

1.022.329

PATENT SPECIFICATION

DRAWINGS ATTACHED

1.022.329



Date of Application and filing Complete Specification: July 9, 1964.

No. 28377/64.

Application made in United States of America (No. 297 884) on July 26, 1963.

Complete Specification Published: March 9, 1966.

© Crown Copyright 1966.

Index at acceptance:—H1 K(1D3A, 5)

Int. Cl.:—H 0111/06

COMPLETE SPECIFICATION

Semiconductor Device Container

5 We, TEXAS INSTRUMENTS INCORPORATED, a Corporation organized according to the laws of the State of Delaware, United States of America, of 13500 North Central Express-
10 way, Dallas, Texas, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be per-
15 formed, to be particularly described in and by the following statement:—

This invention relates to semiconductor device containers and to light-sensitive devices comprising light-sensitive elements mounted within such containers.

15 The increasing demand for miniature electronic components has prompted the develop-
20 ment of several types of miniature semiconductor device packages. Among such components is the light sensor or photo-diode device. Application of these devices in the
25 computer field is especially important when used in card readout equipment. For example a light source is placed on one side of the card and a light sensing device on the other.
30 As the card is moved, the light-sensitive device will be activated each time a hole is encountered in the card that allows light to pass through. To be able to read a row of
35 closely punched holes across the card requires the light sensing devices to be extremely small and capable of being mounted close together as, for example, on a small strip of
40 a printed circuit board.

An object of the invention is to provide an extremely small semiconductor device con-
45 tainer which will allow light to pass through one portion thereof.

The present invention is a semiconductor device container comprising a circular metallic block having a ceramic cylinder hermetically
40 bonded thereto, a metallic ring having two oppositely disposed tabs, said metallic ring being mounted upon and bonded to said ceramic cylinder, and a lens-ring combination
45 mounted upon and bonded to said metallic ring.

[Price 4s. 6d.]

The present invention is also a light-sensitive device comprising a light-sensitive element mounted upon a metallic block, said block having a ceramic cylinder brazed thereto, a metallic ring having two oppositely
50 disposed tabs, said ring being mounted upon and brazed to said ceramic cylinder, a connecting wire one end of which is attached to a point on the surface of said light-sensitive
55 element and the other end of which is attached to said metallic ring, and a lens-ring combination bonded to said metallic ring.

An embodiment of the invention will now be described by way of example, with reference to the accompanying drawing, in
60 which:—

Fig. 1 is a top view of a semiconductor device container according to the invention with a light-sensitive element mounted there-
65 in; and

Fig. 2 is a mid-sectional elevation along the line 2—2 of Fig. 1.

In accordance with the invention, an improved miniature device container is fabri-
70 cated by taking a glass lens mounted on a metallic ring and brazing the ring to another ring which, in turn, has been brazed to a ceramic cylinder. The cylinder is then brazed
75 on to a metallic block, on to which a semiconductor device has been or can be mounted.

Referring now to the drawings, there is shown a miniature light sensor package 1. A circular metal block 7 has a light-sensitive
80 device 4 mounted thereon. The block 7 may be of any suitable material, such as, for example, KOVAR (Registered Trade Mark) which is a nickel, iron, cobalt alloy. On the periphery of block 7 is mounted a ceramic
85 cylinder 6, joined through common interface 11 by any suitable means such as brazing. Joined to the ceramic cylinder at interface 10 is a metal ring 2 with two oppositely
90 disposed outwardly extending tabs. Either tab may be used as a terminal for electrically connecting the device in a circuit. The second terminal is the metallic block 7 on which the

light-sensitive element is mounted. Sealing the package is a lens 3 mounted on and bonded to a metallic ring 8. This ring-lens assembly is brazed to ring 2 at interface 9.

5 Prior to sealing, a lead is attached to semiconductor element 4 at point 5 and to ring 2, completing the circuit path between the terminals. The rings 2 and 8 may be of any suitable material, such as, for example,

10 KOVAR.

An advantage of this invention is the provision of a light-sensitive device of minimal dimensions and of a configuration which allows flexibility in circuit design. Thus, the

15 device may be used in the conventional manner on circuit boards or in a variety of ways that allow for maximum space utilization.

By way of example and to illustrate the degree of miniaturization which is possible with the package of the invention, the dimensions X and Y shown in Figure 2 may be approximately $X=0.061$ inch and $Y=0.088$ inch, respectively.

20

It is to be understood that the embodiment of the invention, herein shown and described, is a preferred example of the same and that various changes in the shape, size and arrangement of the parts may be resorted to without departing from the scope of the invention as defined by the appended claims.

25

30

WHAT WE CLAIM IS:—

1. A semiconductor device container com-

prising a circular metallic block having a ceramic cylinder hermetically bonded thereto, a metallic ring having two oppositely disposed tabs, said metallic ring being mounted upon and bonded to said ceramic cylinder, and a lens-ring combination mounted upon and bonded to said metallic ring.

35

40

2. A container according to claim 1 wherein the block, the metallic ring and the ring of the lens-ring combination are all of KOVAR and all bonding is effected by brazing.

45

3. A light-sensitive device comprising a light-sensitive element mounted upon a metallic block, said block having a ceramic cylinder brazed thereto, a metallic ring having two oppositely disposed tabs, said ring being mounted upon and brazed to said ceramic cylinder, a connecting wire one end of which is attached to a point on the surface of said light-sensitive element and the other end of which is attached to said metallic ring, and a lens-ring combination bonded to said metallic ring.

50

55

4. A light-sensitive device substantially as hereinbefore described with reference to the accompanying drawing.

60

H. D. FITZPATRICK & CO.,
Chartered Patent Agents,
3, Gray's Inn Square, London, W.C.1,
and 94, Hope Street, Glasgow.

light-sensitive element is mounted. Sealing the package is a lens 3 mounted on and bonded to a metallic ring 8. This ring-lens assembly is brazed to ring 2 at interface 9.

5 Prior to sealing, a lead is attached to semiconductor element 4 at point 5 and to ring 2, completing the circuit path between the terminals. The rings 2 and 8 may be of any suitable material, such as, for example,

10 KOVAR.

An advantage of this invention is the provision of a light-sensitive device of minimal dimensions and of a configuration which allows flexibility in circuit design. Thus, the

15 device may be used in the conventional manner on circuit boards or in a variety of ways that allow for maximum space utilization.

By way of example and to illustrate the degree of miniaturization which is possible with the package of the invention, the dimensions X and Y shown in Figure 2 may be approximately $X=0.061$ inch and $Y=0.088$ inch, respectively.

20

It is to be understood that the embodiment of the invention, herein shown and described, is a preferred example of the same and that various changes in the shape, size and arrangement of the parts may be resorted to without departing from the scope of the invention as defined by the appended claims.

25

30

WHAT WE CLAIM IS:—

1. A semiconductor device container com-

prising a circular metallic block having a ceramic cylinder hermetically bonded thereto, a metallic ring having two oppositely disposed tabs, said metallic ring being mounted upon and bonded to said ceramic cylinder, and a lens-ring combination mounted upon and bonded to said metallic ring.

35

40

2. A container according to claim 1 wherein the block, the metallic ring and the ring of the lens-ring combination are all of KOVAR and all bonding is effected by brazing.

45

3. A light-sensitive device comprising a light-sensitive element mounted upon a metallic block, said block having a ceramic cylinder brazed thereto, a metallic ring having two oppositely disposed tabs, said ring being mounted upon and brazed to said ceramic cylinder, a connecting wire one end of which is attached to a point on the surface of said light-sensitive element and the other end of which is attached to said metallic ring, and a lens-ring combination bonded to said metallic ring.

50

55

4. A light-sensitive device substantially as hereinbefore described with reference to the accompanying drawing.

60

H. D. FITZPATRICK & CO.,
Chartered Patent Agents,
3, Gray's Inn Square, London, W.C.1,
and 94, Hope Street, Glasgow.

