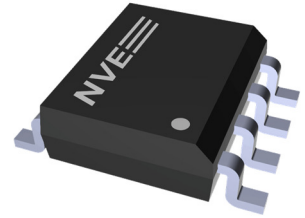


Cost-Effective Off-the-Shelf High-Rel Isolators

The new IL7xxH-Series isolators are high-rel versions of inherently reliable GMR isolators. All NVE isolators feature inherent reliability, a better barrier, inherent radiation tolerance, gold-standard certifications, and low EMI.

The high-rel IL7xxH uses NiPdAu-Ag leadframes, has the full -55 °C to 125 °C military temperature range, and has verified low outgassing in accordance with NASA specifications.



Why Isolate?

Isolators are critical components in various high-rel applications. They can protect sensitive electronics from high-voltage circuits or transients and eliminate ground loops between system modules to enhance signal integrity.

Unique Technology

NVE isolators use unique spintronic data transfer and composite isolation barrier technologies.

Spintronic Data Transfer for Reliability and Low EMI

NVE isolators use a unique spintronic Giant Magnetoresistance (GMR) technology to transfer data across the isolation barrier without RF carriers or refresh clocks. Conventional capacitive and inductive isolator technologies need carriers or clocks, which are easily disrupted by ionizing radiation. NVE's static design also virtually eliminates EMI emissions, which can wreak havoc with the tight quarters of high-rel applications.

A Better Barrier

A unique ceramic/polymer composite barrier provides excellent isolation and virtually unlimited barrier life, with a remarkable barrier resistance of 100 teraohms—100 times higher than other isolators, and an extrapolated life of 44000 years, versus less than 100 years for other isolators. Of course, there's a statistical chance that conventional isolators will fail in much less than 100 years.

Proven in Demanding Applications

IL700-Series isolators were developed with NASA and Department of Defense support and introduced in 2000. Since then, they have been proven in a number of space, defense, and satellite applications.

Inherent Radiation Tolerance

Capacitive and inductive isolators rely on carriers and clocks that are disrupted by radiation damage to the circuit. Customers have tested the parts' radiation immunity.

NASA evaluated three types of commercially-available isolators, capacitive isolators, inductive isolators, and NVE GMR isolators for use on a low-earth orbit (LEO) space mission with a seven-year operational life. Testing validated that NVE IL700-Series isolators had exceptional immunity to Single Event Latch-up (SEL) and Single Event Upset (SEU).¹ The isolators survived Total Ionizing Dose (TID) radiation exposure up to 120 krad.

¹M. A. Jacobson, et. al, "SEE and TID Results for Commercial Non-Optogalvanic Isolators for Space Application," *IEEE Radiation Effects Data Workshop*, Las Vegas, 2011, <https://www.nve.com/Downloads/06062508.pdf>

NASA also highlighted their advantages in applications requiring low power consumption.

Gold-Standard Certifications

NVE isolators are certified to the rigorous IEC 60747-17 (VDE 0884-17) standard. VDE 0884 verifies isolation, partial discharge, surge immunity, and barrier life. The “-17” edition verifies barrier life with extensive Time-Dependent Dielectric Breakdown (TDDB) testing. Surge test requirements are more stringent, including bipolar pulse testing. Many other isolators claim conformance to obsolete or less demanding standards.

NiPbAu Leadframes for Enhanced Reliability

The IL7xxH-Series uses roughened, dimpled NiPbAu leadframes. These leadframes have excellent corrosion resistance in harsh environments, better solderability, and less susceptibility to delamination and bond failures. MSL1 testing validates the resistance to delaminations.

MSL1

All NVE isolators are rated at the highest level—MSL1. MSL1 components have unlimited floor life at 30 °C and 85% relative humidity. A benchmark NASA test found a most components tested failed to meet their claimed MSL ratings². Presumably many parts were tested only when they were qualified with no controls to ensure ongoing compliance.

IL7xxH-Series parts have been recently tested, and exceed the minimum requirements with pristine test results as shown in Figure 1:

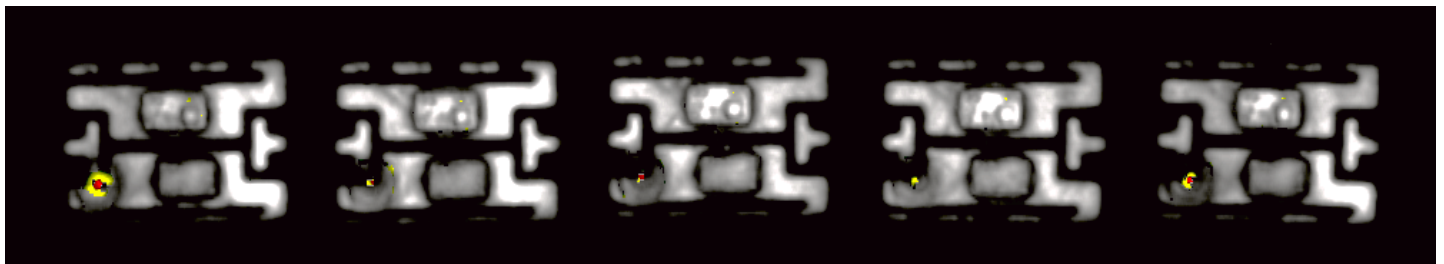
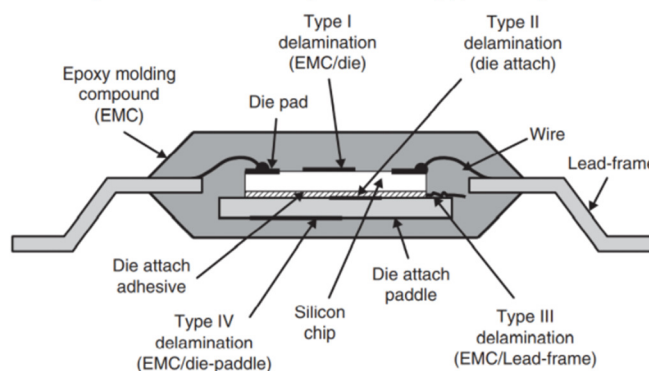


Figure 1. Top-side IL710H post-conditioning Confocal Scanning Acoustic Microscopy (CSAM) images for five test parts showing virtually no delaminations. The red/yellow near pin 1 is from the pin 1 mark and does not represent a defect.

The IL710H MSL1 testing was designed to detect any of four types of potential delamination:



²<https://nepp.nasa.gov/DocUploads/F9103397-759A-4BBA-AD646D32C0A133D7/MOISTURE-LEVEL-TESTING-REPORT-Final.pdf>

Figure 1. Four types of potential delamination (“EMC” = Epoxy Molding Compound).

Conclusion

Cost-effective, off-the-shelf IL7xxH-Series isolators offer inherent reliability and ruggedness in extreme environments. Spintronic data transfer and ceramic/polymer composite barriers make these isolators ideal for critical systems in space, defense, and other demanding applications.

Contact Us

Email us at iso-apps@nve.com for help with your next high-rel project. We'll answer your questions within 24 hours.

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