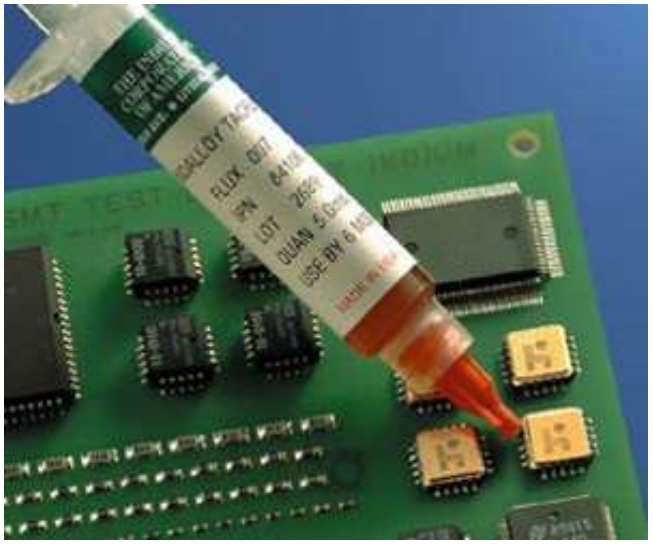
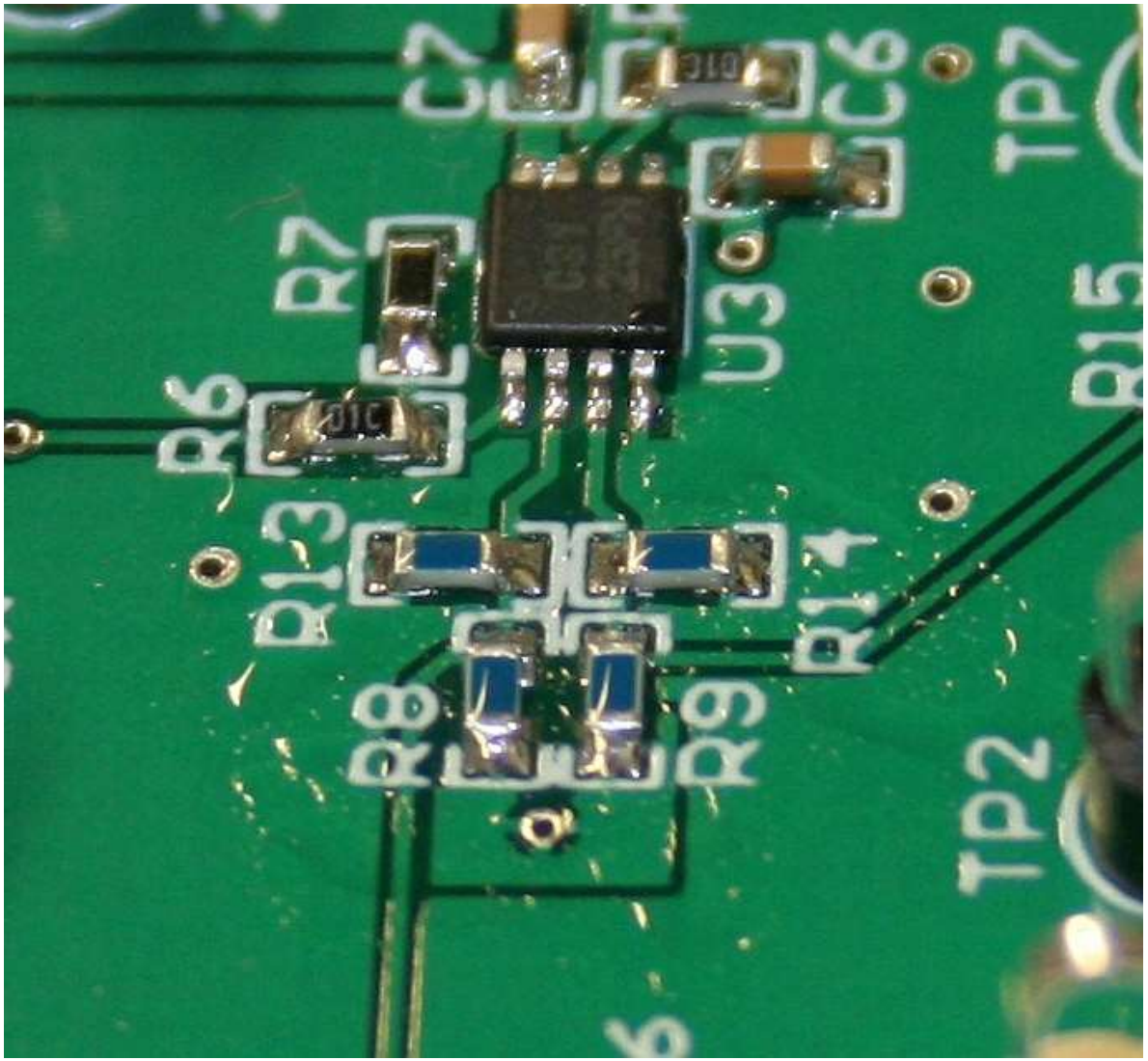
Solder Flux Contamination

What Is Solder Flux?

- A chemical agent used to facilitate the soldering of components to a printed circuit board
- Solder flux serves three main purposes:
  - Removes oxidation from surfaces to be soldered
  - Seals out air, preventing further oxidation
  - Improves “wetting” characteristic of the liquid solder
    - Solder flows more easily onto solder pads and device pins
- Many different types of solder flux
  - Resin, organic, inorganic
  - Liquid, solid, paste



What Is Solder Flux?



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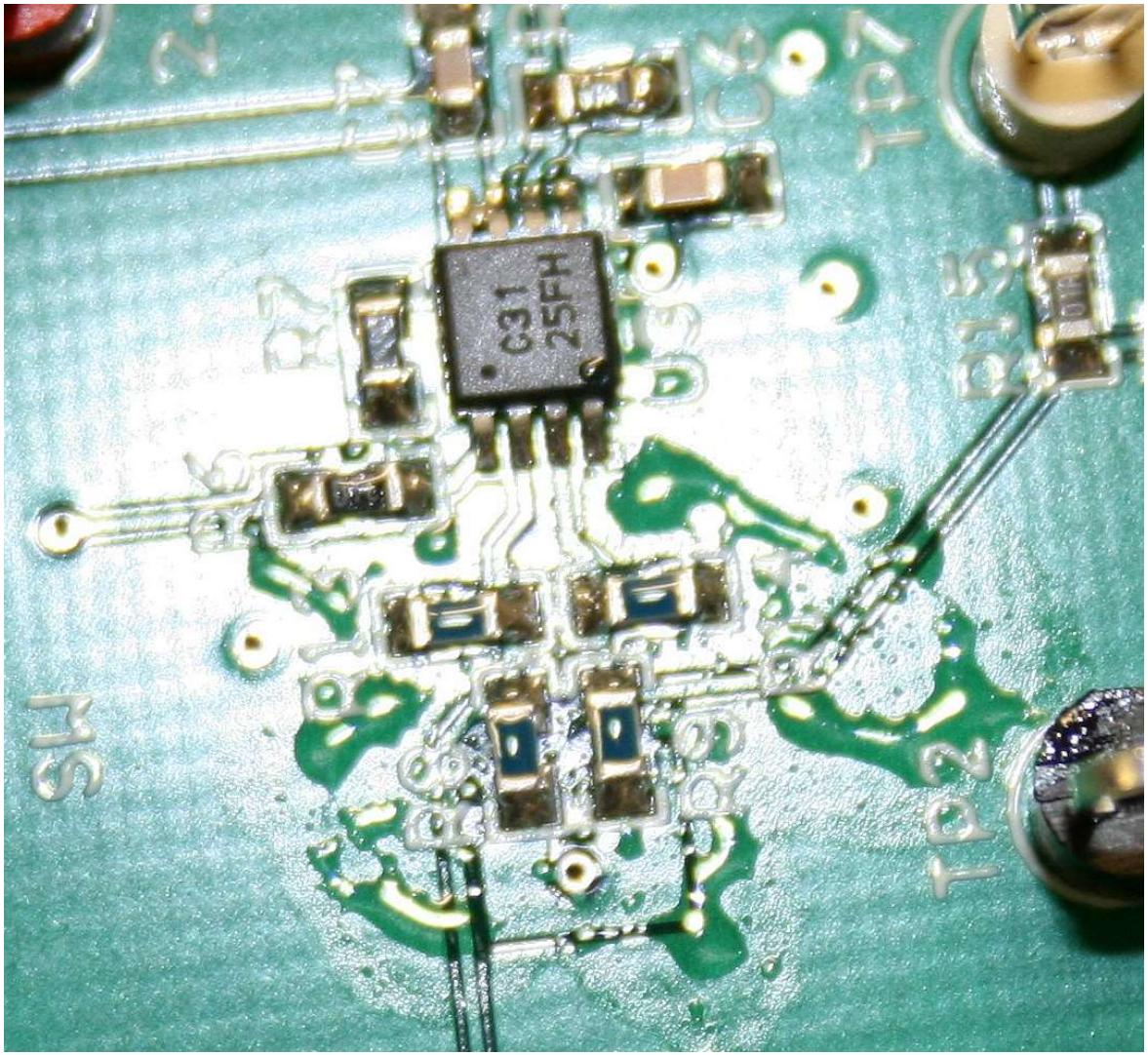
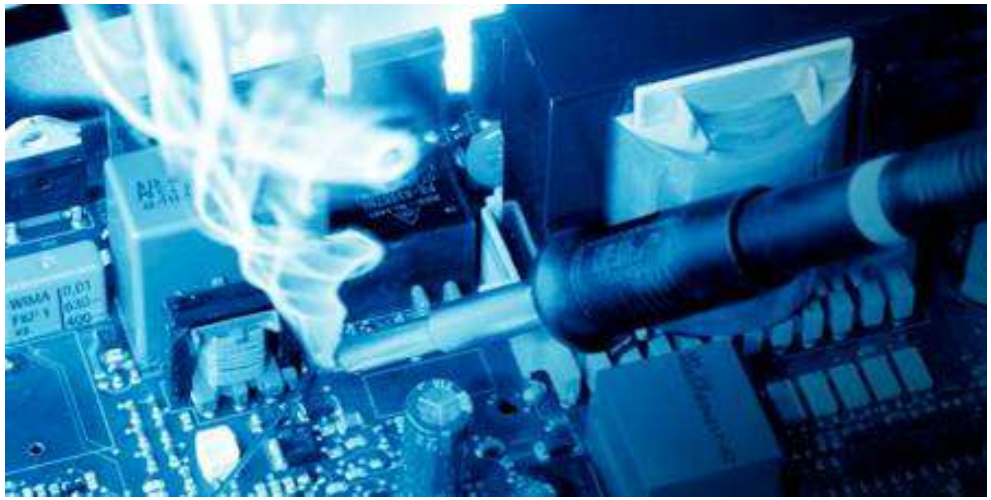
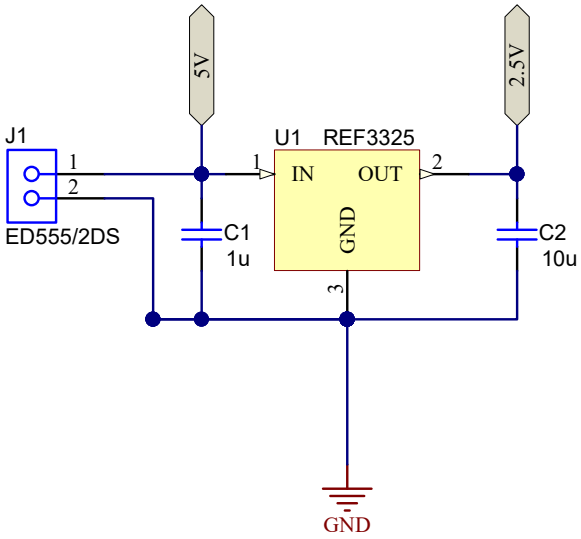


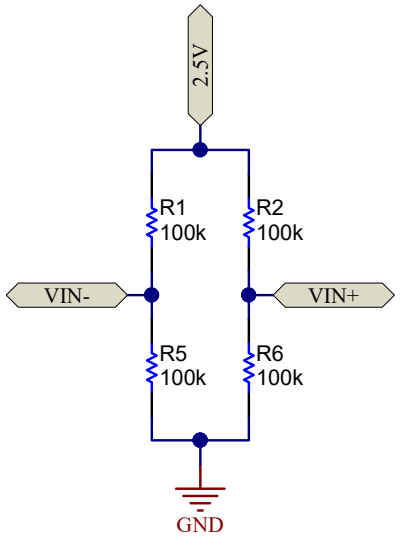
Drawbacks of Solder Flux

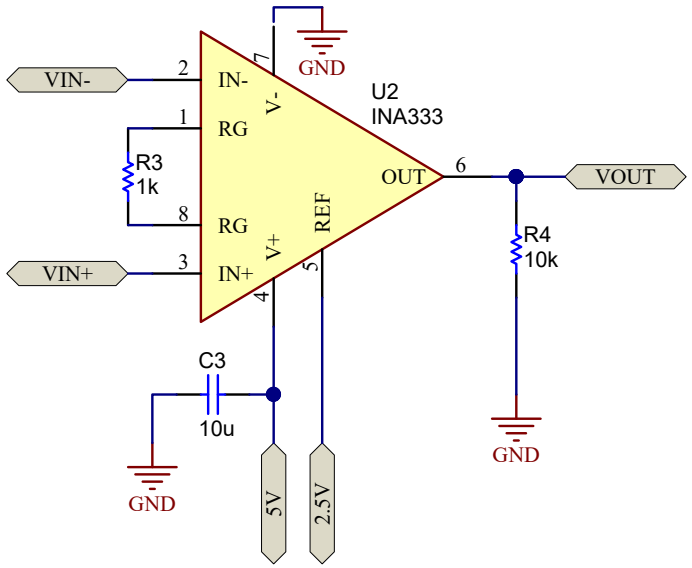
- **Deterioration of surface insulation resistance!**
- Contamination of sensitive parts
  - Connector contacts, mechanical switches, MEMS assemblies
- Growth of whiskers between nearby traces
- Fumes liberated during soldering have adverse health effects
- Solvents required for post-soldering cleaning can be expensive and not environmentally friendly



Test Case: INA333 Bridge Sensor Circuit

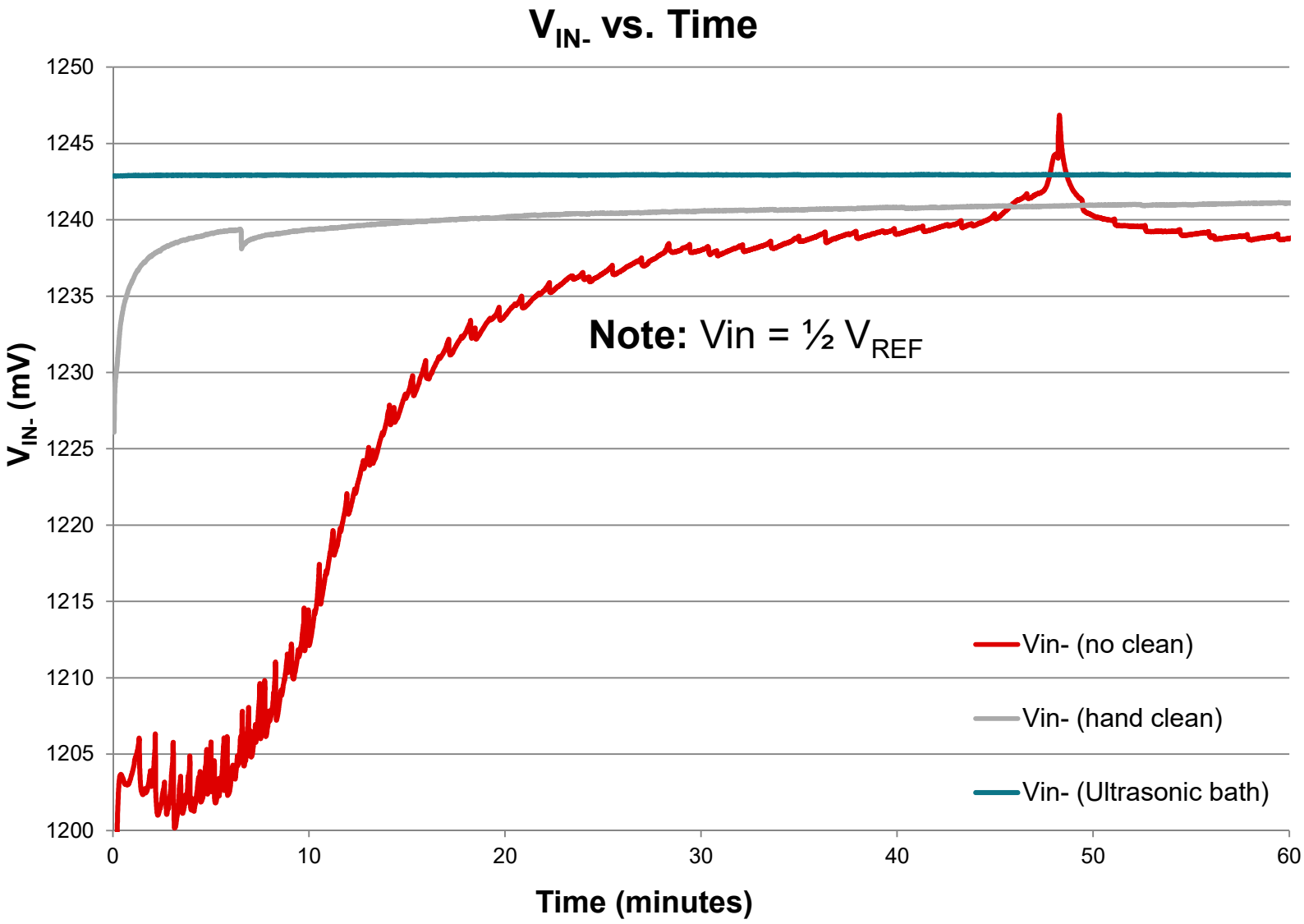




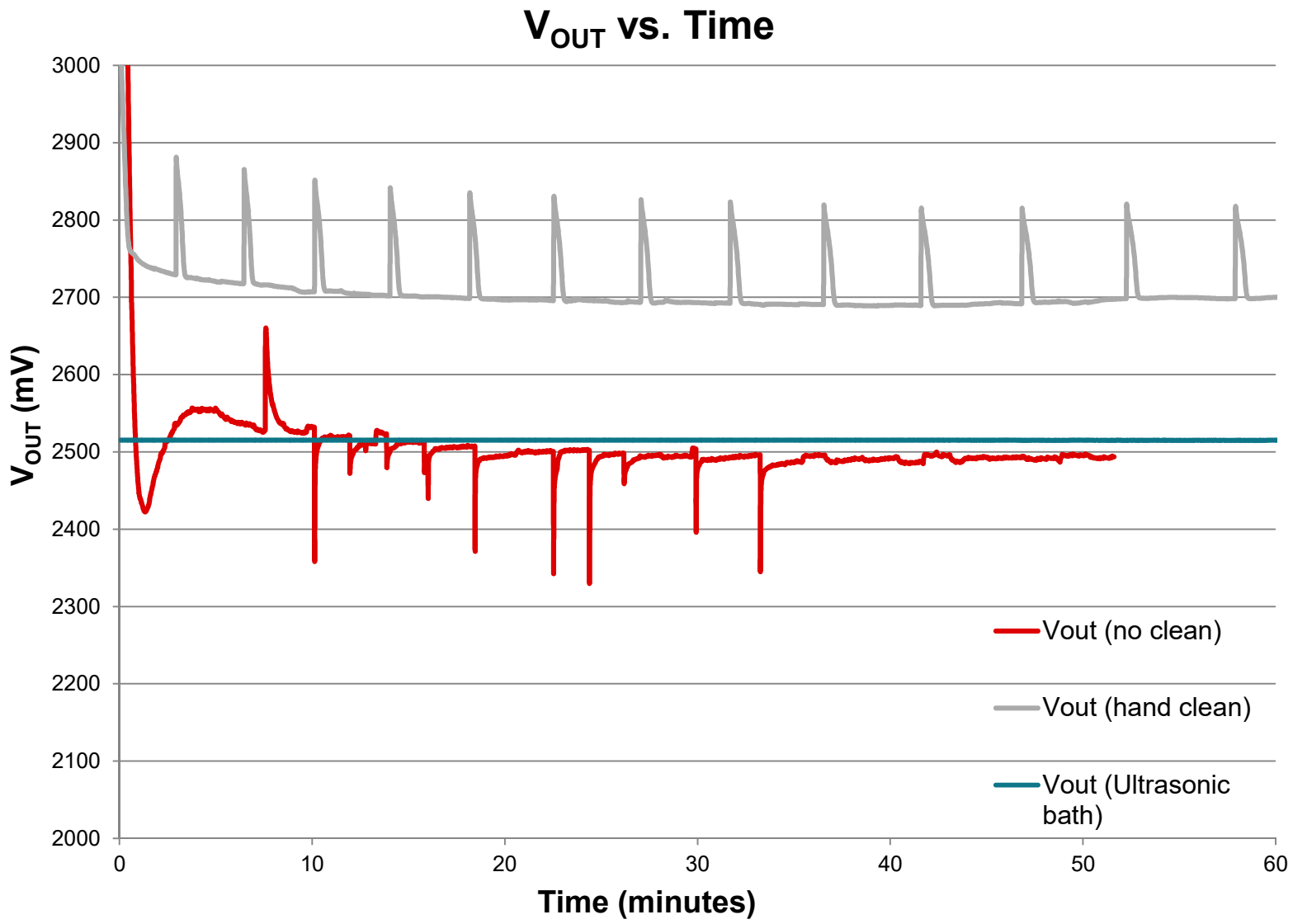


Area most sensitive
to flux contamination

INA333 Bridge Sensor Circuit Results



INA333 Bridge Sensor Circuit Results



Solder Flux – Conclusions & Recommendations

- Improper cleaning of solder flux can cause **huge** DC voltage errors!
  - These errors are random in nature and are nearly impossible to predict
- Use an Ultrasonic bath (or similar) for final cleaning of all hand-assembled or reworked PCBs
  - PCBs assembled by a contracted assembly house should already use suitable post-assembly cleaning methods
- Bake assembled and cleaned PCBs at slightly elevated temperature to remove any residual moisture
  - e.g. 70°C, 10 minutes
- Place guard rings around critical signal traces to reduce PCB surface leakage currents
  - See "Op Amp Precision Design: PCB Layout Techniques" for more information

Thank you for your time!