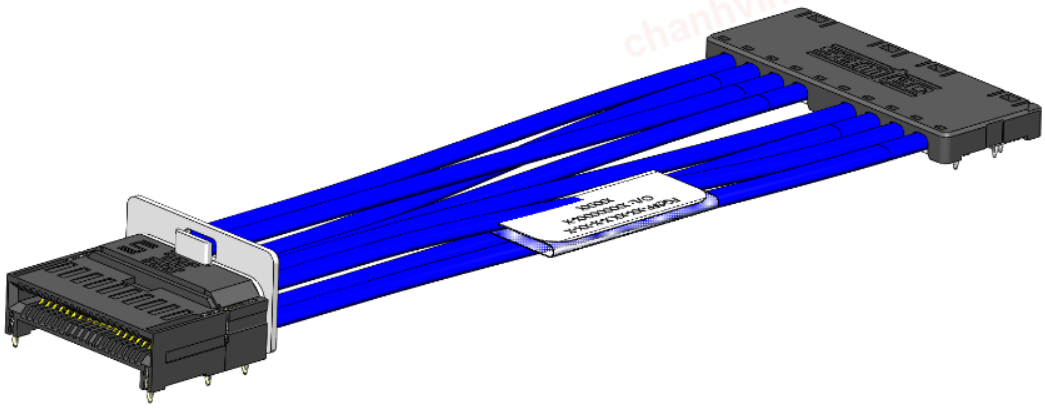
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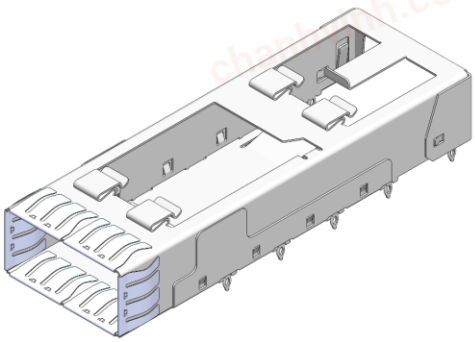
**Product Specification**

**Series:** FQSFP Flyover QSFP28 Cable System

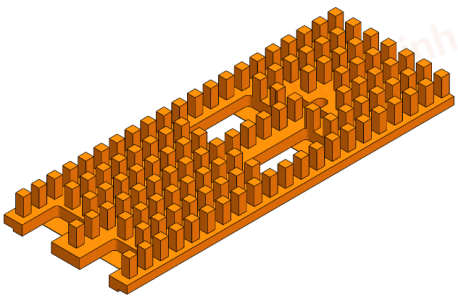
**FQSFP Cable Assembly**



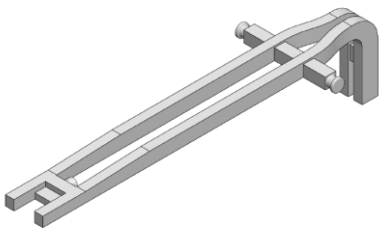
**QSFPC Cage**



**HS-QSFP Heat Sink**



**LP-FQSFP Light Pipe**



**Other configurations available for:**

**DCH-PF 1X8 PAIR END, DCH-PF 2X4 PAIR END, ECUE END, ARC6-08 END**

**QSFPC-LP,**

See www.samtec.com for more information.


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**Series:** FQSFP Flyover QSFP28 Cable System

## 1.0 SCOPE

**1.1** This specification covers performance, testing and quality requirements for Samtec FQSFP Flyover QSFP28 Cable System.

## 2.0 DETAILED INFORMATION

**2.1** Product prints, footprints, catalog pages, test reports and other specific, detailed information can be found at
FQSFP Cable Assembly: https://www.samtec.com/products/fqsfp.
QSFPC Cage: https://www.samtec.com/products/qsfpc
HS-QSFP Heat Sink https://www.samtec.com/products/hs-qsfp
LP-FQSPF Light Pipe: https://www.samtec.com/products/lp-fqsfp

## 3.0 TESTING

**3.1 Current Rating:** 2.1A (Press-Fit Pins Only)

**3.2 Voltage Rating:** 200 VAC

**3.3 Operating Temperature Range:** -25°C to +105°C

**3.4 Operating Humidity Range:** up to 95% (Per EIA-364-31)

**3.5 Electrical:**

| ITEM | TEST CONDITION | REQUIREMENT |
|---|---|---|
| Withstanding Voltage | EIA-364-20 (No Flashover, Sparkover, or Breakdown) | 610 VAC |
| Insulation Resistance | EIA-364-21 (1000 MΩ minimum) | 45,000 MΩ |
| Contact Resistance (LLCR) | EIA-364-23 | Δ 15 mΩ maximum (Samtec defined)/ No damage |

**3.6 Mechanical:**

| ITEM | TEST CONDITION | REQUIREMENT | STATUS |
|---|---|---|---|
| Durability | EIA-364-09C | 100 cycles | PASS |
| Random Vibration | EIA-364-28 Condition V, Letter B 7.56 G 'RMS', 50 to 2000 Hz, 2 hours per axis, 3 axis total, PSD 0.04 | Visual Inspection: No Damage<br>LLCR: Δ 15 mΩ maximum | PASS |
| Mechanical Shock | EIA-364-27 100 G, 6 milliseconds, sawtooth wave, 11.3 fps, 3 shocks/direction, 3 axis (18 total shocks) | Visual Inspection: No Damage<br>LLCR: Δ 15 mΩ maximum | PASS |
| Normal Force | EIA-364-04 | 30 grams minimum for Gold interface | PASS |


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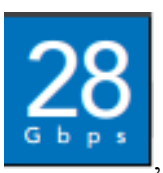
**Series:** FQSFP Flyover QSFP28 Cable System

### 3.7 Environmental:

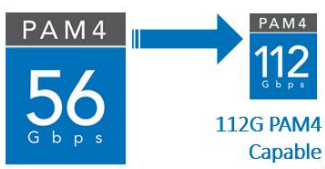
| ITEM | TEST CONDITION | REQUIREMENT | STATUS |
|---|---|---|---|
| Thermal Shock | EIA-364-32<br>Thermal Cycles: 100 (30 minute dwell)<br>Hot Temp: 85°C<br>Cold Temp: -55°C<br>Hot/Cold Transition: Immediate | Visual Inspection: No Damage<br>LLCR: Δ 15 mΩ<br>DWV: 610 VAC<br>IR: >45,000 MΩ | PASS |
| Thermal Aging (Temp Life) | EIA-364-17<br>Test Condition 4 @ 105°C<br>Condition B for 250 hours | Visual Inspection: No Damage<br>LLCR: Δ 15 mΩ<br>DWV: 840 VAC<br>IR: >10,000 MΩ | PASS |
| Cyclic Humidity | EIA-364-31<br>Test Temp: 25°C to 65°C<br>Relative Humidity: 90 to 95%<br>Test Duration: 240 hours | Visual Inspection: No Damage<br>LLCR: Δ 15 mΩ<br>DWV: 610 VAC<br>IR: >45,000 MΩ | PASS |
| Gas Tight | EIA-364-36<br>Gas Exposure: Nitric Acid Vapor<br>Duration: 60 min.<br>Drying Temp.: 50°C +/- 3°C<br>Measurements: Within 1 hour of Exposure | LLCR: Δ 15 mΩ | PASS |

## 4.0 HIGH SPEED PERFORMANCE

### 4.1 Channel Simulation - Channel Performance Metric (CPM) for 0.5m long

**28Gbps NRZ** 

**, and 56Gbps PAM4**
**112Gbps PAM4 under specific applications**




**Note:** CPM is a channel simulation based approach to understanding connector performance. For further information on CPM please visit Introducing Channel Performance.

CPM is simulated using a Samtec specific channel. Connector performance may improve based on specific applications. Please email SIG Frontline SIGFrontline@samtec.com to determine performance in your system.


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**Series:** FQSFP Flyover QSFP28 Cable System

### 4.2 Empirical Testing – Based on -7dB insertion loss

| Assembly | Frequency @ -7dB IL |
|---|---|
| FQSFP Cable Assembly | 27 GHz for 0.5m long |

Note: The cable assembly bandwidth is based on -7dB insertion loss point of the mated cable assembly. The -7dB point can be used to estimate usable system bandwidth in a typical two-level signaling environment.

**4.3 System Impedance:** 100 Ohm for differential pair

## 5.0 APPLICATION PROCEDURE

### 5.1 Connector Insertion Tooling

The FQSFP cable system is intended to be applied utilizing a “flat rock” insert tools for DCH end and a special insert tools for FQSFP end, a special insert tools for QSFPC cage.

If a connector’s ground tails are longer than the thickness of the printed circuit board that the connector is being applied to (ground tail length specification is 1.60 ± 0.15mm) a special bottom support tool will be necessary. This tool could be a PCB with oversized holes or a custom tool designed by the user.

### 5.2 PCB specifications

PCB geometry and materials to comply with appropriate connector footprint drawing.

There is no maximum PCB thickness but the footprint PTH details must be held for the depth at which the compliant pin will be inserted.

PCBs less than 1mm are not recommended for mechanical reasons, there may additional SI limiting factors
Any PCB PTH may be used up to three insertions.

Connectors are only good for one insertion.

### 5.3 Board Insertion Procedure for FQSFP cable system

- **Application views**
  Application view information can be found at link below:
  http://suddendocs.samtec.com/prints/fqsfp-xx-xx.x-x-xx-x-mkt.pdf

**5.4** The post-application inspection should consist of several simple checks to assure that the connector is applied properly and is not damaged.

- Visually assure that all press-fit tails are seated in the proper PCB holes and that none have been crushed during application.
- Visually check that the standoffs on the bottom of each assembly are seated flush and parallel with the PCB surface (see Figure 3 & 4). Once fully seated, there may be some minor gaps (<0.1 mm) due to component tolerances.

## 6.0 APPLICATION INFORMATION

**6.1 Min Cable Bend Radius:** TTF-34100-XX-01 = .125” [3.175mm]

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**6.2 Cable Management:** Samtec recommends some form of cable management to prevent non-axial forces being applied to the connector.

## 7.0 ADDITIONAL RESOURCES

**7.1** For additional mechanical testing or product information, contact our Customer Engineering Support Group at **CES@samtec.com**

**7.2** For additional information on high speed performance testing, contact our Signal Integrity Group at **SIG@samtec.com**

**7.3** For additional processing information, contact our Interconnect Processing Group at **IPG@samtec.com**.

**7.4** For RoHS, REACH or other environmental compliance information, contact our Product Environmental Compliance Group at **PEC@samtec.com**

## USE OF PRODUCT SPECIFICATION SHEET

This Product Specification Sheet ("PSS") is a brief summary of information related to the Product identified. As a summary, it should only be used for the limited purpose of considering the purchase/use of Product. For specific, detailed information, including but not limited to testing and Product footprint, refer to Section 2.0 of this document and the links there provided to test reports and prints. This PSS is the property of Samtec, Inc. ("Samtec") and contains proprietary information of Samtec, our various licensors, or both. Samtec does not grant express or implied rights or license under any patent, copyright, trademark or other proprietary rights and the use of the PSS for building, reverse engineering or replication is strictly prohibited. By using the PSS, the user agrees to not infringe, directly or indirectly, upon any intellectual property rights of Samtec and acknowledges that Samtec, our various licensors, or both own all intellectual property therein. The PSS is presented "AS IS". While Samtec makes every effort to present excellent information, the PSS is only provided as a guideline and does not, therefore, warrant it is without error or defect or that the PSS contains all necessary and/or relevant information about the Product. The user agrees that all access and use of the PSS is at its own risk. **NO WARRANTIES EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY KIND WHATSOEVER ARE PROVIDED.**