



Technical Report of Japan Electronics and Information Technology Industries Association

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**Guideline for IC
Reliability Qualification Plan**

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Table of Contents

	Page
1 Purpose	1
2 Scope of application	1
3 Quality grades and applications	1
3.1 Definition of quality grades (examples)	2
4 Concept of semiconductor failure	3
4.1 Early failure	4
4.1.1 Statistical indicators of early failure	5
4.1.2 Interval estimation method for zero failure case	7
4.1.2.1 Interval estimation method with χ^2 distribution function	9
4.1.2.2 Interval estimation method when employing Weibull distribution	9
4.2 Commonly used period failure	10
4.2.1 Average failure rate during commonly used period	10
4.3 Wear-out failure	13
5 Reliability test	16
5.1 Reliability test plan	16
5.1.1 Design procedure of reliability test plan	16
5.2 Reliability test items	21
5.2.1 Concept of family	24
5.2.1.1 Conducting life test using family	24
5.2.1.2 Verification of early failure rate using family	27
5.2.2 Mission profile (Changes in the actual-use environment and ratio of time)	28
5.2.2.1 Example of reliability test plan considering the mission profile of automotive engine peripherals application (1)	29
5.2.2.2 Example of reliability test plan based on the mission profile of automotive engine peripherals application (2)	31
5.2.2.3 Example of reliability test plan considering the mission profile of application in automotive cabin peripherals	32
5.2.2.4 Example of reliability test plan with regard to humidity	33
5.2.2.5 Example of reliability test plan with regard to temperature difference	36
6 Stress test (items)	38
7 Reference tests	39
8 Screening	40
9 Summary of assumptions in equations, numerical values, etc.	43
10 Calculation examples for mission profiles (sample lifetime test and test time calculation)	44
Annex A [Early failures] (Informative) Deriving at the distribution function in case of zero failures	47
Annex B [Early failure] (Informative) Equivalent failures when the number of failures is zero	50
11 Bibliography	52
Explanatory Notes	53

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Guideline for IC Reliability Qualification Plan

1 Purpose

Semiconductor vendors, before commencing reliability qualification tests*, shall prepare a detailed reliability test plan after consultation with the user of their semiconductor integrated circuit product in order to conduct the test efficiently.

The following are some examples of the qualification test planning methods to satisfy the appropriate reliability test conditions, based on the quality standards needed in the semiconductor integrated circuit use environments classified by type of use. In setting reliability targets, IC uses were divided into automotive applications and general applications and classified into grades. In automotive use, two grades were established, depending on application. The annual operating time, useful life, etc., are defined for each grade. The method for verifying early failure and also for verifying wear-out failure are identified clearly to propose the suitable reliability test. At the same time, this approach employs a screening method aimed at reducing early failures in order to assure the reliability of semiconductor integrated circuits appropriately.

The test conditions and acceleration factor values in the Guideline are examples of calculations on the reliability test conditions done to examine into whether or not the item satisfies with the required quality standards. The values indicated does not necessarily guarantee the reliability of all semiconductor ICs.

Note* Qualification test: Test conducted by the semiconductor vendor with attention to the quality required by its product users.

2 Scope of application

The guideline shall apply to microprocessors, ASICs, SoCs, memory and other semiconductor IC products for automotive and general applications.

3 Quality grades and applications

Semiconductor ICs differ in quality level, operating time and operating environment required in the market, depending on their application in products. As an example of designing test plans, they have been classified largely into three grades – namely, Automotive Use A, Automotive Use B and General (Consumer) Use. The quality level for each grade and the criteria to satisfy the level have been defined, as shown in

Table 1.

Note Further explanation of **Table 1** is given below as examples of how conditions for each grade are satisfied.

Early failure rate See Section 4.1.1

Average failure rate See Section 4.2.1