1. (normative)  
   Source control drawing for External Protection Diodes (SCD‑EPD) ‑ DRD
   1. DRD identification
      1. Requirement identification and source document

This DRD is called from ECSS-E-ST-20-08, requirement 9.2.1.2.2b.

* + 1. Purpose and objective

The source control drawing for external protection diodes (SCD-EPD) contains the specific project dependent requirements, and together with this Standard, which contains the general requirements, constitutes the whole set of requirements for the qualification and acceptance of external protection diodes.

The SCD-EPD can be produced as a standalone document or as part of a system-level specification document.

The information on traceability to high level requirements can be included in the SCD-EPD itself or in the requirements traceability in the design justification file (DJF, see ECSS-E-ST-10). In either case a cross-reference is made.

The SCD-EPD is a major input to the qualification plan.

* 1. Expected response
     1. Scope and content

Introduction

The SCD-EPD shall contain a description of the purpose, objective, content and the reason prompting its preparation.

Applicable and reference documents

The SCD-EPD shall list the applicable and reference documents to support the generation of the document.

Terms and definitions, abbreviated terms and symbols

The SCD-EPD shall include any additional definition, abbreviation or symbol used.

Deviations from ECSS-E-ST-20-08

In conformance with requirement 9.2.1.2.2d, the SCD-EPD shall include the justification for any deviation in the in-process, acceptance and qualification tests.

Materials

The SCD-EPD shall include:

Reference to the procurement specification of the supplier.

The following characteristics of the external protection diodes:

growth technique;

doping element;

orientation;

main breakage direction;

base resistivity;

thickness.

Acceptance tests

In conformance with 9.4.1.e, the SCD-EPD shall include the sample size.

For dimensions and weigh, in conformance with clause 9.6.3, the SCD-EPD shall include:

The lateral dimensions and thickness, including tolerances.

The contact dimensions, including tolerances.

The maximum weight, in mg.

For contact thickness, in conformance with clause 9.6.8, the SCD-EPD shall include the maximum and minimum values of the contact thickness in μm.

For surface finish, in conformance with clause 9.6.9.3, the SCD-EPD shall include the requirements for the interconnection process.

For humidity and temperature, in conformance with clause 9.6.6., the SCD-EPD shall include the chemical contents, type and % in the mist, to be added to the humid environment when there are specific requirements on the contents of the environment and the voltage bias condition to be applied to the EPD.

For Pull, in conformance with clause 9.6.11, the SCD-EPD shall include:

the interconnection technique parameter;

the material and dimension of the interconnectors;

the value of the pull speed in mm/min and direction (0°, 45° or 90°);

the value of the ultimate pull strength in N.

For diode performance, in conformance with clause 9.4.5.2 the SCD-EPD shall include:

For the test conditions specified in clause 9.4.5.2.2:

the temperature,

the forward current level ,

the reverse voltage level.

The pass-fail criteria for the test specified in clause 9.4.5.2.3:

the maximum absolute value of the forward voltage in V;

the reverse current in mA.

The physical limits in terms of maximum forward current and reverse voltage.

Qualification

Qualification test samples

In conformance with requirement 9.5.4.2b, the SCD-EPD shall include:

The minimum number of protection diodes from which the qualification lot shall be selected.

The number of the first production batches from which the qualification lot is obtained.

Dimensions and weight

In conformance with clause 9.6.3, the SCD-EPD shall include:

The lateral dimensions and thickness, including tolerances.

The contact dimensions, including tolerances.

The maximum weight, in mg.

Diode characteristics

In conformance with clause 9.6.15.2, the SCD-EPD shall include:

For the test conditions:

the temperatures,

the times,

the forward current level,

the reverse voltage level.

The pass-fail criteria for the test specified in clause 9.6.15.3:

the maximum absolute value of the forward voltage in V;

the reverse current in mA.

The physical limits in terms of maximum forward current and reverse voltage.

Thermal cycling

In conformance with clause 9.6.4.2, the SCD-EPD shall include the number of thermal cycles and their extreme temperatures.

Burn-in

In conformance with clause 9.6.5.2, the SCD-EPD shall include the temperature of the burning process

Humidity and temperature

In conformance with clause 9.6.6, the SCD-EPD shall include the chemical contents, type and % in the mist, to be added to the humid environment when there are specific requirements on the contents of the environment and the voltage bias condition to be applied to the EPD.

Contact uniformity.

In conformance with clause 9.6.7.3, the SCD-EPD shall include the maximum and minimum values of the contact thickness in μm.

Surface finish.

In conformance with clause 9.6.9.3, the SCD-EPD shall include the requirements for the interconnection process.

Pull

In conformance with clause 9.6.11, the SCD-EPD shall include:

the interconnection technique parameter;

the material and dimension of the interconnectors;

the value of the pull speed in mm/min and direction (0°, 45° or 90°);

the value of the ultimate pull strength in N.

Electron irradiation

In conformance with clause 9.6.12.2, the SCD-EPD shall include the expected total dose for the envisaged application, Φp, at 1MeV, in e- cm-2.

Switching:

In conformance with requirement 9.6.17.2f, the SCD-EPD shall include:

For level 1: The voltage (VREV), current (IFW), times (T1, T2 and T3) and temperatures.

For level 2: The voltage (VREV), current (IFW), times (T1, T2 and T3) and temperatures.

Long Duration - Life Testing:

In conformance with requirement 9.6.18.2e, the SCD-EPD shall include the total number of test steps in reverse and forward bias mode, VREV, IFW and the maximum allowables IREV and VFW.

In conformance with requirement 9.6.18.2d.1, the SCD-EPD shall include maximum allowable temperature of the diode.

* + 1. Special remarks

None.