1. (normative)  
   Source control drawing for Planar Blocking Diodes (SCD-PBD) - DRD
   1. DRD identification
      1. Requirement identification and source document

This DRD is called from ECSS-E-ST-20-08, requirement 12.2.1.2a and 12.2.1.1b.

* + 1. Purpose and objective

The source control drawing for planar blocking diodes (SCD-PBD) 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 planar blocking diodes.

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

* 1. Expected response
     1. Scope and content

Introduction

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

Applicable and reference documents

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

Terms and definitions, abbreviated terms and symbols

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

Deviations from ECSS-E-ST-20-08

The SCD-PBD shall include the justification for any deviation in the in-process, acceptance and qualification tests.

Materials

The SCD-PBD shall include:

Reference to the procurement specification of the supplier.

The following characteristics of the planar blocking diodes:

growth technique;

doping element;

orientation;

main breakage direction;

base resistivity;

thickness.

Marking

The level of the traceability of the manufactured planar blocking diodes in their marking shall be specified.

Acceptance tests

The SCD-PBD shall include the sample size.

For dimensions and weight, in conformance with clause 12.6.2 and 12.6.3, the SCD-PBD shall include:

the lateral dimensions and thickness, including tolerances.

the contact dimensions, including tolerances.

The maximum weight, in mg.

For contact uniformity, in conformance with clause 12.6.13, the SCD-PBD shall include the maximum and minimum values of the contact thickness in μm.

For surface finish, in conformance with clause 12.6.14, the SCD-PBD shall include the requirements for the interconnection process.

For humidity and temperature, in conformance with clause 12.6.4, the SCD-PBD 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.

For Pull, in conformance with clause 12.6.16, the SCD-PBD 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 12.6.3 the SCD-PBD shall include:

For the test conditions specified in requirement 12.6.3.2a:

the temperature;

the forward current level;

the reverse voltage level.

The pass-fail criteria for the test specified in clause 12.6.3.3:

the maximum absolute value of the forward voltage in V;

the reverse current in mA.

Qualification

Qualification test samples

In conformance with requirement 12.5.4b, the SCD-PBD shall include:

the minimum number of blocking diodes from which the qualification lot is selected.

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

Dimensions check and Weight

In conformance with clause 12.6.2, the SCD-PBD shall include:

the lateral dimensions and thickness, including tolerances.

the contact dimensions, including tolerances.

the maximum weight, in mg.

Diode Characterization

In conformance with clause 12.6.3.2, the SCD-PBD 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 12.6.3.3:

the maximum absolute value of the forward voltage in V;

the reverse current in mA.

Temperature Cycling

In conformance with clause 12.6.5.2, the SCD-PBD shall include the number of thermal cycles and their extreme temperatures.

Power Burn-in and High Temperature Reverse Bias Burn-in

In conformance with clause 12.6.7.2 and 12.6.7.3, the SCD-PBD shall include the temperature, as well as the electrical conditions of the Burn-in process.

Humidity and temperature

In conformance with clause 12.6.4.1.2h, the SCD-PBD shall include the voltage bias condition to be applied to the diode.

In conformance with clause 12.6.4, the SCD-PBD 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 diode.

Contact uniformity

In conformance with clause 12.6.13, the SCD-PBD shall include the maximum and minimum values of the contact thickness in μm.

Surface finish

In conformance with clause 12.6.14, the SCD-PBD shall include the requirements for the interconnection process.

Pull test

In conformance with clause 12.6.16, the SCD-PBD 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.

Total Dose Radiation Testing

In conformance with clause 12.6.11, the SCD-PBD shall include the expected total dose for the envisaged application and the type of irradiation.

In conformance with clause 12.6.11, the SCD-PBD shall include the minimum allowable IRev and VFwd after Ionising and Non-Ionising radiation.

Long Duration-Life Test

In conformance with clause 12.6.8, the SCD-PBD shall include, the activation energy and the total number of hours in forward and reverse bias mode (VRev and IFwd).

In conformance with clause 12.6.8, the SCD-PBD shall include maximum allowable temperature of the diode, as defined in the Temperature Stress Step Test of ESCC 2265000.

In conformance with clause 12.6.8, the SCD-PBD shall include the minimum allowable IRev and VFwd after Long Duration-Life test.

Temperature Behaviour

In conformance with clause 12.6.9, the SCD-PBD shall include the forward current IFwd and a reverse voltage VRev respectively, applied to the blocking diode, for each test temperature.

Human Body ESD

In conformance with clause 12.6.15, the SCD-PBD shall include the minimum allowable IRev and VFwd after Human Body ESD test.

Surge Test

In conformance with clause 12.6.17, the SCD-PBD shall include the maximum forward current IFwd to which the diode is biased during the surge test.

In conformance with clause 12.6.17, the SCD-PBD shall include the minimum allowable IRev and VFwd after surge test.

Thermo-optical data

In conformance with clause 12.6.18, the SCD-PBD shall include the following:

The maximum value of the solar absorptance as a percentage of planar blocking diode with tolerances.

The maximum value of normal emittance as a percentage (%) of planar blocking diode with tolerances.

* + 1. Special remarks

None.