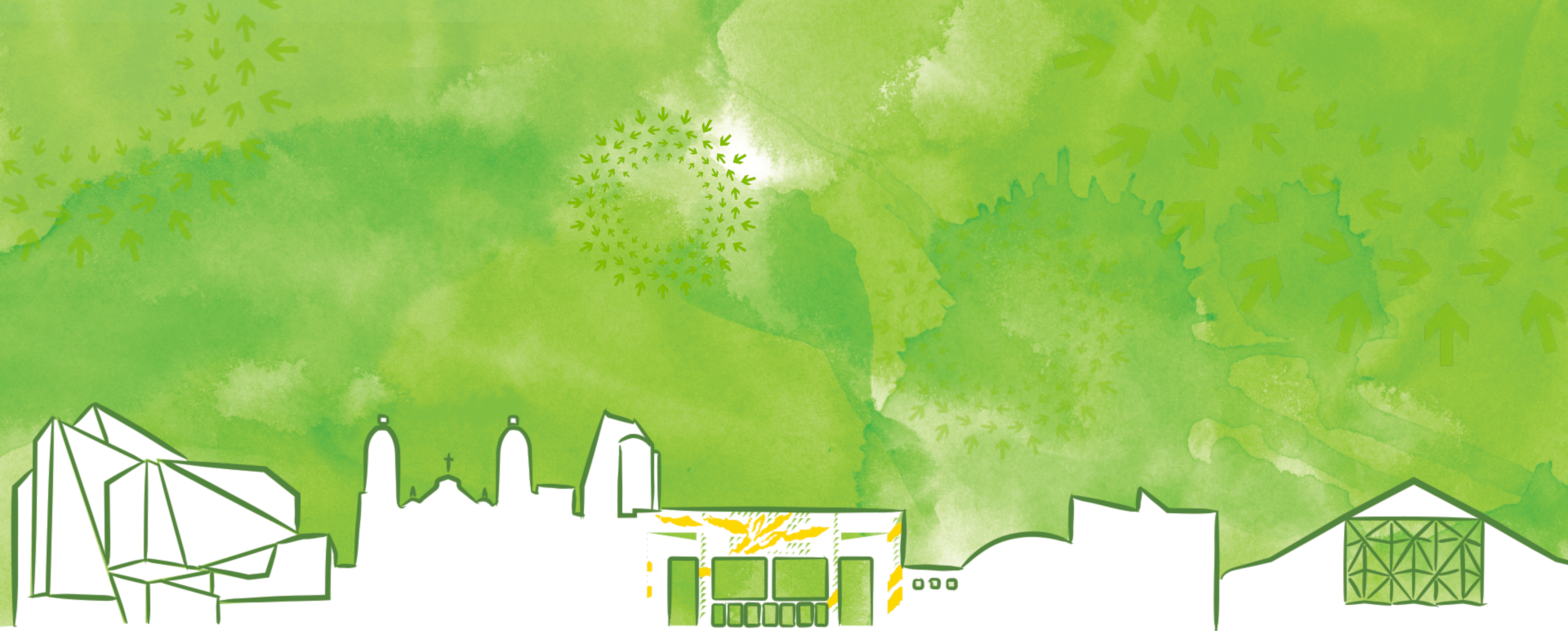




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Mezz 3.0 Specification

Thermal considerations

Yueming Li, John Fernandes
Thermal Engineer, Facebook

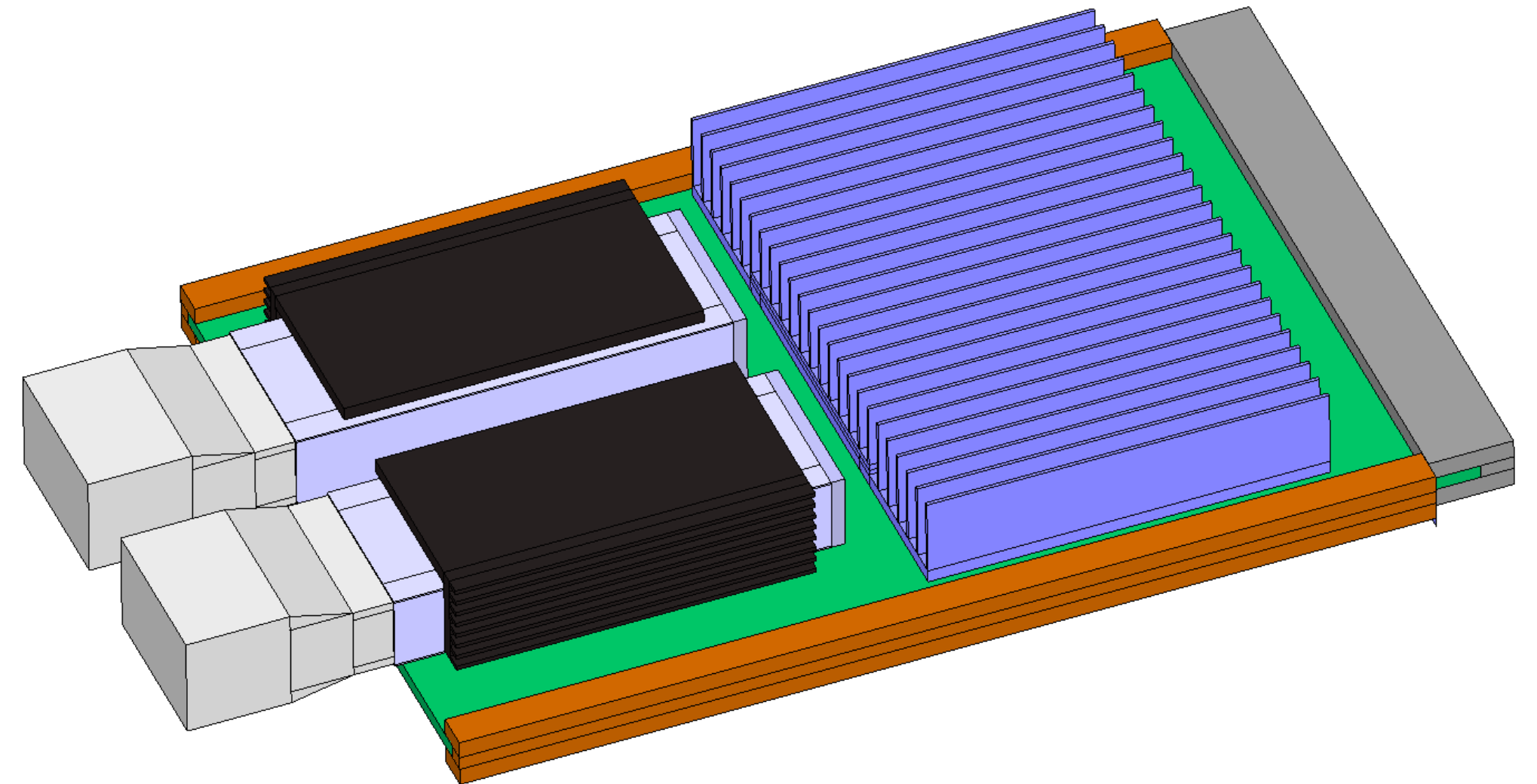
Thermal Boundary in Simulations

- Cold-aisle

- Approach air temperature: 35°C
- ASIC power: 15 ~ 35W
- IO module: 2x QSFP (3.5W each)
- Airflow: 150 ~ 500 LFM

- Hot-aisle

- Approach air temperature: 55°C
- ASIC power: 15 ~ 35W
- IO module: both 2x QSFP (3.5W each) and 4x SFP+ (1.5W each)
- Airflow: 150 ~ 750 LFM



Cold-Aisle Cases

■ Option 14

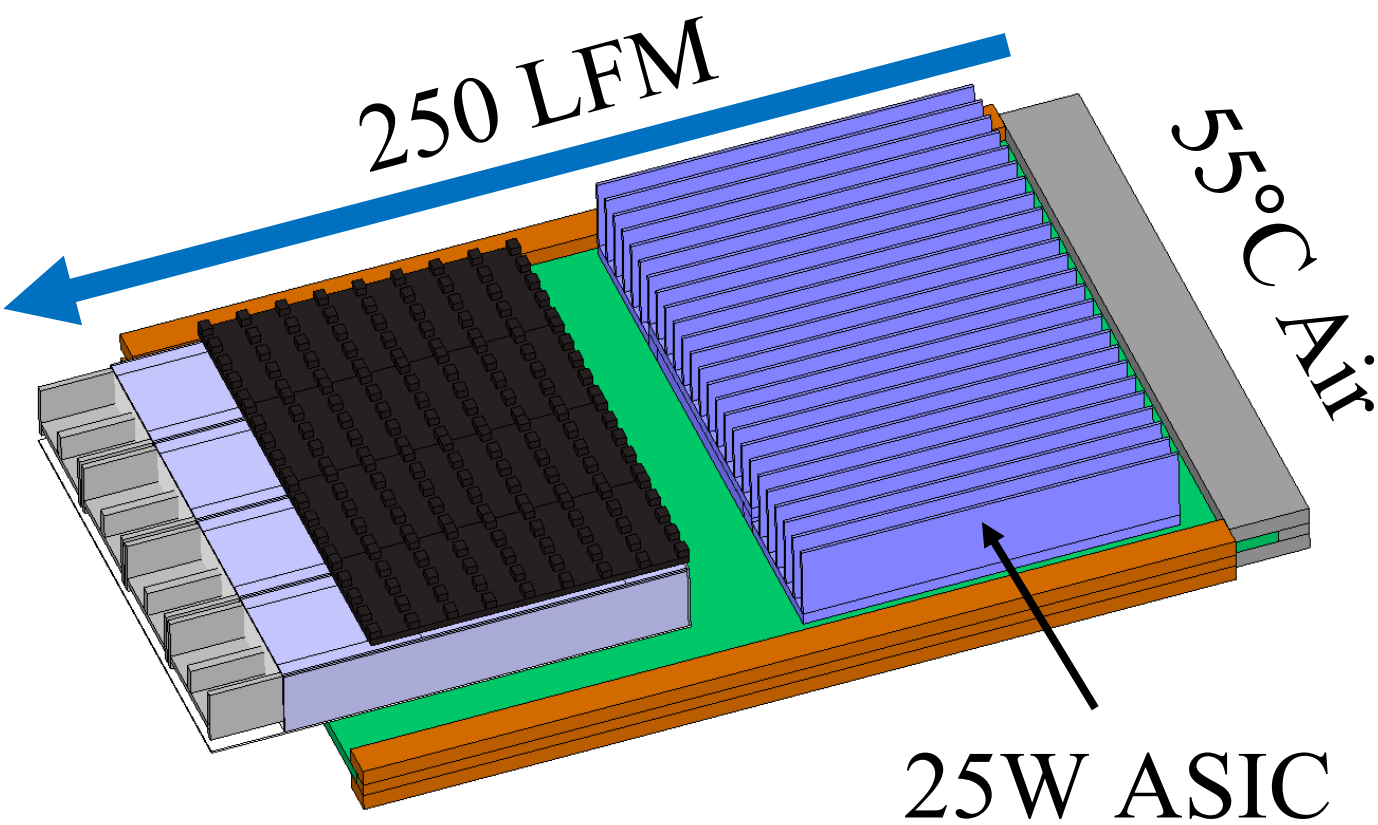
- Improved thermal performance for ASIC compared to options 7 & 13
- Up to 35W of ASIC power can be supported
- Integrated heat sink can help reduce the QSFP temperature

Input parameters		Output parameters												
I/O	ASIC Power (W)	ASIC Tcase_max (°C)						I/O Module Tcase_max (°C)						
		105						70						
		150	200	250	300	400	500	150	200	250	300	400	500	LFM
2x QSFP	15	73.2	67.1	63.3	60.7	57.3	55.0	68.9	63.9	60.7	58.6	55.8	54.0	
2x QSFP	20	83.1	75.7	71.0	67.8	63.6	60.8	69.7	64.3	61.1	58.8	55.9	54.2	
2x QSFP	25	93.1	84.2	78.7	74.9	69.8	66.5	70.4	64.8	61.5	59.0	56.1	54.3	
2x QSFP	30	103.0	92.8	86.4	82.0	76.1	72.3	71.1	65.3	61.8	59.3	56.2	54.4	
2x QSFP	35	113.0	101.3	94.1	89.1	82.4	78.0	71.9	65.7	62.1	59.5	56.4	54.5	

Hot-aisle Cases: I/O Cooling

- For a 25W ASIC, with 250LFM through the NIC

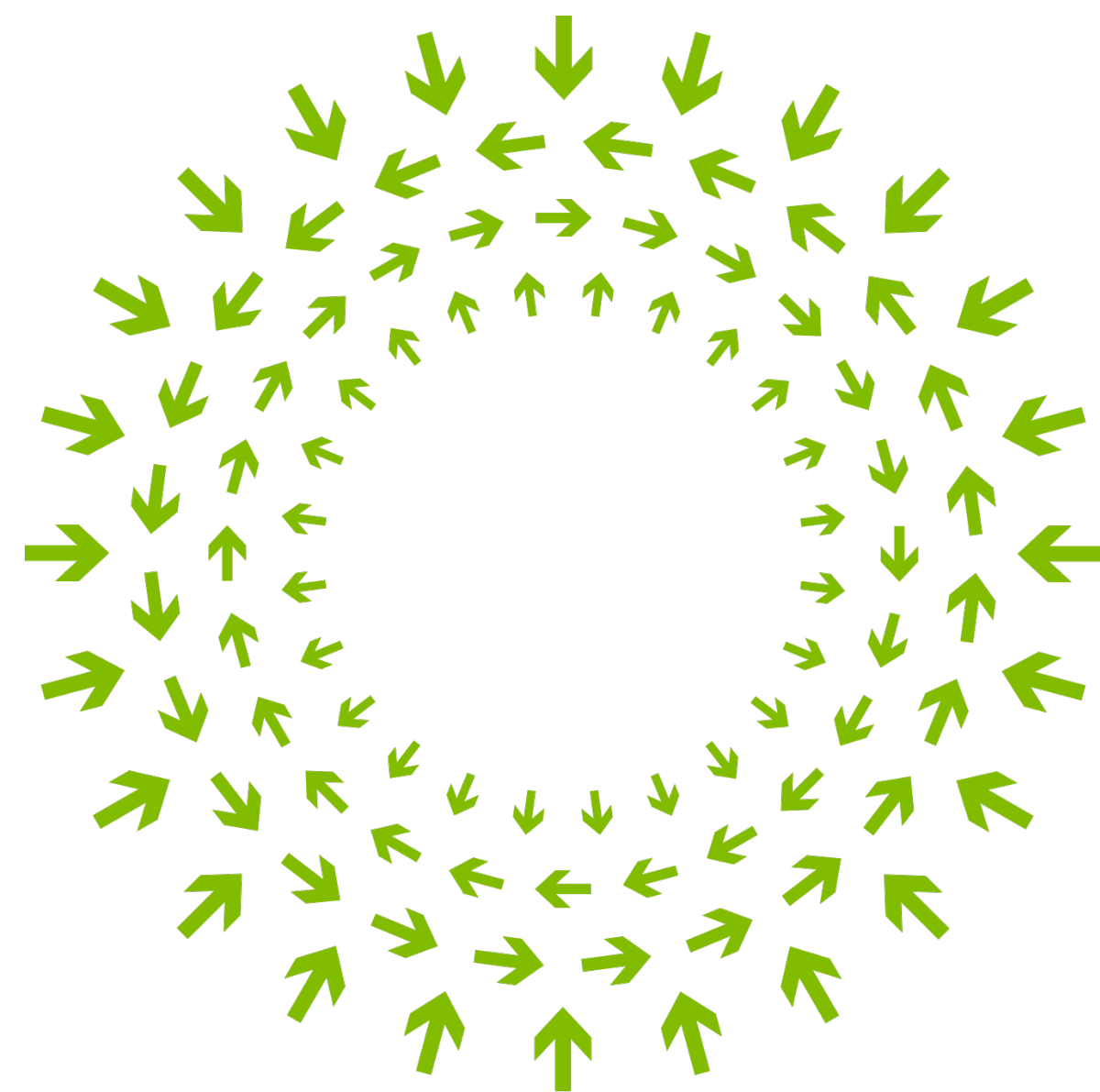
	Dual QSFP+	Quad SFP+
I/O Power (W)	3.5 (x2)	1.5 (x4)
Case Specification (°C)	70 (Commercial) / 85 (Industrial)	
I/O Case (°C)	95.5	89.7
Approach Air (°C)	74.0	78.8



Input parameters		Output parameters														
I/O	ASIC Power (W)	I/O Module Tcase_max (°C)							I/O Module approach air temperature (°C)							
		70 / 85														
		150	200	250	300	400	500	750	150	200	250	300	400	500	750	LFM
2x QSFP	15	102.3	94.2	89.1	85.5	81.0	78.3	74.4	74.1	69.4	66.5	64.6	62.3	60.9	59.0	
2x QSFP	20	107.6	98.2	92.3	88.2	83.1	80.0	75.5	80.2	74.0	70.3	67.8	64.7	62.8	60.3	
2x QSFP	25	113.0	102.2	95.5	90.9	85.2	81.6	76.7	86.4	78.7	74.0	70.9	67.1	64.7	61.6	
4x SFP	15	94.7	87.5	82.9	80.3	76.8	74.3	70.7	77.7	72.8	69.8	67.7	65.1	63.4	61.0	
4x SFP	20	100.1	91.5	86.0	82.8	78.6	75.8	71.8	84.5	78.2	74.3	71.6	68.1	66.0	62.9	
4x SFP	25	105.5	95.5	89.7	85.6	81.0	77.7	72.9	91.3	83.5	78.8	75.5	71.3	68.6	64.7	

To-do's

- Wind-tunnel specification
 - Purpose: NIC vendors can provide standardized thermal test data to system vendors
 - Considering a similar concept as 'PCI-SIG Thermal Reporting'
- Heat sink solution for I/O modules
 - Work with community to evaluate benefits through testing
- Thermal specification for NIC 3.0



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