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[0008]

When a blockchain as cryptocurrency is used for a trail of a contract agreement, there is a problem of how to prove that two or more parties have agreed on the content of the contract. The electronic signature scheme adopted by cryptocurrency blockchains is made possible based on only the electronic signature of the party who sends money as described above, and the electronic signature of the party who receives money is not needed. However, when a contract is made between two or more parties, the contract will not be established by issuance of the contract by only one party. All the related parties, who are the contracting parties, certainly need to agree on the contract. However, because only the electronic signature of the sender is included in a single transaction forming a blockchain, the trail of the contract agreement by the receiver will not remain in the transaction.

[0009]

As a simple method for solving the above problem, for example, a method for adding the electronic signatures of all the related parties in a single transaction is conceivable. In cryptocurrency, a mechanism referred to as multi-signature is adopted. In multi-signature, if at least a certain number of electronic signatures are not used, an address with which the transaction is not approved can be created. However, to add a plurality of electronic signatures in a single transaction, a complex procedure is needed. For example, consideration needs to be given regarding which electronic signatures are needed, how the pre-approval transaction is shared by the related parties, and where a plurality of secret keys are collected and the signing is performed.

[0021]

When planar arrangement of components as in a surface mount product is used, components could be easily redundantly wired. However, as in the present invention, because use of an RFID tag in a multi-layer printed wiring board can shorten the wiring length by using the space between layers of the multi-layer board, the power loss due to the wiring resistance can be reduced. As a result, the size of the RFID tag 10 can be reduced, and the communication performance of the RFID tag 10 can be maintained.

[0022]

Next, data communication principle of the RFID tag 10 will be described.

When radio waves are transmitted from an RFID reader writer device (not illustrated) to the RFID tag 10 in order to read and write identification data of the RFID tag 10, the radio wave are reflected by the metal body 30 to which the RFID tag 10 is attached, and interference is caused. At this point of time, surface waves are generated on the surface of the metal body 30 with which the radio waves have collided, and the surface waves are supplied to the first antenna circuit 16a by the dielectric effect. The surface wave supplied by the first antenna circuit 16a is sent to the second antenna circuit 16b and a third antenna circuit 16c via through-holes 18, and radio waves of a specific frequency resonate and are used. The radio waves of the specific frequency, the radio waves having resonated and having been amplified, are sent to the RFID tag 14. The RFID tag 14, which has received the radio waves, superposes data stored in the RFID tag 14 on the radio waves, and transmits the radio waves from the second antenna circuit 16b and the third antenna circuit 16c to the RFID reader writer device. The data communication ends when the RFID reader writer device receives the transmitted radio waves.

That is, the first antenna circuit 16a is an antenna circuit for acquiring the surface waves generated on the metal body 30, and the second antenna circuit 16b and the third antenna circuit 16c are antenna circuits for allowing the radio waves collected by the first antenna circuit 16a to resonate at a specific frequency, sending these radio waves to the RFID tag 14, and outputting the radio waves on which data in the RFID tag chip has been superposed.

[0023]

In addition, because the RFID tag 10 uses the metal body 30 as if the metal body 30 is an antenna circuit that collects radio waves transmitted from the RFID reader writer device, a better communication gain can be obtained, compared with a case in which the RFID tag 10 is attached to a non-metal body.

1. A semiconductor device including: a semiconductor board having a high-impurity concentration; a parallel pn layer which is formed on a surface of the semiconductor board and in which first-conductivity-type semiconductor regions and second-conductivity-type semiconductor regions are alternately disposed; second-conductivity-type base regions formed on surface layers of the second-conductivity-type semiconductor regions; first-conductivity-type source regions formed on surface layers of the base regions; a gate electrode formed on a surface of the parallel pn layer via a gate oxide film; and a source electrode electrically connected to the source regions and the base region and formed away from the gate electrode,

wherein the semiconductor device includes an insulating film that is selectively formed between the surface of the parallel pn layer and the gate electrode and that is thicker than the gate oxide film,

wherein a first area in which the gate electrode covers a neck portion on the surface of the parallel pn layer, the neck portion not including the areas corresponding to the base regions and the source regions, and a second area which is included in the first area and in which the gate electrode covers the insulating film satisfy 0.1 ≤ second area/ first area ≤ 0.4,

wherein a plurality of islands of the insulating film are formed on a surface of each of the neck portions formed between an individual pair of neighboring first-conductivity-type semiconductor regions of the first-conductivity-type semiconductor regions in a direction perpendicular to an interface between the individual first-conductivity-type semiconductor region and the individual second-conductivity-type semiconductor region, and

wherein different kinds of the insulating film are formed to cover a plurality of electric field concentration regions generated between neighboring first-conductivity-type semiconductor regions of the first-conductivity-type semiconductor regions.