"CIRCUIT BLOCK"

This invention conceerns a circuit block and, although the invention is not so restricted, it concerns more particularly a circuit block for use in a watch or other timepiece or for use in electrical instruments, machinery and tools.

According to the present invention, there is provided a circuit block comprising a lead frame having a plurality of lead terminals; an integrated circuit mounted on the lead frame; and a plurality of wires each of which is electrically connected to the integrated circuit and to a respective lead terminal, all the wires extending substantially in the same direction, the integrated circuit being electrically isolated from all other components except by way of the said wires.

Preferably, each of the wires is an aluminium wire which is wire-bonded to the integrated circuit and to the respective lead terminal.

Preferably, the integrated circuit, the wires and the lead terminals are encapsulated in non-conductive sealing material.

The lead frame may carry an oscillator which is connected to two of the said lead

terminals.

The invention is illustrated, merely by way of example, in the accompanying drawings, in which:-

Figure 1 is a plan view of a circuit block according to the present invention, and

Figure 2 is a plan view of a prior art circuit block.

In Figure 2 there is shown a circuit block of the prior art in which an integrated circuit (IC) 12 is mounted on a printed circuit board 11 which has printed circuit terminals 14. The IC 12 is connected to the printed circuit terminals 14 by aluminium wires 13 which are bonded thereto, the bonded aluminium wires 13 extending radially in plan view.

The IC 12 and the region around it is sealed by means of a resin seal 15. Aluminium wires, however, are affected by the directions in which they extend during wirebonding. That is to say, the directions in which the aluminium wires can be connected are restricted, and wire-bonding with aluminium wires is therefore usually carried out by turning the printed circuit board 11. This, however, takes time with the result

that the cost of the circuit block is increased.

Furthermore, although it is possible to turn the printed circuit board 11, it is very difficult to turn a lead frame provided with a circuit pattern while bonding it to an IC thereon with aluminium wires, since the portions of the lead frame which are to be wire-bonded should be fixed so that they do not vibrate.

One object of the present invention is therefore to provide a circuit block in which an IC can be bonded on a lead frame by means of aluminium wires without having to turn the lead frame.

In Figure 1 there is therefore shown an embodiment of a circuit block according to the present invention which comprises a lead frame 1 made of an electrically conductive metal and formed with a circuit pattern. A capacitor 2 and a quartz oscillator 3 are secured to the lead frame 1. A battery contact 4 is integrally formed with the lead frame 1. An integrated circuit (IC) 7 is mounted on an island portion 6 of the lead frame 1. The IC 7 and lead terminals 8A, 8B, 8C, 8D, 8E, 8F of the lead frame 1 are electrically connected together by aluminium

wires 9 each of which is wire-bonded to the IC 7 and to the respective lead terminal 8A, 8B, 8C, 8D, 8E, 8F, the oscillator 3 being connected to the lead terminals 8E, 8F. The aluminium wires 9 extend substantially in the same direction, being aligned substantially parallel to each other as shown in Figure 1. Similarly, the lead terminals 8A, 8B, 8C, 8D, 8E, 8F are so disposed as to enable the aluminium wires 9 to extend parallel to each other.

The IC 7, the aluminium wires 9 and the lead terminals 8A, 8B, 8C, 8D, 8E, 8F are then encapsulated in a non-conductive sealing material such as a sealing resin 10.

As will be appreciated, the IC 7 is electrically isolated from all other components except by way of the parallel wires 9.

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1. A circuit block comprising a lead frame having a plurality of lead terminals; an integrated circuit mounted on the lead frame; and a plurality of wires each of which is electrically connected to the integrated circuit and to a respective lead terminal, all the wires extending substantially in the same direction, the integrated circuit being electrically isolated from all other components except by way of the said wires.

2. A circuit block as claimed in claim 1 in which each of the wires is an aluminium wire which is wire-bonded to the integrated circuit and to the respective lead terminal.

3. A circuit block as claimed in claim 1 or 2 in which the integrated circuit, the wires and the lead terminals are encapsulated in non-conductive sealing material.

4. A circuit block as claimed in any preceding claim in which the lead frame carries an oscillator which is connected to two of the said lead terminals.

5. A circuit block substantially as hereinbefore described with reference to and as shown in Figure 1 of the accompanying drawings.