



ASML

Movip – Predict Assembly ZHDR in the Design Phase

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Context

Deliver Functional Products to the Customer

Agenda

Functionality Risks

Predict Assembly Performance

Movip Assembly Risk Model

Posibilities

Functionality Risks

Predict Assembly Performance

Movip Assembly Risk Model

Possibilities

Functionality Risks

Design Risks



Assembly Risks



Handling & Transport Risks



Life Time Risks



Design Risks

Design Qualification on Functionality

Design not meeting specification

Part Tolerances (Calculated)

Part Tolerances (Measured)

Functionality Mismatch

Assembly Risks

Assembly Risk at Part Level

Parts

Mounting

Connection

Assembly Risk at final Assembly Level

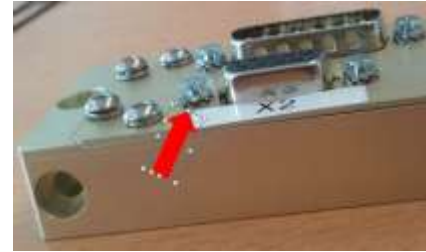
Cleaning

Coating

Adjustment

Excess Parts

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Handling & Transport Risk

Handling

Packaging

Product Identification

Storage

Transport

“DHL” Transport

Planes



Life Time Risks

Initial Failure Period

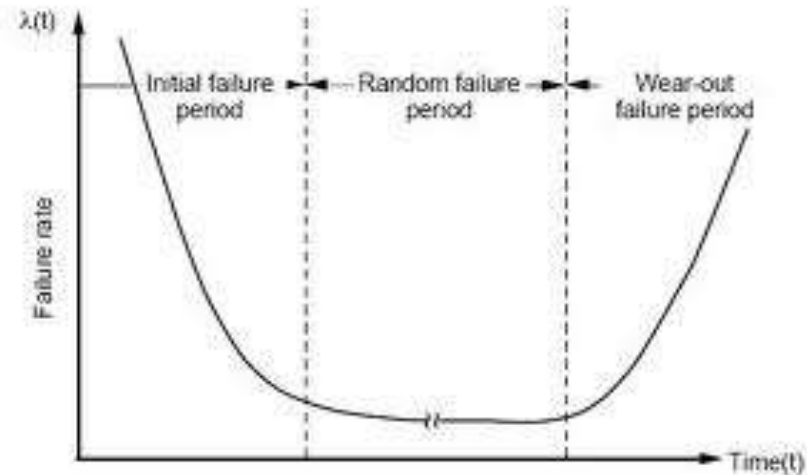
Design

Assembly

Random Failures

Wear Out

Design



Functionality Risks

Design Risks → Design

Assembly Risks

Handling & Transport Risks → Transport

Life Time Risks → Design

Functionality Risk

Prevent Assembly Risks in
the design Phase of a NPI
by predicting the ZHDR and
Mitigate the Risks.

Functionality Risks

Predict Assembly Performance

Movip Assembly Risk Model

Possibilities

Predict Assembly Performance

Current Assembly Performance

1200 PCBA's/Machine

Assembly ZHDR 1%

20 Machines/Year

5h Repair time

12 disturbances/machine Build

1200h Loss electronics → 0.4 Machine not build

Profit

Interest

Space

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Predict Assembly Performance

Predict Assembly ZHDR (Yield/Quality) in the Design Phase

Electronics (PCBA) based on the IMEC IPC7912 model

Electro/Mechanics/Optics/Mechatronics with Movip model

Functionality Risks

Predict Assembly Performance

Movip Assembly Risk Model

Possibilities

Movip Assembly Risk Model

Assembly Risk at Part Level

Parts

Mounting

Connection

Assembly Risk at final Assembly Level

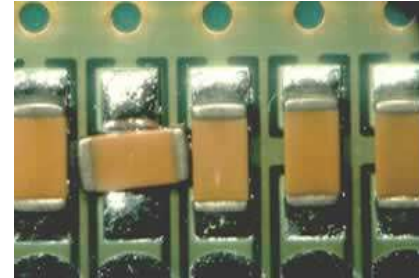
Cleaning

Coating

Adjustment

Excess Parts

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Movip Assembly Risk Model

Part Defect Opportunities

Defect

Functional Out of Spec

Physical out of Spec



Movip Assembly Risk Model

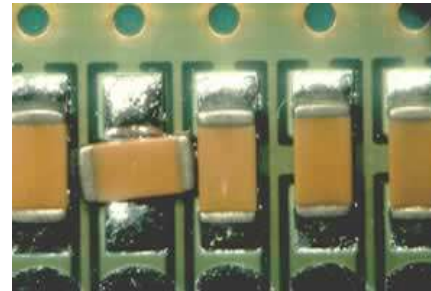
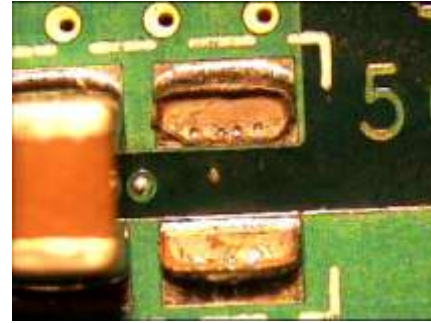
Mounting Defect Opportunities

Wrong Part

Missing Part

Misplaced part

Misoriented Part



Movip Assembly Risk Model

Connection Defect Opportunities

Open (PCBA's)

Closed (PCBA's)

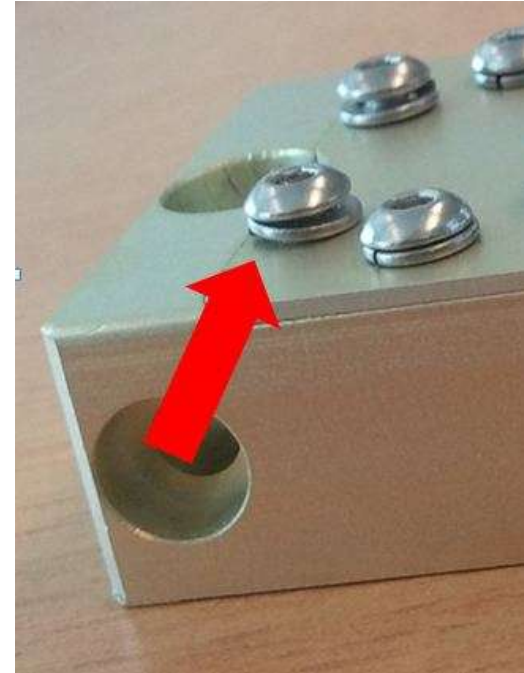
Connection not Functional

Screw not Tightened

Glue not Cured

Bond not tight

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Movip Assembly Risk Model

Assembly Defect Opportunities

Cleaning

Coating

Adjustment

Excess Part

.....



Movip Assembly Risk Model

Prediction based on DPMO/Defect Opportunity

$$ZHDR = 1 - \prod_{i=1}^{DO} [1 - DPMO_i]$$

Movip Assembly Risk Model

Models

IMEC EDM IPC7912 Model PCBA's

Reference Part (PCB)

Movip IMEC Model (Virtual connection)

Connection Assemblies

Bolt/Nut/Rings

No Connection Assembly

Clicking Scales (Telephone)

Glue drops (no BOM item)

Different connection technologies



Movip Assembly Risk Model

Risk Mitigations strategies when predicted ZHDR > Required ZHDR

Design

Production Process



Testing

MoVip
Projectpartners

ASML
Assembleon
PHILIPS

 **FEI COMPANY**
TOOLS FOR NANOTECH



Fiberworx

ASML

Confidential

Slide 24
9 October 2012



Functionality Risks
Predict Assembly Performance
Movip Assembly Risk Model
Possibilities

Possibilities

Based on the Known Assembly Risks

Product Cost

Ordering risk parts

Test Time

Logistics

Ordering

Delivery performance

Waste

Time

Supplier Selection

The image features the ASML logo in a bold, dark blue font on the left side. The background is a gradient of light blue, decorated with abstract, flowing white and light blue wave-like patterns that sweep across the frame from the bottom left towards the top right. The overall aesthetic is clean, modern, and professional.

ASML