

Commercial and Industrial Grade Products

1.0 INTRODUCTION

This application note outlines the differences between the products of the commercial and industrial grade, and focuses on explaining the differences of Chrontel’s production classification and products management policy for the commercial and industrial grade products.

2.0 THE DIFFERENCE OF COMMERCIAL AND INDUSTRIAL PRODUCTS

Generally, the products of electronic components and semiconductors are classified to commercial and industrial grade according to the ambient operation temperature and the tolerance of power supply. For the commercial grade products, the ambient operation temperature is from zero degree C to 70 degree C, and the tolerance of power supply is within 5%. And for the industrial grade products, the corresponding specifications should be from minus 40 degree C to 85 degree C and 10%.

The differences are determined by the applications actually. In fact and generally, the commercial grade products are used in commercial electronic devices, in which the products’ application environment is stable and under room temperature, not likely to be subjected to industrial temperature or power supply variations. The industrial grade products are used in devices or systems including industrial measurement and control, automotive, network and other high reliability systems, in which the application environment is harsher and of more variations. So, the industrial grade products need more reliability, stability and performance than the commercial grade products.

Besides the differences mentioned above, Chrontel’s industrial grade products are generally distinguished from the commercial grade products by products’ part number, with a special character ‘I’ added to the suffix of the part number and is marked on the top surface of the chip.

3.0 THE DIFFERENCE OF OPERATION AND POLICY

The following chapter described the details of the differences in operation and policy for commercial and industrial grade products.

3.1 Production Qualification and Reliability Tests

Table 1: Qualification and Reliability Test Items

TEST ITEM	COMMERCIAL GRADE	INDUSTRIAL GRADE
V _{BD} (Breakdown Voltage)	√	√
TDDB (Dielectric Breakdown)	√	√
EM (Electromigration)	√	√
HCI (Hot Carrier Injection)	√	√

TEST ITEM	COMMERCIAL GRADE	INDUSTRIAL GRADE
Epoxy Thickness	√	√
Epoxy Void	√	√
Die Shear	√	√
Die Tilt	√	√
Die Chipping	√	√
Loop Height	√	√
Ball Size	√	√
Ball Height	√	√
Ball Shear	√	√
Wire Pull	√	√
Wire Sweep	√	√
Plating Thickness	√	√
Plating Composition	√	√
Solderability	√	√
Coplanarity	√	√
Standoff Height	√	√
Warpage	√	√
Cratering	√	√
Preconditioning	√	√
Moisture Sensitivity	√	√
Mark Permanency	√	√
PCT (Pressure Cooker)	√	√
TCT (Temperature Cycle)	√	√
HTSL (High Temperature Storage Life)	√	√
TST (Thermal Shock)	√	√
THT (Temperature Humidity)	√	√
HAST (Highly Accelerated Stress)	√	√
HTOL (High Temperature Operating Life)	√	√
ESD (Electro-Static Discharge)	√	√
Latch-up	√	√

Note: The symbol “√” indicates that the test item should be completed in qualification procedure.

3.2 Production Final Test

Table 2: Production Final Test Items

TEST ITEM	COMMERCIAL GRADE	INDUSTRIAL GRADE
Room Temperature test	√	√
High temperature test (85 degree C)	×	√
Low temperature test (- 40 degree C)	×	× ²
Power supply variation in ATE test	5%	10%

Note:

- 1,The symbol “√” indicates that the test item should be completed in qualification procedure.
- 2, Low temperature test maybe available for some products, please contact ChronTEL for detail.

3.3 Product Failure Rate Target

Table 3: Failure Rate Target

ITEM	COMMERCIAL GRADE	INDUSTRIAL GRADE
Failure Rate Target	<200 PPM	<150 PPM

3.4 Product Change Notification

Table 4: Product Change Notification

ITEM	COMMERCIAL GRADE	INDUSTRIAL GRADE
Package Change Notification	3 months	6 months
Wafer / Die Change Notification	3 months	6 months
EOL Notification	6 months + Last time buy	12 months + Last time buy

Note: Package Change is a change of the products' package type or a change of assembly house. Wafer/die Change is a change of the products' internal circuitry or a change of wafer foundry. EOL is the products' end of life. Product changes are typically identified by a products' unique date code and /or part number as default.

3.5 Product Support

The industrial grade products are treated more strictly on the verification of products' quality than the commercial grade products, customer support priority of the industrial grade products is also generally arranged by ChronTEL to be higher than which of the commercial grade products, which covers all the technical and operation support, including and not limited by the software customize support, products feature documentation on customer request, PCN release if necessary and products' preparation and lead time support.

4.0 REVISION HISTORY

Table 3: Revisions

Rev. #	Date	Section	Description
1.0	2013/08/12	all	First release
1.1	2014/03/03	3.1	Update the Qualification and Reliability Test Items
1.2	2014/09/23	Appendix A	Add Appendix A

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APPENDIX A

Purchaser acknowledges having read and understood the terms and conditions in application note AN-B037, especially those applicable to Chrontel's industrial grade devices.

Company Name: _____

Signature: _____

Printed Name: _____

Title: _____

Please complete the required information in Appendix A, then remove this page and fax it back to the Chrontel Sales Department at +1-408-383-9338.