

# New Results on Opto-Packs

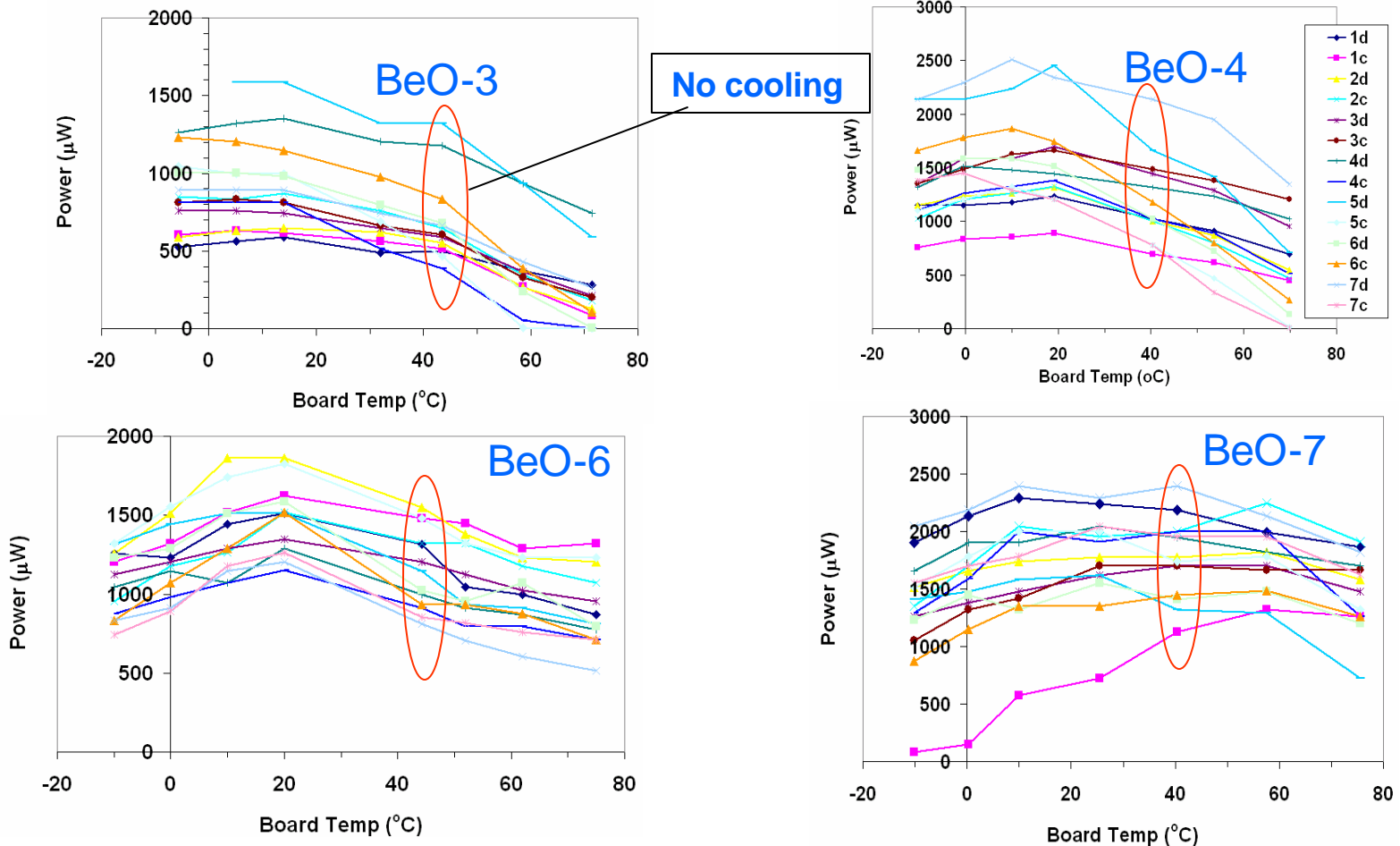
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February 17, 2004

K. Arms, K.K. Gan, M.O. Johnson, H.P. Kagan, R.D. Kass, A. Rahimi,  
C. Rush, R. Ter-Antonian, M. Zoeller  
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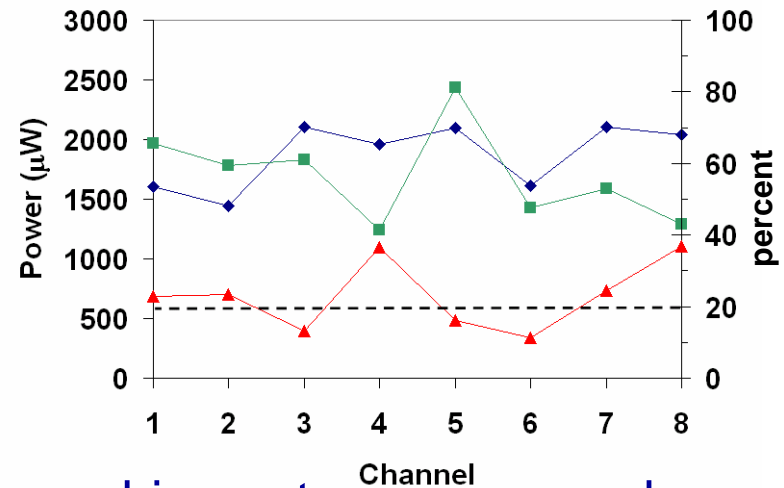
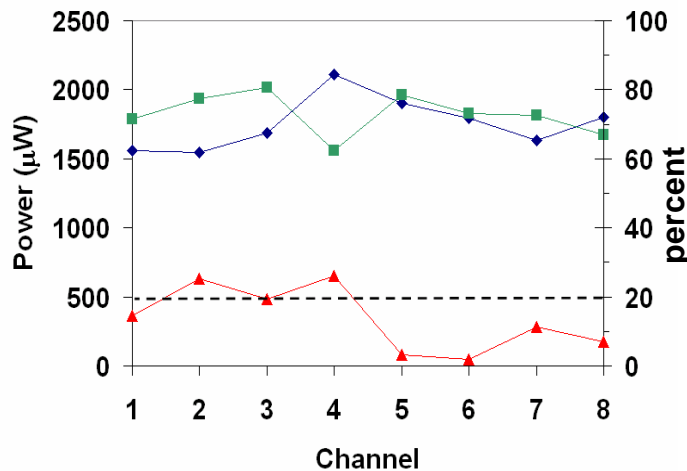
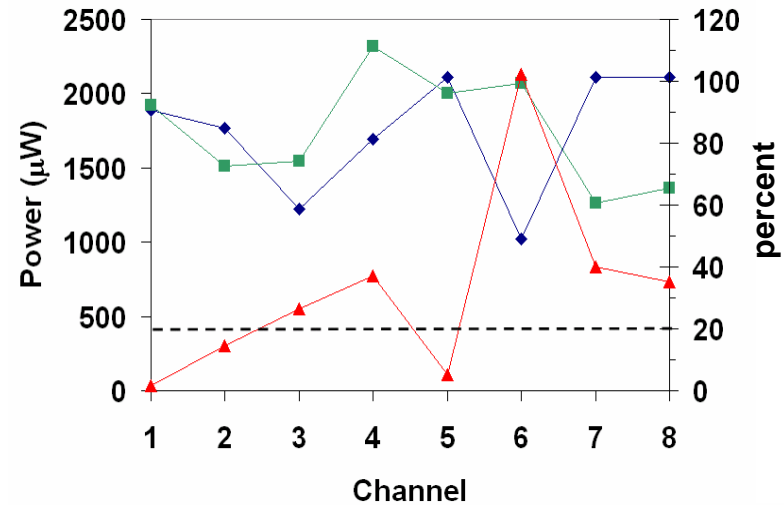
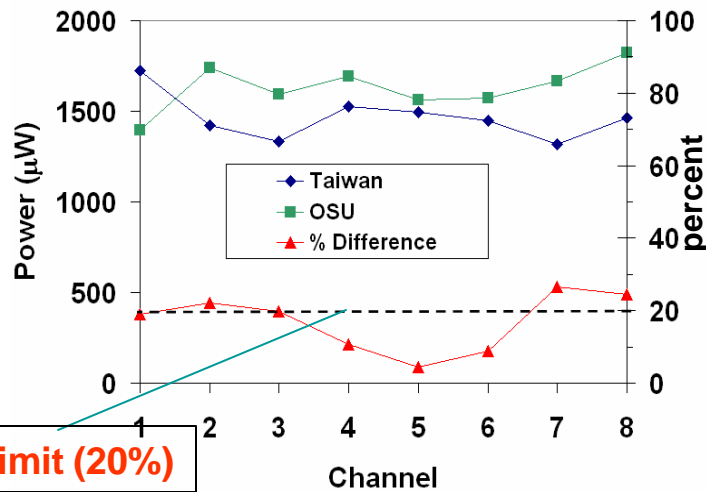
P. Buchholz, A. Coilox, M. Holder, S. Nderitu, A. Niculae, M. Ziolkowski  
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# Opto-board Power vs. Temperature



- BeO-3 and 4 power decrease significantly with higher board temperature
  - Both boards were irradiated, but do not have similar data from before the irradiation to compare
- BeO-6 and 7 are less sensitive to change in board temperature
  - Channel 1c in BeO-7 very irregular
- Favorable optical power at  $\sim 10 < T_{\text{board}} < 30^{\circ}\text{C}$  or  $\sim -6 < T_{\text{ambient}} < 16^{\circ}\text{C}$

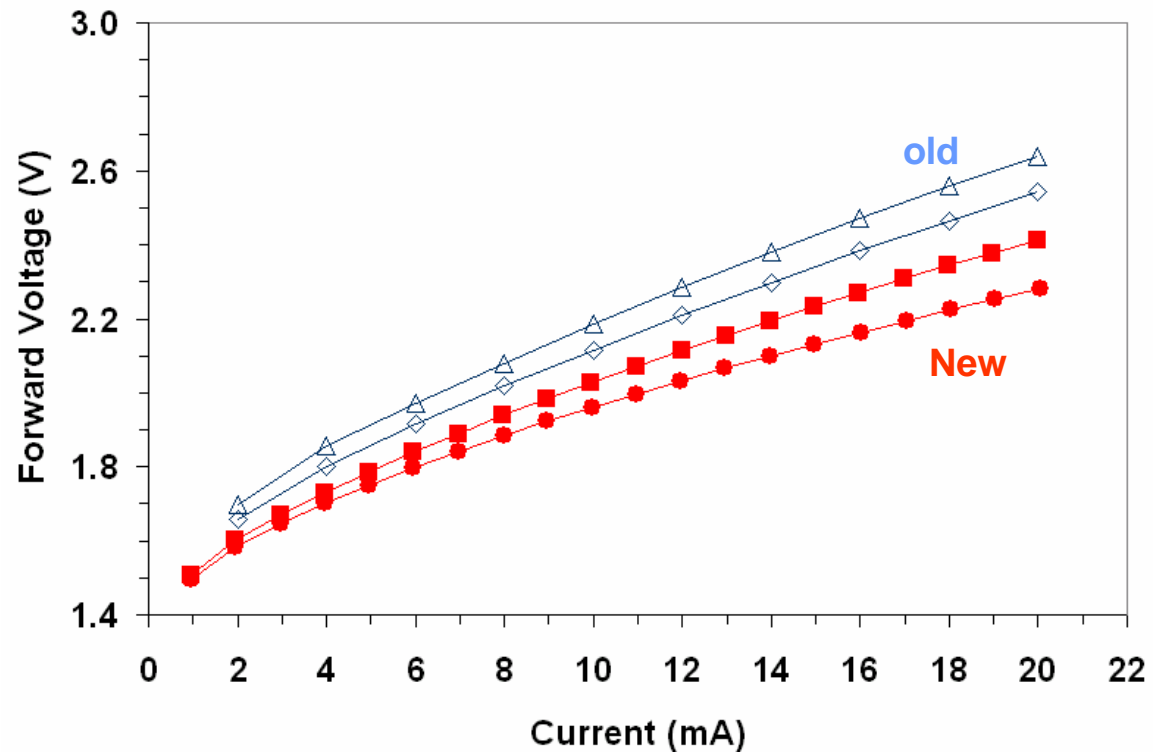
# Taiwan vs. OSU Measurements of Optical Power



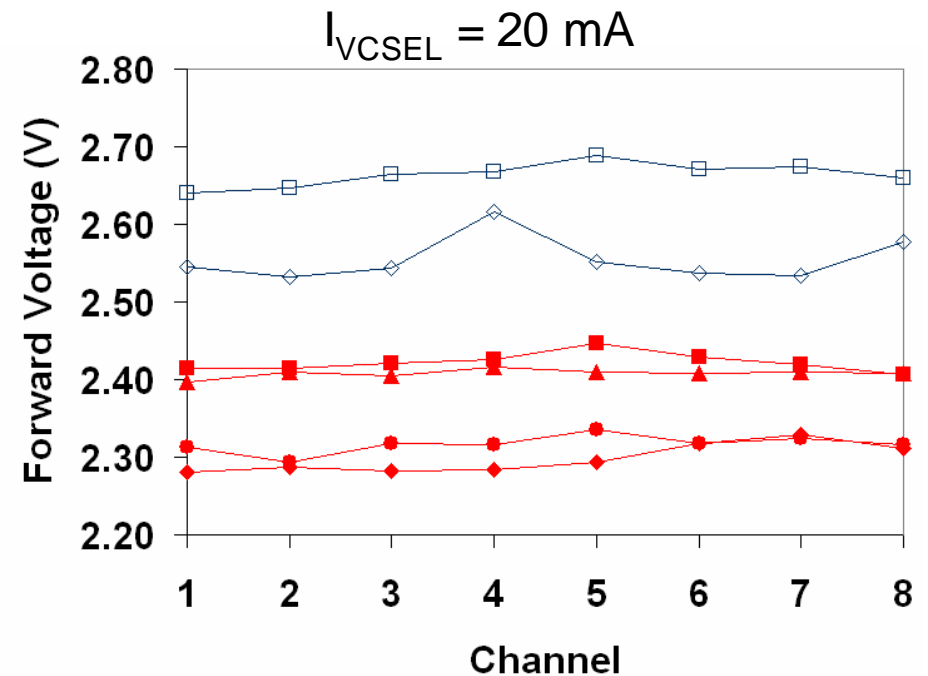
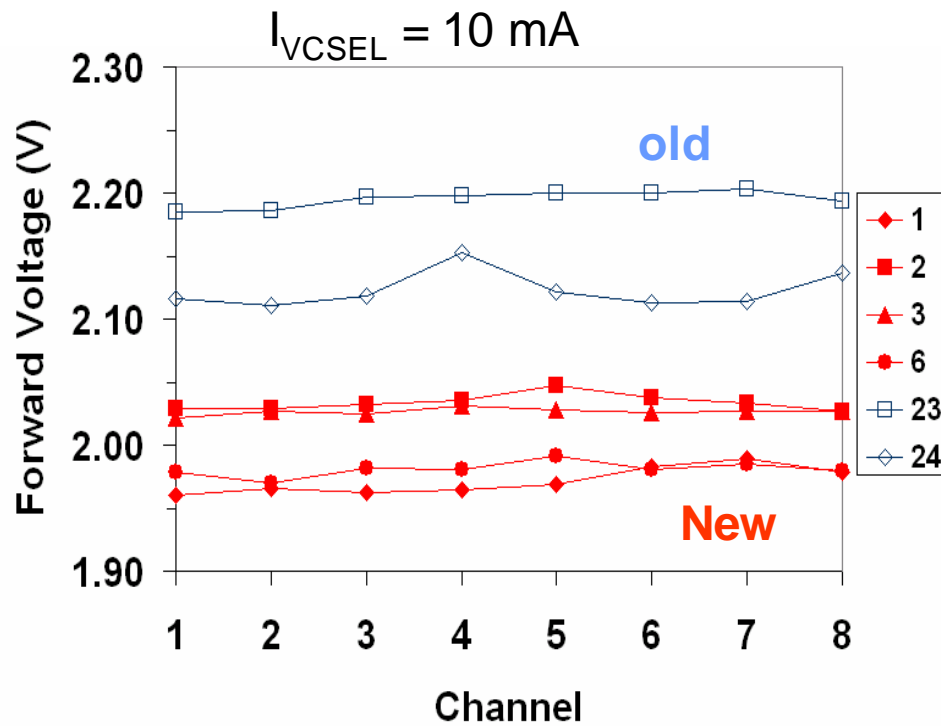
- Four opto-pack power from recent Taiwan shipment are compared
  - Larger than 20% difference between OSU and Taiwan measurements in several channels
  - Power > 1 mW
  - Propose criterion: < 40% difference or > 1 mW

# Lower VCSEL Forward Voltage

- Example of IV curves are shown with new and old VCSELs
  - Expect higher VCSEL drive current in the new opto-packs

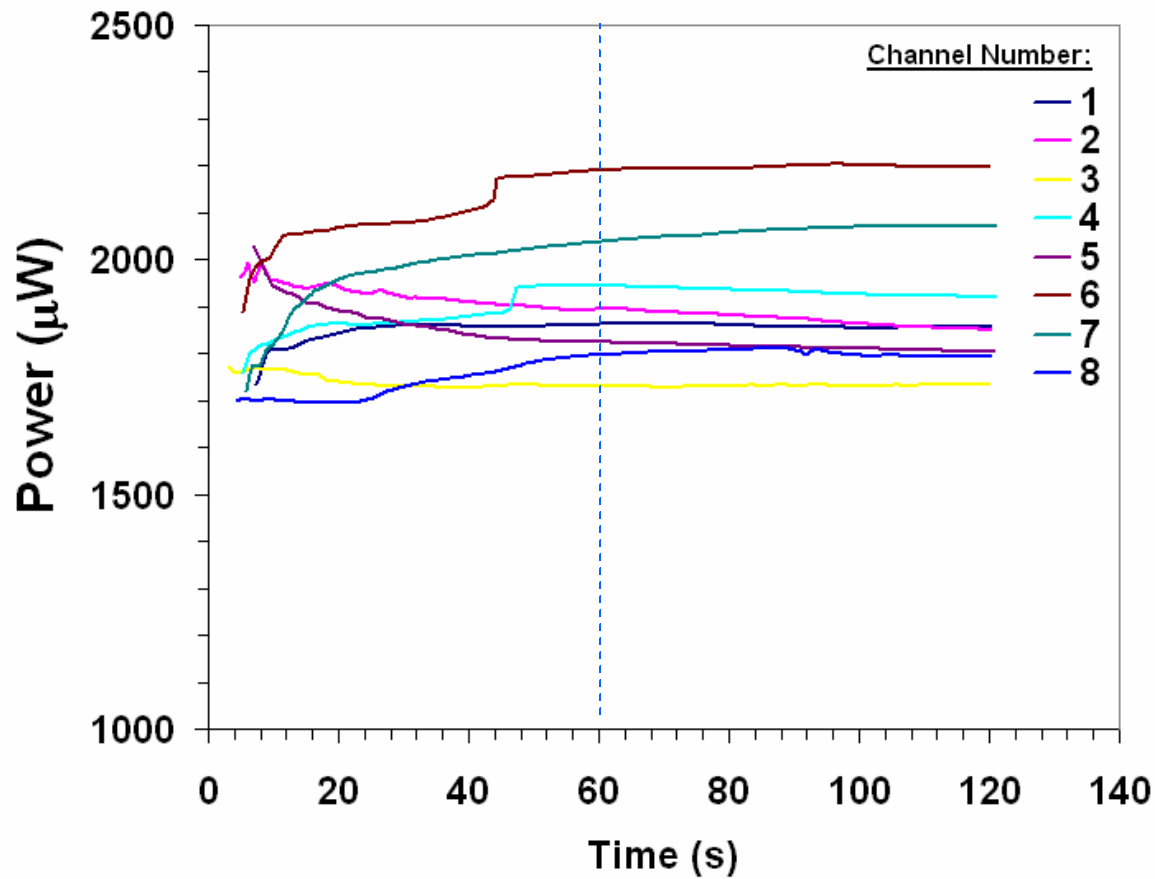


# Lower VCSEL Forward Voltage



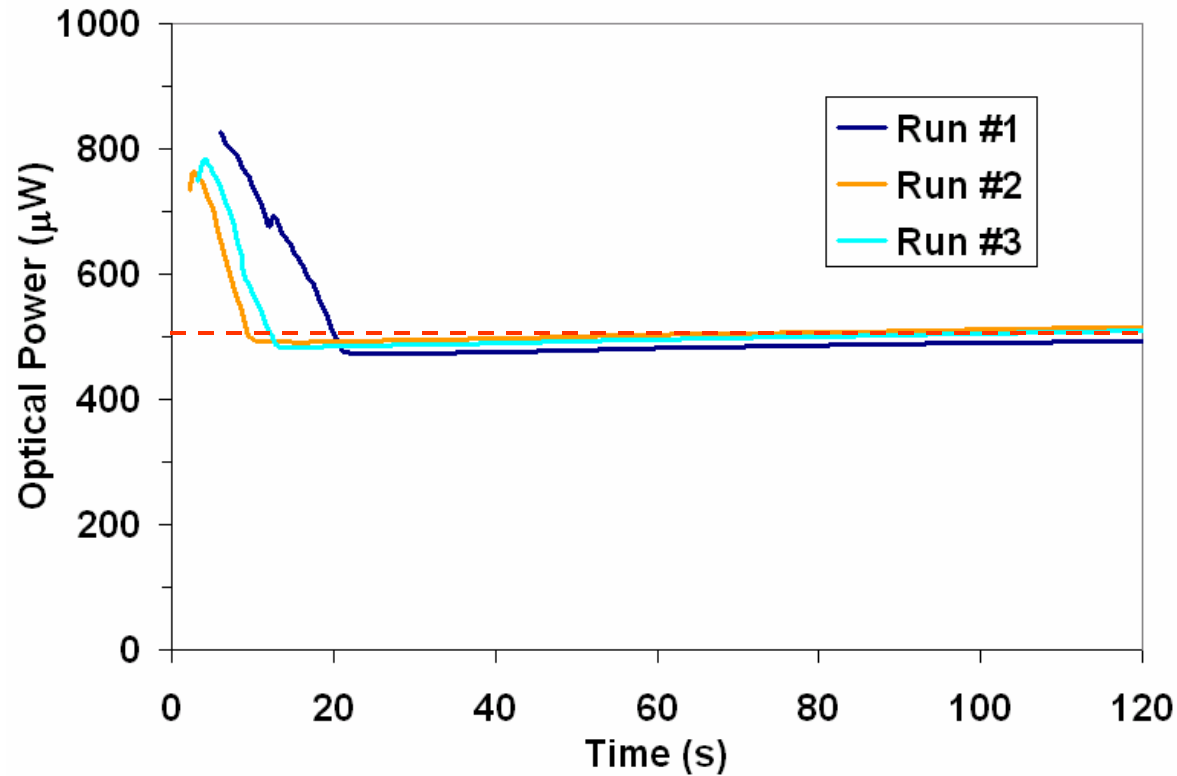
- Measurement of four new opto-packs from Taiwan are compared with two opto-packs obtained a few months ago
- All channels in new opto-packs show lower  $V_{VCSEL}$ 
  - ~ 150 mV lower at 10 mA
  - ~ 200 mV lower at 20 mA

# Power vs. Time



- A typical power vs time trend is shown here
  - VCSEL current of 10 mA
  - Some variation in VCSEL power
  - Power settles to a steady state after ~1 minute of running
  - Need more studies

# VCSEL Power vs. Time



- Power decreases by ~40% after ~16 sec. of running in channel 6 of opto-pack 4
  - This VCSEL nearly fails the QA requirement of  $> 500 \mu\text{W}$
  - This problem was not discovered by standard VCSEL characterization procedures
  - Need to monitor power vs. time to assure opto-pack quality

# Summary

- Measured Power vs.  $T_{\text{board}}$  in two additional boards
  - Results consistent with favorable optical power at ( $\sim 10 < T_{\text{board}} < \sim 30$ ) °C
- The difference in Taiwan vs. OSU measurements of optical power are larger than 20% for many channels
  - Propose criterion:  $< 40\%$  difference or  $> 1$  mW
- New opto-packs have lower forward voltage
  - Expect larger VCSEL drive current
- VCSEL power in one channel decreases with time by  $\sim 40\%$ , nearly fails QA
  - Need to monitor power vs. time to assure VCSEL integrity before mounting on the optoboard