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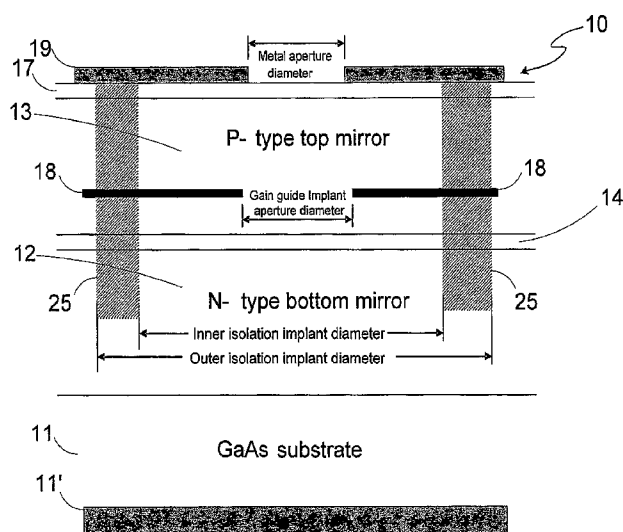
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(57) Abstract: A semiconductor material vertical cavity surface emitting laser for emitting narrow linewidth light comprising a compound semiconductor material substrate and pairs of semiconductor material layers in a first mirror structure on the substrate of a first conductivity type each differing from that other in at least on constituent concentration and each first mirror pair separate from that one remaining by a first mirror spacer layer with a graded constituent concentration. An active region on the first mirror structure has plural quantum well structures separated by at least one active region spacer layer and there is a second mirror structure on the active region similar to the first but of a second conductivity type. A pair of electrical interconnections is separated by said substrate, said first mirror structure, said active region and said second mirror structure.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER IPC: H01S 5/00(2006.01);H01L 31/0256(2006.01) H01S 3/082(2006.01),5/183(2006.01) USPC: 372/50.124;257/76 According to International Patent Classification (IPC) or to both national classification and IPC												
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 372/50.124, 50.12 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)												
C. DOCUMENTS CONSIDERED TO BE RELEVANT												
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.										
X	US 5,557,627 A (SCHNEIDER et al) 17 September 1996, Fig. 1, column 3, lines 52-54;	1										
---	column 5, lines 60-65; column 11, lines 21-38	-----										
Y		2										
Y	US 5,726,462 A (SPAHN et al) 10 March 1998, Fig. 5-6, column 11, lines 11-27	2										
A	US 6631154 B2 (COLDREN et al) 7 October 2003, Figures 7-10	1-2										
☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.												
* Special categories of cited documents: <table border="0"> <tr> <td>"A" document defining the general state of the art which is not considered to be of particular relevance</td> <td>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</td> </tr> <tr> <td>"E" earlier application or patent published on or after the international filing date</td> <td>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</td> </tr> <tr> <td>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</td> <td>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</td> </tr> <tr> <td>"O" document referring to an oral disclosure, use, exhibition or other means</td> <td>"&" document member of the same patent family</td> </tr> <tr> <td>"P" document published prior to the international filing date but later than the priority date claimed</td> <td></td> </tr> </table>			"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	"E" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	"P" document published prior to the international filing date but later than the priority date claimed	
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