

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 35

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte DEEPAK MAHULIKAR, JACOB CRANE  
and ABID A. KHAN

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Appeal No. 95-2500  
Application No. 07/984,147<sup>1</sup>

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ON BRIEF

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Before KIMLIN, GRON and WARREN, Administrative Patent Judges.

KIMLIN, Administrative Patent Judge.

DECISION ON APPEAL

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<sup>1</sup> Application for patent filed November 24, 1992. According to appellants, this application is a continuation of Application No. 07/809,081, filed December 9, 1991, now abandoned; which is a continuation of Application No. 07/663,340, filed February 27, 1991, now abandoned; which is a division of Application No. 07/359,305, filed May 31, 1989, now U.S. Patent No. 5,015,803, issued May 14, 1991.

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This is an appeal from the final rejection of claims 41, 43 and 69-85, all the claims remaining in the present application. Claim 41 is illustrative:

41. A package for housing a microelectronic circuit, comprising:

a plastic housing;

a leadframe partially encapsulated within said plastic housing;

a microelectronic device electrically interconnected to said leadframe; and

a composite heat spreader at least partially embedded in said plastic housing, said composite heat spreader comprising a core layer and first and second cladding layers bonded to opposing sides of said core layer.

In addition to the admitted state of the prior art found in appellants' specification, the examiner relies upon the following references as evidence of obviousness:

Hodge	3,930,114	Dec. 30, 1975
Gernitis et al. (Gernitis)	4,025,997	May 31, 1977
Hascoe	4,283,464	Aug. 11, 1981
Komatsu et al. (Komatsu)	4,298,883	Nov. 3, 1981
Hynes et al. (Hynes)	4,320,412	Mar. 16, 1982
Kato et al. (Kato)	4,521,801	Jun. 4, 1985
Yerman et al. (Yerman)	4,635,092	Jan. 6, 1987
Alvarez et al. (Alvarez)	4,811,166	Mar. 7, 1989
Butt	5,001,546	Mar. 19, 1991

Appellants' claimed invention is directed to an electronic package comprising a plastic housing, having

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therein a micro-electronic device electrically interconnected to a leadframe and a composite heat spreader. The heat spreader comprises a core layer situated between first and second cladding layers. The composite heat spreader has a high thermal conductivity to enhance the removal of heat during the operation of the microelectronic device, in addition to having a coefficient of thermal expansion essentially equal to that of the electronic device in order to inhibit thermal fracture of the device.

Appealed claims 41, 43 and 69-74 stand rejected under 35 U.S.C. § 103 as being unpatentable over the admitted prior art, Hodge and Komatsu in view of Gernitis, Hascoe or Alvarez. Claims 75 and 76 stand rejected under 35 U.S.C. § 103 as being unpatentable over the stated combination of references in further view of Kato, Butt, Yerman or Hynes.

Upon careful consideration of the opposing arguments presented on appeal, we are of the opinion that the applied prior art fails to establish a prima facie case of obviousness for the claimed subject matter. Accordingly, we will not sustain the examiner's rejections.

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Although the admitted prior art, Hodge and Komatsu, the primary references, disclose embedding a heat spreader in the plastic housing of an electronic package containing a microelectronic device, the examiner recognizes that none of the references teaches the presently claimed composite heat spreader. To establish the obviousness of using a composite heat spreader of the type claimed in the electronic packages of the primary references, the examiner relies upon the disclosure of such composite heat spreaders in Gernitis, Hascoe and Alvarez. However, as properly urged by appellants, neither of Gernitis, Hascoe or Alvarez teaches or suggests encapsulating the composite heat spreader in the plastic housing of an electronic package. Indeed, neither Gernitis, Hascoe or Alvarez suggests embedding the composite structure in the plastic material of any device.

In support of the nonobviousness of the claimed invention, appellants advance the following argument at page 3 of the Supplement Reply Brief:

Each of the three additional references [Gernitis, Hascoe and Alvarez] identify that a semiconductor material or a ceramic material is bonded to a surface of a composite heat spreader and that by a rule of mixtures, the surface has a coefficient of thermal expansion proportional to the

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amounts of the two materials making up the composite. The references do not, however, discuss edge effects. Since the low coefficient of thermal expansion semiconductor material and ceramic are both mounted to a surface in the references, the references would not be concerned with edge effects. [Emphasis added.]

There is nothing in any of the references of record, or in Appellants' description of the prior art, to teach or suggest that at the edges of a composite material, where multiple metals are in contact with a molding resin, the composite heat spreader will not fracture the molding resin of a molded plastic package.

We note that the examiner has chosen not to respond to this cogent argument of appellants.

Consequently, in the absence of any teaching or suggestion in the prior art that the composite heat spreaders of Gernitis, Hascoe and Alvarez could be successfully employed while embedded in the plastic housing of an electronic package, we must agree with appellants that the examiner's rejection is based upon impermissible hindsight.

Kato, Butt, Yerman and Hynes, applied by the examiner to establish the obviousness of using composite leadframes, as recited in claims 75 and 76, do not remedy the deficiency of the combination of references discussed above.

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In conclusion, based on the foregoing, the examiner's  
decision rejecting the appealed claims is reversed.

REVERSED

EDWARD C. KIMLIN	)	
Administrative Patent Judge	)	
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TEDDY S. GRON	)	BOARD OF PATENT
Administrative Patent Judge	)	APPEALS AND
	)	INTERFERENCES
	)	
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	)	
CHARLES F. WARREN	)	
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