SLIDE SWITCH ASSEMBLY WITH RESILIENT BRIDGING CONTACT AND TERMINAL STRUCTURE ADAPTABLE TO 8/N POLE CONFIGURATIONS

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Abstract
An improved miniature switch having a pack shape and size, and leadout configuration approximately the same as that of a dual-in-line integrated circuit pack, thus facilitating tooling operations in printed circuit board manufacture, and automatic insertion of components. There are eight pairs of corresponding terminals. Shorting links initially between adjacent terminals are selectively removed, and an appropriate length slider is provided with one, two, or four contacts coupling corresponding terminals, thus making the switch one pole-eight way, two pole-four way, or four pole-two way.

11 Claims, 9 Drawing Figures

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SLIDE SWITCH ASSEMBLY WITH RESILIENT BRIDGING CONTACT AND TERMINAL STRUCTURE ADAPTABLE TO 8/N POLE CONFIGURATIONS

BACKGROUND OF THE INVENTION

This invention relates to switches and is particularly concerned with small switches having a leadout spacing substantially the same as that of an integrated circuit dual-in-line pack.

SUMMARY

According to this invention there is provided a switch comprising a housing, a first set of eight terminals mounted on one side of the housing, a second set of eight terminals mounted on the opposite side of the housing, removable shorting links commoning adjacent terminals of each set, bridging means operable to electrically bridge corresponding terminals of the first and second sets, the terminals having leadouts protruding from the housing, with the leadout spacing being substantially the same as that of an integrated circuit dual-in-line pack.

Preferably the switch has all the shorting links of the first set removed, and selected shorting links of the second set removed to form n poles (where n is one of the numbers 1, 2, and 4, and there are eight, four, and two terminals in each of the number of poles, respectively), and the bridging means comprises a slider slidably mounted within the housing and carrying n slider contacts for electrically bridging said corresponding terminals.

The sets of terminals are formed with shorting links between adjacent terminals for ease of handling during assembly of the switch. With all the shorting links of the second set of terminals in place and with the slider carrying only one slider contact, the switch performs as a single pole, eight way type.

The switch can be arranged as a two pole, four way type by removing the central shorting link of the second set of terminals, and by providing a slider carrying two slider contacts.

Further removal of shorting links from the second set, to form four pairs of commoned terminals, and use of a slider carrying four slider contacts, would make the switch four pole, two way.

Conveniently the housing comprises an upper and lower portion and approximates the shape and size of a present-day dual-in-line integrated circuit package.

Switches in accordance with the invention will normally be inserted in printed circuit boards and soldered permanently in circuit. Alternatively they can be inserted into suitable sockets.

Because of the compatible leadout configuration no special tool is required for printed circuit board manufacture, and the compatible shape and size means that the switch is capable of being handled by the same automatic insertion tool as that for dual-in-line packs.

The slider can be mounted in the upper portion of the housing and arranged to protrude externally to allow the switch to be operated.

Preferably the slider is maintained in the correct positions by means of the engagement of a small projection on the slider with one of a number of corresponding notches in the upper portion of the housing. The spacing of these notches is substantially the same as the terminal spacing at the region of contact with the slider contact.

As a narrow slider contact is used then a break-before-make action will be obtained. Similarly make-before-break action will result from the use of a wide slider contact.

It will be seen that the length of the slider must be chosen to suit the type of switch. For example in a single-pole, eight way switch assembly, a short slider carrying one slider contact is used, and in a four pole, two way switch, a much longer slider, carrying four slider contacts, is used.

One convenient form of the switch comprises a base molding with upstanding rims, two contact sets crimped over the rims, each having eight tags protruding, the tags in one set being linked to form either one group of eight tags, two groups of four tags, or four groups of two tags, an upper molding, either or both of the moldings being slightly resilient and both moldings having interlocking elements so that they can be snapped together, the upper molding engaging in slots in a slider, which slider on its under surface has at least one contact spring so that corresponding tags in the two sets can be electrically connected.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side view of a two pole four way switch assembly;
FIG. 2 is a section on 2—2 in FIG. 1;
FIG. 3 is a plan view of the assembly of FIG. 1;
FIG. 4 is a plan view of a bottom molding of the assembly of FIG. 1;
FIG. 5 is a scrap section on 5—5 in FIG. 4;
FIG. 6 is a side view of the molding of FIG. 4;
FIG. 7 is a section on 7—7 in FIG. 6;
FIG. 8 is an end view of a top molding of the assembly of FIG. 1; and
FIG. 9 is a view on 9—9 in FIG. 8.

FIGS. 1, 2 and 3 show a switch assembly comprising a bottom molding 10, a top molding 11, a slider 12 with attached slider contacts 13, and sixteen terminals 31 each with a leadout or tag 14. The terminals are initially formed in sets of eight with shorting links 15 between adjacent leadouts. FIG. 2 shows a slider contact 13 linking corresponding terminals across the switch, hence it can be seen that by removing all shorting links 15 on one side, the central shorting link on the other side, as shown in FIG. 1 and hereinafter called the pole side, and by fitting a slider 12 carrying two slider contacts 13 which are spaced apart by four terminal spacings then a two pole four way switch is obtained.

The term “terminal spacing” is to be taken as meaning the distance between centers of adjacent terminals measured at the region of contact with the slider contact 13.

There are two other versions of the switch, one pole, eight way and four pole, two way. The former is obtained with all the leadouts on the pole side commoned together, the slide 12 being short, as shown by chain line 16 in FIGS. 1 and 3, and carrying one slider contact 13.

The latter switch is obtained with links removed on the pole side to leave the leadouts linked in pairs. In this case a longer slide 12, shown by chain line 17 in FIGS. 1 and 3, is used which carries four slider contacts 13 spaced apart by two terminal spacings.
FIGS. 4 to 9 of the top and bottom moldings enable the method of assembly to be seen more clearly. In FIG. 9, notches 18 are shown which engage a small complementary protrusion (not shown) on the slider 12 to locate the slide contact accurately on one of the terminals.

The bottom molding 10 has terminal mounting platforms 19 which are situated along each side. Between each pair of adjacent platforms 19 is a raised portion 20 carrying two upstanding walls 21 to locate and grip a lower part 22 of a side wall of the top molding. FIGS. 4, 6 and 7 clearly show these parts and FIG. 2 shows how the lower parts 22 of the side walls of the top molding are engaged by the walls 21.

The switch assembly has an end wall at each end. One end wall 23 is carried by the bottom molding and the other end wall 24 is carried by the top molding. End wall 23 has two foot-like portions 25 extending inwardly from the top of the wall onto the upper surface of the top molding to prevent vertical separation of the top and bottom moldings at that end. Separation of the moldings at the other end is prevented by the engagement of a foot 26 on the bottom of the end wall 24 with a complementary portion 27 on the bottom molding (FIG. 5). Lengthways relative movement between the top and bottom moldings is prevented by the locating of upstanding keys 28 on the bottom molding into corresponding slots 29 in the top molding.

FIG. 2 shows the terminals 31 crimped over mounting platforms 19, and a slider contact 13 making electrical connection between terminals on opposite sides of the switch. The slider contact 13, secured to slider 12 by a projection 30, may be narrow giving break-before-make operation or wide giving make-before-break operation.

The top and bottom moldings 10, 11, and the slider 12 are made from glass filled nylon. The moldings are slightly resilient enabling the assembly to be snapped together. The assembly can be made more permanent by gluing the top and bottom moldings together.

We claim:

1. A switch comprising a housing having an upper portion and a lower portion, the upper portion having a longitudinally extending, horizontal, inwardly directed region on one side, and a corresponding region on the opposite side, the inner edge of each of the regions having a downwardly directed wall; a first set of terminals mounted on one side of the lower portion, a second set of terminals mounted on the opposite side of the lower portion, the terminals having leads protruding from the housing; a slider having a channel in each longitudinal vertical surface and being mounted for longitudinal movement with said walls of the upper portion slidably engaged in said channels; n bridging contacts carried by the slider where n is one of the numbers 1, 2 and 4, each of the bridging contacts being elongate and transversely extending such that each can make electrical connection between a terminal in the first set and the corresponding terminal in the second set; the length of the slider being such that it can be moved into any one of 8/n positions, in each of which positions the bridging contact(s) is aligned with a pair of corresponding terminals.

2. A switch as recited in claim 1 wherein the slider has a small projection on a surface adjacent a surface of the upper portion, and said surface of the upper portion has a number of corresponding notches, the projection and notches being arranged such that the slider can be accurately located in each of the 8/n positions.

3. A switch as recited in claim 1 wherein the upper and lower portions of the housing have interlocking elements, and at least one of the portions is formed of a resilient material so that they can be snapped together.

4. A switch as recited in claim 1 wherein the slider has a region which protrudes above the upper portion of the housing.

5. A switch as recited in claim 1 wherein the width of a bridging contact is less than the distance between adjacent terminals in a set, whereby a break-before-make action is obtained as the slider is moved longitudinally from one of said positions into an adjacent position.

6. A switch as recited in claim 1 wherein the width of a bridging contact is greater than the distance between adjacent terminals in a set, whereby a break-before-make action is obtained as the slider is moved longitudinally from one of said positions into an adjacent position.

7. A switch as recited in claim 1 wherein the leads of the terminals are formed with removable shorting links between adjacent leadouts of each set.

8. A switch as claimed in claim 1 wherein the leadout spacing is substantially the same as that of an integrated circuit dual-in-line pack.

9. A switch as recited in claim 1 wherein the switch approximates the shape and size of a dual-in-line integrated circuit pack.

10. A switch comprising an elongate base molding with upstanding longitudinal rims; a set of eight contacts crimped over each rim, each contact having a protruding tag; a corresponding upper molding, at least one of the moldings being slightly resilient, and both of the moldings having interlocking elements so that they can be snapped together the upper molding having a longitudinally extending, horizontal, inwardly directed region on one side, and a corresponding region on the opposite side, the inner edge of each of the regions having a downwardly directed wall; a slider having a channel in each longitudinal vertical surface and being supported by the upper molding for longitudinal movement with said walls slidably engaged in said channels, at least one elongate transversely extending contact spring mounted on the upper surface of the slider for electrically connecting corresponding contacts in the two sets.

11. A switch comprising a housing having an upper and a lower molding, the moldings having interlocking elements, and at least one of the moldings being formed of a resilient material so that the moldings can be snapped together; a first set of eight terminals mounted on one side of the lower molding, a second set of eight terminals mounted on the opposite side of the lower molding; the terminals having leads protruding from the housing with the leadout spacing being substantially the same as that of an integrated circuit dual-in-line pack; removable shorting links commencing adjacent leadouts of each set; an elongate slider, n slider contacts carried by the slider on its undersurface, where n is one of the numbers 1, 2 and 4, and where the two slider contacts are spaced apart by four terminal spacings and the four slider contacts are spaced apart
by two terminal spacings, the terminal spacings being measured at the region of contact with a slider contact, the slider having a channel in each longitudinal vertical surface; the upper molding having a horizontal, inwardly extending region on said one side and a corresponding region on said opposite side, the inner edge of each of the regions having a downwardly extending wall, which walls slidably engage in the channels in the slider; and the housing approximating the shape and size of an integrated circuit dual-in-line pack.

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