

## High-Rel and Space-Rel Screening Options

### History

Since 1985 MwT has shipped millions of units for use in Commercial, Industrial, Military and Space end-use environments. MwT prides itself on its quality of product and workmanship. MwT's workmanship standards are derived from MIL-STD-883, Method 2010, 2017 and 2032 and meet the intent of MIL-STD-883.

### Commercial and Industrial

Unless otherwise specified by Customer Drawing, Customer Request and/or Customer PO, MwT will build test and inspect product to its commercial/industrial standards.



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### Military and Space

MwT performs military screening in accordance with customer specifications or to MIL-PRF-38534 Table C-IX Device Screening Class H. MwT performs space screening in accordance with customer specification or to MIL-PRF-38534, Class K, element and group screening. If product screening for Military or Space end-use is required, please specify criteria and MwT will bid accordingly.

### High-Rel and Space-Rel Screening Standard List

- Table C-II Microcircuit and semiconductor dice evaluation
- Table C-III Passive element evaluation
- Table C-V Substrate evaluation
- Table C-VI Package evaluation
- Table C-IX Device Screening, EXCEPTION nondestructive bond pull
- Table C-Xa Group A electrical Subgroups 1 - 7
- Table C-Xb Group B testing, Subgroup 1 - 8

- Table C-Xc Group C testing, Subgroup 1 - 4
- Table C-Xd Group D testing, Subgroup 1 - 4

### High Reliability Capability

MwT has developed a high-reliability capability to serve the growing market for space qualified microwave products. Based on our 21 years of experience of supplying advanced microwave devices to both military and space oriented companies, MwT has established the controls and processes necessary to supply the demanding high-rel and space market. With a product base featuring inherently reliable GaAs based devices, circuits, and processes, MwT is capable of meeting the most stringent hi-rel requirements. Typical products are based on the following technologies:

- GaAs Epitaxial Material Based FETs and MMICs
- Multi-Level Thin Film Circuit Metal Technology
- Hermetic Sealing and Laser Welding Technology
- In-House SEM and QC/QA Inspection Capability
- Standard Design Manual for Reliability
- ISO 9001 Qualified Company Quality Manual

### Materials

To insure the highest quality products, MwT maintains tight control of all critical material. MwT has developed an internal capability to produce the industry's best GaAs epitaxial material, GaAs FETs, GaAs MMICs and thin film circuits. With total control from initial material through finished product, our vertically integrated process assures the capability to meet all requirements for in-process control and quality. For example, each wafer is thoroughly qualified before introduction to the product flow. Qualification includes physical tests such as SEM photos, die adhesion, bondability, and a full 1000 hour life test on a sample basis.

Outside purchased elements and components are subjected to the same stringent process of evaluation and acceptance. Although purchased as fully qualified military components or screened internally to an equivalent level, each lot is tested for compliance to physical and environmental requirements before use.

### Process Control

MwT process controls for all products include clean room fabrication of components with Class 100 Laminar flow hoods used to special processes. Wire bond pull and die shear tests are performed regularly in accordance with MIL-STD-883, Method 5008, Class S. An ISO 9001 system is in place. A system of formal release and change policy are

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in effect and with device tracking and document control. These controls allow MwT to respond to high-reliability requirements for traceability and configuration control.

### Screening and Qualification

MwT hi-rel products have passed space and military level screening and qualification tests. MwT design and construction techniques set the standards for rugged construction and long life. Data is on file for vibration, mechanical shock, temperature cycling, life test and electrical tests



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over temperature. Additional test data is also available for package related tests such as water vapor content and hermeticity. Test methods used were from MIL-STD-883, MIL-STD-810, and MIL-STD-202. MwT maintains the internal capability for many environmental tests with specialty tests contract to nearby laboratories.

### Program Management

MwT has a dedicated program management team to provide support for high-reliability orders. From the quote cycle to the final shipment of an order, program managers provide coordination, contact and control for all high-reliability orders. These qualified professionals, serve as project leaders and manager each high-reliability order to insure on time deliveries and excellent customer interface. MwT has

the capability to meet the following specifications:

MIL-STD-202	MIL-STD-785	MIL-STD-810
MIL-STD-461	MIL-STD-883	MIL-STD-461
MIL-STD-19500	MIL-STD-750	MIL-M-38510
MIL-STD-781	MIL-I-45208	DOD-D-1000
MIL-Q-9858	MIL-STD-45662	MIL-PRF-35834

### Experience

MwT is a leader in the design and manufacture of narrow and broad band, low noise, medium power GaAs FET amplifiers. We have extensive experience in designing products for existing applications and can often offer smaller size and improved efficiency. MwT has fully qualified designs for high reliability applications (MIL-STD-883, level S) in the frequency ranges within 0.5–22.0GHz.

All amplifiers incorporate MwT manufactured GaAs FETs and are fully qualified at the wafer level. All MwT FETs feature gold refractory alloy metallization for extended reliability in high temperature, high stress environments. MwT FET devices cover the frequency range of 500MHz to 40GHz. Temperature compensation

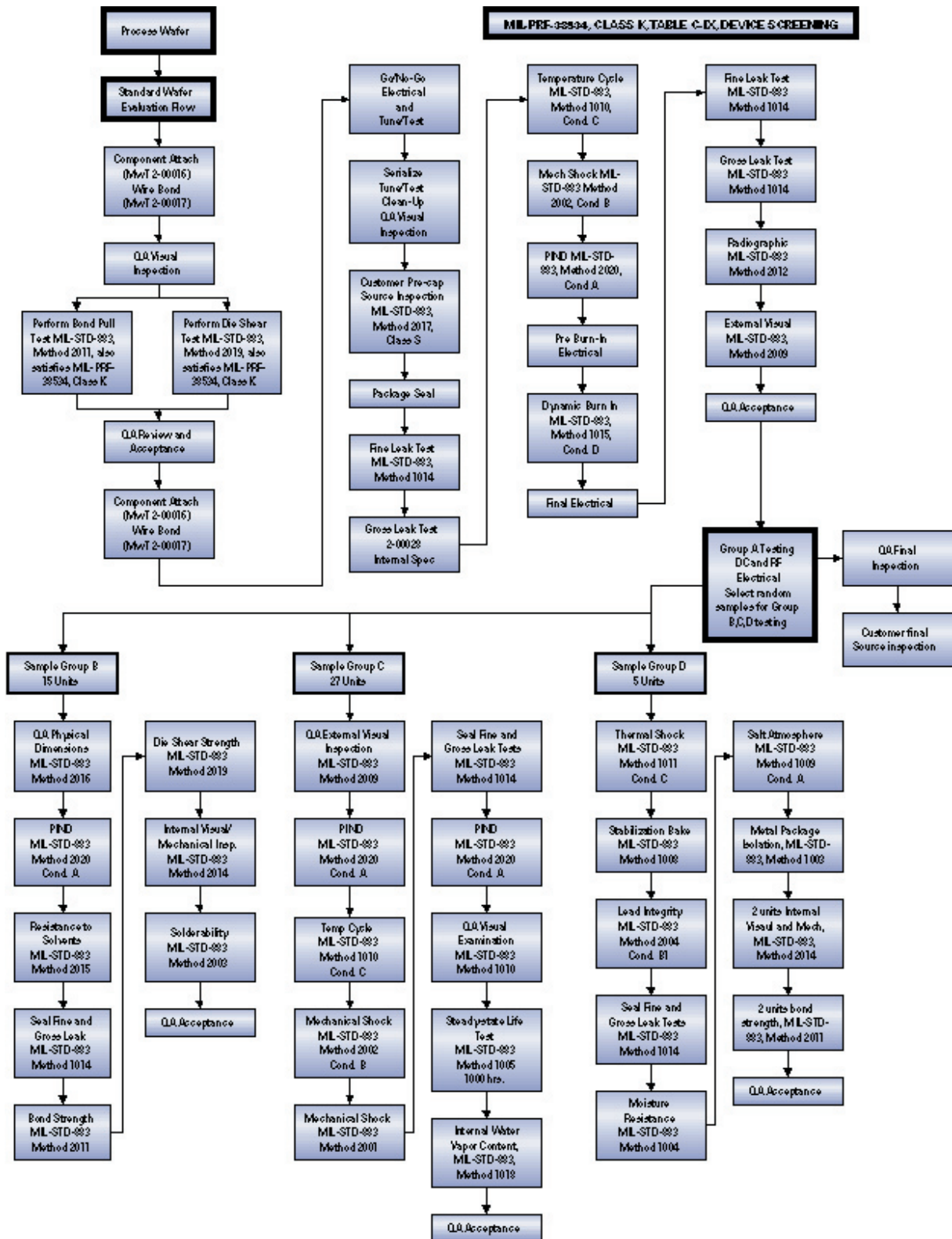
networks using PIN diode attenuators and thermistors and voltage regulators with space qualified chips have been qualified in high-rel amplifiers.

All design, processing, screening and testing phases of product development and manufacture have been fully documented. Qualification of the purchased components and MwT manufactured devices, circuits and amplifiers are shown in the attached flow diagram of a typical screening/qualification program. Modifications to meet specific program requirements are readily available.

All products manufactured by MwT use design and processing techniques which have been validated by qualification in high reliability applications. Therefore, all products, from GaAs FETs to complex integrated MIC subsystems can be qualified for high reliability programs.

# Space-Rel Screening Flow Example [For A Clearer Chart, CLICK HERE](#)

For a custom MPS amplifier product



HIGH RELIABILITY OPTIONS