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United States Patent Application Publication	20250258273
Kind Code	A1
Publication Date	August 14, 2025
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Radar Device And Method For Manufacturing The Same

Abstract

A radar device for Autonomous Driving, AD, or Advanced Driver Assistant Systems, ADAS, applications for vehicles is provided. The device comprises a housing comprising a base and a cover, a radar unit mounted on a Printed Circuit Board, PCB, and a shielding covering the radar unit and configured to provide EMC, Electro Magnetic Compatibility, shielding to the radar unit. The shielding is fixedly attached to an inner bottom of the base. The base is provided with a supporting structure comprising a plurality of supporting elements configured to provide support the PCB and/or the shielding.

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Appl. No.:	**18/628700**
Filed:	**April 06, 2024**

Foreign Application Priority Data

EP	24156653.8	Feb. 08, 2024

Publication Classification

Int. Cl.: **G01S7/02** (20060101); **G01S7/03** (20060101); **G01S13/931** (20200101)

U.S. Cl.:

CPC **G01S7/027** (20210501); **G01S7/032** (20130101); **G01S13/931** (20130101);

Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit and priority of European patent application number 24156653.8, filed on Feb. 8, 2024. The entire disclosure of the above application is incorporated herein by reference.

FIELD

[0002] This section provides background information related to the present disclosure which is not necessarily prior art.

[0003] The present disclosure relates to a radar device for Autonomous Driving, AD, or Advanced Driver Assistant Systems, ADAS, applications for vehicles, and a method for manufacturing the same. The radar device comprises a housing, a radar unit, and a shielding.

BACKGROUND

[0004] To ensure an optimal performance of a radar device, heat generated by the radar device has to be dissipated to the outside of the device. The generated heat is usually dissipated using heatsinks which are arranged within the radar device. Currently used solutions employ aluminum die-cast or stamped sheet metal heatsinks. Both variants of heatsinks can act as temperature dissipation as well as EMC shielding unit. In stamped heatsinks, an EMC metal spring is welded together with the heatsink, and provides an electrical connection between the heatsink and a ground path on PCB.

[0005] During assembly of the radar device, the heatsink usually is inserted before the PCB comprising the radar unit and then compressed during PCB press fit assembly.

[0006] Heat sinks considerably contribute to manufacturing costs of a radar device, as the piece price per heatsink is relatively large. In this respect, die-cast heatsinks are even more cost-intensive than stamped sheet metal heatsinks. Previous solutions to decrease heatsink cost therefore replaced die-cast heatsinks with stamped sheet metal heatsinks. Even though this lowered the piece price per heat sink, the use of stamped sheet metal heatsinks created problems during the press fit assembly due to their lower stiffness compared to die-cast heat sinks.

[0007] Accordingly, there is a need for a radar device which is cost-effective and easy to assemble and operates reliably.

SUMMARY

[0008] This section provides a general summary of the disclosure, and is not a comprehensive disclosure of its full scope or all of its features.

[0009] The present disclosure provides in a first aspect a radar device and in a second aspect a method for manufacturing a radar device according to the independent claims. Embodiments are given in the sub-claims, the description and the drawings.

[0010] In a first aspect, the present disclosure is directed at a radar device for Autonomous Driving, AD, or Advanced Driver Assistant Systems, ADAS, applications for vehicles, the device comprising a housing comprising a base and a cover, a radar unit mounted on a Printed Circuit Board, PCB, and a shielding covering the radar unit and configured to provide EMC, Electro Magnetic Compatibility, shielding to the radar unit, wherein the shielding is fixedly attached to an inner bottom of the base, and wherein the base is provided with a supporting structure, the supporting structure comprising a plurality of supporting elements configured to provide support for the PCB and/or the shielding.

[0011] The radar device is not provided with a conventional heat sink. Instead, heat generated by the radar unit is dissipated to the outside by the housing, to which the shielding is fixedly attached. Heat generated by the radar unit is absorbed by the shielding and transferred to the base which efficiently dissipates the heat to the surroundings of the radar device. By omitting a dedicated heat

sink component, the radar device can be manufactured more cost-efficiently than previous radar devices comprising a heat sink component. The reduced number of components reduces bill of materials (BOM) costs and enables shorter assembly times of the radar device.
[0012] The base and the cover may be rectangular shaped and form a flat housing of the radar device. The base comprises a flat bottom surface and four sidewalls. One of the side walls may be provided with an electro-mechanical connector for connecting the radar device for example with a vehicle or components thereof.
[0013] The base may comprise a plurality of compartments which may be separated from one another by supporting elements of the supporting structure. The supporting structure with the plurality of supporting elements provides a robust hard-stop for the PCB during assembly of the radar device. The supporting elements are formed of a stiff material and can for example include bars, bridges, ridges, pillars and platforms.
[0014] The supporting elements may protrude from the inner bottom of the base and/or may protrude from inner surfaces of the sidewalls of the base. The supporting elements may also be part of the base itself. The supporting elements may for example be bridges forming partition walls of different compartments of the base. The supporting elements may form ridges extending on inner sidewalls of the base for providing support for the PCB and/or the shielding. The supporting elements may also be a part of a sidewall of the base forming a horizontal platform to support the PCB and/or the shielding.
[0015] The plurality of supporting elements brace the PCB at various positions along the PCB's extension and ensure a safe stop and a secure retention of the PCB within the radar device. Due to the enhanced stiffness of the base and its supporting structure, a heat sink is no longer necessary for providing a robust support during PCB press fit assembly. The robustness of the base and its supporting structure thus ensures an unproblematic assembly and a flawless operation of the radar device.
[0016] The radar device is therefore cost-effective and easy to assemble and operates reliably.
[0017] According to an embodiment of the first aspect, the shielding is a stamped metal spring, in particular a stamped steel spring. In particular, the shielding is formed as a thin stamped metal spring. The metal spring is rectangular shaped and includes a flat bottom surface and four side walls. Adjacent side walls may not be connected to one another and may form edge openings which extend along the four side edges. Alternatively, adjacent side walls may be connected by a plurality of connecting elements like flanges or tabs.
[0018] The flat bottom surface is fixedly attached to the inner bottom of the base while the side walls extend from the flat bottom surface of the metal spring to a surface of the PCB. Support for the side walls of the metal spring is provided by the supporting elements of the supporting structure. At least one of the side walls is provided with an electrical connection with the ground path on the PCB.
[0019] The rectangular shaped metal spring and the PCB form a cavity which prevents the radar unit arranged within said cavity from being impacted by electromagnetic interference (EMI) or radio frequency (RF) interference. Thereby, only components which are sensitive to EMI or RF interference may be arranged on the PCB within the cavity formed by the shielding. Other components which are not affected by said interferences may be arranged outside the shielded area on the PCB. This allows to reduce size and cost of the shielding.
[0020] The main purpose of the shielding is therefore to provide an efficient EMC shielding to the radar unit. Furthermore, the stamped metal spring also provides for a compensation of manufacturing tolerances of the housing and the PCB components of the radar device. Due to its reduced thickness and reduced volume, heat capacity of the shielding is limited. Heat generated by the radar unit is absorbed by the shielding and quickly dissipated to the base of the housing. Stamped metal springs are easy to manufacture and provide a cost-effective EMC shielding to the radar unit.

[0021] According to an embodiment of the first aspect, the shielding is in contact with the inner bottom of the base. Accordingly, a contact area is formed between an outer surface of the shielding and the inner bottom of the base. Since the shielding and the base are in direct contact with one another, heat is dissipated from the shielding to the base, and finally to the outside of the radar device more efficiently.

[0022] According to an embodiment of the first aspect, at least 70% of an outer surface of the shielding on an opposite side of the PCB is in direct contact with the inner bottom of the base. Accordingly, a contact area comprising at least 70% of an outer surface of the shielding on an opposite side of the PCB is formed between an outer surface of the shielding and the inner bottom of the base. Since the shielding and the base are in direct contact with one another over a large fraction of the outer surface of the PCB, heat is dissipated from the shielding to the base, and finally to the outside of the radar device even more efficiently. To enhance said heat dissipation efficiency, an occupation fraction of the contact area of the outer surface of the shielding may also be larger than 70%, in particular 80%, 85% or 90%.

[0023] The shielding may furthermore be provided with a circular opening formed in a flat bottom surface of the shielding opposite the emitting and receiving components of the radar unit to further improve dissipation of heat generated by the radar unit.

[0024] According to an embodiment of the first aspect, the shielding is fixedly attached to the inner bottom of the base by a plurality of fastening means. The fastening means ensure that the shielding and the base are robustly connected to one another. In particular, the fastening means prevent that the shielding may shift with respect to the inner bottom of the base.

[0025] According to an embodiment of the first aspect, the plurality of fastening means is formed by a plurality of heat staked joints. Heat staked joints provide a robust and easy to implement attachment of the shielding to the base. The heat staking joints may be formed by heat staking of plastic pins provided on the inner bottom of the base, wherein the plastic bins have been inserted in corresponding openings in the shielding before heat staking is performed. For a shielding formed by a stamped metal spring, the openings are provided in a bottom surface of the metal spring. The plastic pins protrude from the inner bottom of the base over a length exceeding the thickness of the shielding to be attached to the base. This allows heat staking to be easily performed. After heat staking, the plastic pins form button-shaped rivets which fixedly connect the base and the shielding. The heat staking joints may be arranged along the edges of the inner bottom of the base. At least one of the heat staking joints may be arranged adjacent to the circular opening of the shielding.

[0026] According to an embodiment of the first aspect, the housing is made of plastic. A housing made of plastic is easy to manufacture and cost-effective. It can provide a necessary amount of stiffness for the base and its supporting structure for acting as a robust support for the PCB and a robust hard stop for the PCB during press fit assembly.

[0027] According to an embodiment of the first aspect, the housing is made of thermally conductive plastic, in particular a thermally conductive plastic having a thermal conductivity of at least 5 W/mK. The use of thermally conductive plastic enhances the capabilities of the radar device to dissipate heat. A housing made of thermally conductive plastic therefore ensures an efficient dissipation of heat and a reliable performance of radar devices with enhanced heat generation.

[0028] According to an embodiment of the first aspect, the base and the supporting structure are formed in one piece. This can enhance the structural stability and the stiffness of the supporting structure, ensuring a robust support for the PCB. The formation of the base and the supporting structure in one piece is very cost-effective and contributes to a further reduction of the manufacturing costs of the radar device.

[0029] In a second aspect, the present disclosure is directed at a method for manufacturing a radar device, the method comprising the steps of providing a housing comprising a cover and a base with a supporting structure comprising a plurality of supporting elements; inserting a shielding into the interior of the base, the shielding being configured to provide EMC, Electro Magnetic Compatibility, shielding to a radar unit; fixedly attaching the shielding to the inner bottom of the base; arranging a PCB comprising the radar unit on the supporting elements of the base, press-fit assembling the PCB; and attaching the cover to the base to close the housing.

[0030] Since the radar device is not provided with a heat sink, assembly times are shorter than in previous radar devices which have been equipped with such a dedicated heat dissipation component. By omitting the heat sink component, the radar device can therefore be manufactured more cost-efficiently than previous radar devices. The reduced number of components reduces bill of materials (BOM) costs and enables shorter assembly times of the radar device.

[0031] The supporting structure with the plurality of supporting elements provides a robust hard-stop for the PCB during assembly of the radar device. The supporting elements are formed of a stiff material and can for example include bars, bridges, ridges, pillars and platforms. The plurality of supporting elements brace the PCB at various positions along the PCB's extension and ensure a safe stop and a secure retention of the PCB within the radar device. Due to the enhanced stiffness of the base and its supporting structure, a heat sink is no longer necessary for providing a robust support during PCB press fit assembly. The robustness of the base and its supporting structure thus ensures an unproblematic assembly and a flawless operation of the radar device.

[0032] The method for manufacturing a radar device therefore requires less components and enables shorter assembly times, and therefore ensures an unproblematic and cost-effective assembly of the radar device.

[0033] According to an embodiment of the second aspect, the shielding is a stamped metal spring, in particular a stamped steel spring. In particular, the shielding is formed as a thin stamped metal spring. The main purpose of the shielding is to provide an efficient EMC shielding to the radar unit. Furthermore, the stamped metal spring also provides for a compensation of manufacturing tolerances of the housing and the PCP components of the radar device. Due to its reduced thickness and reduced volume, heat capacity of the shielding is limited. Heat generated by the radar unit is absorbed by the shielding and quickly dissipated to the base of the housing. Stamped metal springs are easy to manufacture and provide a cost-effective EMC shielding to the radar unit.

[0034] According to an embodiment of the second aspect, the housing is made of plastic, in particular thermally conductive plastic. In particular the housing is made of thermally conductive plastic having a thermal conductivity of at least 5 W/mK. A housing made of plastic is easy to manufacture and cost-effective. It can provide a necessary amount of stiffness for the base and its supporting structure for acting as a robust support for the PCB and a robust hard stop for the PCB during press fit assembly. The use of thermally conductive plastic enhances the capabilities of the radar device to dissipate heat. A housing made of thermally conductive plastic therefore ensures an efficient dissipation of heat and a reliable performance also in radar devices with enhanced heat generation.

[0035] According to an embodiment of the second aspect, the shielding is fixedly attached to the inner bottom of the base by a plurality of fastening means. In particular, the shielding is in contact with the inner bottom of the base. Accordingly, a contact area is formed between an outer surface of the shielding and the inner bottom of the base. Since the shielding and the base are in direct contact with one another, heat is dissipated from the shielding to the base, and finally to the outside of the radar device more efficiently.

[0036] Thereby, at least 70% of an outer surface of the shielding on an opposite side of the PCB may be in direct contact with the inner bottom of the base. Accordingly, a contact area comprising at least 70% of an outer surface of the shielding on an opposite side of the PCB may be formed between an outer surface of the shielding and the inner bottom of the base. Since the shielding and the base are therefore in direct contact with one another over a large fraction of the outer surface of the PCB, heat is dissipated from the shielding to the base, and finally to the outside of the radar device of the housing even more efficiently. To enhance said heat dissipation efficiency, an

occupation fraction of the contact area of the outer surface of the shielding may also be larger than 70%, in particular 80%, 85% or 90%.
[0037] The shielding may furthermore be provided with a circular opening formed in a flat bottom surface of the shielding opposite the emitting and receiving components of the radar unit to further improve dissipation of heat generated by the radar unit.
[0038] According to an embodiment of the second aspect, the inner bottom of the base is provided with a plurality of plastic pins, the shielding is provided with a plurality of corresponding openings, and the shielding is inserted into the interior of the base by inserting the plurality of openings in the plurality of corresponding plastic pins. The plurality of pins may protrude from the inner bottom of the base and may be formed in one piece with the base. The openings may be formed cost-effectively as holes during the formation of the shielding. For a shielding formed by a stamped metal spring, the openings are provided in a bottom surface of the metal spring.
[0039] According to an embodiment of the second aspect, the shielding is fixedly attached to the inner bottom of the base by heat staking of the plastic pins after the shielding is inserted into the interior of the base. The plastic pins protrude from the inner bottom of the base over a length exceeding the thickness of the shielding to be attached to the base. This allows heat staking to be easily performed. After heat staking, the plastic pins form button-shaped rivets which fixedly connect the base and the shielding. The heat staking joints may be arranged along the edges of the inner bottom of the base. At least one of the heat staking joints may be arranged adjacent to the circular opening of the shielding. After heat staking, the plastic pins form robust fastening means for connecting the base and the shielding.
[0040] Heat staked joints provide a robust and easy to implement attachment of the shielding to the base. The present disclosure is however not restricted to an attachment by heat staking joints, other methods for fixedly attaching the shielding to the base are possible as well.
[0041] Further areas of applicability will become apparent from the description provided herein. The description and specific examples in this summary are intended for purposes of illustration only and are not intended to limit the scope of the present disclosure.

Description

DRAWINGS
[0042] The drawings described herein are for illustrative purposes only of selected embodiments and not all possible implementations, and are not intended to limit the scope of the present disclosure.
[0043] Exemplary embodiments and functions of the present disclosure are described herein in conjunction with the following drawings.
[0044] FIG. **1** schematically shows an illustration of a section view of an embodiment of a radar device.
[0045] FIG. **2** schematically shows an illustration of a perspective view of the radar device of FIG. **1** with translucent housing.
[0046] FIG. **3** schematically shows an illustration of another perspective view of the radar device of FIG. **1**.
[0047] Corresponding reference numerals indicate corresponding parts throughout the several views of the drawings.
DETAILED DESCRIPTION
[0048] Example embodiments will now be described more fully with reference to the accompanying drawings.
[0049] FIG. **1** depicts a section view of an embodiment of a radar device **10**. FIGS. **2** and **3** depict two perspective views of the embodiment of FIG. **1**, with FIG. **2** showing the radar device **10** with

translucent housing.

[0050] The radar device **10** comprises a housing **12** including a base **14** and a cover **16**, a radar unit **18** mounted on a Printed Circuit Board (PCB) **20** and a shielding **22** covering the radar unit **18** and configured to provide EMC (Electro Magnetic Compatibility) shielding to the radar unit **22**.

[0051] The base **14** and the cover **16** are rectangular shaped and form a flat housing **12** of the radar device **10**. The base **14** comprises a flat bottom surface **14***a* and four sidewalls **14***b*. One of the side walls **14***b* is provided with an electro-mechanical connector **38** for connecting the radar device **10** for example with a not shown vehicle or components thereof. The base **14** comprises a plurality of compartments **15***a*, **15***b* which are separated from one another by supporting elements **30** of the supporting structure **28**.

[0052] The shielding **22** is fixedly attached to the inner bottom **24** of the base **14** by a plurality of fastening means **26**. The base **14** is provided with a supporting structure **28** comprising a plurality of supporting elements **30** configured to provide support for the PCB **20**.

[0053] The shielding **22** is a thin stamped metal spring, in particular a thin stamped steel spring. The metal spring is rectangular shaped and includes a flat bottom surface **22***a* and four side walls **22***b*. In this embodiment, adjacent side walls are not connected to one another and form edge openings **22***c* which extend along the four side edges. Alternatively, adjacent side walls may also be connected by a plurality of connecting elements like flanges or tabs.

[0054] The flat bottom surface **22***a* is fixedly attached to the inner bottom **24** of the base **14** while the side walls **22***b* extend from the flat bottom surface **22***a* of the metal spring **22** to a surface of the PCB **20**. Support for the side walls **22***b* of the shielding **22** is provided by the supporting elements **30** of the supporting structure **28**. At least one of the side walls **22***a* is provided with an electrical connection with the ground path on the PCB **20**.

[0055] The rectangular shaped metal spring **22** and the PCB **20** form a cavity **40** which prevents the radar unit **18** arranged within said cavity **40** from being impacted by electromagnetic interference (EMI) or radio frequency (RF) interference. Thereby, only components which are sensitive to EMI or RF interference are arranged on the PCB **20** within the cavity **40** formed by the shielding **22**. Other components which are not affected by said interferences are arranged outside the shielded area on the PCB **20**.

[0056] The main purpose of the shielding **22** is to provide an efficient EMC shielding to the radar unit **18**. Furthermore, the stamped metal spring **22** also provides for a compensation of manufacturing tolerances of the housing **12** and the PCP **20** components of the radar device **10**.

[0057] The shielding **22** is in direct contact with the inner bottom **24** of the base **14**. Accordingly, a contact area **32** is formed between an outer surface **34** of the shielding **22** and the inner bottom **24** of the base **14**. The contact area **32** comprises at least 70% of an outer surface **34** of the shielding **22** on an opposite side of the PCB **20**. This ensures an efficient dissipation of heat generated by the radar unit **18** from the shielding **22** to the base **14**, and finally to the outside of the radar device **10**. The shielding **22** is furthermore provided with a circular opening **42** formed in the flat bottom surface **22***a* of the shielding **22** opposite the emitting and receiving components of the radar unit **18** to further improve dissipation of heat generated by the radar unit **18**.

[0058] The housing **12** is made of plastic, in particular thermally conductive plastic. The plastic material provides a necessary amount of stiffness for the base **14** and its supporting structure **28**. The use of thermally conductive plastic enhances the capabilities of the radar device **10** to dissipate heat. A housing **12** made of thermally conductive plastic therefore ensures an efficient dissipation of heat and a reliable performance also in radar devices **10** with enhanced heat generation.

[0059] The shielding **22** is fixedly attached to the base **14** by a plurality of heat staked joints **26** which provide a robust attachment of the shielding **22** to the base **14**. The heat staked joints **26** are formed by heat staking of not shown plastic pins provided on the inner bottom **24** of the base **14**, wherein the plastic pins have been inserted in corresponding openings **36** in the shielding **22** before heat staking is performed.

[0060] Thereby, the plastic pins protrude from the inner bottom **24** of the base **14** over a length exceeding the thickness of the shielding **22** to be attached to the base **14**. This allows heat staking to be easily performed. After heat staking, the plastic pins form button-shaped rivets **26** which fixedly connect the base **14** and the shielding **22**. The heat staking joints **26** are arranged along the edges of the inner bottom **24** of the base **14**. One further heat staking joint **26** is arranged adjacent to the circular opening **42** of the shielding **22**.
[0061] The base **14** and the supporting structure **28** are formed in one piece which enhances the structural stability and the stiffness of the supporting structure **28**, and ensures a robust support for the PCB **20**. The supporting structure **28** comprises a plurality of supporting elements **30** which can for example include bars, bridges **30***a*, ridges, pillars and platforms **30***b*.
[0062] The supporting elements **30** may protrude from the inner bottom **24** of the base **14** and/or may protrude from inner surfaces of the sidewalls **14***b* of the base **14**. The supporting elements **30** may also be part of the base **14** itself. The supporting elements **30** comprise at least one bridge **30***a* forming a partition wall of the compartments **15***a*, **15***b* of the base **14**. The bridge **30***a* provides support for the PCB **20** and the shielding **22**. The supporting elements **30** further comprise a horizontal platform **30***b* as part of a sidewall **14***b* of the base **14** to support the PCB **20** and/or the shielding **22**.
[0063] The plurality of supporting elements **30** brace the PCB **20** at various positions along the PCB's extension and ensure a safe stop and a secure retention of the PCB **20** within the radar device **10**. The supporting structure **28** with its supporting elements **30** provide a robust support for the PCB **20** and a robust hard stop for the PCB **20** during press fit assembly.
[0064] During assembly of the radar device **10**, the shielding **22** is inserted into the interior of the base **14**, and fixedly attached to the base **14** by heat staking as described above. In a further step, the PCB **20** is arranged on the supporting elements **30** of the base **14** and press-fit assembling of the PCB is performed. During press-fitting, the supporting structure **28** and its supporting elements **30** provide a robust hard-stop for the PCB **20**. After press-fitting, the cover **16** is attached to the base **14** to close the housing **12** and finish the assembly of the radar device **10**.
[0065] Due to the enhanced stiffness of the base **14** and its supporting structure **28**, a heat sink is no longer necessary for providing a robust support during PCB **20** press fit assembly. The robustness of the base **14** and its supporting structure **28** thus ensures an unproblematic assembly and a flawless operation of the radar device **10**.
[0066] By omitting a dedicated heat sink component, the radar device **10** can be manufactured more cost-efficiently than previous radar devices comprising a heat sink component. The reduced number of components reduces bill of materials (BOM) costs and enables shorter assembly times of the radar device **10**.
[0067] The method for manufacturing a radar device **10** requires less components and enables shorter assembly times, and therefore ensures an unproblematic and cost-effective assembly of the radar device **10**.
REFERENCE NUMERAL LIST
[0068] **10** Radar device [0069] **12** Housing [0070] **14** Base [0071] **14***a* Bottom surface of the base [0072] **14***b* Side wall of the base [0073] **15***a* Compartment [0074] **15***b* Compartment [0075] **16** Cover [0076] **18** Radar Unit [0077] **20** PCB [0078] **22** Shielding [0079] **22***a* Bottom surface of the shielding [0080] **22***b* Sidewall of the shielding [0081] **22***c* Edge opening of the shielding [0082] **24** Inner bottom of the base [0083] **26** Fastening means/Heat staked joint [0084] **28** Supporting structure [0085] **30** Supporting element [0086] **30***a* Bridge [0087] **30***b* Platform [0088] **32** Contact area [0089] **34** Outer surface of the shielding [0090] **36** Opening [0091] **38** Electro-mechanical connector [0092] **40** Cavity [0093] **42** Circular opening

Claims

1. A radar device for Autonomous Driving (AD) or Advanced Driver Assistant Systems (ADAS) applications for vehicles, the device comprising: a housing comprising a base and a cover; a radar unit mounted on a Printed Circuit Board (PCB); and a shielding covering the radar unit and configured to provide Electro Magnetic Compatibility shielding to the radar unit; wherein: the shielding is fixedly attached to an inner bottom of the base; and the base is provided with a supporting structure, the supporting structure comprising a plurality of supporting elements configured to provide support for the PCB and/or the shielding.
2. The radar device of claim 1, wherein the shielding is a stamped metal spring.
3. The radar device of claim 1, wherein the shielding is in contact with the inner bottom of the base.
4. The radar device of claim 3, wherein at least 70% of an outer surface of the shielding on an opposite side of the PCB is in direct contact with the inner bottom of the base.
5. The radar device of claim 1, wherein the shielding is fixedly attached to the inner bottom of the base by a plurality of fastening means.
6. The radar device of claim 1, wherein the plurality of fastening means is formed by a plurality of heat staked joints.
7. The radar device of claim 1, wherein the housing is made of plastic.
8. The radar device of claim 7, wherein the housing is made of thermally conductive plastic.
9. The radar device of claim 1, wherein the base and the supporting structure are formed in one piece.
10. A method for manufacturing a radar device for Autonomous Driving or Advanced Driver Assistant Systems applications for vehicles, the method comprising the steps of: providing a housing comprising a cover and a base with a supporting structure comprising a plurality of supporting elements; inserting a shielding into an interior of the base, the shielding being configured to provide Electro Magnetic Compatibility shielding to a radar unit mounted on a Printed Circuit Board (PCB); fixedly attaching the shielding to an inner bottom of the base; arranging the PCB comprising with the radar unit on the plurality of supporting elements of the base, the plurality of supporting elements being configured to provide support for the PCB and/or the shielding; press-fit assembling the PCB; attaching the cover to the base to close the housing.
11. The method of claim 10, wherein the shielding is a stamped metal spring.
12. The method of claim 10, wherein the housing is made of plastic.
13. The method of claim 10, wherein the shielding is fixedly attached to the inner bottom of the base by a plurality of fastening means.
14. The method of claim 10, wherein the inner bottom of the base is provided with a plurality of plastic pins, the shielding is provided with a plurality of corresponding openings, and the shielding is inserted into the interior of the base by inserting the plurality of openings in the plurality of corresponding plastic pins.
15. The method of claim 14, wherein the shielding is fixedly attached to the inner bottom of the base by heat staking of the plastic pins after the shielding is inserted into the interior of the base.
16. The radar device of claim 2, wherein the stamped metal spring is a stamped steel spring.
17. The radar device of claim 8, wherein the thermally conductive plastic has a thermal conductivity of at least 5 W/mK.
18. The method of claim 11, wherein the stamped metal spring is a stamped steel spring.
19. The method of claim 12 wherein the plastic is a thermally conductive plastic.