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REVISION HISTORY

REV	DATE	ECN#	DESCRIPTION OF CHANGE
A	09-18-07	37615	NEW DOCUMENT (S Balasubramanian)
B	06-16-07	40691	Addition of Flow Through Requirements in Section 5.17.12 Corporate Policies and Objectives. (S.Buffham)
C	02-24-10	49453	Update references to ISO specs. (L.Krogstad)
D	06-24-10	52018	Updated various sections. (S. Balasubramanian)
MSW			

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03, 200,201,206, 400, 403, 406, 407

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1. PURPOSE

This manual defines the basic quality systems and business procedures required of suppliers who manufacture and/or supply production material and/or services to TriQuint Semiconductor. This manual also defines quality requirements, expectations and business practices for these suppliers to maintain their status as an approved supplier. This manual may be referenced in the Purchasing agreement between the supplier and TriQuint, however any supplier requirements explicitly called out in the purchasing agreement will supersede this document.

2. SCOPE

This document applies to TriQuint's current and prospective Tier 1 suppliers of Materials. The document is applicable across all TriQuint Business units, manufacturing and design sites.

3. REFERENCED DOCUMENTS

3.1) Internal Procedures

Supplier_Ethics	Supplier Code of Conduct
COR.008	Banned and Restricted Substances Specification
COR.102	Supplier Performance Reporting

3.2) External Specifications

ISO/TS 16949	Quality management systems – Particular requirements for the application of ISO 9001 for automotive production and relevant service organizations
ISO 9001	Quality management systems – Requirements
ISO 14001	Environmental Management Systems - Requirements
SA8000	Social Accountability System
EICC	Electronic Industry Code of Conduct
ISO 26000	Guidance on social responsibility
JESD46C	Supplier Product / Process Change Notice
JESD-50A	Special Requirements for Maverick Product Elimination

4. SAFETY PRECAUTIONS

N/A

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5. ABBREVIATIONS

PPAP	Production Part Approval Process
FMEA	Failure Mode Effects Analysis
MSA	Measurement System Analysis
SPC	Statistical Process Control
OPI	Opportunities for Improvement
APQP	Advanced Product Quality Planning and Control Plan
DMR	Discrepant Material Request

6. PROCEDURE

6.1. **Acceptance and Exceptions**

All Suppliers receiving this document must acknowledge that they have read the manual and understood the requirements as outlined in this document. Any deviations and exceptions to the requirements listed in this manual shall be listed in a formal acknowledgement response and must be mutually agreed upon by the supplier and TriQuint.

6.2. **Revisions**

TriQuint may issue updates to this document or to the internal documents referenced here. Suppliers will be notified of revisions accordingly. Suppliers will indicate acknowledgement of the updated requirements and note exceptions if any as described in the Acceptance and Exceptions section above

6.3. **Annual Review of Supplier Quality Manual**

The TriQuint Supplier Quality Manager is responsible for reviewing the Supplier Quality Manual on an annual basis and making appropriate revisions. The supplier is encouraged to provide feedback to TriQuint regarding the content of the manual for the purpose of continuous improvement and to ensure an effective working document

6.4. **Supplier Contact Point**

The supplier contact point at TriQuint is always the buyer, unless otherwise specified. All questions, problems or requests for information and visits should always be directed initially to the buyer. The supplier shall not accept any changes to the technical requirements, quantity, pricing, due dates, revision levels and/or quality requirements for the materials or services to be delivered unless authorized via purchase order change notice or revised purchase order issued by the TriQuint buyer.

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6.5. Supplier Qualification Process

TriQuint follows a formal qualification process to qualify new sources. New suppliers are qualified based on survey information obtained, an on-site assessment or a self assessment followed by product evaluation, testing and reliability. The actual assessment will be performed by TriQuint personnel or their authorized agents

6.6. Supplier Survey

The Supplier Survey shall be completed by all prospective suppliers. Qualified suppliers shall complete the survey every three years or more often if requested by the TriQuint Supplier Quality Engineer and will be kept on file by TriQuint. New suppliers will be required to complete the survey as part of the supplier qualification process.

6.7. Supplier On-Site Assessment

TriQuint or their authorized agents reserves the right to perform on-site assessments/audits of supplier's facilities, for the purpose of determining capabilities and compliance with TriQuint quality management system requirements. Assessment will be based on a formal agenda that will be issued in advance of the audit. A formal audit report will be issued to the supplier that may include gaps and opportunities for improvement (OFI) if any. Formal corrective actions are required for the gaps identified during the audit. Responses to OFI are required but formal corrective actions are not necessary. A written response to the corrective action request will be required within (30) thirty days from the notification of finding unless otherwise indicated by TriQuint.

6.8. Supplier Performance

Supplier performance will be periodically monitored by TriQuint and scorecards will be issued to top tier suppliers in accordance with COR.102. Suppliers will be rated for performance against elements such as Quality, Cost, Delivery and Responsiveness. Suppliers are expected to review the scorecards and work on continual improvement projects as requested in the scorecard.

6.9. Corporate Policies and Objectives

It is the policy of TriQuint that materials and services used in the design and production of TriQuint products be procured in a professional and ethical manner that results in achieving the lowest total cost of ownership for TriQuint and for our customers. Furthermore, all purchased materials and services must be in compliance with agreed upon requirements, be delivered on time, and have competitive lead times and prices.

6.10. Supplier Ethics Policy

At TriQuint Semiconductor we have built our reputation on unquestionable ethical behavior and consider this belief to be a key contributor to our success. TriQuint expects that all TriQuint employees and suppliers comply with TriQuint's Code of

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Conduct regardless of local business practices or social customs. Suppliers should refer to TriQuint-Supplier ethics policy document available on the TriQuint website

7. REQUIREMENTS

7.1. **Quality Management system**

Suppliers are expected to have an effective quality management system in place that assures consistent on-time delivery of conforming product. Registration to ISO 9001 by an accredited third party certification body is required at a minimum while conformity to ISO/TS 16949 is encouraged as the long-term goal. The supplier is required to inform TriQuint immediately if, for any reason, their certification is not renewed or is revoked. In addition, the supplier shall inform TriQuint in the event that there is a change in the Registrar or registration status. The supplier shall notify TriQuint when there are any mergers, acquisitions or affiliations associated with the supplier. TriQuint will verify the continuity of the supplier's quality management system and its effectiveness.

7.2. **Regulatory Agency Compliance**

It is the supplier's responsibility to ensure that their product is in compliance with all applicable regulatory agency and product safety requirements and claims, including those stated in supplier published product advertising, catalogues and data sheets. The supplier must be prepared at all times to substantiate compliance by providing copies of test reports and making records available for review if requested.

7.3. **Environmental Specification and certification**

TriQuint is committed to the protection and preservation of the environment in all its business operations. We strive to control impacts to the environment from business activities while promoting environmental improvement throughout our entities and associates. The supplier shall maintain an environmental management system. Registration to ISO 14001 by an accredited third party certification body is encouraged. Additionally suppliers must comply with requirements as defined in COR.008- Banned and Restricted Substances Specification.

7.4. **Social Accountability**

The supplier shall be committed to ethical conduct, full compliance to applicable national and international laws and respect for human rights in the spirit of SA8000 and/or guidelines as defined in ISO26000. Suppliers are encouraged to certify or self assess to SA8000, EICC standards or ISO26000.

7.5. **Risk Management Policy**

The supplier shall have an up-to-date documented Risk Management/Business continuation plan ensuring that in the event of disaster or inability to perform, the supplier has a plan to take necessary action in order to minimize and/or eliminate such risk, to TriQuint. The Business continuation plan shall be provided along with the completed survey.

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7.6. Manufacturers Representatives, Distributors & Brokers

Manufacturer's Representatives, Distributors and Brokers accepting TriQuint purchase orders must recognize that all procurement documentation requirements apply to them as well as to the material manufacturer. As the direct supplier to TriQuint and as a representative of the manufacturer, it is the supplier's responsibility to assure that the manufacturer's part supplied meet all TriQuint procurement documentation requirements.

7.7. Responsibility of Test and Inspections

The supplier is responsible for the performance of all tests and inspection requirements as specified in the procurement documentation. The supplier may use his own or other suitable facilities. TriQuint reserves the right to witness or perform any of these tests and inspections set forth in the procurement documentation and to audit the data resulting from the supplier's performance of these tests and inspections. Suppliers agree that any incoming inspections performed by TriQuint or its subcontractors resulting in a non conformance to specification will be rejected.

7.8. Product Packaging and Protection

Components are to be packaged to prevent part damage during shipping for the applicable transportation mode and utilizing materials friendly to the environment and easy to dispose of or recycle at the receiving facility. No packing or packaging material that is used shall crumble, flake, powder or shed. The supplier shall also assure that any special packaging and preservation considerations contained within the product specification, such as for ESD sensitive parts are met. Wooden pallets used in shipments should be heat treated. Recyclable containers are encouraged where appropriate and we encourage our suppliers to develop these approaches with TriQuint where the practice makes business sense. We encourage the use of the supplier's standard techniques to minimize costs.

7.9. Notification of Product Quality or Delivery Issues

7.9.1. Deviations

When it is known by the supplier prior to the start of production that there is some product feature that may have a requirement that is desirable to deviate from, either because of manufacturing ease, lead-time or cost reduction, or some other benefit either to the supplier or to TriQuint, the supplier must obtain written approval for such deviation from the TriQuint buyer prior to implementing any change. The request must be in writing and contain (as a minimum) the following:

- Purchase order number and line item number.
- SAP Material number and description.
- Specification or drawing requirement (include page number or print location) and revision level.
- Actual deviated condition that is being proposed.

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Material Deviation Requests will not be accepted after receipt of material.

7.9.2. Non conforming Product

Delivery of product to TriQuint not meeting supplier's internal manufacturing specifications for measurements as identified on the control plan, acceptance criteria, outlier limits, Maverick limits or TriQuint specifications requires:

- Supplier to review each non-conformance through a cross-functional Material Review Board (MRB) to determine acceptability of shipping material to TriQuint.
- Issuance of a Discrepant Material Report (DMR) to the TriQuint Supplier Quality Engineer specifying nature of non-conformance, along with the associated data and supplier's MRB explanation of why the supplier believes the non-conformance will not impact TriQuint product performance, quality or yield.
- Approval of the DMR disposition by TriQuint supplier quality department will be needed prior to the lot being released from hold.

7.10. Product and Process Changes

The Supplier shall have a process to manage and track changes in requirements and product data. This shall include revision history documentation of the resulting changes in engineering documentation.

The Supplier shall provide a formal PCN to TriQuint outlining the product/process changes made after the product has been qualified by TriQuint in accordance with the requirements of JESD46C Supplier Product / Process Change Notice. All PCNs shall be sent to **supplier_pcn@tqs.com**. Following are some of the change notification criteria but not limited to the list below:

- Site location change.
- Design changes driven by the supplier.
- Packaging change.
- Process flow change including addition or removal of a process/inspection step, change in sequence of operation, which affects product performance, reliability, quality and safety.
- Process input parameter changes exceeding 10% of qualified process.
- Material source change or BOM change.
- Changes to test system, test plan or test code.
- Changes that affect current compliance to Environmental standards such as RoHS and lead free requirements.

At minimum a 90 day notification with supporting data is needed prior to the implementation of the change. TriQuint may request samples to perform internal

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evaluations if needed. A formal notification will be sent to the supplier accepting or rejecting the PCN.

7.11. Obsolescence Notifications

The supplier shall provide six (6) months notice prior to obsolescence of any TriQuint qualified part and shall include a suggested replacement part if one exists. Purchasing will contact the supplier to negotiate last time buy (LTB) quantities and last time ship (LTS) requirements.

7.12. Sub-supplier Procurement Requirements

Suppliers shall manage their commodity suppliers and sub-contractors for any outsourced process using a structured supplier management process that includes but is not limited to the following:

- Sub-Supplier selection and qualification
- Sub-Supplier monitoring
- Sub-Supplier performance evaluation through periodic assessments and audits

Suppliers shall flow down TriQuint specific requirements and control their sub-suppliers to ensure compliance with any applicable specifications provided by TriQuint. The supplier shall also flow down process requirements outlined in this document. TriQuint reserves the right to perform on-site assessments/audits of sub-supplier's facilities, for the purpose of determining capabilities and compliance with TriQuint quality management system requirements.

7.13. TriQuint Designated Sources

Where specified in the TriQuint purchasing specification, the supplier shall purchase products, materials or services from TriQuint designated sources. However, the Supplier is responsible to ensure that items procured from such sources meet all applicable technical and quality requirements.

7.14. Product Identification

The Supplier shall have a system of manufacturing control such as a route card, run card, control software, etc, used for the identification of products with regard to type, lot or serial number, and their status during all stages of production and test. Shipments containing finished products shall be labeled according to relevant TriQuint specifications. In case of discrepant material, supplier will provide all traceability and identification information as required by TriQuint.

7.15. Product Traceability

The Supplier shall have a system for ensuring finished product traceability back to the factory, date code and lot or serial number as specified by TriQuint. The Supplier shall also have a system for identifying and tracing critical raw materials back to the source. All received lots shall be traceable back to their corresponding inspection lot and shall be clearly identified upon receipt.

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7.16. Process Control Plan

Suppliers shall develop a process control plan. The intent of a process control plan is to control the product characteristics and the associated process variables to ensure capability (around the identified target or nominal) and stability of the product over time. The process control plan is a living document and must be updated to reflect the addition/deletion of controls based on experience gained by producing parts. Suppliers may use their own format, but the Control Plan must include all items contained in the AIAG APQP Manual.

7.17. Statistical Process Control

Suppliers are required to apply effective statistical process controls where applicable and monitor critical to quality parameters using appropriate SPC techniques. When requested by TriQuint suppliers should provide control charts for specific parameters and/or make the charts available during audits.

7.18. Capability Indices

Suppliers should have a procedure in place to calculate process capability indices such as Cp and Cpk's using appropriate statistical techniques. The supplier shall report Cp and Cpk metrics on critical to quality parameters on a monthly basis. TriQuint requires Cpk's on critical processes to be above 1.33 (4σ). The supplier shall develop an improvement plan to achieve this goal for parameters with Cpk below 1.33. Suppliers are further encouraged to continue with improvement efforts to target a Cpk > 1.67 (5σ). Suppliers shall establish a procedure to consider tightening all critical to quality in-process specifications where a Cp,k exceeds 2.3 for two consecutive quarters. While tightening the specifications, suppliers should ensure that the spec limits do not exceed 6 Sigma from the process median of the two quarters and that the tightened limits assure a Cp,k of ≥1.33. This procedure may be reviewed by the TriQuint Supplier Quality Engineer.

7.19. Corrective Action and Failure Analysis

TriQuint will use a Supplier Corrective Action Request (SCAR) as the trigger to engage the supplier for a request for containment, root cause analysis, corrective action and verification. All responses from the supplier shall be in an 8D format. The initial containment response (3D) needs to be within 1 business day of receipt of the SCAR. The final report/analysis (8D) needs to be delivered to TriQuint within 10 business days. The supplier shall also use the 8D format to correct any findings resulting from assessments. Failure Analysis capabilities and support needs to be identified in the Quality Plan

7.20. Reports

The supplier may be requested to provide periodic reports or summary reports of inspection or test results. The TriQuint Supplier Quality Engineer may review the

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metrics and reporting formats and frequency. Performance reporting requirements are documented in the supplemental commodity specific documentation. Additionally the supplier may be requested by the TriQuint Supplier Quality Engineer to provide periodic summary reports of Failure Analysis and evaluation results on SCAR's / RMA's. Suppliers shall maintain a summary of all key measurements, definitions, reporting frequency, goals and continuous improvement targets.

8. ADDITIONAL RECOMMENDATIONS

In addition to the above requirements suppliers are encouraged to implement the following processes. TriQuint reserves the right to make any of these processes a requirement in future releases of this manual.

8.1. Process Flow Diagram

Supplier is encouraged to develop a comprehensive flow diagram of the overall process from receipt of purchased material to shipping. This diagram shall clearly describe the production process steps and sequence, and meet the specified TriQuint needs, requirements and expectations.

8.2. Measurement System Analysis

Equipment used for test, inspection and measurement of TriQuint product shall be calibrated and deemed fit for use. TriQuint recommends the use of measurement Systems Analysis (MSA) studies that looks at gage repeatability & reproducibility (GR&R), bias, linearity, stability, of all new or modified gauge, measurement, and test equipment to demonstrate the capability of the equipment and measuring process. For details on how to perform a MSA, please refer to the AIAG Measurement System Analysis Manual.

8.3. Failure Mode and Effect Analysis (FMEA)

It is strongly recommended that the supplier develops Design and Process FMEA's and uses the results to determine the appropriate test and inspection points as well as appropriate control methods. A single design or process FMEA may be applied to a process manufacturing family of similar parts or materials if reviewed for commonality by the Supplier. Additional information can be found in the AIAG FMEA Manual

8.4. Maverick Lot Program

TriQuint encourages suppliers to have a Maverick lot program in place in compliance **JESD-50A** requirements.