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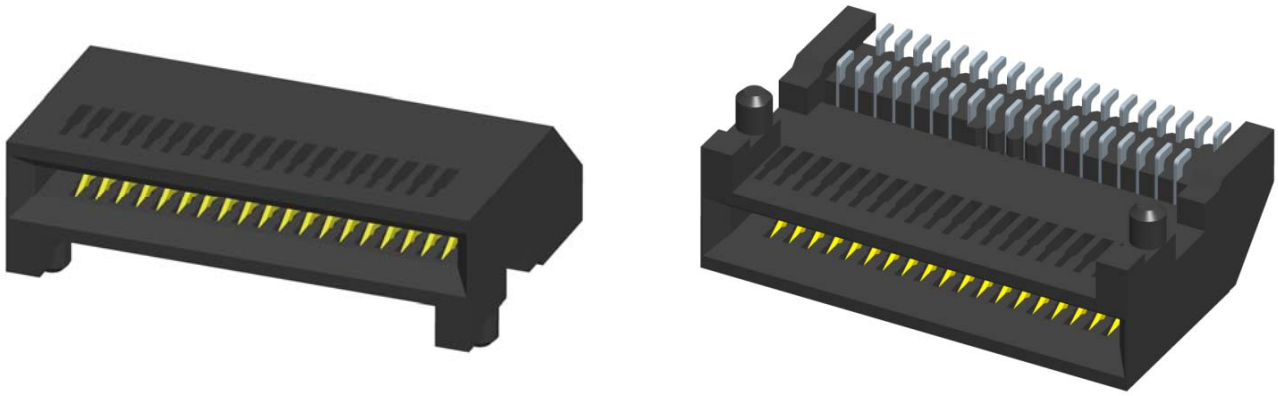


FIGURE 1: 38 POSITION SURFACE MOUNT BOARD CONNECTOR

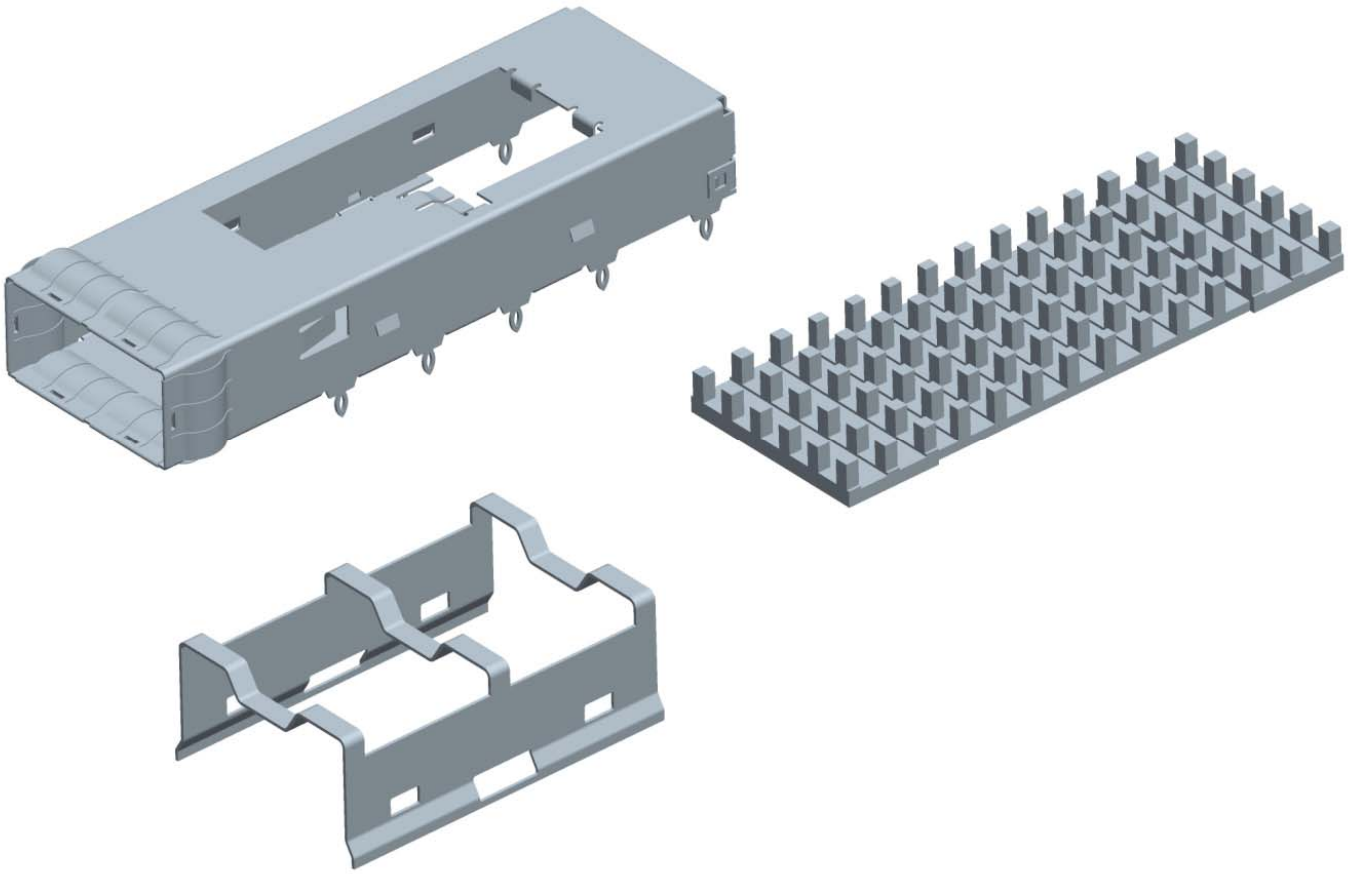


FIGURE 2: CAGE ASSEMBLY, HEAT SINK, AND HEAT SINK CLIP

1.0 OBJECTIVE

This specification provides information on product features and recommended customer application of the QSFP+ board mounted connector and cage assembly. This specification is intended to provide general guidance for process development. It is recognized that no single process will work under all customer applications and that customers will develop processes to meet their needs. However, if these processes differ greatly from the following recommendations, FCI cannot guarantee results.

2.0 SCOPE

This specification provides information and requirements regarding application of the QSFP+ right angle surface mount connector, cage, and heat sink.

3.0 APPLICABLE DOCUMENTS

- Applicable FCI product customer drawings
- FCI Product Specification GS-12-622
- FCI Packaging Specification GS-14-1400

FCI product drawings and specifications are available by accessing the FCI website or by contacting FCI Technical Service.

4.0 PCB DESIGN

4.1 BOARD LAYOUT

Refer to the applicable FCI product customer drawing for the specific connector foot print and outline.

4.2 BOARD THICKNESS

For single sided mounting, a minimum board thickness of 1.60 millimeters is required due to the press-fit termination of the cage assembly. Likewise, a minimum thickness of 2.30 millimeters is required for double sided mounting (belly to belly mounting). There is no maximum board thickness requirement for either application.

5.0 PACKAGING

The QSFP+ board mount connector is supplied in tape and reel packaging for manual or automated placement onto the PCB. Cages, heat sinks, and heat sink clips are supplied in tray packaging for manual placement. Refer to FCI packaging specification GS-14-1400 for specific packaging details.

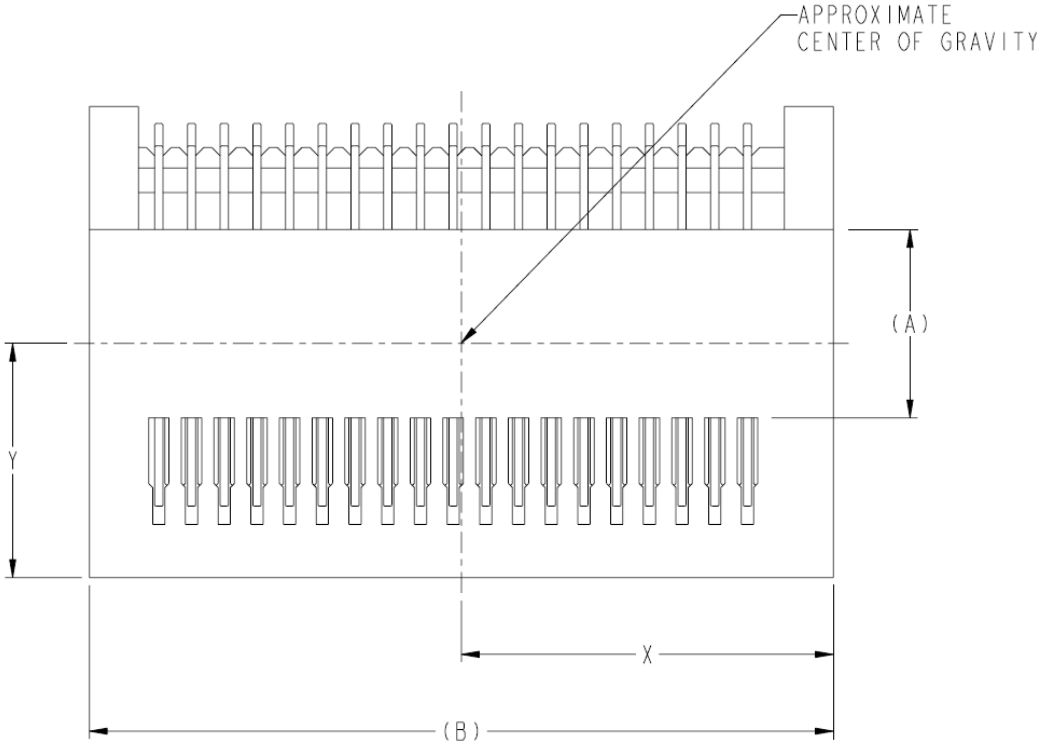
6.0 APPLICATION INFORMATION

6.1 BOARD MOUNTED CONNECTOR

6.1.1 VACUUM PICK UP

QSFP+ connectors have a flat area on the top surface of the connector housing for vacuum pick up and placement with automated equipment.

6.1.1.1 CENETER OF GRAVITY AND WEIGHT



Connector Number of Positions	DIM X (mm)	DIM Y (mm)	DIM A (mm)	DIM B (mm)	Weight (grams)
38	9.10	5.72	11.00	4.60	0.93

FIGURE 3: CENTER OF GRAVITY LOCATION

6.1.2 ALTERNATE PLACMENT METHODS

If automated pick and place equipment is not available the connectors may be placed by hand or with mechanical grippers that grip the outside of the connector housing. Care should be taken to only handle the connectors by the housing to avoid damaging or contaminating the terminals.

6.1.3 CONNECTOR REGISTRATION AND SEATING

The connector is equipped with alignment posts to help aid with positioning on the board. The alignment posts are a clearance fit so minimal force will be required for seating. The connector should be seated with just enough force to imbed the solder tails below the top surface of the solder paste. Optimally the solder tails should be as close to the center of the solder pad as possible, however, an overhang of up to 50% of the solder tail's width off of the edge of the solder pad is permissible.

6.1.4 SOLDER PASTE AND STENCIL REQUIREMENTS

- No clean solder paste is recommended for ease of use
- Recommended stencil thickness: 0.127 mm
- Recommended aperture shape and size: use solder pad outline per the applicable FCI customer drawing
- Resultant solder paste volume should be approximately 0.127 mm^3 per solder tail

6.1.5 SOLDER REFLOW

- Temperatures shall be measured on the board surface, within, or near the termination area.
- Soak time between 175°C and 217°C should be between 75 to 100 seconds.
- Time above 217°C should typically be between 60 to 90 seconds.
- Peak temperature should be between 230 and 260°C.
- The maximum total cumulative time to ramp up, soak, and reflow shall be limited to 360 seconds.
- Nitrogen, equal to or less than 4,000 ppm O_2 can improve solderability, but is not required.
- Maximum ramp rate should be < 2.5°C per second.
- See figure 4 for an example of a lead free profile.

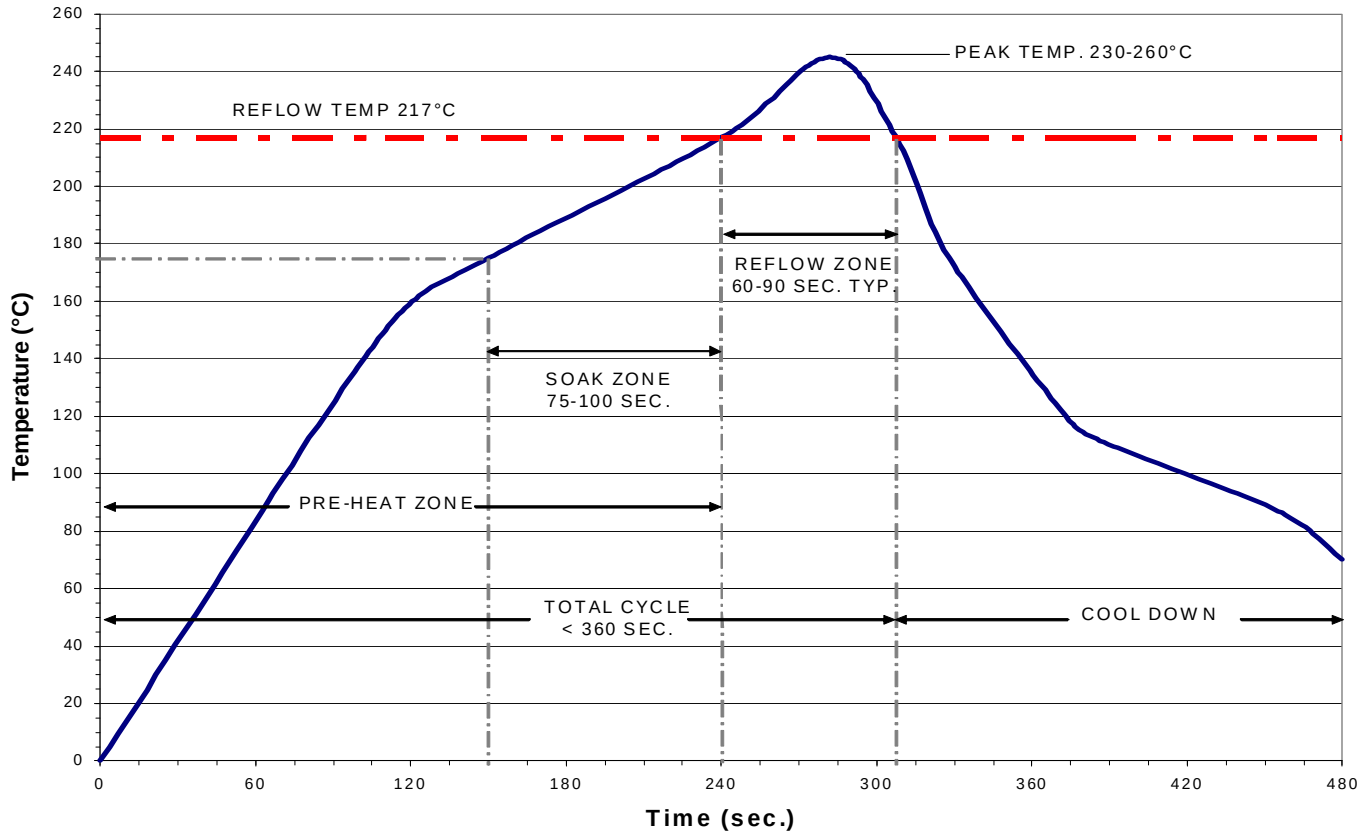


FIGURE 4: REFLOW PROFILE

6.1.6 INSPECTION

- Visually inspect the connector after reflow for damage and cleanliness
- Solder joints should be inspected visually, if possible, or by alternate methods such as X-ray to assure that the solder joints are acceptable and that no solder bridging has occurred.
- If electrical testing is performed by the customer after reflow, caution must be taken to avoid damage to the connector terminals.

6.1.7 CLEANING

The connector and board assembly can be washed with an appropriate cleaner to remove any residue or contaminants after reflow

6.2 CAGE ASSEMBLY

The cage assembly must be assembled to the board after the surface mount connector has been soldered to the board.

6.2.1 TOOLING

The cage assembly can be applied to the board with the use of standard flat rock equipment therefore no special tooling is required.

6.2.2 INSERTION FORCES

The force required to insert an entire cage into the PCB is a maximum of 550 Newtons. Care should be taken to not over press the cage as this will cause damage. As a note, the maximum insertion force will occur before the cage bottoms on the top of the PCB surface.

6.2.3 INSPECTION

Visually inspect the cage after it has been assembled to the board to insure that no damage as occurred during the insertion process. At a maximum, the gap between the bottom of the cage standoffs and the top of the PCB surface should not exceed 0.10 millimeters, see figure 5 below. After mounting the cage into the bezel, inspect the cage opening to make sure that it is centered within the bezel opening. Also, inspect the EMI Springs on all four sides of the cage to make sure that they have been compressed by the bezel.

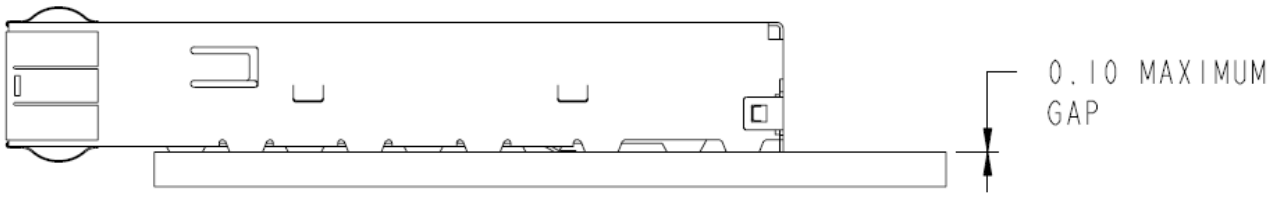


FIGURE 9: MAXIMUM CAGE GAP

6.3 HEAT SINK AND HEAT SINK CLIP

The heat sink and heat sink clip are to be assembled to the cage after the cage has been pressed onto the board. Begin assembling the heat sink by inserting the raised portion on the bottom surface of the heat sink into the opening on top of the cage as shown in figure 6. Next, assemble the heat sink clip by placing it over top of the heat sink and applying downward pressure until the clip latches into place. See figure 7 for reference. After installing the clip, inspect all four latches to make sure that each latch is properly engaged.

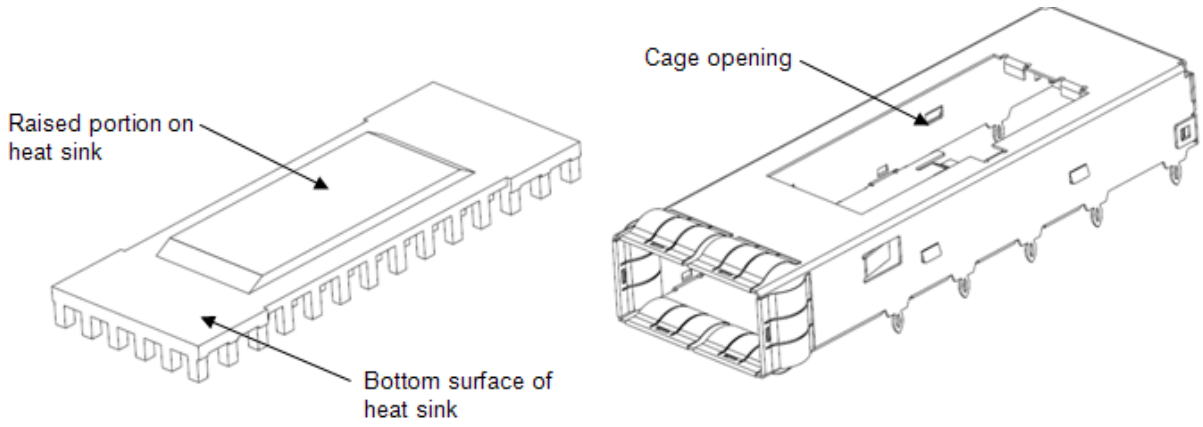


FIGURE 6: Heat Sink and Cage Features

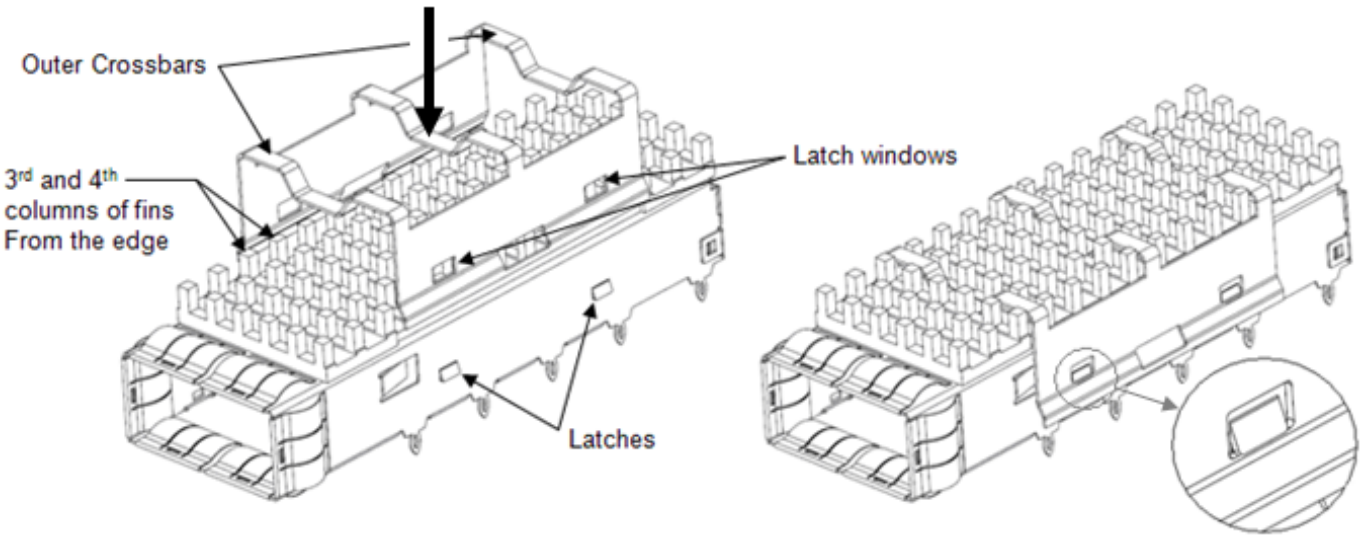


FIGURE 7: Heat Sink Clip Assembly

7.0 REVISION RECORD

REV	PAGE	DESCRIPTION	EC #	DATE
A	All	Initial Release	V10-0020	2010-01-18