

Transient Thermoreflectance (TR)

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Acquires new thermal imaging data for pulses between 50 μ s and 5 ms (transient).

Key features:

- **Mode Selector** — Device Setup (optimize brightness/focus, no thermal image shown) vs. Thermal Imaging (begin acquisition).
- **Camera Image Display** — live DUT image; zoom tool (SHIFT-CLICK to zoom out).
- **Output Voltage Control** — voltage to device and output source.
- **Illumination Control** — LED pulse width (image integration time for a thermal event); adjust acquisition period (total cycles per image) if brightness is off.
- **Time Delay Control & Timing Parameters** — controls when in the heating cycle the "snapshot" image is taken.
- **Thermal Image Display** — calculated thermal image using the entered thermoreflectance coefficient; scale bars compress the scale to see detail despite shadows.
- **Region Mean Graph** — history of measured ROIs; ideally points differ by less than 5% before stopping. Right-click → "clear chart" to reset.
- **ROI Statistics:**
 - Temperature Value — ROI ΔT for the current image.
 - CTR — the thermoreflectance coefficient, constant per substance; must be entered correctly and must correspond to the active Channel Number (wavelength). Example values given in the source: Channel 6 (530 nm) CTR = 2.5E-4; Channel 6 (470 nm) CTR = 1.6E-4 (*source lists both as "Channel 6" — verify wavelength/channel mapping before relying on this*). CTR may also be called "Cth."
 - Scale Bars — zoom the temperature scale; note the ROI mean tool may be inexact when limit bars coerce data into range.
 - ROI Tools — rectangle, annulus (zoom/magnification), freehand region, point tool.

Example procedure — obtaining a transient measurement:

1. Turn off "Int Vo 20mA Range" in the Project Manager.
2. Set "DUT Pulse" to the desired pulse width (example: 500 μ s).
3. Set "Voltage to Device" (example: 6.0 V) and select "Update Values."
 1. Switch to "Thermal Imaging" mode.
 2. Confirm the device is heating as expected for the 500 μ s delay.
4. Set "Image Delay(s)" to 0 to initialize delay to 0 μ s (you can start at any initial delay time).
5. Go to File → Setup Sweep.
6. Enter "Number Delay Images" (example: 51).
7. Enter "Delay Steps(s)" (example: 10.0 μ s) — software will take 51 images at 10 μ s steps starting at 0 s (0–500 μ s).
8. Enter "Ave time per frame(s)" (example: 5 s per image).
9. Enter the "Base File Name" to save under.
10. Select an ROI with the "Draw ROI" tool.
11. Press "Start."
12. The software steps through the thermal transient automatically and shuts off voltage on completion. A thermal image is averaged and saved at the configured interval (example: every 5 s; 255 s total for 51 points, 4 min 15 s).
13. Once done, exit and open the saved data in SanjANALYZER.

The transient response of an ROI can be watched live in the "Region Mean Graph" tab (lower-left) by selecting a region with "Draw ROI."

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