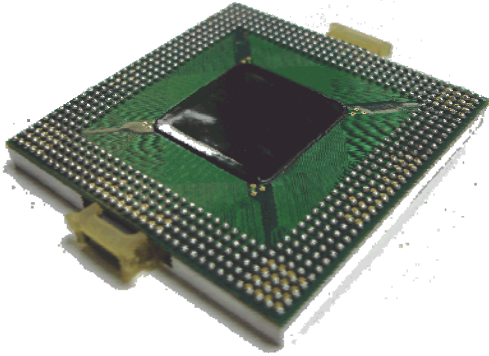


Optically-Enabled Ball Grid Array (OE-BGA) *Light On Board*[™] Cavity Down Package

Optically Enabled BGA



Product Summary:

Reflex Photonics now offers unique semiconductor packaging technology which enables high-speed optical input and output signals to be directly connected to the chip – effectively enabling a Fiber-To-The-Chip solution. This innovative technology incorporates the most advanced assembly processes and allows applications to maximize the bandwidth of semiconductor Integrated Circuits (ICs).

The high performance optically enabled BGA packages are offered in a deep cavity down architecture with multiple wire bonding tiers for power, ground, electrical signals and optical signals. The Integrated Circuit (IC) is mounted on a copper heat spreader and each optical MT connector consists of up to 16 independent transmit or receive optical channels. Each channel is capable of transmitting up to 10Gb/s up to 300m on 50 micron multimode fiber.

Additionally, the optical BGAs utilize industry proven, semiconductor grade materials for reliable, long-term operation 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's 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
- Up to 960 Gb/s of Unidirectional Optical Bandwidth

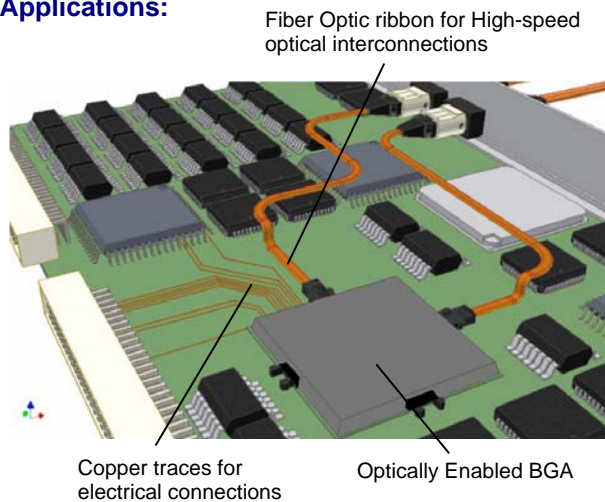
Product Highlights:

- Inverted Cavity Configuration
- Die sizes up to 400X400 mils
- 352 to 1140 ball count
- Custom packages in body sizes ranging from 35 x 35 mm to 45 x 45 mm
- 0.8, 1.0 & 1.27 mm ball pitches available
- Superior Thermal Performance
- Up to 96 Optical Input or Output channels
- 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

Applications:

- 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

Applications:



Reflex's concept is to provide the IC package 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 from the microchip are 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 microchip 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 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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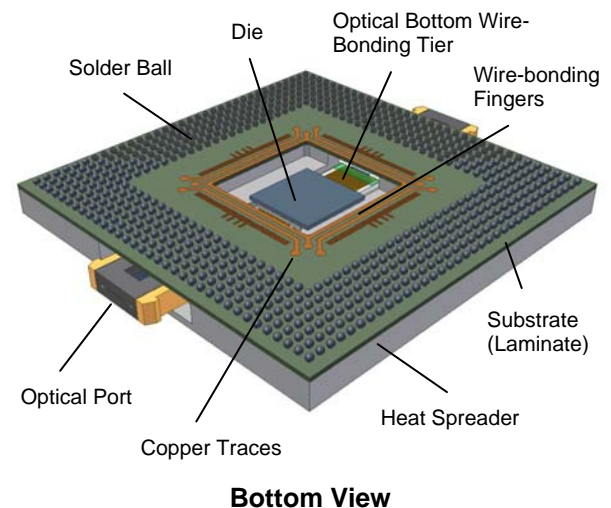
www.reflexphotonics.com

Specifications:

Die Thickness: 1mm Maximum
 Die Size: 15mmX15mm Maximum
 Wire: Gold (Au) 18 to 30um diameter
 Pad Pitch: 51um (minimum)
 Ball Pitch: 0.8mm, 1mm or 1.27mm
 Solder Balls: 63Sn/37Pb or Sn-Ag-Cu (RoHS Compliant)
 Ball Size: 0.51mm, 0.63mm or 0.76mm
 Ball Inspection: Optical
 Thickness: 4.2mm (excluding solder balls)

Wavelength: 850nm
 Fiber Type: 50um or 62.5um multimode
 Fiber Pitch: 250um
 Bandwidth: up to 10 Gb/s per optical channel

OE-BGA Cross-Section:



Standard Configurations:

| Body Size (mm) | Ball Count | Optical I/O (Channels) |
|----------------|-------------------------|------------------------|
| 35 X 35 | 352, 400, 580, 672 | 48 or 96 |
| 37.5 X 37.5 | 584, 812 | 48 or 96 |
| 40 X 40 | 432, 560, 600, 672, 900 | 48 or 96 |
| 42.5 X 42.5 | 500, 836 | 48 or 96 |
| 45 X 45 | 600, 900, 1140 | 48 or 96 |

For more information on this or other products:
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 by email at sales@reflexphotonics.com