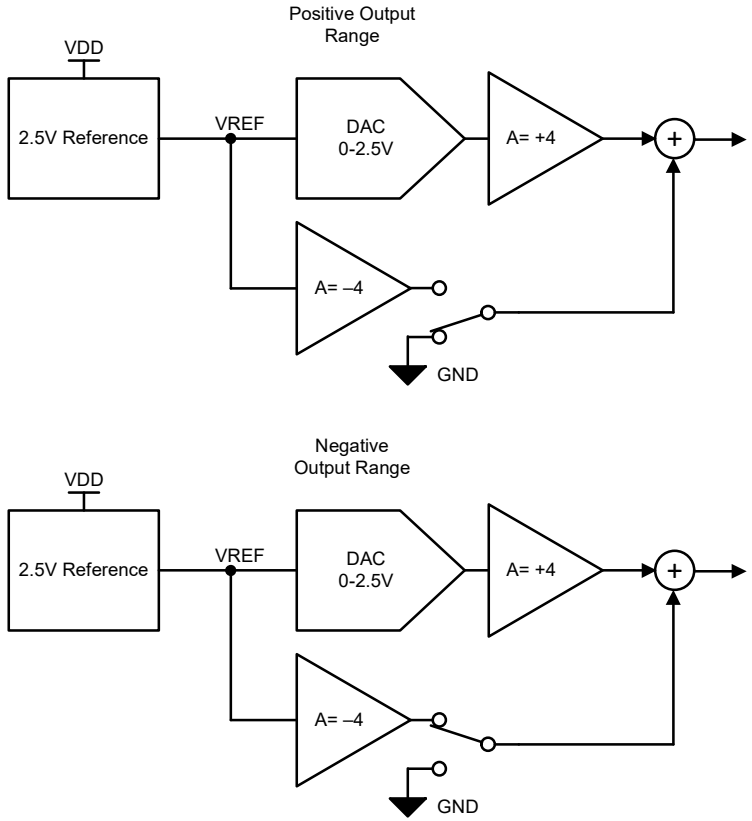
AMC7932 Power Supply Reference Glitch

ASC-DC-DAC

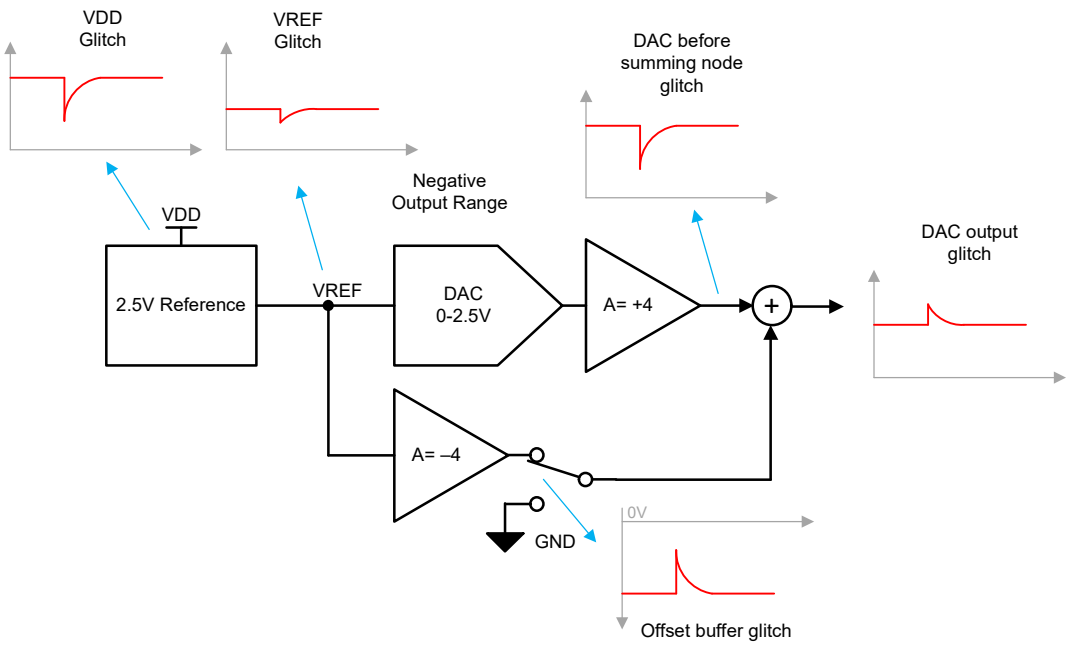
DAC Output Configuration

- Reference is in the VDD domain
- Offset Buffer provides -10V offset in negative range
- Glitch on VDD can result in glitch in 2.5V reference
- Glitch is gained by the -4× gain of the offset buffer
- Glitch is scaled by the DAC, then gained by the +4× output buffer



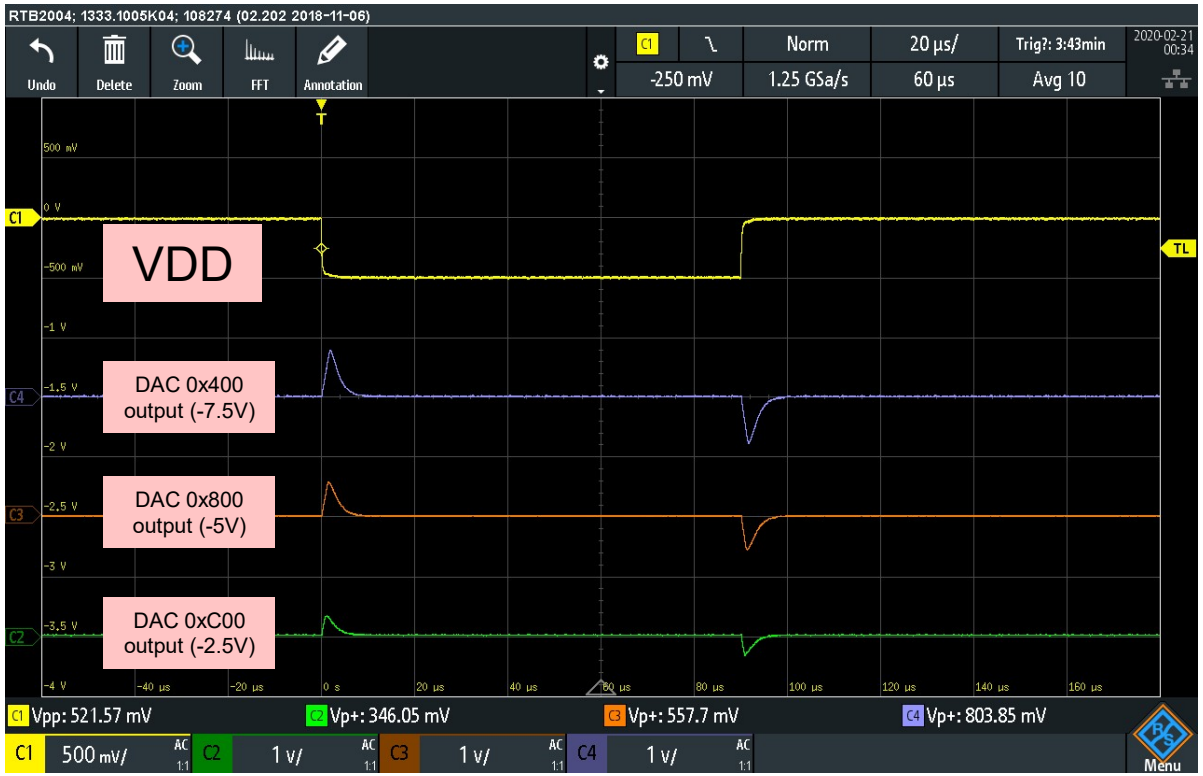
Glitch in Negative Range

- In the negative range:
  - Offset buffer has a positive glitch
  - Offset buffer's glitch is constant
  - DAC output buffer has a negative glitch
  - DAC output buffer glitch is scaled based on DAC value, as the reference is divided
- Lowest glitch occurs at fullscale output (0V) as the glitch on the offset buffer and output buffer cancel
- Greatest glitch occurs at negative full scale (-10V), as none of the offset buffer glitch is cancelled



Measured data in negative range

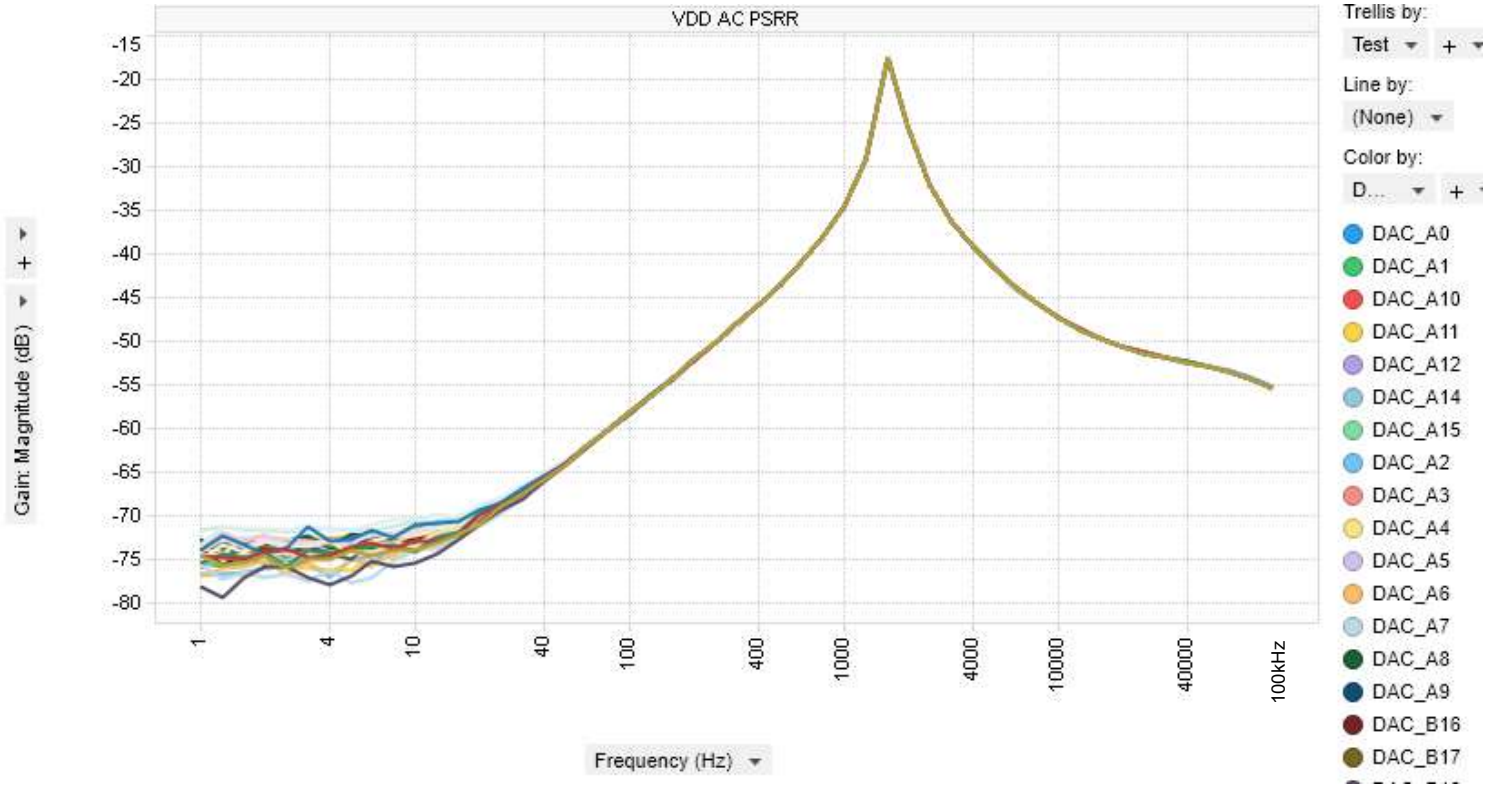
- Output glitch scales based on DAC code
- Higher codes result in lower glitch as the more of the offset buffer glitch is cancelled



Measured data in positive range

- Glitch polarity is opposite in the positive range as there is no offset buffer contribution
- Glitch gets larger near full-scale output

Example AC PSRR for VDD and DAC Outputs



Recommendations

- Reduce VDD transients:
  - Increase decoupling capacitors
  - Add small series resistance to enable RC filter
  - Increase bulk capacitors on the DCDC output that supplies VDD