

form a 45° surface in the substrate thereby simplifying the end face of the fibers. Angles obtained by dry etching are not limited to the crystalline structure of the substrate. Once the facet is defined on the substrate, it may be metal coated or otherwise rendered reflective using known techniques.

[0005] A problem to be solved is to use a common angled surface coated with a reflective material to couple the light between optical conduits (e.g., fibers or waveguides) and optical components (e.g., an array of OEDs) to realize economies of scale and consistency across the fiber channels.

[0005a] According to first aspect, there is provided an interposer comprising: a plurality of optical conduits, each having an optical axis, wherein at least one of said optical conduits is a fiber having a substantially perpendicular end face; a substrate defining a plurality of grooves having a terminal end, each optical conduit being disposed in a single groove; a common angled surface defined in said substrate and traversing two or more of said plurality of grooves at said terminal end, at least a portion of the angled surface proximate the optical axes of the optical conduits in said two or more grooves is reflective, wherein a lower edge of said angled surface is higher than the bottom of said two or more grooves, thereby defining a step at said terminal end of said two or more grooves; one or more optical components disposed above said angled surface, said optical components and said optical conduits being optically coupled by said angled surface; and said step having a register surface adjacent said angled surface at said terminal end of each groove, said register surface configured to abut said end face of said optical conduit to align said end face axially with respect to said angled surface.

[0005b] According to second aspect, there is provided a substrate for an interposer comprising: a plurality of grooves having a terminal end, each groove adapted for receiving an optical conduit, said optical conduit having a substantially perpendicular end face; a common angled surface defined in said substrate and traversing two or more grooves of said plurality of grooves at said terminal end, at least a portion of the angled surface is treated to be reflective, wherein a lower edge of said angled surface is higher than the bottom of said two or more grooves, thereby defining a step at said terminal end of said two or more grooves; and said step having a register surface adjacent said angled surface at said terminal end of each groove, said register surface configured to abut said end face of said optical conduit to align said end face axially with respect to said angled surface.

[0005c] According to third aspect, there is provided a substrate for an interposer comprising: at least one groove having a terminal end and adapted to receive an optical conduit having a substantially perpendicular end face; an angled surface defined in said substrate and traversing said at least one groove at said terminal end, at least a portion of said angled surface is treated to be reflective, wherein a lower edge of said angled surface is higher than the bottom of said at least one groove, thereby defining a step at said terminal end of each groove; and said step having a register surface adjacent said angled surface at said terminal end of said at least one groove, said register surface configured to abut said end face of said optical conduit to align said end face axially with respect to said angled surface.

[0006] The solution is provided by providing an interposer that functions as a substrate for securing optical and/or opto-electrical components while providing a common angled surface for optically coupling multiple optical conduits with multiple optical components. A common angled surface is machined across the grooves and thus, the terminal ends of the grooves can be fashioned with an angled surface in one, readily-performed step. By machining a common angled surface across the grooves in one step, economies of scale are realized and there is substantial continuity among the different angled surfaces. In one embodiment, the angled surfaces are defined in the substrate prior to the substrate being diced from the wafer in which they are formed. In such an embodiment, the dicing wheel may cut across not only the grooves on a substrate, but cut across the grooves on different substrates in one process step.

[0007] The interposer comprises a configurable angled surface for optically coupling the fiber with an optical component. In one embodiment, the interposer comprises a substrate having (a) a plurality of grooves having a terminal end, each optical conduit being disposed in a single groove; and (b) a common angled surface traversing two or more of said grooves at said terminal end, at least a portion of the angled surface is treated to be reflective.

[0008] Disclosed herein~~Another aspect of the invention~~ is a subassembly comprising the interposer integrated with an optical component and fiber. In one embodiment, the subassembly comprises: (a) a plurality of optical conduits, each having an optical axis; (b) a substrate defining a plurality of grooves having a terminal end, each optical conduit being disposed in a single groove; (c) a common angled surface traversing two or more of said grooves at said terminal end, at least a portion of the angled surface proximate the optical axes of the optical conduits in said two or more grooves is treated to be reflective; and (d) one or more optical

components disposed above said angled surface, said optical components and said optical conduits being optically coupled by said angled surface.

[0009] ~~Disclosed herein~~ Another aspect of the invention is a process of preparing the interposer. In one embodiment, the process comprises: (a) etching grooves in a substrate to receive an optical conduit, said grooves defining a terminal end in said substrate; and (b) machining an angled surface across two or more of said grooves at their terminal ends.

[0010] The invention will now be described by way of example with reference to the accompanying drawings in which:

[0011] Fig. 1 shows an interposer of the present invention.

[0012] Fig. 2 shows a detailed view of the groove of the interposer of Fig. 1.

[0013] Fig. 3 shows a detailed view of a terminal end of the groove of Fig. 2

[0014] Fig. 4 shows a side view of the terminal end of the groove shown in Fig. 3.

[0015] Fig. 5 shows a cross section of the interposer of Fig. 1 combined with an optical conduit and an OED.

[0016] Fig. 6a shows one embodiment of machining the angled surface of the substrate of Fig. 1 using a dicing wheel.

[0017] Fig. 6b shows a side view of the machining step shown in Fig. 6a.

[0018] Fig. 6c shows a detailed view of the edge of the dicing wheel shown in Fig. 6b.

[0019] Fig. 7a shows an alternative embodiment of a chamfered dicing wheel.

[0020] Fig. 7b shows a detailed side view of the chamfered dicing wheel cutting into a substrate.

[0021] Fig. 7c shows an alternative embodiment of the chamfered dicing wheel cutting into a substrate.