

New MicReD Products

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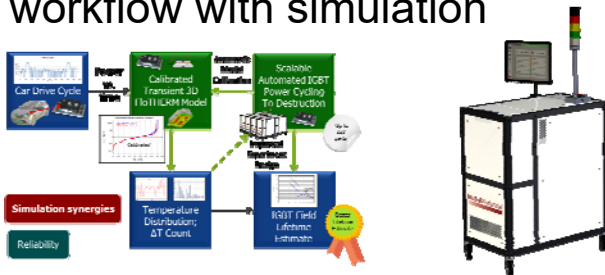
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MENTOR GRAPHICS USER CONFERENCE

Notable launches in FY17

PWT 600A 16C

Workflow with simulation

- Serves a specific user segment
- Press tour (automotive)
- Mission profile based workflow with simulation



DynTIM-S

Industrial segmentation

- DynTIM mechanics
- DYnTIM+T3Ster circuits (all MicReD HW)
- For users interested in material properties (priced lower)



Booster 240A/11V

Modularity and QA

- Replacing LS200
- Heating at 10..240A, 11V
- 4x gate drive, 1x Is
- PSU's from 3rd party, 4+2U



PWT 600A 16C



- Lighter mechanics (no cold-plate or cavity)
- Measurement: 16 channels (2x2x4)
- Output current: 600A (2x300A)
- Output voltage: 48V
- Power Tester 600A 16C 48V (29kW!)
- Launch date: May 2016

PWT 600A 16C features

- Output current: 2*300A or 1*600A / 48V flexible powering
- 2 * 8 channels MUX
- Gate driver built in with -10 to 20V earth independent Voltage
- No cold plate or water system included
- 2 or more units can be connected and create a system

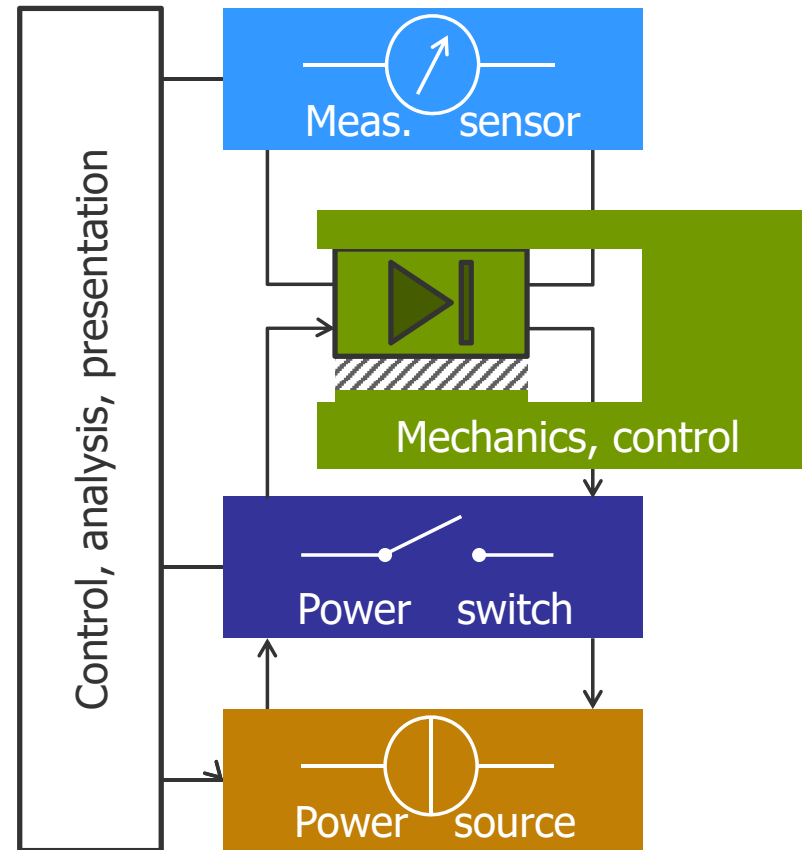
DynTIM S - a standalone system

Measuring bulk thermal conductivity of thermal interface materials by varying thickness

DynTIM S includes:

- Mechanics for thickness control
- Diode for heating and sensing
- Control electronics
- Heating and sensing circuits

No other MicReD HW is needed



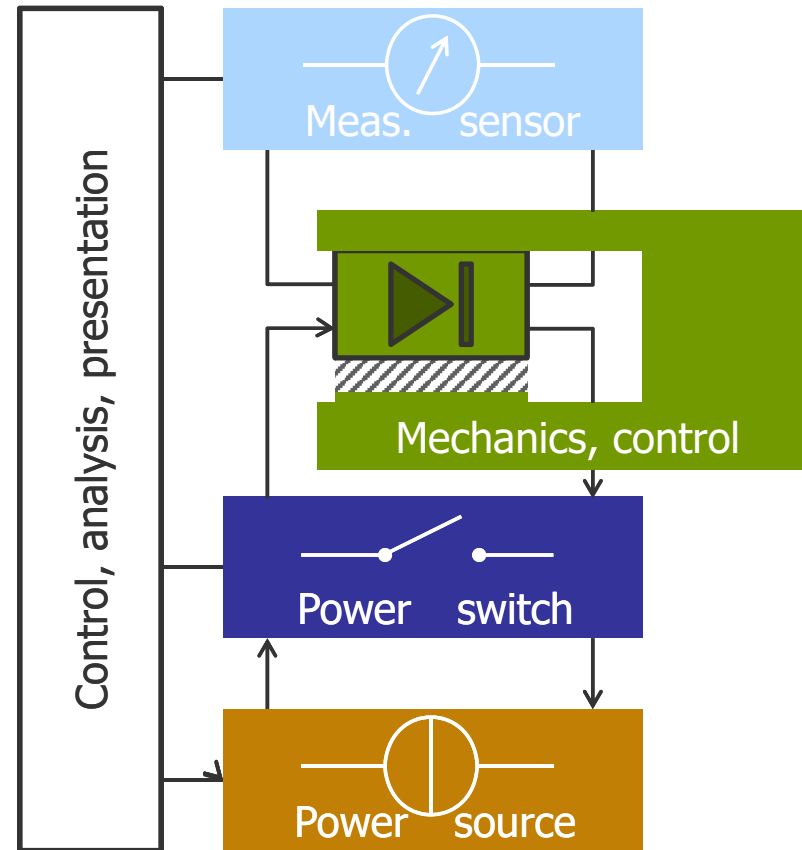
DynTIM S - a standalone system

Measuring bulk thermal conductivity of thermal interface materials by varying thickness

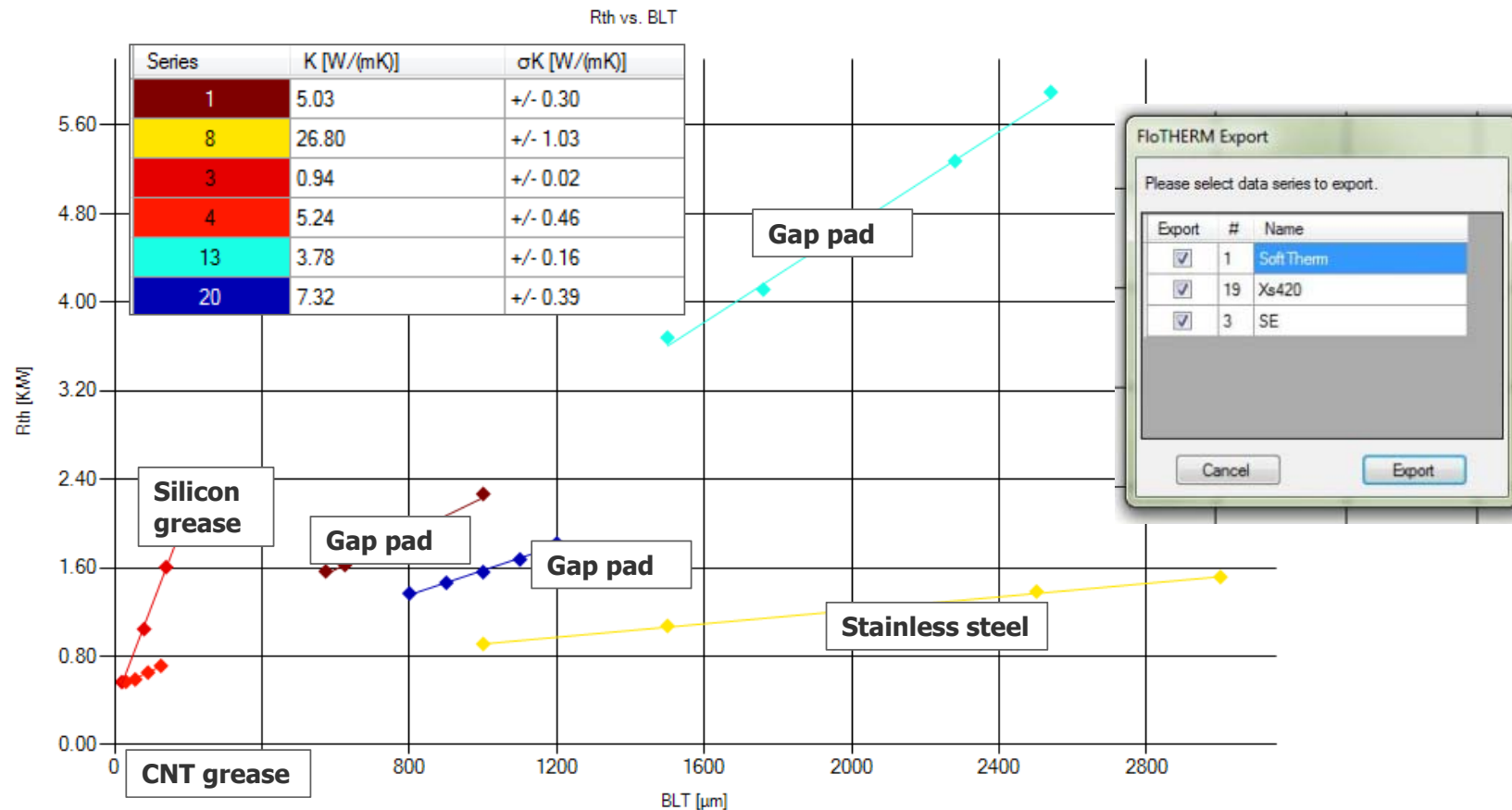
DynTIM includes:

- Mechanics for thickness control
- Diode for heating and sensing
- Control electronics

+ T3Ster for other functions



Similar measurements with similar UI



240A/11V Booster (PWB240A)

Motivation: LS200 limitationa

- External power supply required for the operation below 40A
- Gate driver is grounded, not even multiple boosters can drive one IGBT half-bridge
- Lack of negative sensor current -> limited possibilities in MOSFET measurement
- Noise issues in some measurement setups
- Complicated manufacturing, and calibration



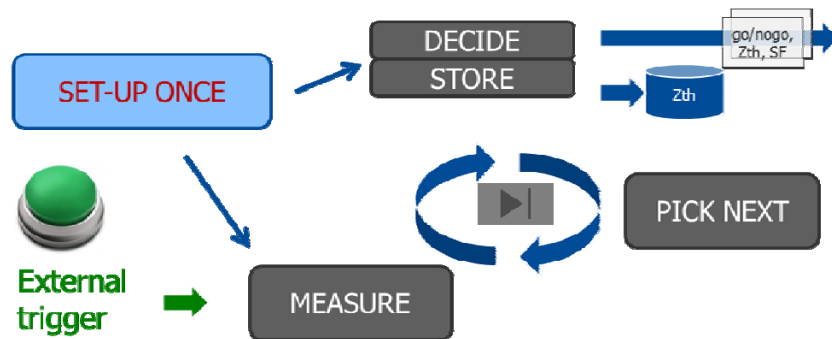
240A/11V Booster (PWB240A)

- Built from the modules used also in the 1800/3600A power testers
- Specifications:
 - Heating current: 1x10..240A/10V, **not grounded**
 - Sensing current: 1x -1A..1A, grounded
 - Gate driver: 4x -10..25V, **not grounded**
 - 4U high main box + 2x1U power supply;
 - Complete solution: 2x120A/12V power supplies included in the bundle
- Capabilities:
 - Easy measurement of IGBT half-bridges - both the gate drivers and the heating current sources are floating, not grounded
 - Can heat MOSFET on open channel and measure on body diode
 - Built-in $R_{ds,on}$ generator for one device (+ LV booster compatible rear connector for external VCB generator)



NEW PRODUCT ROADMAP

Volume / Integrated testing – FY18



Status

- First test system in PacRim / Japan
- Second test system is being built

- Same tests repeated (same- or similar part)
- Set-up once
- Test on external trigger
- Measurement results are stored for post processing
- Automated decision making (go / no-go, binning)



What is volume / integrated testing

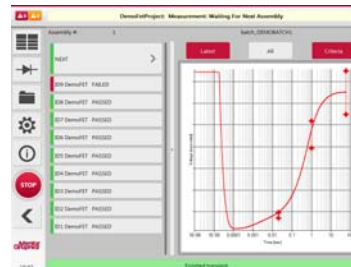
User interface

- Touch UI / like PWT
- Workflow oriented
- Configuration aware
- Engineers and technicians



Automation

- Repeated measurements
- Group testing
- “Pushbutton”
- Built in analysis



Integration

- Works with other systems
- “Give us an API!”
- “Can we script?”
- (Not yet) going in- line

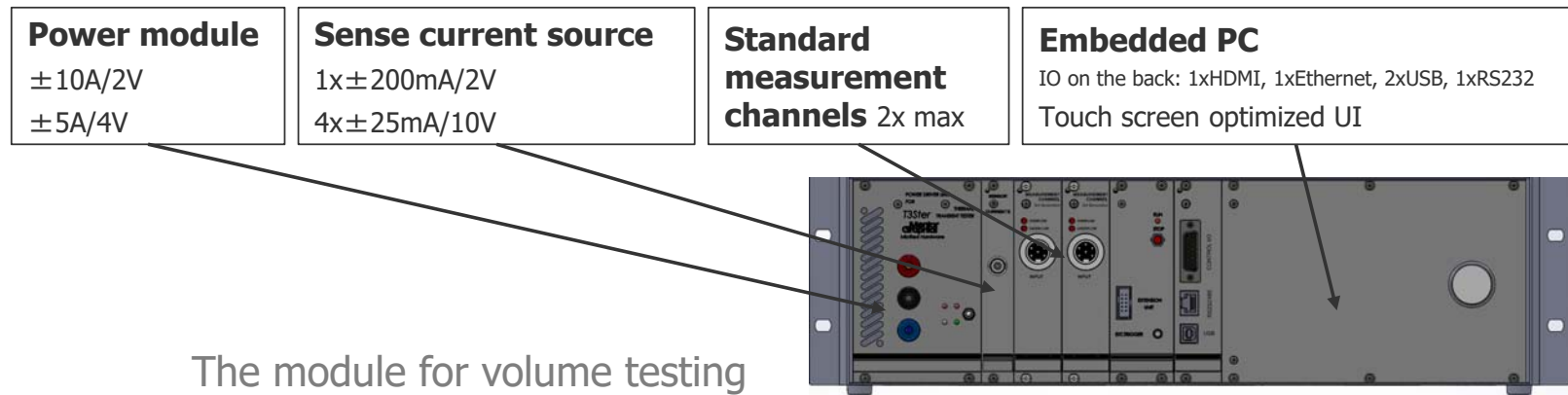
We have to control the measurement

PC shall be included

Modular set-up for the measurement case

Do we have the modules?

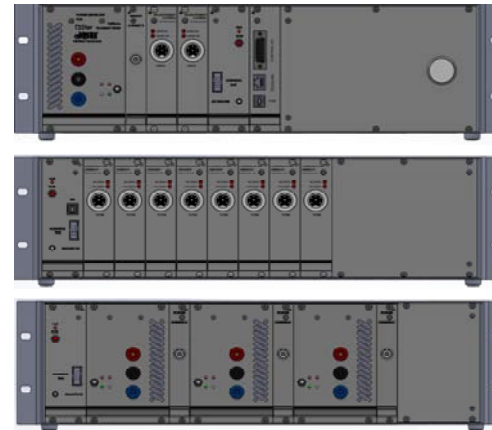
T3Ster S



- T3Ster size subrack: a 2 ch T3ster, **PC inside**, touch-screen
- No transistor drive, booster can be added
- Single PN, a bit cheaper than T3Ster
- **Touch UI** for a subset of defined T3Ster measurements
- **Can be integrated to other systems**

T3Ster IC

The module for
IC testing



T3Ster S

Sense Box

Up to 8 additional
measurement channels

Force box (1 or 2)

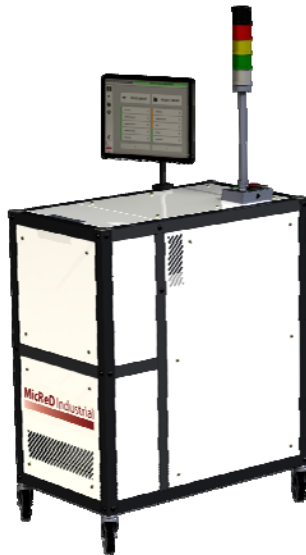
3 or 6 additional power and
sensor current modules

- Builds on T3Ster-S: has 10 sense channels, 4-7 force channels
- Heating capability: 2V - 10A (or 2A - 10V)
- **Multicore IC measurements** (negative current)
- Transfer thermal resistance measurements

PWT600A Learnings

Benefits

- Throughput (16 DUTs)
- Smaller size (no coldplate)



Issues

- From field specs (30V-s please)
- Increased to 48V (for 16 devices)
- 16 DUTs in serial
- 15kW PSUs (output capacitance)
- Focus on switching (not on auxiliary circuits)

Could have had

- Connection in parallel (a bit higher costs)
- 16 DUTs = 4x4 DUTs
- Quicker development (= more testing time)
- Unified HW architecture (QA benefits, lead times)

Let's learn from it

PWT 600A 4x4C 12V

- Same capacity (16 DUTs)
- 4 heating channels at 600A 12V, 4x4 measurement channels
- Built from the circuits of the 1800A
- No cold-plate or hydraulics, ~ 19 inch rack
- Offers most users the right specs or even slightly more
- Complementary offering to the 600A PWT



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