PMP40040 Test Results

1 General

1.1 Purpose

This test report is to provide the detailed data for evaluating and verifying the PMP40040 which employs one Buck Converter ---- LMR23625 and a USB Charging Port Controller ---- TPS254900-Q1.

1.2 Reference Documentation

Schematic: PMP40040_Sch.pdf

Gerber: PMP40040_GerberNCdrills.zip

Layer Plot: PMP40040_PCBlayers.pdf

Assembly Drawing: PMP40040_Assy.pdf

CAD File: PMP40040_CAD.zip

BOM: PMP40040_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

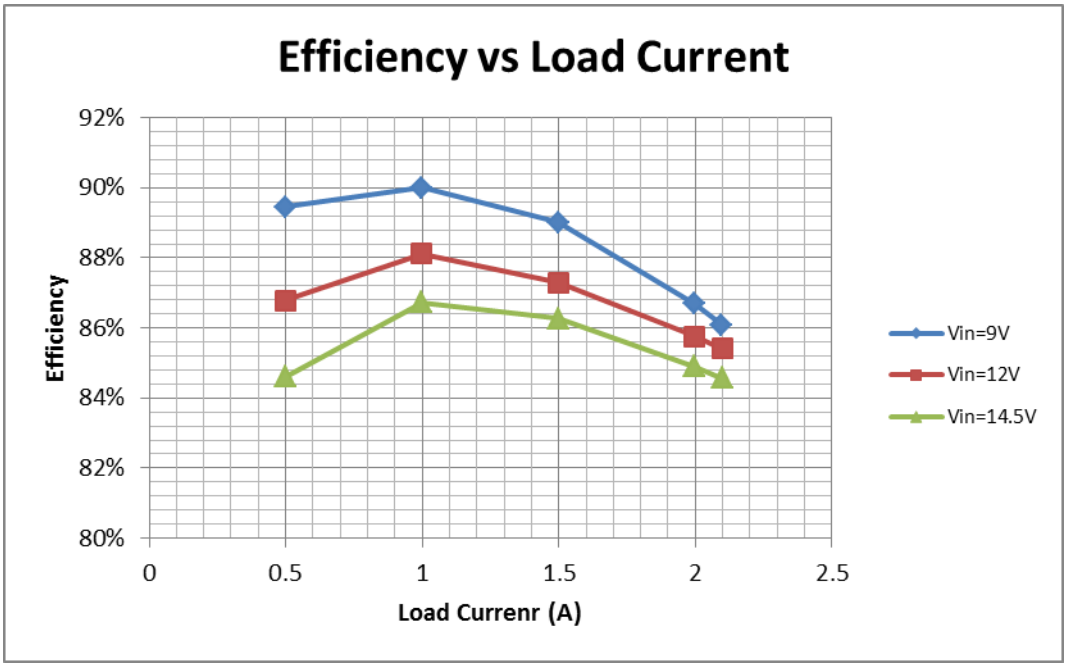
Oscilloscope: Tektronix DPO3054

Electrical Thermography: Fluke Ti9

2 Performance Data and Waveform

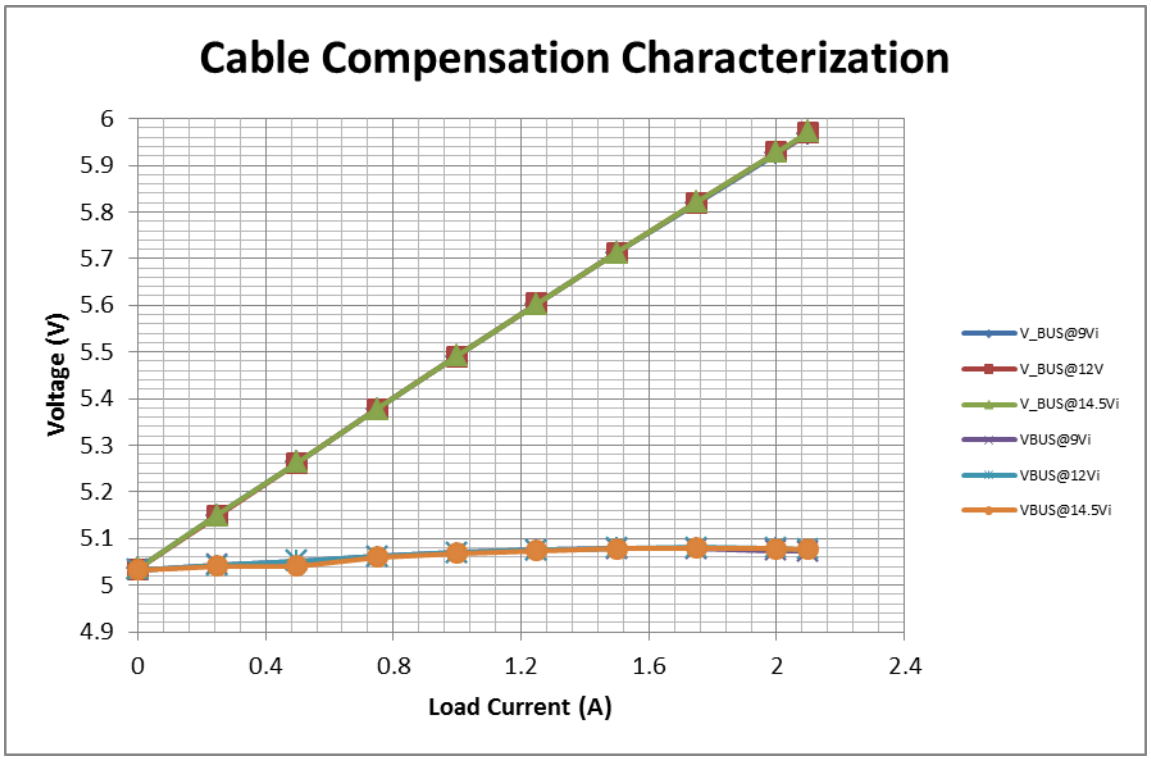
2.1 Efficiency

Vin (V)	Iin (A)	VBUS (V)	Io (A)	Efficiency
9.003	0.026	5.039	0.016	35.09%
8.991	0.325	5.238	0.499	89.45%
8.979	0.672	5.441	0.998	89.99%
8.964	1.059	5.637	1.499	89.01%
8.947	1.499	5.819	1.998	86.69%
8.943	1.594	5.856	2.096	86.08%
12.002	0.021	5.036	0.009	17.38%
11.993	0.251	5.236	0.499	86.78%
11.983	0.514	5.438	0.998	88.11%
11.972	0.808	5.633	1.499	87.29%
11.960	1.134	5.820	1.998	85.75%
11.954	1.204	5.857	2.099	85.41%
14.502	0.020	5.035	0.009	15.10%
14.495	0.213	5.236	0.499	84.61%
14.486	0.432	5.438	0.998	86.73%
14.477	0.676	5.633	1.499	86.28%
14.467	0.947	5.820	1.998	84.89%
14.464	1.005	5.857	2.099	84.57%



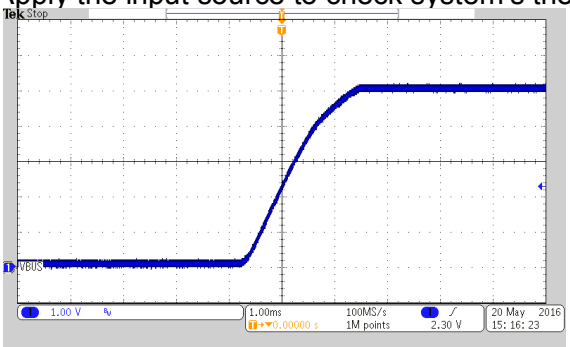
2.2 Cable Compensation

Test the output voltage (V_BUS) of DCDC converter with the increase of load current. The resistance of attached cable is about 370mOhm.

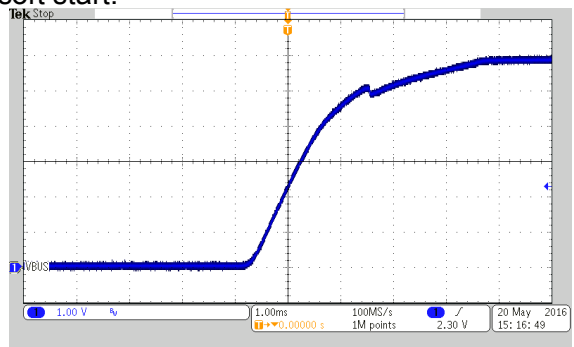


2.3 Start Up

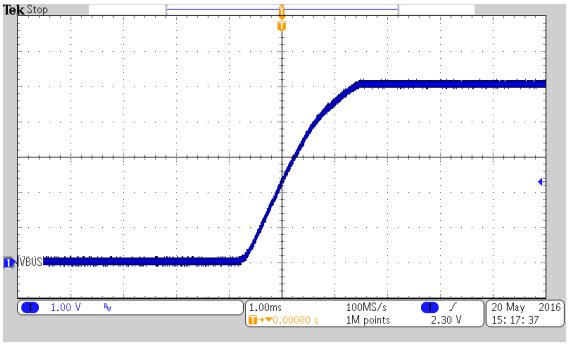
Apply the input source to check system's the soft start.



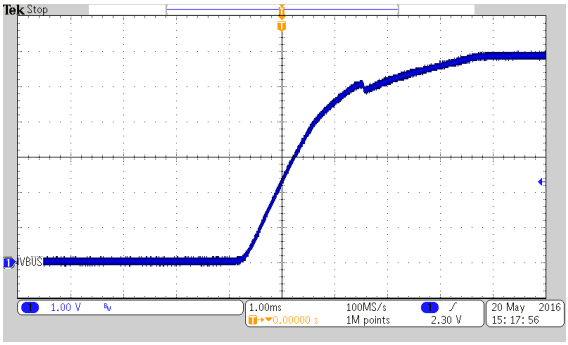
Vin=9V and No Load
CH1: VBUS 1V/Div



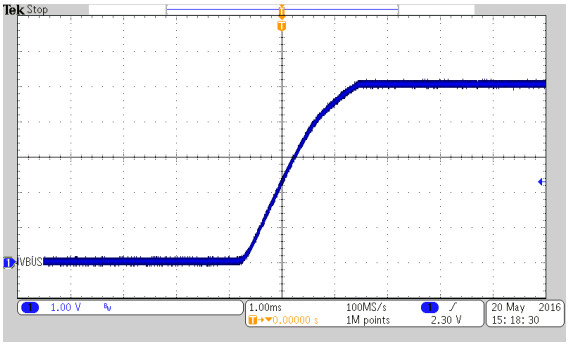
Vin=9V and Full Load
CH1: VBUS 1V/Div



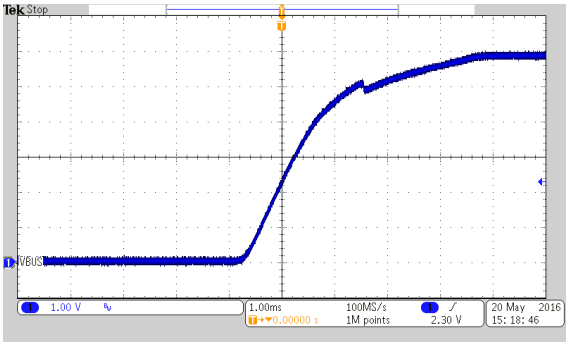
Vin=12V and No Load
CH1: VBUS 1V/Div



Vin=12V and Full Load
CH1: VBUS 1V/Div



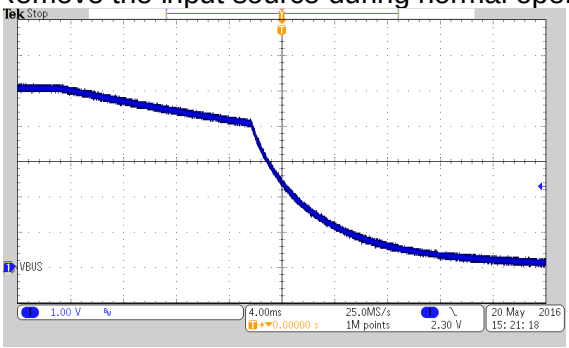
Vin=14.5V and No Load
CH1: VBUS 1V/Div



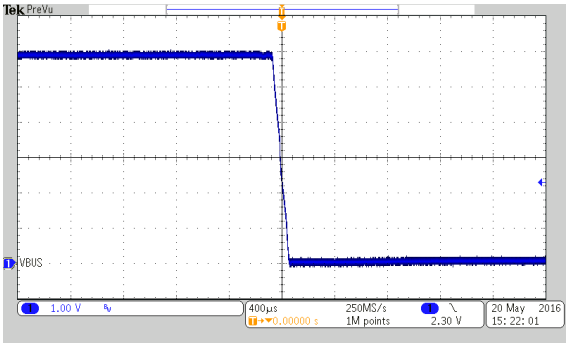
Vin=14.5V and Full Load
CH1: VBUS 1V/Div

2.4 Shut Down

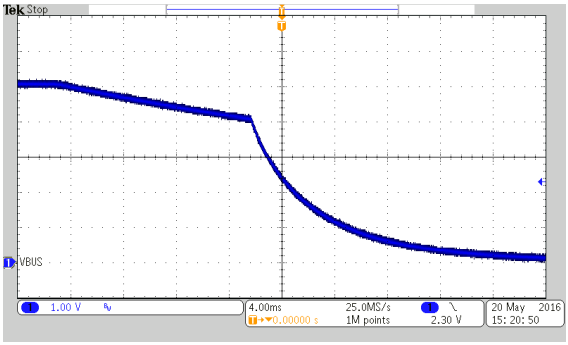
Remove the input source during normal operation.



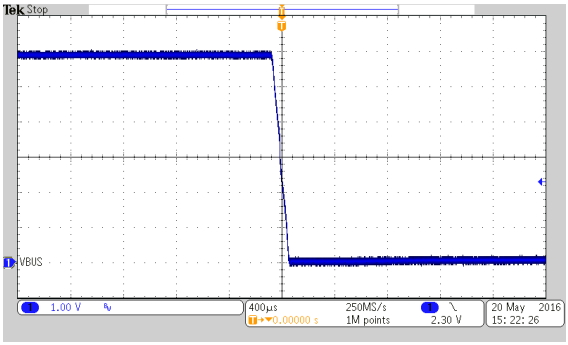
Vin=9V and No Load
CH1: VBUS 1V/Div



Vin=9V and Full Load
CH1: VBUS 1V/Div



Vin=12V and No Load
CH1: VBUS 1V/Div



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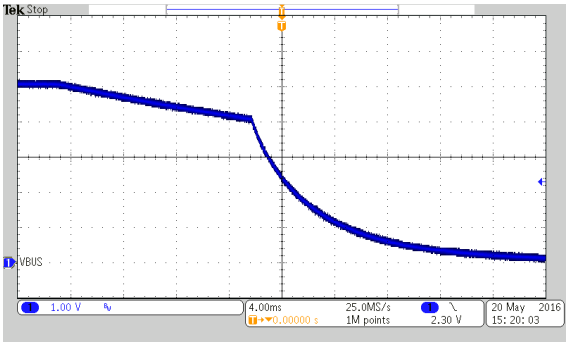

Vin=14.5V and No Load
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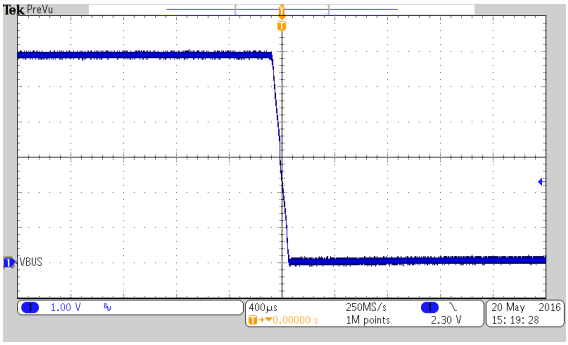
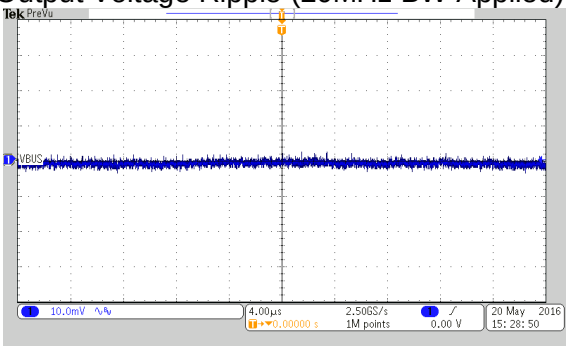
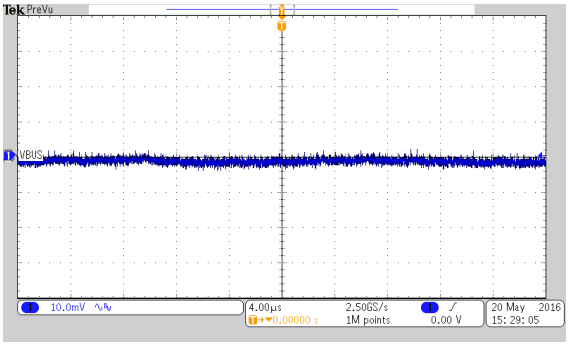


Vin=14.5V and Full Load
CH1: VBUS 1V/Div

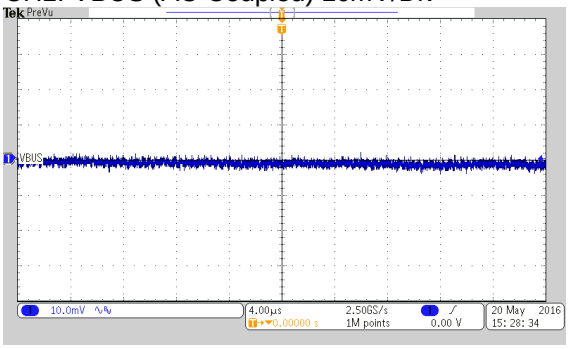
2.5 Output Voltage Ripple (20MHz BW Applied)



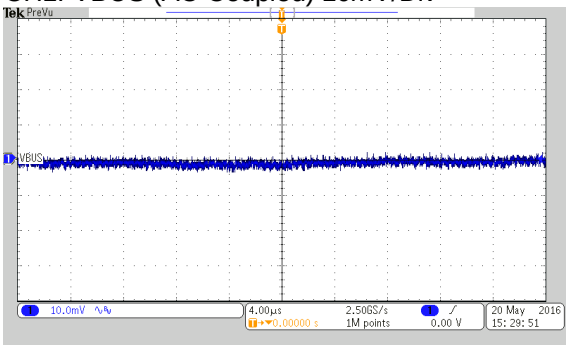
Vin=9V and No Load
CH1: VBUS (AC Coupled) 10mV/Div



Vin=9V and Full Load
CH1: VBUS (AC Coupled) 10mV/Div

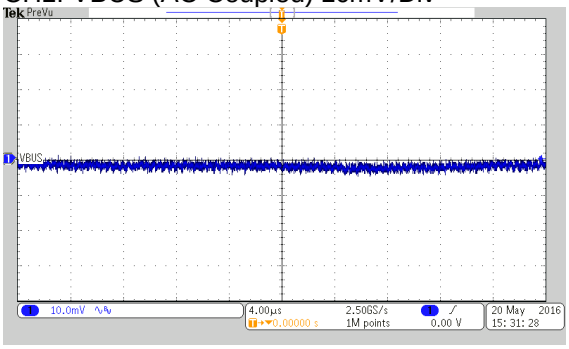


Vin=12V and No Load



Vin=12V and Full Load

CH1: VBUS (AC Coupled) 10mV/Div



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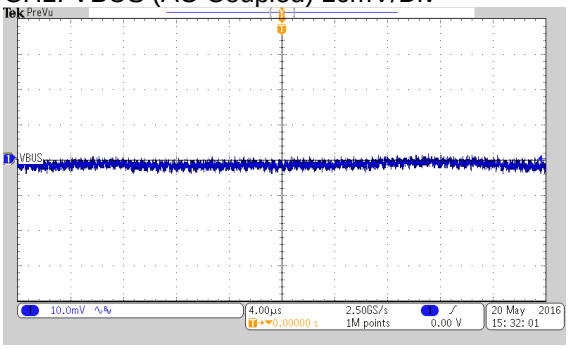
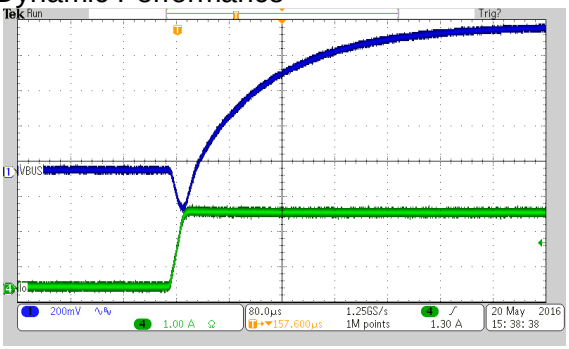
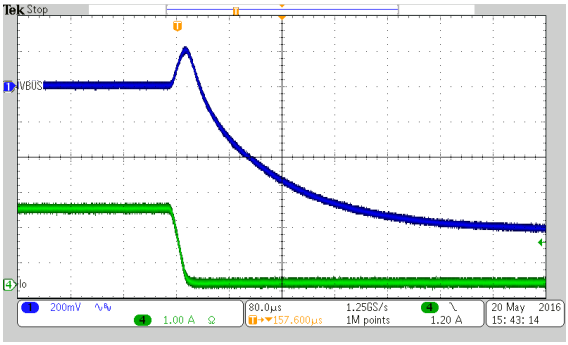


Vin=14.5V and Full Load
CH1: VBUS (AC Coupled) 10mV/Div

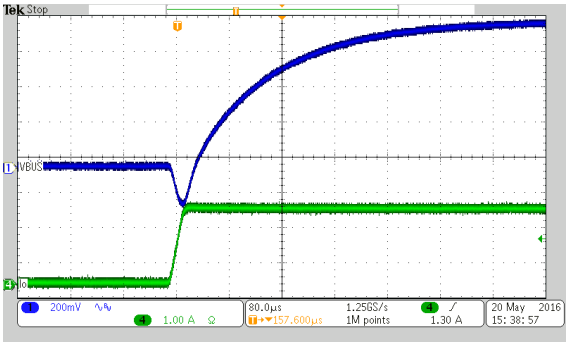
2.6 Dynamic Performance



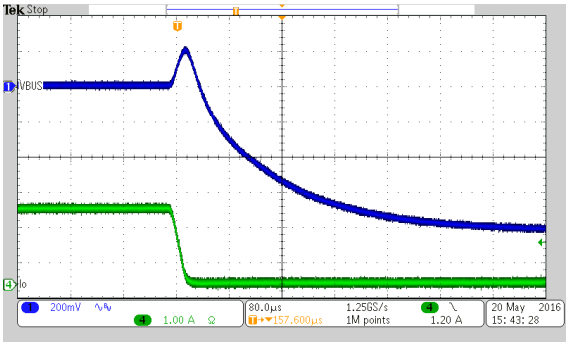
Vin=9V and Load switching from 0A to 2.1A
CH1: VBUS (AC Coupled) 0.2V/Div
CH4: Load Current 1A/Div



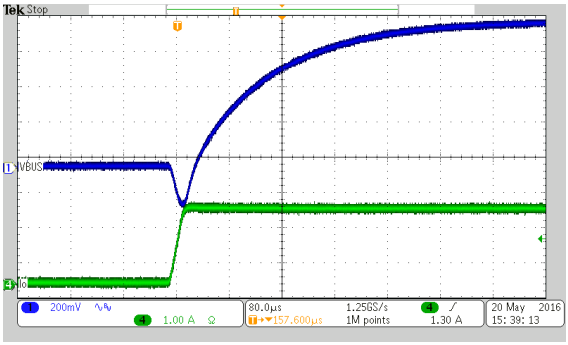
Vin=9V and Load switching from 2.1A to 0A
CH1: VBUS (AC Coupled) 0.2V/Div
CH4: Load Current 1A/Div



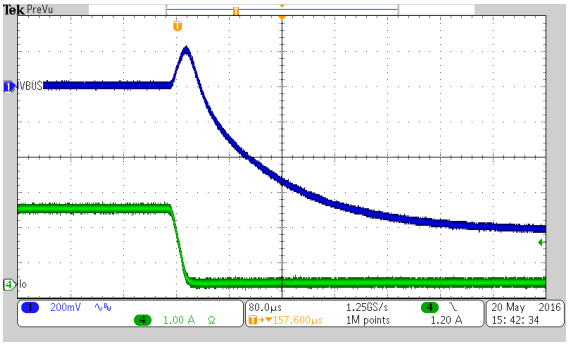
Vin=12V and Load switching from 0A to 2.1A
CH1: VBUS (AC Coupled) 0.2V/Div
CH4: Load Current 1A/Div



Vin=12V and Load switching from 2.1A to 0A
CH1: VBUS (AC Coupled) 0.2V/Div
CH4: Load Current 1A/Div



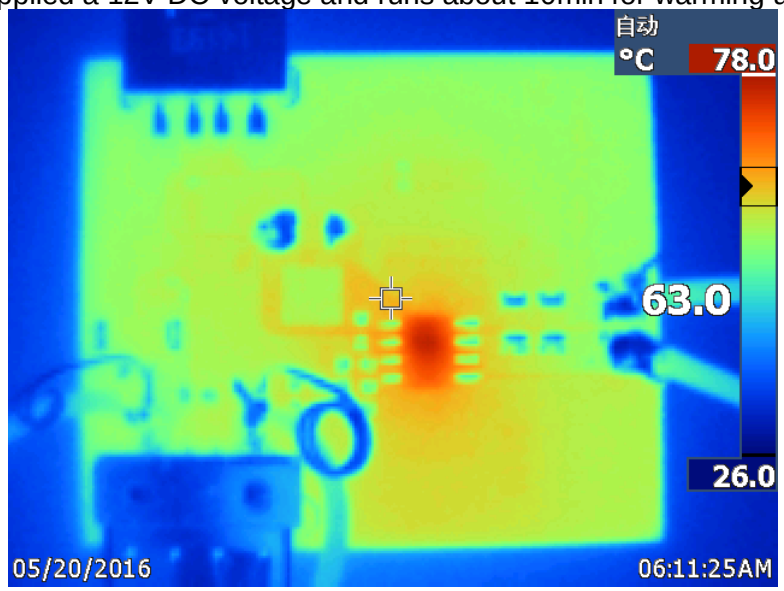
Vin=14.5V and Load switching from 0A to 2.1A
CH1: VBUS (AC Coupled) 0.2V/Div
CH4: Load Current 1A/Div



Vin=14.5V and Load switching from 2.1A to 0A
CH1: VBUS (AC Coupled) 0.2V/Div
CH4: Load Current 1A/Div

2.7 Thermal Performance

The board is applied a 12V DC voltage and runs about 10min for warming up.



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