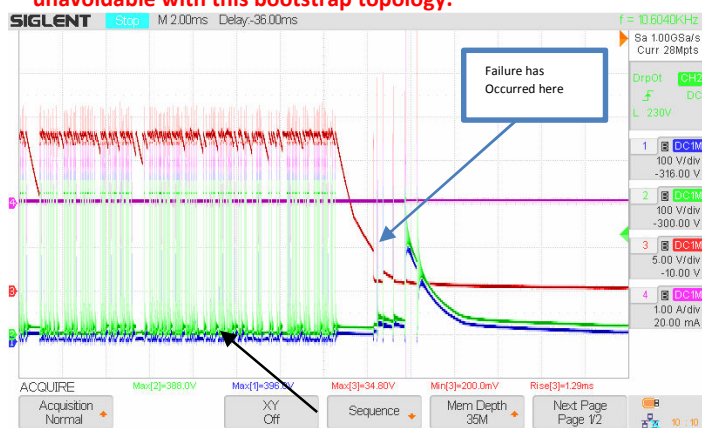


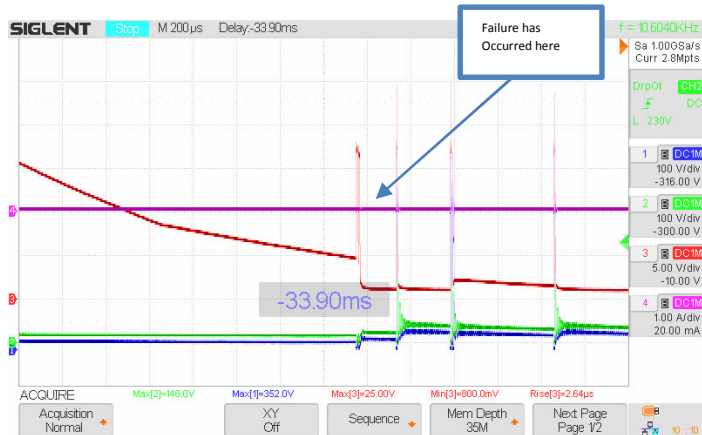
**Fig 1) Typical Recovery from UVLO state of upper driver in UCC21520.**

- CH1)** Source C (One Leg of Full Bridge)
  - CH2)** Source A (The Full Bridge Leg Corresponding to this Driver)
  - CH3)** Boot Strap Cap (Measured W/ Isolated Probe)
- At random, a gap impules long enough to cause UVLO is encountered. This happens at no-load, and also after load-dump events. It is unavoidable with this bootstrap topology.**



**Fig 2) UCC21520 - Failure Observation, Full Scale**

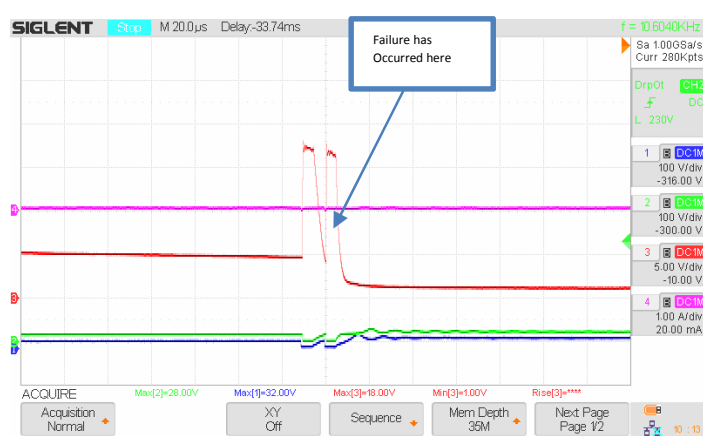
- CH1)** Source C (One Leg of Full Bridge)
  - CH2)** Source A (The Full Bridge Leg Corresponding to this Transition)
  - CH3)**  $V_{GS}^{Q7}$ , GATE A Turn on (Measured W/ Isolated Probe)
  - CH4)** Shim Inductor Current in Full Bridge
- Failure is observed upon first bootstrap after a UVLO event.



**Fig 3) UCC21520 - Failure Observation, Zoom**

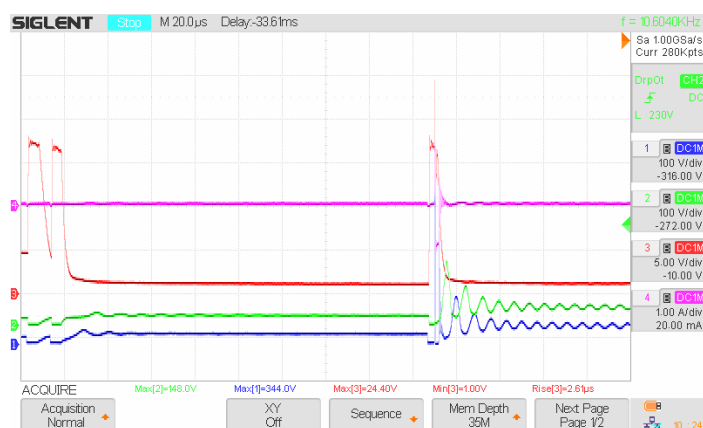
- CH1)** Source C (One Leg of Full Bridge)
- CH2)** Source A (The Full Bridge Leg Corresponding to this Driver)
- CH3)**  $V_{GS}^{Q7}$ , GATE A Turn on (Measured W/ Isolated Probe)
- CH4)** Shim Inductor Current in Full Bridge

When the bootstrap cap recharges, the driver appears as those the output (OUT A) is either shorted to VSSA, or becomes shorted to VSSA when a high Gate state is requested, as the Bootstrap voltage discharges rapidly.



**Fig 4) UCC21520 - Failure Observation, Zoom**

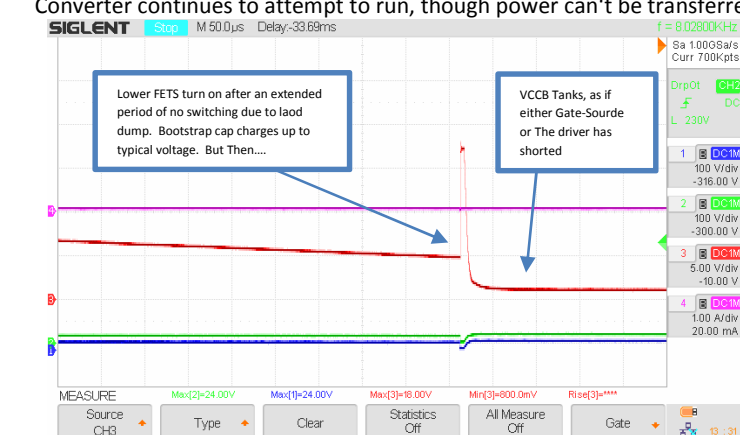
- CH1)** Source C (One Leg of Full Bridge)
  - CH2)** Source A (The Full Bridge Leg Corresponding to this Transition)
  - CH3)**  $V_{GS}^{Q7}$ , GATE A Turn on (Measured W/ Isolated Probe)
  - CH4)** Shim Inductor Current in Full Bridge
- Note the quick discharge of the bootstrap voltage after the lower mosfet in the totem pole has turned off.



**Fig 5) UCC21520 - Failure Observation, Zoom**

- CH1)** Source C (One Leg of Full Bridge)
- CH2)** Source A (The Full Bridge Leg Corresponding to this Transition)
- CH3)**  $V_{GS}^{Q7}$ , GATE A Turn on (Measured W/ Isolated Probe)
- CH4)** Shim Inductor Current in Full Bridge

Converter continues to attempt to run, though power can't be transferred



**Fig 6) UCC21520 -FAILURE OF A UNIQUE SECOND UNIT**

- CH1)** Source C (One Leg of Full Bridge)
- CH2)** Source A (The Full Bridge Leg Corresponding to this Driver)
- CH3)** Boot Strap Cap (Measured W/ Isolated Probe)

A SECOND UNIT WAS TESTED TO FAILURE, AND EXTREMELY SIMILAR WAVEFORMS ARE OBSERVED.

In both cases, No MOSFETS have failed (G-S, D-S, D-G or otherwise). Yet UCC21520 shows shorted from OUTA to VSSA when removed from ckt.