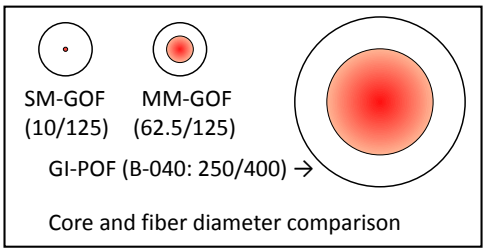
OM-Giga-B040

Gradient-Index Plastic Optical Fiber

OM-Giga-B040 is a PMMA-based GI-POF for ultra-high bandwidth (> 10 Gbps) very short distance applications. Its outer diameter is 400 μm with the effective core diameter of 250 μm and its optical and physical properties are as follows:

Property	OM-Giga-B040	Remarks
Diameter (core)	400 (250) ± 20 um	95% confidence interval
Tensile Strength	> 12 N	at break
Bending Radius	0.5 mm	360° turn
Operating Temperature	-30 ~ 70 °C	
Attenuation at 655 nm	< 240 dB/km	measured by OTDR
Bandwidth	> 75 Gbps-m	

As the global demand for bandwidth continues to grow explosively, new application areas emerge that require the use of optical fibers. Such application areas include optical interconnects for networking equipment and hybrid cables for mobile devices. Although glass optical fibers can be used for such applications, GI-POF offers numerous advantages over multimode or single mode GOF.



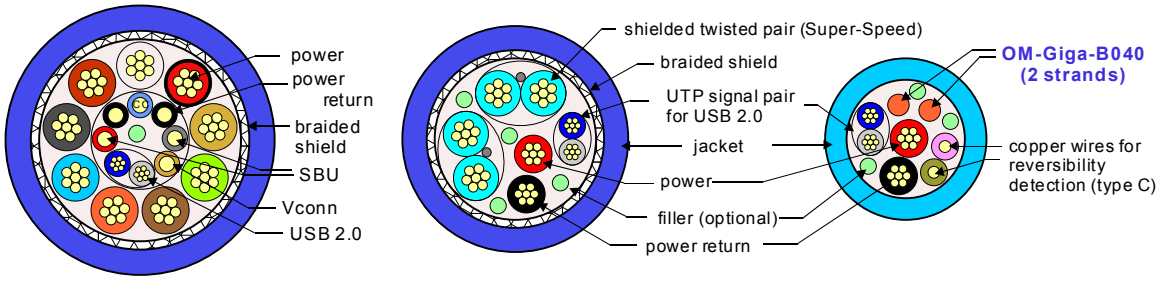
Core and fiber diameter comparison

Optical Interconnects: Ever-growing bandwidth requirements for networking equipment demand EMI-free, compact, light-weight, and most of all, low-cost interconnects for rack-to-rack, board-to-board, and chassis-to-chassis connections. Optical interconnects that are made of multiple strands of OM-Giga-B040 can meet such requirements especially when the application length is shorter than 10 meters. Its outer diameter of 400 μm is large enough allowing B040 to retain all the advantages of a POF such as easy handling and flexibility, yet it is small enough to make the cable compact and light. Furthermore, the large core dimeter of 250 μm, that is 4 times larger than that of MM GOF as shown in the figure, allows more forgiving tolerances when aligning transceivers with the fiber. This larger alignment tolerances enable cheater connectorization and cheaper transceivers while maintaining ultra-high bandwidth.

Hybrid cables for mobile devices: Hybrid cables such optical HDMI cables have long been used for some special applications requiring a long distance connection (> 10 m). To date, GOFs have been used mostly to make such hybrid cables. However, recent advancement of mobile devices now offers significant opportunities for hybrid cables even for very short distance applications (< 2 m). USB 3.1-type C cable is such an application.

USB cable that was introduced for human input devices such as keyboards and joysticks more than 20 years evolved into Hi-Speed USB 2.0 in 2001 to support a data rate of 480 Mbps. The USB 2.0 cables are ubiquitous as they are broadly used to interconnect mobile devices as well

as to charge such devices. Now that the communication speed of mobile devices has become extremely fast even supporting ultra-high definition displays (4K resolution and beyond), USB has also evolved into Super-Speed USB 3.0 in 2009 supporting 5 Gbps data rate and further into Super-Speed^{+} USB 3.1 in 2014 for 10 Gbps.

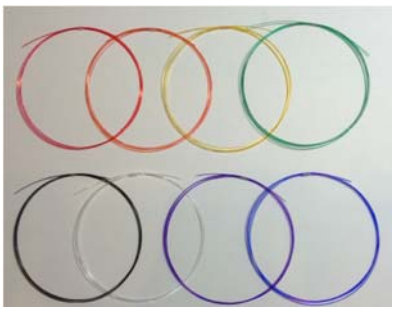


USB 3.1 w/ DP (generation 2) | USB 3.1 w/o DP (generation 1) | Hybrid cable (w/o DP) (B040 replaces Super-Speed Pairs)

Furthermore, VESA has adopted USB 3.1 type C (USB-C) for their DP (DisplayPort™), and major consumer electronics manufacturers are apparently beginning to incorporate it into their products (e.g., Apple's Retina McBook, Google's Chromebook Pixel). Consequently, demand for USB-C cables is expected to grow rapidly. As the USB-C cables will be mostly for mobile devices, compactness or small diameter of the cable is of utmost importance. As the figures given above indicate, however, it is virtually impossible for copper cables to be thin if they are to meet all functional specifications for USB-C. Hybrid USB-C, however, can be very compact as thin optical fibers replace the bulky super-speed shielded differential pairs. Furthermore, optical fibers enable elimination of braided shield thereby making the cable even more compact and flexible. B040 has proven to be very appropriate for such application. Its optimized outer diameter and the core dimeter offer all the advantages of POF.

The hybrid cable shown in the figure is without the DP functionality. However, addition of more B040 to impart the DP function will not increase the cable diameter significantly. As B040 is a PMMA-based GI-POF, the most appropriate Tx is 650 or 680 nm VCSEL (or LD). However, 850 nm VCSEL can be also used if the application length is shorter than 2 m. Furthermore, the bandwidth of B040 at this short length will be greater than 20 Gbps.

Available products: Transparent and color coded bare fibers (in red, orange, yellow, green, blue, purple and black) are available in units of 1 km.
Custom-made hybrid cables are also available for large quantity orders.



Various colors of OM-Giga-B040

Hybrid USB 3.1 (Gen 1)
B040 X 2 + 32AWG X 2 + 30AWG X 1P + 26AWG X 2

Contact information: Optimedia, Inc.
204 Byuksan Technopia, 560 Dunchon-daero, Jungwon-gu,
Seongnam-si, Gyeonggi-do, 13230, Korea
Phone : +82-31-737-8151 Fax : +82-31-737-8150
support@optimedia.co.kr (www.optimedia.co.kr)