



Status of Opto-Board Production

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Nov 6, 2019



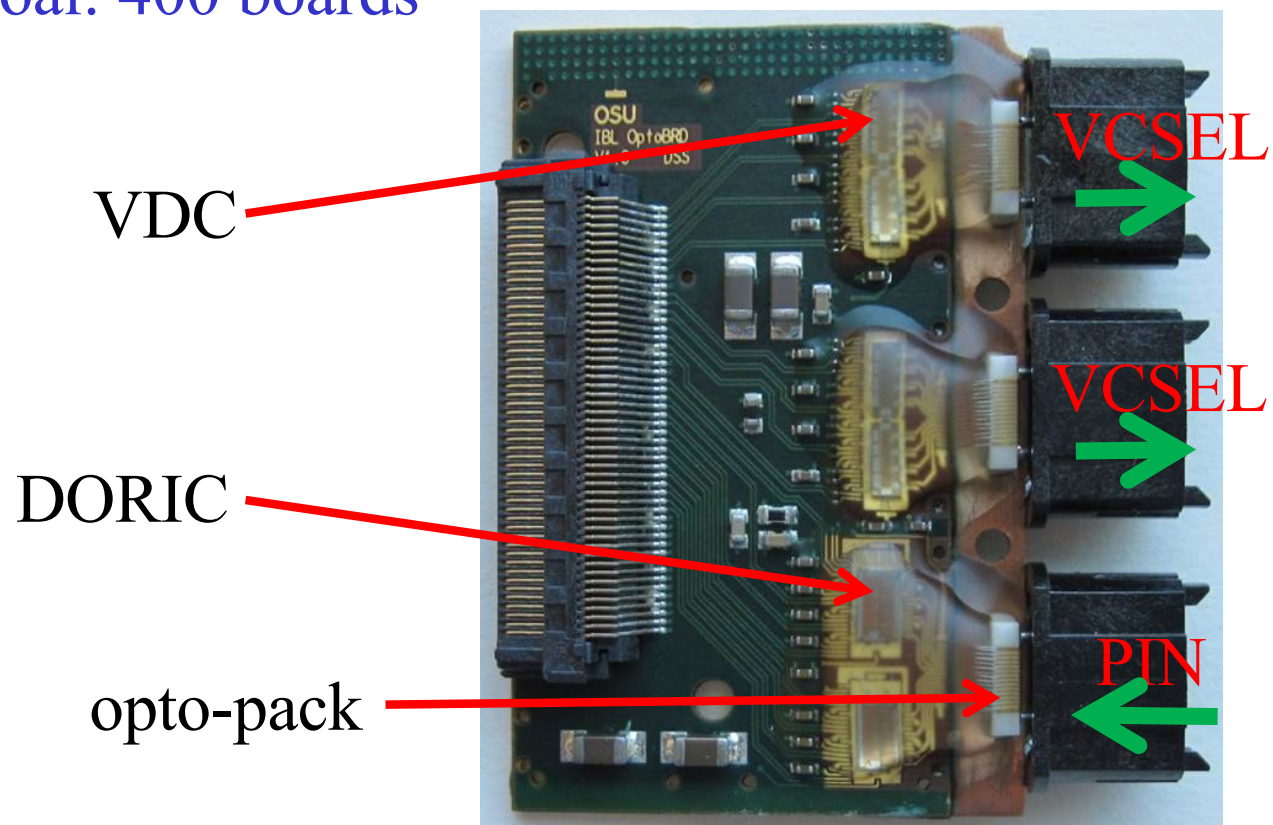
Outline

- Introduction
- Opto-pack bases
- VCSEL/PIN arrays
- Opto-pack burn-in
- ASIC probing
- Opto-board PCB
- Opto-board QA
- Summary



Opto-Board

- needed: 272 boards
- goal: 400 boards





Status of Opto-Pack Bases

- traces on opto-pack bases in 2018 order were over etched
- vendor claims to understand the problem
- blistering in gold during cleaning process
 - vendor in contact with BeO supplier
 - will try high temp clean air fire at 1500 C



Status of VCSEL/PIN Delivery

- 300 VCSEL arrays from II-VI delivered
 - ULM can't give a delivery date due to yield problem
- 700 additional VCSEL arrays ordered
- PIN arrays ship date: Nov 7th



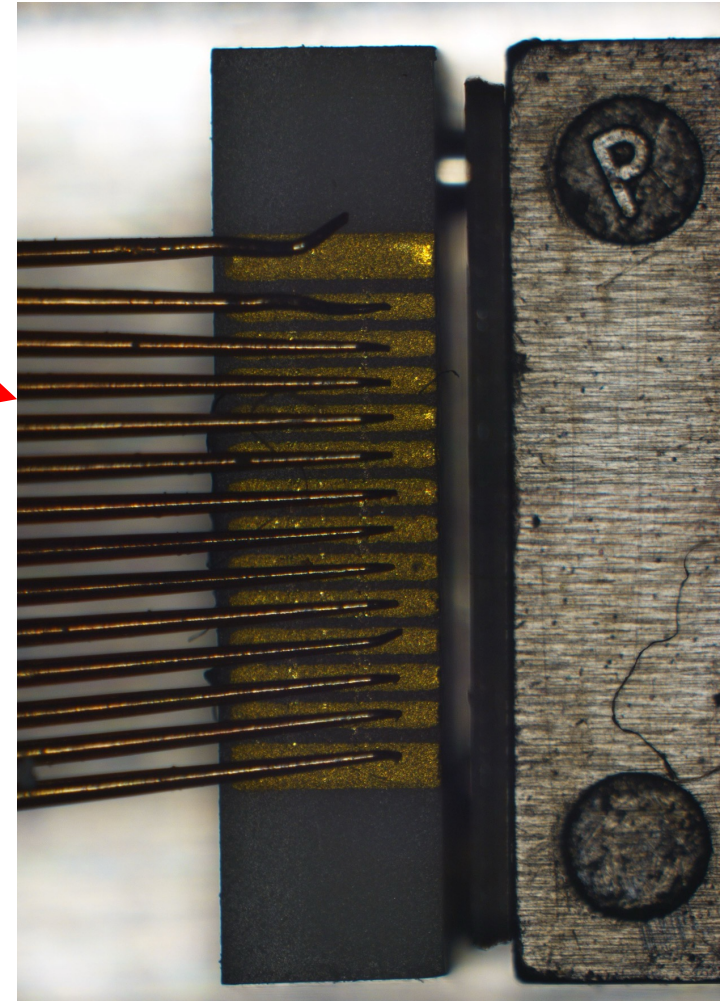
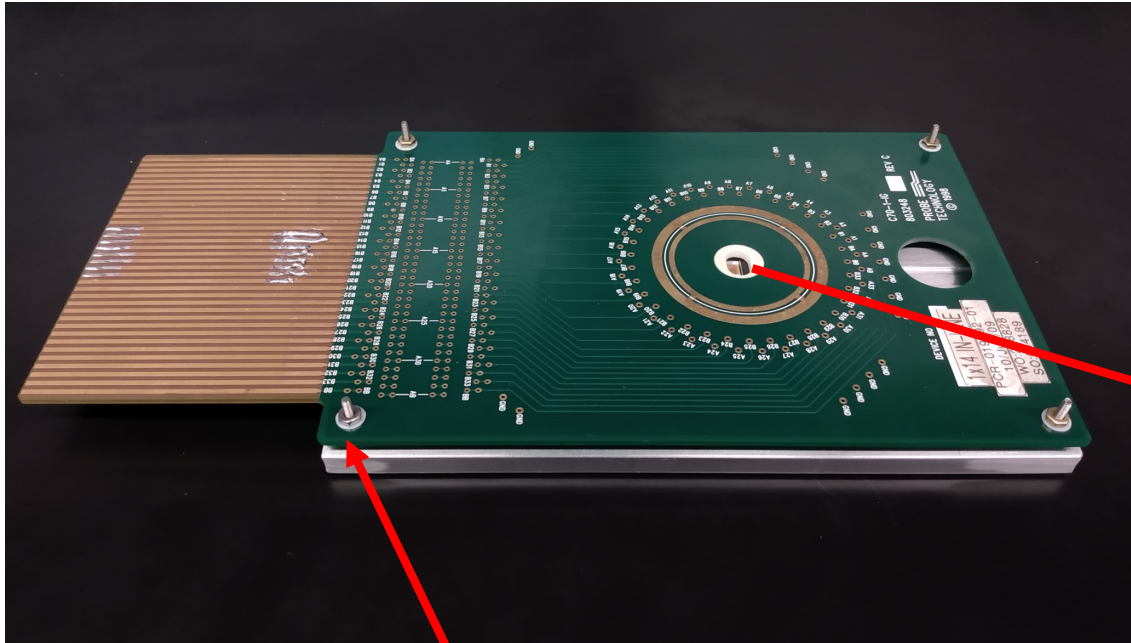
Opto-Pack Burn-In

- use II-IV VCSEL array in optical package
- II-IV statement: there is a need for a burn-in
- recommend 24 hours of burn-in at 100 C at 10 mA
 - will burn-in for 69 hours at 80 C at 10 mA
- recommended acceptable changes:
 - optical power: -15 to +5% at 6 mA
 - threshold current: -5 to +10%
 - forward voltage increase: < 40 mV at 6 mA



Test of Opto-Pack Burn-In Concept

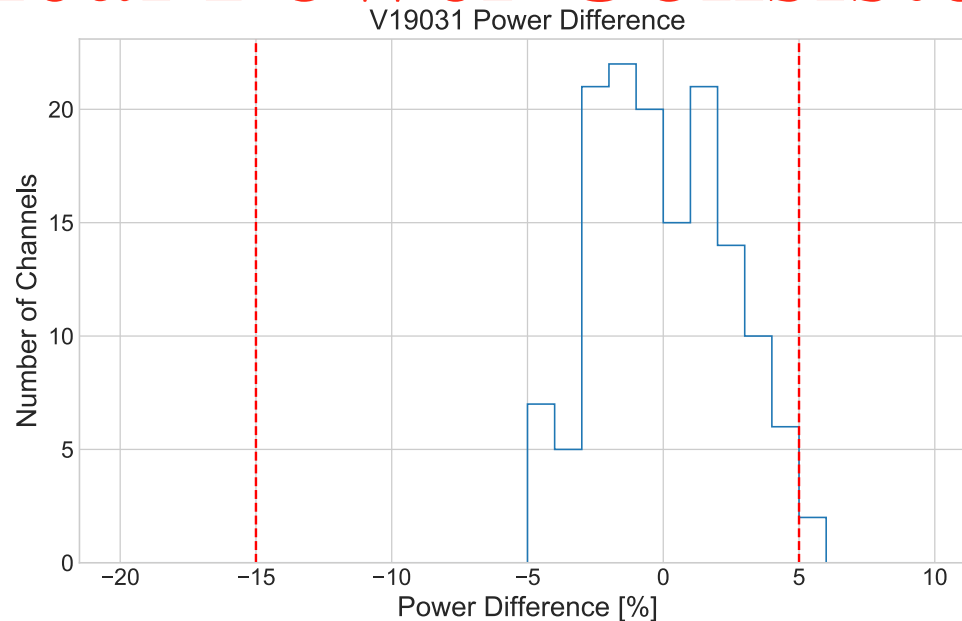
- challenge: electrical contact with fine traces of 250 μm spacing
- jig successfully tested using a broken probe card used in opto-pack QA



- PCB has 4 slightly oversize holes
- springs underneath PCB to ensure probe tips are slightly above traces during alignment



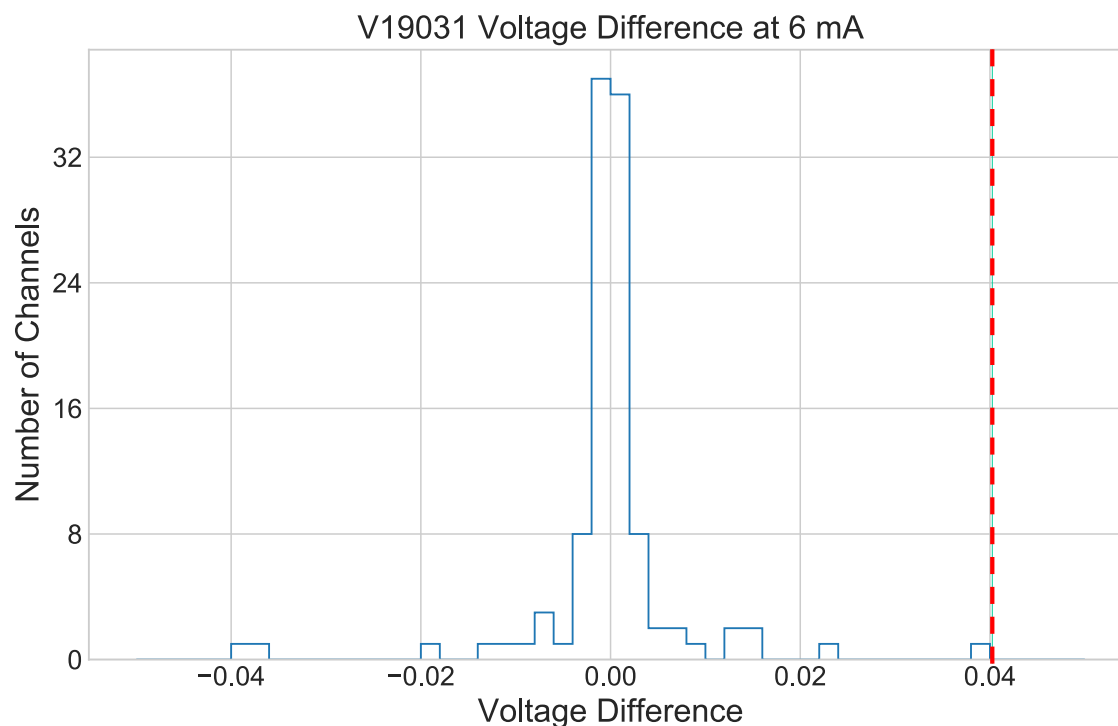
Optical Power Consistency Test



- VCSEL power coupled to a fiber will fluctuate between measurements due to mode hopping and slightly different coupling
 - standard procedure is to use large area PIN diode
 - test consistency of measurements with repeated remounting to avoid development of setup for large area PIN diode
 - 2 out 130 measurements just above threshold
- present QA system acceptable for burn-in test



Forward Voltage Consistency Test



- No failure in 130 measurements
- present QA system acceptable for burn-in test



Opto-Pack Burn-In To-Do List

- design PCB to supply 10 mA to all VCSELs
- 24 VCSEL opto-packs needed per week
 - order 36 probe cards
 - machine 36 aluminum jigs
 - design/machine a rack to hold 36 jigs
- pushing to get everything done in 3 weeks



DORIC/VDC Probing

- two wafers diced
 - PO for dicing two more wafers placed
 - will have two spare un-diced wafers
- use automatic probe station with pattern recognition instead of manual probe station used previously
- new VDC probe card ordered
- VDC probe card PCB designed/ordered
- old DORIC probe card sent for repair
- new probe station controller PC power supply ordered



Status of Opto-Board PCB

- 150 PCBs were delivered but some traces were over etched
- Cirexx claims that the etching script has been fixed
- expect replacement batch next week
- order for passive components mounting has been placed
- might have PCBs with passive components mounted in 2 weeks



Opto-Board QA

- need two QA systems to have enough through-put as in 2013/14 production
- one environmental chamber (refrigerator/oven) has broken refrigeration
 - service call has been placed
- one QA system is working but needs some software update
- need to get the other QA system working



Conclusion

- VCSEL procurement problem solved
- new problem in production of opto-pack bases at vendor
- VCSEL opto-pack burn-in is feasible
- significant amount of work remains to launch production on Dec 1st