KYOCERA STANDARD SPECIFICATIONS OF CERQUAD

No. BS-4001 Rev. B
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KYOCERA

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STANDARD SPECIFICATIONS OF CERQUAD

1.0. Scope

This document is applicable to the standard CERQUAD produced by Kyocera Corporation. Matching cap and bull's eye cap should be specified by Kyocera Standard Specifications of Cerdip BS-2001.

2.0. Reference documents

2.1. MIL-STD-883C

2.2. MIL-M-38510

2.3. MIL-I-45208

2.4. MIL-STD-105D

2.5. Kyocera Standard Specifications of Cerdip BS-2001

2.6. Kyocera Standard Specifications of Lead embedded base BS-3001

3.0. Materials

3.1. Ceramic

Black Alumina Al_2O_3 90% min.

3.2. Lead frame

Kovar, Alloy-42, Alloy-45 or equivalent in accordance with ASTMF30.

3.3. Gold plating

Gold plating shall be 99.9% min. pure gold and gold thickness shall be 60 microinches min, no under plating.

3.4. Aluminization

Aluminization shall be 99.9% min. pure aluminum and aluminum thickness shall be 100 microinches min.

3.5. Glass

Glass materials shall be specified by customer.

3.6. Die attach cavity

Gold thickness shall be 120 microinches min.
Silver thickness shall be 300 microinches min.

4.0. Dimensional

4.1. Dimensions and tolerances shall be in accordance with the applicable drawings.

4.2. Measuring method of each dimension shall be per Kyocera Standard Specifications of Cerdip NO. BS-2001 REV.C paragraph 1.2.2.2. and 3.2.

4.3. Die attach cavity flatness shall be measured using surface roughness measuring instrument.

4.4. Lead frame related dimensions shall be measured using projector and lead frame thickness shall be measured using micrometer.

4.5. Gold plating and aluminum thickness shall be measured using X-RAY fluorescence.

5.0. Visual

5.1. Raw ceramic

5.1.1. Ceramics

The surface shall be free of dirt, grease and finger marks.

5.1.2. Crack

No cracks allowed.

5.1.3. Pits

Pits up to .010 inch in dia. shall be allowed.

5.1.4. Burrs

Burrs or projections up to .003 inch shall be allowed.

5.1.5. Chips

Chips up to .050 x .050 x .010 inch shall be allowed.

5.1.6. Glass splatter

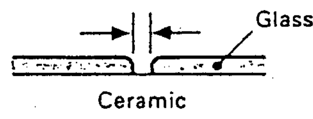
Glass splatter on ceramic up to .015 inch in dia. by .001 inch in height shall be allowed.

5.2. Glass

5.2.1. Bare ceramic (glass void exposing substrate)

Bare ceramic up to .010 inch in dia. shall be allowed.

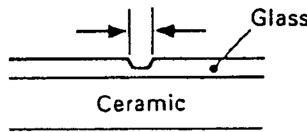
Fig. 1



5.2.2. Pin hole (glass void with no exposed substrate)

Pin hole up to .030 inch in dia. shall be allowed.

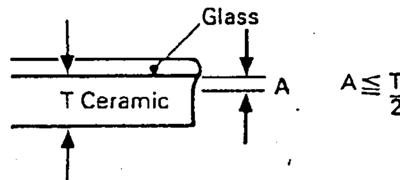
Fig. 2



5.2.3. Glass rundown on the edge of the substrate

Glass rundown A in fig. 3 shall not exceed over one-half of the substrate thickness. Glass rundown at corners shall not be specified.

Fig. 3



5.2.4. Foreign material in the glass

Foreign material up to .020 inch in dia. shall be allowed.

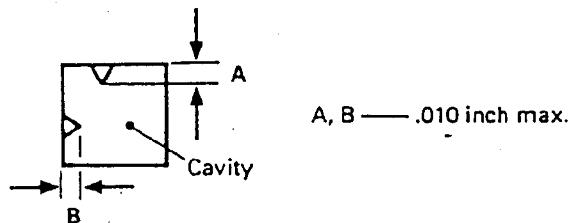
5.2.5. Glass overhang

Glass overhang shall not extend more than .015 inch from ceramic edge. Glass runout on leads shall not extend more than .020 inch from ceramic edge.

5.2.6. Glass rundown into cavity

Maximum glass rundown into cavity shall be determined at point A and B as indicated in fig. 5. Readings at point A and B shall meet the following specification.

Fig. 4



5.2.7. Glass pull back

Glass pull back is defined as the distance from the ceramic edge to the tip of glass bulk as shown in fig. 5 and 6.

Fig. 5

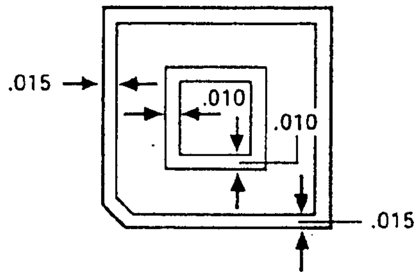
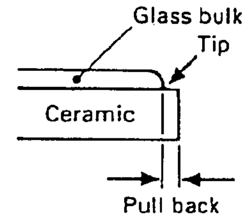


Fig. 6

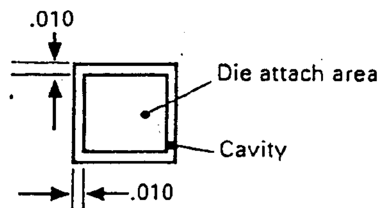


5.3. Die attach cavity

5.3.1. Die attach area

Minimum die attach area is defined as follows.

Fig. 7



5.3.2. Foreign material in die attach area

Shall be free of foreign material (exceeding .005 inch in dia.) and gold lumps (exceeding .010 inch in dia.)

5.3.3. Glass splatter in cavity

Glass splatter in die attach cavity of base shall not exceed .005 inch in dia. by .001 inch in height. The defined die attach area shall be per paragraph 5.3.1.

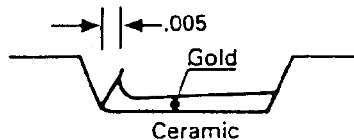
5.3.4. Bare spot in die attach area

The minimum die attach area shall be free of bare spots (exceeding .005 inch in dia.).

5.3.5. Gold pull back from the cavity wall.

Gold pull back from the cavity wall shall not exceed over .005 inch.

Fig. 8



5.3.6. Excessive gold on sealing area

Excessive gold within .005 inch from the edge of cavity is acceptable but it shall be disconnected from gold in die attach area.

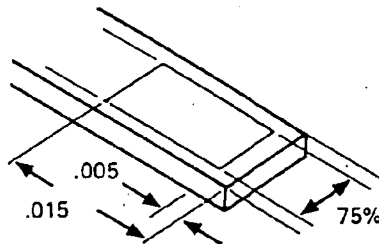
5.4. Lead frame

5.4.1. Wire bonding area

5.4.1.1. Minimum wire bonding area

Minimum wire bonding area is defined as follows. Unless otherwise specified, this definition shall be applied to the following criteria.

Fig. 9



5.4.1.2. Voids or pits (exposing base metal)

Voids or pits (exposing base metal) up to .001 inch in dia. shall be allowed.

5.4.1.3. Discoloration, blisters and peeling

There shall be no discoloration, blisters or peeling.

5.4.1.4. Scratches or scrapes (exposing base metal)

There shall be no scratches or scrapes which expose base metal.

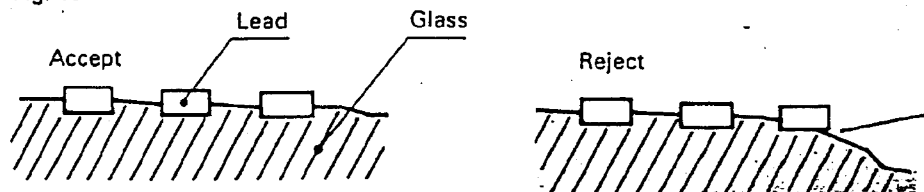
5.4.1.5. Foreign material, glass splatter, and projections

Up to .001 inch in dia. shall be allowed.

5.4.1.6. Glass wetting

Any lifting of the lead finger from the glass is not allowed except for the glass pull back area defined in 4.4.1.7.

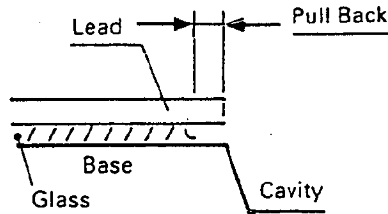
Fig. 10



5.4.1.7. Glass pull back from lead tip

Glass pull back to .015 shall be allowed.

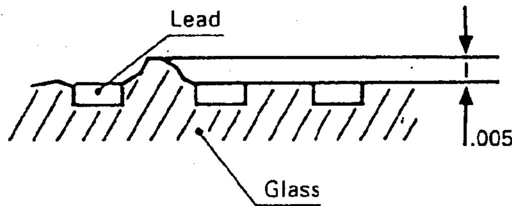
Fig. 11



5.4.1.8. Glass bulge between fingers

There shall be no glass bulge between fingers greater than .005 inch.

Fig. 12



5.4.1.9. Protrusion of glass

The protrusion of glass to ¼ max. of finger width of wire bonding area shall be allowed. Protrusion of glass onto the lead finger which prevents good wire bonding shall not be allowed.

Fig. 13

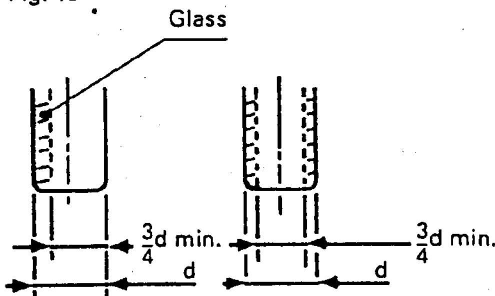
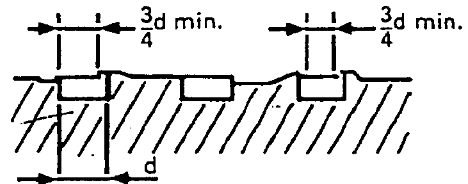


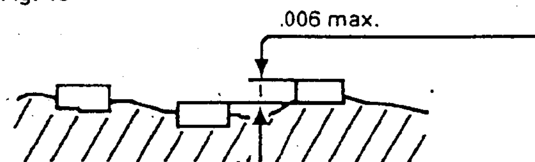
Fig. 14



5.4.1.10. Lead tip planarity

Lead tip planarity shall be a maximum of .006 inch.

Fig. 15



5.4.1.11. Lead pitch

Lead pitch shall be ± .002 inch tolerance.

5.4.2 Lead area other than wire bonding area

5.4.2.1. Effective lead area: Non functional portions of lead frame such as tie bars are not subject to this spec.

5.4.2.2. Burrs, pits, projections

Burrs, pits, projections up to .015 inch max. in dia. by .002 inch height shall be allowed.

5.4.2.3. Foreign material, dirt, scratch, discoloration

There shall be no foreign material, dirt, scratch, discoloration which prevents tin plating.

5.4.2.4. Gold plating

5.4.2.4.1. Voids or pits (exposing base metal)

Voids or pits (exposing base metal) up to .002 inch in dia. shall be allowed.

5.4.2.4.2. Discoloration, blisters or peeling

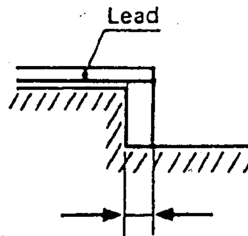
There shall be no discoloration, blisters or peeling.

5.4.3 Lead assembly

5.4.3.1. Lead tip over hang from the cavity edge

Lead tip over hang from the cavity edge shall be .010 inch max.

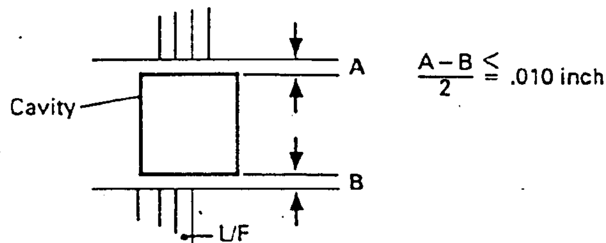
Fig. 16



5.4.3.2. Misalignment between the base and lead frame

Misalignment between the base and lead frame shall be shown by the following formula.

Fig. 17

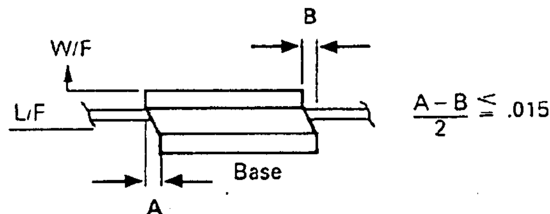


5.4.4. Window frame assembly

5.4.4.1. Misalignment between the base and window frame

Misalignment between the base and window frame shall be shown by the following formula.

Fig. 18



6.0. Functional

6.1. Electrical: Insulation resistance

Electrical leakage shall be less than 5 nano amps when 100 volts D.C. is applied.

6.2. Mechanical: Lead fatigue test

Lead frame shall withstand bending at a 90° angle 3 times.

6.3. Heat resistance

Gold plating and aluminization shall exhibit no discoloration and blistering after 450° C for 5 minutes in oven.

6.4. Adhesion

Gold plating and aluminization shall withstand pull test by using scotch tape.

6.5. Wire bond

The parts shall be subjected to wire bond pull strength test MIL-STD-883, method 2011 cond. D using .00125 diameter aluminum 1 pct Si wire and standard ultrasonic bonding practices.

6.6. Environmental test

A. Die attach

A die shall be attached to CERQUAD per the following manner:

Pre-heat	300° C 1 minutes min.
Die attach	450° C within 60 sec. in N_2 atmosphere.

B. Sealing

Cap must seal with CERQUAD.

C. Temperature cycle

The sealed parts are temperature cycled per MIL-STD-883, method 1010 condition C, 10 cycles.

D. Thermal shock

The sealed parts are thermal shock tested per MIL-STD-883, method 1011, condition C, 10 cycles.

E. Fine and gross leak

After temperature cycle test and/or thermal shock test, the parts shall be subjected to hermeticity test per MIL-STD-883, method 1014, condition A and C. The maximum acceptable criteria for leak is 5×10^{-8} cc/sec.

F. Torque test

After fine and gross leak tests, the parts shall be subjected to torque test MIL-STD-883, method 2024. Torque strength shall meet MIL-STD-883, method 2024.

G. Die shear test

The sealed parts shall be subjected to thermal shock test per MIL-STD-883, method 1011, condition A, 5 cycles and decapped. Subsequently, the parts shall be subjected to die shear test per MIL-STD-883 method 2019.

7.0. Sampling Plan

Sampling plan shall be in accordance with MIL-STD 105D single normal. Applicable level and AQL are as follows:

Group	Level	AQL	Remarks
Dimensional	S-3	1.0 pct	
Visual	II	1.5	cumulative
	II	1.0	non-cumulative
Functional	S-3	0.65	non-cumulative