

6 rail, Multiphase, DC-DC converter using the MAX16602 and MAX20790, MAX77812, MAX16491 and MAX15101

MAXREFDES1238

Design Verification Testing

Introduction

The MAXREFDES1238 is a 6 rail output, multiphase, DC-DC converter using the MAX16602 and MAX20790, MAX77812, MAX16491 and MAX15101. The reference design was subjected to design verification testing and the specification has been validated in laboratory conditions at an ambient temperature of +25°C.

Test Equipment Used

- HP 6032A DC Power Supply
- 2 BK Precision 8610 Electronic Loads
- 2 BK Precision 8540 Electronic Loads
- PLZ303W Electronic Load
- M9711 Maynuo Electronic Load
- Tektronix MDO3024 Oscilloscope
- Fluke 87 Digital Multimeters

Tests Conducted

1. Output Voltage Accuracy
2. Sequencing
3. Efficiency versus Load Current
4. Output Voltage Ripple
5. Output Voltage Response to Transient Load

Test Results

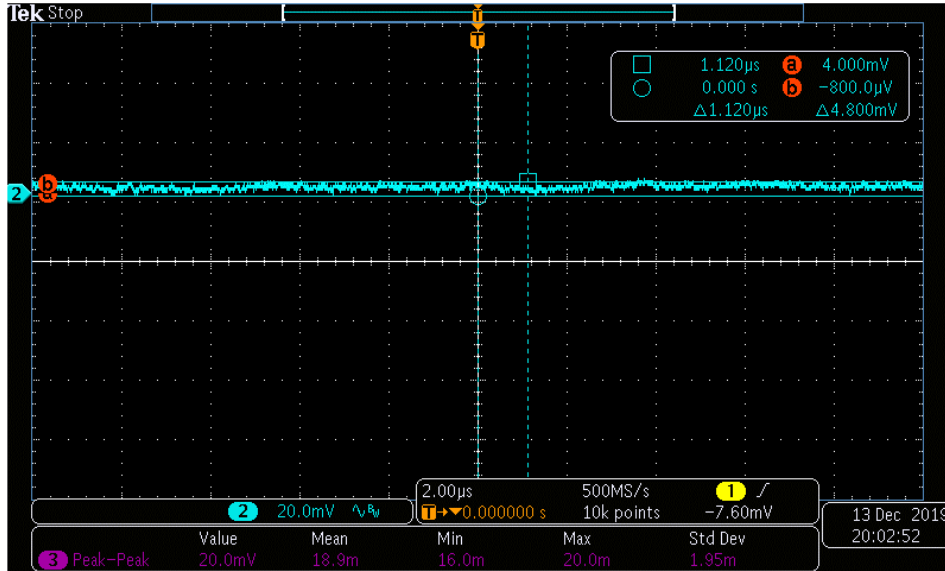
Output Voltage DC Accuracy

Rail	Target DC output voltage (V)	Actual DC output voltage (V)	DC Error (%)
VCCINT	0.8	0.801	0.125
VCCAUX	1.5	1.505	0.333333333
MGTAVCC	0.88	0.887	0.795454545
MGTAVAUX	1.5	1.499	-0.066666667
MGTAVTT	1.2	1.21	0.833333333
VCC_PMIO	3.257	3.26	0.092109303

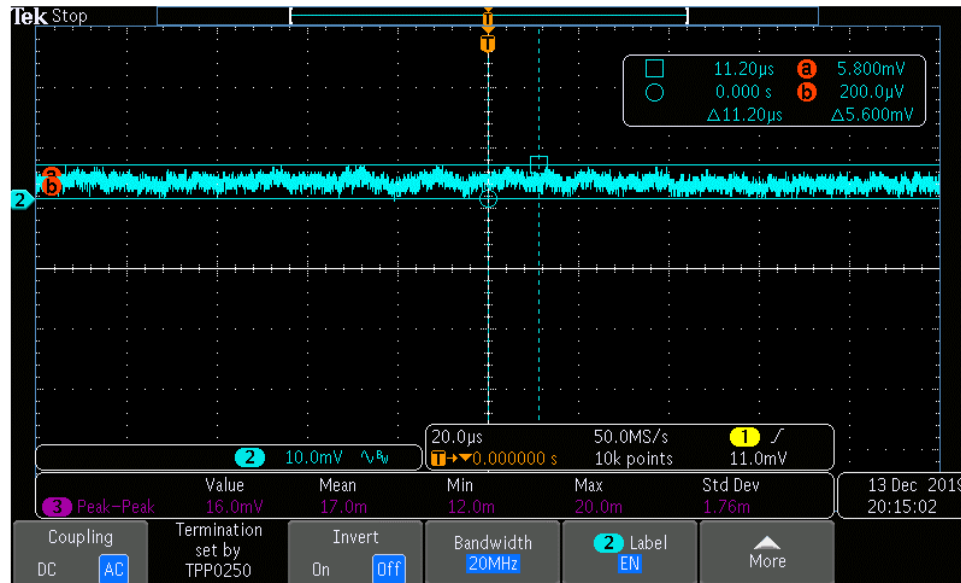
Output Voltage Ripple

VCCINT

No Load

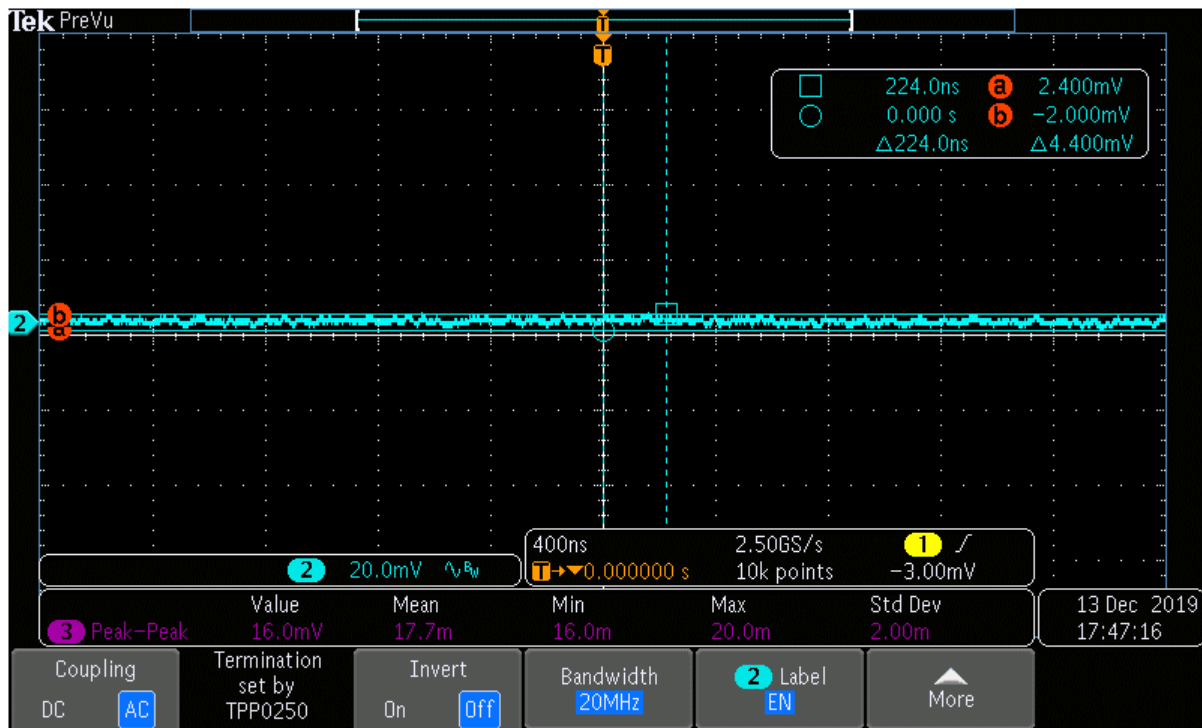


160A Load

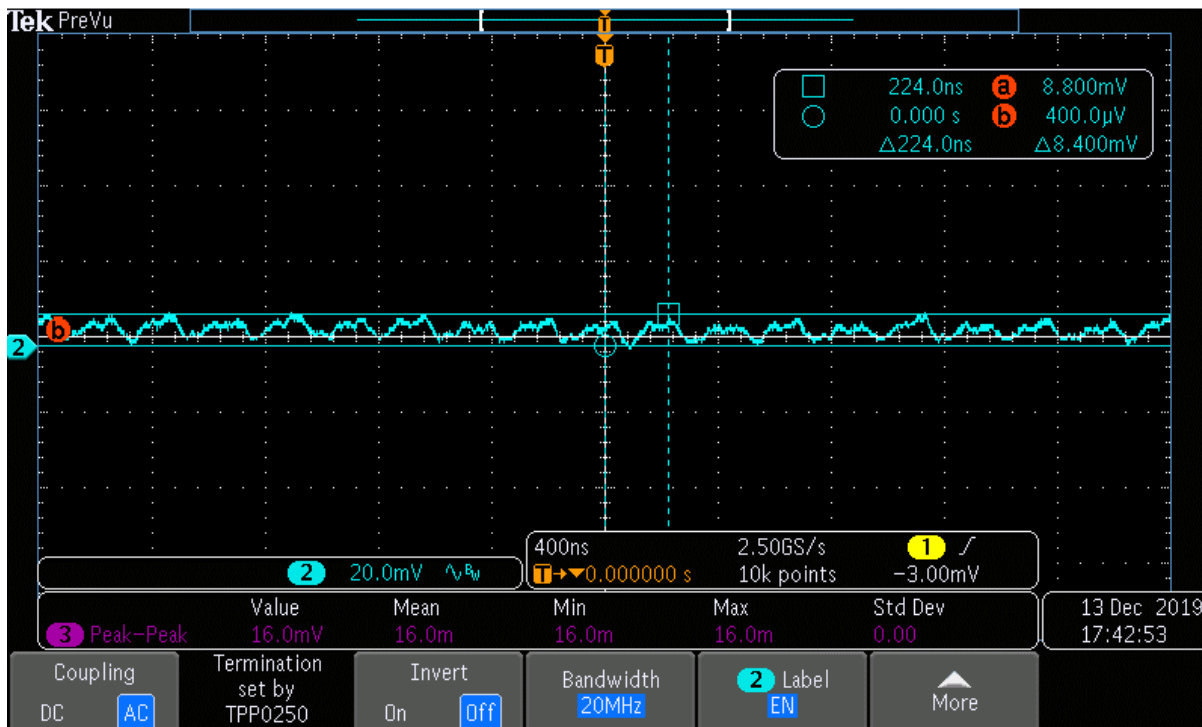


VCCAUX

No Load

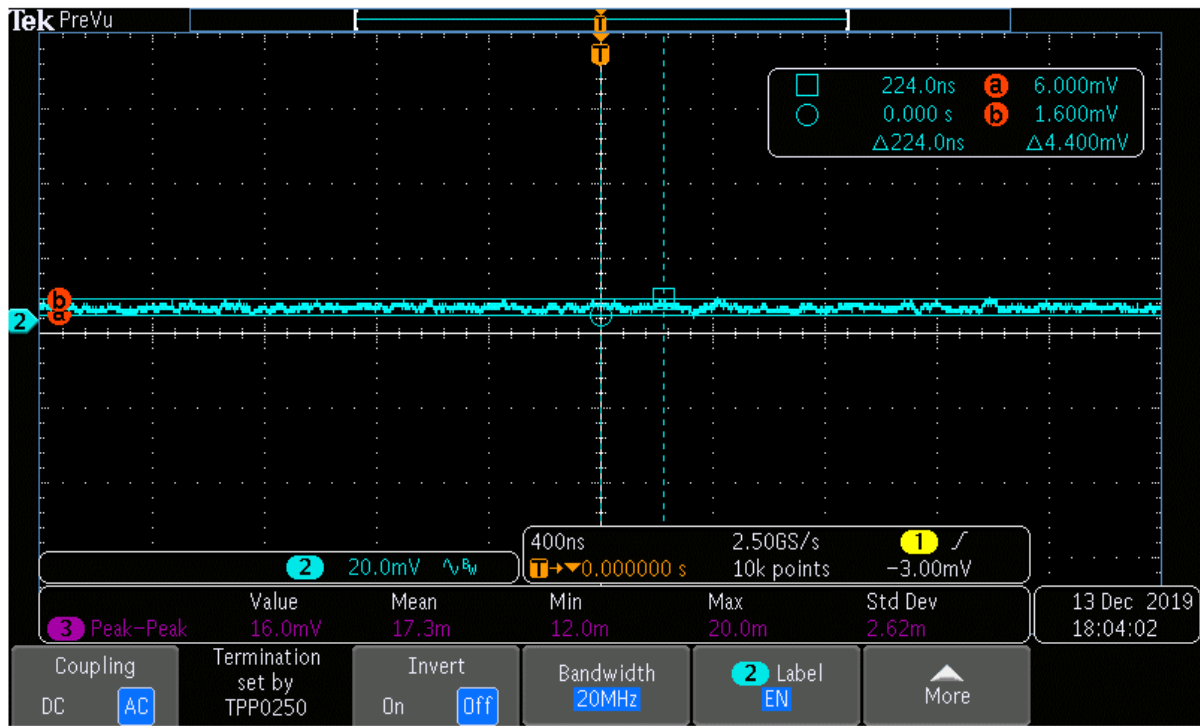


3.9A Load

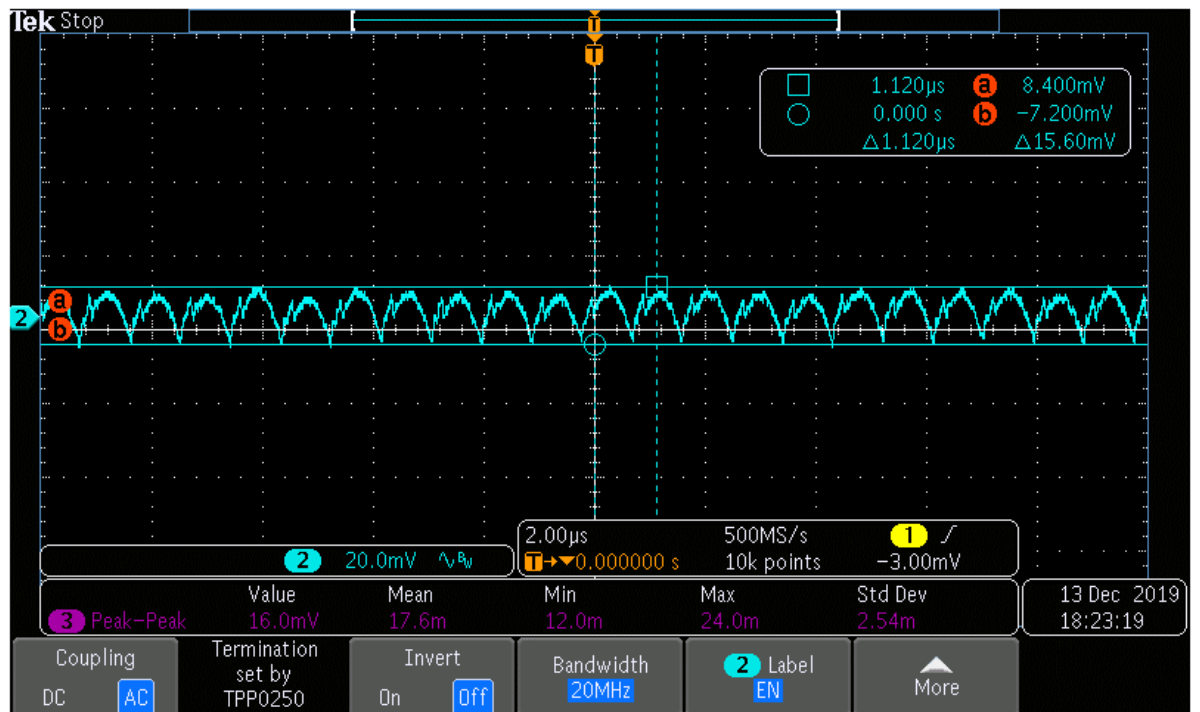


MGTA VCC

No Load

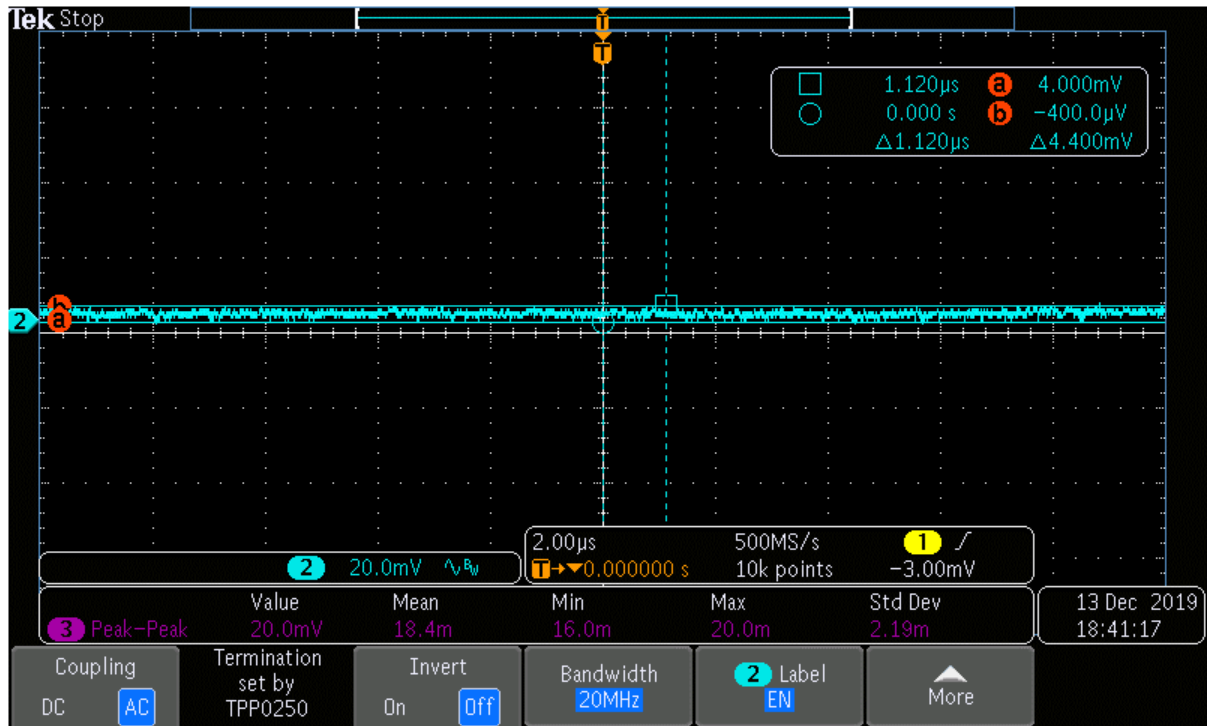


3.08A Load

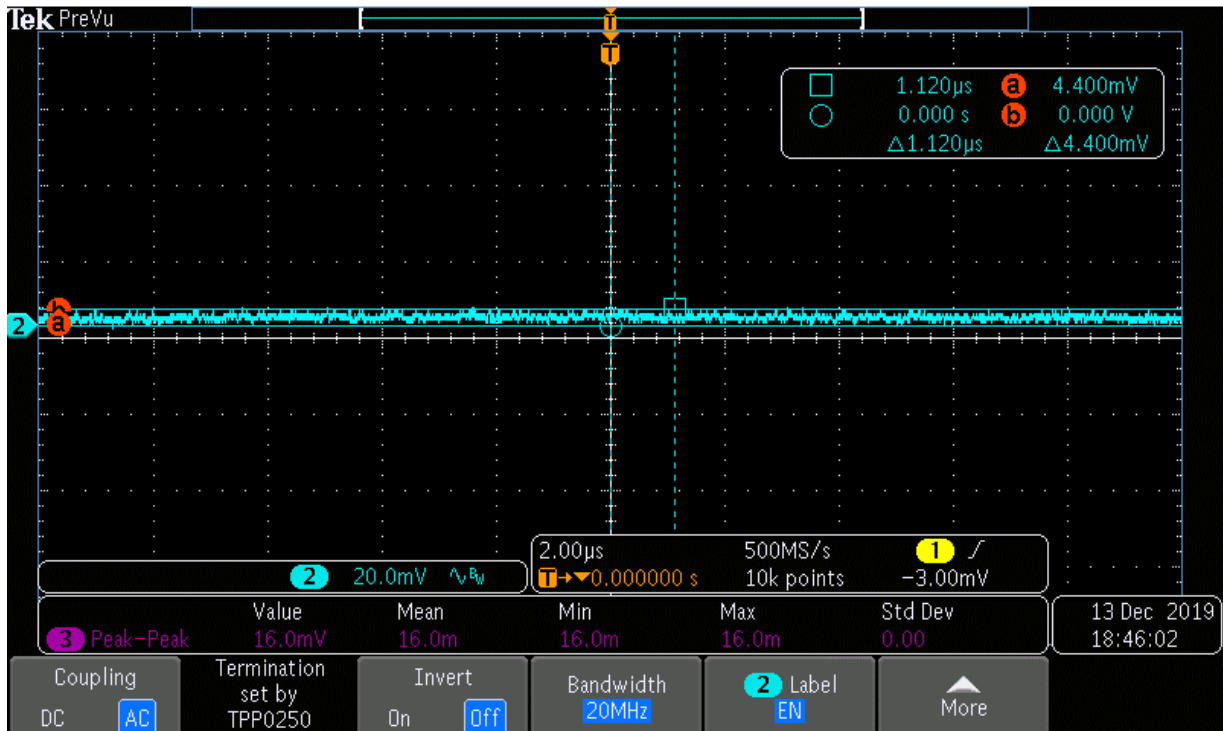


MGTAVAUX

No Load

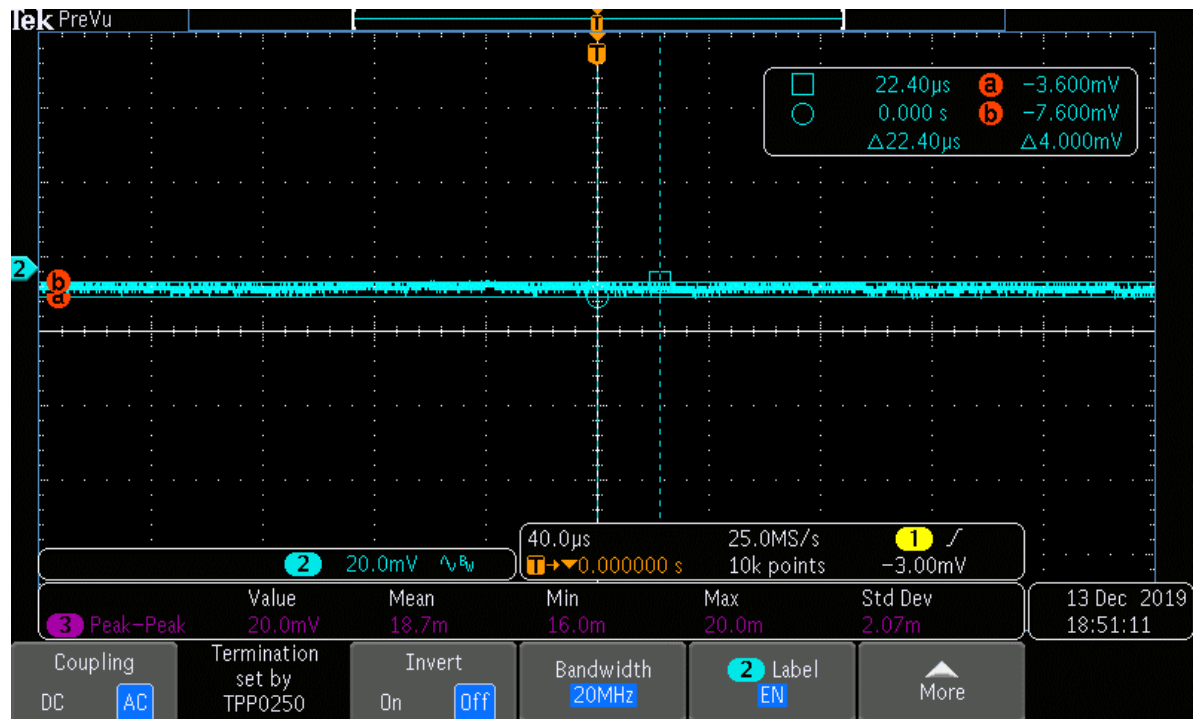


0.29A Load

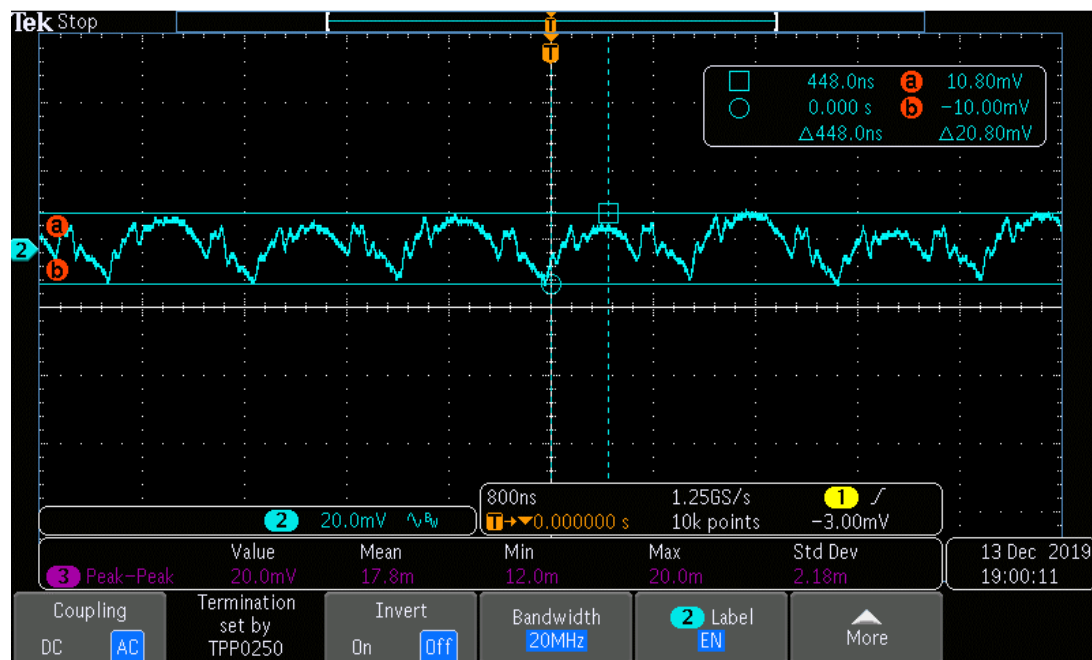


MGTA VTT

No Load

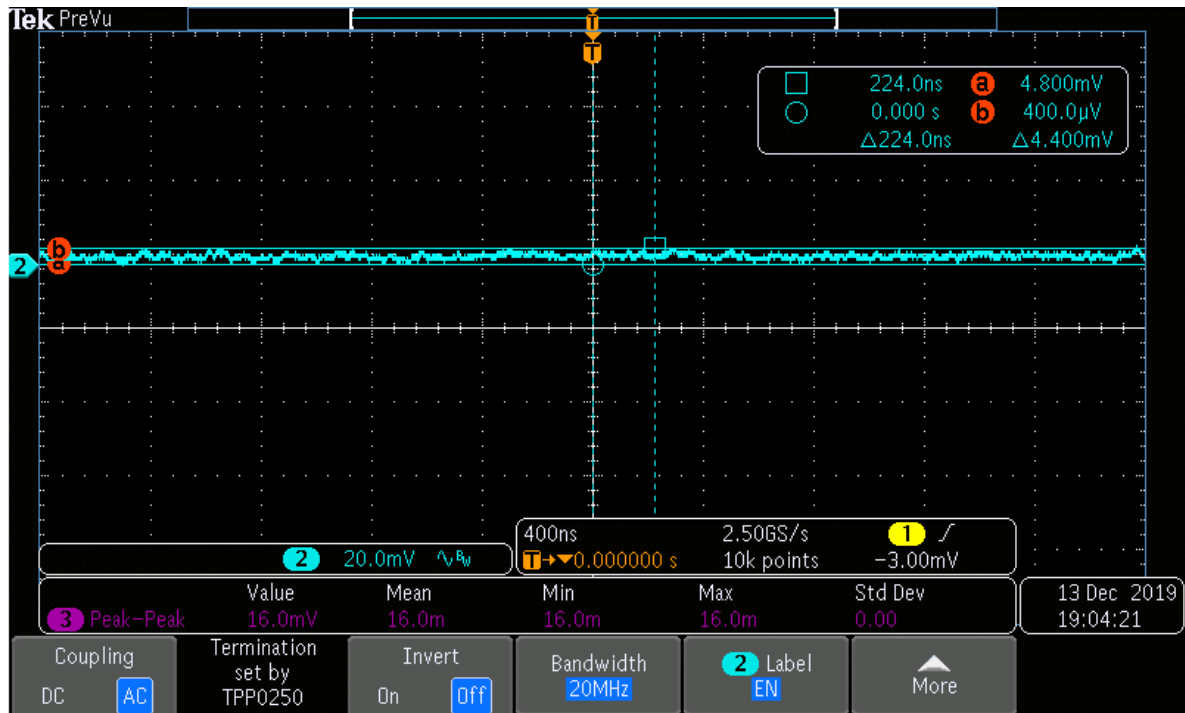


4.81A Load

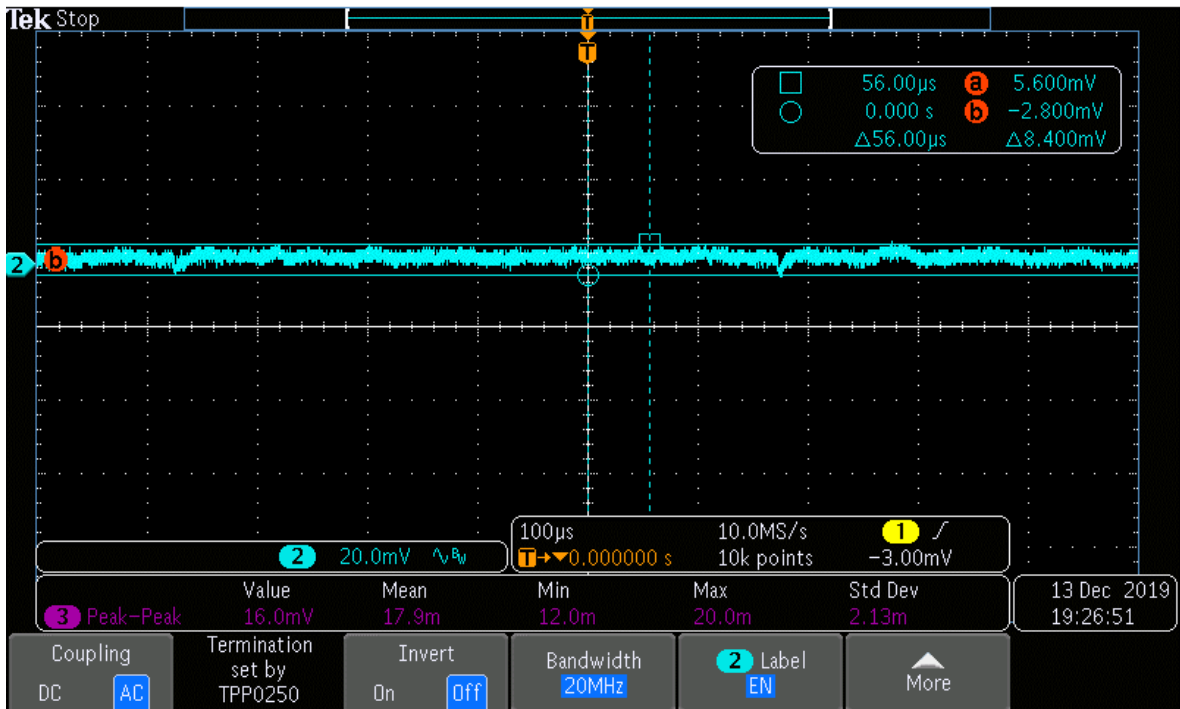


VCC_PMIO

No Load

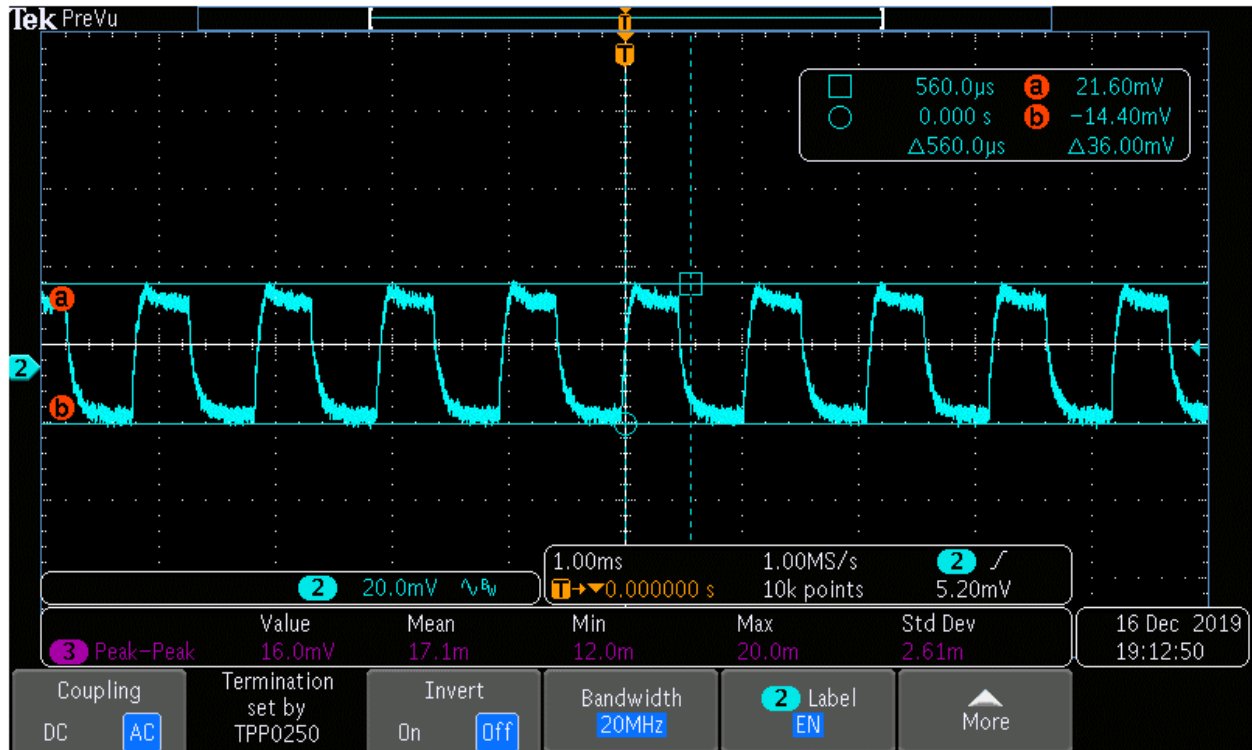


4.24A Load

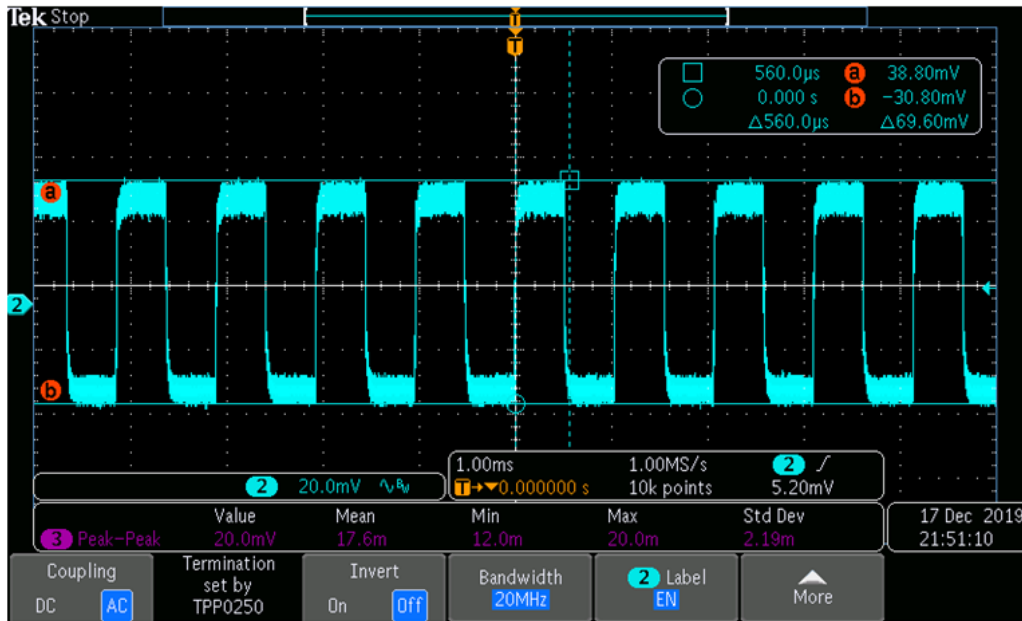


Transient Response

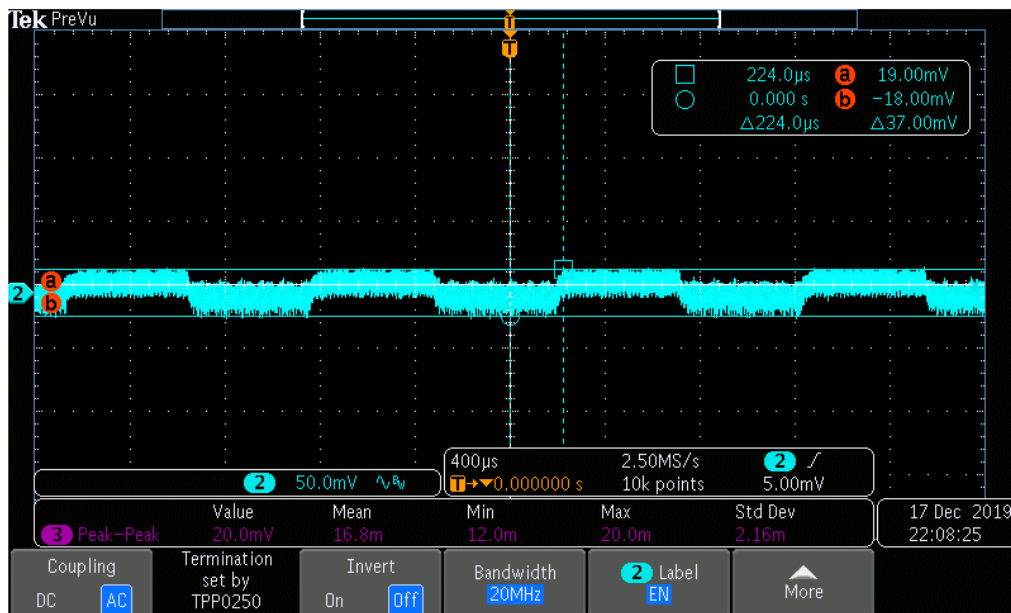
VCCINT 0.78V, 60% load step, 52.8-132A (5A/us)



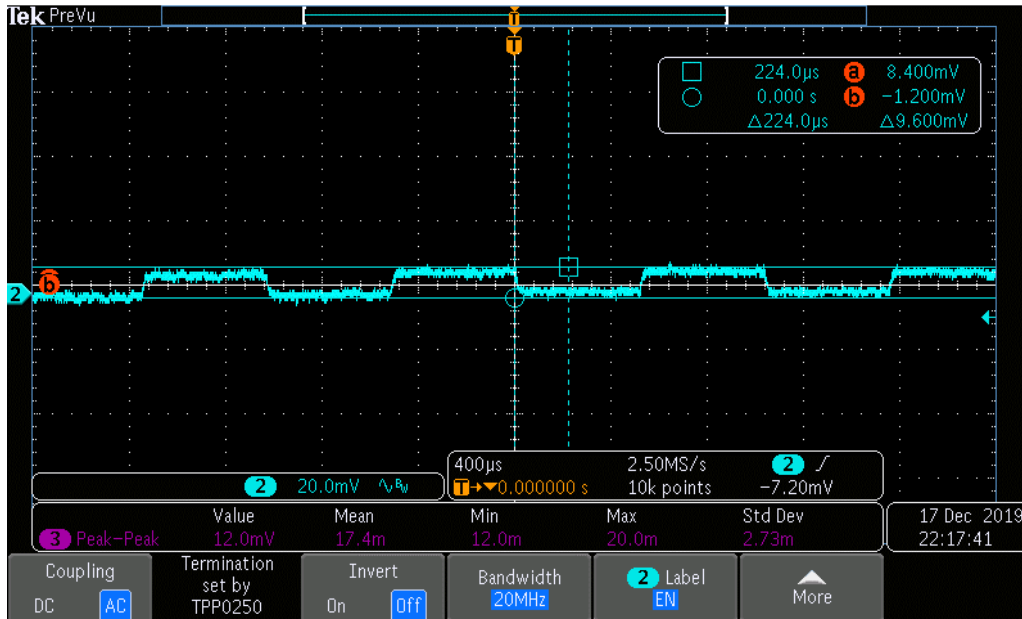
VCCAUX 1.5V, 90% step, 0.312-3.12A (5A/us)



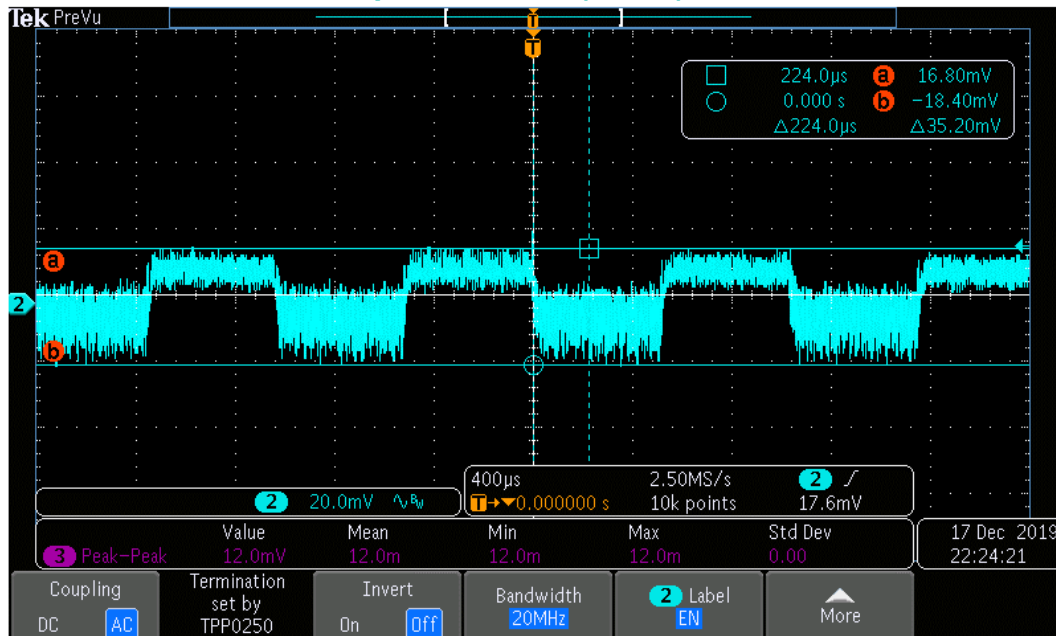
MGTA VCC 0.88V, 25% step, 1.85-2.47A (5A/us)



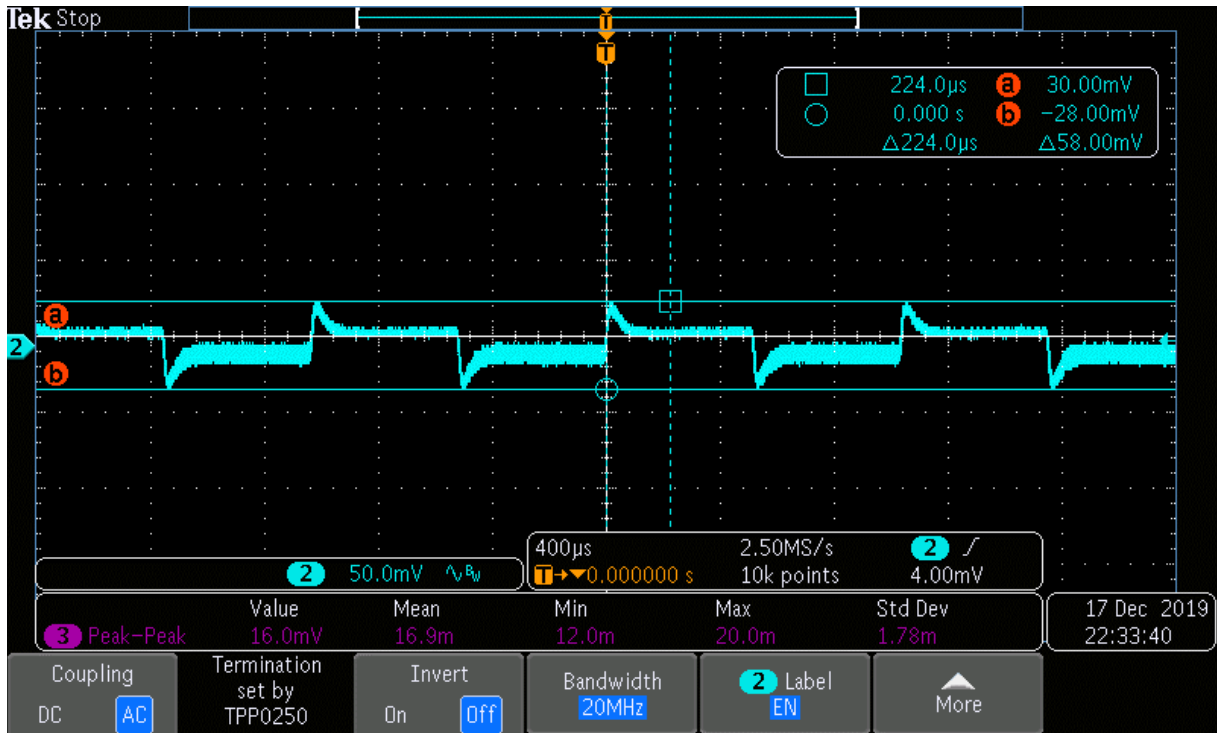
MGTAVAUX 1.5V, 25% step, 0.173-0.23A (5A/us)



MGTAVTT 1.2V, 25% step, 2.88-3.85A (5A/us)

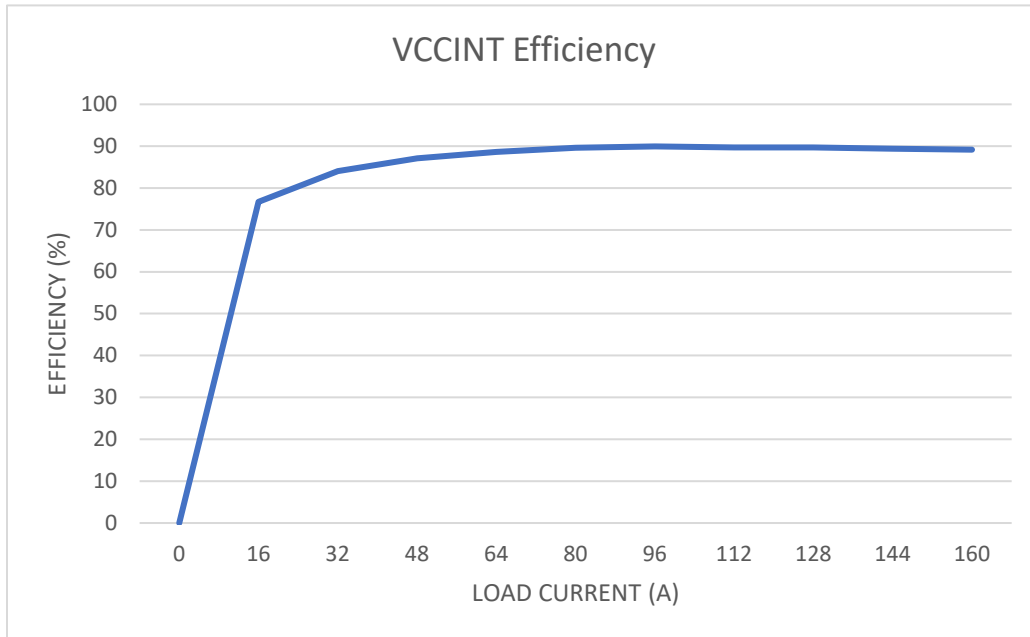


VCC_PMIO 3.257V, 25% step, 2.54-3.39A (5A/us)



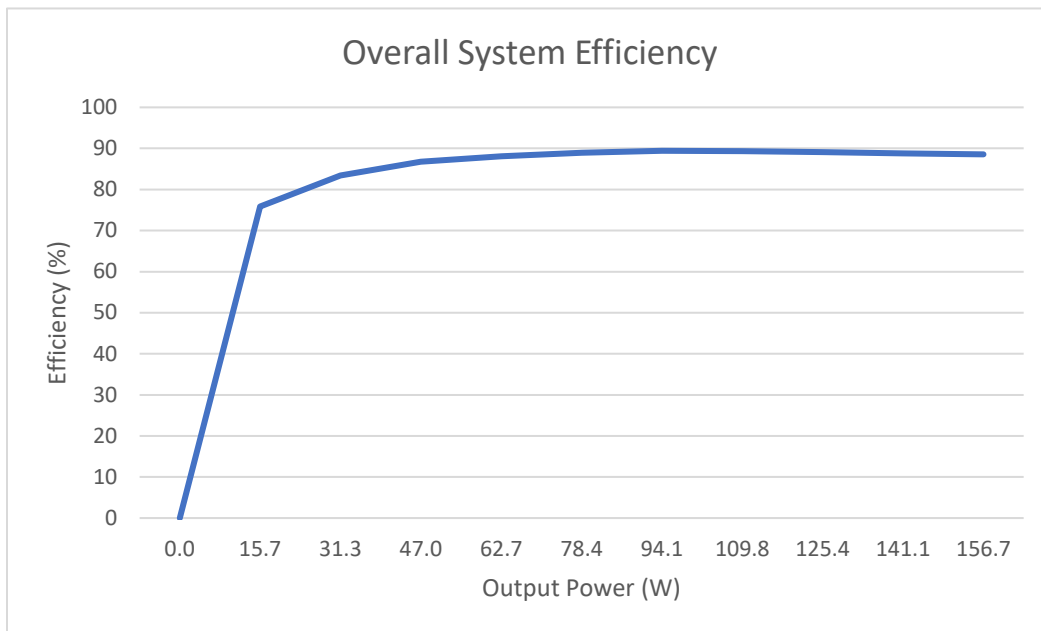
VCCINT Efficiency Results

Peak Efficiency 89.96% at 110A Load Current

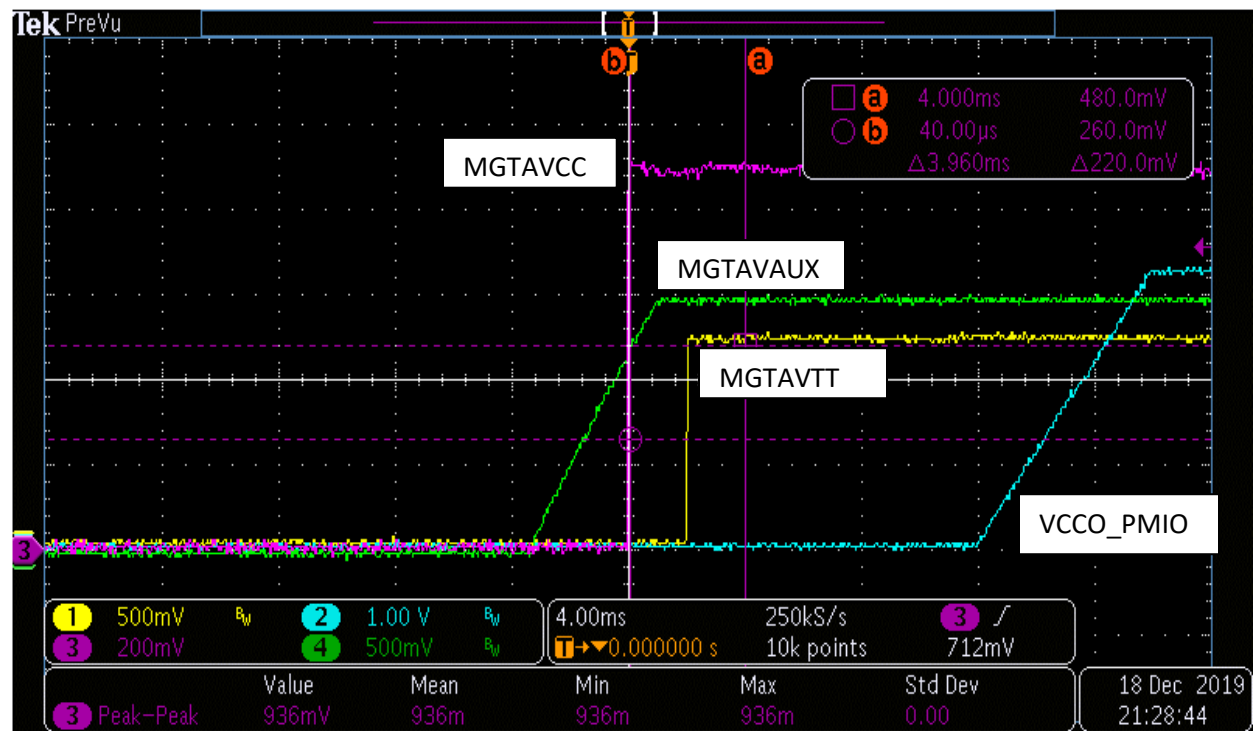
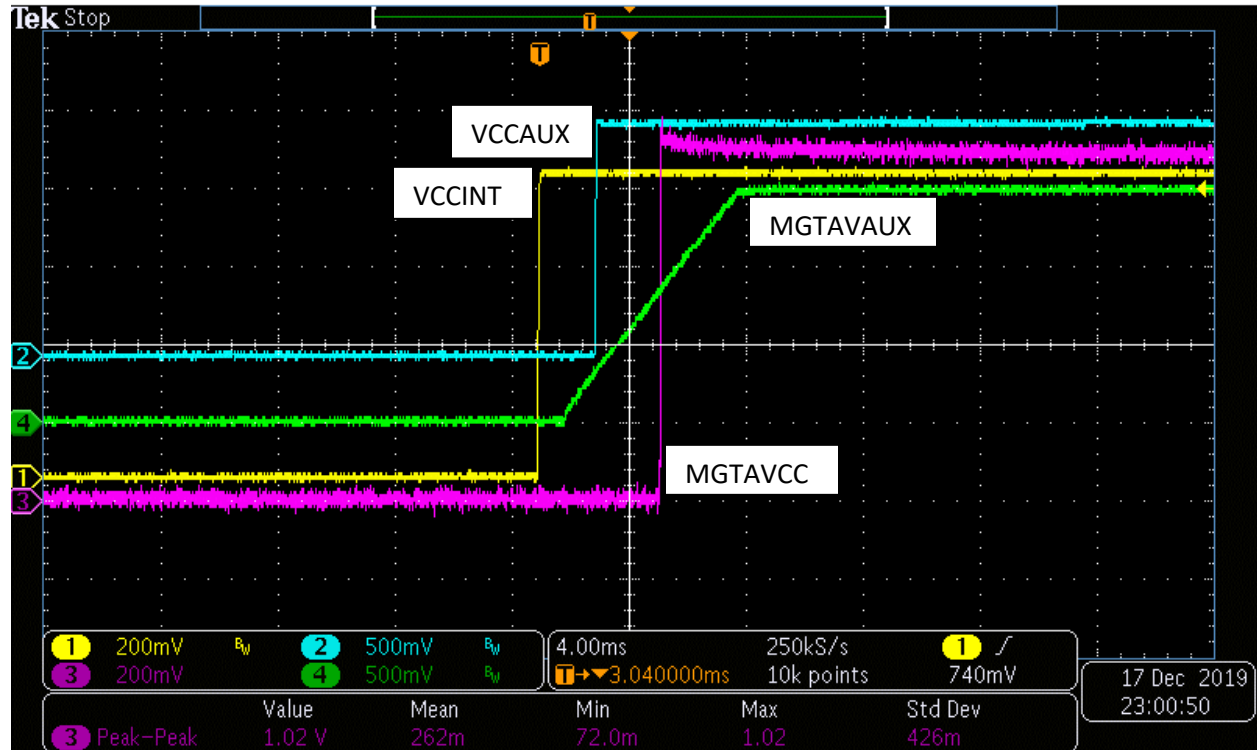


Overall System Efficiency Results

Peak Efficiency 89.43% at 94.1W Output Power



Sequencing



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