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1.0 SCOPE

This specification covers the requirements for the installation and rework of the zQSFP+ Cage Assemblies with EMI Spring Fingers onto printed circuit (pc) boards and bezel. The cage assemblies are available in single port or ganged 1x2, 1x3, 1x4, 1x5, and 1x6 configurations. All configurations are available with, or without, optional heat sinks in three different heights (PCI, SAN, NET). All configurations are available with, or without, optional light pipes with three different display options (single, dual, quad).

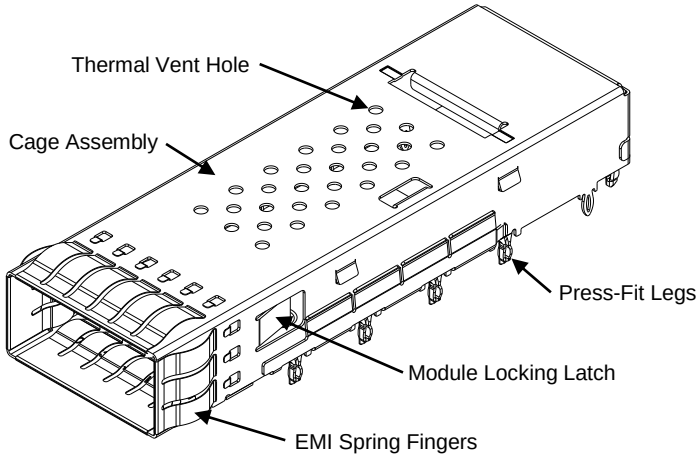
All cage assemblies provide suppression of electromagnetic interference (EMI) through ground fingers that contact both the bezel and the module. The cage assemblies have side latch tabs that will retain a module. The cage assembly is designed to be inserted through a bezel after being seated onto the pc board.

The zQSFP+ cage assemblies have press-fit legs that accommodate belly-to-belly applications for both single and ganged cages.

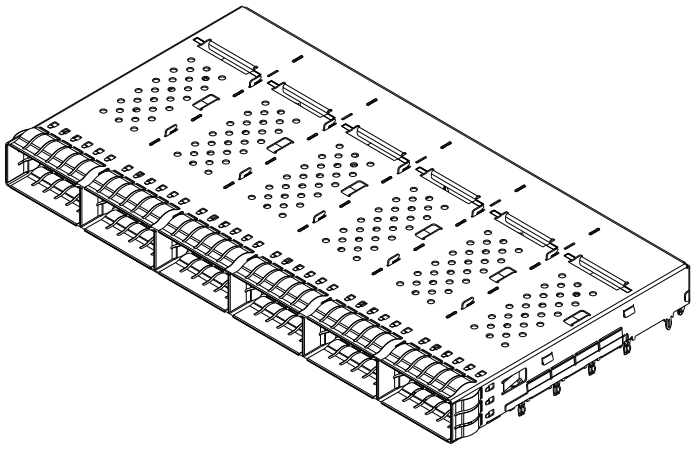
Basic terms and features of these products are provided in the following figures.

zQSFP+ Cage Assemblies

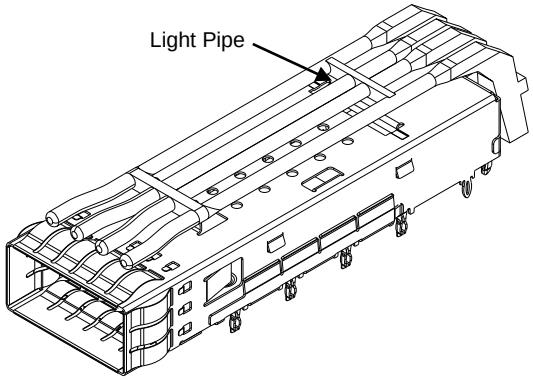
zQSFP+ Single Port Cage Assembly
Shown with optional closed top



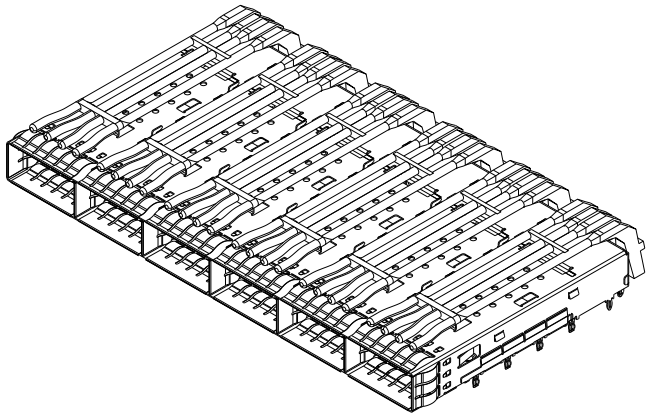
zQSFP+ 1x6 Cage Assembly
Shown with optional closed top



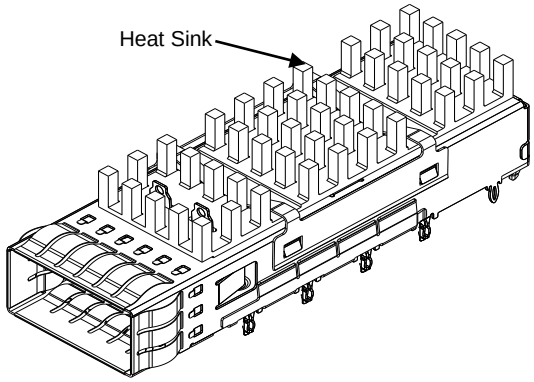
zQSFP+ Single Port Cage Assembly
Shown with optional closed top and quad light pipe



zQSFP+ 1x6 Cage Assembly
Shown with optional closed top and quad light pipe

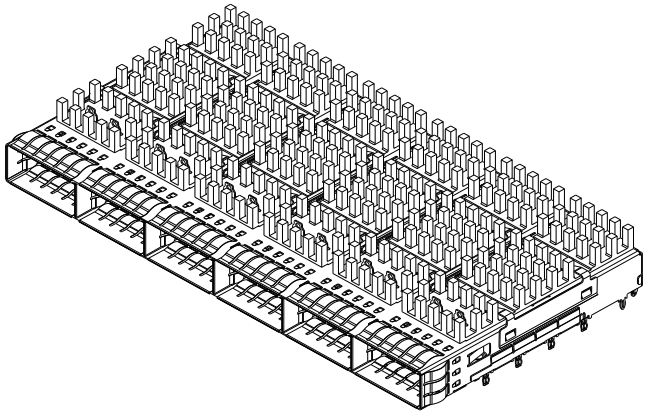


Shown with optional SAN heat sink

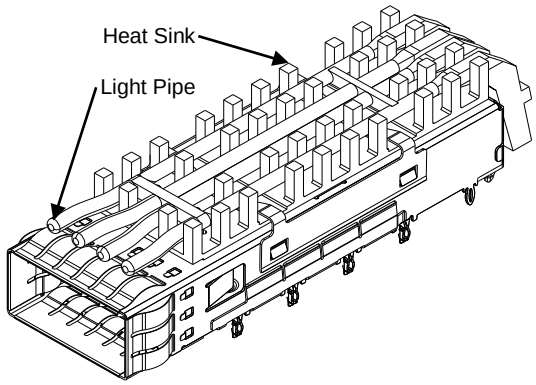


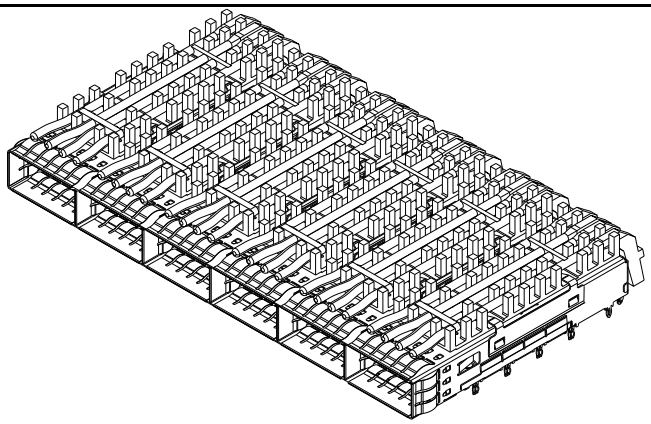
zQSFP+ Single Port Cage Assembly
Shown with optional SAN heat sink and quad light pipe

Shown with optional SAN heat sink

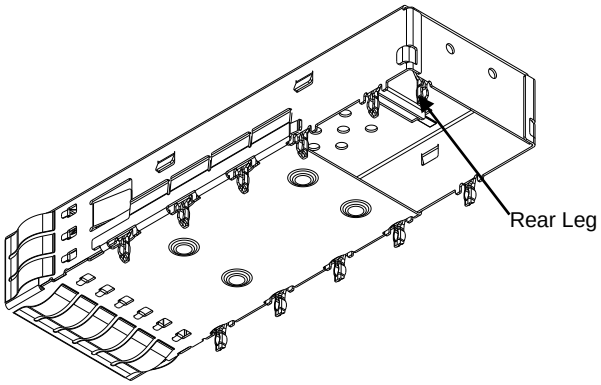


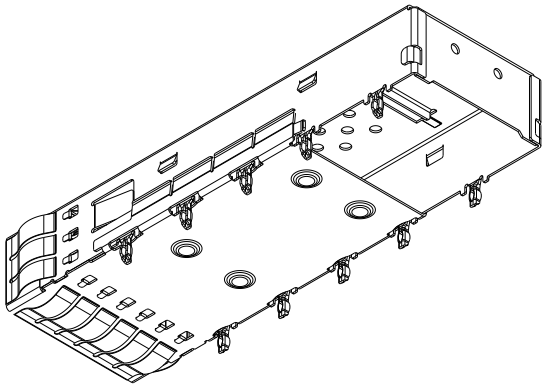
zQSFP+ 1x6 Cage Assembly
Shown with optional SAN heat sink and quad light pipe

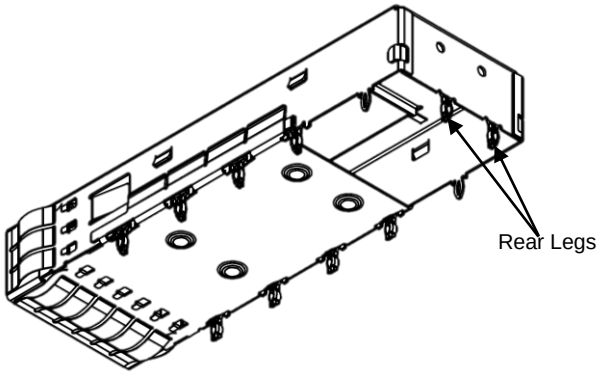




zQSFP+ Single Port Cage Assembly
Shown with optional rear press-fit legs

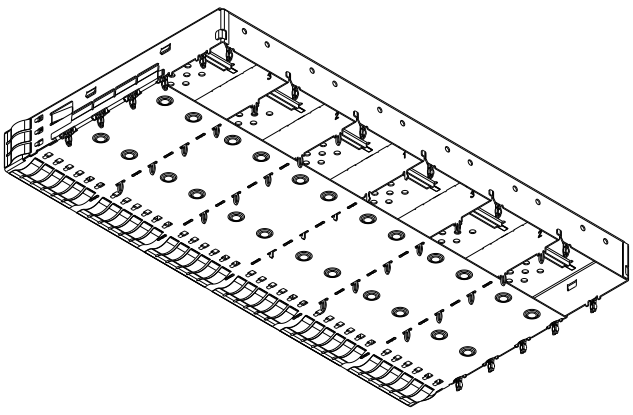






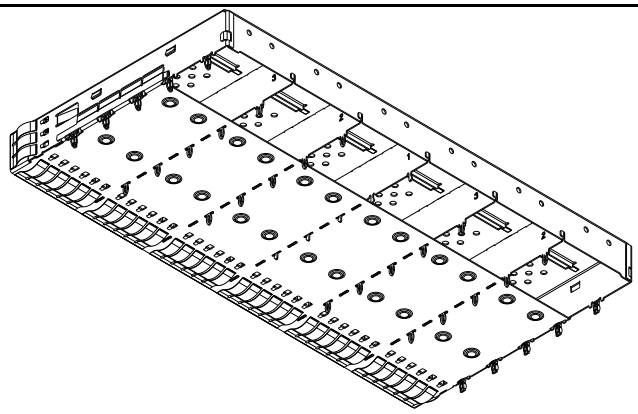
Shown without optional rear press-fit legs

zQSFP+ 1x6 Cage Assembly
Shown with optional rear press-fit legs



REVISION:	ECR/ECN INFORMATION:	TITLE:	SHEET No.
E	ECM No: **636946** DATE: **2020/05/05**	**zQSFP+ Cage Assemblies w/ EMI Spring Fingers**	**4** of **16**

DOCUMENT NUMBER:	CREATED / REVISED BY:	CHECKED BY:	APPROVED BY:
1000140001	**MARSHALL CHEN**	**JOE YEN**	**JASON CHIANG**



Shown without optional rear press-fit legs

2.0 REFERENCE DOCUMENTS

Refer to the appropriate customer sales drawing for product part numbers.
Refer to PS 1000140001 for the zQSFP+ Cage assembly Product Specification.
Refer to SFF-8661 Specification for QSFP+ 28 Gb/s 4X Pluggable Module.
Refer to SFF-8662 Specification for QSFP+ 28 Gb/s 4X Connector (Style A)
Refer to SFF-8663 Specification for QSFP+ 28 Gb/s Cage (Style A).
Refer to SFF-8665 Specification for QSFP+ 28 Gb/s 4x Pluggable Transceiver Solution (QSFP28)

3.0 PROCEDURE

3.1 GENERAL REQUIREMENTS

3.1.1 Material The light pipes are made of polycarbonate, UL 94-V-0. The EMI spring fingers are made of Nickel plated Beryllium Copper (BeCu). The heat sinks are made of Nickel plated Aluminum. All other components of the cage assembly are made of Stainless Steel.

3.1.2 Storage The cage assembly should remain in the shipping container until ready for use to prevent deformation to the contact leads, ground tails and mounting posts. The cage assemblies should be used on a first in, first out basis.

3.1.3 Chemical Exposure Do not store connector assemblies near any chemicals listed below as they may cause stress corrosion cracking in the terminal contacts or mounting posts.

Alkalis	Ammonia	Citrates	Phosphates Citrates	Sulfur Compounds
Amines	Carbonates	Nitrites	Sulfur Nitrites	Tartrates

4.0 PC BOARD REQUIREMENTS

4.1 MATERIAL THICKNESS

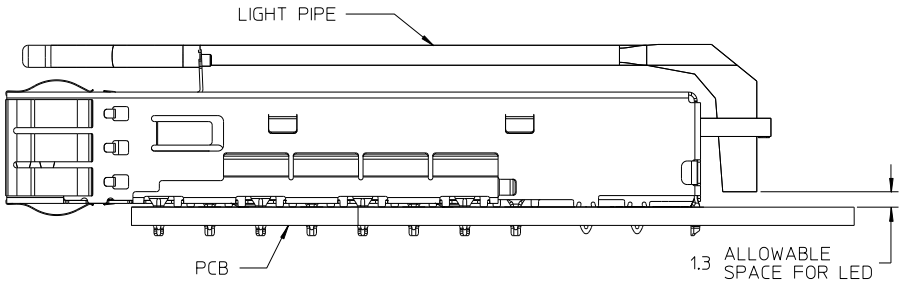
The pc board material shall be glass epoxy (FR-4 or G-10). The minimum pc board thickness shall be 1.57mm (0.062") for Single Sided and 2.50mm (0.098") for Belly-to-Belly.

4.2 TOLERANCE

Maximum allowable deviation of flatness of the pc board shall be 0.08mm under the cage assembly.

4.3 LED

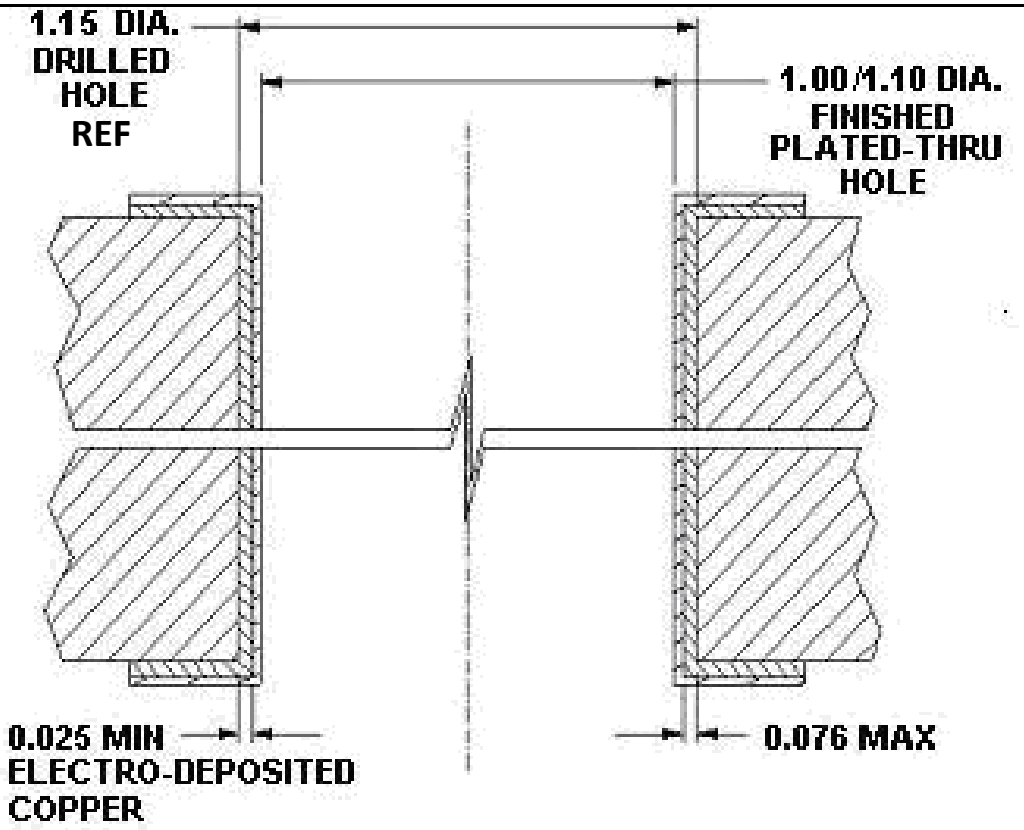
To prevent unintended illumination of adjacent light pipes, use an LED with as narrow a viewing angle as possible. A maximum viewing angle ($2\theta^{1/2}$) of 60° is recommended.



4.4 HOLE DIMENSIONS

The holes for the cage assembly must be drilled and plated through to dimensions specified on next page.

Recommended Hole Dimensions



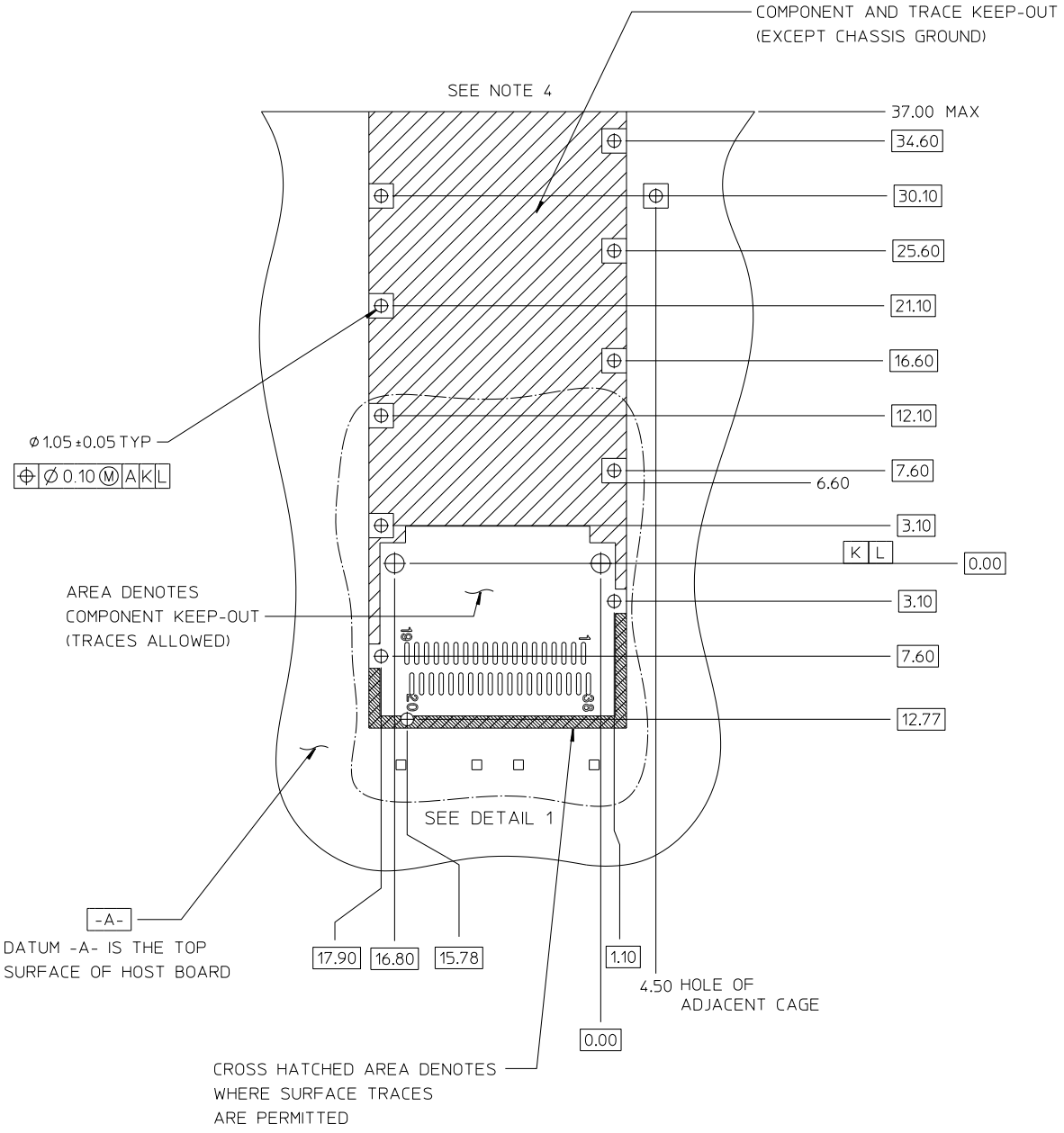
PLATING DETAIL FOR 1.05MM DIA. COMPLIANT PIN/SOLDER TAIL HOLE

Note: Drill diameter is determined by the desired plating finish and plating process.

4.5 LAYOUT

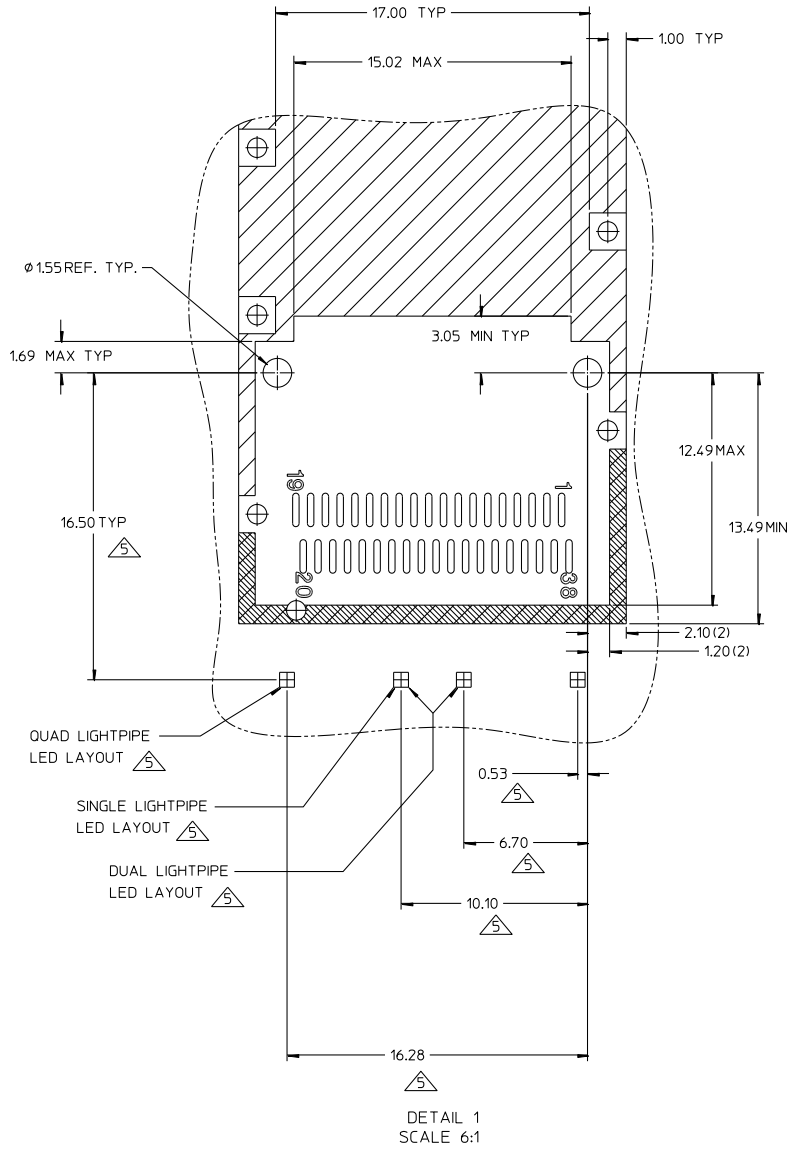
The holes for the cage assembly must be precisely located to ensure proper placement and optimum performance of the connector assembly. Example of PCB layout is shown below.

Example: PC Board Layout for Single Port Cage Assembly



Note: For a specific PCB layout, refer to Customer Sales Drawing

Example: PC Board Layout for Single Port Cage Assembly Cont.



NOTES:
1. PADS AND VIAS GO TO CHASSIS GROUND. (RECOMMENDED PADS TO BE 2.00mm SQUARE.)
2. RECOMMENDED THRU HOLE PLATING INCLUDES HASL, OSP, OR IMMERSION (GOLD, SILVER, OR TIN).
3. CONNECTOR PAD LAYOUT PER SFF-8663 WILL ACCOMODATE MOLEX CONNECTOR SERIES 170432.
4. HOLE PATTERN REPEATS FOR EACH PORT.
5. NOTED DIMENSIONS ONLY APPLY TO CAGE ASSEMBLIES WITH LIGHT PIPES.

Note: For a specific PCB layout, refer to Customer Sales Drawing

5.0 BEZEL REQUIREMENTS

5.1 THICKNESS

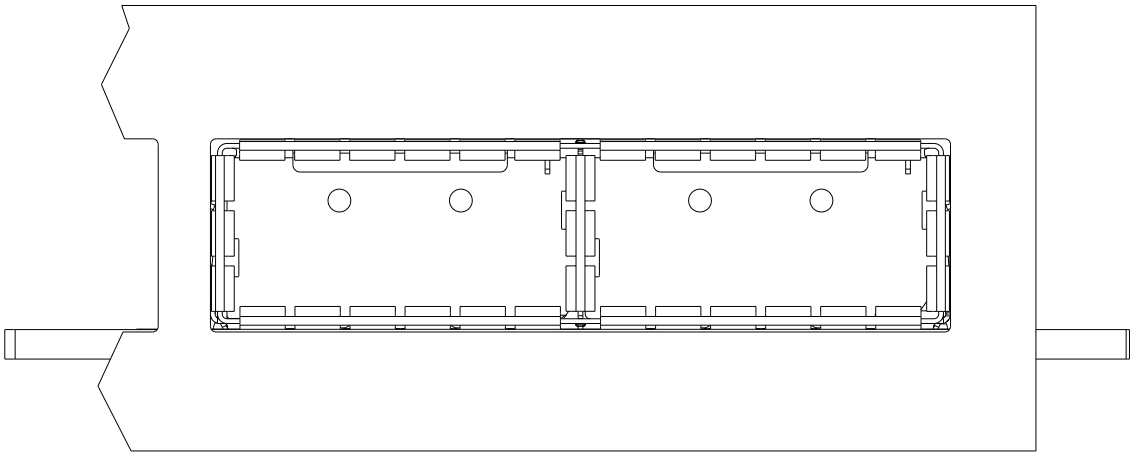
The bezel thickness range shall be 0.8 mm min. Bezel shall not extend past cage opening. See figures.

5.2 CUTOUT

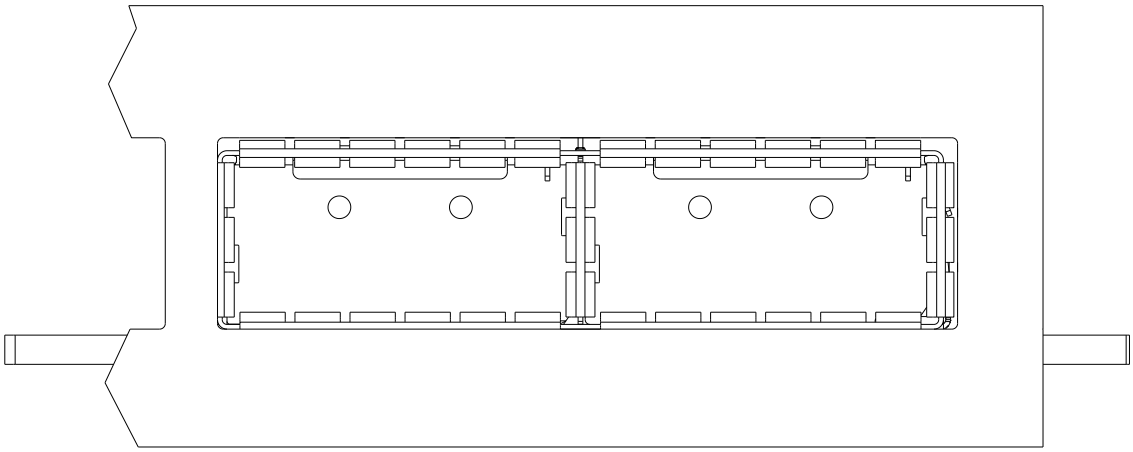
The bezel must provide a cutout that allows proper mounting of the connector assembly. The bezel must compress the EMI spring fingers in order to provide an electrical ground between the cage assembly and bezel for EMI suppression. The minimum allowable distance between cage assemblies must be considered to ensure proper assembly. See figures.

5.3 PC BOARD AND BEZEL POSITION

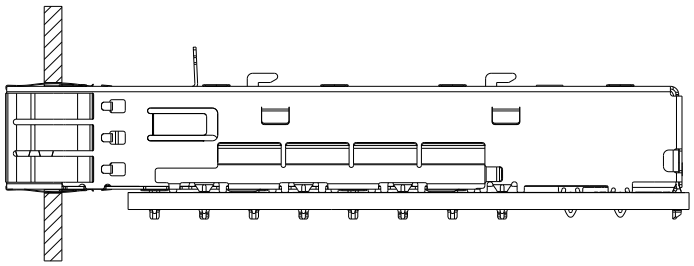
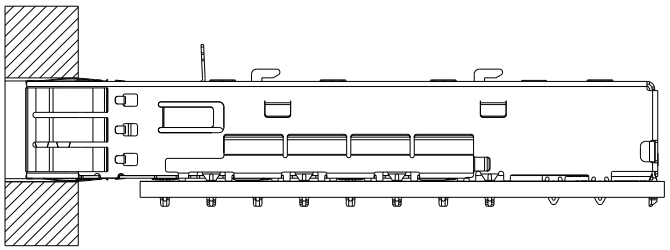
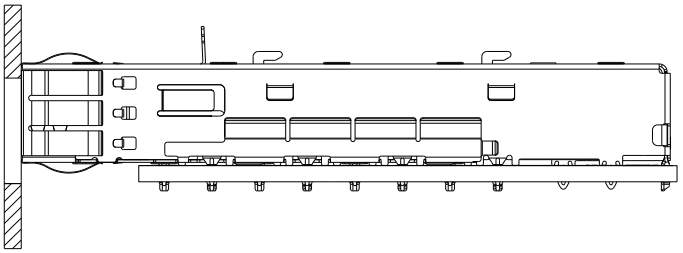
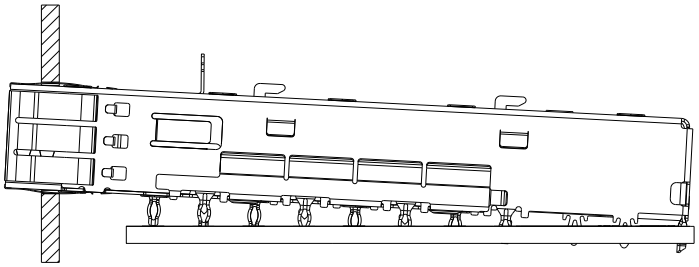
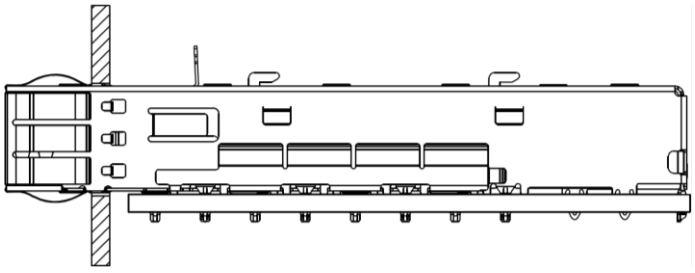
The bezel and pc board must be properly positioned relative to each other for ease of assembly. See figures.



✓ **CORRECT**



X INCORRECT

✓ **CORRECT**	
X INCORRECT **Bezel extends past opening of cage assembly**	
X INCORRECT **Improper alignment of bezel and pc board causing stubbing of bezel**	
X INCORRECT **Improper alignment of bezel and pc board causing cage assembly to lift off of pc board**	
X INCORRECT **Over-insertion of cage through the bezel at any point during assembly can cause damage to spring fingers and/or spring finger attachment features**	

6.0 ASSEMBLY PLACEMENT INSTRUCTIONS

The following requirements also apply to the rework of cage assemblies.

6.1 REGISTRATION

The cage compliant pins must be aligned with matching holes in the pc board simultaneously to prevent any twisting or bending of the legs.

6.2 SEATING

Using proper seating force and seating height is essential to interconnection performance. The force used to seat the cage assembly must be applied evenly at an insertion rate of 50mm/min. to prevent deformation or other damage to the legs. The force required to seat the cage assembly onto the pc board can be calculated by:

Seating Force: **TBD**

CAUTION *Over-driving of the cage assembly will deform parts critical to the quality of the cage assembly. Maximum force occurs prior to the cage assembly bottoming on the pc board.*

The *shut height* of the application tool must be specifically set for proper seating of the cage assembly. The shut height can be calculated by:

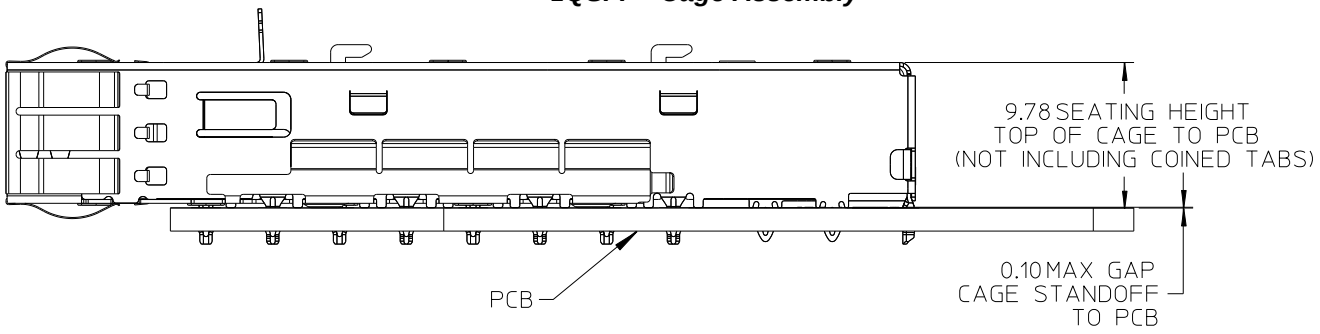
Seating Height (Cage Assembly Seated) + Height of Seating Tool (loaded onto Cage Assembly) + Combined Thickness of PC Board and PC Board Support Fixture = Shut Height (Ram Down)

The seating height, measured from the top of the cage assembly (not including the EMI spring fingers) to the top of the pc board, is given in Figure 5.

The cage assembly must be seated on the pc board not exceeding the dimensions shown in Figure 5.

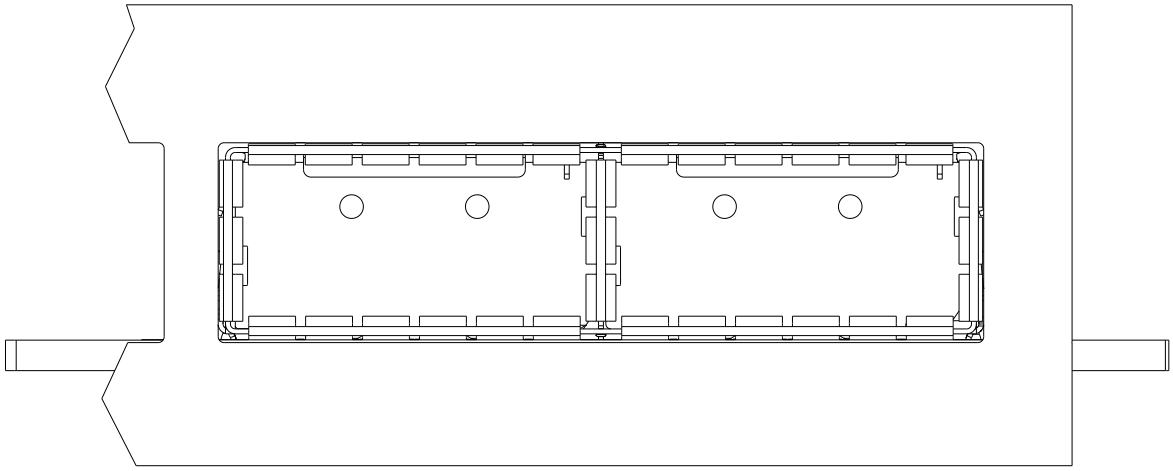
NOTE *The shut height may need to be adjusted to obtain the 0.10 mm [0.004 in.] maximum gap between the standoffs in the cage assembly and the pc board.*

zQSFP+ Cage Assembly



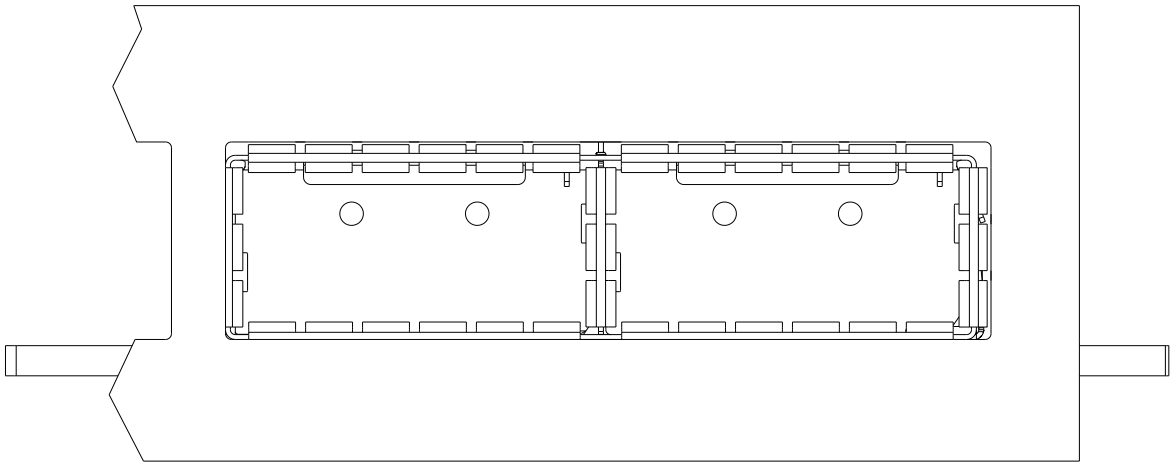
6.3 CHECKING ASSEMBLY

After assembly, the cage assembly EMI spring fingers must be compressed by the bezel.



✓ **CORRECT**

All EMI spring fingers compressed by bezel



X INCORRECT

All EMI spring fingers NOT compressed by bezel

6.4 REPAIR AND REWORK

Damaged or defective cage assemblies must be removed and replaced. Do not reuse a cage after it has been removed from a pc board.

When removing a cage from a PCB, the cage must be removed vertically off of the board using an appropriate extraction tool. The body of the cage must stay parallel to the board during removal enabling all legs to be removed at the same time.

CAUTION *If the cage is removed from the board at an angle, or not using an appropriate extraction tool, there is a high chance of damage to the board.*

Make sure that temperature limitations are not exceeded: –55º to 105ºC [-67º to 221º F]. Excessive temperatures may cause connector housing and light pipe degradation.

See Table 7.0 in section 7.0 for a listing of extraction tools for these cages.

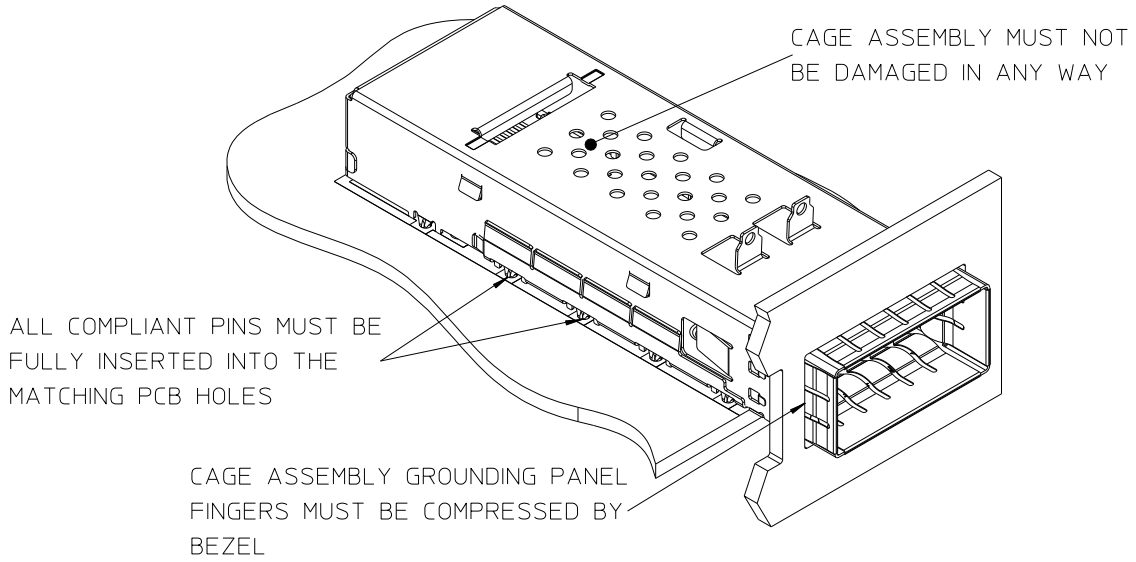
7.0 INSERTION AND REMOVAL TOOLING

Tooling options are available on Molex.com

8.0 VISUAL AIDS

The illustration in the figure below shows the typical applications of the zQSFP+ cage assemblies with EMI spring fingers. The illustration should be used by production personnel to ensure a correctly applied product. Applications, which DO NOT appear correct, should be inspected using the information in the associated sales drawings.

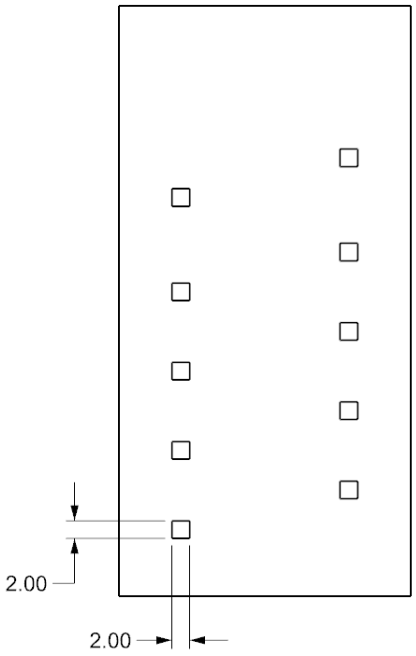
Single Port Cage Assembly w/ EMI Spring Fingers Shown
Requirements also apply to Ganged Cage Assembly



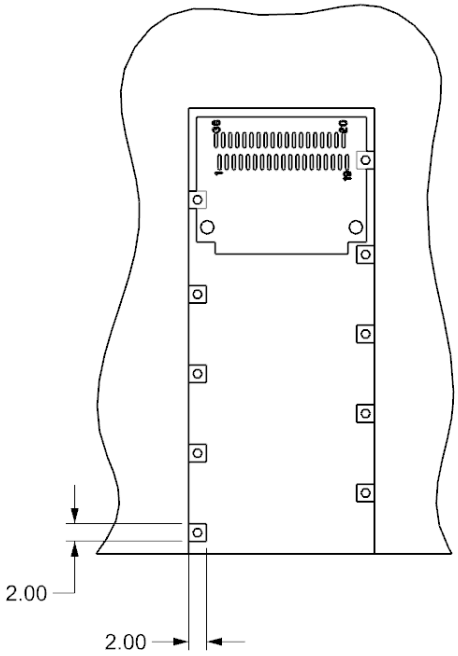
9.0 PIN-IN-PASTE (PIP)

PIP is the process of using a reflow oven to create through hole solder joints.

1. Recommended Stencil's hold and PCB pads to be 2.00mm square and the thickness of Stencil is 0.15mm.
2. Recommended proportion of Paste is Sn96.5/ Ag3.0/ Cu0.5
3. Recommended Reflow Curve is about 260℃ Peak Temp.



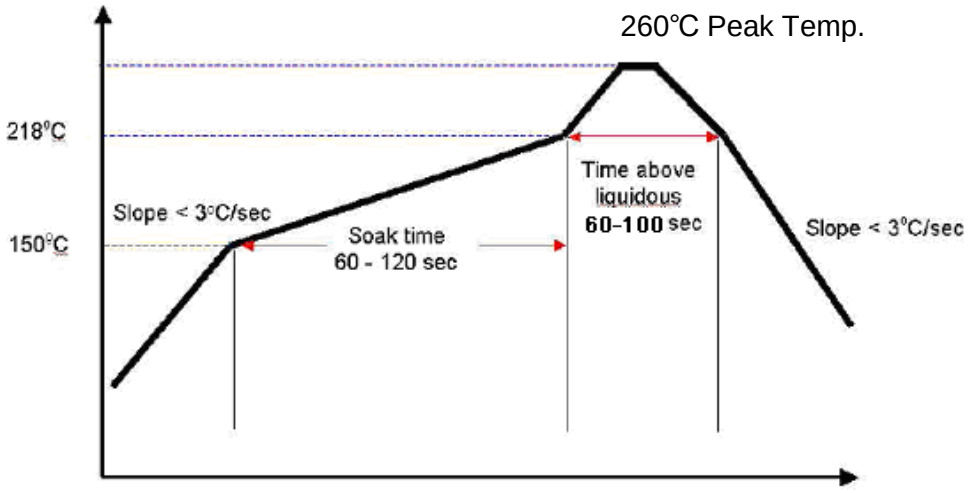
STENCIL



PCB

PASTE

Recommended Reflow Curve



Temperature vs. Time

10.0 HISTORY

DATE	REV	DESCRIPTION
2015/04/01	C	INITIAL RELEASED
2017/02/08	D	SHEET 13&14: REMOVED SHEET 13&14 TOOLING TABLE, ADDED: TOOLING OPTIONS ARE AVAILABLE ON MOLEX.COM
2020/05/05	E	SHEET 15&16: ADDED 9.0 PIN-IN-PASTE (PIP) ADDED 10.0 HISTORY