

Artix 7 Test Report

MPM54304-0001

MP2002A and MP20051

2/27/2023

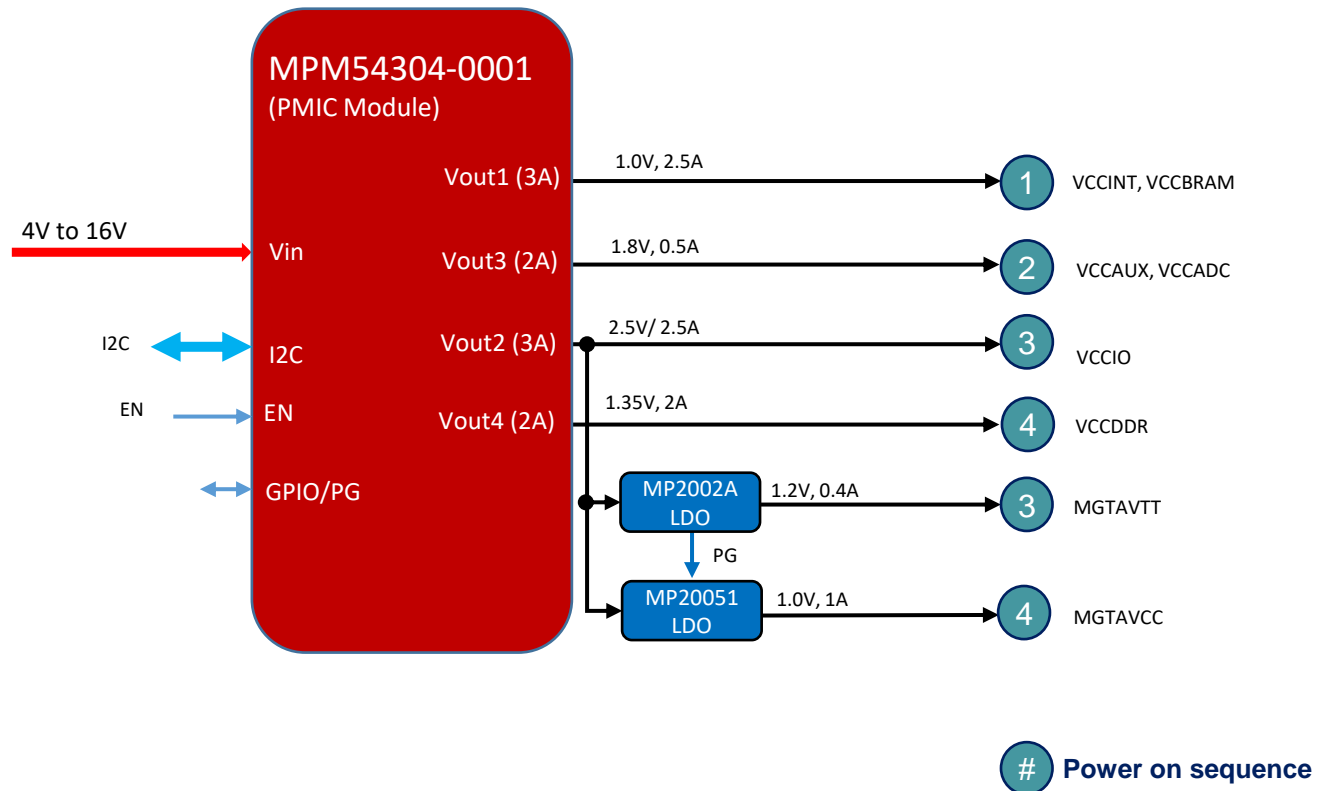
By: Cindy Yu



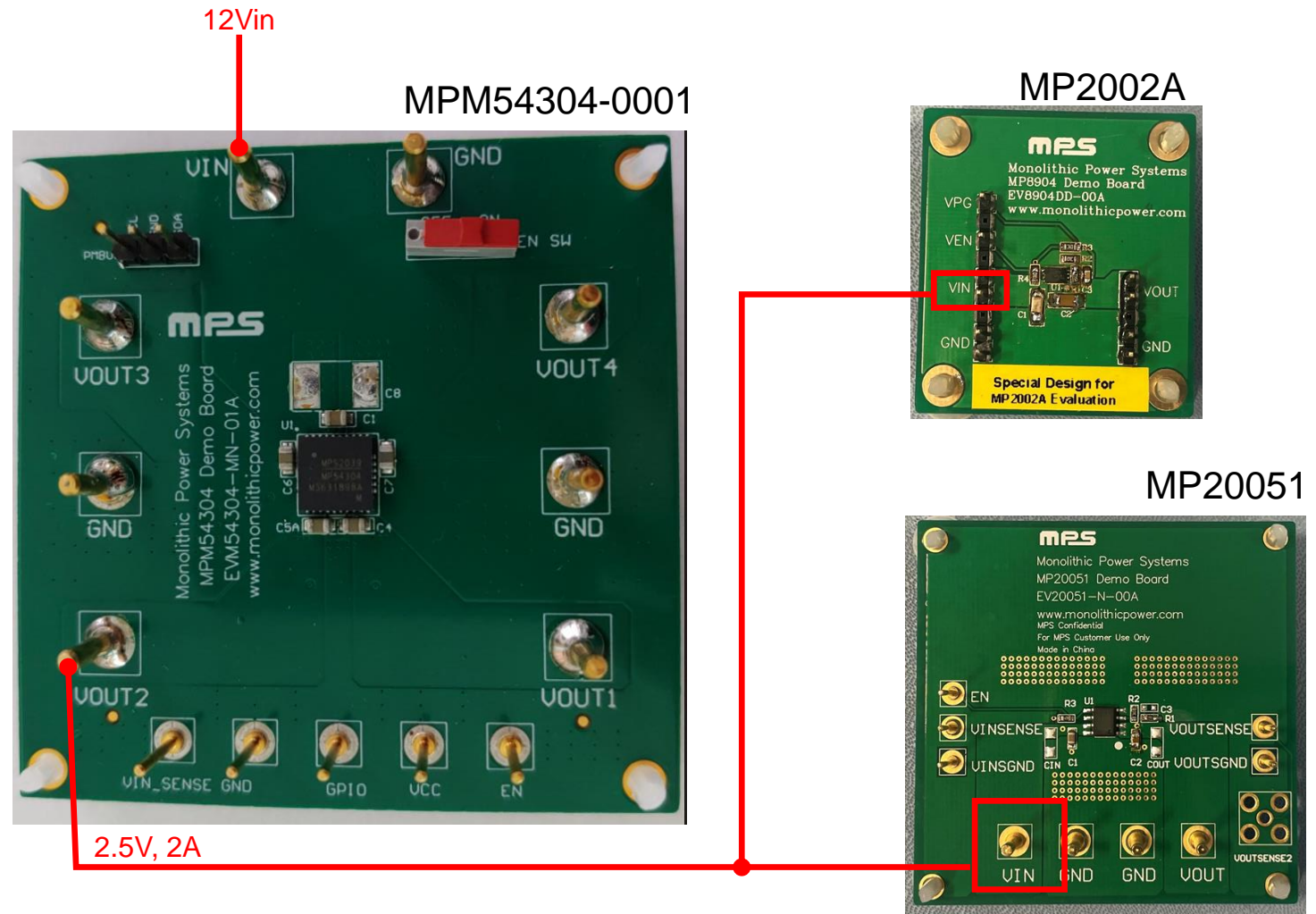
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Artix 7 Power Tree



Artix 7 EVB Connection



Test Specifications

| Rail Name | MPS Part# | Vin | Vout | Power Seq | Max Current | Max Ripple % | Step load | Slew Rate |
|--------------------|---------------------------|------|-------|-----------|-------------|--------------|--------------------|-----------|
| VCCINT, VCCBRAM | MPM54034-0001 (Buck 1) | 12V | 1.0V | 1 | 2.5A | +/-3% | 1.25A→1.88A→1.25A | 10A/us |
| VCCIO | MPM54034-0001 (Buck 2) | 12V | 2.5V | 3 | 2.5A | +/-3% | 1.25A→1.88A→1.25A | 10A/us |
| VCCAUX, VCCADC | MPM54034-0001 (Buck 3) | 12V | 1.8V | 2 | 0.5A | +/-3% | 0.25A→0.375A→0.25A | 10A/us |
| VCCDDR | MPM54034-0001 (Buck 4) | 12V | 1.35V | 4 | 2.0A | +/-3% | 1.0A→1.50A→1.0A | 10A/us |
| MGTAVTT | MP2002A | 2.5V | 1.3V | 3 | 0.4A | +/-10mV (ss) | | |
| MGTAVCC | MP20051 | 2.5V | 1.0V | 4 | 1.0A | +/-10mV (ss) | | |

DC Voltage Accuracy

| Power Rail | Rail Name | Input Voltage | Design Target | Vout (No Load) | Vout (Half Load) | Vout (Full Load) | Max Error % |
|-----------------|-----------------|---------------|---------------|----------------|------------------|------------------|-------------|
| MPM54304 Buck 1 | VCCINT, VCCBRAM | 12V | 1.0V | 0.998 | 0.997 | 0.994 | 0.60% |
| MPM54304 Buck 2 | VCCIO | 12V | 2.5V | 2.518 | 2.517 | 2.514 | 0.72% |
| MPM54304 Buck 3 | VCCAUX, VCCADC | 12V | 1.8V | 1.792 | 1.792 | 1.791 | 0.50% |
| MPM54304 Buck 4 | VCCDDR | 12V | 1.35V | 1.354 | 1.354 | 1.356 | 0.44% |
| MP2002A | MGTAVTT | 2.5V | 1.2V | 1.189 | 1.185 | 1.181 | 1.58% |
| MP20051 | MVTAVCC | 2.5V | 1.0V | 0.996 | 0.995 | 0.993 | 0.7% |

MPM54304 Buck 1 – 1.0Vout - Steady State Ripple

No load

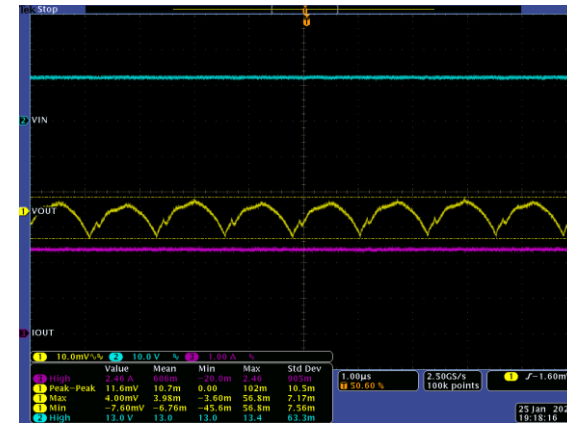
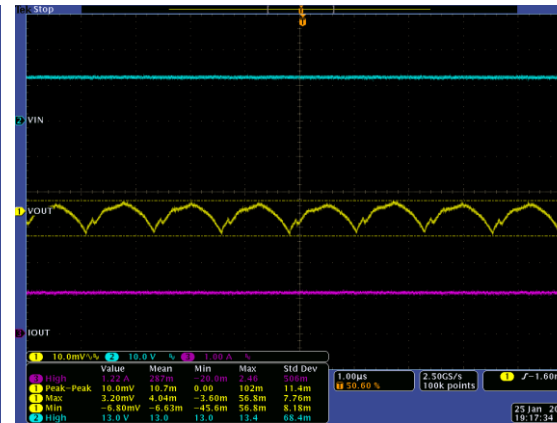
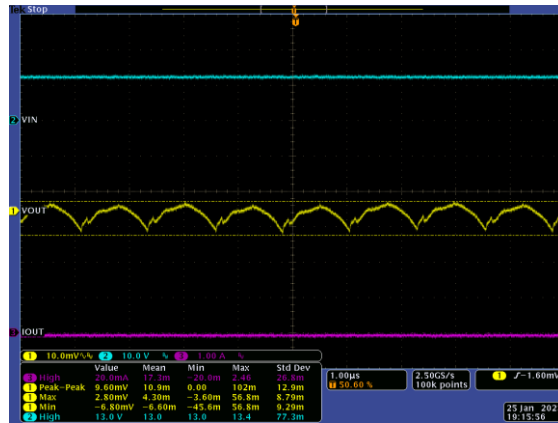
Half Load (1.25A)

Max Load (2.50A)

VIN

VOUT

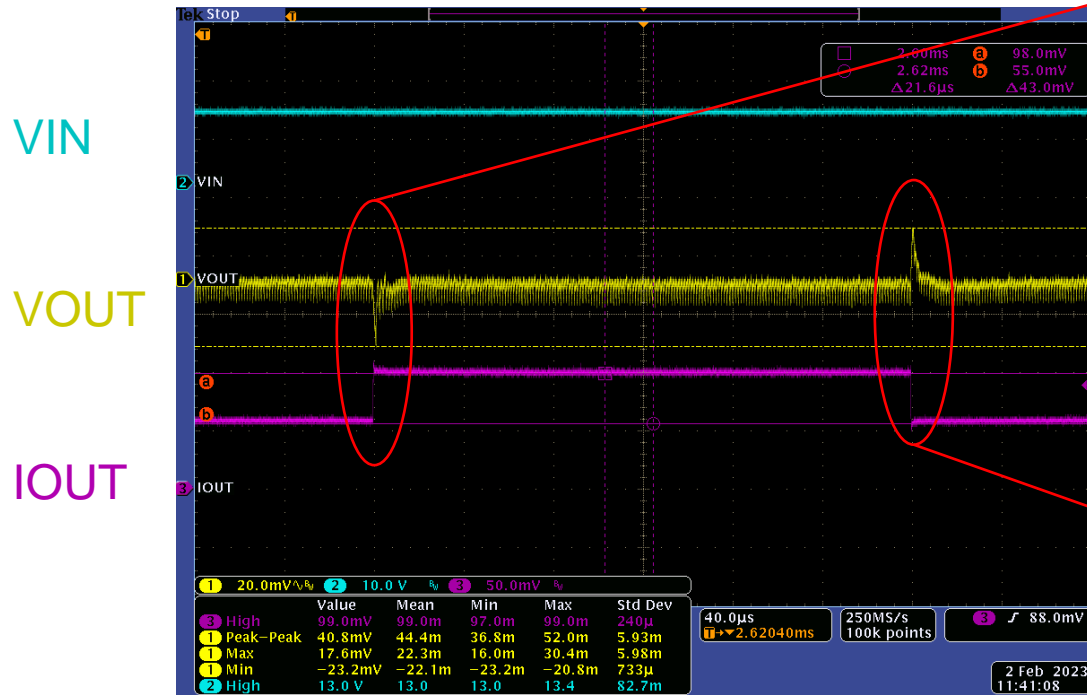
IOUT



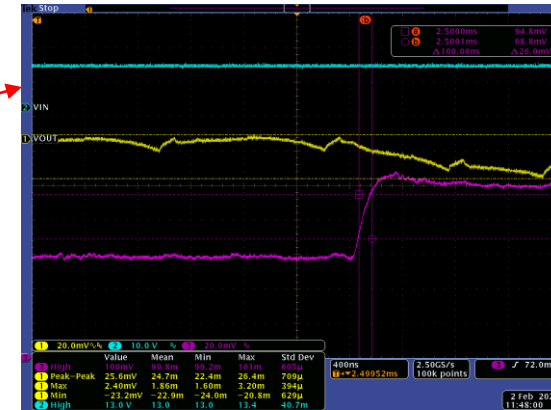
- 9.60 mV peak-peak ripple at No load
- 10.0 mV peak-peak ripple at Half load
- 11.6 mV peak-peak ripple at Max load

MPM54304 Buck 1 – 1.0Vout Transient Response

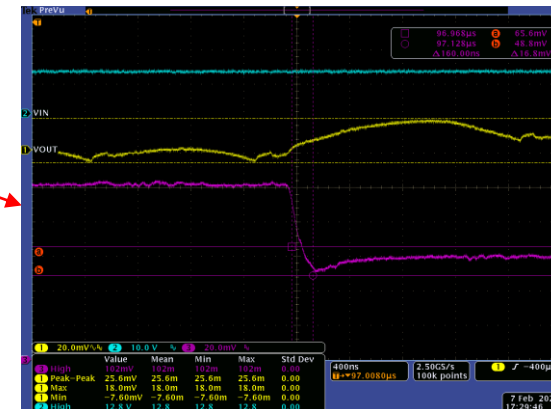
Step Load 1.25A → 1.88A → 1.25A, 10A/us



Rising Edge



Falling Edge



➤ Vout ripple -2.32% (-23.2mV) to +1.76% (17.6mV) with load transient

MPM54304 Buck 2 – 2.5Vout - Steady State Ripple

No load

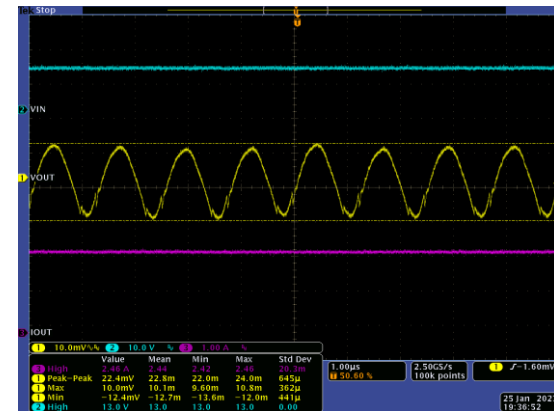
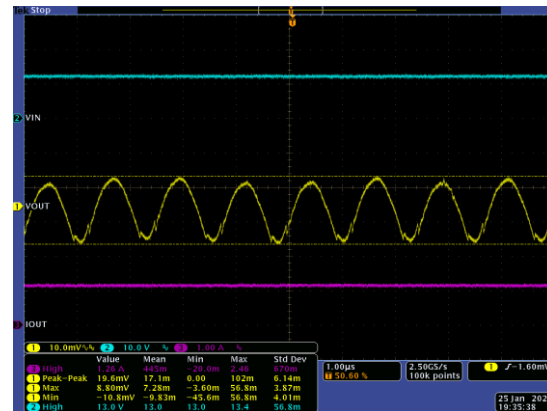
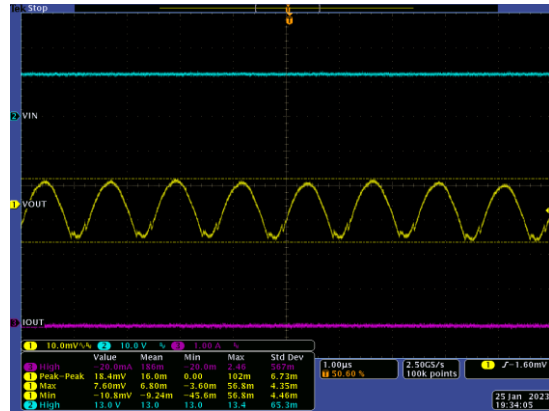
Half Load (1.25A)

Max Load (2.50A)

VIN

VOUT

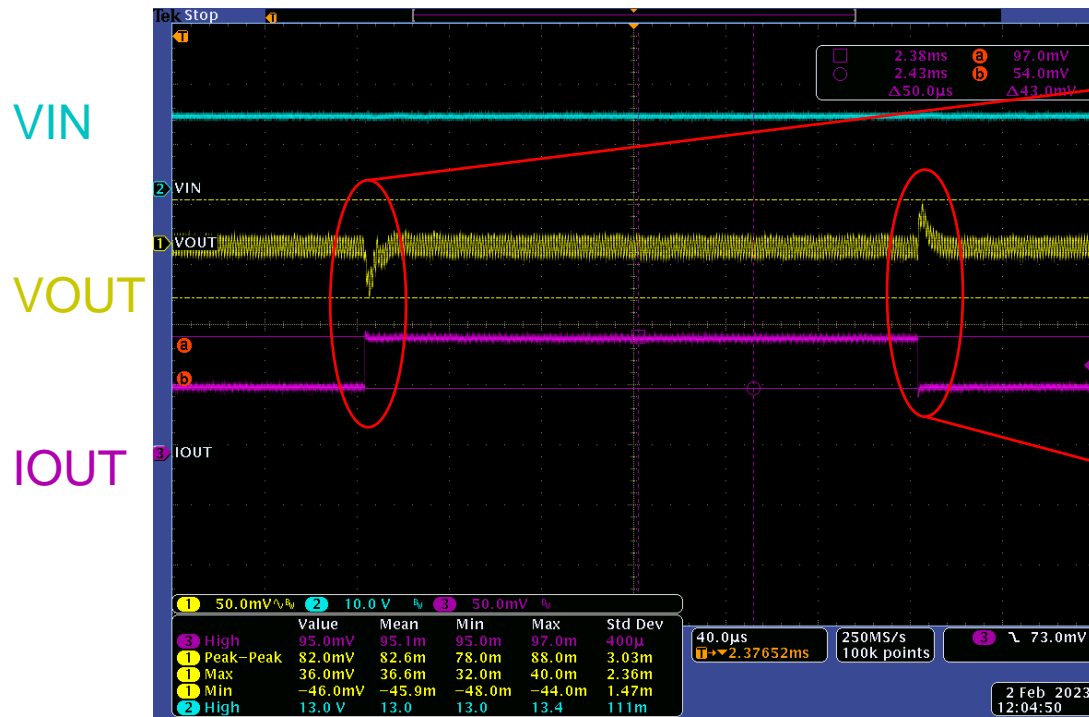
IOUT



- 18.4 mV peak-peak ripple at No load
- 19.6 mV peak-peak ripple at Half load
- 22.4 mV peak-peak ripple at Max load

MPM54304 Buck 2 – 2.5Vout Transient Response

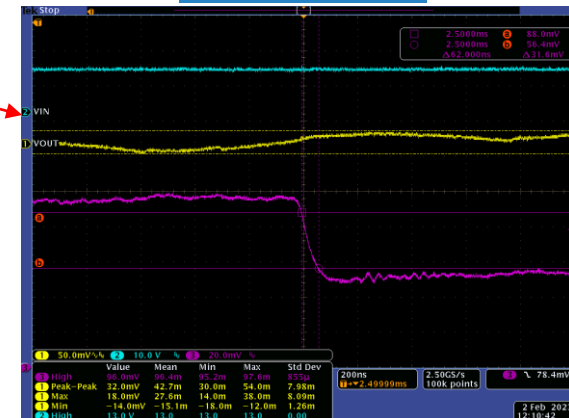
Step Load 1.25A → 1.88A → 1.25A, 10A/us



Rising Edge



Falling Edge



➤ Vout ripple -1.84% (-46.0mV) to +1.44% (36.0mV) with load transient

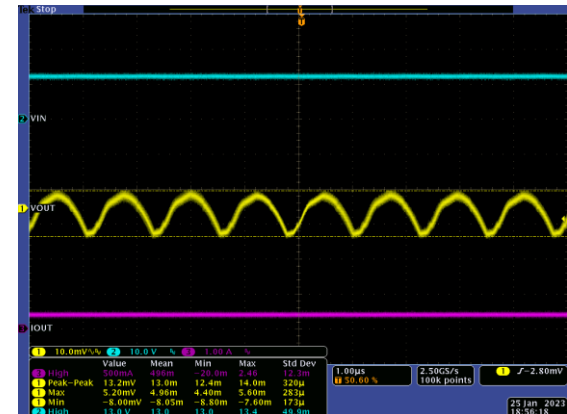
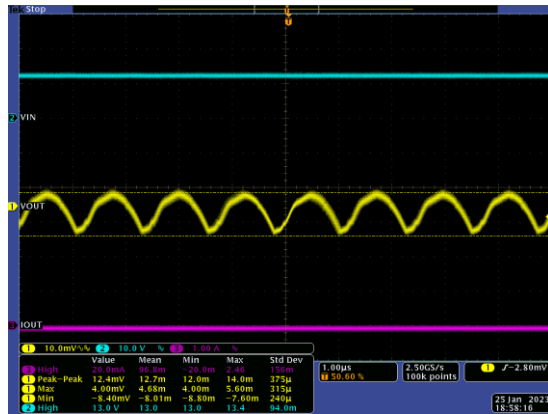
MPM54304 Buck 3 – 1.8Vout - Steady State Ripple

No load

Half Load (0.25A)

Max Load (0.50A)

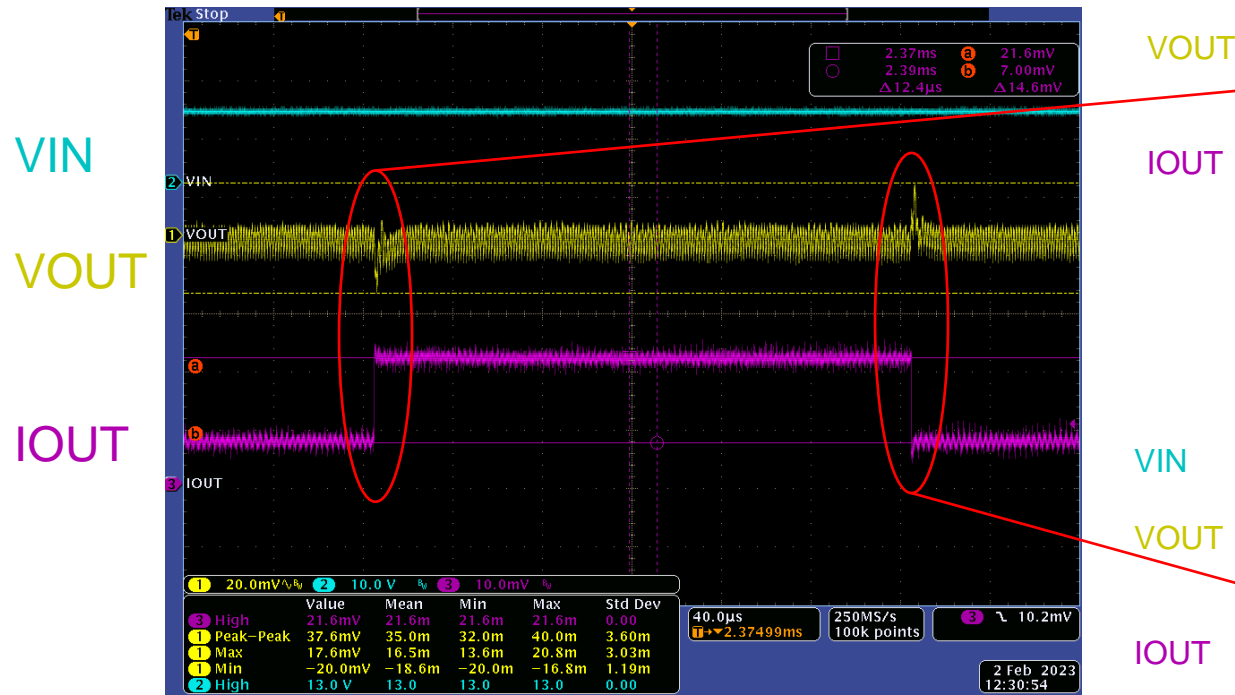
VIN
VOUT
IOUT



- 12.4 mV peak-peak ripple at No load
- 13.2 mV peak-peak ripple at Half load
- 13.2 mV peak-peak ripple at Max load

MPM54304 Buck 3 – 1.8Vout Transient Response

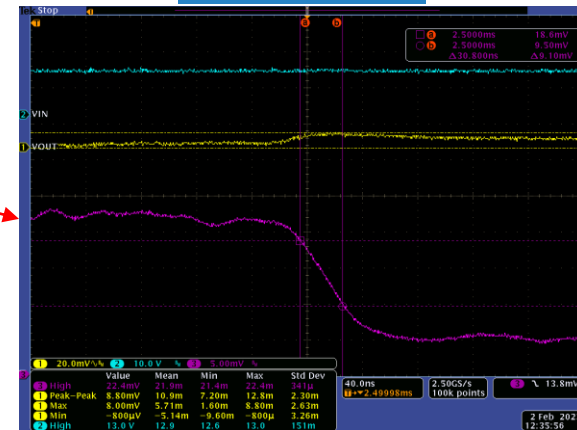
Step Load 0.25A→0.375A→0.25A, 10A/us



Rising Edge



Falling Edge



➤ Vout ripple -0.80% (-20.0mV) to +0.70% (17.6mV) with load transient

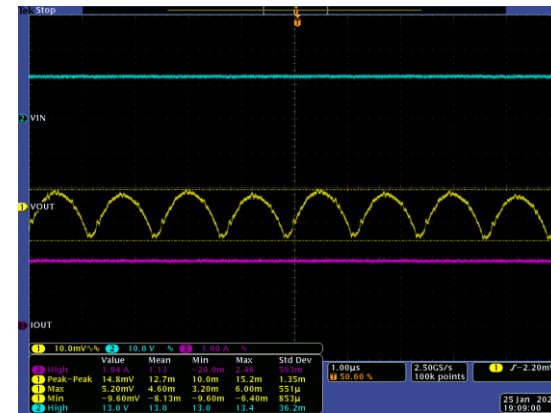
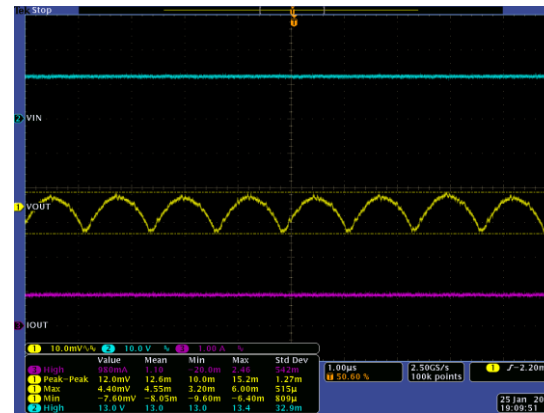
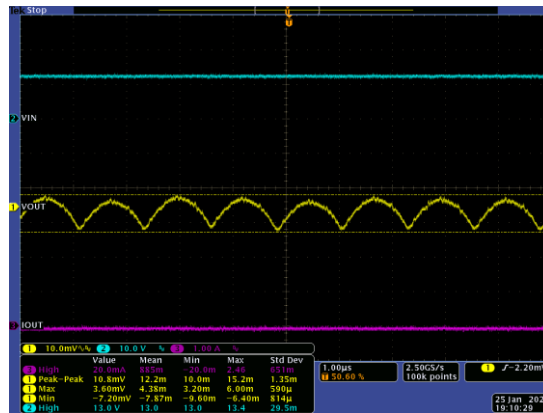
MPM54304 Buck 4 – 1.35Vout - Steady State Ripple

No load

Half Load (1.00A)

Max Load (2.00A)

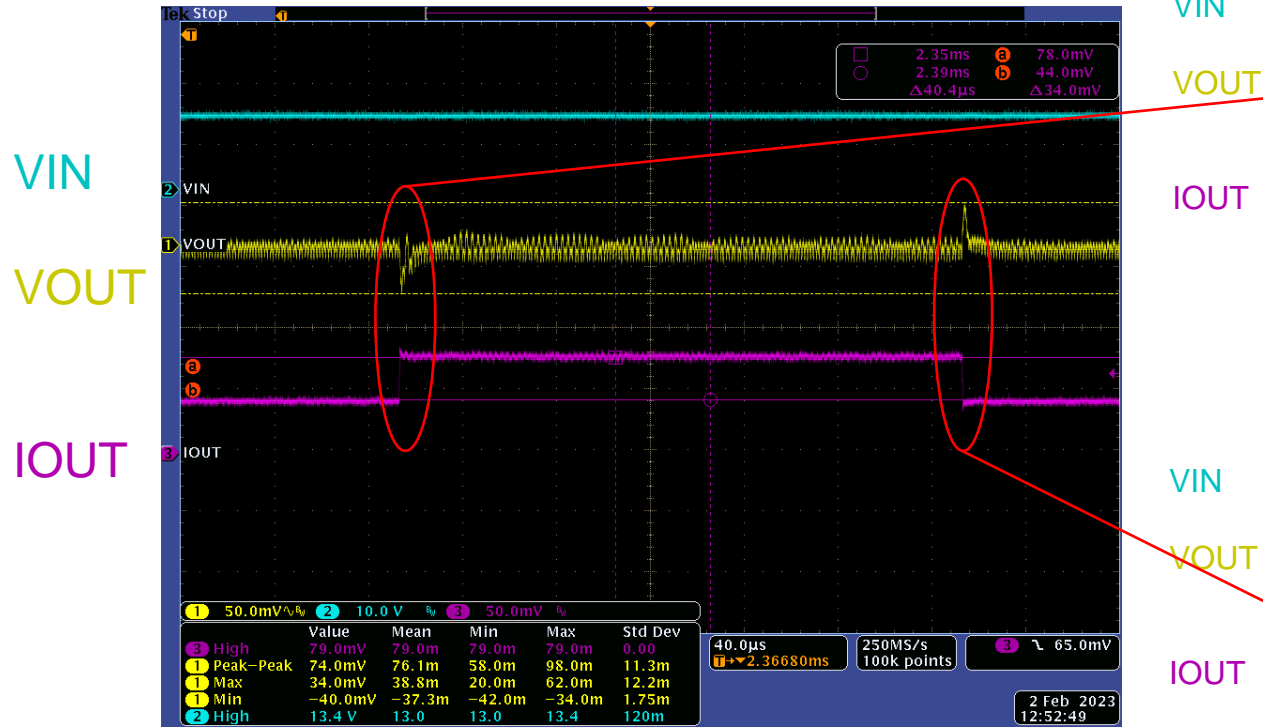
VIN
VOUT
IOUT



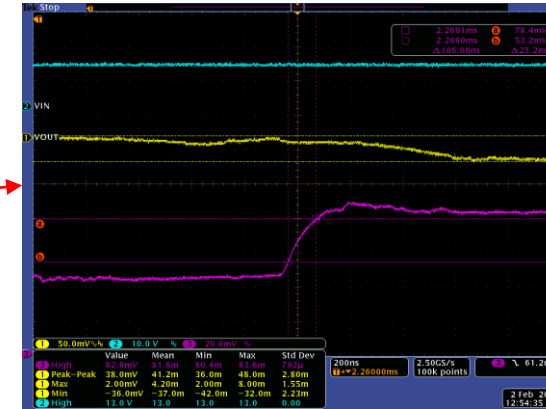
- 10.8 mV peak-peak ripple at No load
- 12.0 mV peak-peak ripple at Half load
- 14.8 mV peak-peak ripple at Max load

MPM54304 Buck 4 – 1.35Vout Transient Response

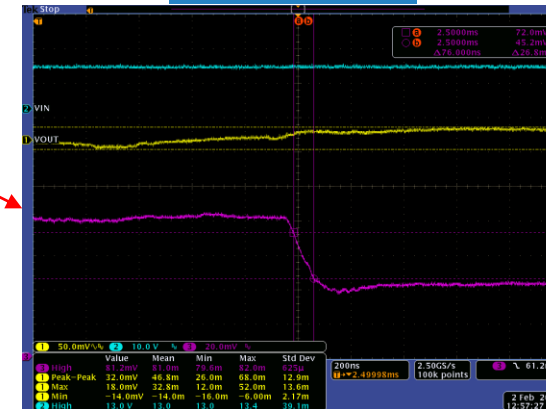
Step Load 1.00A→1.50A→1.00A, 10A/us



Rising Edge



Falling Edge



➤ Vout ripple -2.96% (-40.0mV) to +2.51% (34.0mV) with load transient

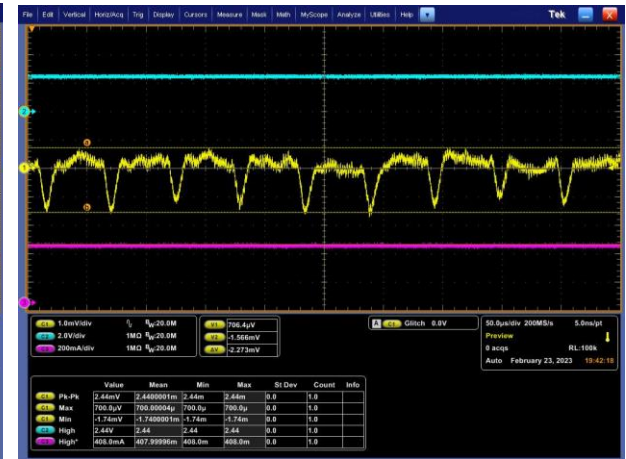
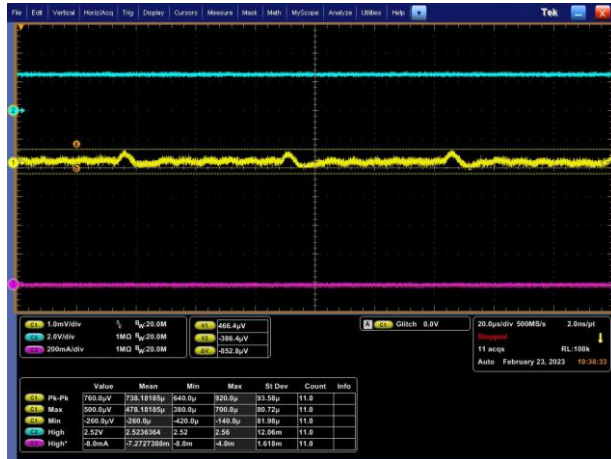
MP2002A – 1.2Vout - Steady State Ripple

No load

Half Load (0.20A)

Max Load (0.40A)

VIN
VOUT
IOUT



- 0.76 mV peak-peak ripple at No load
- 2.08 mV peak-peak ripple at Half load
- 2.44 mV peak-peak ripple at Max load

MP20051 – 1.0Vout - Steady State Ripple

No load

Half Load (0.50)

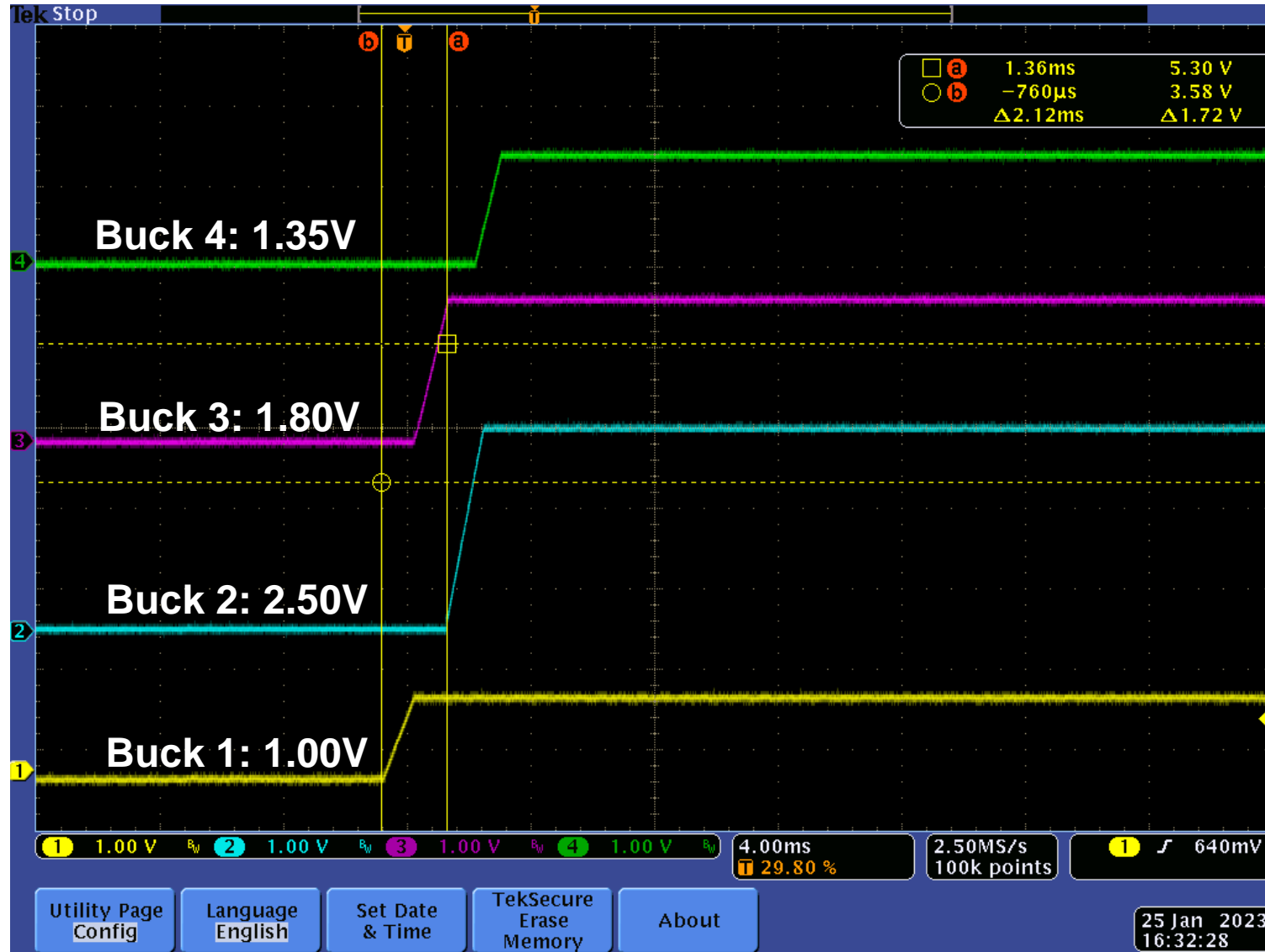
Max Load (1.00A)

VIN
VOUT
IOUT

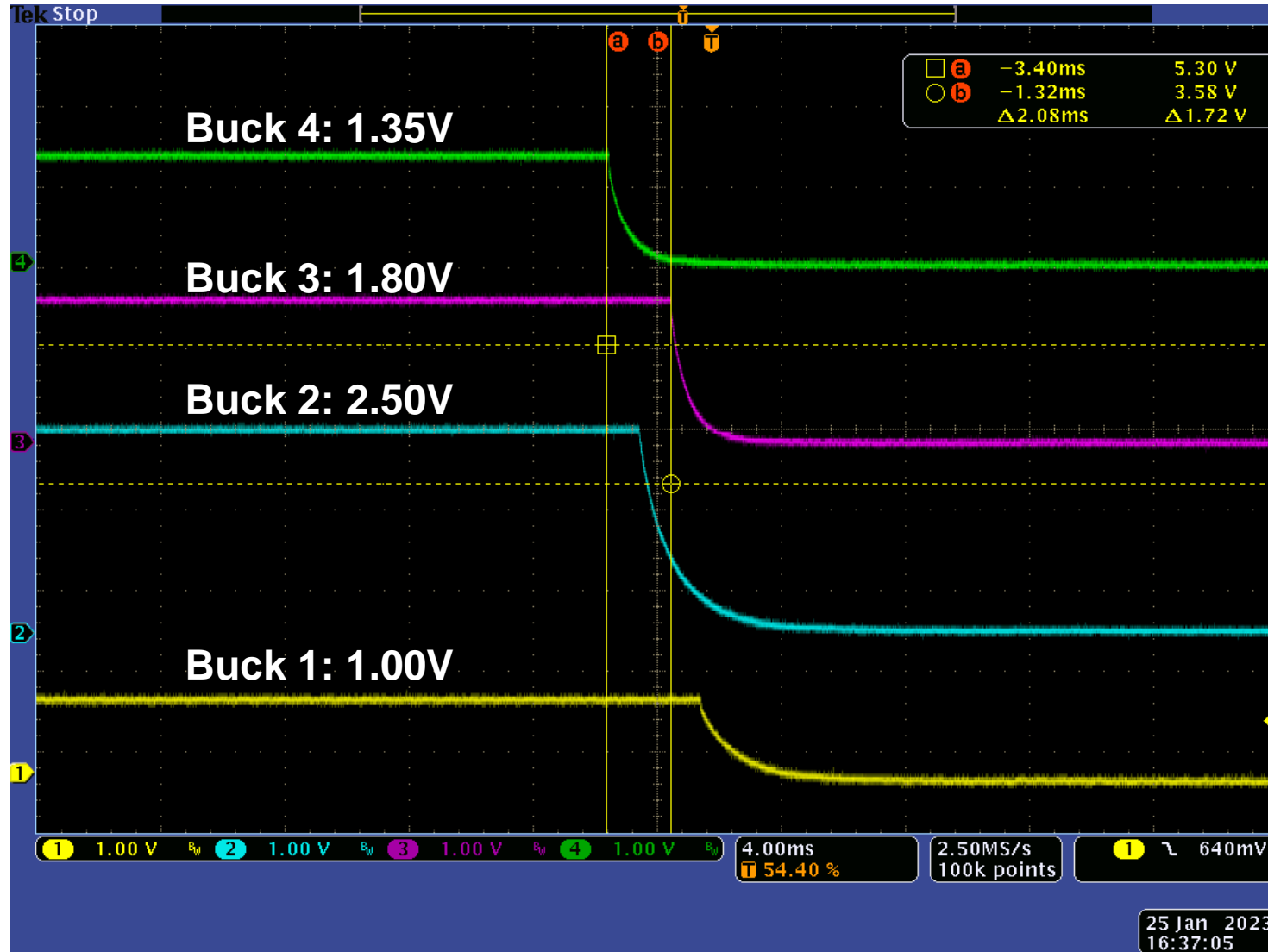


- 1.0 mV peak-peak ripple at No load
- 0.84 mV peak-peak ripple at Half load
- 1.0 mV peak-peak ripple at Max load

Power-Up Sequence



Power-Down Sequence



Test Setup

Measurement procedures:

- All steady state measurements (No Load/Typical/Max) were taken directly at output capacitors using a digital multimeter
- All current waveforms were captured with a current probe coming directly off the output capacitor into the E-load
- Steady state ripple and transient response waveforms were measured directly across the output capacitors using a shielded cable

Equipment:

- Tektronix DPO 4034 Digital Phosphor Oscilloscope
- Agilent E3633A DC Power Supply
- Chroma 63103A DC Electronic Load
- Tektronix AFG3022C Function Generator
- Intel Series 1 25A Mini Slammer ver. B2