

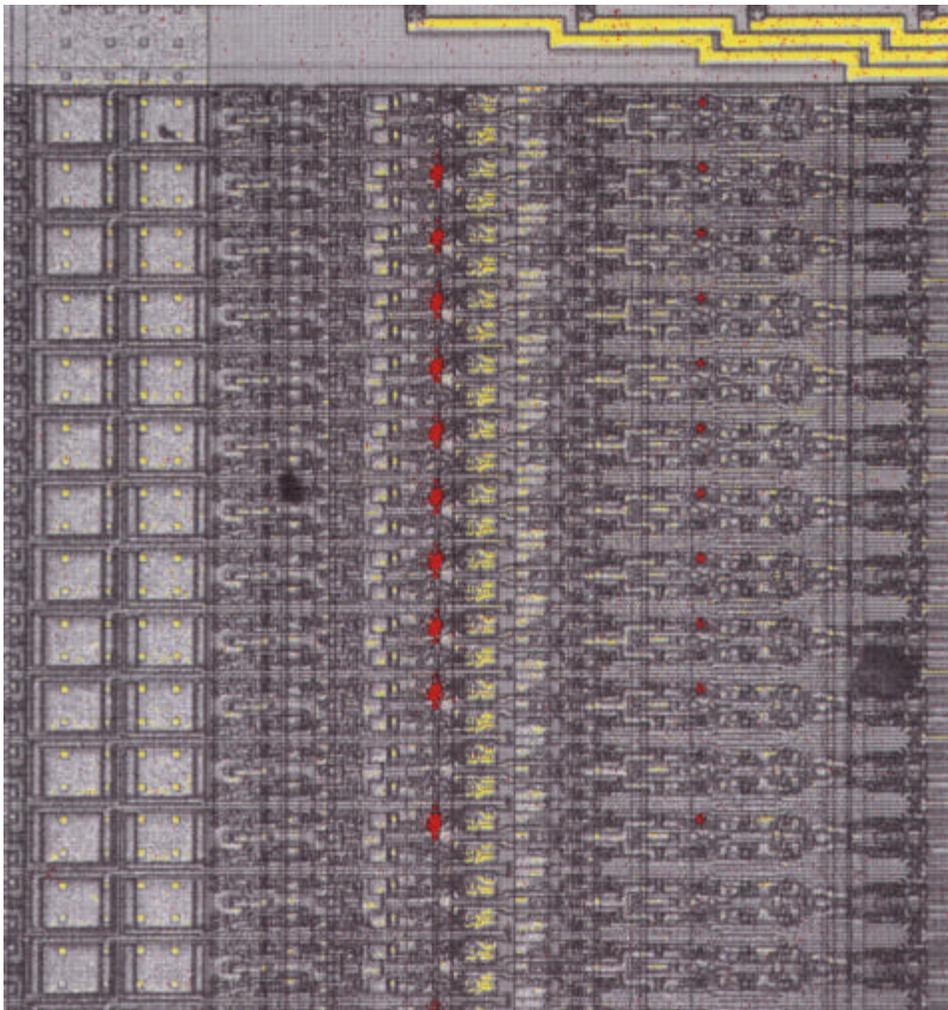
In the course of developing the front-end ICs, poor fabrication yields led us to an extensive program of failure analysis.

One tool is to view IR images of chips. Defects can form localized high-field regions that allow electrons to acquire sufficient energy while traversing their mean free path to excite atomic transitions. Emission from these defect sites can be “seen” with appropriate position-sensitive sensors.

Data taken with T. Ohsugi at Hiroshima University.

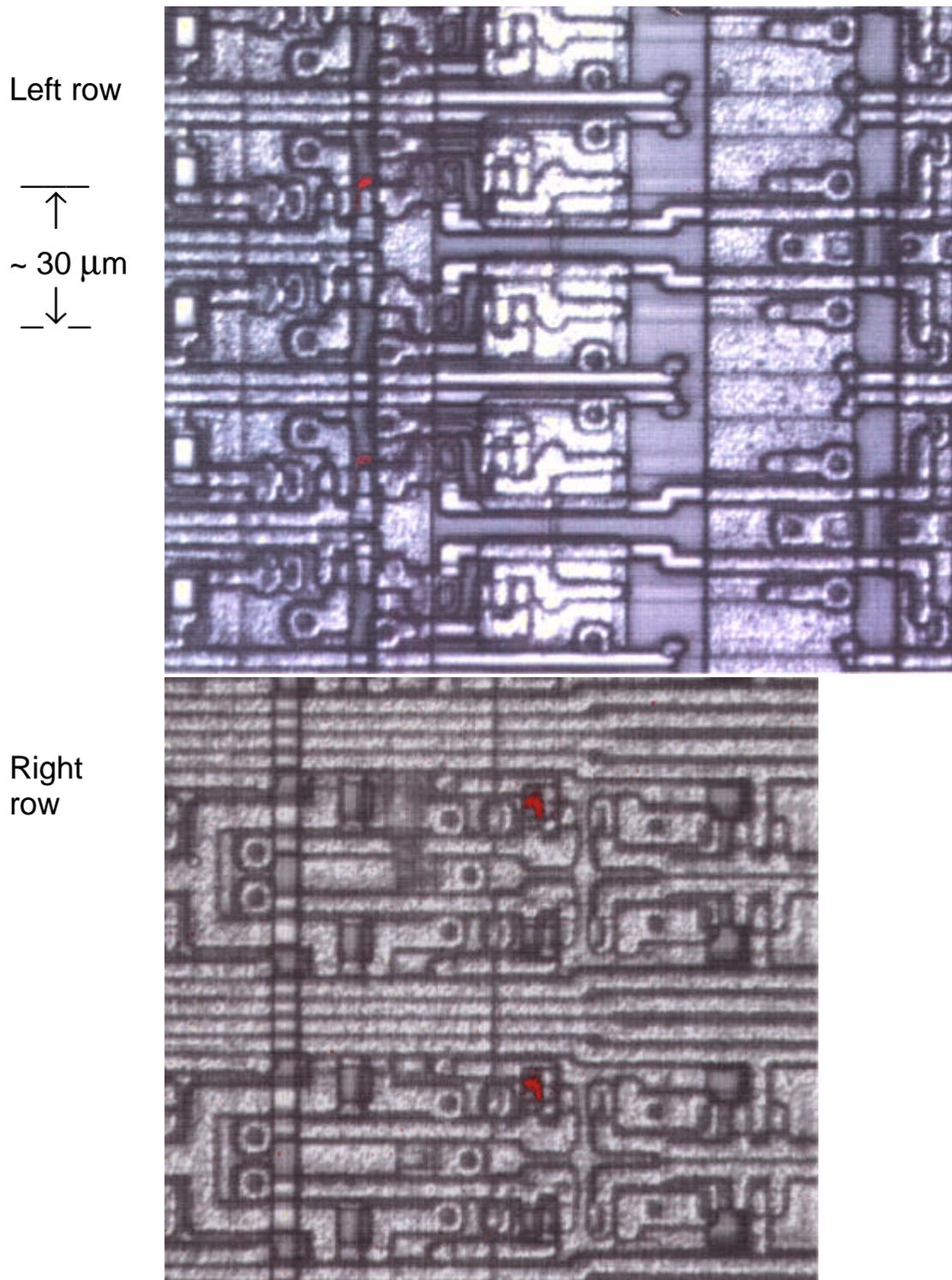
1.2 x 1.5 mm² view of chip

Image at $\lambda = 1 \mu\text{m}$ (red) superimposed on visual image (gray/yellow)



↑ ↑
red spots indicate IR emission

Viewing the emission sites at higher resolution allows the identification of individual transistors.



Since the aluminum metallization is opaque at 1 μm , the emission appears to “go around the corner”.