

VERY Quick Start Version Integrated Circuit Reliability Course

Quick Start Micro Training LLC *Very Quick Start™*
Integrated Circuits Reliability Course

VERY QUICK START VERSION SAMPLE SLIDES

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The Reliability Management and Engineering Sections Apply to More Than Just ICs

Applies to all components that are:

1. Non-repairable
2. Very high level of reliability

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Why is Reliability So Challenging?
Fundamental Problems

- There are multiple failure mechanisms
- For each failure mechanism parts show a distribution of times-to-failure
- Reliability tests are generally destructive

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The 5 Parts to A Reliability Prediction

1% Failing	Reliability Number
90% CL	(Sampling) Confidence Level (CL)
Per Spec Sheet	Part Specifications (Max Frequency, Power, ...)
0-70°C	Allowed Environments
10 Years	Lifetime

**What does this mean?
Should you trust the numbers?**

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Unfortunately for the Pharaoh Cheops
The Great Pyramid's Reliability = 0

All but one of the tombs of the Pharaohs was robbed in ancient times

- What was its specified function?
 - To protect the Pharaoh and his possessions
- What was the specified environment?
 - Anything that happened
- What was the specified lifetime?
 - Eternity
- What was the reliability?
 - Tomb broken into in antiquity
 - Reliability, R = 0

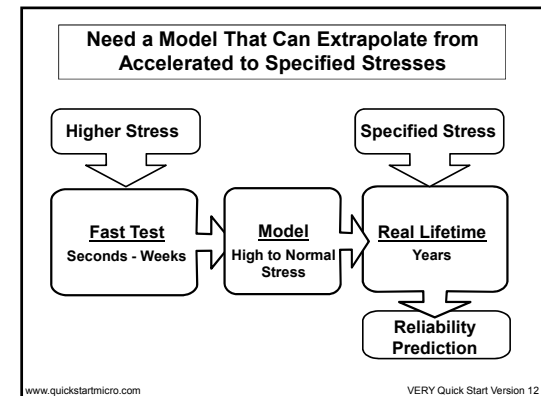
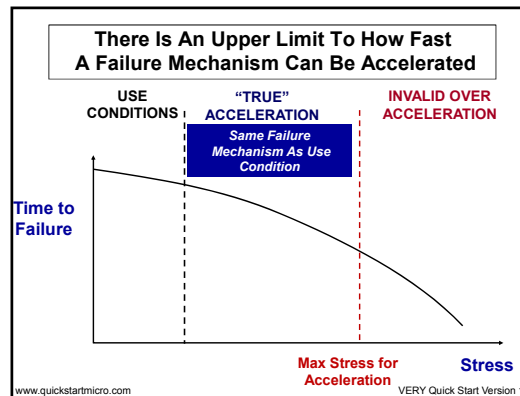
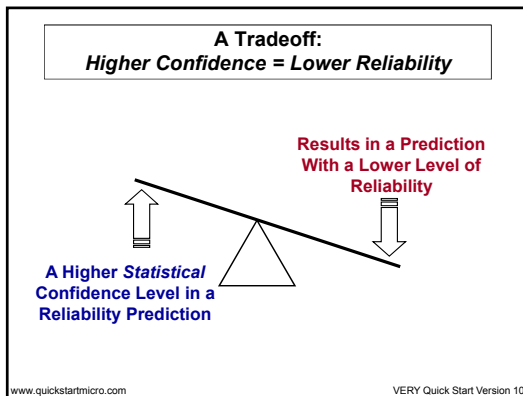
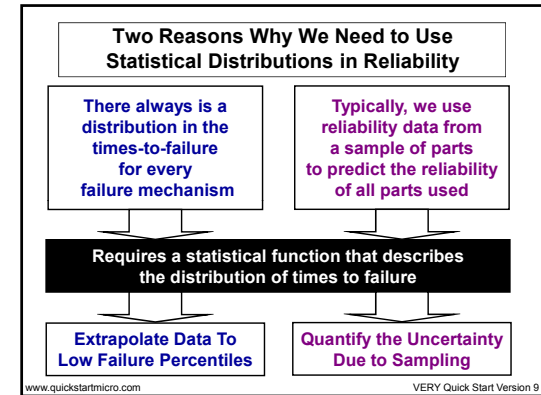
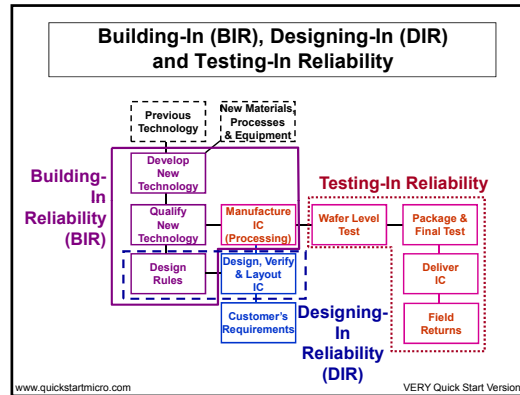
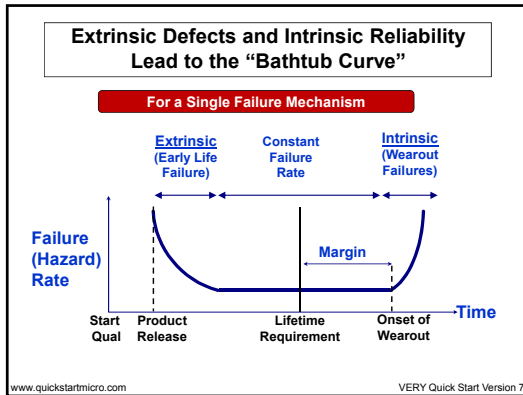
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Cumulative Failure, F(t), and Cumulative Survival, R(t), Example

	Start 100	Year 1	90 Left	Year 2	72 Left
F(t)	0.0		0.1 (=10/100)		0.28 (=28/100)
R(t)	1.0		0.9 (=90/100)		0.72 (=72/100)
F(t) + R(t)	1.0		1.0		1.0

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