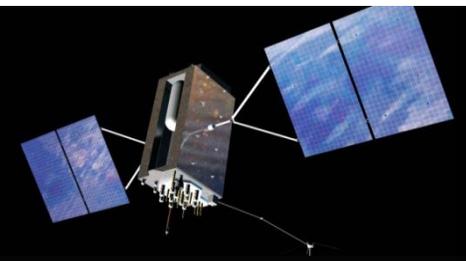


VPT's Approach to Radiation Environments in Space

VPT takes a conservative approach to radiation testing to ensure our products perform flawlessly during the rigors of space travel.



TID

Definition: Total Ionizing Dose (TID). A measure of the energy absorbed in the semiconductor components from the naturally occurring sources of radiation (protons, electrons, photons). This results in the slow degradation of semiconductor performance specifications. TID is tested by exposing components to gamma radiation from a Cobalt-60 source.

VPT's Approach: VPT verifies its SV series converters' performance by testing to 60 krad(Si).



SEE

Definition: Single Event Effects (SEE). Single high energy protons and heavy ions can deposit sufficient energy in a semiconductor component, causing a range of effects. SEEs include single event latchups (SEEs), single event gate ruptures (SEGRs), single event transients (SETs), single event functional interrupts (SEFIs) and single event burnouts (SEBs)

VPT's Approach: Converters are characterized for no destructive events up to LET = 44 MeV-cm²/mg, including: SEB, SEL, SEGR and SEFI. Converters also characterized for cross section and magnitude for output transients caused by heavy ion irradiation (SET).

RLAT

Definition: Radiation Lot Acceptance Testing (RLAT). Semiconductor wafer lots are tested for TID performance on a sample basis. If the parameter degradation for the tested samples is within the predetermined acceptance limits, then the lot can be used in radiation hardened converters.

VPT's Approach: Sensitive semiconductor components undergo RLAT to 60 krad(Si) per MIL-STD-883 Method 1019 (2x margin). Converters built with RLAT tested semiconductor lots are characterized to 60 krad(Si) (2x margin).

ELDRS

Definition: Enhanced Low Dose Rate Sensitivity (ELDRS): Many linear-bipolar integrated circuits show enhanced parameter degradation when exposed at low dose rates close to those seen in a space environment as compared to the high dose rates (50-300 rad(Si)/s) that components were traditionally tested at for TID degradation. MIL-STD-883 Method 1019 gives guidance

for characterizing components for ELDRS. Components that exhibit ELDRS are tested for TID at a rate below 0.01 rad(Si)/s.

VPT's Approach: All linear-bipolar integrated circuits are characterized for ELDRS per MIL-STD-883 Method 1019. Any components that show ELDRS undergo low dose rate RLAT to at least 60 krad(Si) per condition D of MIL-STD-883 Method 1019.