EXTERNAL VISUAL INSPECTION OF DISCRETE SEMICONDUCTOR DEVICES

ESCC Basic Specification No. 2055000

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1 SCOPE

This specification to be read in conjunction with ESCC Basic Specification No. 20500 External Visual Inspection, contains additional specific requirements for discrete semiconductor devices. It is not applicable to discrete microwave semiconductor devices.

2 GENERAL REQUIREMENTS

2.1 APPLICABILITY

The following criteria may not be varied or modified after commencing an inspection stage. Any ambiguity or proposed minor deviation shall be referred to the ESCC Executive for resolution and approval.

2.2 PROCEDURE

All items shall be examined in such a manner that a minimum of handling and movement of the component is involved.

3 EQUIPMENT REQUIRED

3.1 MAGNIFICATION

All items shall be examined with a binocular or stereoscopic microscope with a minimum range of from 8 power (8X) to 40 power (40X). A magnification of 20 power (20X) shall be used for the determination of acceptance or rejection of the listed criteria unless otherwise stated in Section 4. The stated range of capability shall otherwise be available solely for clarification of detail.

3.2 MOUNTING FIXTURES

Suitable fixtures may be used to assist in the inspection process, provided that they do not themselves cause damage to the device. Care must be taken that adequate provision is made to avoid accidental damage by electro-static discharge to certain devices susceptible to this effect.

4 DETAILED REQUIREMENTS

4.1 REJECT CRITERIA

A component shall be rejected if it exhibits one or more of the defects listed in any of the following paragraphs of this Section. Where applicable, drawings are included to provide additional explanatory material, but shall be considered as examples only.

4.2 LEAD CONDITION

(a) Exposed base material, in excess of lead diameter or thickness, caused by chipped glass meniscus.
(b) Exposed base material anywhere on the lead within a distance of 20mm of the case, other than that caused by (a).
(c) Exposed base material greater than 5% of the surface area anywhere on the lead, beyond a distance of 20mm from the case.
(d) Non-conductive material on the lead, beyond a distance of 1.5mm from the case.
(e) Reduction of lead diameter, width or thickness by more than 10%, within 20mm of the case.

(f) Nicks, fractures, non-uniformity or discolouration of coating or abrasions exposing base material.

4.3 LEAD CONFIGURATION

(a) Round leads twisted more than one revolution along the length, or flat leads twisted more than 10 degrees per 10mm of length.
(b) Leads kinked or bent and re-bent within 20mm of the case.
(c) Leads deviating from the specified direction by more than 1.0mm per any 5.0mm of length.
(d) Eccentricity of lead passing through centre of glass to metal seal greater than 10% of the seal diameter (see Figure 1(a) Para. 5.1).
(e) Eccentricity of lead passing through end of body greater than 10% of the body diameter (see Figure 1(b) Para. 5.1).
(f) Lead tilted by more than five degrees (see Figures 2(a) and (b) Para. 5.2).

4.4 GLASS SEALS

(a) Filling, in glass filled cases, protruding above the level of the case flange.
(b) Single bubbles in a glass seal whose diameter exceeds one eighth of the seal diameter or a collection of smaller bubbles which cannot be separated from each other or whose spatial distribution cannot be determined.
(c) Foreign material embedded in the glass seal.
(d) Surface chips, greater in any diameter than 20% of the glass seal diameter or greater in depth than one quarter of the header thickness.
(e) Cracks of any shape, length or position.

4.5 CASE OR PACKAGE SEALING

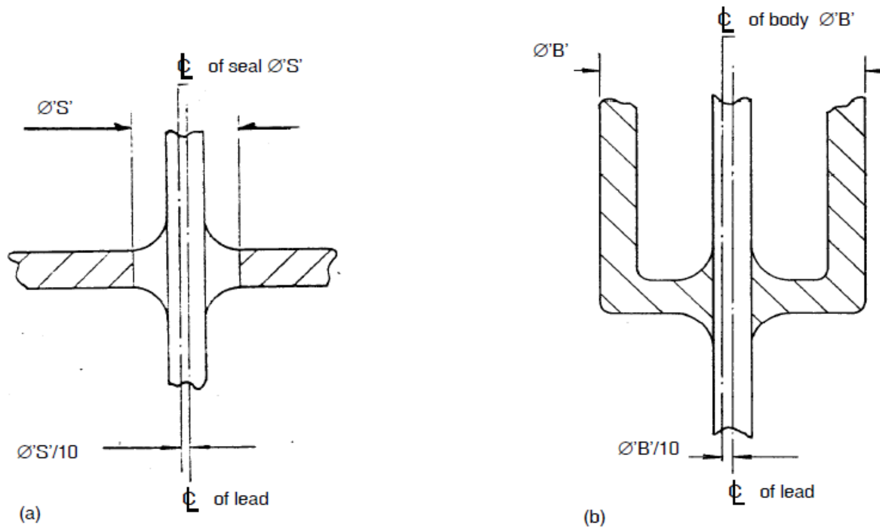
(a) Lack of uniformity or continuity of solder around the complete perimeter of the case.
(b) Solder protruding beyond the edge of the case.
(c) Weld spatters, lack of uniformity or continuity of weld.
(d) Reduction of design sealing area by more than 30% due to undercutting of sealing material or misalignment of case parts.

4.6 CASE CONCENTRICITY

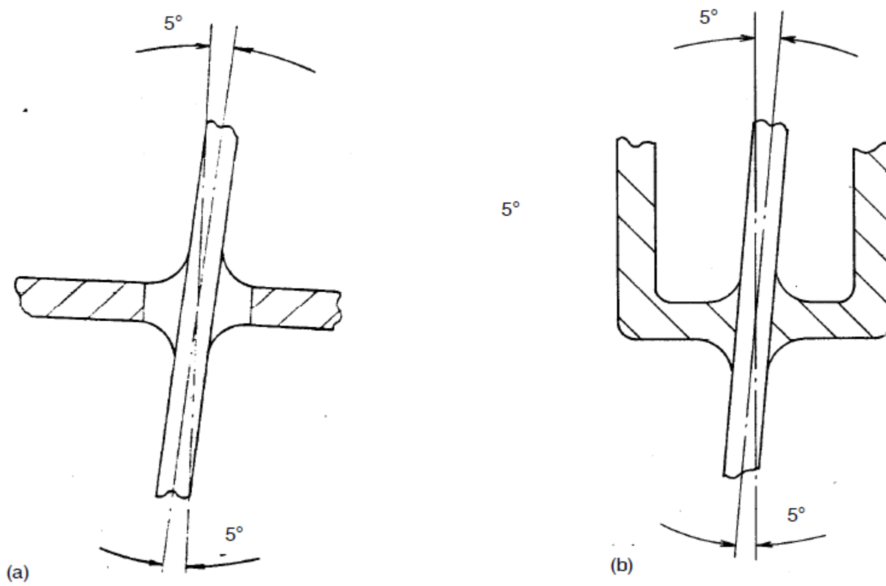
Minimum case perimeter to header perimeter clearance, in plan view, is less than 70% of the maximum clearance (see Figure 3 Para. 5.3).

5 FIGURES

5.1 FIGURE 1: LEAD ECCENTRICITY



5.2 FIGURE 2: LEAD TILT



5.3 FIGURE 3: CASE CONCENTRICITY