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Intellectual property rights in: COOLING MODES (Präfix "POLY")

POLY-01:

HEAT-DISSIPATION POLYVALENT HEAT TRANSFER DEVICE FOR AT LEAST ONE SEMI-CONDUCTOR ELEMENT, AND ASSOCIATED TESTING AND OPERATING METHOD

The invention relates to a heat transfer device (15) having at least one semi-conductor element (10) and a heat conducting body (20). The semi-conductor element has a heat source region, which encloses the pn junctions thereof generating heat during operation. The heat conducting body (20) comprises at least one receiving surface (21) for the bonded connection to a contact surface (11, 12) of the semi-conductor element (10), and at least one channel structure (30, 31). The heat transfer device (15) is characterized in that the channel structure (30, 31) is disposed completely outside a projection (22) of the heat source region, which extends perpendicular to the contact surface (11, 12). The heat transfer device is also characterized by at least one connection surface (23) of the heat conducting body (20), said surface being provided for a conductive heat transfer to a heat dissipation body (98) comprising at least one heat transfer structure (35). During the operation of the heat conducting body (20), or through the heat transfer structure (35) of the heat conducting body (20), or through the heat transfer structure (35) of the heat conducting body (20), or through the heat transfer structure (35) of the heat conducting body (20), or through the heat transfer structure (35) of the heat dissipation body (98).

IP rights:

German Patent no. DE 10 2008 010 784 B3 (validity limit: 24.02.2028)

POLY-02:

CONVERSION UNIT COMPRISING A PLURALITY OF CONVERSION MODULES AND AN OPTICAL ARRANGEMENT HAVING SUCH A CONVERSION UNIT

Conversion modules (20/20') are disposed in a conversion unit (50/50') in at least one arrangement direction (35, 36) adjacent to one another to form a conversion arrangement (30/30') in order to convert electrical energy into radiation energy or conversely on a scalable scale. For cooling they are supplied with coolant via a coolant supply and withdrawal device (40).

In the region of a heat-absorbing surface (21*), respectively one semiconducting conversion element (10/10') is fastened to a heat-conducting member (21) to form a conversion module (20/20') which is divided into three sections: the heat-absorbing section (21) bearing the heat-absorbing surface (21*), a heat-emitting section (21c) having a heat-emitting surface (26*) wetted by coolant in at least one recess (26) and a heat-conducting section (21b) disposed between the heat-absorbing section (21a) and the heat-emitting section (21c). In the conversion arrangement (30/30') an opening (27) in the heat-emitting section (21c) is connected to the

recess there and is facing the adjacent conversion module (20/20') in the arrangement direction. The heat-conducting section (21b) has at least one sealing surface (24) by which means a seal is made, which

contributes to an inclusion of coolant in coolant flow passages (37) between the heat-emitting sections (21c) of adjacent conversion modules (20/20').

The coolant flow is effected in such a manner that at least two groups of conversion modules (20/20') have fluidically parallel flow therethrough.

The conversion modules (20/20) can be configured as diode laser components (20) and as solar modules (20).

IP riahts:

German patent application no. 10 2009 016 953 A1 (validity limit: 08.04.2029) German utility model no. DE 20 2009 009 203 U1 (published 19.11.2009)

POLY-03

HEAT DISSIPATION MODULE

A heat dissipation module has a semiconductor element (2) with a first and opposing second side (13, 12), a first heat dissipation body (3) for conductively cooling the semiconductor element (2), which exhibits a first contact surface (6),

a second heat dissipation body (4), which exhibits a second contact surface (7) facing the first contact surface (6), and incorporates a cooling channel (16) through which a cooling fluid can be passed,

wherein the semiconductor element (2) is situated between the two heat dissipation bodies (3, 4), and the first side (13) is joined to the first contact surface (6), and the second side (12) is joined to the second contact surface (7) in such a way that the first side (13) of the semiconductor element (2) is thermally contacted with the first contact surface (6), and the second side (12) of the semiconductor element (2) is thermally contacted with the second contact surface (7),

and wherein the cooling channel (16) in the second heat dissipation body (4), viewed from the top on the second side (12) of the semiconductor element (2), extends at least sectionally into the area of the second side (12), while no channel for carrying a cooling fluid extends into the area of the first side (13) in the first heat dissipation body (3), viewed from the top on the first side (13) of the semiconductor element (2).

IP rights:

German patent application no. DE 10 2008 051 081 A1 (validity limit: 09.10.2028)



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