



## Corporate Quality Manual

Semtech Corporation  
200 Flynn Road  
Camarillo, CA 91320  
(805) 498 2111  
[www.semtech.com](http://www.semtech.com)

1.	Quality Management System (QMS) Overview .....	5
1.1.	QMS Process & Sequence.....	5
1.2.	Quality Management System Policies .....	5
1.3.	Quality Manual Policies .....	5
1.4.	Control of Documents .....	6
1.5.	Control of Quality Records .....	6
2.	Core Values.....	6
2.1.	Teamwork and Innovation in all areas.....	6
2.2.	Treat all individuals with dignity and respect.....	6
2.3.	Honesty and Integrity in all we do.....	6
2.4.	Open and direct communications.....	7
2.5.	Fiscal responsibility .....	7
3.	Quality Policy .....	7
4.	Semtech's Leadership Team Commitment and Responsibilities.....	7
4.1.	Most Important Tasks (MITs).....	8
4.2.	Department Roles & Responsibilities .....	8
4.2.1.	Administration & Finance .....	8
4.2.2.	Corporate Technical Officer (CTO) .....	8
4.2.3.	Human Resource.....	8
4.2.4.	Sales & Marketing.....	8
4.2.5.	Information Services.....	9
4.2.6.	Operations and Manufacturing.....	9
4.2.7.	Quality & Reliability .....	9
4.3.	Business Unit Manager's Roles & Responsibilities.....	9
4.3.1.	Reference Documents – Additional Details.....	9
5.	Management Representative(s).....	9
6.	QMS Continuous Improvement .....	9
7.	Customer Focus .....	10
7.1.	Customer Care .....	10
7.1.1.	Policies.....	10
7.1.2.	Process Description overview.....	10
7.1.3.	Responsible Function/Business Unit .....	10
7.1.4.	Reference Documents – Additional Details.....	10
7.2.	Customer Requirements Review .....	10
7.2.1.	Process Description Overview .....	10
7.2.2.	Responsible Function/Business Unit .....	11
7.2.3.	Reference Documents – Additional Details.....	11
7.3.	Customer Notifications .....	11
7.3.1.	Change Notifications .....	11
7.3.2.	End-of-life Notification .....	11
7.3.3.	Quality Alerts.....	11
7.3.4.	Process Description Overview .....	12
7.3.5.	Responsible Function/Business Unit .....	12
7.3.6.	Reference Documents – Additional Details.....	12
7.4.	Failure Analysis.....	12
7.4.1.	Policies.....	12
7.4.2.	Responsible Function/Department.....	12
7.4.3.	Process Description Overview .....	12
7.4.4.	Reference Documents – Additional Details.....	12
8.	Management Review .....	13
8.1.	QMS Continuous Improvement .....	13
8.2.	Quarterly Business Reviews.....	13
8.3.	Site QMS Reviews.....	13
8.4.	Responsible Function/Business Unit.....	14
8.5.	Reference Documents – Additional Details.....	14

9.	Resource Management .....	14
9.1.	Training and Development.....	14
9.2.	Infrastructure.....	14
9.3.	Work Environment.....	14
9.4.	Reference Documents – Additional Details.....	14
10.	New Product Introduction.....	15
10.1.	Phase 1: Product Definition.....	15
10.2.	Phase 2: Product Design.....	15
10.3.	Phase 3: Design Validation.....	16
10.4.	Phase 4: Qualification .....	16
10.5.	Design Modifications .....	16
10.6.	Responsible Function/Business Unit .....	16
10.7.	Reference Documents – Additional Details.....	17
11.	Managing Customer Contracts.....	17
11.1.	Process Description Overview .....	17
11.1.1.	Responsible Function/Business Unit.....	17
11.1.2.	Reference Documents – Additional Details .....	17
12.	Documentation and Key Datafile Management.....	18
12.1.	Policies.....	18
12.2.	Quality Records.....	18
12.3.	Responsible Function/Business Unit .....	18
12.4.	Reference Documents – Additional Details.....	18
13.	Supplier Management .....	19
13.1.	Qualification of Wafer Fab Processes.....	19
13.1.1.	Policies.....	19
13.1.2.	Responsible Function/Business Unit .....	19
13.1.3.	Process Description Overview .....	19
13.1.4.	Reference Documents – Additional Details .....	20
13.2.	Qualification of Assembly and Final Test Processes .....	20
13.2.1.	Policies.....	20
13.2.2.	Responsible Function/Business Unit .....	20
13.2.3.	Process Description Overview .....	20
13.2.4.	Reference Documents – Additional Details .....	20
13.3.	Supplier Corrective Action (SCAR).....	20
13.3.1.	Policies.....	20
13.3.2.	Responsible Function/Business Unit .....	21
13.3.3.	Process Description Overview .....	21
13.3.4.	Reference Documents – Additional Details .....	21
13.4.	Supplier Audits.....	21
13.4.1.	Process Description Overview .....	21
13.4.2.	Responsible Function/Business Unit .....	21
13.4.3.	Reference Documents – Additional Details .....	21
13.5.	Supplier Report Cards.....	21
13.5.1.	Policies.....	22
13.5.2.	Responsible Function/Business Unit .....	22
13.5.3.	Process Description Overview .....	22
13.5.4.	Reference Documents – Additional Details .....	22
14.	Purchasing.....	22
14.1.	Purchasing Control Information.....	22
14.2.	Purchasing Information.....	22
14.2.1.	Verification of Purchased Product.....	22
14.2.2.	Control of Production and service .....	23
14.2.3.	Validation of Processes for Production and Service.....	23
14.2.4.	Reference Documents – Additional Details .....	23
15.	Managing Non-Conforming Material .....	23

15.1.	Policies .....	23
15.2.	Process Description Overview .....	24
15.3.	Responsible Function/Business Unit .....	24
15.4.	Reference Documents – Additional Details .....	24
16.	Manufacturing and Operations Controls .....	24
16.0.1	Reference Documents – Additional Details .....	24
16.1.	Product Identification and Traceability .....	24
16.1.1.	Reference Documents – Additional Details .....	25
16.2.	Handling, Storage, Packaging, Preservation and Delivery.....	25
16.2.1.	Reference Documents – Additional Details .....	25
16.3.	Customer Property .....	25
17.	Measurement, Analysis and Improvement.....	25
17.1.	Customer Satisfaction .....	25
17.2.	Internal Audits.....	25
17.2.1.	Policies.....	25
17.2.2.	Process Description Overview .....	26
17.2.3.	Responsible Function/Business Unit .....	26
17.2.4.	Reference Documents – Additional Details .....	26
17.3.	Calibration .....	26
17.3.1.	Policies.....	26
17.3.2.	Responsible Function/Business Unit .....	26
17.3.3.	Reference Documents – Additional Details .....	27
17.4.	On-Going Reliability Testing.....	27
17.4.1.	Responsible Function/Business Unit.....	27
17.4.2.	Reference Documents – Additional Details .....	27
18.	Corrective Action Request System (CAR8D) .....	27
18.1.	Internal Corrective Action System .....	27
18.1.1.	Policies.....	27
18.1.2.	Responsible Function/Business Unit .....	27
18.1.3.	Process Description Overview .....	27
18.1.4.	Reference Documents – Additional Details .....	28
19.	Preventive Action .....	28
19.1.	Preventive Action System .....	28
19.1.1.	Reference Documents – Additional Details .....	29
19.2.	Process Control Plans.....	29
19.2.1.	Policies.....	29
19.2.2.	Responsible Function/Business Unit .....	29
19.2.3.	Reference Documents – Additional Details .....	29
20.	Appendix A: Semtech Sites Requiring Quality Manual Supplements .....	29
21.	Appendix B: Site Application of QMS Process.....	30
22.	Appendix C: Organization Charts .....	33
22.1	Semtech Corporation .....	33
22.2	Q&R Functional Organization .....	34
23.	Appendix D: QMS Sequence & Interaction.....	35
24.	Appendix E: Processed Based Quality Management System .....	36
25.	Appendix F: QMS Relationship with ISO 9001 .....	37

## 1. Quality Management System (QMS) Overview

### 1.1. QMS Process & Sequence

Semtech Corporation determined the need for fifteen core quality management system processes that are applicable throughout the corporation:

- Customer Focus
- Semtech's Leadership Team Responsibilities
- Management Review
- Most Important Tasks (MITs)
- Resource Management
- New Product Introduction
- Managing Customer Contracts
- Documentation & Key Datafile Management
- Supplier Management
- Purchasing
- Managing Non-Conforming Material
- Manufacturing & Operation Controls
- Measurement, Analysis & Improvement
- Corrective Action Request System
- Preventive Action

The sequence and interaction of these processes is described in 23. Appendix D: QMS Sequence & Interaction.

Semtech Corporation's Quality Management System ensures that:

- a. The entire organization focuses on customer requirements (both internal and external) and that business processes are in place to enable these requirements to be fulfilled;
- b. The criteria and methods needed to ensure that both the operation and monitoring of these processes are effective;
- c. The Quality Management System complies with the requirements of ISO 9001 and other appropriate QMS standards;
- d. Resources and information necessary to support the operation and monitoring of these processes are available;
- e. Product quality, product reliability, and business practices meets or exceeds the quality, reliability and performance requirements demanded by ourselves and our customers;
- f. Quality objectives are set and are consistent with our quality policies;
- g. Methods exist to monitor, measure and analyze these processes; and,
- h. Actions are taken to achieve planned results and continual improvement of these processes.

### 1.2. Quality Management System Policies

The following QMS policies are applicable company wide:

- Individuals engaged in the review and/or approval of QMS processes implemented by a Notes application database shall be provided a unique Notes electronic address by MIS.
- The unique Note address stamp assigned during the course of review or approval for QMS processes implemented by a Notes application is equivalent to handwritten approval.

As defined within this Quality Manual, Semtech Corporation continues to meet the documentation requirements established in ISO 9001 standard to include;

- A quality manual, and quality policy
- Quality objectives established through our MITs program
- Documented procedures and records required by ISO 9001 and other regulatory standards or statutes.
- Documents and records necessary to demonstrate the effective planning, operations and control of our processes

### 1.3. Quality Manual Policies

Quality & Reliability group (Q&R) maintains this document as the Corporate Quality Manual. This corporate quality manual:

- a. Specifies Semtech's Core Values
- b. Specifies the corporate Quality Policy.
- c. Specifies and describes the core quality management system processes and their sub-processes.
- d. References lower level documents that are implemented company-wide.
- e. Provides guidance and policies for processes or sub-processes that may be implemented or customized at specified company sites.
- f. Specifies which company site is required to have a supplemental quality manual.
- g. Specifies which quality system processes are applicable at each company site.

Semtech sites may require quality manual supplements when QMS processes deviate or need to be clarified to ensure effective local implementation. The Sr. Vice President of Q&R determines which sites are required to have quality manual supplements to this Corporate Quality Manual. The sites requiring a quality manual supplement are defined in; Appendix A: Semtech Sites Requiring Quality Manual Supplements. The local site ISO Management

representative is responsible to prepare and maintain the quality manual supplement.

Semtech maintains certain quality management system documents that are applicable company wide in the corporate document control databases.

Additions or exceptions to the corporate procedures are maintained at local sites. Corporate quality assurance personnel and local quality assurance personnel approve exceptions to corporate quality procedures.

Since Semtech Corporation is a company of many sites, some sites may only be required to implement and maintain a subset of QMS processes and/or their sub-processes. The Vice President of Q&R determines which QMS processes and/or sub-processes are required for each Semtech site.

The QMS requirements for each site are specified in Appendix B: Site Application of QMS Process.

The site ISO Management Rep ensures that the combination of corporate procedures and site procedures address all the quality management system requirements.

#### **1.4. Control of Documents**

Semtech Corporation maintains a documented procedure identifying and controlling the use of its production documents. Semtech Corporation also maintains a documented process for enabling revision control and approval routings within our QMS. All electronically controlled documents are retrievable and readable with access down to points of use.

#### **1.5. Control of Quality Records**

Semtech Corporation defines quality records as records that provide evidence of conformity to requirements and of the effective operation of the QMS.

Semtech Corporation maintains a documented procedure and controls required for the identification, storage, protection, retrieval, retention and disposition of such records. Semtech's quality records are legible, readily identifiable and retrievable.

## **2. Core Values**

Semtech's Leadership Team (SLT) has developed this list with the idea of "pursuing work and life with enthusiasm, creativity and a passion for excellence" embodied in five Core Values.

- Teamwork and innovation in all areas
- Treat all individuals with dignity and respect
- Honesty and integrity in all we do
- Open and direct communications
- Fiscal responsibility

The SLT has defined these core values within a few key points.

### **2.1. Teamwork and Innovation in all areas**

Key points;

- Common purpose; we all need to row in the same direction
- Create an environment that facilitates freedom to innovate & achieve extraordinary results
- Challenge the status quo, take measured risks, and resist conventional thinking
- Learn to win and lose as a team

### **2.2. Treat all individuals with dignity and respect**

Key points;

- Treat people the way you want to be treated
- Attack the problem not the person
- Respect and value diversity of experience, culture and opinions
- Learn from everyone – peers, subordinates, bosses, competitors and customers

### **2.3. Honesty and Integrity in all we do**

Key points;

- Never compromise your integrity
- Hold everyone accountable and recognize each other's contributions
- Explicitly communicate goals and standards of behavior

- Do the right thing even when no one is looking or will ever find out

#### **2.4. Open and direct communications**

Key points:

- Communicate clearly and candidly
- Challenge people, but learn to listen
- Focus on what is right not who is right
- Acknowledge that debate contributes to productive meetings

#### **2.5. Fiscal responsibility**

Key points:

- Focus on efficiencies of time, work effort, decision making and \$ expenditures
- Build a plan and work to meet or exceed that plan
- Treat every \$ of the company's money respectfully
- If in doubt, ask your boss

### **3. Quality Policy**

Semtech's Leadership Team has determined that the following quality policy: best expresses their overall intentions and directions for the corporation; includes our commitment to meeting and/or exceeding customer requirements; and, provides a framework for establishing and reviewing quality objectives.

Semtech's Leadership Team reviews this quality policy for suitability periodically throughout the year. Whenever the quality policy is modified, the change shall be communicated using three methods to ensure the quality policy is understood at appropriate levels in the organization. First, Corporate and Business Unit Managers will review the change during their regular Staff meetings. Second, each Site ISO Representative will prepare and send notification using e-mail to appropriate employees. Each site is encouraged to post professional displays of the quality policy as suitable to the environment. Finally, all existing policy statement displays will be changed to reflect the new policy.

Semtech measures the effectiveness of the Quality Policy through a variety of channels. They include but are not limited to;

- Design wins
- Marketing and comparative analysis
- New product introduction through product realization
- Customer Report Cards
- Supplier and Internal quality audits
- Quality system cycle time improvements

### **4. Semtech's Leadership Team Commitment and Responsibilities**

Semtech's Leadership Team is responsible to identify resource requirements, provide adequate resources and assign trained personnel for management, performance of work and verification activities including internal quality audits. The leadership team

## **Quality Policy**

**Semtech Corporation pledges to provide ever-improving value and satisfaction to our customers by:**

- Providing innovative and technically superior products and services that meet or exceed their expectations;
- Continuously improving our organizational performance and capabilities;
- Performing our work to the highest level of quality workmanship;
- Ensuring that our subcontractors and suppliers meet and exceed our quality standards;
- Establishing and reviewing key performance measures & objectives, taking action as needed; and,
- Working to achieve the lowest cost of ownership for our customers and suppliers.

can provide evidence of its commitment to the development and implementation of the QMS and continually improve its effectiveness by communicating to the company of meeting customer as well as statutory and regulatory requirements, establishing the quality policy, ensuring that quality objectives are established, conducting management reviews and ensuring adequate resources. The President and CEO of Semtech Corporation, along with his leadership team, have taken the responsibility and authority as defined within this manual and other relevant corporate documentation, to empower and designate key personnel. This has been communicated and continues to be communicated through our employee indoctrination training.

Additionally, Semtech's Leadership team can ensure that customer requirements are determined and are met with the aim of enhancing customer satisfaction.

#### **4.1. Most Important Tasks (MITs)**

Semtech establishes quality performance objectives at relevant functions and business units by setting quarterly Most Important Tasks (MITs). These performance objectives may include: customer, product, service, operations, market, competitive comparisons, continual improvement, supplier, employee, resource, cost and/or financial objectives. Each Senior Manager: determines in his/her function or business unit the personnel who will have MITs goals; ensures that MITs are measurable and consistent with the quality policy; and, scores the individual's performance to MITs at the end of the quarter.

MITs goals are considered company confidential and are only auditable by Semtech's ISO registrar.

Approved MITs Score sheets are the quality records for this QMS element.

### **4.2. Department Roles & Responsibilities**

#### **4.2.1. Administration & Finance**

Finance provides timely and accurate financial information to managers; analyzes and reports results of operations; identifies, analyzes and reports key sales and operational trends; and, ensures adequate internal controls exists over the Company's assets. In addition Finance ensures assets and liabilities are properly stated and valued in financial reports; prepares accurate financial reports for internal (managers) and external (IRS, SEC) customers.

Finance strives to maximize return on assets and equity; and, ensures the Company operates to drive value for our shareholders, customers and employees.

Administration creates support infrastructure in order to empower our employees and ensure customers and vendor's requirements are fully supported.

#### **4.2.2. Corporate Technical Officer (CTO)**

Corporate Technical Officer leads activities to establish corporate strategies by monitoring, analyzing and reporting major market trends and advances in product and process technology. Corporate Technical Officer participates in the Business Unit's product and technology road map discussions and ensures that the served available market (SAM) for the served platforms is increased by identifying adjacent product opportunities. CTO actively pursues product opportunities via various means such as: intellectual property licensing, product licensing, company acquisition, product line acquisition or by taking an equity position in start-up companies.

#### **4.2.3. Human Resource**

The Human Resource (HR) Department contributes to the bottom-line performance by developing and implementing world class HR business processes, programs and services that attract retain and motivate employees. These business processes ensure that managers are equipped with the tools and knowledge necessary for creating and maintaining a productive and inspiring working environment while optimizing the potential of the human resource at Semtech.

#### **4.2.4. Sales & Marketing**

Sales & Marketing (S&M) provides the corporation timely and accurate booking forecasts by region: by customer, and, by product. Sales and Marketing also manages order entry while providing company-wide sales administration. In addition, S&M communicates with customers on all aspects of business such as pricing, delivery information and backlog management. Through the field application engineering organization, S&M drives design win activities that support future company growth. Sales and Marketing implements product, platform and field sales strategy defined jointly with business units. Sales and Marketing is responsible for market communication, public relations and advertising.

**4.2.5. Information Services**

Information Services establishes the enterprise-wide information & communications architecture; selects information & communications technology standards in support of the implementation of the enterprise-wide information & communication architecture; coordinates the investigation and implementation of emerging information & communication technologies and services across the enterprise; assists in the identification of business opportunities and implementing business applications to meet corporate and enterprise-wide business requirements; and, provides enterprise-wide executive education to improve awareness of the impact of information technology on the business.

**4.2.6. Operations and Manufacturing**

Operations and Manufacturing group implements, maintains and continuously improves a company-wide operations, manufacturing, planning and inventory tracking system that assures product quality, product built to the highest level of quality workmanship, meeting customer requirements, company goals and expectations and customer satisfaction. Operations group leads and promotes total quality management values, practices, and principles to continuously improve cost of product ownership, measuring key performance indicators and objectives for our suppliers, continuously improve manufacturing performance and capability.

**4.2.7. Quality & Reliability**

Quality & Reliability (Q&R) implements, maintains and continuously improves a company-wide quality system that assures product quality, reliability and customer satisfaction. Quality & Reliability leads and promotes *total quality management* values, practices, and principles to continuously improve performance. Quality & Reliability demonstrates Semtech's effective quality system to us and to our customers by achieving and maintaining registration to ISO 9001, AS9100 and MIL-PRF-19500 quality systems standards. Quality & Reliability leads the effort on continuous improvement of our current quality system to meet the ISO 9001-2008 as amended to ISO 9001:2000 standard as well as pursuit of other industry and professional quality system standards.

**4.3. Business Unit Manager's Roles & Responsibilities**

Semtech Corporation organizes product lines into business units. Senior Staff determines the number,

scope, product lines and market segment for each business unit. Business units are added or scope changed as the corporation grows.

Each business unit is lead by a Business Unit Manager. Each Business Unit Manager selects, designs and qualifies leading edge products, sources manufacturing, and sells and markets a wide range of products in their selected markets.

Up-to-date information on Semtech's Business Units and the products associated with the business unit can always be found on Semtech's Web Site: [www.semtech.com](http://www.semtech.com).

**4.3.1. Reference Documents - Additional Details**

Corporate Document; Title	Document #
I.S. Change Management Policy	AROS-7STPKY
I.S. Major Change Management Procedure	AROS-7STPND
I.S. Minor Change Procedure	AROS-7STPPQ

**5. Management Representative(s)**

The Sr. Vice President of Quality & Reliability, as Semtech's Chief Quality Officer, appoints member(s) of management who, irrespective of other responsibilities, has responsibilities and authority that includes: ensuring that processes of the quality management system are established and maintained; reporting to Semtech's Leadership Team on the performance of the quality management system, including needs for improvement; and, promoting awareness of customer requirements throughout the organization.

These appointments are documented in Appendix C 22.2 Q&R's Functional Organization Chart. The designated Corporate ISO Management Representative serves as the ISO Management Representative for Semtech sites where a site representative is not available.

At such sites, a liaison is identified and aids in any dissemination of materials or scheduling of training for personnel at that site. These liaisons work closely with the Corporate ISO Management Representative.

**6. QMS Continuous Improvement**

The Sr. Vice President of Quality & Reliability, as Semtech's Chief Quality Officer, orchestrates the management's review of Semtech's QMS on a quarterly basis. He/she shall ensure that improvements to the QMS are conducted in a controlled manner and that the integrity of the QMS is maintained during the improvements. The QMS review for continuous

Improvement may take into consideration management review findings; results of internal, customer and supplier audits; customer feedback; process performance, cycle times, product conformance, and special needs of Semtech's internal customers.

Complete Management Review of the QMS Continuous improvement efforts are quality records and placed under document control within the Corporate Meetings database.

**7. Customer Focus**

**7.1. Customer Care**

Semtech Corporation maintains a worldwide Customer Care Action Request System commonly known as the CCARE system. This CCARE system logs and tracks customer issues such as: customer complaints, requests for information, audits, return material authorizations, requests for failure analysis, etc. The CCARE system is implemented via a worldwide Lotus Notes Database application.

**7.1.1. Policies**

- Semtech employees initiate CCAREs whenever a customer issue(s) needs to be addressed that cannot be resolved within 24 hours and a response to the customer is either required or desirable.
- Data contained in the CCARE application are the quality records for this QMS element.

**7.1.2. Process Description overview**

Any Semtech employee may initiate a CCARE. The site CCARE Administrator reviews each request. Once accepted, he/she sends an acknowledgment to the customer. This signifies that Semtech is aware of a customer issue. The CCARE Administrator strives to acknowledge within 24 hours of acceptance.

Once accepted, the CCARE Administrator determines and assigns a Quality Advocate. The Quality Advocate coordinates all Semtech activities/resources worldwide to address the CCARE to the satisfaction of the customer. The Advocate goal is to verify the CCARE with the Customer within 72 hours. Verification to the customer signifies to the customer that Semtech accepts the CCARE and will track it until closure.

The Quality Advocate may send interim reports to the customer as appropriate.

The CCARE system uses the 8D corrective action problem solving method.

Upon completion of the CCARE, the Quality Advocate sends to the customer a closure letter. The closure letter to the customer signifies that Semtech has concluded all activities and closed the CCARE. The Quality Advocate makes every effort to close all CCARES within 17 days from acceptance.

**7.1.3. Responsible Function/Business Unit**

Quality & Reliability ensures the effectiveness of this QMS element.

**7.1.4. Reference Documents - Additional Details**

Corporate Document; PLOT-4LJP6Z	CCARE: Customer Care Action Request
---------------------------------	-------------------------------------

**7.2. Customer Requirements Review**

Semtech reviews customer requirements prior to our commitment to supply product(s). These procedures ensure that:

- Product requirements are clearly defined;
- Contracts or order requirements differing from those previously expressed are resolved; and
- We have confirmed Semtech's ability to meet the defined requirements.

When a product requirement changes, Semtech will raise a "Change Request" against that document to review and approve changes and ensure that relevant personnel are made aware of the changed requirements.

The Customer Documents database ensures appropriate communication with customers in relation to product information, inquiries, contracts or order handling, customer feedback and amendments.

Records of these reviews are posted and maintained as quality records in the Customer Documents database.

**7.2.1. Process Description Overview**

Sales and Marketing raises a Customer Document review whenever a customer submits a document to Semtech and requests a formal review, and it cannot be resolved thru the Purchase Order system.

Examples of document types include but are not limited to: product specifications, general procurement guidelines and procedures, drawings,

terms and conditions, quality system requirements etc.

Customer Document Reviews are initiated prepared and stored in the Customer Documents database as quality records.

The originator first reviews the documents already in the database to determine if the document was previously reviewed.

If the document was already reviewed and our response is still applicable, then our response is sent to the customer.

If the document was already reviewed and our response is no longer applicable, a change request is initiated. The document is reviewed again for adequacy.

In general, each document submitted by the customer is treated as separate requests.

**7.2.2. Responsible Function/Business Unit**

Quality & Reliability ensures the effectiveness of this QMS element.

**7.2.3. Reference Documents – Additional Details**

Corporate Document; SFBN-53SU7Y	Customer Requirements Review
Corporate Document; SFBN-53RVXU	Customer Documents Database User's Guide

**7.3. Customer Notifications**

Semtech Corporation provides three types of change notification to our customers: Change Notifications, End-of-Life Notifications and Quality Alerts.

**7.3.1. Change Notifications**

Semtech provides a 90 day advanced notification to customers who have entered into a notification agreement. In general, Semtech notifies; whenever possible, on major product or process changes that affect the form, fit, function or reliability of products. Should business conditions warrant a less than 90-day notification, it will be specified in the change notification letter.

Customers will be provided an opportunity to accept/reject a change within the specified period. If a customer does not respond within the specified

period, Semtech will assume that the customer has accepted the change.

For customers who do not accept the change, Sales, Marketing, and/or Q&R will work with the customer to determine the next step(s).

Semtech can postpone the change until the outstanding customer(s) have approved or rejected the change.

Semtech reserves the right not to follow through with a change published in a Process Change Notification if the qualification of the change is unsuccessful or if business conditions require that the proposed change be discontinued.

**7.3.2. End-of-life Notification**

Whenever the company determines it will no longer manufacture certain product(s), Semtech will issue an End-of-Life (EOL) notification to all customers who have purchased the affected product(s) within the previous 24 months. The notification will contain a last time buy date for the affected product(s). Customers may place an order for the product any time prior to the last time buy date.

Semtech will provide a 180 day advanced notification on the company's intent to discontinue the manufacture of certain products. Should business conditions warrant a less than 180-day notification, it will be specified in the notification letter.

The notification will contain references to suitable replacement parts; or, indicate the last day that the company will ship the affected products.

**7.3.3. Quality Alerts**

Whenever Quality Assurance determines that certain product is discrepant and has already been shipped to customers, Quality Assurance raises a Quality Alert notification to advise customers of the discrepant product.

The Quality Alert contains a description of the discrepant condition, a listing of affected products, and appropriate traceability information such as date codes and lots numbers. In addition, instructions will be provided on how to handle the discrepant product or return the product for replace. A return material authorization (RMA) number maybe included if appropriate. If known at the time the Quality Alert is issued, it may also contain the root cause, corrective and preventive actions.

**7.3.4. Process Description Overview**

Quality Assurance is responsible to process Change Notifications and Quality Alerts using the Customer Documents application database. Request for End-of-Life Notification can come from a business unit representative, operations staff or from the Sales group. The End-of-Life process is also initiated and prepared in the Customer Documents application database.

Once prepared, the document is circulated to appropriate personnel for review and approval. After approval the notification is sent to the customer using e-mail.

**7.3.5. Responsible Function/Business Unit**

Quality & Reliability ensures the effectiveness of this QMS element.

**7.3.6. Reference Documents - Additional Details**

Corporate Document; KFD-4JCQ2S	Customer Notification Policies for Commercial Products
Corporate Document; SFBN-53RVXU	Customer Document Database User's Guide

**7.4. Failure Analysis**

Semtech's Failure Analysis (FA) Lab contains state-of-the-art optical analysis, imaging and material analysis, video imaging and storage, non-invasive inspection equipment, package decapsulation, automated test equipment (ATE) as well as reactive ion etching, a scanning electron microscope and a wet chemical bench. In order to ensure rigorous tracking and prompt response back to our customers, customer FA jobs are submitted through the CCARE system.

**7.4.1. Policies**

- Any Semtech employee may submit a Failure Analysis job on behalf of a customer using the CCARE system.
- Data contained in the CCARE application database are the quality records for this QMS element.

**7.4.2. Responsible Function/Department**

Quality & Reliability ensures the effectiveness of this QMS element.

**7.4.3. Process Description Overview**

Any Semtech employee may initiate a Failure Analysis job on behalf of a customer using the CCARE system. The site CCARE Administrator reviews each request. As appropriate, the CCARE Administrator issues to the customer a Return Material Authorization tracking number (RMA) within the authorization letter. This confirms to the customer that the devices may be returned to Semtech for Failure Analysis. Once the suspect parts are received, the CCARE Administrator accepts the CCARE and issues an acknowledgement letter to the customer. The CCARE Administrator then notifies the Failure Analysis Lab. The CCARE Administrator strives to acknowledge receipt of parts within 24 hours of arrival.

The FA Lab's goal is to verify pass/fail status of the suspect parts in less than 4 days from receipt of parts. The FA Analyst serves as the Quality Advocate until the root cause is determined. The FA Lab makes every effort to determine the root cause for failed devices in less than 15 days from receipt of parts. Interim reports are sent to the customer as necessary. Once root cause is determined, the FA Lab issues a final report to the customer, signifying root cause has been determined and the FA job is being closed.

If additional corrective action is required to ensure diagnosed non-conformities do not recur, the CCARE will remain open as the 8D corrective action problem solving method continues. Once the FA Job is closed, the CCARE Administrator determines and may assign a different Quality Advocate. The Quality Advocate coordinates all Semtech activities/resources worldwide to address the CCARE to the satisfaction of the customer.

The Quality Advocate may send interim reports to the customer as appropriate.

Upon completion of the CCARE, the Quality Advocate will send to the customer a closure letter. If warranted, the Final FA Report may serve as the closure letter. The closure letter to the customer signifies that Semtech has concluded all activities and closed the CCARE. The Quality Advocate strives to close all CCARES within 28 days from acceptance.

**7.4.4. Reference Documents - Additional Details**

Corporate Document; PLOT-4LJP6Z	CCARE System, Policies and Procedure
---------------------------------	--------------------------------------

Corporate Documents; SFBN-4VVL4C	Failure Analysis Database User's Guide
-------------------------------------	--

## 8. Management Review

Semtech continually reviews the quality management system to ensure its suitability, adequacy and effectiveness using four key methods: QMS Review for Continuous Improvement, Quarterly Business Reviews, and Site QMS Reviews. In combination, these methods evaluate the need for changes to our QMS including the quality policy and quality objectives.

Based on these reviews, strategic or long term improvements needed to our QMS are addressed and documented within the Management Review prepared by Q&R. Short Term Improvements to our QMS are addressed and documented in quarterly Most Important Tasks (MITs). Issues needing immediate attention are addressed as appropriate.

### 8.1. QMS Continuous Improvement

Semtech reviews the suitability and effectiveness of our quality management system through a system of management reviews. Q&R sponsors and conducts these management reviews at least quarterly. The QMS review for continuous Improvement may take into consideration management review findings; results of internal, customer and supplier audits; customer feedback; process performance, cycle times, product conformance, and special needs of Semtech's internal customers.

The Sr. VP of Q&R makes the final determination on the scope of any major continuous improvement project and then instructs the Corporate ISO Management Representation to begin implementation.

For each QMS element in Semtech's quality manual, the management review solicits feedback on: What is working well; Improvements made since the last review; What is not working; and, Suggested actions for improvement.

The QMS management review also determines whether the quality policy should be amended.

These management reviews may take on several forms. The QMS elements may be addressed in whole or broken down by elements.

Internal Communication, as defined within ISO 9001, has been accepted and adopted by Semtech to ensure that appropriate communication processes

are established and that such communication takes place regarding the effectiveness of the QMS.

Q&R records all the inputs from the management reviews and documents the improvement efforts. This documentation is the quality record for reviewing the effectiveness and suitability of Semtech's quality management system.

Actions are taken on the results of the review as described in 8.Management Review.

### 8.2. Quarterly Business Reviews

Semtech conducts regular business reviews at the corporate headquarters, or at the discretion of the CEO, remote business unit site. The measures or indicators reviewed best represent the factors that lead to improved customer, operational, and financial performance. These comprehensive set of measures or indicators tie to customer and/or organizational performance requirements representing a clear basis for aligning all activities with the organization's goals through the 4.1 Most Important Tasks (MITs) process.

The Vice President of Q&R prepares and delivers a comprehensive review of the company's quality, reliability, failure analysis findings, CCARE, internal audits, supplier performance, follow-up from prior reviews, and progress against the QMS Continuous improvement efforts. Actions taken as a result of this review are described in 8.Management Review. Q&R tracks actions/decisions made which are treated as quality records within the Corporate Meetings database.

Q&R tracks agendas, minutes, decisions, actions and/or suggested improvements from these business reviews. These are treated as quality records and stored in a database designed for tracking meetings.

### 8.3. Site QMS Reviews

Each Semtech site with a named ISO Site Management Representative as defined in, 22.2 Q&R Functional Organization, also conducts a complementary review at least every six months. These reviews focus on the site's quality, reliability, failure analysis findings, CCARE, internal audits, supplier performance, follow-up from prior reviews, and progress against the QMS improvement plan. Actions taken as a result of this reviews are described in 8. Management Review. The site ISO Management Representative tracks actions/decisions made which are treated as quality records.

Q&R tracks agendas, minutes, decisions, actions and/or suggested improvements from these site QMS

reviews. These are treated as quality records and stored in a site database designed for tracking meetings.

**8.4. Responsible Function/Business Unit**

Quality & Reliability ensures the effectiveness of this QMS element.

**8.5. Reference Documents – Additional Details**

Corporate Document; SFBN-4PXVWZ	Meetings Database User's Guide
Corporate Document; SFBN-4MFN3G	Management Review – Corporate Procedure

**9. Resource Management**

**9.1. Training and Development**

Semtech established and maintains documented procedures for identifying training needs and provide for the training of all personnel performing activities affecting conformity and product quality. Personnel performing specific assigned tasks are qualified on the basis of appropriate education, training and/or experience.

Each facility maintains a set of procedures for site-specific practices within the standardized training program.

Responsibility for training of Semtech employees is split between the Human Resources Department and the responsible Department Manager. Within this working partnership, they are responsible to provide training or take other actions to achieve the necessary competence, evaluate the effectiveness of the actions taken, ensure that its personnel are aware of the relevance and importance of their activities and how they contribute to the achievement of the quality objectives, and maintain appropriate records of education, training, skills and experience.

Human Resources is responsible for the following training:

- Initial overview orientation for Hazard Communications, Occupational Safety and Health Program, and ISO 9001 Standards.
- Annual ISO 9001 Standards training.
- Initial Overview and Orientation of all company Policies and Procedures, as applicable.

Each Department Manager and Area Supervisor is responsible for Certification/Re-certification to detailed area procedures.

Appropriate records of training are maintained at each Semtech location and or posted within the Corporate Training Database. Training records are considered quality records and are maintained either as paper copies or if entered into the Training Database, as appropriate.

**9.2. Infrastructure**

Semtech Chief Executive Officer in corroboration and cooperation with his/her Senior Staff determines, provides and maintains the infrastructure needed to achieve conformity to product requirements. Semtech's infrastructure includes the organization, building, workspace, associated utilities, process equipment and support services.

- The functional and departmental infrastructure is defined in Appendix C; Organization Charts. The responsibilities of each department and / or function are described in section 4. Semtech Leadership Team Responsibilities.
- A senior staff member manages each department and / or function. Each senior manager is responsible to provide suitable infrastructure for their department and / or function.

**9.3. Work Environment**

Semtech determines and manages the appropriate work environment required to achieve conformity to product requirements.

- The work environment consists of the physical property, plant and equipment, the processes in place as well as the collaborative team based work environment that is a part of our company culture and essential to both our past and future success.
- Other references to the work environment are contained within the employee handbook as maintained by the Human Resources department.

**9.4. Reference Documents – Additional Details**

Corporate Document; KFID-4JCPZD	Corporate General Training Procedure
Corporate	Training: Managers Guide

Document; SFBN-4K329U	
Corporate Document; SFBN-4JSS3S	Training: Enrolling in a Course
Corporate Document; SFBN-4JZNXH	Training: Attendance Form
Corporate Document; SFBN-5BVP2V	Resource Management

### 10. New Product Introduction

Each business unit exercises extensive control during the definition, development and production release of new standard products and customer specific products. Semtech established a comprehensive set of design control procedures that: a) determines the quality, reliability and performance objectives for new product, b) provides program/project management, resource identification and facilities; c) ensures verification and validation activities; d) provides criteria for acceptability; and, e) clearly defines records that are necessary to provide confidence of conformity of the processes and resulting product.

All business units follow the same new product introduction workflow that consists of 4 phases:

1. Product Definition
2. Product Design
3. Design Validation
4. Qualification

This workflow and record keeping for each phase is managed by a unique set of databases for each business unit. The general workflow for all business units is the same; however, each respective business unit defines records kept. The database workflow manages, updates and tracks changes to new products as they are designed and prior to being released to production. This includes provisions for the evaluation of changes as well as the verification and validation of changes. The workflows also define the responsibilities and authorities for design and/or development activities.

Key review meetings are held in each phase. Specially designed databases track agendas, minutes, decisions, actions and/or suggested improvements from phase reviews. These are treated as quality records.

Exceptions or clarifications to the typical flow described in this quality manual can be found in the local business unit work procedure.

#### 10.1. Phase 1: Product Definition

Inputs relating to product requirements are defined and documented in the Product Definition Phase. This phase addresses:

- Return on investment analysis.
- Functional and performance requirements in the form of a target datasheet.
- Applicable regulatory and legal product requirements.
- Product requirements not specified by the customer but necessary for intended or specified use.
- Applicable information derived from previous similar designs.
- Other requirements essential for design and/or development.

This Phase contains two critical reviews: NPAW (New Product Approval Worksheet) Hopper Review and Product Initiation Review. Participants in these reviews include representatives of each function concerned with the new product design. Results, decisions, and subsequent actions from these reviews are documented and treated as quality records in the appropriate databases.

The quality records generated during this phase include: defining the design team, a return on investment analysis, block schematic, preliminary part number assignment, draft data sheet, and proposed development schedule.

The return on investment databases are confidential and not subject to customer audits. However, Semtech's 3<sup>rd</sup> party registrar ensures its compliance and effectiveness.

Authorized personnel review and approve the completion of this phase ensuring that incomplete, ambiguous or conflicting requirements are resolved.

#### 10.2. Phase 2: Product Design

During the Product Design Phase each design team translates requirements defined in Phase 1 into actual product designs. This phase:

- Updates the functional and performance requirements in the form of a preliminary datasheet.
- Determines if the actual design meets the requirements specified in Phase 1.
- Provides appropriate information to production.

- Defines the characteristics of the product that are essential to its safe and proper use.
- Identifies any additional customer requirements together with additional requirements determined by the organization.
- Identifies problems and propose follow-up actions.

This Phase contains four critical reviews: Concept Review, Design Review, Tape Out Review and Engineering Design Release. Participants in these reviews include representatives of each function concerned with the new product design. Results, decisions, and subsequent actions from these reviews are documented and treated as quality records in the appropriate databases.

The workflow databases define the product acceptance criteria. Typical records generated during this phase include: updated schematic (block & transistor level), simulation summary comparison with the preliminary datasheet, design rules, marking diagram, bonding diagram, design evaluation report, application evaluation report, test program and a reliability test plan.

Authorized personnel review and approve the completion of this phase.

#### **10.3. Phase 3: Design Validation**

This phase validates the performance of first silicon devices to the product requirements. Successful completion of this phase ensures that the new products meet the product performance specifications as previously defined. This phase:

- Updates the functional and performance requirements in the form of a final datasheet.
- Completes all the necessary production documentation needed to enter the qualification phase.
- Prepares marketing and collateral demonstration material.
- Performs customer evaluations.

This phase consists of a critical Pre-Production Release review where a decision is made to release the new product for final qualification. Participants in this review include representatives of each function concerned with the new product design. Results, decisions, and subsequent actions from these reviews are documented and treated as quality records in the appropriate databases.

Typical Records generated during this phase include: final data sheet, design evaluation report, application

evaluation report, operational test program, and updated reliability test plan.

Authorized personnel review and approve the completion of this phase.

#### **10.4. Phase 4: Qualification**

Results from this phase ensure that the new products meet the manufacturability, quality and reliability requirements for new products.

The Product Release Review confirms that all necessary qualification requirements have been met indicating that the device is ready for full production. Participants in this review include representatives of each function concerned with the new product design. Results, decisions, and subsequent actions from these reviews are documented and treated as quality records in the appropriate databases.

Records generated during this phase include: summaries of Wafer Fab, Probe Yield and Final Test yields; results from the reliability tests performed; ESD capability report; processing work flow; final assembly documentation, approved assembly bill of materials; supplier audits.

**NOTE:** Qualification plans are Semtech's key preventive action to eliminate the causes of potential nonconformities and to prevent occurrence. The reliability test plan requirements and quality system audits are appropriate to the impact of the potential problems.

Upon approval by authorized personnel, the product is released to production.

#### **10.5. Design Modifications**

Design and development modifications are identified and recorded in a Change Management applications database as Design Modification Records (DMRs). These changes are reviewed, verified, validated and qualified before implementation. Qualification plans for the changes include evaluations of the effect of the changes on products.

#### **10.6. Responsible Function/Business Unit**

Business unit managers ensure that their new product introduction procedures are suitable, effective, and compliant to the business needs.

Quality & Reliability oversees the effectiveness of the new product introduction process and ensures its compliance to ISO and other appropriate quality management system standards.

**10.7. Reference Documents – Additional Details**

Corporate Document; SFBN-TGW4U	New Product Introduction – Summary Overview
Corporate Document; SFBN-4TKTPS	New Product Introduction: NPAW Database User's Guide
Corporate Document; SFBN-4U52WQ	New Product Introduction: Meeting Database User's Guide
Corporate Document; SFBN-4U52YJ	New Product Introduction: Phase Review Database User's Guide
Corporate Document; SFBN-4XTTX4	Change Management: Database User's Guide

**11. Managing Customer Contracts**

Semtech acknowledges the need for systematic review of necessary changes that are identified, negotiated, and implemented before deliveries of product or services commence. Such reviews include but are not limited to;

- Customer Non-Standard Part Contracts
- Customer Standard Part Contracts
- Sub-Contractor Facility Contracts

Semtech reviews customer contracts and requirements prior to our commitment to supply product(s). These procedures ensure that:

- Product requirements are clearly defined;
- Contracts or order requirements differing from those previously expressed are resolved; and
- We have confirmed Semtech's ability to meet the defined requirements.

When a product requirement changes, Semtech will raise a "Change Request" against that document to review and approve changes and ensure that relevant personnel are made aware of the changed requirements.

The Customer Documents database ensures appropriate communication with customers in relation to product information, inquiries, contracts or order handling, customer feedback and amendments.

When the review of such contracts, agreements, warranties, or guarantees include Semtech's Legal team, the communication to the customer is transferred to them. Such reviews are not open to Semtech's general employee population and therefore, not open to audit by customers. However, Semtech's 3<sup>rd</sup> party registrar, and Semtech's Corporate Quality Manager ensures its compliance and effectiveness.

Records of these reviews are posted and maintained as quality records in the Customer Documents database.

**11.1. Process Description Overview**

Sales and Marketing raises a Customer Document review whenever a customer submits a document to Semtech and requests a formal review, and it cannot be resolved thru the Purchase Order system.

Examples of document types include but are not limited to: contract agreements, product specifications, general procurement guidelines and procedures, drawings, terms and conditions, quality system requirements etc.

Customer Document Reviews are initiated prepared and stored in the Customer Documents database as quality records.

The originator first reviews the documents already in the database to determine if the document was previously reviewed.

If the document was already reviewed and our response is still applicable, then our response is sent to the customer.

If the document was already reviewed and our response is no longer applicable, a change request is initiated. The document is reviewed again for adequacy.

In general, each document submitted by the customer is treated as separate requests.

**11.1.1. Responsible Function/Business Unit**

Quality & Reliability ensures the effectiveness of this QMS element.

**11.1.2. Reference Documents – Additional Details**

Corporate Document; SFBN-53SU7Y	Customer Requirements Review
Corporate	Customer Documents Database

Document; SFBN-53RVXU	User's Guide
--------------------------	--------------

## 12. Documentation and Key Datafile Management

Semtech uses comprehensive on-line Lotus Notes based applications for document management and key quality system record keeping. These systems provide: document initiation, change control, quality record keeping, review & approval workflows, and archiving as appropriate.

These applications ensures that:

- Documents/quality records are reviewed for adequacy prior to use;
- Documents are reviewed, updated as necessary and re-approved;
- Only the current revision of documents/quality records are available for use;
- Relevant versions of documents/quality records are immediately available to employees;
- Documents/quality records remain legible and readily identifiable;
- Documents of external origin are identified and their distribution controlled;
- Obsolete documents/quality records are archived to prevent un-intended use; and,
- Documents needed by the corporation to ensure effective planning, operation and control of its processes are available.

All doc control/quality system databases around the company are replicated daily with the corporate headquarters master copies.

### 12.1. Policies

- The doc control/quality system databases contain the quality records for document control/quality system.
- All documents printed from the doc control databases are defined to be un-controlled copies. Exceptions are noted in the Off-line distribution list defined in the appropriate database.
- Approval loops are defined by the databases' workflow definitions.
- Only authorized personnel have access to the database definitions, document templates and workflow definitions.
- The unique Note address stamp assigned during the course of review or approval for QMS processes implemented by a Notes application is equivalent to handwritten approval.

### 12.2. Quality Records

Semtech defines the quality records required by our management system in a series of Quality Records databases.

- Each site requiring a supplemental quality manual maintains a local quality records database that provides site-specific definitions that are not included in the corporate quality records database.
- Additional quality records required by our quality management system and not covered in any site database are managed by a corporate Quality Records Database.

Each Database specifies: the nature of the records, the record type, storage location and methods for the identification, storage, retrieval, protection, retention time and disposition of quality records.

These records are maintained to provide evidence of conformance to requirements and of effective operation of the quality management system.

The site ISO Management Rep ensures that the combination of the corporate quality record database and site quality records database address all the quality records requirements.

### 12.3. Responsible Function/Business Unit

Quality & Reliability ensures the effectiveness of this QMS element.

### 12.4. Reference Documents – Additional Details

Corporate Document; SFBN-4JAM6L	Corporate Documents: Database Instructions
Corporate Document; SFBN-4YWSTJ	Corporate Product Documents: Database Instructions
Corporate Document; PSAZ-5AFUCE	Standardize Guidelines for Specifications
Corporate Document; KFID-4KWSAP	Control of Quality Records
Corporate Document; PSAZ-5AFU9J	Change Control Procedure
Corporate	Quality Records Database User

Document; SFBN-4SPNRU	Guide
--------------------------	-------

### 13. Supplier Management

Semtech maintains an extensive supplier management program to develop supplier partnerships based on trust, communication, and objective performance. Our approach is to:

- Ensure all our key suppliers/subcontractors are aware of our quality and reliability requirements;
- Ensure that our key suppliers/subcontractors have quality systems that deliver product that meets or exceed our quality & reliability requirements;
- Objectively measure the performance of foundry subcontractors by structured, defined, and consistent methods;
- Provide feedback to our foundry subcontractors approximately every 6 months.
- Semtech encourages its suppliers to obtain and sustain registration to ISO 9000 standards.
- Semtech encourages its suppliers to obtain and sustain registration to ISO 140001 or equivalent

Semtech maintains and develops supplier partnerships with a preferred set of wafer foundry, final test and assembly subcontractors that demonstrate the ability to meet or exceed these requirements or can demonstrate consistent progress towards meeting these expectations.

Semtech defines 4 levels of supplier status for key wafer fab, final test and assembly subcontractors: preferred, qualified, conditionally qualified and dis-qualified.

Semtech's supplier management program ensures our suppliers are evaluated and selected based on their ability to supply product or services that meet or exceed our quality management system, product, or service requirements. Criteria for selection and periodic evaluation are defined in the appropriate supplier management specification and the supplier audit checklists.

Each wafer foundry, final test, assembly subcontractor or other key supplier are provided with the appropriate supplier management requirements specification prior to qualification and whenever a major change is made to the performance document.

#### 13.1. Qualification of Wafer Fab Processes

Semtech qualifies wafer fabs, including internal wafer fabs, once they pass a quality management system

audit, submit an acceptable process control plan and completing a reliability test plan.

Semtech designs wafer fab qualification requirements as preventive action to eliminate the causes of potential nonconformities and to prevent occurrence. The reliability test plan requirements and quality system audits are appropriate to the impact of the potential problems.

#### 13.1.1. Policies

- A wafer fab must achieve conditional qualification status prior to shipment of product to our customers.
- Semtech adopted JESD 47 Stress-Test-Driven Qualification of Integrated Circuits specification to guide reliability test plans requirements, test methods and sample sizes.
- Semtech may accept generic data supplied by the wafer fab to satisfy certain environmental tests required in the reliability test plan per JEDEC recommendations.
- Semtech uses ISO 9000 as baseline criteria for the quality management systems audits. Audits also assess the fab's compliance to our internal Wafer Foundry Specification(s) and other industry standard practices as appropriate.
- Approved final reports are the quality records for this QMS element.

#### 13.1.2. Responsible Function/Business Unit

Quality & Reliability ensures the effectiveness of this QMS element.

#### 13.1.3. Process Description Overview

Anyone may initiate a Wafer Fab Qualification job using the Rel\_Planner database. Once the job is initiated, a Reliability Engineer will prepare a reliability test plan. If appropriate, the reliability test plan will include the requirements for conditional qual. If a quality systems audit is required the Reliability Engineer notifies the appropriate Quality Assurance Engineer.

The Reliability Test Plan (\*.pdf file copy) is submitted to the on-line document for review and approval. Once approved, the reliability test plan is scheduled and tracked by the Rel\_Planner. At anytime, appropriate personnel may access the Rel\_Planner to determine the status and the estimated completion dates.

A change request is generated for the previously approved Reliability Test Plan in our on-line document control system in order to approve the final report. Upon approval, Q&R changes the qualification status.

**13.1.4. Reference Documents – Additional Details**

Corporate Document; KFID-4JCQB8	Wafer Fab: Wafer Foundry Supplier Performance Requirements
Corporate Document; SFBN-4JKMNA	EIA/JESD47 Stress Driven Qualification of Integrated Circuits

**13.2. Qualification of Assembly and Final Test Processes**

Semtech qualifies all assembly and final test subcontractors when they pass a quality management system audit, submit and acceptable process control plans and complete a reliability test plan.

Semtech designs assembly subcontractor and final test qualification requirements as preventive action to eliminate the causes of potential nonconformities and to prevent occurrence. The reliability test plan requirements and quality system audits are appropriate to the impact of the potential problems.

**13.2.1. Policies**

- Assembly and final test subcontractors must achieve conditional qualification status prior to shipment of product to our customers.
- Semtech Corporation follows the environmental tests, and techniques specified in JESD47 Stress-Test-Driven Qualification of Integrated Circuits when qualifying new packages.
- Semtech may accept generic data supplied by the assembly subcontractor to satisfy certain environmental tests required in the reliability test plan per Semtech’s Reliability Test Specification.
- Semtech uses ISO 9000 as baseline criteria for the quality management systems audits. Audits also assess the fab’s compliance to our internal Subcon Assembly Specification(s) and other industry standard practices as appropriate.
- Approved final reports are the quality records for this QMS element.

**13.2.2. Responsible Function/Business Unit**

Quality & Reliability ensures the effectiveness of this QMS element.

**13.2.3. Process Description Overview**

Anyone may initiate an Assembly and Final Test Subcontractor qualification job using the Rel\_Planner

database. Once the job is initiated, a Reliability Engineer will prepare a reliability test plan. If appropriate, the reliability test plan will include the requirements for conditional qual. If a quality systems audit is required the Reliability Engineer notifies the appropriate Quality Assurance Manager.

The Reliability Test Plan (\*.pdf file copy) is submitted to the on-line document for review and approval. Once approved, the reliability test plan is scheduled and tracked by the Rel\_Planner. At anytime, appropriate personnel may access the Rel\_Planner to determine the status and the estimated completion dates.

A change request is generated for the previously approved Reliability Test Plan in our on-line document control system in order to approve the final report. Upon approval, Q&R changes the qualification status.

**13.2.4. Reference Documents – Additional Details**

Corporate Document; SFBN-4JPT6M	Assembly Subcon: Assembly Subcontractor Performance Requirements
Corporate Document; SFBN-4ZWT2Q	Final Test: Final Test Subcontractor Performance Requirements
Corporate Document; KFID-4JRLDK	Reliability and Qualification Test Requirements
JESD-47	Stress-Test-Driven Qualification of Integrated Circuits.

**13.3. Supplier Corrective Action (SCAR)**

**13.3.1. Policies**

Any Semtech employee may raise a Supplier Corrective Action Request whenever (SCAR):

- A problem originating from a supplier is severe requires corrective action and tracking until completion;
- Action is needed to eliminate the cause of nonconformities originating from a supplier in order to prevent recurrence;
- One of Semtech’s Customer’s requires a SCAR from one of our suppliers;
- The results from a failure analysis indicates that the root cause for the device failure is from a supplier;
- A major or minor finding is raised during the course of a surveillance audit.

Information contained in the application databases are the quality records for this QMS element.

**13.3.2. Responsible Function/Business Unit**

Quality & Reliability ensures the effectiveness of this QMS element.

**13.3.3. Process Description Overview**

Any Semtech employee may raise a SCAR using the corporate corrective action database by selecting the "Supplier Corrective Action" document type. The employee assigns the document to any Semtech Quality Assurance Manager (or other Quality Assurance staff member). The Quality Assurance Manager reviews the SCAR, determines and assigns the most appropriate Quality Assurance Manager to manage and drive the supplier to address the problem. Upon acceptance, the assigned Quality Assurance Manager notifies the supplier of the SCAR using the application software to begin and record the problem solving activity. He or She coordinates the supplier's and any Semtech resources to address the following 8D problem solving methodology:

- Describing the problem;
- Determining the root cause;
- Determining and implementing containment action if needed;
- Documenting an implementation plan and estimate the completion date;
- Determining actions necessary to prevent recurrence;
- Ensuring the actions and implementation plans are completed in a timely manner suitable to the severity of the request.

The application software automatically escalates late SCARs.

The Quality Assurance Manager closes the SCAR once he/she is satisfied that suitable action was taken.

**13.3.4. Reference Documents – Additional Details**

Corporate Document; PLOT-4TGUW6	Supplier Corrective Action Request (SCAR)
------------------------------------	---

**13.4. Supplier Audits**

Semtech audits key suppliers on a regular basis in order to ensure that:

- Their quality systems continue to meet Semtech's requirements;

- Supplier corrective actions or action items were completed as promised;
- They continue to be aware of new Semtech requirements;
- Identified quality issues and corrective actions are deployed throughout Semtech's supplier base.

**13.4.1. Process Description Overview**

Semtech maintains a Lotus Notes based software application that manages the Supplier Audit Program.

Quality Assurance prepares and documents audit checklists in this application with special emphasis on Semtech key requirements.

Audit checklists are then assigned to specified audit types. Examples of audit types include qualification and surveillance audits. The application includes features to prepare and document on-demand audits that might be needed as a result of a quality incident.

Finally, Semtech schedules and documents audit results using the same application. Semtech defines 3 finding categories: observation, minor and major. Semtech communicates audit findings in the audit report and raises a SCAR to monitor and track closure.

**13.4.2. Responsible Function/Business Unit**

Quality & Reliability ensures the effectiveness of this QMS element.

**13.4.3. Reference Documents – Additional Details**

Corporate Document; SFBN-4JPT6M	Assembly Performance Requirements	Subcontractor Performance Requirements
Corporate Document; SFBN-4ZWT2Q	Final Test Performance Requirements	Subcontractor Performance Requirements
Corporate Document; KFID-4JCQB8	Wafer Foundry Performance Requirements	Supplier Performance Requirements

**13.5. Supplier Report Cards**

Semtech monitors key wafer foundries, final test, assembly subcontractors, and other key company-wide suppliers. On a quarterly basis, Semtech reviews key supplier data and prepares a report card for each supplier.

The goal of these report cards is to: establish criteria for rewarding top suppliers with additional work; identify areas of weaknesses where corrective action is warranted; influence the frequency, areas and level of detail for surveillance audits.

Typical Score Card criteria include:

- Commitment to the appropriate supplier management requirements specification;
- Findings from surveillance audits;
- Supplier Corrective Action Response Times;
- Number & Severity of Quality Incidents;
- Cp and Cpk Reports;
- Process Change Notifications;
- On-going Reliability Monitoring;
- Outgoing Quality.

**13.5.1. Policies**

Each local site may find it appropriate to monitor additional suppliers. In those situations, the site key suppliers shall be named along with supporting procedural documentation.

**13.5.2. Responsible Function/Business Unit**

Quality & Reliability ensures the effectiveness of this QMS element.

**13.5.3. Process Description Overview**

Semtech maintains a Lotus Notes based database where report cards are created, scored, reviewed and approved.

Quality Assurance initiates a report card for each supplier on a quarterly basis. Quality Assurance and Operations scores the supplier in key areas. Each scorecard is reviewed and approved by Operations and Quality's senior management. Once approved, Quality Assurance issues the scorecard to the supplier directly from the application.

If appropriate, Quality Assurance raises a SCAR to address a weakness identified in the scorecard.

**13.5.4. Reference Documents - Additional Details**

Corporate Document; SFBN-52XNYK	Supplier Quality Data: User's Guide
Corporate Document; KFID-4JCQB8	Wafer Fab: Wafer Foundry Supplier Performance Requirements
Corporate Document;	Assembly Subcon: Assembly Subcontractor Performance

SFBN-4JPT6M	Requirements
Corporate Document; SFBN-4ZWT2Q	Final Test: Subcontractor Requirements Final Test Performance

**14. Purchasing**

Semtech Corporation maintains a purchasing department at each facility that procures materials used in the manufacture of Semtech products.

**14.1. Purchasing Control Information**

Purchasing control is accomplished by requiring various approvals on any purchase order placed for procurement. Minimum signature approvals include the department head, engineering, and the purchasing agent. All production materials are purchased to specific part drawings that are generated and maintained by Semtech Corporation personnel. Orders are placed to a drawing number and revision level controlled. The latest revision of Semtech Corporation drawings is provided to the vendor with each purchase order. Vendors must be qualified and listed within the Qualified Suppliers Listing database before orders are placed.

For those products that are off-the-shelf commercial products, part number references suffice and are the responsibility of the vendor.

**14.2. Purchasing Information**

Purchasing information is maintained in an electronic database for a minimum of 5 years. Traceability includes specific vendors, dates, quantities, delivery points, and pricing. Inspection results are recorded on Receiving Inspection Reports (RIR's), travelers, or other reporting media and filed by Quality Assurance personnel. Retention is again a minimum of 5 years unless customer requirements include a longer retention period.

**14.2.1. Verification of Purchased Product**

All materials shipped to Semtech manufacturing facilities for use in manufactured products are subject to an inspection upon receipt at their point of delivery. Quality Assurance personnel carry out the required inspections and the results of said inspections are recorded as quality records and retained at the receiving facility. These quality records are maintained by specific part number and by specific vendor for a minimum period of 5 years. Semtech reserves the right

to inspect procured materials at their site of manufacture when necessary.

**14.2.2. Control of Production and service**

Semtech and its manufacturing facilities, and suppliers plan and carry out production and service requirements under controlled conditions. These controlled conditions include, as applicable,

- the availability of information that describes the characteristics of the product,
- the availability of work instructions, as necessary,
- the use of suitable equipment,
- the availability and use of monitoring and measuring equipment,
- the implementation of monitoring and measurement, and
- the implementation of product release, delivery and post-delivery activities

**14.2.3. Validation of Processes for Production and Service**

Semtech Corporation outsources much of its fabrication, assembly and test processes. Within this business model, Semtech's engineering, operations and quality teams validates these processes used in production and service. This validation demonstrates the ability of those processes to achieve planned results. These teams establish and review, as applicable,

- Define criteria for review and approval of these processes,
- Approval of equipment and qualification of personnel,
- Use of specific methods and procedures,
- Control of records, and
- revalidation

**14.2.4. Reference Documents – Additional Details**

Each Semtech facility requiring a quality manual supplement maintains their own procedures for purchasing these materials using the Corporate Purchasing Procedure as a basis for those documents.

Corporate Document; KFID-4KDLKB	Purchasing Procedure
Corporate Document; KFID-4MEPGU	Qualified Suppliers Listing Database

**15. Managing Non-Conforming Material**

Semtech Corporation maintains a worldwide Non-Conforming Material Request system (NCRM) driven by a Lotus Notes database. This system ensures that product which does not conform to requirements is identified and controlled to prevent unintended use or delivery.

Nonconforming product is corrected and subject to re-verification after correction to demonstrate conformity per the direction of the Material Review Board (MRB.)

When nonconforming product is detected after delivery or use has started, the Material Review Board specifies appropriate action such as reporting for concession to the customer, the end-user, regulatory body or other body.

**15.1. Policies**

A NCRM is generated whenever it is determined that:

- Finished product(s) does not meet Semtech datasheets or customer specified requirements, or were not manufactured, inspected or tested to the process of record.
- Work-in-process does not meet internal specifications; or were not manufactured, inspected or tested to the process of record.
- An external wafer foundry requests a concession from Semtech specifications prior to shipment;
- An assembly subcontractor requests a concession from Semtech prior to shipment.
- An RMA is generated through the CCARE system where the customer returns product to Semtech. A NCRM must be generated and the material dispositioned prior to any re-stocking, re-work or re-shipment activity.
- A Maverick Lot has occurred at either an internal wafer fab, external wafer foundry or an assembly subcontractor.
- A QPL Failure has occurred and the failures were determined to be non-discountable.
- Quality & Reliability suspects product, or work in process are not conforming to Semtech datasheets, customer specified requirements or were not

manufactured, inspected or tested to the process of record.

**15.2. Process Description Overview**

Any Semtech employee may initiate a Non-Conforming Material Request. Once entered into the system, the system forwards the NCMR to the specified Quality Manager. This Quality Manager reviews and is allowed to re-assign the NCMR to another Quality Manager at a different site if appropriate.

The Quality Manager then specifies the most appropriate Material Review Board Chair (MRB Chair) for the NCMR type. The MRB Chair selects the most appropriate Material Review Board Members for the NCMR type. A Quality Assurance professional is always included in each MRB.

The Chair solicits disposition recommendations from the MRB Board. After reviewing the recommendations, the Chair selects the most appropriate disposition action and asks the MRB for final approval. If the MRB cannot agree on a course of action, the NCMR is escalated to Q&R Management for final disposition.

The NCMR system allows for the creation and tracking of CAR&Ds or Action Items.

**15.3. Responsible Function/Business Unit**

Quality & Reliability ensures the effectiveness of this QMS element.

**15.4. Reference Documents - Additional Details**

Corporate Document; SFBN-4LZMC4	NCMR: Non-Conforming Material Request
---------------------------------	---------------------------------------

**16. Manufacturing and Operations Controls**

Semtech assures that each product is manufactured to the datasheet specifications whether it is manufactured internally or externally. These datasheets describes the characteristics of our products.

Semtech demands from each wafer fab, wafer probe, assembly and final test site that:

- They manufacture or test Semtech product according to a lot traveler or equivalent.
- They have documented procedures (work instructions) defining each processing step for the traveler, or equivalent.

- Personnel performing the work are qualified.
- They have documented procedures specifying criteria for workmanship at key inspection/testing and or assessment points.
- Appropriate monitoring and measuring devices as specified in the lot traveler or equivalent.
- Out-of-control action plans are defined implemented at key processing steps.
- Key equipment is qualified prior to use and monitored to assure its suitability.
- They implemented an appropriate preventative maintenance program.
- Final Test and wafer probe equipment are routinely calibrated.
- Products are final tested prior to release for customer delivery.

Lot travelers or equivalent define the processing steps where statistical techniques are needed to control and verify process capability and product characteristics. Each manufacturing site maintains procedures describing the methods to implement and control the application of statistical methods identified in Lot travelers.

These policies are assured as each Semtech site has a QMS compliant to ISO 9001. Their implementation and effectiveness is monitored during regular internal audits.

Semtech evaluates key suppliers during our supplier qualification process. Semtech expects that key suppliers have quality systems compliant to ISO 9000 or demonstrate equivalent. Their continued implementation is monitored during surveillance audits.

**16.0.1 Reference Documents - Additional Details**

Documentation for Semtech manufacturing sites is specified in the site Quality Manual Supplement.

**16.1. Product Identification and Traceability**

Semtech identifies each product with a unique part number. Semtech provides specific labeling and marking instructions to our final assembly and test sites.

During production, Semtech established the following unique traceability policies and procedures:

- **Wafer Lot Number:** Each Wafer lot is started in production with a unique lot number that is listed on the wafer lot traveler. The Wafer lot number accompanies the wafer lot thru wafer probe.
- **Assembly Lot Number:** Our assembly subcontractors create unique Assembly Lot

numbers during the packaging processes. One wafer lot may yield multiple assembly lot numbers. These numbers are listed on the assembly lot travelers.

The combination of part number, wafer lot number, and assembly lot number provide the identification and traceability requirements demanded by us, our customers and ISO 9001 QMS requirements.

#### 16.1.1. Reference Documents – Additional Details

Documentation for Semtech manufacturing sites is specified in the site Quality Manual Supplement.

#### 16.2. Handling, Storage, Packaging, Preservation and Delivery

Semtech established and maintains documented procedures for handling, storage, packaging, preservation and delivery of product throughout the manufacturing cycle. These procedures provide the methods that prevent damage or deterioration of our products. Wherever practical, Semtech adopts accepted industry standards.

Semtech also has designated storage areas or stock rooms to prevent damage or deterioration of product, pending use or delivery. Appropriate methods for authorizing receipt and the dispatch to and from such areas are documented.

In order to detect deterioration, the condition of product in stock is assessed at appropriate intervals.

#### 16.2.1. Reference Documents – Additional Details

Documentation for these practices is specified in the site Quality Manual Supplement.

#### 16.3. Customer Property

Semtech Corporation does not accept/work with or uses customer property. Semtech excludes ISO 9001-2008 section 7.5.4 requirements for Customer Property in our QMS.

### 17. Measurement, Analysis and Improvement

Semtech has implemented measurement, analysis and improvement processes where needed;

- To demonstrate conformity to product requirements,
- To ensure conformity of the QMS,

- To continually improve the effectiveness of the quality management system.

Such processes are planned and exist within our internal Audit program.

#### 17.1. Customer Satisfaction

Semtech continuously works on improving its QMS, product and processes to enhance customer satisfaction. As part of monitoring and measuring customer satisfaction, Semtech monitors information relating to customer perception to determine if we meet customer requirements. Such methods include;

- Design wins and losses
- CCare / RMA returns
- Customer Report Cards
- Customer audits and their findings
- Quality incidences, Alerts, and Recalls
- Customer Satisfaction Surveys

#### 17.2. Internal Audits

##### 17.2.1. Policies

Semtech conducts periodic internal audits to determine whether the QMS conforms to ISO 9001; policies and procedures defined by these quality manual and other planned arrangements. These audits ensure our quality management system has been effectively implemented, maintained and provide feedback to Semtech Management for them to drive continuous improvement of their business processes.

Semtech Corporation's internal audit program applies to the business processes deployed corporate wide. For any audit performed at any corporate site fulfills the annual audit requirement as specified herein.

The Management Representative of each named Semtech site:

- Plans an audit program for those areas and processes unique to their site operation taking into consideration the status and importance of the activities to be audited as well as the results of the previous audits;
- Implements and maintains an internal audit Lotus Note database addressing those unique areas and processes;
- Defines the audit scope, frequency and audit methodologies for those local site audits;

- Ensure personnel other than those who perform the activity being audited conduct audits.

For Semtech Sites without a named ISO Management Rep, the Corporate ISO Management Rep shall ensure an appropriate audit program. For business processes implemented and maintained using a Lotus Notes bases workflow application, certain audits for remotes sites are performed on the quality records contained within the database.

**17.2.2. Process Description Overview**

Quality Assurance creates and maintains audit criteria in a series of process audit checklists in the appropriate site internal audit database. Semtech's process audits do not maintain a standardized audit checklist in the sense of the word. The so-called checklists identify the applicable clauses associated with the particular process audit. These clauses embody the full breadth and depth of ISO 9001, business processes defined by this quality manual, key customer requirement, and other industry standard practices. These checklists contain methods for scoring the results of audits.

Checklists are then assigned to audit profiles. Audit profiles take into consideration the status, importance, and the results of previous audits. The application program provides the capability to create ad hoc checklists and/or audit profiles as may be needed.

Quality Assurance schedules audits by area, department or business processes using the application program. Each audit is assigned an audit profile, which in turn contains a series of audit checklists. Audits are generally scheduled at least one calendar quarter in advance.

Auditors are assigned to ensure objectivity and impartiality of the audit process. Auditors do not audit their own work.

Results and scoring of the audits are recorded on each checklist.

Quality Assurance raises an internal audit corrective action for appropriate findings. A document link is placed in the checklist to assure linkage to the corrective action. The corrective action system then manages the actions taken to address the finding as well as verification of corrective action effectiveness. If an audit detects suspected non-conforming material, then a non-conforming material request (NCFMR) would be raised. The NCFMR system then manages the review and disposition of suspect material. A document link

is added to the checklist for traceability. If appropriate a corrective action may be raised as well.

**17.2.3. Responsible Function/Business Unit**

Quality & Reliability ensures the effectiveness of this QMS element.

**17.2.4. Reference Documents – Additional Details**

Corporate Document; SFBN-52ZS4J	Audit System: Database User's Guide
Corporate Document; KFID-4L3S3E	Corporate Internal Audit Program

**17.3. Calibration**

Semtech identifies and calibrates appropriate equipment needed to assure conformity of product to requirements.

For each site where there is a named Site ISO Management Representative prepares and maintains a calibration work procedure compliant to ISO 9001 requirements. The Corporate ISO Management Rep addresses sites without a name ISO Management Rep.

Semtech uses calibration techniques that are traceable to international or national standards. If no standards exist each site documents the basis used for calibration.

Calibration records are stored in the appropriate site-tracking database.

The calibration work procedure includes re-call provisions should equipment be found out of calibration.

**17.3.1. Policies**

Each site ensures work procedures for equipment requiring calibration address:

- Ensure appropriate equipment are calibrated or adjusted prior to use;
- Safeguarding equipment from adjustments that would invalidate the calibration;
- Protecting equipment from damage and deterioration during handling, maintenance and storage.

**17.3.2. Responsible Function/Business Unit**

- Quality & Reliability ensures the effectiveness of this QMS element.

**17.3.3. Reference Documents – Additional Details**

Corporate Document; KFID-4KGKRU	Calibration Procedure
Corporate Document; PSAZ-5AMV6Y	Calibration Record - FORM

For sites with a Supplemental Site Quality Manual requirement, such calibration documentation shall be listed in their appropriate section.

**17.4. On-Going Reliability Testing**

Semtech has an extensive On-going Reliability Testing Program. Reliability Assurance classifies wafer fab process families for the purposes of selecting sampling plans; reporting reliability tests; and, reporting reliability statistics. The classifications take into consideration processing technologies, minimum spacing geometries, dielectric passivation techniques, number of metal inter connect levels and wafer fab site and assembly sites.

Product samples are drawn per the procedure listed below on a regular basis in order to demonstrate to us and our customers FIT levels <10 for all major process groups. Special emphasis is placed on newly qualified or immature processes.

The ORT program includes the following environmental tests:

- High Temperature Operating Life
- Highly Accelerated Stress Testing
- Autoclave
- Temperature cycling

The program includes requirements for our assembly subcontractors to participate in our ORT program.

Testing procedures and methods are performed according to the appropriate JEDEC specifications and are only performed by qualified personnel.

A reliability test plan is prepared for each ORT event. The initial report and the final report are the quality records for this QMS. Results from each ORT test are incorporated into our Reliability Statistics databases for tracking and reporting purposes.

Our ORT addresses the ISO 9001 requirement to re-validate processes where the resulting output cannot be verified by subsequent measurement or monitoring. The environmental reliability testing addresses wafer

fab and assembly processes where deficiencies may become apparent only after the product is in use.

**17.4.1. Responsible Function/Business Unit**

Quality & Reliability ensures the effectiveness of this QMS element.

**17.4.2. Reference Documents – Additional Details**

Corporate Document; GSAN-4MFNM4	Reliability Test Requirements for ORT
JESD-47	Stress-Test-Driven Qualification of Integrated Circuits.

**18. Corrective Action Request System (CAR8D)**

**18.1. Internal Corrective Action System**

**18.1.1. Policies**

Any Semtech employee may raise an internal Corrective Action Request using the 8D problem solving method whenever:

- Action needs to be tracked until completion;
- Action is needed to eliminate the cause of nonconformities in order to prevent recurrence;
- There is a major or minor finding during an internal audit.

Information contained in the application database is the quality records for this QMS element.

**18.1.2. Responsible Function/Business Unit**

Quality & Reliability ensures the effectiveness of this QMS element.

**18.1.3. Process Description Overview**

Any Semtech employee may initiate CAR8D using the CAR8D database. The initiator documents the problems and sends it to any Quality Assurance Manager (or QA Staff Member). Quality Assurance reviews each submission and forwards it to the most appropriate Quality Assurance Manager. Upon acceptance, Quality Assurance determines and assigns a Driver. The Driver coordinates Semtech resources by addressing the corrective action request using the CAR8D database by:

- Describing the problem;
- Determining the root cause;
- Determining and implementing containment action if needed;

- Documenting an implementation plan and estimate the completion date;
- Determining actions necessary to prevent recurrence;
- Ensuring the actions and implementation plans are completed in a timely manner suitable to the severity of the request.

Quality Assurance may escalate CAR8Ds whenever timely actions are not evident. The application program automatically escalates late CAR8Ds.

When the Driver is satisfied that the appropriate corrective action was taken, he/she forwards the document for closure review. The Closure Review team consists of at least the assigned Quality Assurance Manager and the Originator.

Once approved, the document is marked for an effectiveness audit to be performed within 90 to 120 days by Quality Assurance. The application includes an automatic escalation for CAR8Ds not audited within 90 - 120 days from closed.

The CAR8D is formally closed after a successful effectiveness audit.

**18.1.4. Reference Documents – Additional Details**

Corporate Document; PLOT-4LSTMJ	CAR8D System: Database Instructions
Corporate Document; PSAZ-5AMMXS	Corrective Action and Preventive Action Procedure

**19. Preventive Action**

**19.1. Preventive Action System**

Semtech strives to identify quality practices, processes and quality systems in support of preventive action initiatives to include product qualification process geared to eliminate or as a minimum significantly reduce recurring non-conformances in material, product, services or the development of practices outside the guidelines of corporate directives and policies as a measure of preventive action.

Preventive Action as a tool is part of our quality system as a proactive measure to eliminate or reduce the occurrences of nonconformity and non-compliance and also serves as a measure of continuous improvement.

Such measures are found in;

- Internal Audit and Supplier Audit Program

- Daily Ongoing Reliability Testing conducted at our subcontractors
- Semtech’s ORT program administered by our reliability group
- Semtech’s Shift Analysis program
- Semtech’s qualification process as identified in our New Product Introduction program
- Generation of FMEAs and OCAPs
- The review of Statistical Process Control data, Process Control Measurement data and Key Product Indicators
- The review of data and information within our quality systems and the change control processes defined for gaining approval
- Device Profile modeling
- T Supreme Dopant & Epi Measurement tool
- Yield Enhancement Programs
- Test Program Transfers
- Change Management process
- Subcontractor qualification program
- Measuring Subcontractor Performance as identified within our Supplier Quality Management Program
- Calibration Program
- Management Review Programs
- Preventive Maintenance Program
- Verification audits pursuant to Corrective Action Response

The measures listed are a sampling of those areas whereby preventive action is part of the goal or process. The list is not all inclusive but should serve as a basis of information.

Additionally, Semtech performs extensive qualification work prior to the release of products to our customers. These qualification activities eliminate the cause(s) of potential nonconformities and is our prime preventive action as required by ISO 9001.

Documents referenced within JESD 47 Stress-Test-Driven Qualification of Integrated Circuits identify potential nonconformities and their causes. Semtech adopted JESD 47 Stress-Test-Driven Qualification of

Integrated Circuits specification to guide qualification plan requirements, test methods and sample sizes.

Quality & Reliability approves all qualification plans. This ensures that qualification requirements and/tests are appropriate to the impact of potential problems.

Upon completion of the qualification requirements, Q&R approves a final report. These final reports document the results of the qualification requirements/tests, exceptions, and any action taken as appropriate.

The initial qualification plan and the final report are the quality records for this QMS.

NOTE: Each qualification plan includes provisions to perform certain environmental testing assessing the reliability of our devices. These reliability tests address the ISO 9001 requirement to perform validation tests on processes where the resulting output cannot be verified by subsequent measurement or monitoring.

**19.1.1. Reference Documents – Additional Details**

Corporate Document; PSAZ-5AMMXS	Corrective Action and Preventive Action Procedure
Corporate Document; KFID-4JRLDK	Qualification Reliability Testing
Corporate Document; SFBN-4JKMNA	EIA/JESD47 Stress Driven Qualification of Integrated Circuits

**19.2. Process Control Plans**

**19.2.1. Policies**

- Process control plans are generated for each major wafer fab, assembly subcontractor or other key supplier at time of qualification.
- Process Control Plans are stored in the appropriate corporate database and are placed under revision control.
- Process Control Plans identify preventive, monitoring, out of control action plans and the statistical methods used to measure and monitor manufacturing processes.

**19.2.2. Responsible Function/Business Unit**

- Each site where manufacturing is being conducted, the site quality manager prepares a list of processes requiring Process Control Plans.

- Process or Manufacturing Engineering at each site prepares and submits process control plans for review and approval.
- Semtech's Q&R Supplier Quality Assurance Engineer prepares list(s) of processes requiring process control plans from our wafer fabs, assembly subcontractors and other key suppliers. He/she also coordinates activities to obtain control plans during qualification.

The Process Control Plans, once obtained or created, are maintained within the Supplier Quality database.

**19.2.3. Reference Documents – Additional Details**

Corporate Document; KFID-4JRLDK	Qualification Reliability Testing
Corporate Document; GSTD-4KE54M	Process Control Plan Requirements

**20. Appendix A: Semtech Sites Requiring Quality Manual Supplements**

Semtech Sites that need to have Quality Manual Supplements are defined in: Table 1 Sites Requiring Supplemental Quality Manuals. The Supplements are prepared and maintained by the site ISO Management Representative.

**Table 1 Sites Requiring Supplemental Quality Manuals**

Camarillo, California USA
Reynosa, Mexico
Neuchatel, Switzerland

**21. Appendix B: Site Application of QMS Process**

This appendix defines the QMS processes application by Semtech site.

**Table 2 Site Application of QMS Process**

<b>Quality Management System Element</b>	<b>Camarillo, CA</b>	<b>San Jose, CA</b>	<b>San Diego, CA</b>	<b>Morrisville, NC</b>	<b>Reynosa, Mexico</b>	<b>Southampton, UK</b>	<b>Neuchatel, Switzerland</b>	<b>Irvine, CA</b>	<b>Redondo Beach, CA</b>
1. Quality Management System Overview								TBD	TBD
1.1. QMS Process & Sequence	X	X	X	X	X	X	X	TBD	TBD
1.2. Quality Management System Policies	X	X	X	X	X	X	X	TBD	TBD
1.3. Quality Manual Policies	X				X		X	TBD	TBD
2. Core Values	X	X	X	X	X	X	X	TBD	TBD
3. Quality Policy	X	X	X	X	X	X	X	TBD	TBD
4. Semtech's Leadership Team Responsibilities	X	X			X		X	TBD	TBD
4.1. Most Important Tasks (MITs)	X	X	X	X	X	X	X	TBD	TBD
4.2. Department Roles & Responsibilities	X	X	X	X	X	X	X	TBD	TBD
4.3. Business Unit Manager's Roles & Responsibilities	X	X	X	X	X	X	X	TBD	TBD
5. Management Representative(s)	X				X		X	TBD	TBD
6. QMS Continuous Improvement	X							TBD	TBD
7. Customer Focus	X				X		X	TBD	TBD
7.1. Customer Care	X				X		X	TBD	TBD
7.2. Customer Requirements Review	X	X	X	X	X	X	X	TBD	TBD
7.3. Customer Notifications	X				X		X	TBD	TBD

Quality Management System Element	Camarillo, CA	San Jose, CA	San Diego, CA	Morrisville, NC	Reynosa, Mexico	Southampton, UK	Neuchatel, Switzerland	Irvine, CA	Redondo Beach, CA
7.4. Failure Analysis	X				X		X	TBD	TBD
8. Management Review	X				X		X	TBD	TBD
8.1. QMS Continuous Improvement	X	X	X	X	X	X	X	TBD	TBD
8.2. Quarterly Business Reviews	X	X	X	X	X	X	X	TBD	TBD
8.3. Site QMS Reviews	X				X		X	TBD	TBD
9. Resource Management	X				X		X	TBD	TBD
9.1. Training and Development	X	X	X	X	X	X	X	TBD	TBD
10. New Product Introduction	X	X	X	X	X	X	X	TBD	TBD
10.1. Phase 1: Product Definition	X	X	X	X	X	X	X	TBD	TBD
10.2. Phase 2: Product Design	X	X	X	X	X	X	X	TBD	TBD
10.3. Phase 3: Design Validation	X	X	X	X	X	X	X	TBD	TBD
10.4. Phase 4: Qualification	X	X	X	X	X	X	X	TBD	TBD
11. Managing Customer Contracts	X				X		X	TBD	TBD
12. Documentation and Key Datafile Management	X	X	X	X	X	X	X	TBD	TBD
13. Supplier Management	X				X		X	TBD	TBD
13.1. Qualification of Wafer Fab Processes	X				X		X	TBD	TBD
13.2. Qualification of Assembly Processes	X				X		X	TBD	TBD
13.3. Supplier Corrective Action	X				X		X	TBD	TBD
13.4. Supplier Audits	X				X		X	TBD	TBD
13.5. Supplier Report Cards	X							TBD	TBD
								TBD	TBD

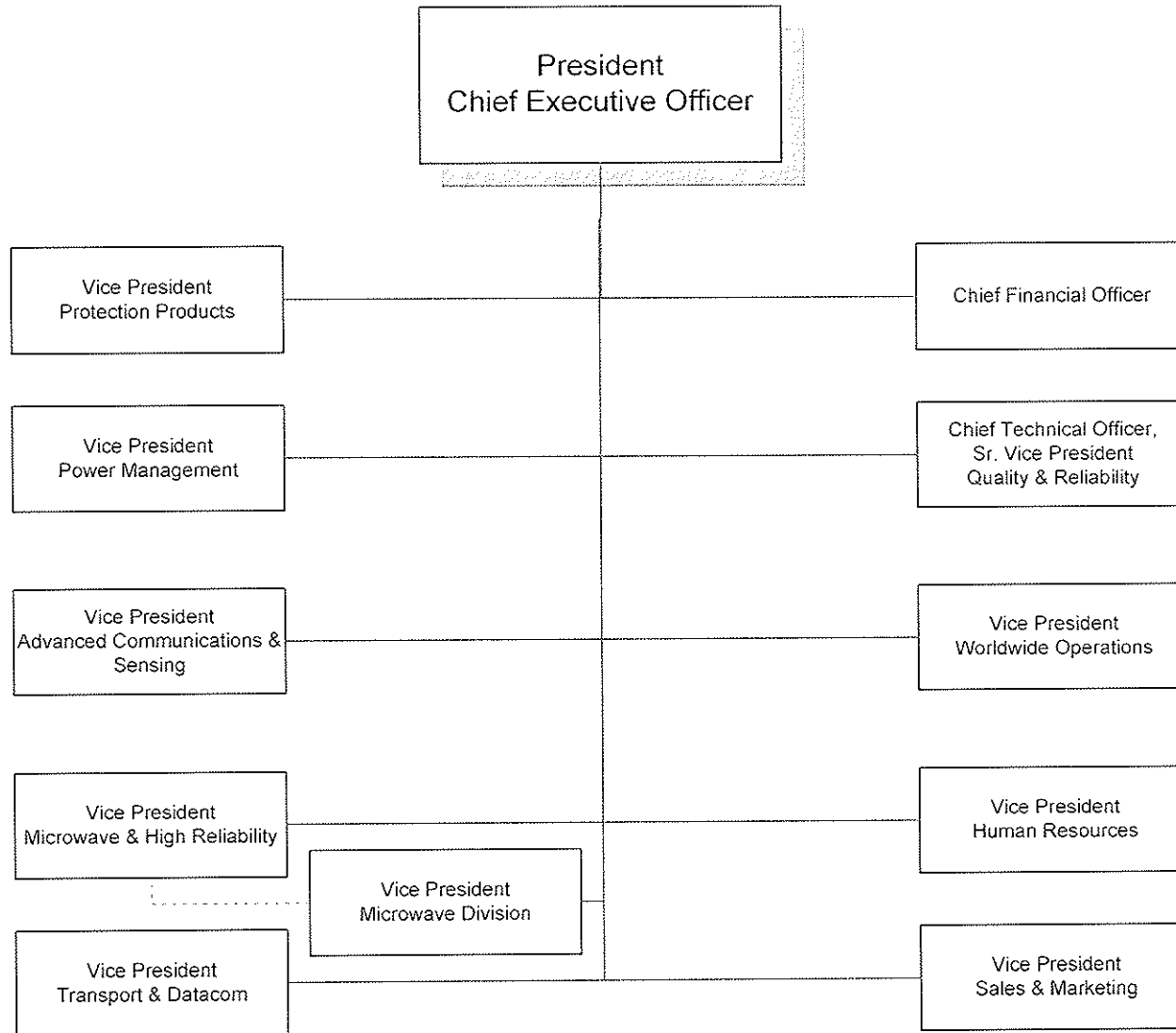
Quality Management System Element	Camarillo, CA	San Jose, CA	San Diego, CA	Morrisville, NC	Reynosa, Mexico	Southampton, UK	Neuchatel, Switzerland	Irvine, CA	Redondo Beach, CA
14. Purchasing									
14.1. Purchasing Control Information	X	X	X	X	X	X	X	TBD	TBD
14.2. Purchasing Information	X	X	X	X	X	X	X	TBD	TBD
15. Managing Non-Conforming Material	X				X		X	TBD	TBD
16. Manufacturing and Operations Controls	X				X		X	TBD	TBD
16.1. Product Identification and Traceability	X				X		X	TBD	TBD
16.2. Handling, Storage, Packaging, Preservation and Delivery.	X				X		X	TBD	TBD
16.3. Customer Property	X				X		X	TBD	TBD
17. Measurement, Analysis and Improvement	X				X		X	TBD	TBD
17.1. Internal Audits	X	X*	X*	X*	X	X*	X	TBD	TBD
17.2. Calibration	X	X	X	X	X	X	X	TBD	TBD
17.3. On-Going Reliability Testing	X							TBD	TBD
18. Corrective Action Request System (CAR&D)	X	X	X	X	X	X	X	TBD	TBD
19. Preventive Action	X	X	X	X	X	X	X	TBD	TBD

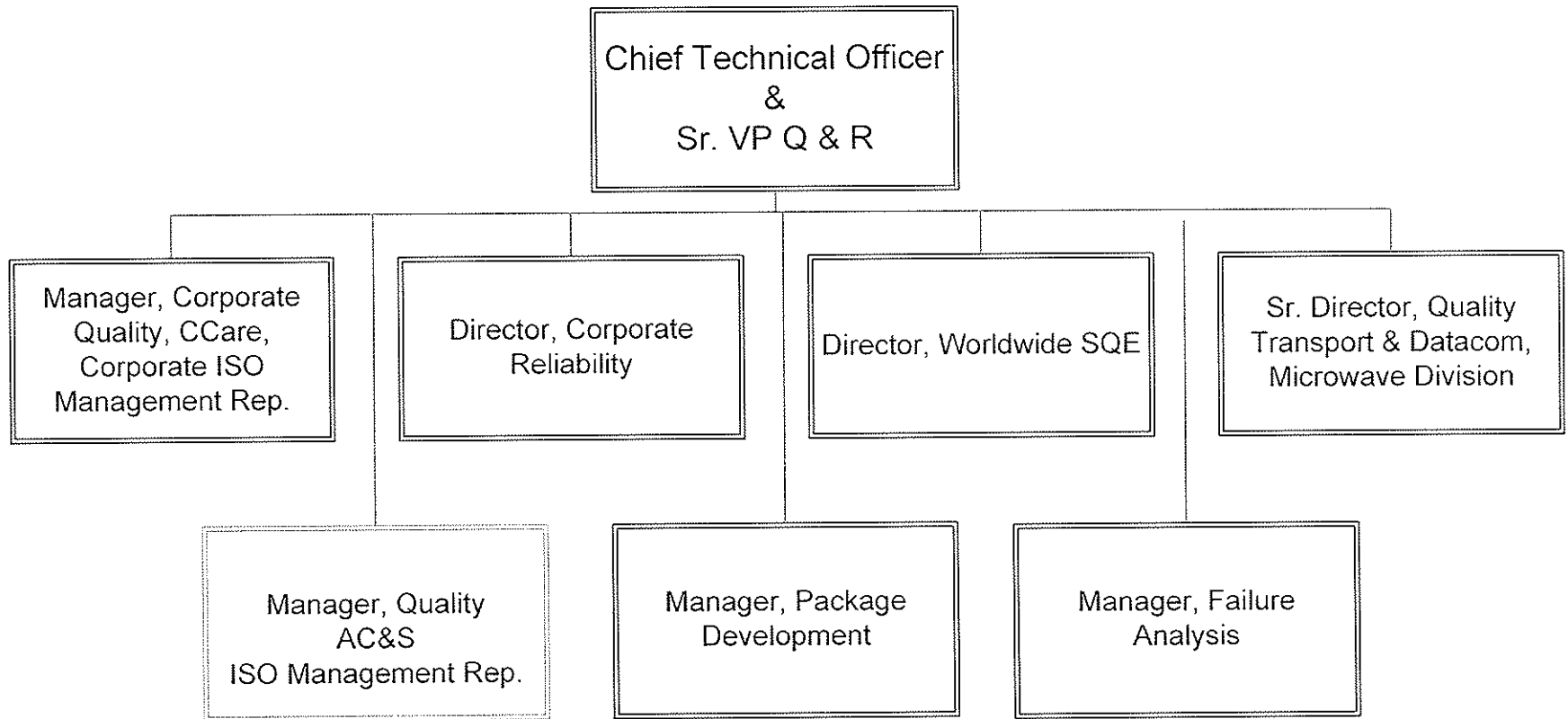
(\*); Internal audit programs fall within the Corporate Audit Program and are scheduled and tracked accordingly. Furthermore, these sites do not maintain local site specific audit requirements.

TBD; Semtech Corporation acquired Sierra Monolithics Inc. on December 10, 2009. This company now comprises the Transport & Datacom business unit based out of Irvine CA. And the Microwave division of High Reliability, formerly known as Power Discrete, based out of Redondo Beach CA. . That business unit is now called Microwave & High Reliability. Semtech Corporation will execute an Assessment and Transition Plan once the foundation has been made within our QMS.

22 Appendix C: Organization Charts

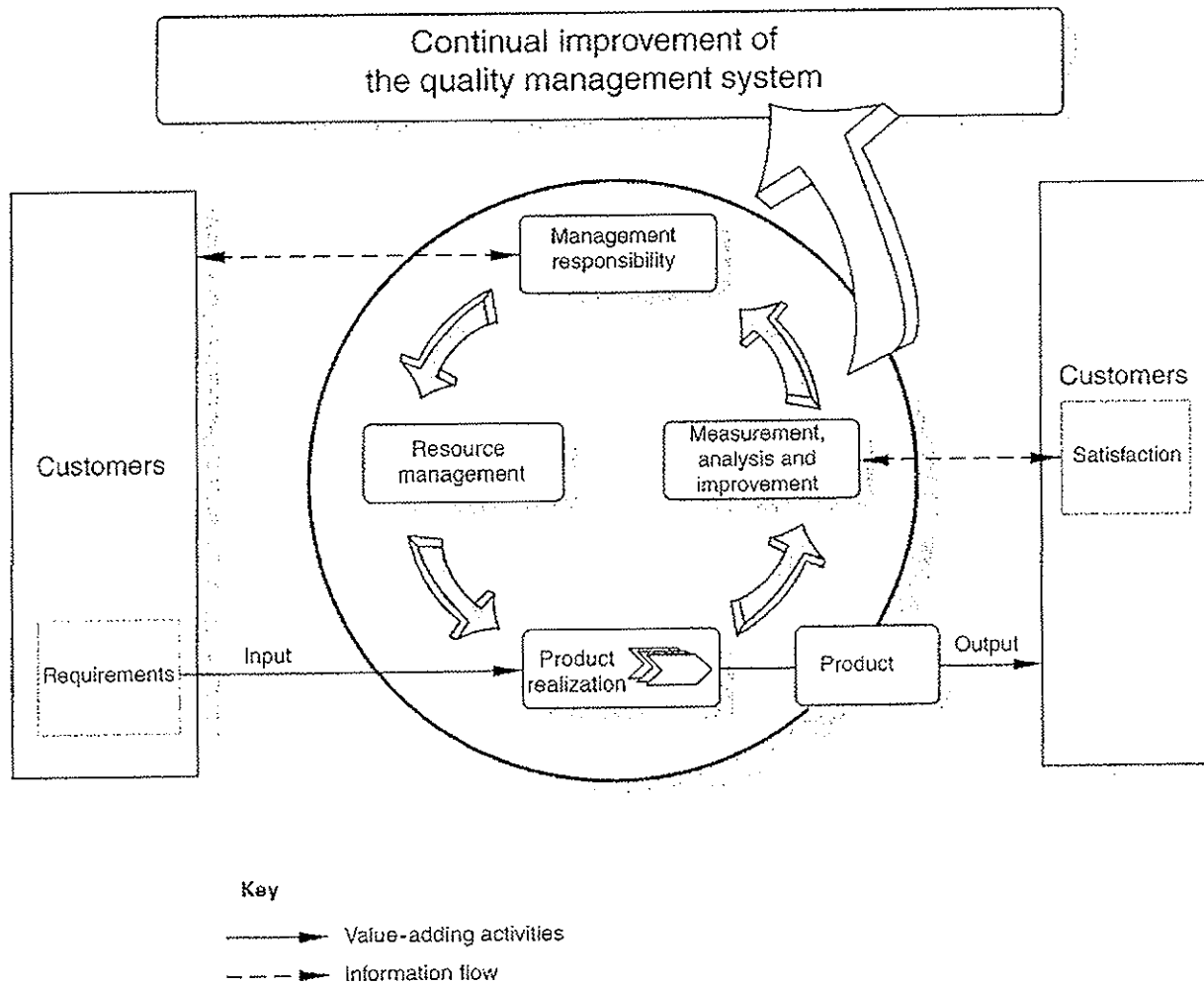
22.1 Semtech Corporation







24. Appendix E: Process Based Quality Management System



## 25. Appendix F: QMS Relationship with ISO 9001

This appendix provides a cross reference of Semtech's Quality Management System with ISO 9001 requirements.

Quality Management System Element	ISO 9001 – 2008 Clause
1. Quality Management System Overview	4.1
1.1. QMS Process & Sequence	4.1
1.2. Quality Management System Policies	4.1, 4.2.1
1.3. Quality Manual Policies	4.2.2
1.4. Control of Documents	4.2.3
1.5. Control of Quality Records	4.2.4
2. Core Values	
3. Quality Policy	5.3
4. Semtech's Leadership Team Commitment and Responsibilities	5.1, 5.2, 5.4.1
4.1. Most Important Tasks (MITs)	5.4.1
4.2. Department Roles & Responsibilities	5.5.1
4.3. Business Unit Manager's Roles & Responsibilities	6.5.1
5. Management Representative(s)	5.5.1, 5.5.2
6. QMS Continuous Improvement	5.4.2, 8.5.1
7. Customer Focus	5.2
7.1. Customer Care	7.2.3
7.2. Customer Requirements Review	5.2, 7.2.1, 7.2.2, 7.2.3
7.3. Customer Notifications	
7.4. Failure Analysis	
8. Management Review	5.6
8.1. QMS Continuous Improvement	5.5.3, 5.6.3
8.2. Quarterly Business Reviews	5.6.1, 5.6.2, 8.4
8.3. Site QMS Reviews	5.6.2
9. Resource Management	6.1, 6.3, 6.4
9.1. Training and Development	6.2.1, 6.2.2
9.2. Infrastructure	6.3
9.3. Work Environment	6.4
10. New Product Introduction	7.1, 7.2, 7.3
10.1. Phase 1: Product Definition	7.1, 7.3.1
10.2. Phase 2: Product Design	7.3.1, 7.3.3, 7.3.4

Quality Management System Element	ISO 9001 – 2008 Clause
10.3. Phase 3: Design Validation	7.3.1, 7.3.3, 7.3.5, 7.3.6
10.4. Phase 4: Qualification	7.3.1, 7.3.4, 7.5.1, 7.5.2
10.5. Design Modifications	7.3.7
11. Managing Customer Contracts	5.2, 7.2.1, 7.2.2, 7.2.3
12. Documentation and Key Datafile Management	4.2.1, 4.2.3
12.2. Quality Records	4.2.4
13. Supplier Management	7.4.1
13.1. Qualification of Wafer Fab Processes	7.4.1, 8.5.3
13.2. Qualification of Assembly Processes	7.4.1, 8.5.3
13.3. Supplier Corrective Action (SCAR)	7.4.1
13.4. Supplier Audits	7.4.1
13.5. Supplier Report Cards	7.4.1
14. Purchasing	7.4.1, 7.4.2, 7.4.3
14.2.2 Control of Production and Service	7.5.1
14.2.3 Validation of Processes for Production and Service	7.5.2
15. Managing Non-Conforming Material	8.3
16. Manufacturing and Operations Controls	7.5.1, 8.2.3, 8.2.4
16.1. Product Identification and Traceability	7.5.3
16.2. Handling, Storage, Packaging, Preservation and Delivery.	7.5.5
16.3. Customer Property	7.5.4
17. Measurement, Analysis and Improvement	8.1, 8.2.1
17.1. Internal Audits	8.2.2
17.2. Calibration	7.6
17.3. On-Going Reliability Testing	7.5.2
18. Corrective Action Request System (CAR8D)	8.5.2, 8.4
19. Preventive Action	8.5.3, 8.4