1 - 3 Examples of power electronic damages

Troubleshooting
In Power Electronics
From System to Chip Level

1. Your situation
   - Zero-hour failures after launched volume production
   - Products with life-time problems
   - Products with sporadic or difficult to detect failures
   - Unclear destroyed or fragmented returns
   - Problems with sub-supplier systems & components
   - Financial conflicts that require an independent technical advice

2. Our service
   - On Site Measurements
     - Test & Measurement in target application
     - Get an inside view and better understanding of the application
   - System context analysis
     - Understand & consider peripherals
     - Identify of application specific differences
     - Study of environmental dependencies
     - Check system to subsystem interface impact
     - System and subsystem simulation
   - Failure Analysis (destructive and non-destructive)
     - System – Circuit – Layout – Component Reviews
     - Optical, thermal, ultrasonic, x-ray, REM inspection
     - Disassembling from electromechanical system level down to smallest subcomponents, demolding, micrograph polished sections
Your Benefit

- Large expert team with many years of industrial background
- Independent system related point of view
- Regardless of manufacturer → objective
- In-house experts in many disciplines
- Modern and well-equipped laboratories with a wide range of analysis devices

Testing & Service - Some Examples

- Long term system check with data-logging
- Electrical performance under applied stress: temperature, humidity, overvoltage, overcurrent, ESD, burst, RF-radiation, partial discharge
- Electrical behavior under critical conditions as power-up, power-down, brown out, ...
- Characteristic curves of electrical components with state of art curve tracer
- Contamination check - chemical spectral analysis
- 3D surface analysis with ultrasonic scanning SAM
- Short circuit / overload detection with standard thermography
- Short circuit, ESD-damage, oxide damage, edge termination defects, avalanche breakdown detection of IGBT’s, MOSFET’s, diodes, resistors with Lock-In thermography
- Static electrical characterization
- Dynamic electrical characterization of power modules / systems up to 10 kV / 100kA
- Active power cycling
- Passive temperature cycling

Swapping behavior check on power semiconductors

Chip-level Lock-In Thermography, supersonic analysis solder thickness

Thermography gate-driver, x-ray transformer