



Update on DPTS temperature studies

New insights on the energy conversion factor

Conversion factor vs temperature

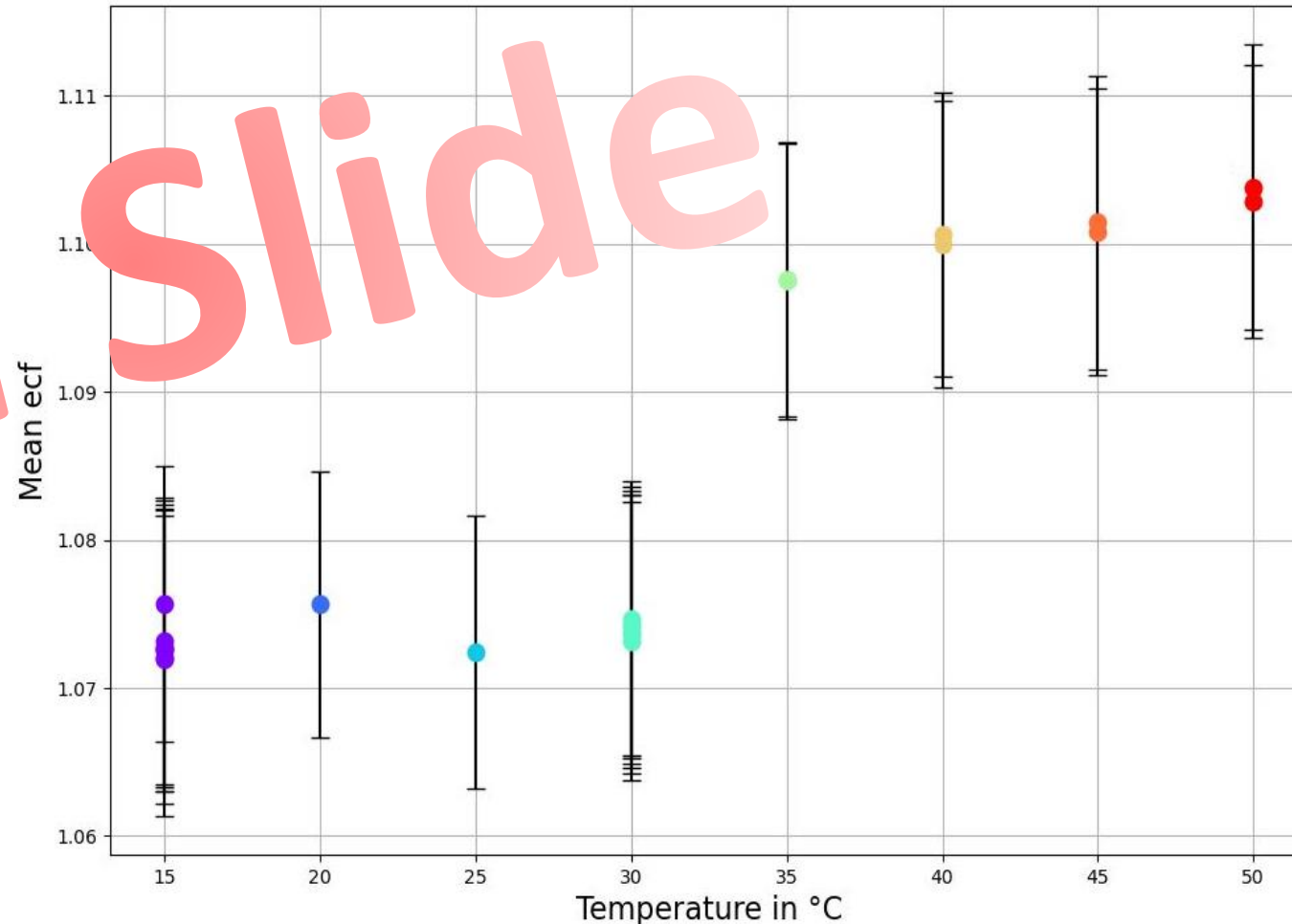


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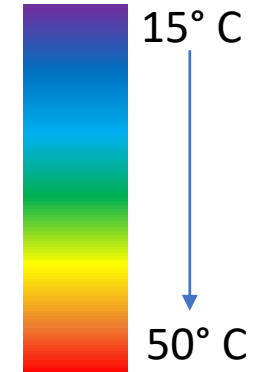
Mean Energy Calibration Factor vs Temperature

- Big Jump between 30°C and 35°C

Old Slide



LBNL Setup
DPTSXW22B33
wafer: 22
chip: 33
version: X
split: 4 (opt.)
T = 15 °C
 $I_{reset} = 10 \text{ pA}$
 $I_{bias} = 100 \text{ nA}$
 $I_{biasn} = 10 \text{ nA}$
 $I_{db} = 100 \text{ nA}$
 $V_{casn} = 300 \text{ mV}$
 $V_{pwell} = V_{sub} = -1.2 \text{ V}$

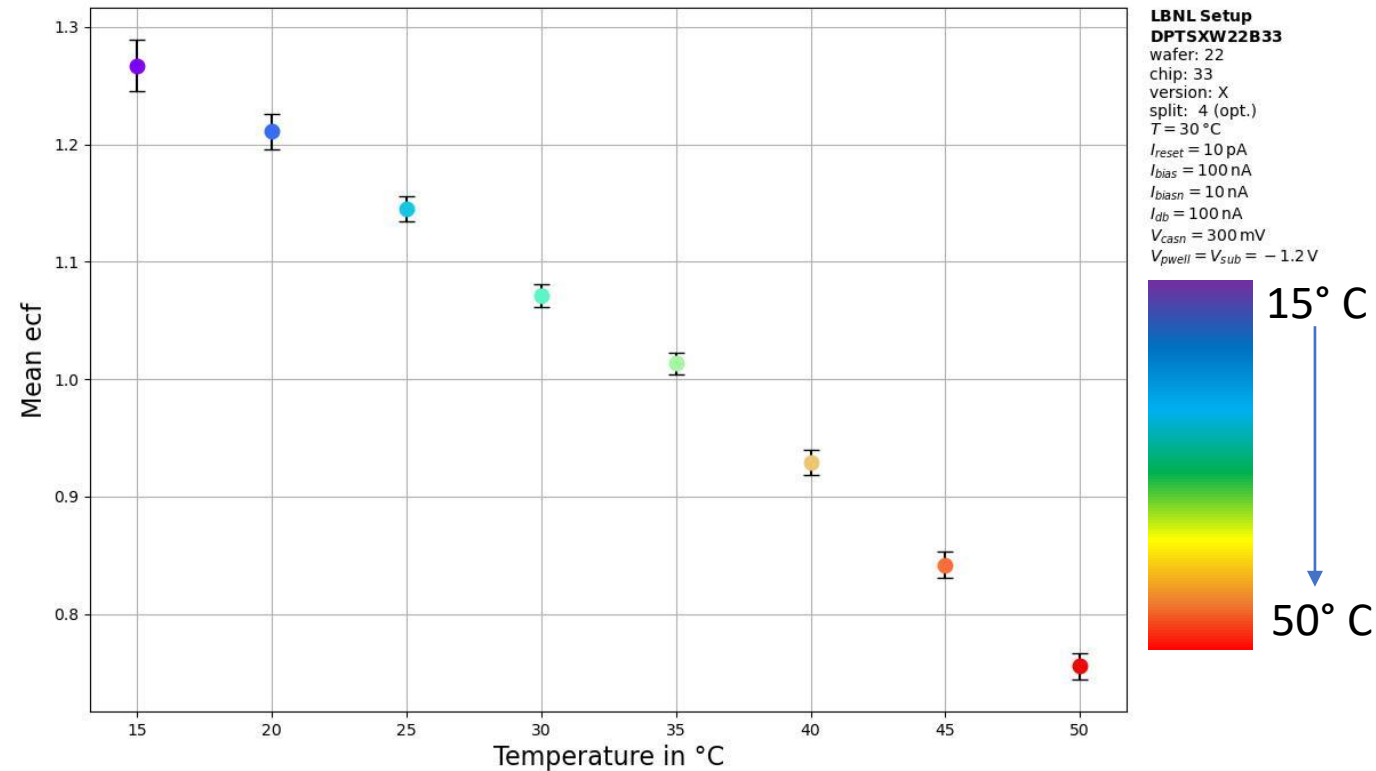


● VCASB 250mV
+ VCASB 300mV

Varying the calibration datasets

Analysing the same dataset with PIG/GID, Threshold and ToT data from different temperatures to investigate the influence on the energy calibration factor. Here: Varying all calibration datasets together

Mean Energy Calibration Factor vs Calibration Temperature for Dataset at 30°C

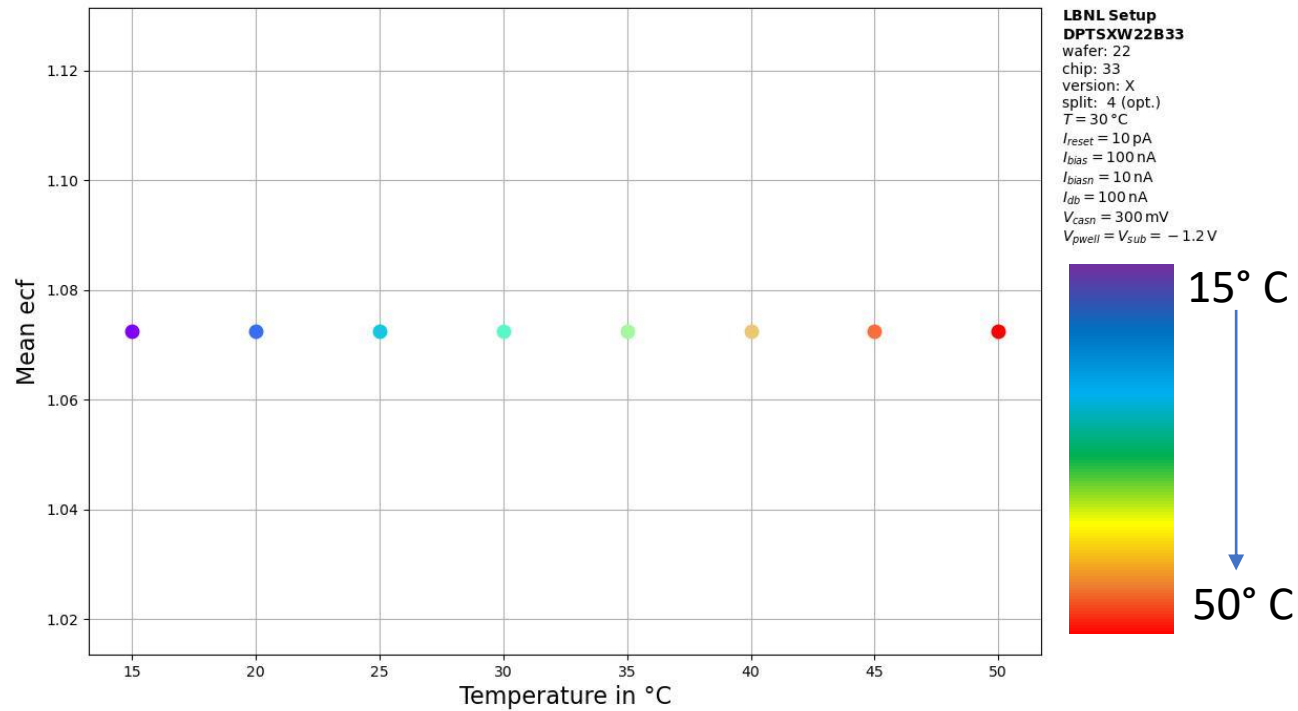


Source Data with different PID/GID calibrations



Analysing the same source data set (30°C) with different calibration data and investigating the Impact on the energy calibration factor: Using PID/GID data from different temperatures

Mean Energy Calibration Factor vs PID/GID Calibration Temperature for Dataset at 30°C

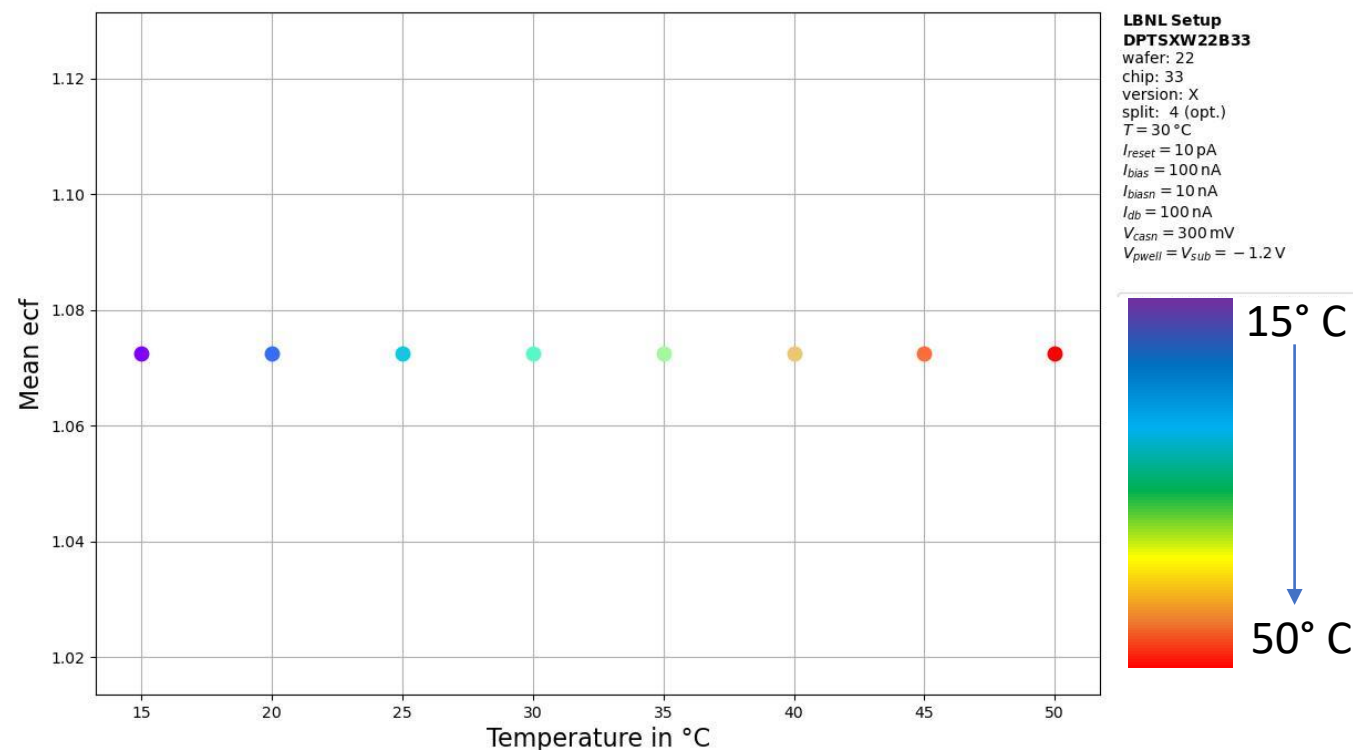


Source Data with different Threshold data in ToT analysis



Analysing the same source data set (30°C) with different calibration data and investigating the Impact on the energy calibration factor: Using Threshold data from different temperatures

Mean Energy Calibration Factor vs Threshold data Temperature for Dataset at 30°C

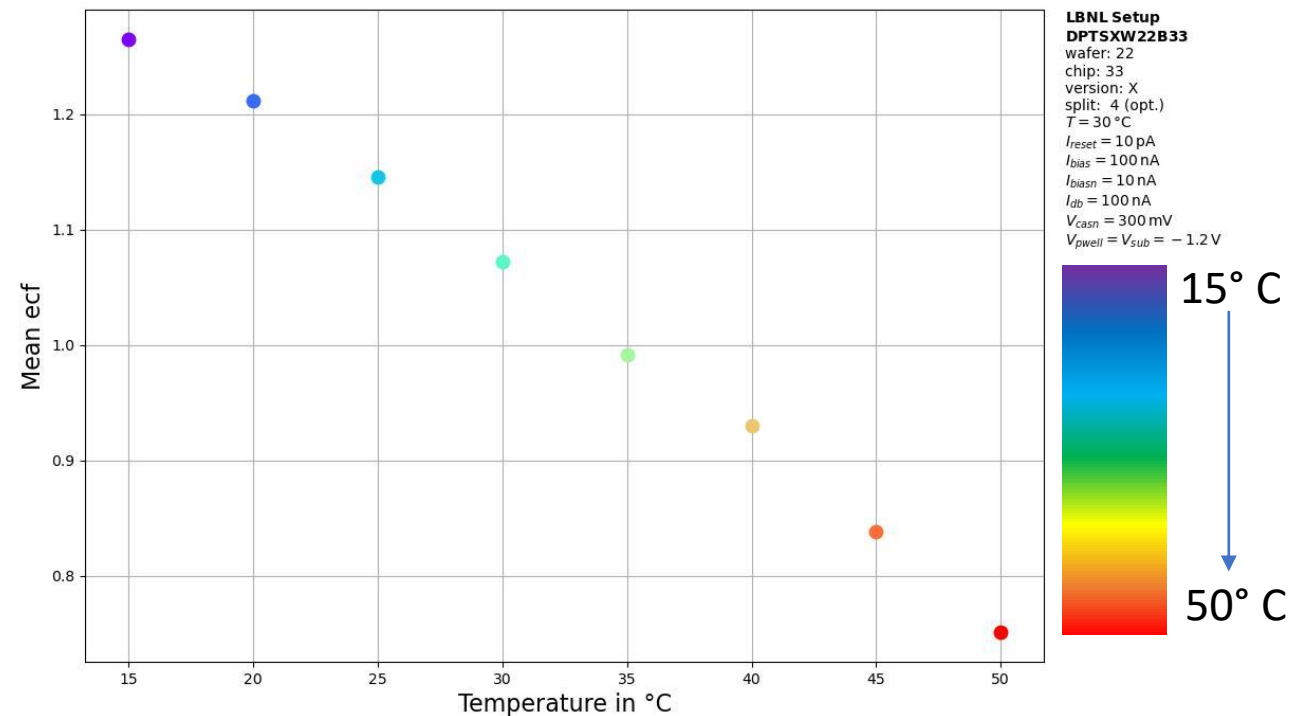


Source Data with different ToT calibrations



Analysing the same source data set (30°C) with different calibration data and investigating the Impact on the energy calibration factor: Using ToT data from different temperatures

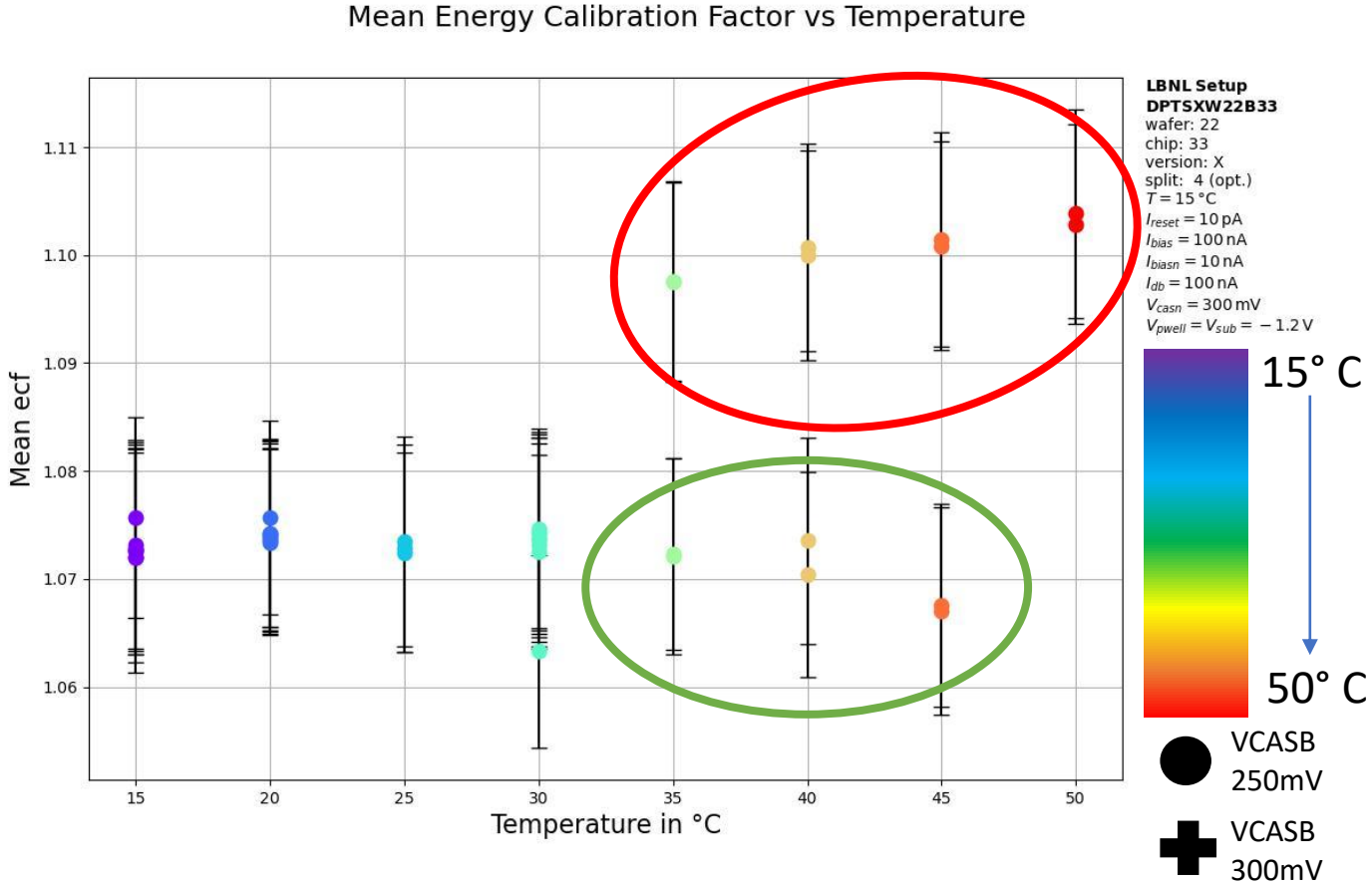
Mean Energy Calibration Factor vs ToT Calibration Temperature for Dataset at 30°C



More Source Data



- Jump in ecf cannot be reproduced
- Old datasets (red) taken in continuous measurements from 15-50°C
- New datasets (green) taken in continuous measurements from 20-45°C with powercycling the chip after every temperature



Summary

- PID / GID Calibration does not affect the energy conversion factor
- The ToT Calibration affects the ecf
- We couldn't reproduce the jump in the ecf
- New Data shows a continuously slightly degreasing trend
- In general, our calculated mean ecf is not very stable
- We need more analysis on our data