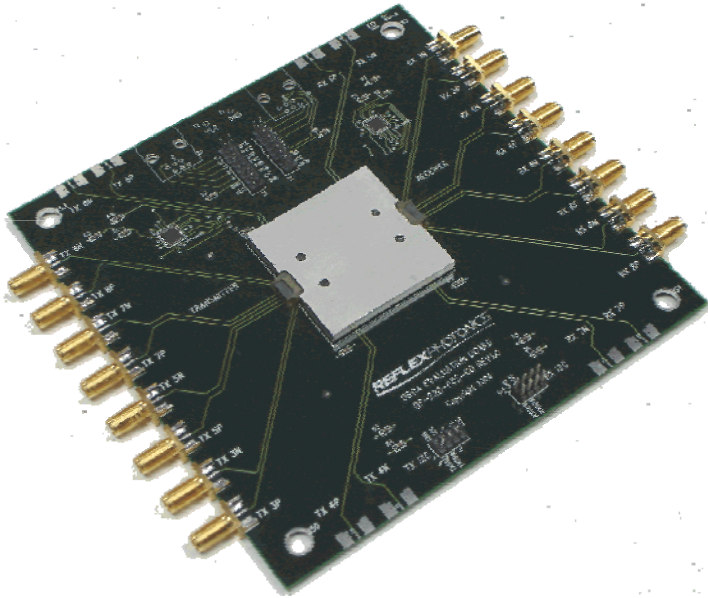


Optically- Enabled Ball Grid Array (OE-BGA) *Light On Board*[™] Technology Demonstrator

Optically Enabled BGA (OE-BGA)



Demonstrator Summary:

Reflex Photonics Optically-Enabled BGA (OE-BGA) semiconductor packaging Technology Demonstrator enables the evaluation of a fiber-to-the-chip interconnection solution. The Technology Demonstrator contains 12 optical transmitter and receiver ports integrated inside cavity down, wire-bondable packages reflowed on an evaluation motherboard. The optical ports are accessible via fiber ribbon cables and industry standard MT connectors.

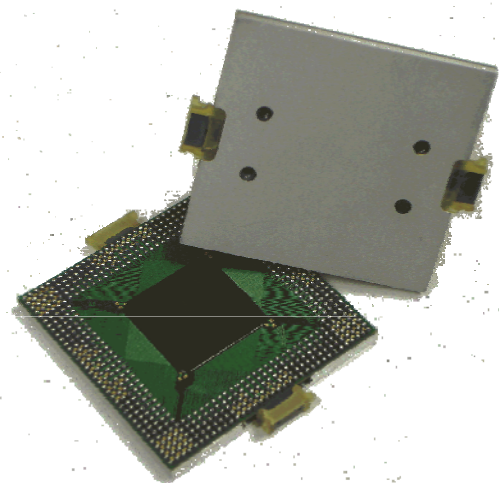
The optically-enabled BGA packages utilize industry proven, semiconductor grade materials for reliable, long-term operations while providing the user flexible design parameters. The packages have been designed to meet the harshest external operating conditions including temperature, humidity and EMI interference and integrate Reflex Photonics next generation, *LightABLE*[™] optical packaging technology.

Key Benefits:

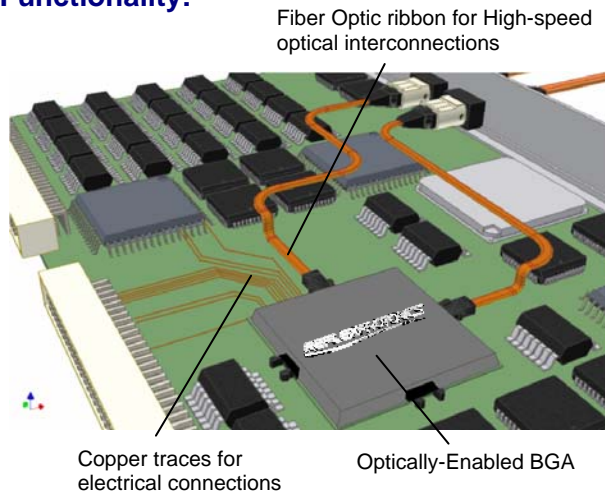
- High-speed Optical Inputs and Outputs Directly to the Chip
- Outstanding high-speed capabilities via *LightABLE*[™] optical technology
- Ideal Package for High-Performance ASICs

OE-BGA Product Highlights:

- Custom packages in body sizes ranging from 35 x 35 mm to 45 x 45 mm
- Inverted Cavity Configuration
- Die sizes up to 400X400 mils
- 352 to 1140 ball count
- 0.8, 1.0 & 1.27 mm ball pitches available
- Superior Thermal Performance
- Up to 24 Optical Input and Output channels in current demonstrator
- Up to 10 Gb/s per channel optical performance
- Excellent Reliability
- Up to 10 Laminate Metal layers
- Optional grounded heat spreader
- Deep Cavity Down Architecture with Multiple Wire Bonding Tiers
- Eutectic of Pb-free versions available



Functionality:



The *Light On Board™* concept is to provide the IC packages with multiple optical inputs and outputs without changing either the microchip fabrication or the standard assembly and test methods used by IC and PCB manufacturers. Ultra-high speed electrical signals can immediately converted into optical signals and passed to the outside world thus eliminating the need to external optics. Both performance and cost issues can then be addressed into the next decade by allowing the ASIC to remain as an all-electrical processing unit where optical fiber is the ultimate conduit of high speed data to and from the microchip.

This “optical fiber directly to the chip package” approach enables applications to remove the need for external optical transceivers and therefore offers 4 key advantages:

- Significantly lower overall system cost
- Increased packaging density
- Increased signal fidelity
- Lower overall system power consumption

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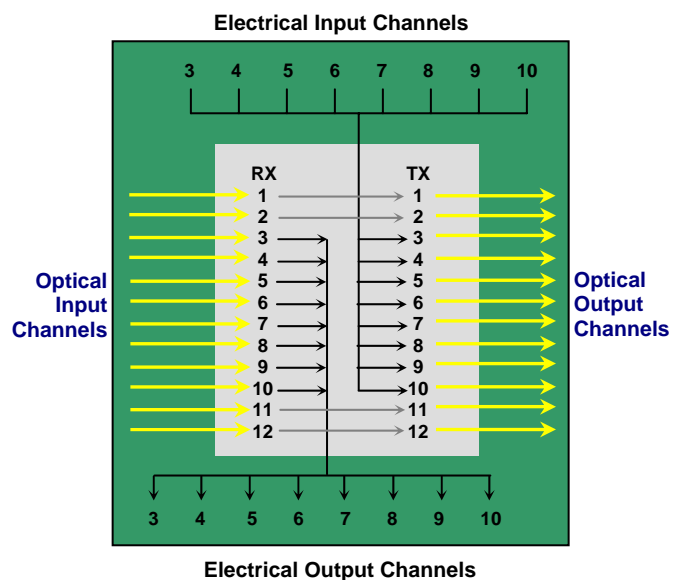
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Application Examples:

- High-speed, high-power semiconductors:
 - ASICs
 - Microprocessors
 - DSP and FPGA requiring high-performance packages.
- Solution for bandwidth, power and space requirements of:
 - Internet Routers
 - Switches
 - Network Servers
 - Systems on a Chip

Functional Description:

As per the diagram below, this high performance optically-enabled BGA Technology Demonstrator offers access to optical and electrical high-speed signal. The Demonstrator contains 8 E-to-O, 8 O-to-E and 4 O-E-O independent channels capable of 10G/s operation. Electrical signals are accessible via the 16 SMA connectors located on the edge of the printed circuit motherboard and the optical signals are accessible via two optical MT connectors located on the side of the optically-enabled OE-BGA package. Each optical connector attaches to a 12 channel optical ribbon cable and one connector/cable is used for transmit channels and the other for receive channels.



Simplified Block Diagram

For more information on this or other products:
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