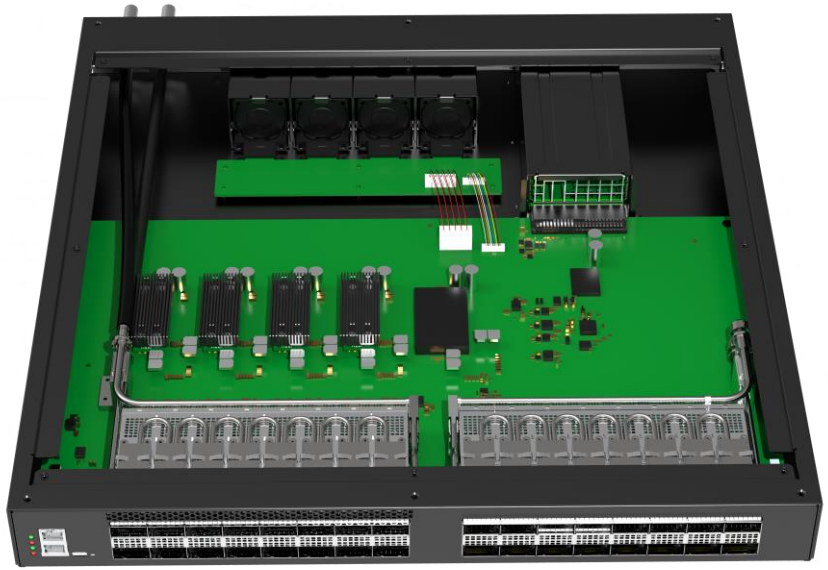
Liquid Cooled OSFP 2×8 Cage Enabling Next-Gen High Power Optical Port

Robbie Xu

Head of US/EMEA Sales and Marketing, Luxshare-Tech



High-Speed I/O Evolving to 224G+





Thermal management is becoming a system-level challenge
Liquid Cooling Is becoming the Data Center Trend

Requirements and Challenges of 224G+ I/O Liquid Cooling

System Thermal Budget

Increasing module power and port density are pushing conventional air cooling to its limits



Compact Integration

Liquid cooling must be integrated into increasingly constrained front-panel space without compromising port density and system accessibility



Thermal Uniformity

Balanced heat removal across multiple high-power ports is essential for stable system operation



Robust Liquid Integration



Reliable sealing and mechanical integration are critical for long-term liquid-cooled system operation

System Level Co Design



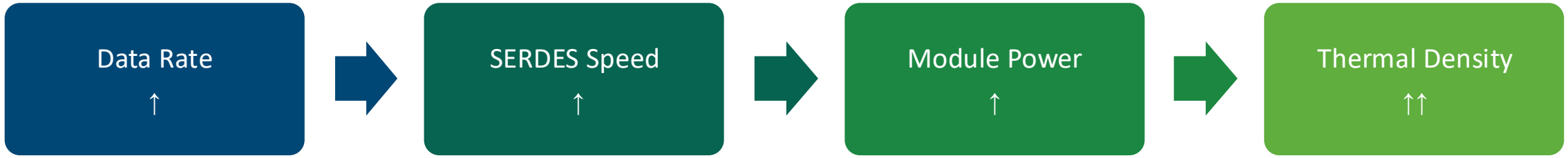
Electrical, thermal and mechanical domains must be optimized together rather than independently

Fast Ramping Up



Capability to Replicate and Deliver OSFP 224G+ Liquid-Cooling Solutions Within 3 Months

High-Speed I/O Is Facing a Growing Thermal Challenge



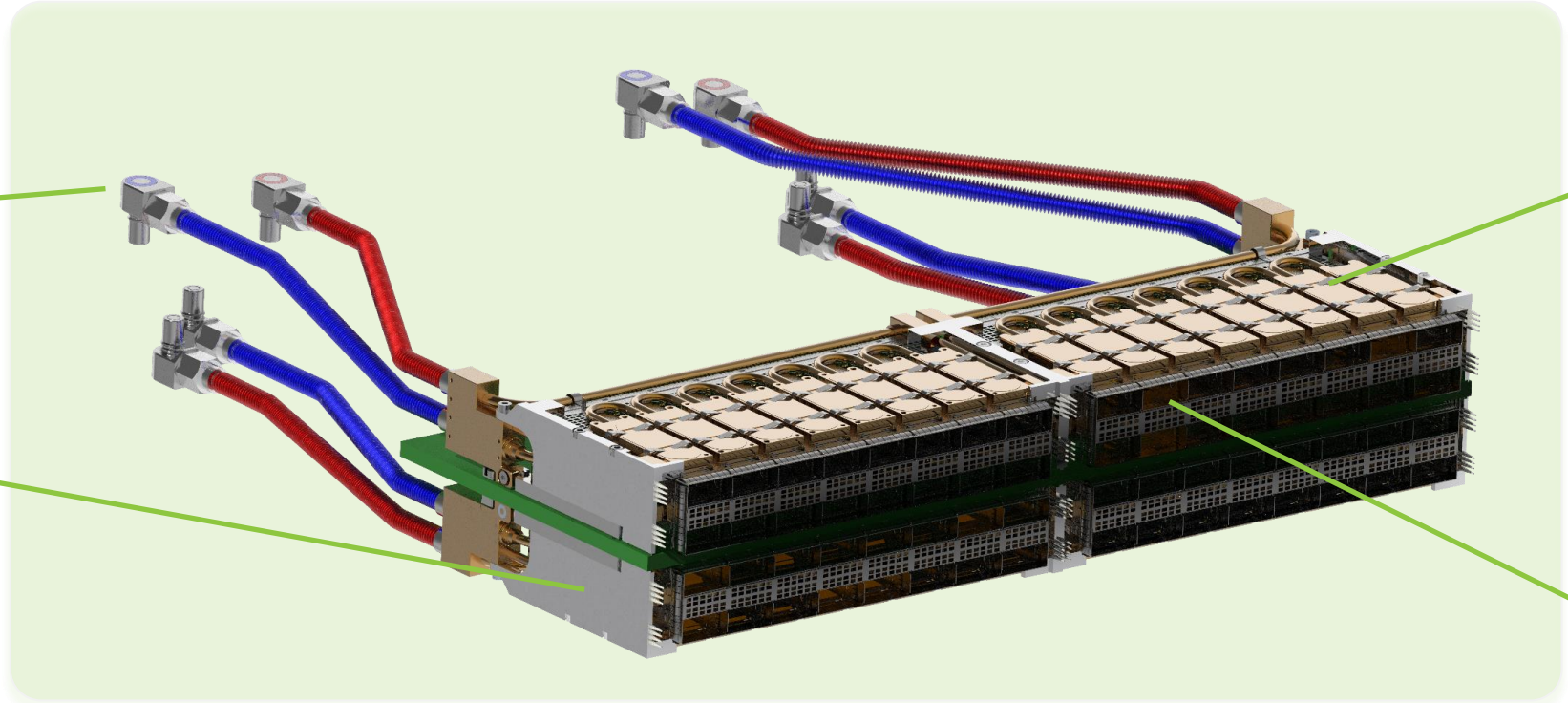
- Higher optical module power
- Higher port density
- Limited airflow
- More complex thermal interaction



Thermal performance is becoming a critical part of high-speed I/O design.

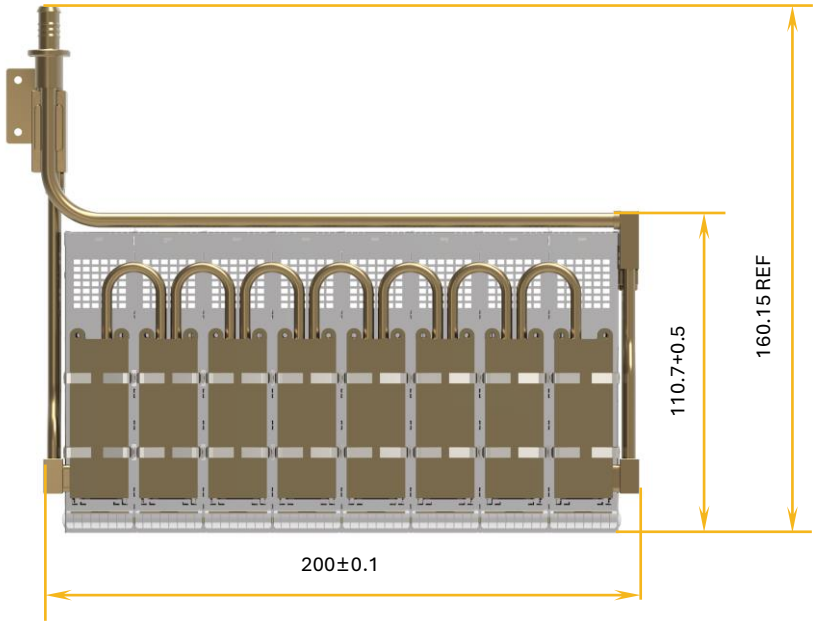
Enabling the Next Generation of High-Speed I/O

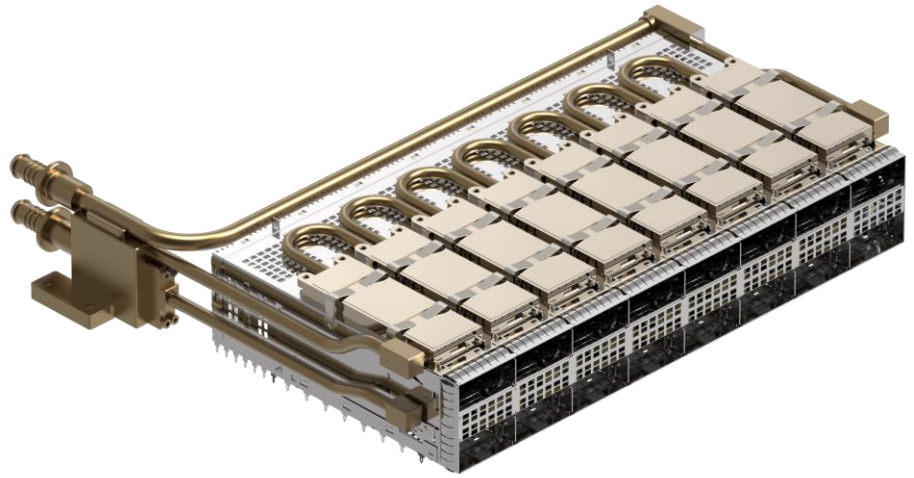
Total Solution for 1.6T OSFP Cold plate
(64 ports belly-to belly application)



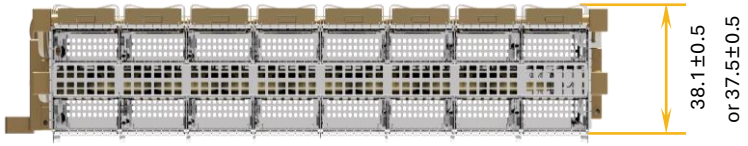
OSFP 224G 2x8 Cage & Cold Plate Assembly

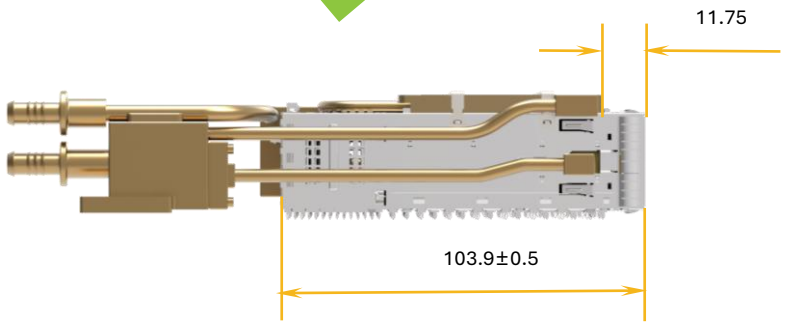
1 Inlet +1 Outlet





Luxshare-Tech patent pending





The overall height of the tested samples is 37.5±0.50 mm.

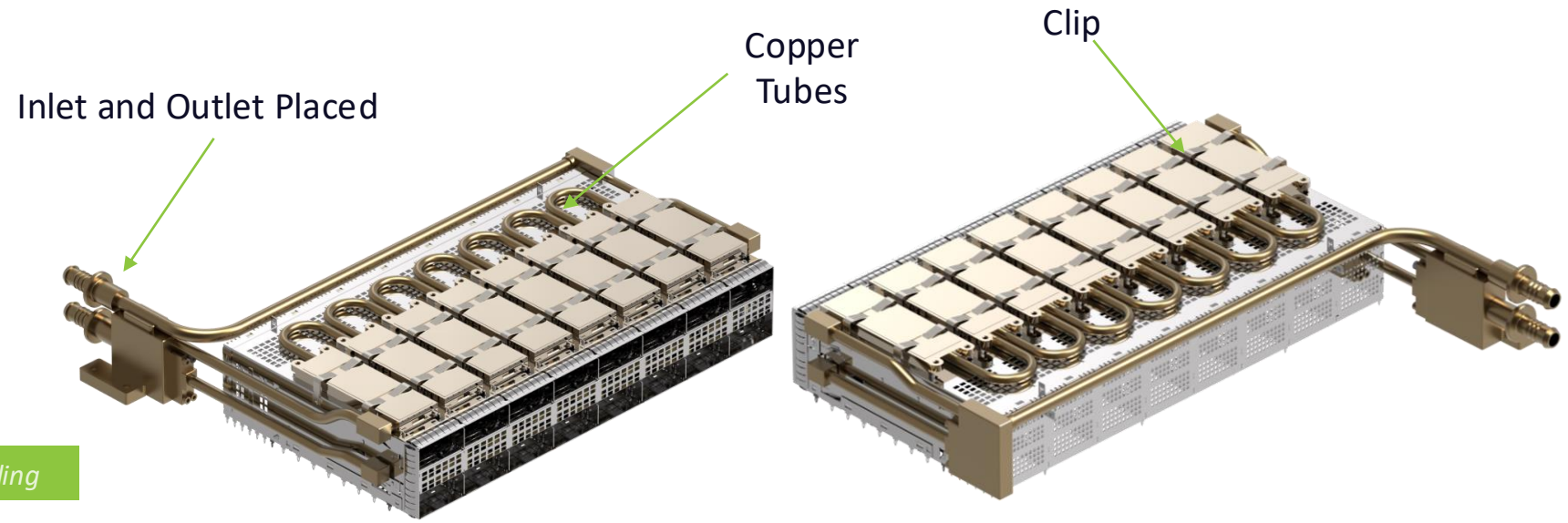
Specifications

- Module Power: 40W
- Module Max. case Temp: ≤ 70℃
- Max Pressure drop to cool 16 OSFP ≤35Kpa
- Flow rate drop to cool 16 OSFP ≤1.15lpm
- Coolant: ≤ 25%GLY
- Coolant inlet temperature: ≤40℃

OSFP 224G 2x8 Cage & Cold Plate Assembly

Key Features

- The heat dissipation module adopts an independent floating structure, with copper tubes connected to each other to ensure its pressure resistance
- The upper cold plate provides downward pressure through traditional clamps to ensure buoyancy and flexibility.
- One step cage and cold plate press assembly
- Single-side inlet/outlet, minimizing system routing complexity and connections.

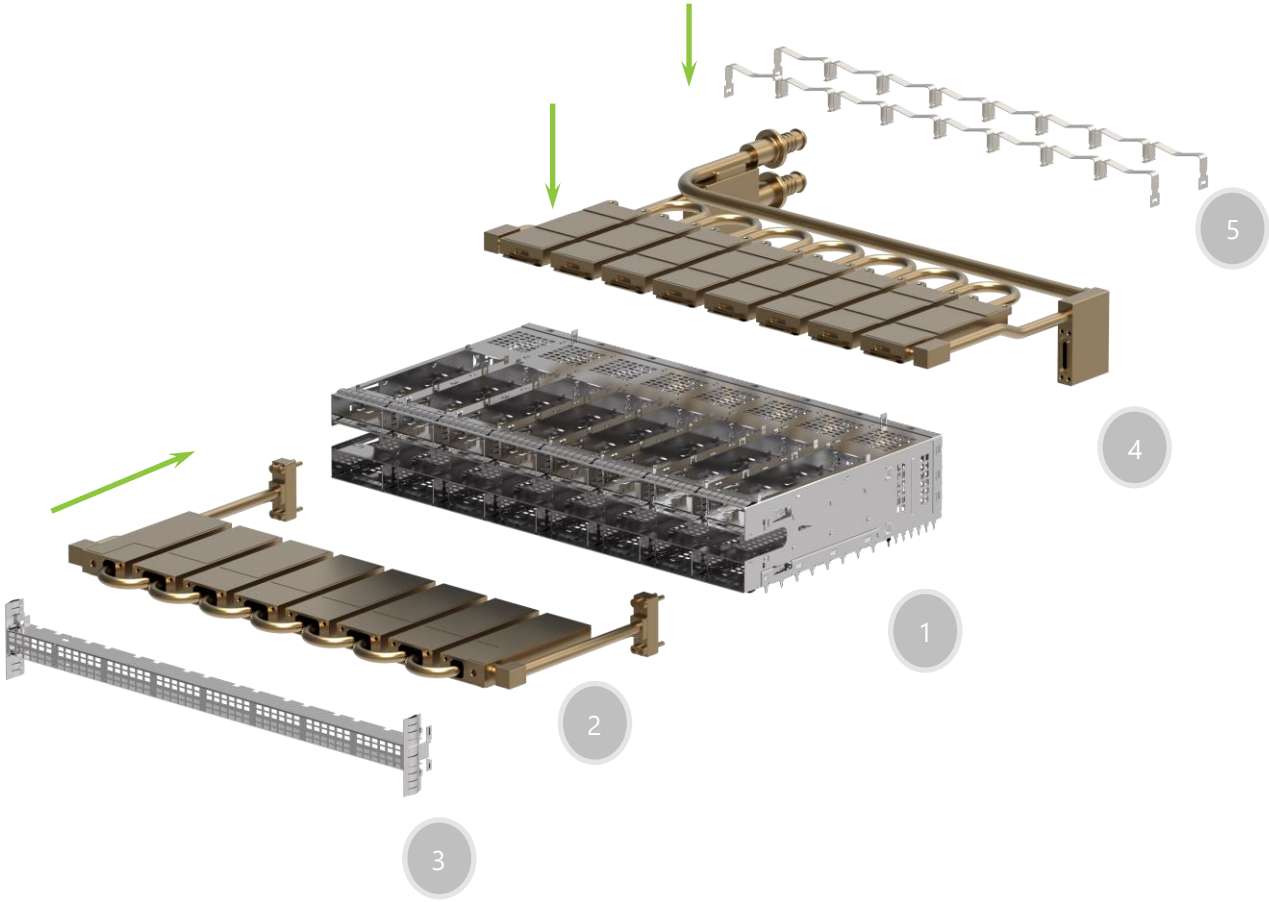


Luxshare-Tech patent pending

OSFP 224G 2x8 Cage & Cold Plate Assembly

OSFP Model Assembly Path



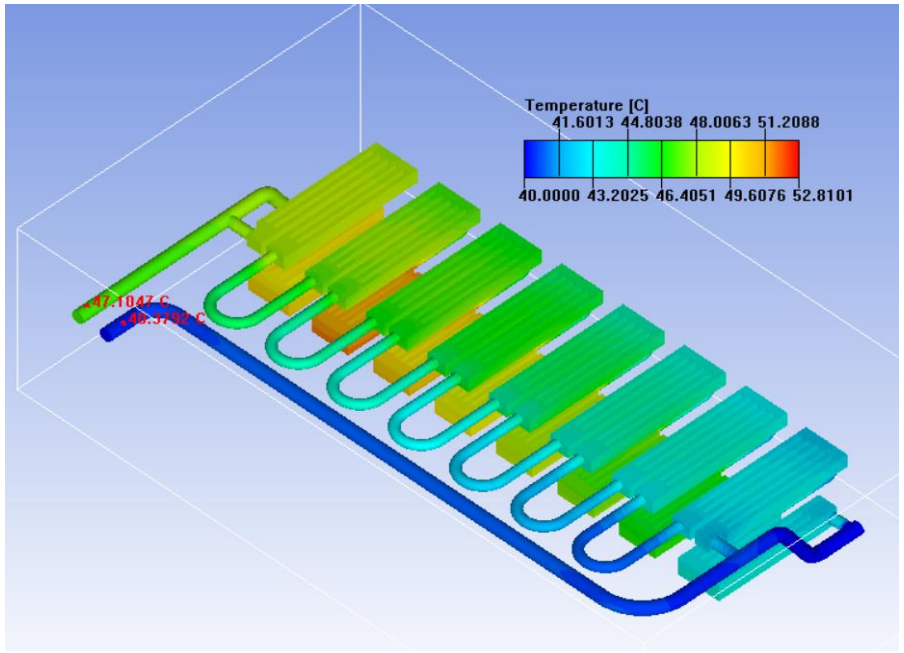


Luxshare-Tech patent pending

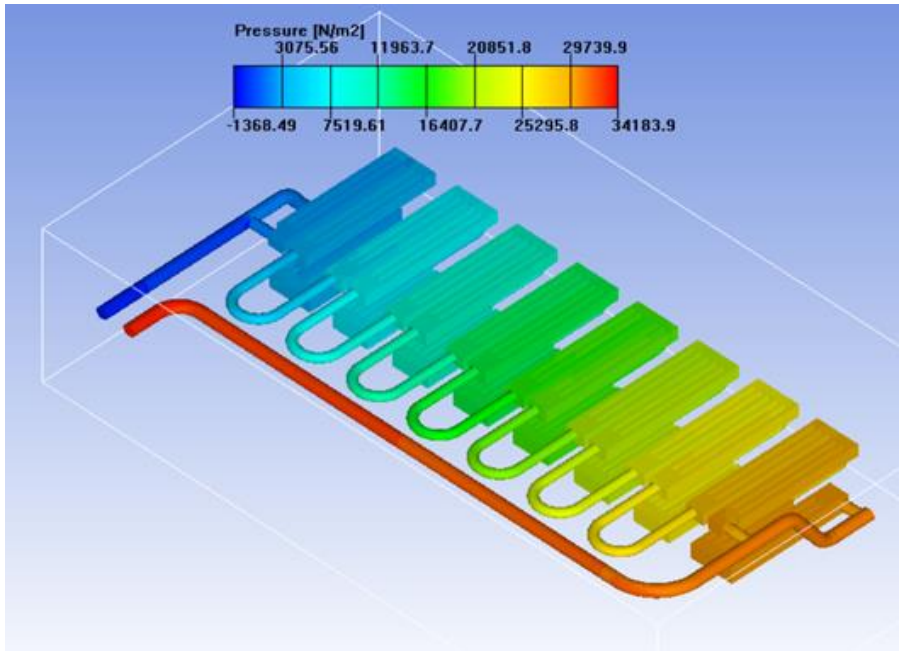
OSFP 224G 2x8 Cage & Cold Plate Assembly

Detailed simulation result: flow field characteristics

Temperature@1.15LPM



Pressure drop@1.15LPM



Simulation result summary

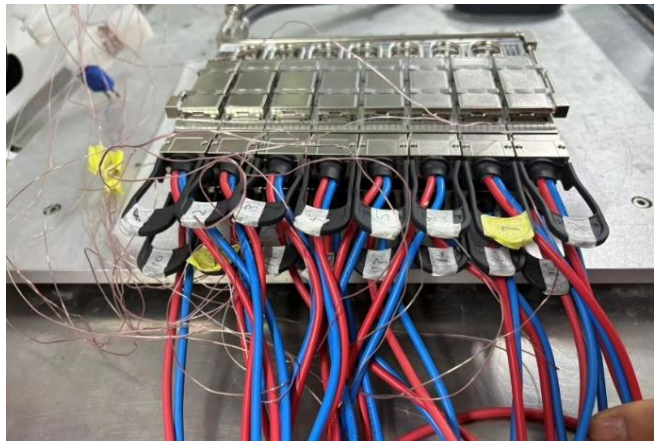
Case ID	Heat loss	Flow rate	Contact Resistance	Equal TIM δ	Equal TIM δ	TIM a	TIM TC	T inlet	T outlet	dT	Max Bottom surface temperature	Corresponding top surface temperature	dT	Max portcase temperature	Rca	Drop pressure
	W	LPM	m2*K/W	mm	W/mK	mm	W/mK	°C	°C	°C	°C	°C	°C	°C	K/W	KPa
Case 1	512	1.15	0.00015	0.15	1	0.15	8.5	40	48.33	8.33	64.96	53.74	11.22	66.35	0.055	34183

OSFP 224G 2x8 Cage & Cold plate Assembly Testing Results

Thermal Performance Test Results

TIM	Stainless Steel Film									
Test Medium	Deionized Water									
Sample	#001	#002	#003	#004	#005	#006	#007	#008	#009	#010
Test Power(W)	16x32W									
Flow (L/min)	1.15									
T1 (℃)	54.5	53.4	55.3	55.1	51	51	54.9	51	51.7	52.8
T2	56.3	52.5	54.8	55.2	50.9	54.4	53.5	55.1	55	56.3
T3	54.2	53.7	58.5	54.3	52.3	61	53.3	51.4	51.7	60.7
T4	52.1	56.4	55.1	54.6	51.5	48.7	52.9	52	55.2	51.8
T5	52	54.2	52.9	51.4	50.8	48.4	50.9	50.6	51.5	54.5
T6	52.6	56	57.2	53.4	53.4	49.7	58.4	52.8	54	54.1
T7	52.3	55.1	62.6	51.3	57.4	56.8	54.5	54.8	53.8	59.5
T8	53	57	53.4	53.4	54.1	49.6	53.4	54.9	56.2	51.5
T9	53.1	50.1	54.5	54.4	48.4	50.4	52	51.1	48.6	51.1
T10	54.8	51.6	54.2	53.3	57.9	51.3	55.5	53.4	50.2	53.3
T11	55.5	52.9	59.3	54.7	60.5	51.9	54.8	50.9	51.3	54.1
T12	52.8	54.5	55.6	54.9	60.8	50.6	51.4	50.8	53.6	51.2
T13	51.8	53.8	53.4	52.7	58.1	50	52.2	58.6	52.5	51.9
T14	51.6	56.5	53.3	52	54.3	49.6	51.3	53.5	53.2	49.6
T15	53.2	53.2	52.4	50.8	58.8	48.6	59.7	52.6	53.2	50.5
T16	54.3	54.7	53	52.4	53.6	49.2	50.4	62.3	53.8	49.7
T17(Inlet temp)	42.1	42.2	42.7	42.1	41.4	41.1	41.4	40.8	42.1	41.2
T18(Outlet temp)	46.3	46.6	47	46.5	45.1	45.1	45.3	45.1	46.5	45.2
MAX	56.3	57	62.6	55.2	60.8	61	59.7	62.3	56.2	60.7
MIN	51.6	50.1	52.4	50.8	48.4	48.4	50.4	50.6	48.6	49.6





Upper Cold Plate：T1~T8
Bottom Cold Plate ： T9~T16

OSFP 224G 2x8 Cage & Cold Plate Assembly Testing Results

Insertion force and Extraction force test meet industry standard



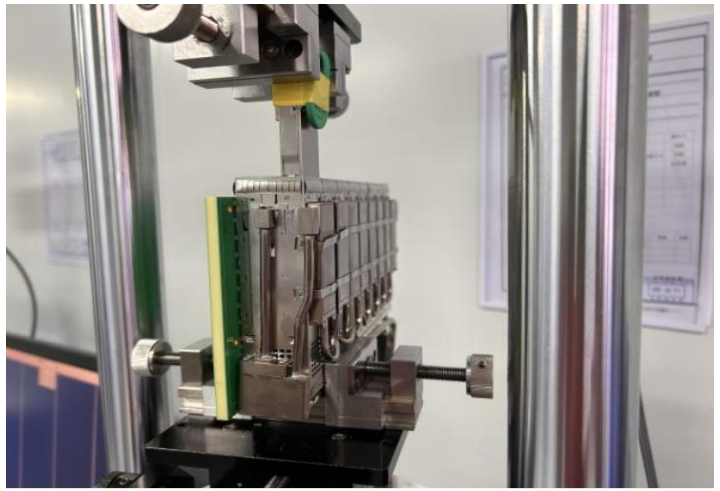


No.	Test Item	Test Requirement		Test Result	
		Test Conditions	Criteria	Result	Pass/Fail
1	Insertion force and Extraction force test	Inflation pressure:75psi Speed: 25.4mm/m in	Insertion force less than 55N. extraction force less than 45N	See Table	Pass

Test item / Sample NO.	Module Thickness Dimension (9.5+0.1/-0.2mm)	Insert force test:<55N	Extraction force test:<45N	Result
1	9.58	28.5	29.3	Pass
2	9.58	41.3	28.4	Pass
3	9.58	38.2	30.5	Pass
4	9.58	36.5	28.4	Pass
5	9.58	40.1	25.3	Pass
6	9.58	35.0	26.9	Pass
7	9.58	34.1	26.8	Pass
8	9.58	28.7	28.3	Pass
9	9.58	41.0	25.8	Pass
10	9.58	37.8	27.0	Pass
11	9.58	37.9	26.7	Pass
12	9.58	34.8	29.7	Pass
13	9.58	32.2	29.2	Pass
14	9.58	35.0	30.4	Pass
15	9.58	39.0	29.4	Pass
16	9.58	33.1	30.9	Pass

OSFP 224G 2x8 Cage & Cold Plate Assembly Testing Results

Durability test meet Industry standards



No.	Test Item	Test Requirement		Test Result	
		Test Conditions	Criterion	Result	Pass/Fail
1	Durability test	Plug and unplug each port **100 times**, and record the insertion and extraction force for the first and last time.	Insertion force less than 55N. extraction force less than 45N	See Table	Pass

Test item	Insertion force/Unit:N(Maximum:55N)		Test Result	Remark
	The first force	The 100th force		
Port-1	34.0	39.3	PASS	Top row 4 Port
Port-2	28.0	27.0	PASS	
Port-3	37.4	45.2	PASS	
Port-4	41.5	52.9	PASS	
Port-5	30.1	39.9	PASS	Bottom row 4 Port
Port-6	30.7	37.3	PASS	
Port-7	31.5	43.3	PASS	
Port-8	39.0	54.4	PASS	

Test item	Extraction force /Unit:N(Maximum:45N)		Test Result	Remark
	The first force	The 100th force		
Port-1	25.7	34.9	PASS	Top row 4 Port
Port-2	27.7	38.9	PASS	
Port-3	27.7	35.1	PASS	
Port-4	27.9	41.3	PASS	
Port-5	24.7	37.4	PASS	Bottom row 4 Port
Port-6	26.4	27.7	PASS	
Port-7	26.1	40.0	PASS	
Port-8	30.2	40.8	PASS	

OCP Demonstrations of Luxshare-Tech Technologies

Please stop by our booth A31



OCP Demonstrations of Luxshare-Tech Technologies

- Please stop by our booth A31
- Live Demos
  - 224G OSFP 2×8 Liquid Cooling I/O
  - 224G OmniStack™ NPC to XPO Airchannel™
  - 448G KOOLIO™ CPC to OSFP I/O with Intrepid™ Nexus 448G Backplane Airchannel™
- Xuanyuan 3.0 AI Rack and SST Rack
  - Xuanyuan 3.0 AI full-rack infrastructure solution is featuring HVDC power supply, liquid cooling, NPC/CPC and XPO/NPO technologies.
  - Solid State Transformer (SST) Rack offers high power density, exceptional efficiency (peak 99%), high reliability power solution for mission-critical AI infrastructure.



Luxshare-Tech Liquid Cooled OSFP 2×8 Cage

- The independent floating structure, with copper tubes connected to each other to ensure its pressure resistance
- One step cage and cold plate press assembly
- Single-side inlet/outlet, minimizing system routing complexity and connections
- Consistent and Proven Thermal Performance across all 16 ports
- Vertically integrated in-house Cold Plate and Cage Design and Manufacturing
- Contact Us:
  - w: luxshare-tech.com
  - e: robbie.xu@luxshare-ict.com


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