



We are the link  
between the real and  
the digital world.

# Quality Beyond the Standards With a Zero Defect Mindset



# Our competitive advantage: Differentiating as quality leader

## Our path

We do what we promise.  
That's quality made by Infineon.

## Our aspiration

Zero defect regarding the committed

- › functionality
- › reliability
- › time
- › volume & cost

## Our foundation

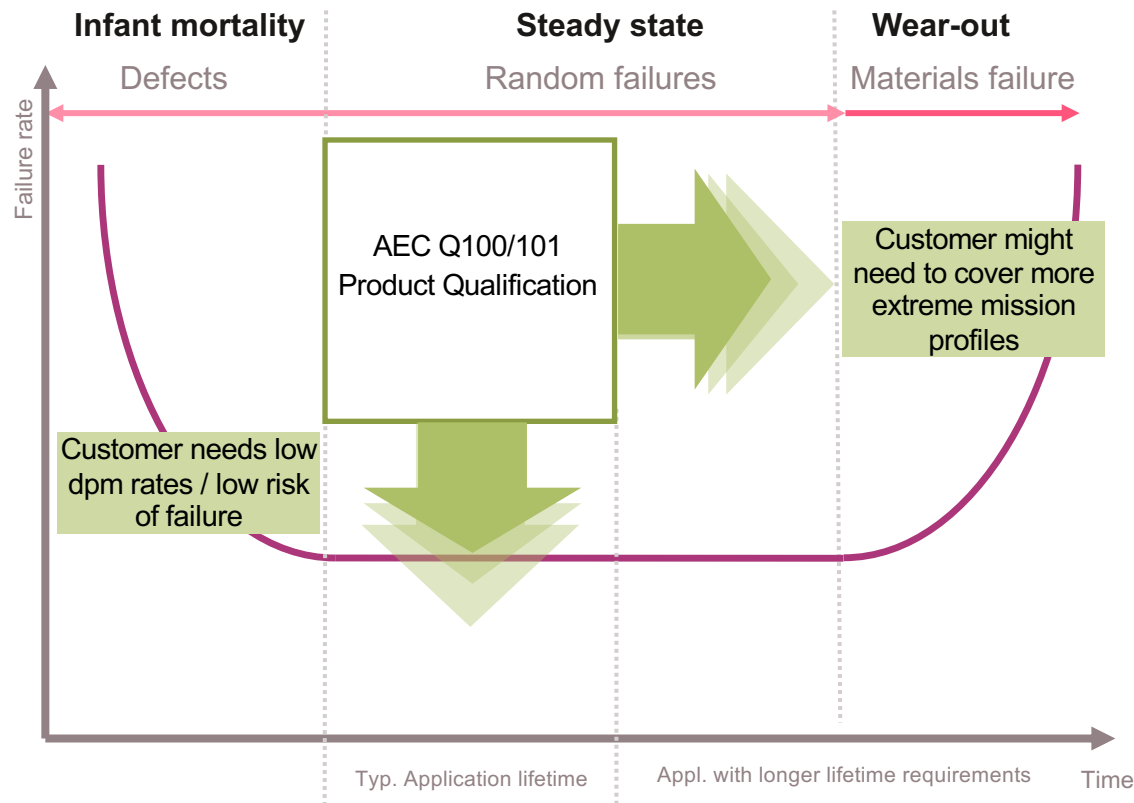
International standards such as ISO 9001,  
IATF 16949, AS 9100, IEC 17025

# Infineon Standards

We go **Beyond the Standards**  
to better fit the real application  
requirements



## Necessary but sufficient for your system?



AEC Q100/101

Are you aware:

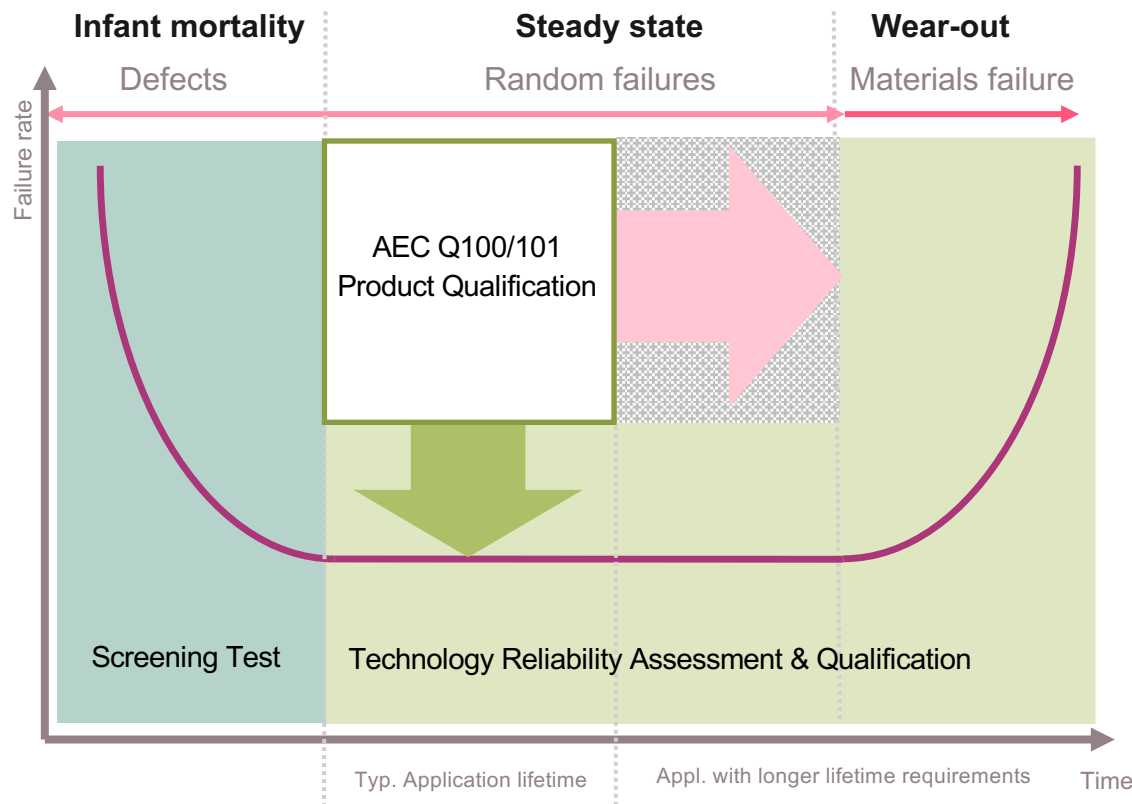
A disaster check only

No indication of expected dpm

No indication of process stability

No method to understand limits of technology

# Models to validate product design and intensive screening methods to detect production defects

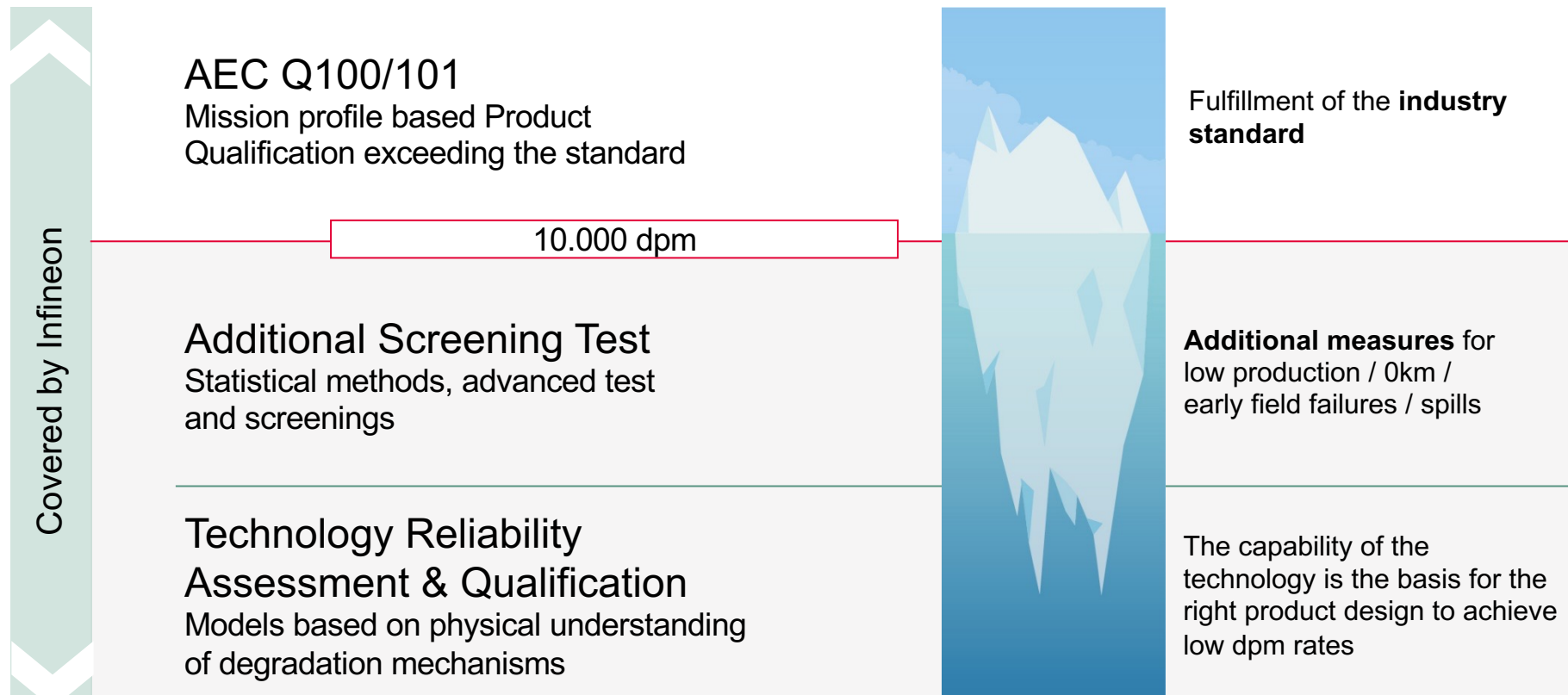


Extended Screening Test are done to screen out production defects (infant mortality) before shipment to customer

Extended AEC Q100/101 tests when needed – based on target applications

Sub 1ppm validation (intrinsic)  
Assessment of the capability of the technology / Margin assessment

# We go beyond the industry standard



# Consistent achievement of sub 1dpm over time and through different market cycles

Sense



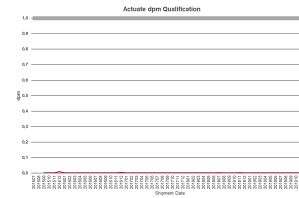
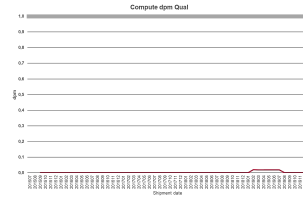
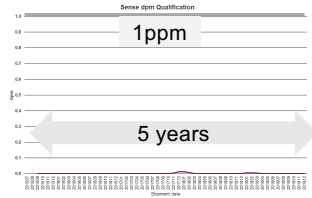
Interpret & Decide



Act

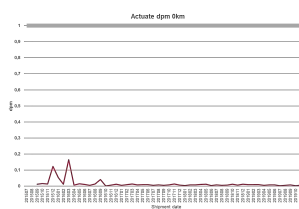
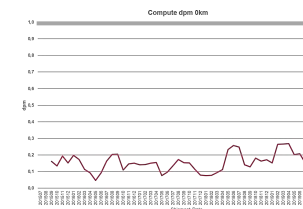
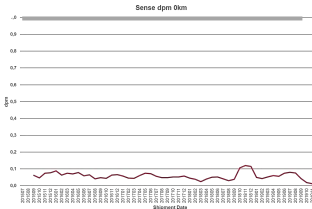


QUALIFICATION



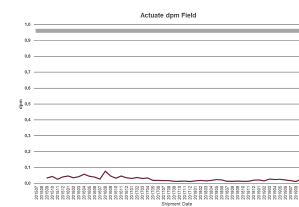
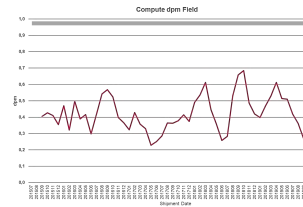
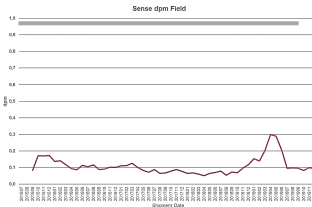
Low risk to fail product or system qualification and respective efforts, costs / project delay

0km



Low risk to fail product or system qualification and respective efforts, costs / project delay

FIELD



Low risk of recall and loss of reputation for Infineon's customers



Quality criteria encompass the product **requirements**, **design**, **manufacturing** and **testing**



# Meeting customers needs by best in class product requirements, design, manufacturing and testing

Product quality is **MORE** than:

- › Temperature range
- › Labelling based on demand
- › Qualifying to automotive standards: AEC-Q100/101
- › ...

It's meeting real customer expectations through



- › **Development processes (e.g. RDDF)**
- › **Design rules (e.g. ADeGo)**
- › **Materials**
- › **Manufacturing processes and process controls**  
the full production chain must be automotive (stability, traceability and deviation management, ...)
- › Failure mechanism based validation & mission profile based qualification
- › Screening, statistical methods and firewalls



**AEC-Q100 (= disaster check):**

3lots à 77pcs in qualification

→ **10.000dpm**

Up to 100  
additional  
specific  
measures

Automotive target:

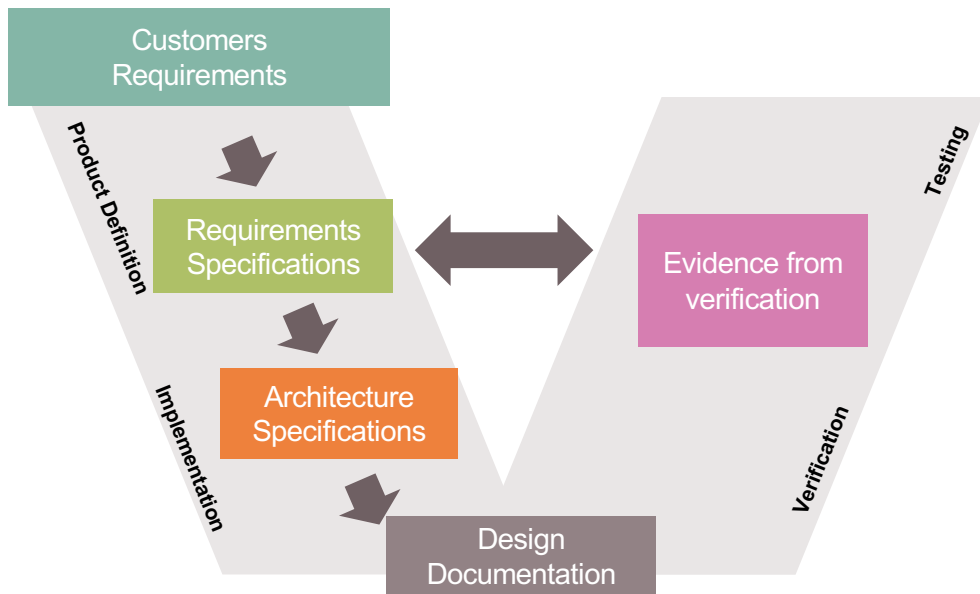
**<1dpm**

over e.g. **30000h** lifetime

# Our RDDF\* implementation ensures a systematic handling of requirements reflected into the V-model

We **increase quality, reduce risk** and in the end **save time and effort** in our developments by:

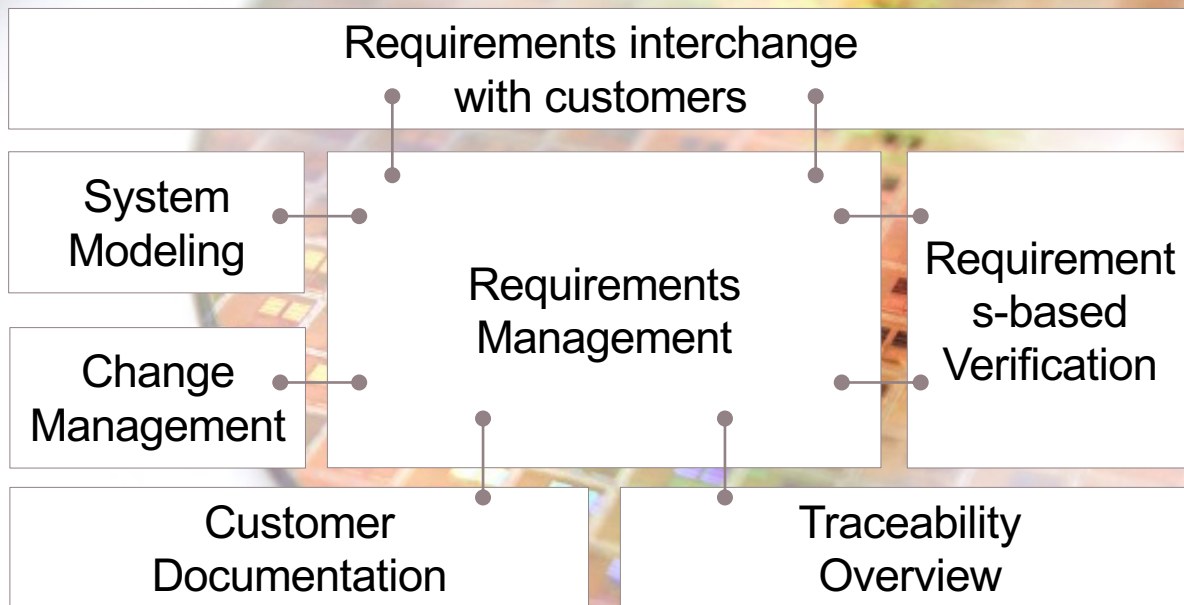
- › understanding what the **customer wants and needs**
- › and **ensuring correct and complete implementation** through verification and testing



Systematic handling of requirements along with technology (wafer and package) and product development cycle: from definition to implementation until verification of evidence and testing (both in development and production)

\* Requirement Driven Development Flow

# Infineon RDDF tooling landscape



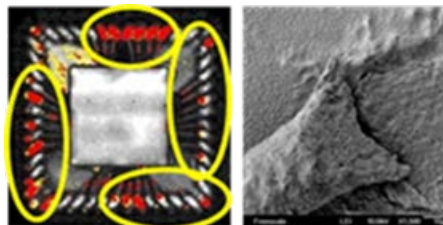
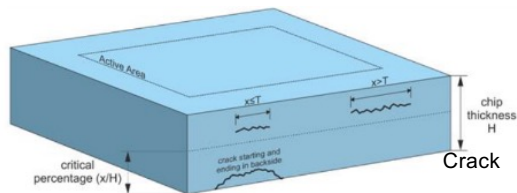
To ensure a proper RDDF workflow, Infineon RDDF is supported by Requirements Management tooling integrated within the product development environment.

## Automotive Development Goals for molded packages

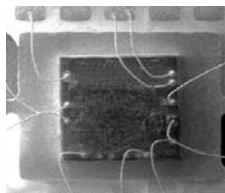
### ADeGo to be followed during development, production, testing and shipment

#### ADeGo requirements

- > for Package External Properties
- > for Package Internal Properties (e.g. delamination)
- > after individual Processes
- > at 0hr and after stress test



Delamination



Wire Sweep

Clear and quantifiable packaging development goals and practices, which reflect customer requirements of performance, quality and reliability to reduce the risk for failure.



# Infineon's Automotive Manufacturing Rules ensuring Highest Quality



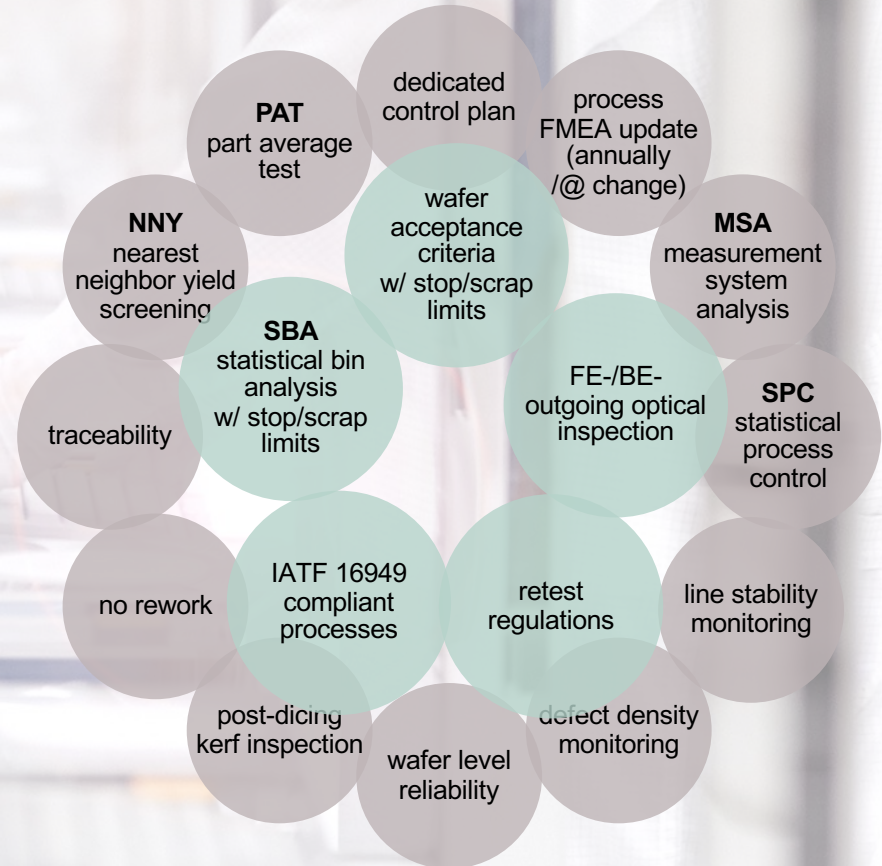
## AUTOMOTIVE manufacturing



Examples for rules/measures applied for semiconductor manufacturing; different criteria applying depending on segment



Examples for additional automotive rules/measures applied for semiconductor manufacturing, tighter criteria

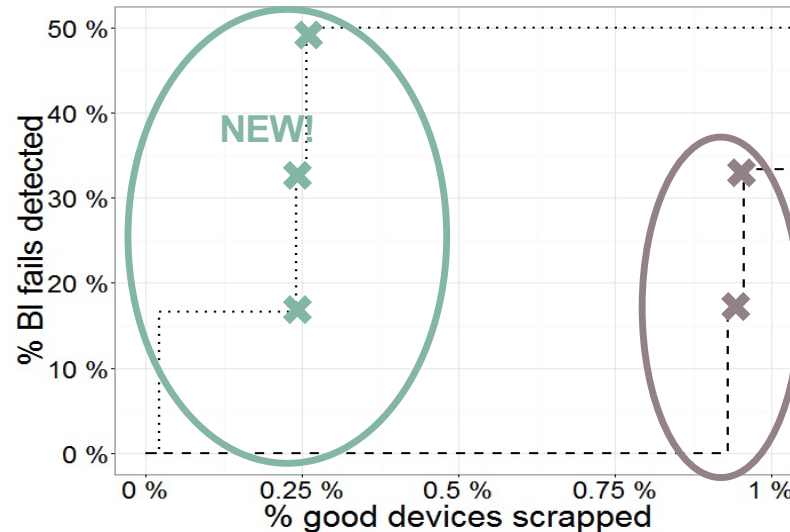


# Reduced failure rates by unique and proprietary testing and screening methodologies

Infineon-owned research center [KAI](#)\* is developing screening and testing methods beyond the standard PAT (Part Average Testing) and NNY (Nearest Neighbor Yield) screening procedures by transforming data.

## Example:

With the additional data transformation method, additional fails are detected at only **0.25% scrap** of good devices.



With the standard PAT, only a limited number of failures are detected and almost **1%** of good dies are **scrapped**.

- Benefit:**
- › increase the reliability of Infineon's semiconductor products
  - › reduce the failure rate at 0km and in the fields



Customer Service  
Our automotive quality  
includes the **highest  
customer service level**



# We offer complementary know-how to our customers worldwide to enable fast and reliable problem solving



- › Global infrastructure for applications and failure analysis
- › Localized support close to customers R&D and manufacturing sites



- › Fast and reliable root cause analysis and problem solving
- › Most quality issues closed in less than 14 days
- › Saves customers reputation and minimizes financial risk

- Regional failure analysis labs
- Production sites with extended failure analysis capabilities

A circular collage of ten images showing various scientific instruments and equipment, arranged in a ring around a central area. The instruments include: a laboratory workstation with a computer and a large display; a complex optical setup with multiple lenses and mirrors; a large industrial machine with a blue and white exterior; a small, compact analytical device; a large, multi-channel spectrometer or detector; a large, multi-channel spectrometer or detector; a large, multi-channel spectrometer or detector; a large, multi-channel spectrometer or detector; a large, multi-channel spectrometer or detector; and a large, multi-channel spectrometer or detector.

- 
- The image is a composite of three parts:
- Flowchart (Top Left):** A process flow for semiconductor testing. It starts with 'Customer' leading to 'Design Analysis'. This leads to a decision 'Optical Inspection?'. If 'Yes', it goes to 'E-ray Radiography?'. If 'No', it goes to 'Electrical Testing'. From 'E-ray Radiography?', it goes to 'Electrical Testing' if 'No', or to 'Electrical Testing' if 'Yes'. 'Electrical Testing' leads to a decision 'Critical Analysis?'. If 'Yes', it goes to 'C-Scan'. If 'No', it goes to 'Device'. From 'C-Scan', it goes to 'Device'. From 'Device', it goes to 'Optical'. From 'Optical', it goes to 'SEM/EDS'. From 'SEM/EDS', it goes to 'TEM/EDS'. From 'TEM/EDS', it goes to a decision 'Further Report & Ship to Customer?'. If 'Yes', it goes to 'Final QA Report'. If 'No', it loops back to 'Optical'.
  - Technical Diagram (Top Right):** A diagram of a scanning electron microscope (SEM) with labels for 'Scanning Electron Microscopy & Energy Dispersive X-Ray Analysis' and 'Infinite'.
  - Microscope Image (Bottom):** A photograph of a laboratory setup featuring a microscope, two computer monitors displaying SEM images, and a keyboard.

# We offer technical trainings to our customers to support their business



- › Our trainings support our customers in their discussion with their customers
- › The technical trainings on automotive semiconductor technology include:
  - Technology
  - Manufacturing
  - Failure Analysis
  - EIPD/EOS reduction



## High Quality Achievements

We have a proven **track record of high quality achievements**





# We have a proven track record of high quality achievements



Our customers can rely on a partner that has consistently achieved outstanding quality targets and received many awards in the automotive industry.

## Examples

**TOYOTA**

**Honor Quality Award**  
March 2020



**Supplier of the Year**  
July 2019

**UAES**

**Best Corporation Supplier**  
January 2020



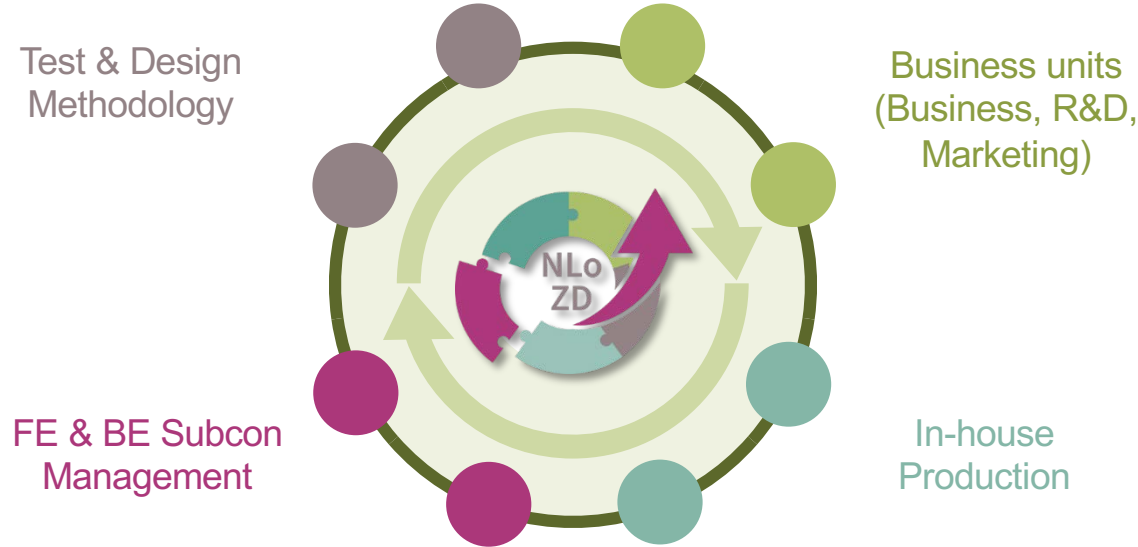
**Supplier of the Year**  
January 2019

Continuous Improvement  
We strive for **continuous  
improvement** & we **invest in  
quality**

# Next Level of Zero Defect (NLoZD) – A company wide integrated continuous quality improvement program

## Continuous quality improvement

### NLoZD links managerial units (business & R&D), production and design



Zero Defect Culture & Quality Leadership

Problem Solving Excellence & Continuous Improvement

Regular Reporting and Reviews



# Long term reliable partner committed to permanent improvement (with NLoZD)



Zero Defect Culture & Quality Leadership

Problem Solving Excellence & Continuous Improvement

Regular Reporting and Reviews

## Customer Focus

### Customer Satisfaction

(regular reviews of ratings to address weaknesses)

**Customer Incident Reduction** Focus to avoid single incidents, not only keep ppm level

### EIPD<sup>\*)</sup>/EOS Reduction

at Infineon and customer production

<sup>\*)</sup> Electrical Induced Physical Damage

## Lifecycle Stability

**High robustness for Products in Production**

**Avoidance of quality incidences** by advanced R&D and test development methodologies

**Characterization and stabilization** of manufacturing processes

## Deviation Culture

**Consequent implementation** of **firewalls** in R&D, test and manufacturing  
Development of **advanced outlier screening** technologies

# Infinion Zero Defect Mentality

## We Do what we promise



We reduced our ppm rate significantly to sub ppm levels



We produce 24/7/365 and deliver Zero Defect for all but the last 3 seconds of a year



Most of our 8Ds are closed in less than 14 days



Regional network of failure analysis labs and strong localized competencies

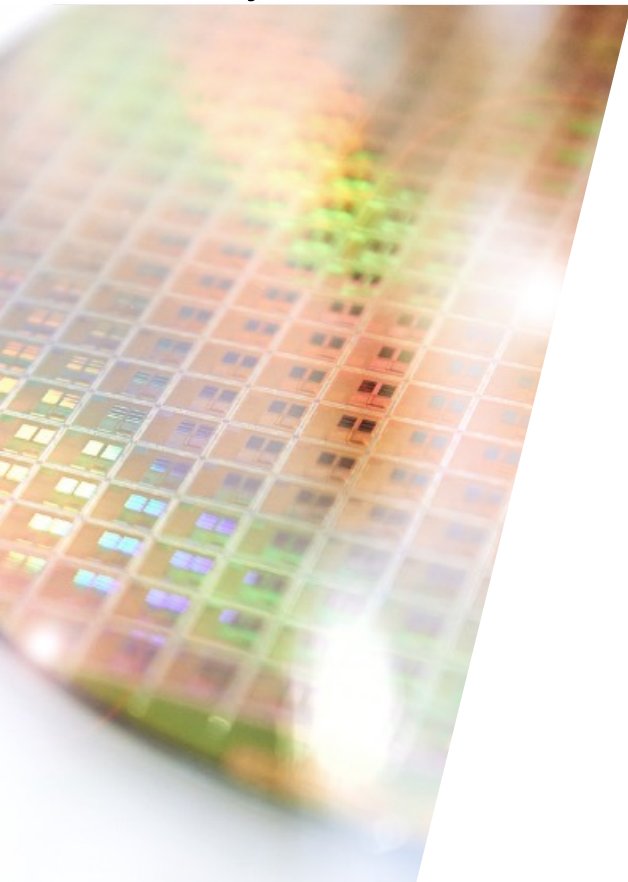


Zero delamination approach



90% of our products are already Zero Defect

## Summary



As our customer, you can rely on a partner that has continuously achieved and proved outstanding quality targets in the automotive industry.



Part of your life. Part of tomorrow.

For more information click on the respective image below



Dependable Electronics

