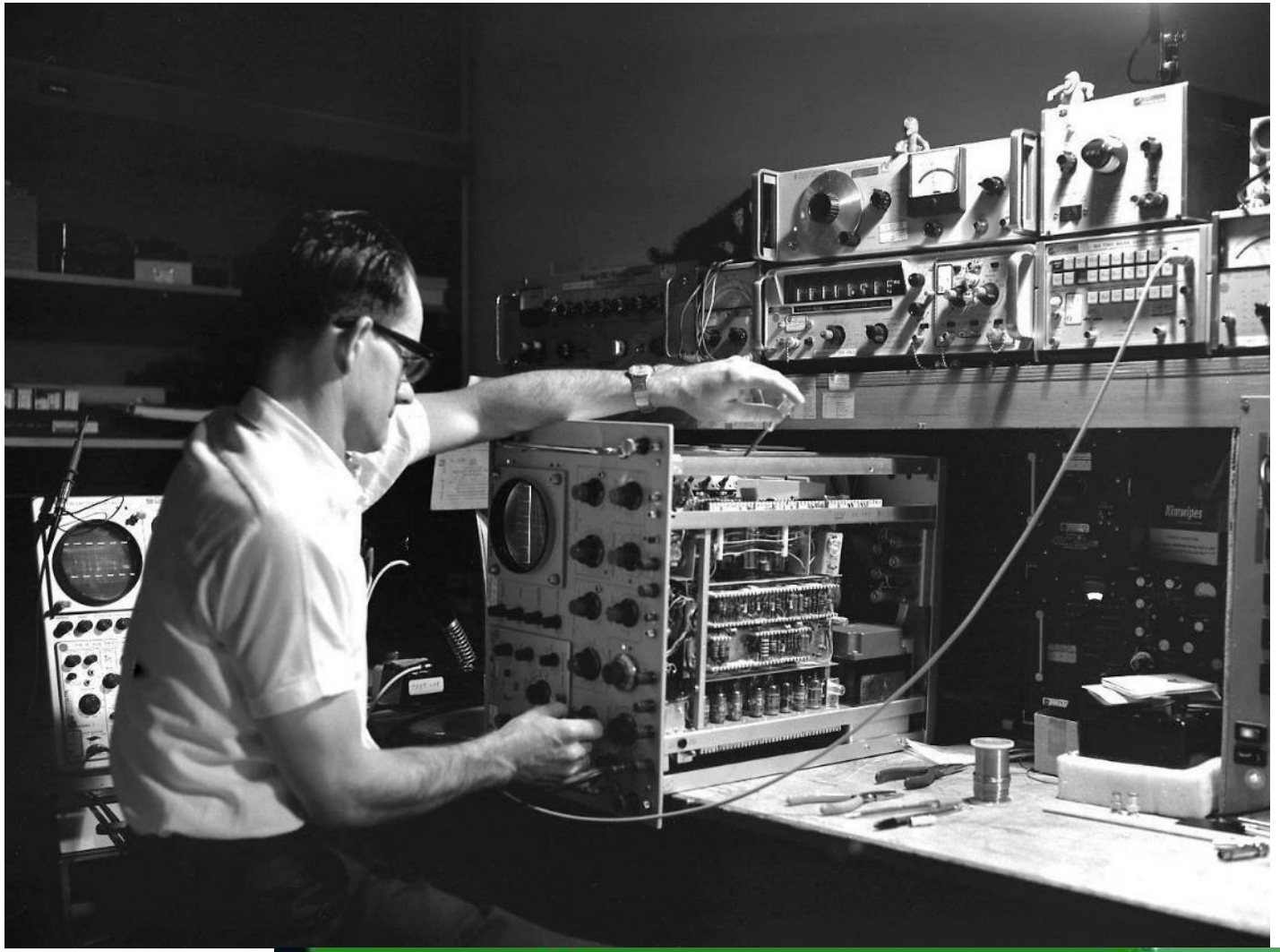
Faster time to market for your power conversion designs

JUNE 14TH

14 juni 2018
1931 Congrescentrum Den Bosch
POWER ELECTRONICS 2018

ANDREA VINCI
BUSINESS DEVELOPMENT EMEA
AUTOMOTIVE & POWER

T&M Power Electronics Suppliers

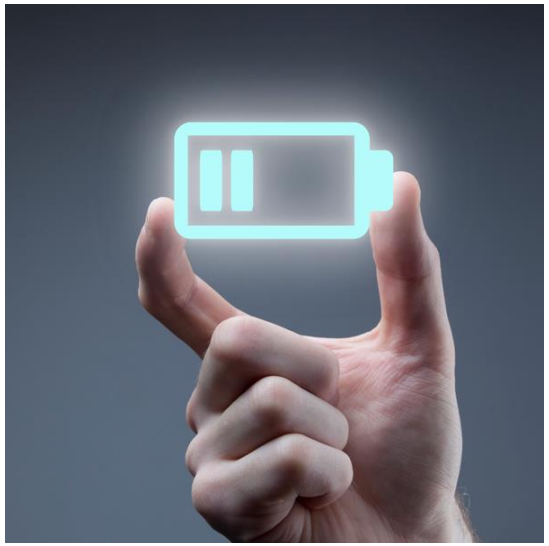


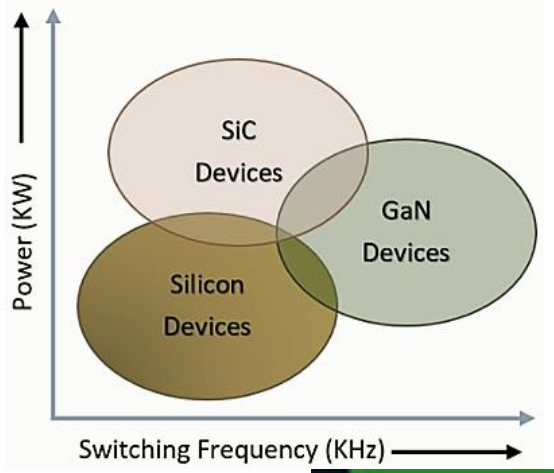
Tektronix®

KEITHLEY
A Tektronix Company

- Oscilloscopes
- (Power) Probes
- EMC solutions (spectrum analyzers)
- Power Supply
- Analog Signal sources
- Power Analyzers
- SMUs, DMMs, Electronic Loads, Battery simulators
- Parametric testing, Curve Tracers

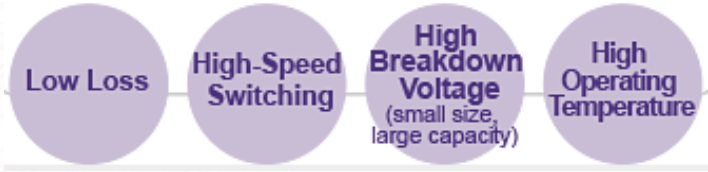
Enabling Power Efficiency





- Power Supply Design
- Electric vehicles and plug-in hybrids
- Lighting - LED
- Industrial motors
- Datacenters (UPS)
- Consumer Electronics
- Energy (supply, conversion, Grid Integration)
- Telecom
- Radars (Military)

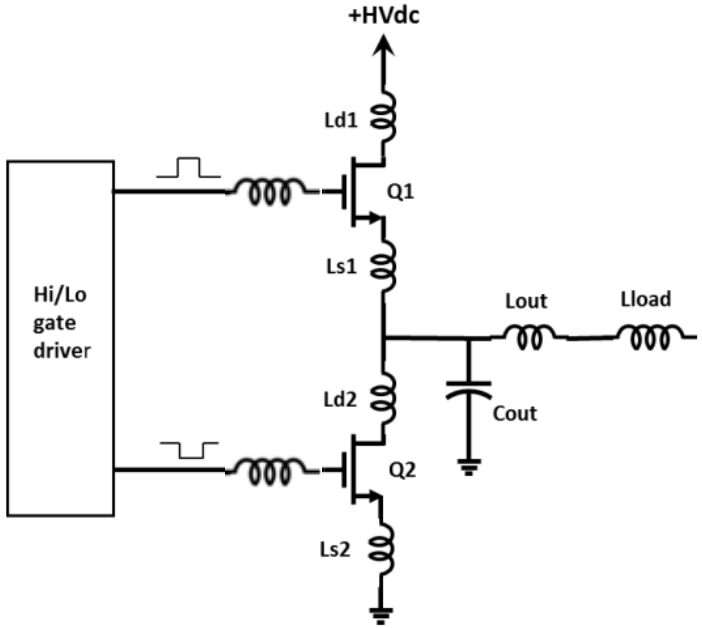
Your headaches



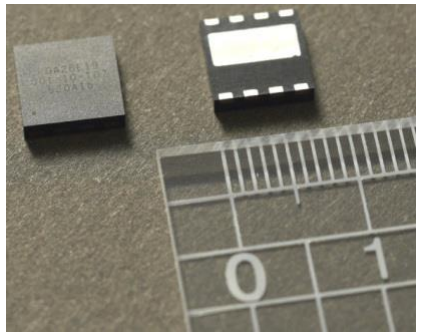
- Alternative packaging materials
- New designs, new architectures
- PCB layout
- Integration with existing systems
- Reliability
- Thermals
- $$$

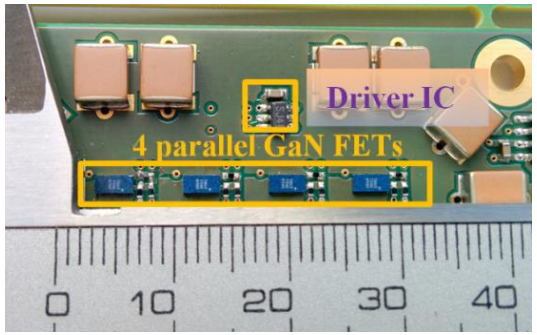
- Simulate & Measure

Design Challenges



- Drive circuit optimization
- Very low gate threshold voltage
- high side or floating side supply in half bridge configuration may oscillate (turn-on and turn-off inadvertently)
- "Miller effect"





- Need to measure fast dv/dt
- Need to reject common mode
- Need to accurately certify switching loss improvement
- Need to probe tiny things

Never forget

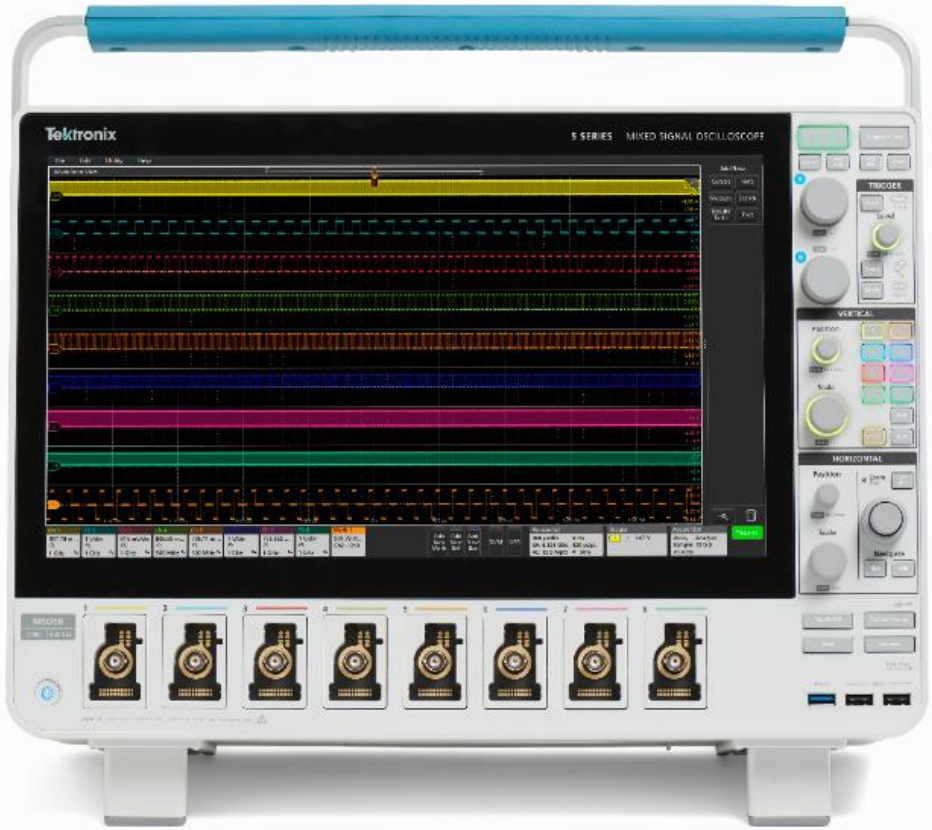
Accurate measurements rely on using suitable instruments (for that specific measurement)

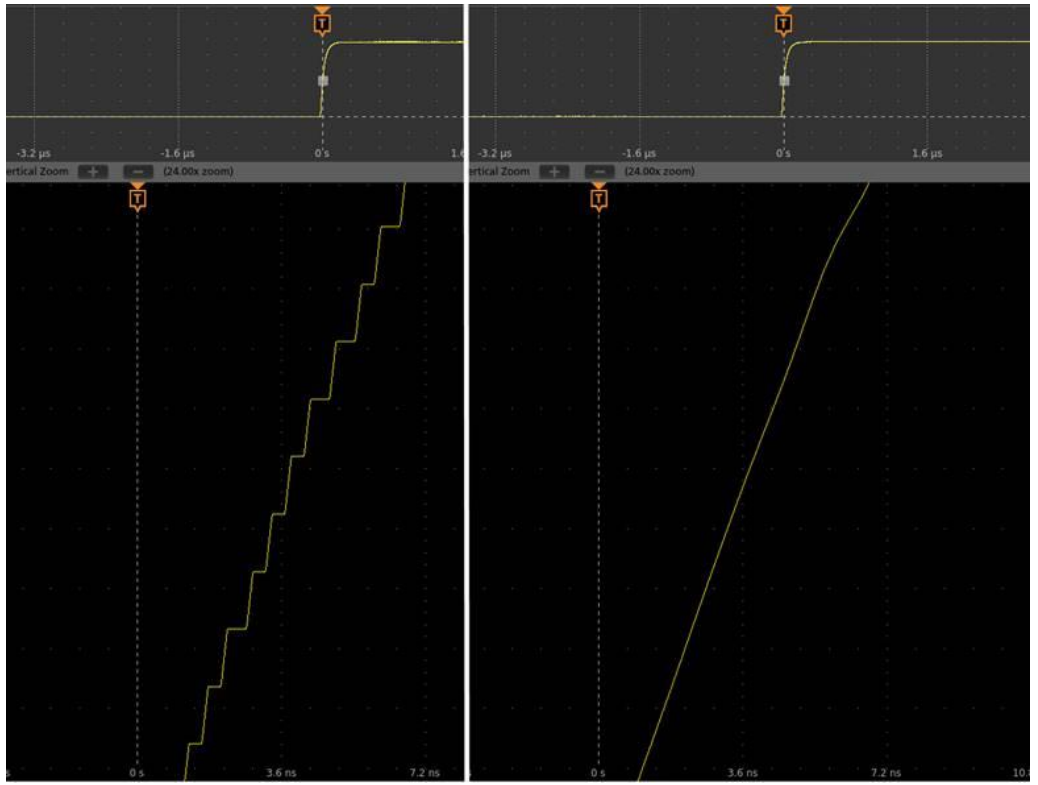
Instruments always influence measurements

Good T&M suppliers provide measurement consulting (not just fancy marketing specs)

Is the oscilloscope still a good tool?

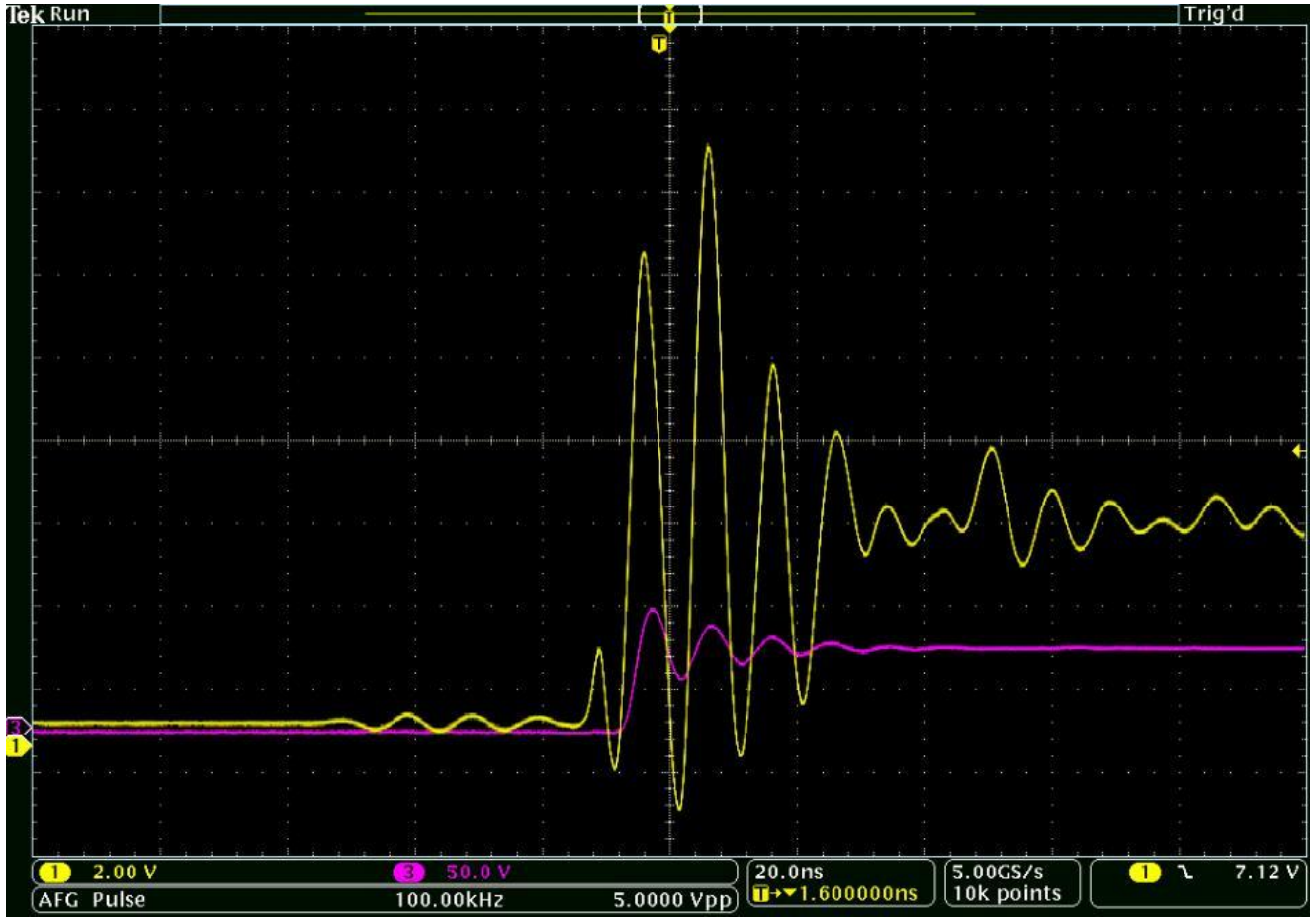
YES IT IS, BETTER THAN EVER



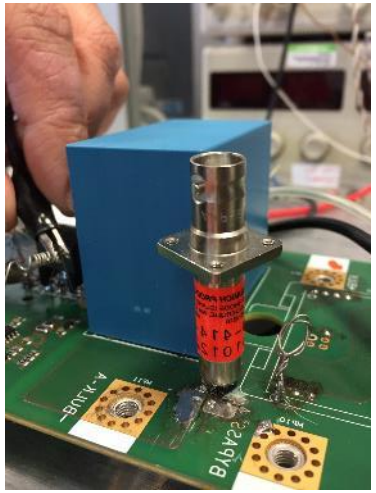


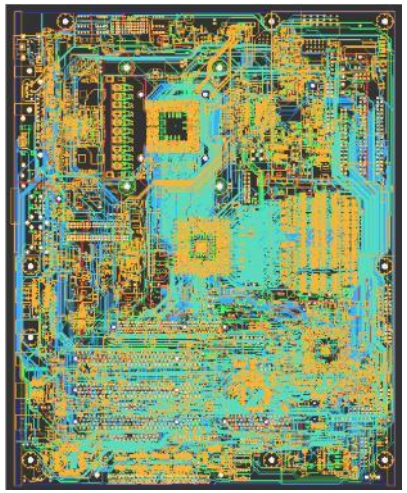
16x more digitizing levels on a 12-bit scope

How would you probe the gate of a wbg fast switching Mosfet?



Current measurements?



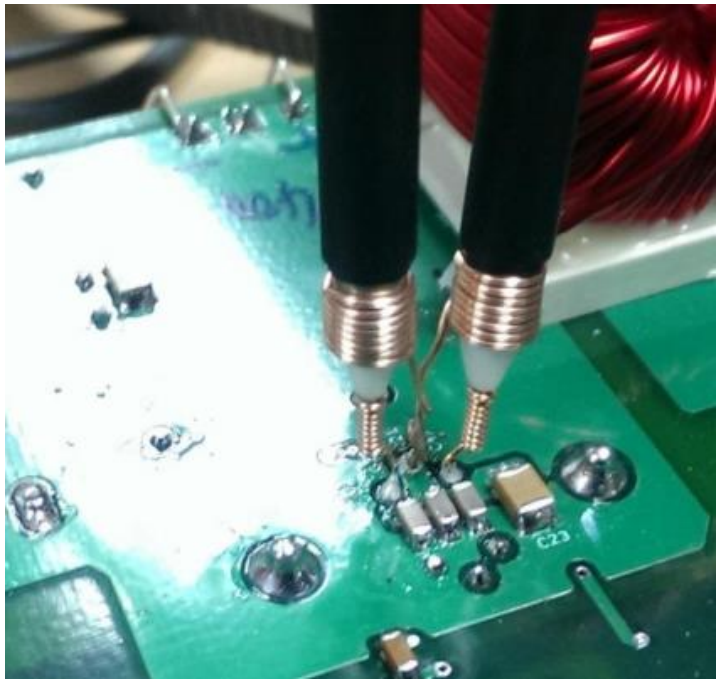


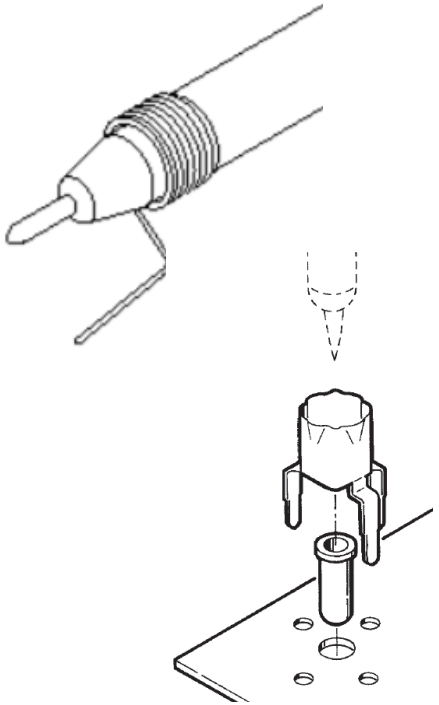
- Hall effect current probe (HECP)?
- Rogowski coil (RC)?
- Current shunt (CS)?

Keep Your Ground Leads Short

THE TEST POINT ISSUE

- Trade-off of convenience versus performance
- Smaller loop area = Lower inductance, lower noise, cleaner meas.



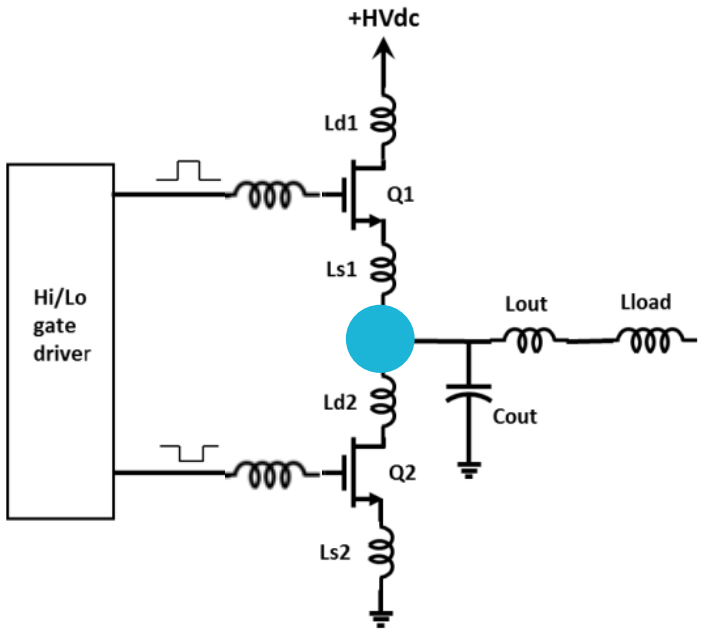


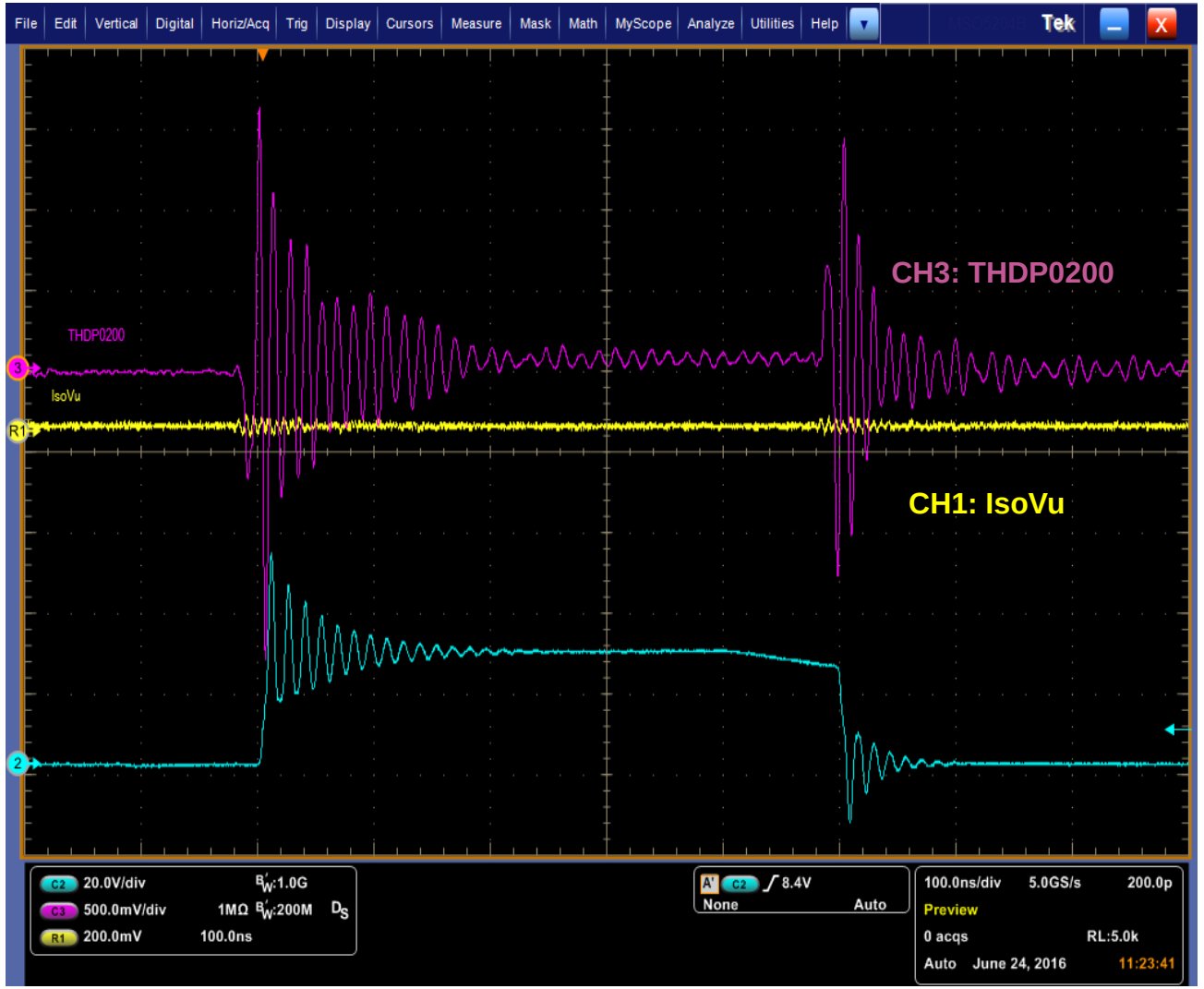
Complete, flexible, backward compatible

- World's best
  - Common Mode Rejection
  - Bandwidth
  - Input range
  - Flexibility

- Up to ±2,5kV input range
- Up to 60kV CM
- Up to 1GHz (<350ps rise time)
- Up to 80dB CMRR @1GHz

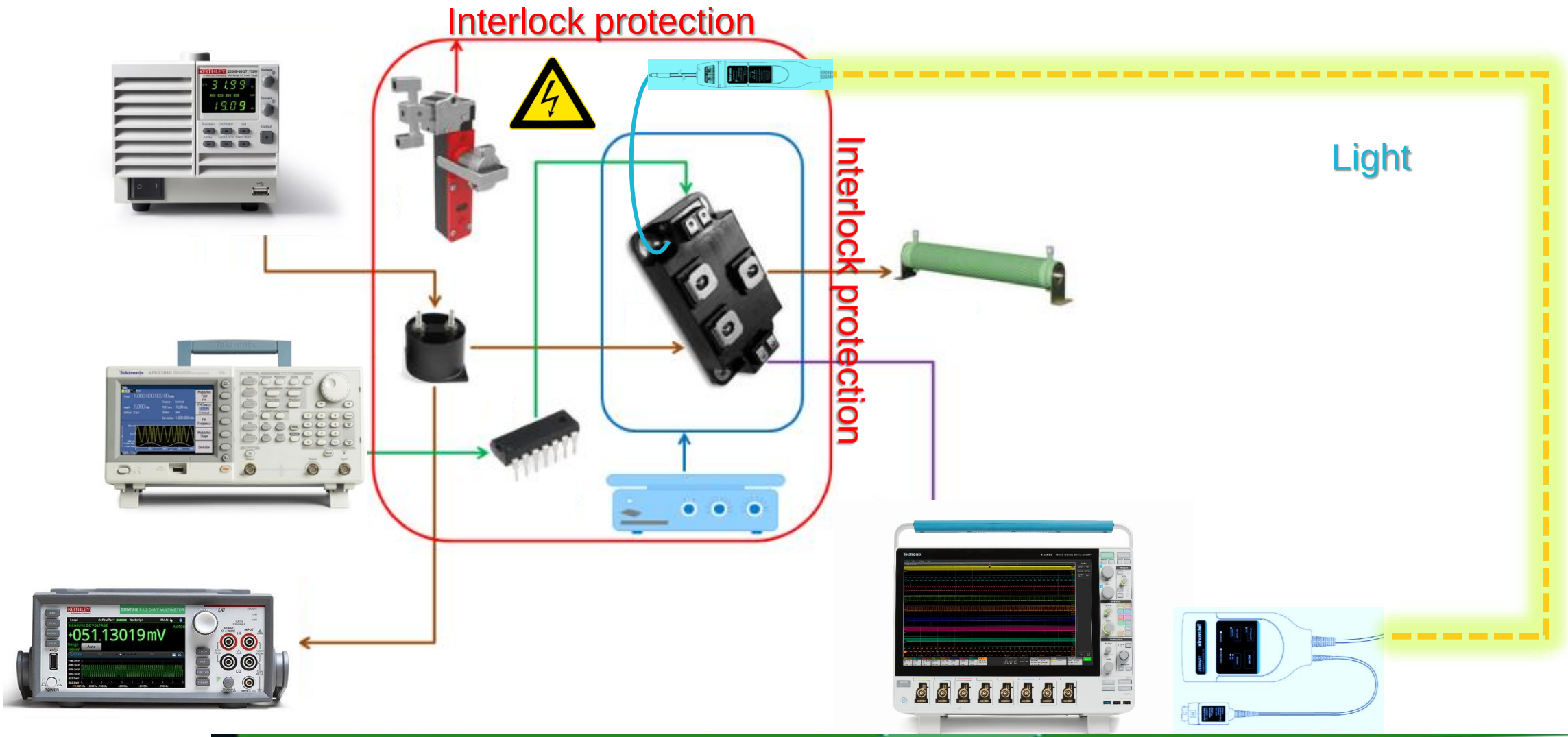
Influence of CMRR?





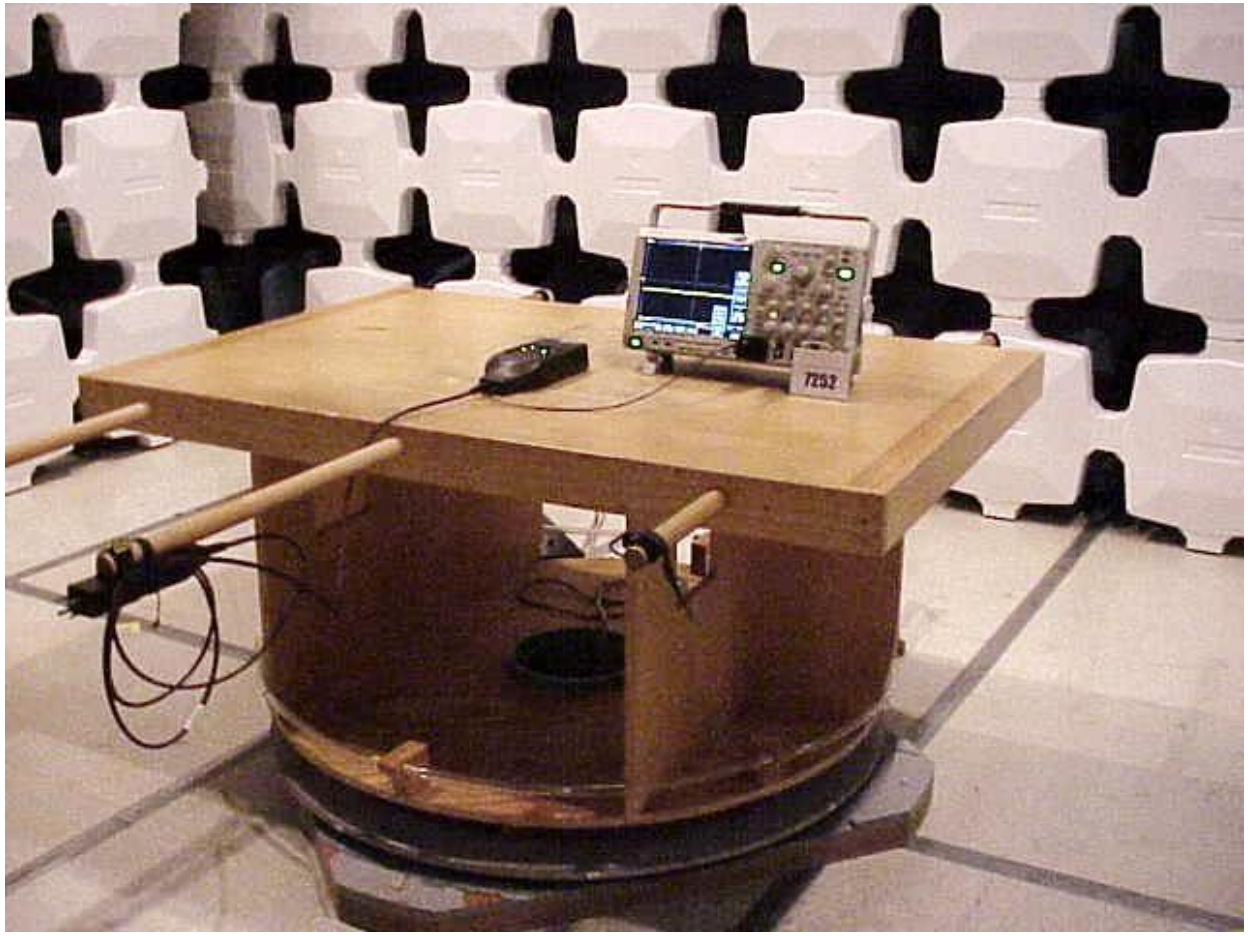
- Probing to floating point with shorted differential probe

Safety: away from dangerous high voltages



ESD Test Setup

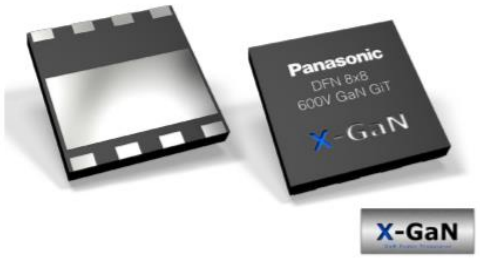
ROBUST TO ESD, PERFECT FOR TLP, CMTI VERIFICATION, NOT SUSCEPTIBLE TO RADIATED SIGNALS

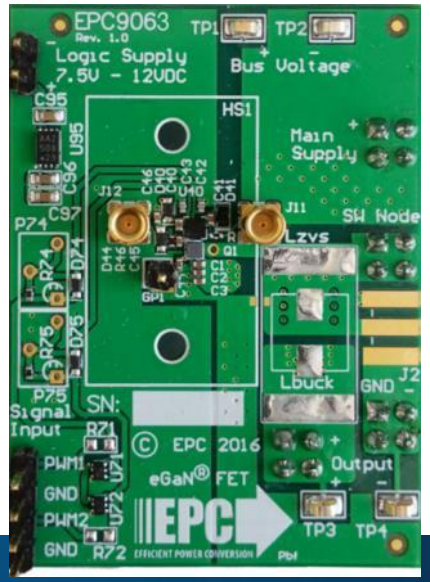


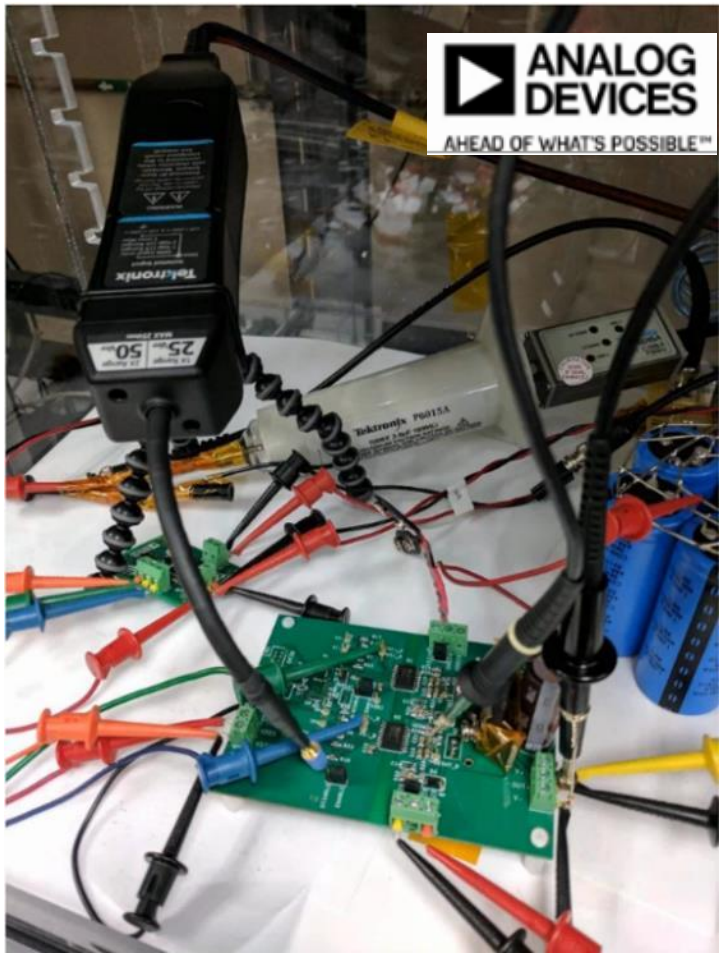
Widely adopted by Industry

DESIGNERS ARE TURNING TO ISOVU TO REDUCE TIME TO MARKET AND VERIFY CRITICAL SPECIFICATIONS

Tektronix IsoVu Measurement Systems Helps Panasonic Semiconductor Solutions Significantly Shorten Development Time for New GaN Device







Accurately Measuring High Speed GaN Transistors

EPC
EFFICIENT POWER CONVERSION

14 juni 2018
1931 Congrescentrum Den Bosch

POWER ELECTRONICS 2018

Come visit us at booth:

Thank you

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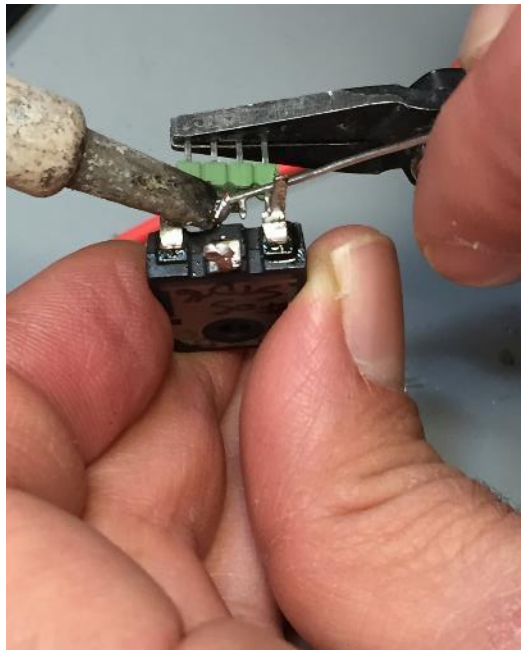
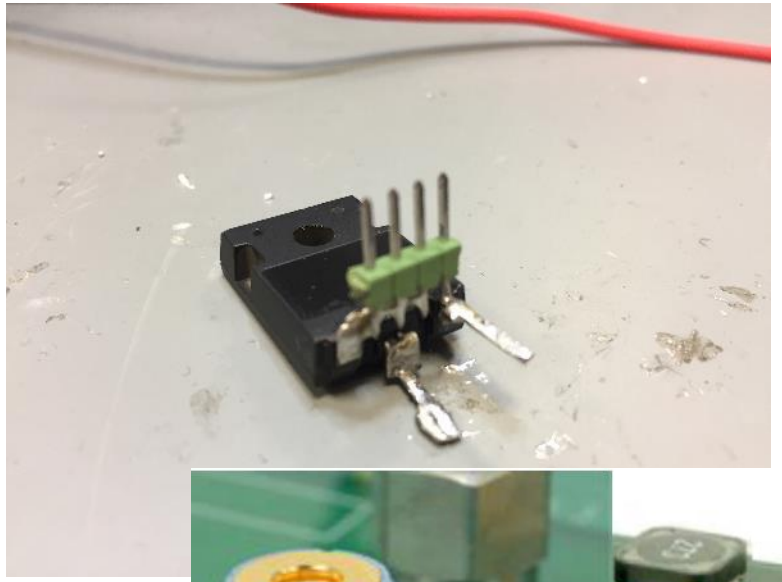
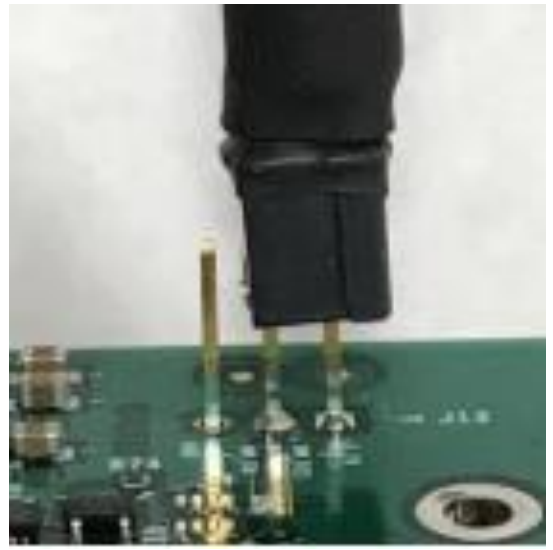
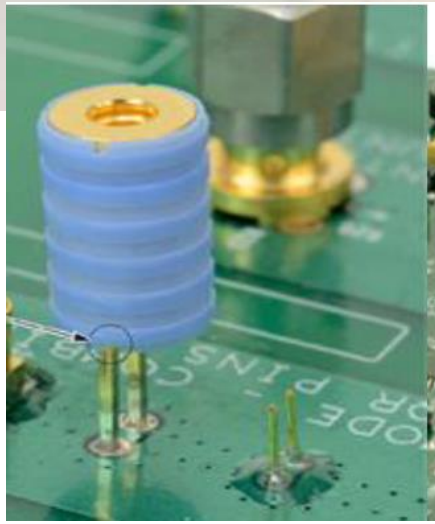
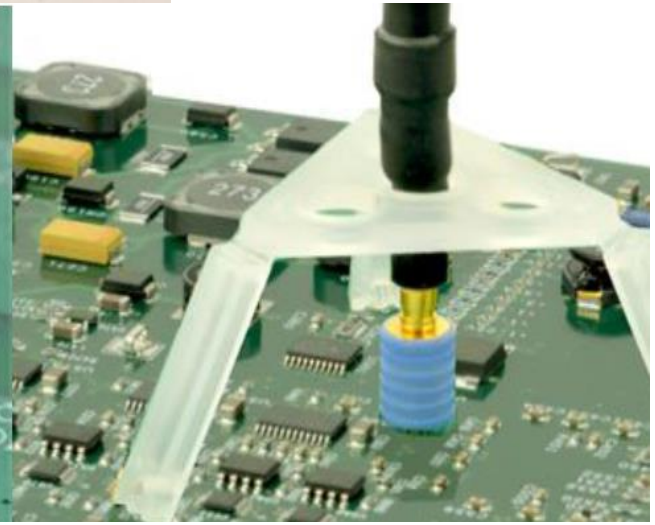
Simply different, starting from the connector

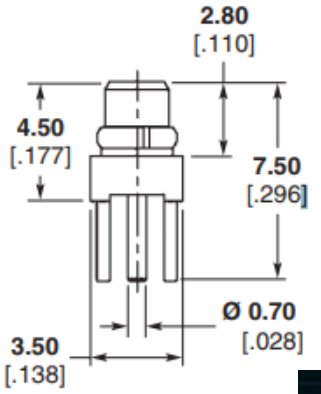


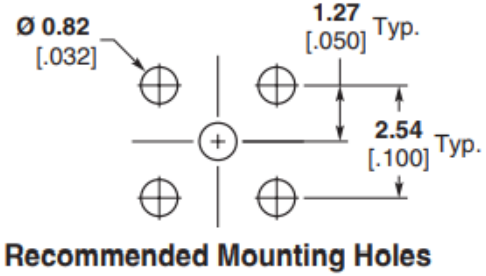












Recommended Mounting Holes