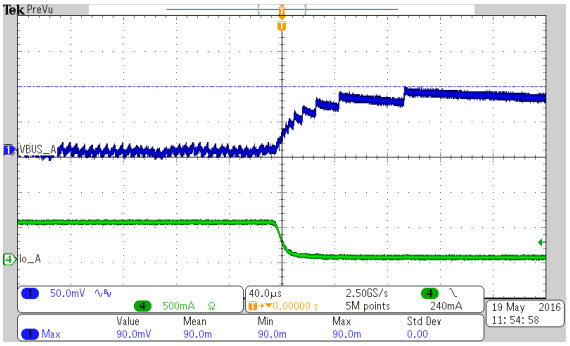
Vin=14.5V and Full Load
CH1: VBUS_A (AC Coupled) 20mV/Div
CH2: VBUS_B (AC Coupled) 20mV/Div

2.5 Dynamic Performance

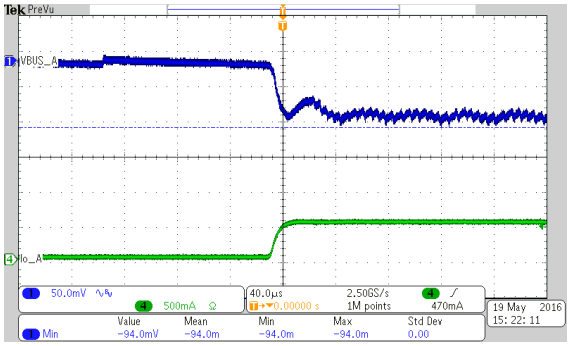
0A↔0.5A Load Step @100mA/us



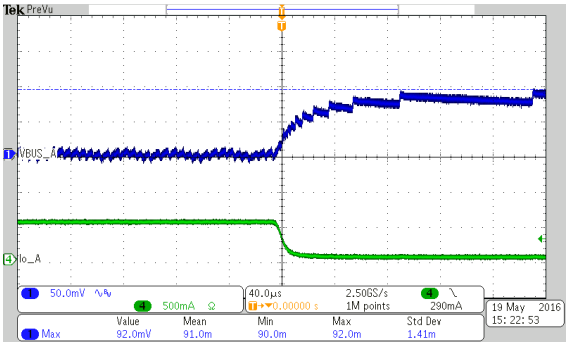
Vin=9V, Io_B=0A and Load switching for Io_A from 0A to 0.5A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div



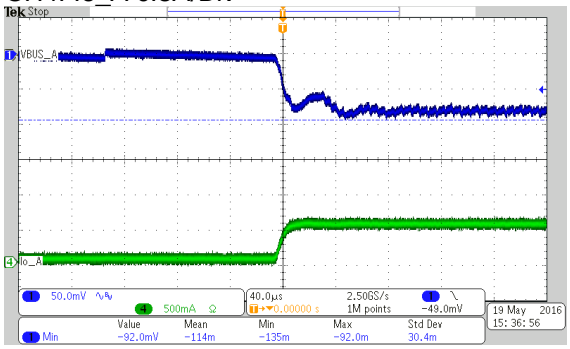
Vin=9V, Io_B=0A and Load switching for Io_A from 0.5A to 0A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div



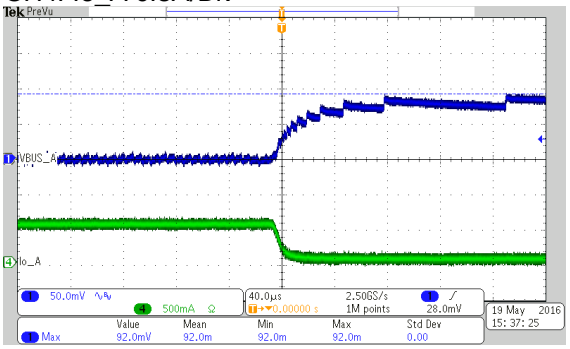
Vin=12V, Io_B=0A and Load switching for Io_A from 0A to 0.5A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div



Vin=12V, Io_B=0A and Load switching for Io_A from 0.5A to 0A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div

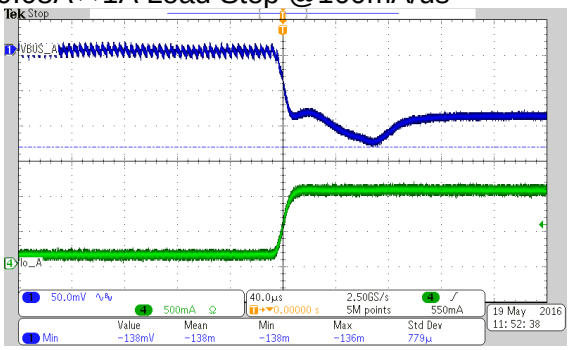


Vin=14.5V, Io_B=0A and Load switching for Io_A from 0A to 0.5A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div

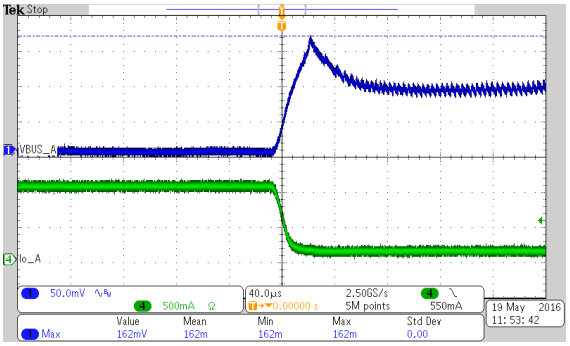


Vin=14.5V, Io_B=0A and Load switching for Io_A from 0.5A to 0A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div

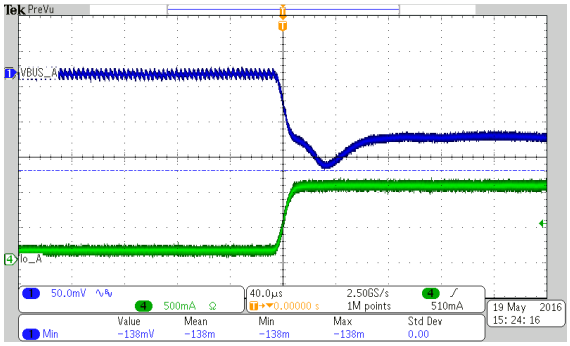
0.08A↔1A Load Step @100mA/us



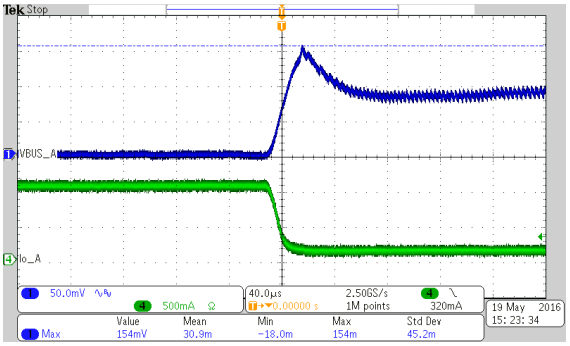
Vin=9V, Io_B=0A and Load switching for Io_A from 0.08A to 1A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div



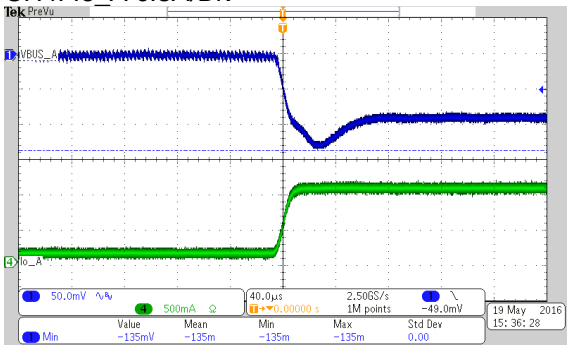
Vin=9V, Io_B=0A and Load switching for Io_A from 1A to 0.08A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div



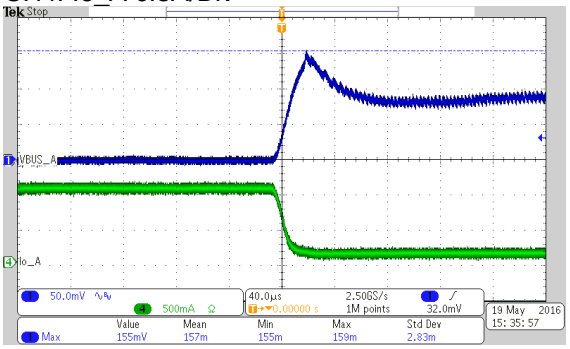
Vin=12V, Io_B=0A and Load switching for Io_A from 0.08A to 1A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div



Vin=12V, Io_B=0A and Load switching for Io_A from 1A to 0.08A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div

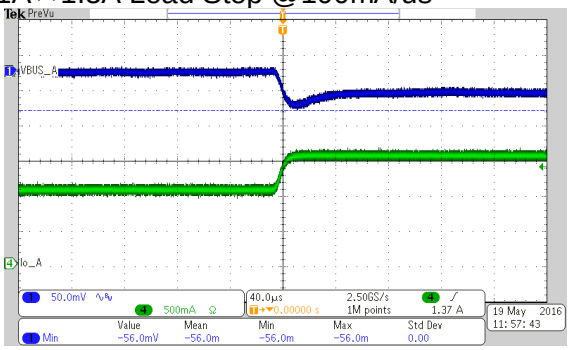


Vin=14.5V, Io_B=0A and Load switching for Io_A from 0.08A to 1A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div

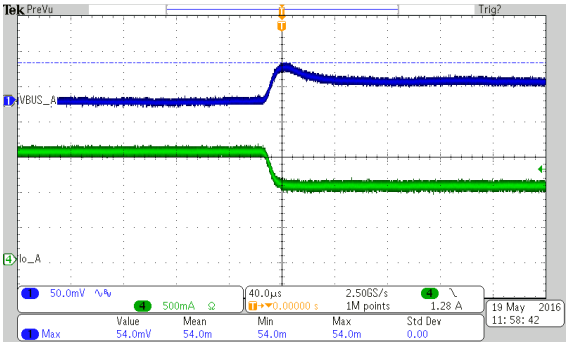


Vin=14.5V, Io_B=0A and Load switching for Io_A from 1A to 0.08A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div

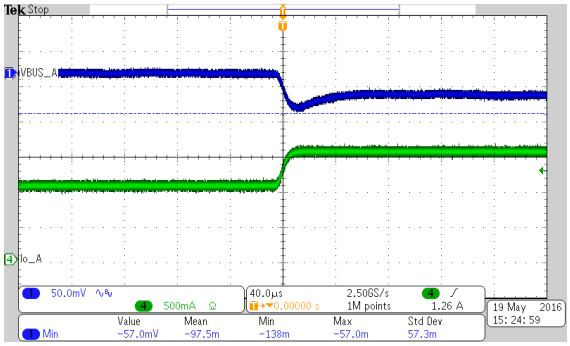
1A↔1.5A Load Step @100mA/us



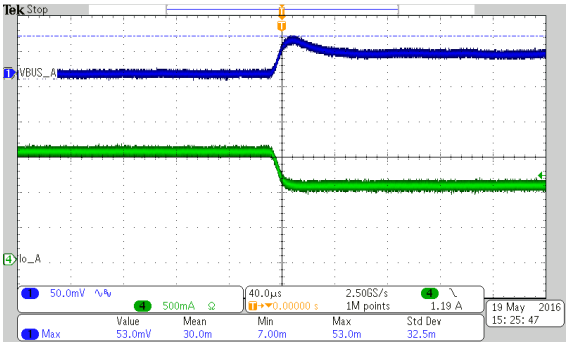
Vin=9V, Io_B=0A and Load switching for Io_A from 1A to 1.5A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div



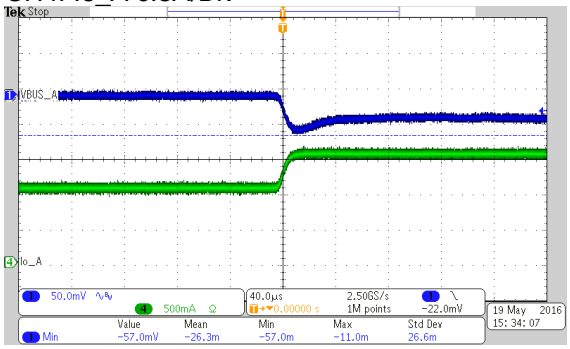
Vin=9V, Io_B=0A and Load switching for Io_A from 1.5A to 1A
CH1: VBUS_ A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div



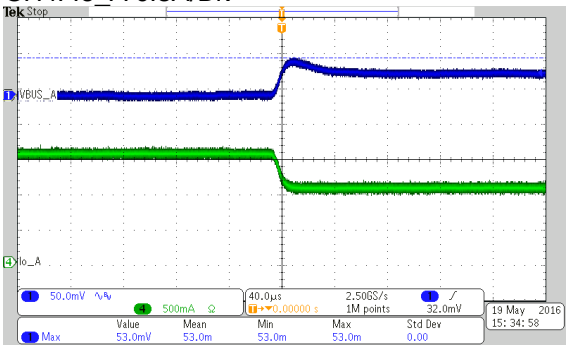
Vin=12V, Io_B=0A and Load switching for Io_A from 1A to 1.5A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div



Vin=12V, Io_B=0A and Load switching for Io_A from 1.5A to 1A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div

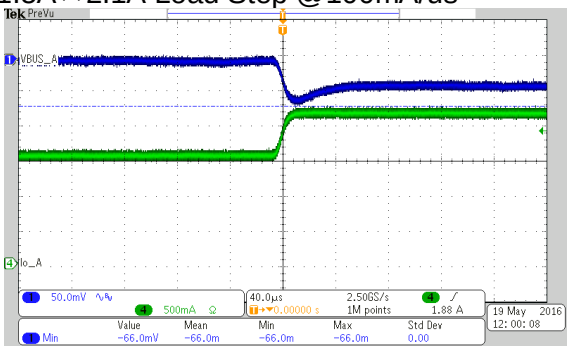


Vin=14.5V, Io_B=0A and Load switching for Io_A from 1A to 1.5A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div

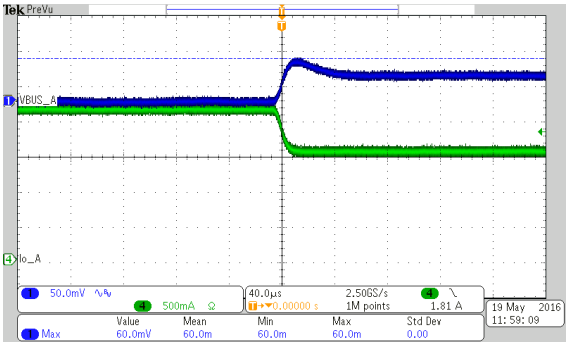


Vin=14.5V, Io_B=0A and Load switching for Io_A from 1.5A to 1A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div

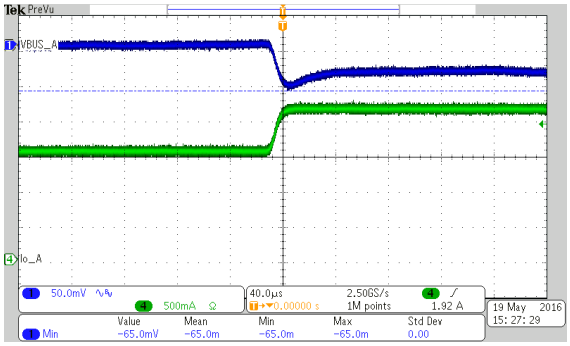
1.5A↔2.1A Load Step @100mA/us



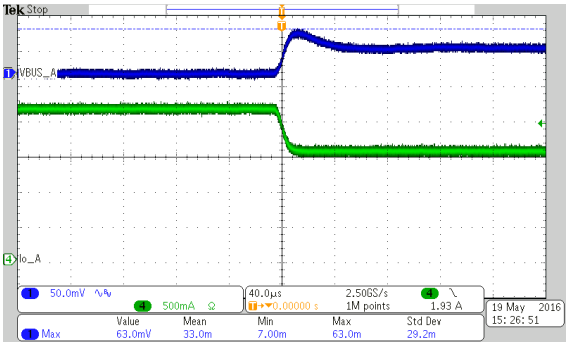
Vin=9V, Io_B=0A and Load switching for Io_A from 1.5A to 2.1A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div



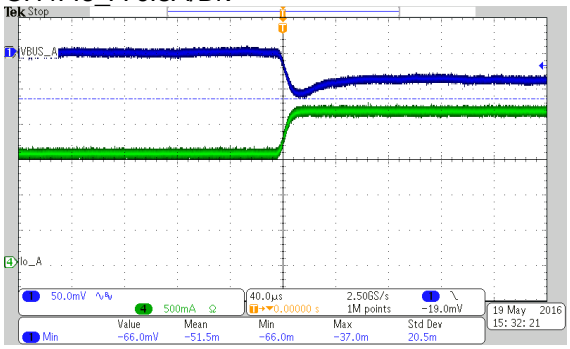
Vin=9V, Io_B=0A and Load switching for Io_A from 2.1A to 1.5A
CH1: VBUS_ A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div



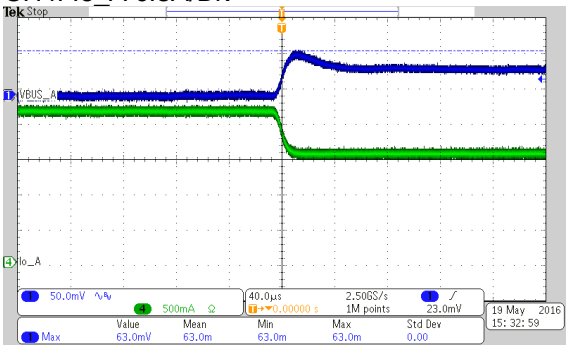
Vin=12V, Io_B=0A and Load switching for Io_A from 1.5A to 2.1A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div



Vin=12V, Io_B=0A and Load switching for Io_A from 2.1A to 1.5A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div

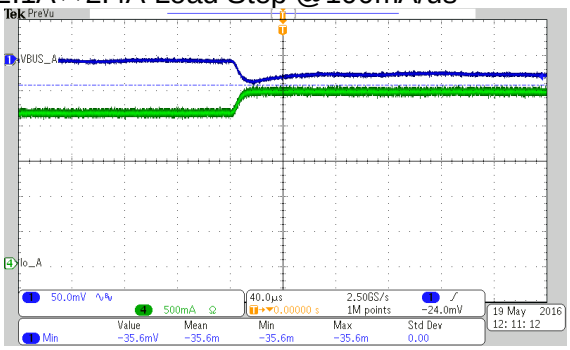


Vin=14.5V, Io_B=0A and Load switching for Io_A from 1.5A to 2.1A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div

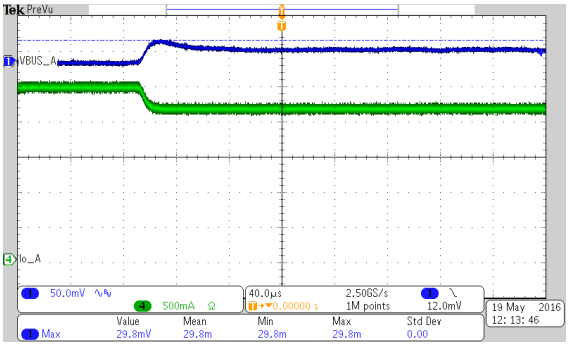


Vin=14.5V, Io_B=0A and Load switching for Io_A from 2.1A to 1.5A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div

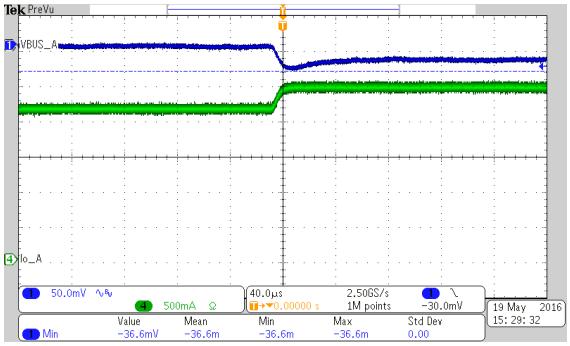
2.1A↔2.4A Load Step @100mA/us



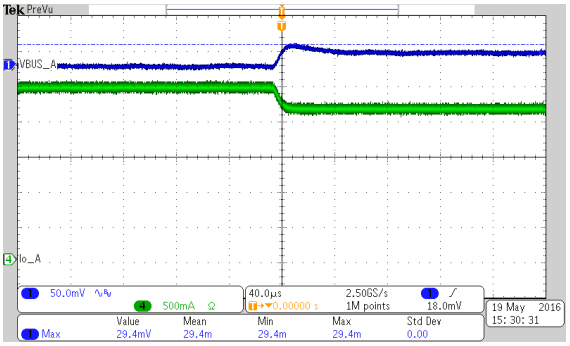
Vin=9V, Io_B=0A and Load switching for Io_A from 2.1A to 2.4A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div



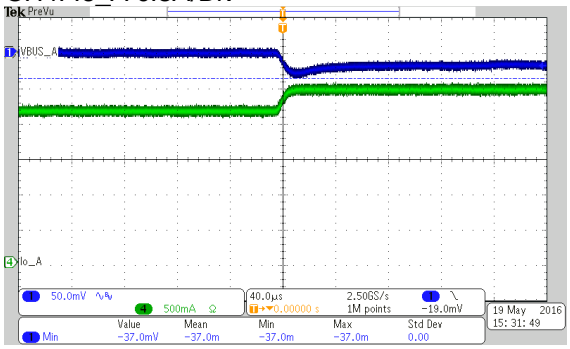
Vin=9V, Io_B=0A and Load switching for Io_A from 2.4A to 2.1A
CH1: VBUS_ A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div



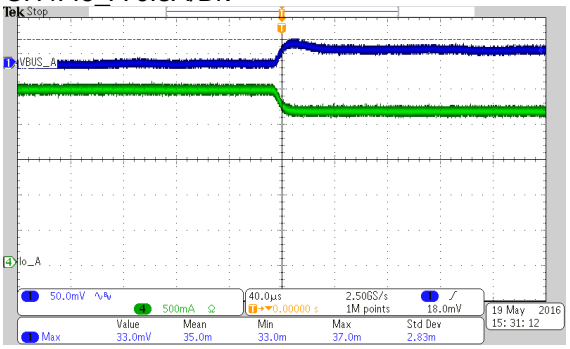
Vin=12V, Io_B=0A and Load switching for Io_A from 2.1A to 2.4A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div



Vin=12V, Io_B=0A and Load switching for Io_A from 2.4A to 2.1A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div



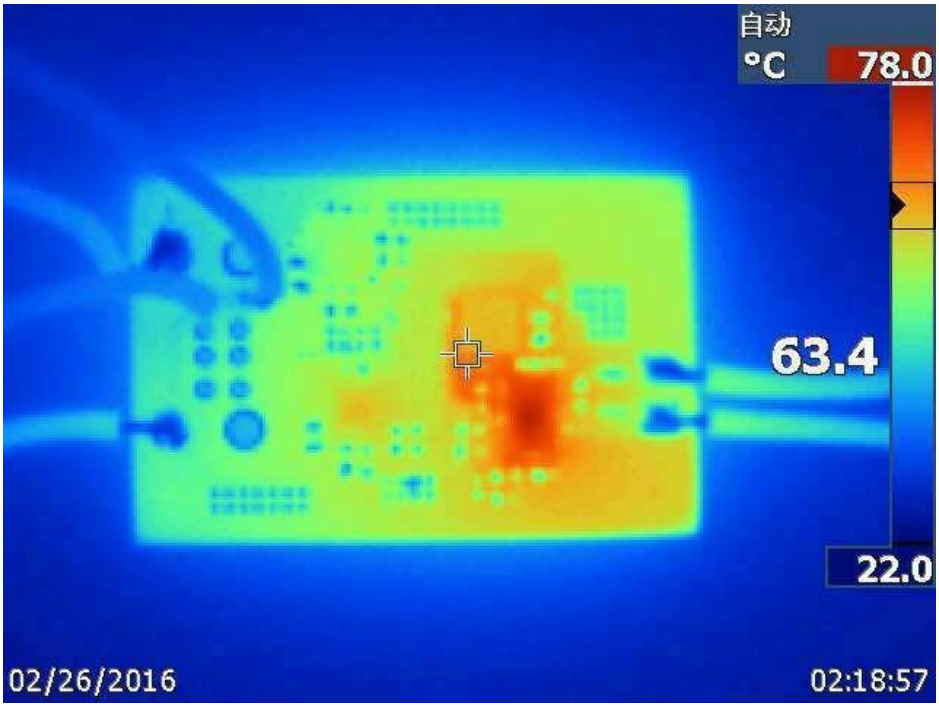
Vin=14.5V, Io_B=0A and Load switching for Io_A from 2.1A to 2.4A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div



Vin=14.5V, Io_B=0A and Load switching for Io_A from 2.4A to 2.1A
CH1: VBUS_A (AC Coupled) 50mV/Div
CH4: Io_A 0.5A/Div

2.6 Thermal Performance

The board is applied a 12V DC voltage and 3.5A load current for both outputs. Run about 10min for warming up.


自动
°C
78.0
63.4
22.0
02/26/2016
02:18:57

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