

GIGALIGHT Marketing Report Special Issue on Immersion Cooling

2022 Q3 Vol.7

New Products

DAC Immersion Cooling DAC



Following the great success of immersion cooling optical modules, GIGALIGHT recently announced a breakthrough in the immersion cooling DAC product line and introduced three immersion cooling interconnect DACs for liquid-cooled servers.

- 25G SFP28 DAC
- 100G QSFP28 DAC
- 100G QSFP28 to 4X25G SFP28 DAC

Immersion cooling DACs are technically more complex than immersion cooling optical modules. High-speed DACs undergo several changes in 5-parameters when immersed in liquid. The goal of immersion cooling DAC development is to overcome the adverse effects of changes on signal interconnections.

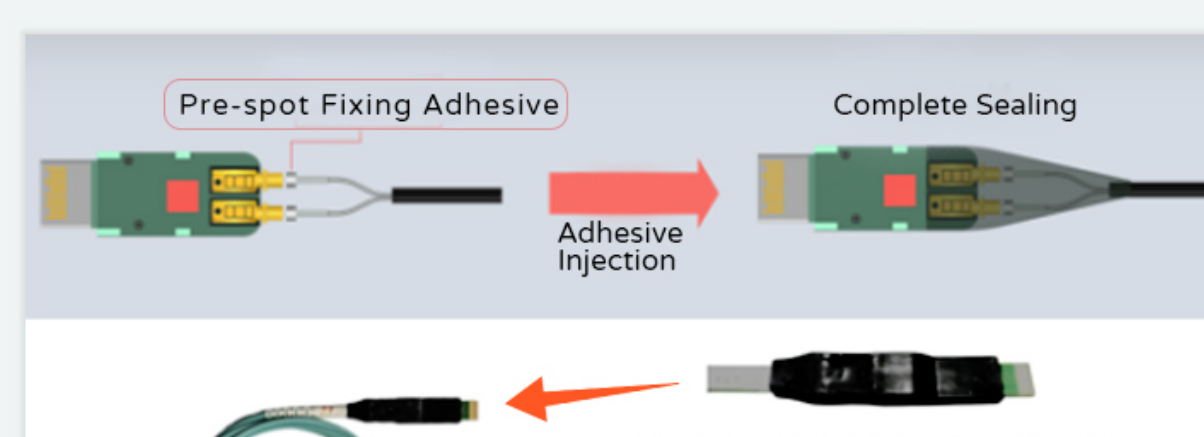
GIGALIGHT will demonstrate these R&D results at ODCC2022 and CIOE2022.

Extended Reading

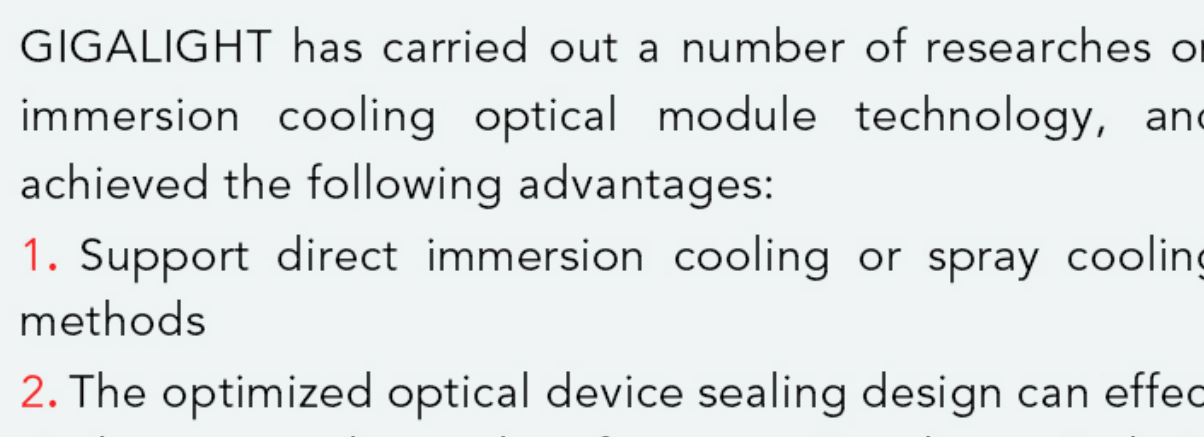
Immersion Cooling

Immersion cooling is a full immersion solution using insulating liquid as the coolant. The heat is directly transferred from server to coolant, the coolant then undergoes secondary heat exchange with the coolant sent in from the primary side. The final round of returned water from primary side undergoes heat exchange with the atmosphere or is directly used for warm water heat recovery and waste heat utilization. This architecture is called immersion cooling architecture.

Due to the direct contact heat exchange of the secondary side, and no assistance of precision air conditioning and compressor cooling is required during the whole process, the overall PUE can be controlled between 1.05 and 1.07.



GIGALIGHT Immersion Cooling Product Advantages

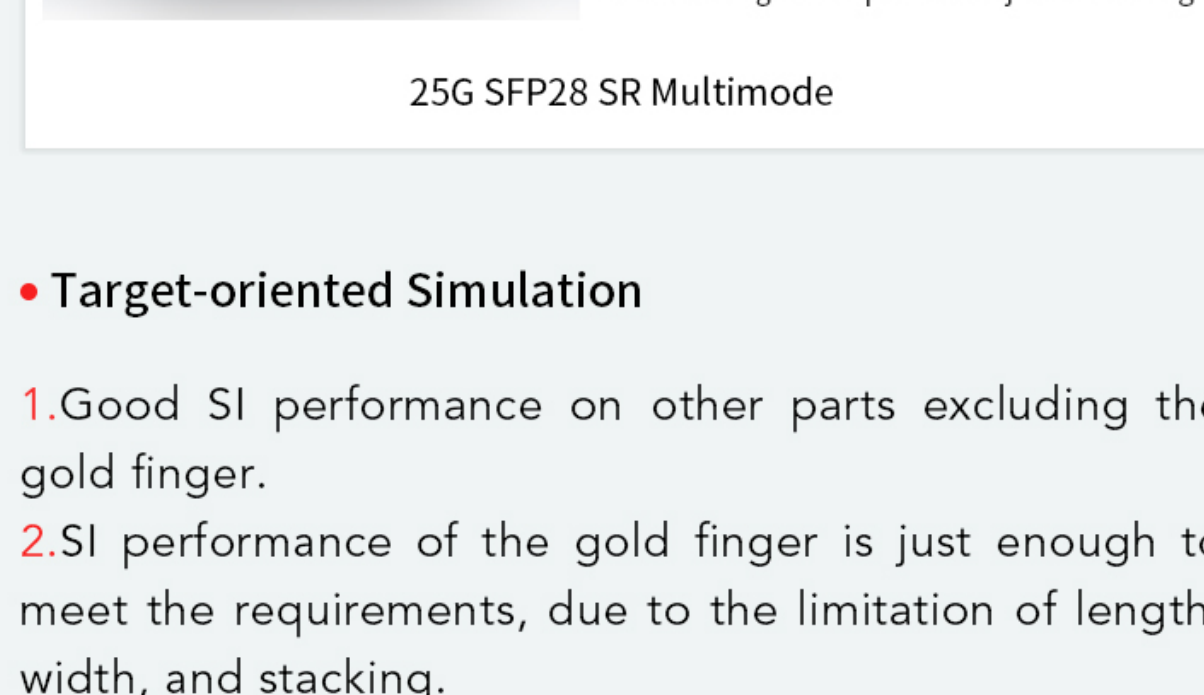


GIGALIGHT has carried out a number of researches on immersion cooling optical module technology, and achieved the following advantages:

1. Support direct immersion cooling or spray cooling methods
2. The optimized optical device sealing design can effectively prevent the coolant from entering the optical circuit, thereby preventing the solution from affecting the optical circuit
3. Passing the 72-hour of 0.5 kg coolant pressurization test (to enhance coolant fluidity), proving that the product has high reliability and ensures long-term business stability
4. Temperature of the immerse cooling environment ranges from 10°C to 55°C, while the working depth of coolant can be deeper than 1m. The material selection of the optical module meets the long-term compatibility requirements of liquid cooling

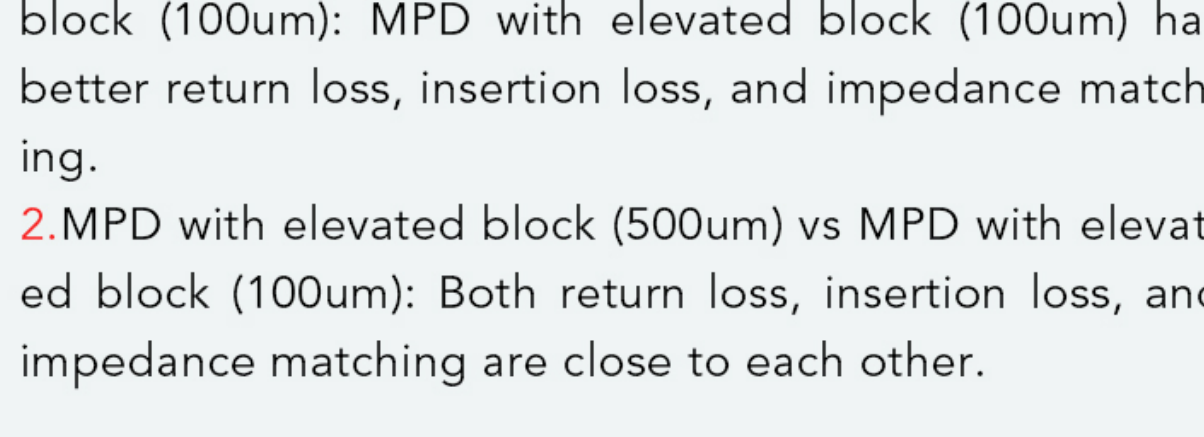
Key Technologies of GIGALIGHT Immersion Cooling

Internal Structure



Target-oriented Simulation

1. Good SI performance on other parts excluding the gold finger.
2. SI performance of the gold finger is just enough to meet the requirements, due to the limitation of length, width, and stacking.



Summary:

1. MPD without elevated block vs MPD with elevated block (100um): MPD with elevated block (100um) has better return loss, insertion loss, and impedance matching.
2. MPD with elevated block (500um) vs MPD with elevated block (100um): Both return loss, insertion loss, and impedance matching are close to each other.

Suggestions:

Adopt 100um height on MPD with elevated block.

4 gold wires can be used since the impeded height of gold wires is high (space needs to be evaluated).

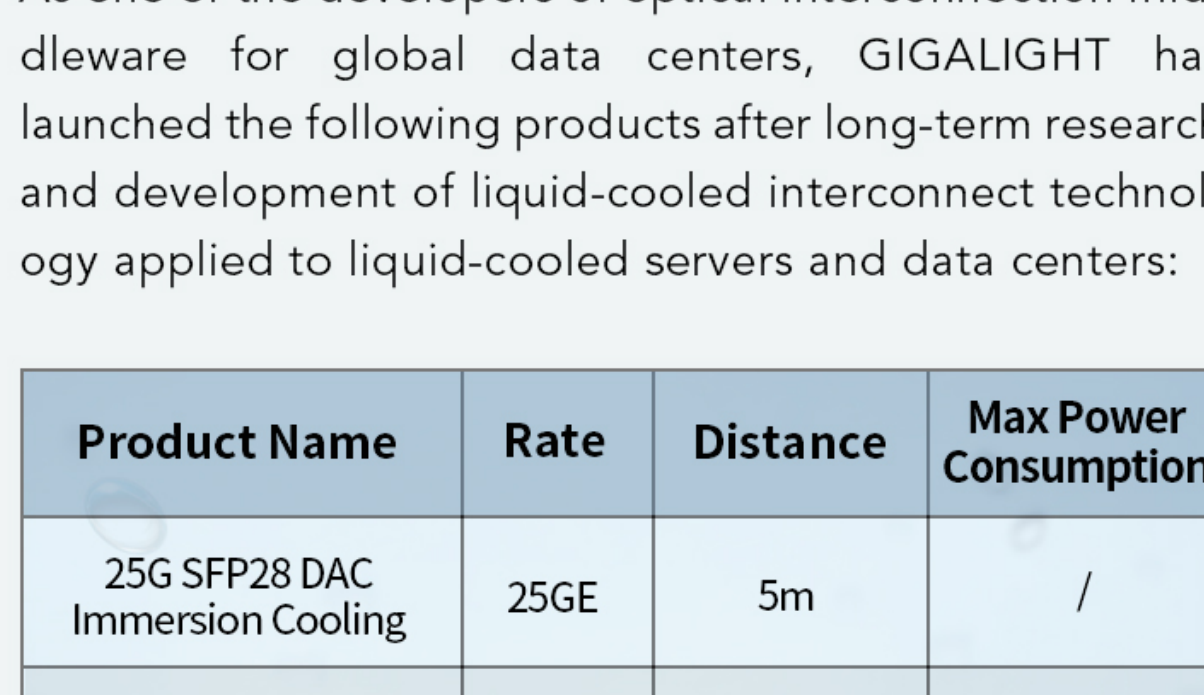
COC differential pair impedance is high (about 54.3ohm), therefore widening the line width can be considered.

Verification

There are two common coolants used for verification, 3M fluorinated fluid and silicone oil. Characteristics are as follows:

1. 3M Fluorinated Fluid: 1-methoxy-nonafluorobutane, C4F9OCH3, which is non-flammable and expensive
2. Silicone Oil: polydimethylsiloxane, with high viscosity and certain flammability

Experimental Standards: Liquid-cooled optical modules immersed in the laboratory environment for a cumulative 6 months without sudden changes in performance



Passed the 72-hour 0.5 kg coolant pressurization test (to enhance coolant fluidity), which proves that the product has high reliability and ensures long-term business stability

The Product Line of GIGALIGHT Immersion Cooling Optical Modules

As one of the developers of optical interconnection middleware for global data centers, GIGALIGHT has launched the following products after long-term research and development of liquid-cooled interconnect technology applied to liquid-cooled servers and data centers:

Product Name	Rate	Distance	Max Power Consumption
25G SFP28 DAC Immersion Cooling	25GE	5m	/
100G QSFP28 DAC Immersion Cooling	100GE	5m	/
25G SFP28 AOC Immersion Cooling	25GE	100m	/
100G QSFP28 AOC Immersion Cooling	100GE	100m	2W
25G SFP28 SR Immersion Cooling	25GE	100m	1W
25G SFP28 LR Immersion Cooling	25GE	10km	1.5W
100G QSFP28 SR4 Immersion Cooling	100GE	100m	2W
100G QSFP28 PSM4 Immersion Cooling	100GE	2km or 10km	3.5W
200G QSFP56 SR4 Immersion Cooling	200GE	100m	4.5W
200G QSFP56 DR4 Immersion Cooling	200GE	500m	5.5W

Brand Sales

GIGALIGHT — Pioneer of the Liquid Cooling Interconnection Revolution

- Direct immersion liquid cooling method
- Optimized optical device sealing design
- High product reliability to ensure long-term business stability

From \$39.5

Order Now >

From \$66.4

Order Now >

From \$104.5

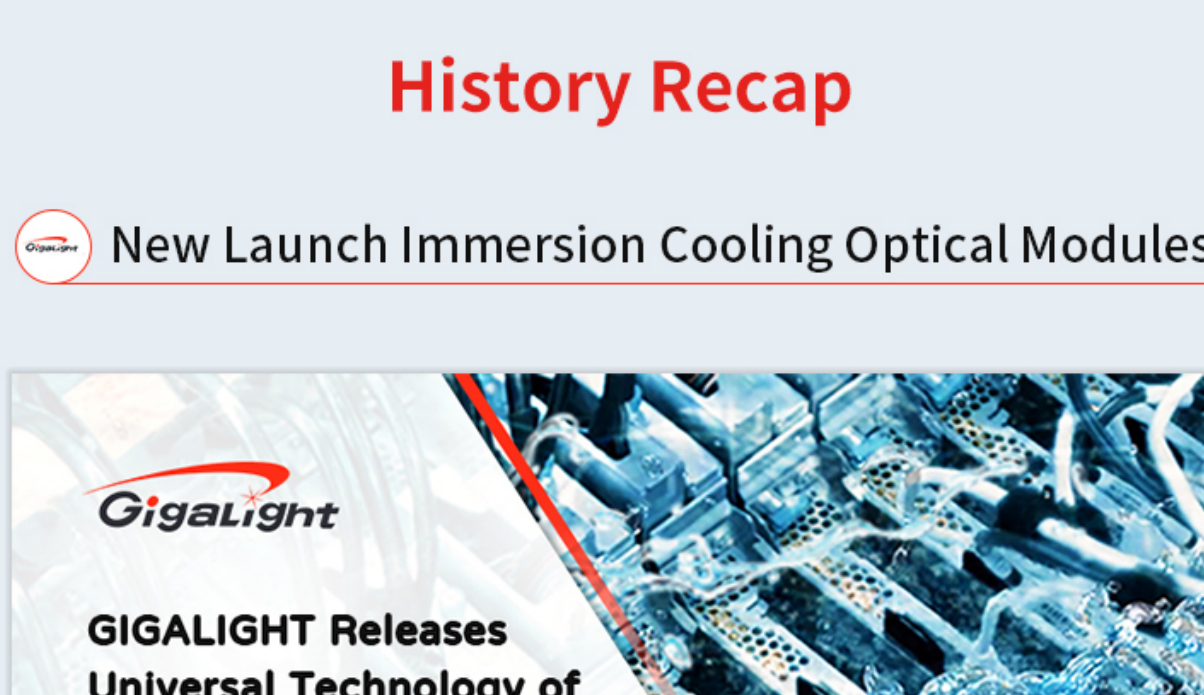
Order Now >

From \$238.0

Order Now >

History Recap

New Launch Immersion Cooling Optical Modules



In July 2021, GIGALIGHT announced the completion of technical research on immersion cooling optical modules. The results are applicable to all data center optical module products developed by GIGALIGHT and can provide high reliability and cost-effective optical interconnect solutions for customers' immersion liquid-cooled data centers.

GIGALIGHT has conducted a number of researches around the immersion cooling optical module technology and realized the following advantages:

- Direct immersion liquid cooling method available
- Adopting optimized optical device design (patent pending), which can effectively prevent the coolant from entering the optical circuit and prevent the solution from affecting the optical circuit
- Passing 72 hours of 0.5 kg liquid pressurization test (to improve the fluidity of the coolant), showing its high reliability and long-term stability of data transmission
- The temperature range of the liquid environment is 10-55°C
- Working depth in liquid can reach deeper than 1m
- Optical transceiver material selection meets the long-term compatibility requirements of liquid cooling

*If you are interested in our products or solutions, please reply to the email directly to explain your needs, and our sales manager will get in touch with you as soon as possible!