Renesas Electronics
Quality Assurance System

Renesas Electronics Corporation
Quality Assurance Division

October 3, 2013
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Renesas Electronics Group

Quality Policy

We aim to deliver customer satisfaction and enhance society by providing highly reliable and high-quality products and services.

We abide by the following principles in all stages of our business activities—including sales, design, development and manufacturing—in accordance with our corporate quality management system.

We will:

- Comply with all applicable legal and regulatory requirements
- Enhance product safety and trust
- Commit to continuously improve the quality of products and services
- Strive to continually improve our quality management system
## Company Profile

<table>
<thead>
<tr>
<th><strong>Company Name</strong></th>
<th>Renesas Electronics Corporation</th>
</tr>
</thead>
</table>
| **Established**  | November 1, 2002 as NEC Electronics Corporation  
(Started operations on April 1, 2010 as Renesas Electronics Corporation) |
| **Representatives** | Hisao SAKUTA  
Representative Director, Chairman and CEO  
Tetsuya TSURUMARU  
Representative Director, President and COO |
| **Major Operations** | Research, development, design, manufacture, sale and servicing of semiconductor products |
| **Registered Head Office** | 1753 Shimonumabe, Nakahara-ku, Kawasaki, Kanagawa 211-8668, Japan |
| **Headquarters** | Nippon Bldg., 2-6-2, Ote-machi, Chiyoda-ku, Tokyo 100-0004, Japan |
| **Capital Stock** | 153.2 billion yen (As of March 2013) |
| **Sales** | 785.8 billion yen (Fiscal year ended March 2013) |
| **Employees** | 33,840 (Consolidated, as of March 2013) |
| **Stock Exchange** | Tokyo Stock Exchange, First Section  
(Since July 24, 2003, TSE:6723) |
| **Website** | www.renesas.com, japan.renesas.com |
Manufacturing Capabilities

Global

Wafer Fabrication: 1 plants
Assembly & Test: 6 plants

Japan

Wafer Fabrication: 9 plants
Assembly & Test: 5 plants

(Front-end) Wafer Fabrication
(Back-end) Assembly & Test

Beijing
Suzhou
Malaysia
Singapore

Tsuruoka
Yonezawa
Takasaki
Kofu
Naka

Ube
Yanai
Kochi
Saijo
Oita
Kumamoto
(Kawashiri)
Kumamoto
(Nishiki)
Organization of Quality Assurance Division

Quality Assurance Division

- Quality Strategic Planning Dept.
- Quality Control Dept.
- 1st MCU Quality Assurance Dept.
- 2nd MCU Quality Assurance Dept.
- SoC Quality Assurance Dept.
- 1st Analog & Power Devices Quality Assurance Dept.
- 2nd Analog & Power Devices Quality Assurance Dept.
Quality Assurance System

We build quality into the products from the development stage, through continuous improvement of the production processes, in order for more competitive quality and reliability.

In addition to above, we have an established comprehensive quality assurance system with product quality monitoring and customer support on quality, serving for customer’s confidence in our products.

<table>
<thead>
<tr>
<th>Development</th>
<th>Design / Prototype</th>
<th>Production process</th>
<th>Test/inspection</th>
<th>Customer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development flow</td>
<td>Action flow</td>
<td>Information flow</td>
<td>Relevance</td>
<td></td>
</tr>
</tbody>
</table>

Customer Support
- Provision of Quality information
  - user’s guide
- Failure Analysis
- Customer Qualification support
- Quality meetings with customer

Customer Support ensuring customer’s confidence through provision of easy-to-understand documents and technical information, engineering support activities and quality support for customer.

Quality and Reliability improvement
- Failure analysis
- Reliability technology
- Reliability physics
- Data collection

Design Quality Control
- Reliability design
- Design Review
- Process/Packaging structure design
- Product Qualification system

Built-in quality and reliability with design methods optimized for microfabrication and large scaling and design review focusing on points of change.

Process Quality Control
- Document control
- Education
- Operator qualification
- Environment management
- Management of facilities and measuring equipment
- Change control
- Parts/material management
- SPC
- Yield improvement
- Abnormality Control

Activities for built-in quality by process control using scientific and statistical methods and by 4M control. Activities for preventing defective products from leaving the manufacturing plant by detecting unusual data trends and signs of abnormalities at an early stage.

Product Quality Control
- Verification by quality assurance test
- Periodic reliability test
- Warehousing and shipping control

Product quality and reliability level monitoring with sampling inspections and reliability testing.

We build quality into the products from the development stage, through continuous improvement of the production processes, in order for more competitive quality and reliability.

In addition to above, we have an established comprehensive quality assurance system with product quality monitoring and customer support on quality, serving for customer’s confidence in our products.
Procedure of Quality Assurance System

Customer Requirement

Planning stage

Customer Requirement → Market research

Development Requirements

Development & Design stage

Product planning → Review of New Product Development

Design and Development

Prototype stage

Marketing Strategy

Design Review

Electrical characteristics approval → Product qualification

Mass Production release

Mass Production

Purchase Order → Sales Planning

Quality improvement activity / quality information

Incoming Inspection → Production Planning → Production → Inspection

Occurrence of failure

Market & Customer

Failure analysis and corrective action

Reception / Failure Analysis / Reporting
Customer Complaint Handling

- Customer
  - Failure products (Information)
  - Quality Assurance Dept.
    - Failure Analysis
      - Production Dept.
        - Root cause analysis
        - Prevention of reoccurrence
        - Countermeasures
      - Design Dept.
        - Countermeasures
          - Report
          - Tracing and support for Countermeasure implementation
            - Report
              - Sales Dept.
                - Reply
                  - Customer
# Change Control System

<table>
<thead>
<tr>
<th><strong>Customer</strong></th>
<th><strong>Sales Dept.</strong></th>
<th><strong>Quality Assurance Dept.</strong></th>
<th><strong>Design Dept.</strong></th>
<th><strong>Related Engineering Dept.</strong></th>
<th><strong>Manufacturing Site</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Proposal of the change plan</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Review and evaluation of the change plan</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Advance notification</strong></td>
<td><strong>Approval on the change plan</strong></td>
<td><strong>Customer reply confirmation</strong></td>
<td><strong>Prototype evaluation</strong></td>
<td><strong>Review on the evaluation result</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Report</strong></td>
<td><strong>Customer reply confirmation</strong></td>
<td><strong>Decision and order of the change</strong></td>
<td><strong>MP Ramp-stage Control</strong></td>
<td><strong>Mass Production</strong></td>
<td></td>
</tr>
</tbody>
</table>

- Advance notification
- Approval on the change plan
- Customer reply confirmation
- Prototype evaluation
- Preparation of samples and data
- Review on the evaluation result
- Decision and order of the change
- Customer reply confirmation
- Change approval
- MP Ramp-stage Control
- Mass Production

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Corrective Action Flow

**Customer**

**Renesas Electronics**

<table>
<thead>
<tr>
<th>QC Dept.</th>
<th>Engineering Dept.</th>
<th>Production/relevant Dept.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition of abnormality judgment criteria</td>
<td>Occurrence of abnormality</td>
<td>Cause Analysis Retroactive verification, Identification &amp; isolation of the affected products</td>
</tr>
<tr>
<td>Root cause analysis and retroactive verification</td>
<td>Issuance of process non-conformance report</td>
<td></td>
</tr>
</tbody>
</table>

**Notification**

- Notification on defective product shipping

**For defects that are due to design and cannot be closed at factories**

- Analysis, countermeasure planning and determination of corrective action

**Information**

- Information on cause and corrective action

**Decision of treatment on concerned products**

- Instructions on the product and process

- Verification and approval

- Implementation of corrective action

- Effect evaluation

- Horizontal development of corrective action

- Countermeasure on Products / process
# Summary of ISO, TS Certification

## [Japan]

<table>
<thead>
<tr>
<th>Company</th>
<th>ISO9001</th>
<th>ISO/TS 16949</th>
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</thead>
<tbody>
<tr>
<td><strong>Renesas Electronics Corporation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Headquarters (Nippon Building)</td>
<td></td>
<td>(*)</td>
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<tr>
<td>Musashi Site</td>
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<td>(*)</td>
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<tr>
<td>Takasaki Site</td>
<td></td>
<td>Yes</td>
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<tr>
<td>Naka Site</td>
<td></td>
<td>Yes</td>
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<tr>
<td>Kofu Site</td>
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<td>Yes</td>
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<tr>
<td>Kitaitami Site</td>
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<td>(*)</td>
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<tr>
<td>Saijo Site</td>
<td></td>
<td>Yes</td>
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<tr>
<td>Kochi Site</td>
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<td>Yes</td>
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<tr>
<td>Tamagawa Site</td>
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<td>(*)</td>
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<tr>
<td>Sagamihara Site</td>
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<tr>
<td>Yes</td>
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<tr>
<td>(***) = Remote supporting function</td>
<td></td>
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</tr>
</tbody>
</table>
### [Other than Japan]

<table>
<thead>
<tr>
<th>Company</th>
<th>ISO9001</th>
<th>ISO/TS 16949</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renesas Electronics America Inc.</td>
<td>Yes</td>
<td>(*)</td>
</tr>
<tr>
<td>Renesas Semiconductor (Beijing) Co., Ltd.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Renesas Semiconductor (Suzhou) Co., Ltd.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Shougang NEC Electronics Co., Ltd.</td>
<td>Yes</td>
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</tr>
<tr>
<td>Renesas Semiconductor KL Sdn. Bhd.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Renesas Semiconductor (Malaysia) Sdn. Bhd.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Renesas Semiconductor (Kedah) Sdn. Bhd.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Renesas Semiconductor Singapore Pte. Ltd.</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Renesas Electronics Europe Limited</td>
<td>Yes</td>
<td>(*)</td>
</tr>
<tr>
<td>Renesas Electronics Europe GmbH</td>
<td>Yes</td>
<td>(*)</td>
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<tr>
<td>Renesas Electronics (China) Co., Ltd.</td>
<td>Yes</td>
<td>-</td>
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<tr>
<td>Renesas Electronics (Shanghai) Co., Ltd.</td>
<td>Yes</td>
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<tr>
<td>Renesas Electronics Hong Kong Limited</td>
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<td>Renesas Electronics Taiwan Co., Ltd.</td>
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<td>Renesas Electronics Singapore Pte. Ltd.</td>
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