QSFP Copper Cable Assemblies

For 40Gb/s aggregate bandwidth applications – IEEE802.3ba & Infiniband QDR

DESCRIPTION

FCI's QSFP (Quad Small Form-factor Pluggable) connector, cage and cable assemblies are designed to meet emerging data center and high performance computing application needs for a high density cabling interconnect system capable of delivering an aggregate data bandwidth of 40Gb/s. This interconnect system is fully compliant with existing industry standard specifications such as the QSFP MSA and IBTA (InfiniBand Trade Association). The QSFP cables support the bandwidth transmission requirements as defined by IEEE 802.3ba (40 Gb/s) and Infiniband QDR (4x10 Gb/s per channel) specifications.

The 38 position SMT mounted edge card connector and the cable assembly's mating printed circuit card has been designed for the higher-bandwidth signal integrity requirements associated with 10Gb/s per channel transmission. The metal EMI cage along with the rugged diecast covers on the cable assembly assure proper EMI shielding effectiveness and termination. FCI offers both passive as well as actively equalized cable assemblies that enables the use of a copper based interconnect system for applications with cable lengths up to 12 meters. The cage offering also includes a heat sink and mounting clip to address applications where module heat dissipation is required.

FEATURES & BENEFITS

- Fully compatible with IEEE802.3ba and Infiniband QDR specifications
- 100 ohm differential impedance system
- Allows for 10Gb/s per channel transmission; aggregate of 40 Gb/s total bandwidth
- Optimized PCB interface board to minimize crosstalk and insertion loss
- Robust diecast covers for superior EMI shielding effectiveness
- EEPROM for cable signature & system communications
- Actively equalized cables enable longer cable lengths or the use of smaller cable diameters for shorter cable lengths
- 32 AWG to 24 AWG cable sizes available
- RoHS compliant

TARGET MARKETS / APPLICATIONS

- Data
  - Servers
  - Networked storage systems
  - Routers
  - External storage systems
  - High Performance Computing (HPC) applications
  - Data Center networking
- Communications
  - Switches
  - Routers
- Industry Standards
  - InfiniBand Trade Association (IBTA)
  - IEEE802.3ba
  - 40Gigabit Ethernet (40G BASE – CR4)

Cable Assemblies

The cable assembly's 38 position printed circuit card has been designed for the higher-bandwidth signal integrity requirements associated with 10Gb/s per channel transmission. The printed circuit board has also been designed to accommodate the industry (SFF) defined EEPROM cable signature requirements. FCI offers both passive as well as actively equalized cable assemblies to either maximize the usable copper cable length or minimize of the raw cable bulk for a given cable length. Rugged diecast covers assure proper EMI termination and shielding effectiveness. Cable assembly removal is enabled via a robust user friendly pull tab. In addition, FCI manufactures these cable assemblies using highly controlled and stable cable assembly manufacturing processes to minimize wire management and termination variations that impact the performance of the cable assembly. Robust final test and quality systems assure high quality cable assemblies conforming to the high-speed electrical performance requirements in industry specifications

TECHNICAL DATA

PHYSICAL

- Shells: Diecast zinc – Copper underplate with a nickel overplate
- PCB: FR-4 laminate with gold plated contact pads
- Raw cable: 8 individually shielded parallel pair cables with fully braided EMI shield with low smoke, zero halogen or PVC jacketing
- EMI girdle: Stainless steel
- Pull tab: Thermoplastic polymer
- Release plate: Stainless steel
- Drive screws: Stainless steel

ELECTRICAL PERFORMANCE

- Differential Impedance: 100Ω +/- 10Ω @70ps rise time (20-80%)
- Within Pair skew: < 10 ps / meter
- Pair-to-pair skew: <50 ps / meter
- Withstanding voltage: 300V DC
- Current rating: 0.5 amps maximum per contact

MECHANICAL PERFORMANCE

- Durability: 50 cycles
- Mating force: 40N maximum
- Latch Strength; axial load: 180N minimum
- Cable axial strain relief: 90N minimum
- Cable flex: 180° flex; 15 cycles per EIA 364-41

ENVIRONMENTAL

- Operating temperature: -20°C to 85°C
- RoHs compliant
- Thermal shock: EIA 364-32, condition1, 25 cycles, -55°C to 85°C
- Temperature life: EIA 364-17, Method A, Condition 2, Time Condition C, 500 hours, 70°C
- Mixed Flowing gas – EIA 364-65, Class IIA – 7 days unmated and 7 days mated

REFERENCE DATA

- GS- 12-622 – Product specification- QSFP+ connectors, cages and cable assemblies – passive & actively equalized

APPLICABLE INDUSTRY STANDARDS

- SFF-8436 QSFP+ Copper and Optical Modules
- SFF-8074i SFP Small Form-Factor Pluggable Transceiver rev 1.0
- SFF-8431 Enhanced SFF Pluggable
- IEEE 802.3 Gigabit-Ethernet standard

CERTIFICATIONS & APPROVALS

- Infiniband Trade Association (IBTA) Integrators listing

PART NUMBERS

10093084 – QSFP / QSFP+ cable assembly – passive

10107528 – QSFP / QSFP+ cable assembly – actively equalized

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CABLE ASSEMBLY CAPABILITY MATRIX

QSFP+

	Unequalized cable length													
Performance Level	**1m**	**2m**	**3m**	**4m**	**5m**	**6m**	**7m**	**8m**	**9m**	**10m**	**11m**	**12m**	**13m**	**14m**
Infiniband - QDR	32	32	30	28	26	26	24							
IEEE 802.3ba	TBD	TBD	TBD	TBD	TBD	TBD								
Fibre Channel / SAS 2.1	TBD	TBD	TBD	TBD	TBD	TBD								

	Actively equalized cable length													
Performance Level	**1m**	**2m**	**3m**	**4m**	**5m**	**6m**	**7m**	**8m**	**9m**	**10m**	**11m**	**12m**	**13m**	**14m**
Infiniband - QDR	32	32	32	32	32	30	30	28	28	28	26	26		
IEEE 802.3ba	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD				
Fibre Channel / SAS 2.1	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD				

TBD - Cables currently being tested to this standard

Connectors and Cages

FCI's QSFP / QSFP+ connector & cage product portfolio includes a 38 position, 0.8mm contact centerline spaced, SMT terminated card edge connector. Also offered is an accompanying single unit (1x1) EMI metal cage that includes a heat sink and associated heat sink mounting clip. The edge card connector and cage are designed to meet all signal integrity requirements and EMI requirements as defined by the SFF-8436 specification. Robust EMI fingers on the cage port assure a robust and reliable EMI shield & termination when placed through the chassis opening. All connector and cage offerings are fully RoHs compliant.

TECHNICAL DATA

PHYSICAL

Connector

- Housing: Black thermoplastic, UL94V-0 rated
- Spacer: Black thermoplastic, UL94V-0 rated
- Contact: Phosphor-bronze
- Contact plating : 30 micro-inch minimum gold plating on edge card interface with 50 micro-inch nickel under-plate 150 micro-inch minimum tin plating on SMT leads with 50 micro-inch nickel underplate

Cages

- Cage: Copper alloy
- EMI fingers: Copper alloy
- Heat sink: Aluminum alloy
- Heat sink mounting clip: Copper alloy
- Cage plating: 50 micro-inch minimum nickel plating
- EMI finger plating: 50 micro-inch minimum tin over 50 micro-inch minimum nickel
- Heat sink plating: 50 micro-inch minimum nickel plating
- Heat sink clip plating: 50 micro-inch minimum nickel plating

ELECTRICAL PERFORMANCE

- Differential Impedance: 100Ω +/- 10Ω @ 70ps rise time (20-80%)

MECHANICAL PERFORMANCE

- Durability: Connectors - 100 cycles
- Connector mating force: 40N maximum
- Cage: Press fit tail termination – insertion force – 40N per tail

ENVIRONMENTAL

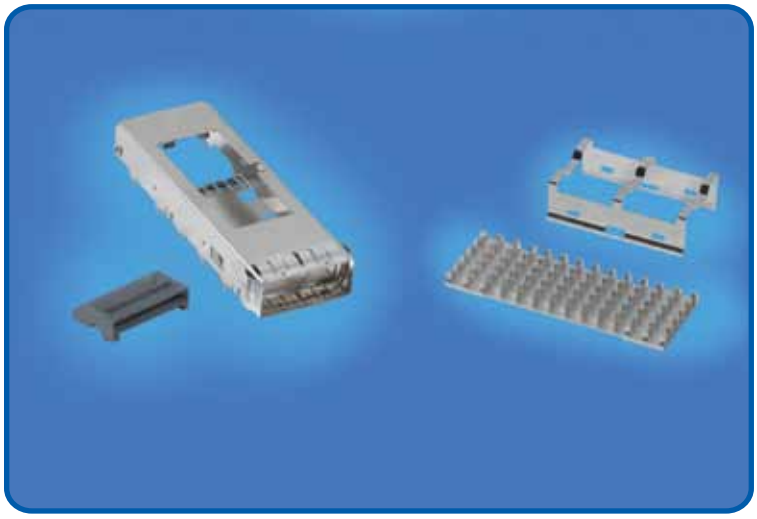
- Operating temperature: -20°C to 85°C
- RoHs compliant
- Thermal shock: EIA 364-32, condition1, 25 cycles, -55°C to 85°C
- Temperature life: EIA 364-17, Method A, Condition 2, Time Condition C, 500 hours, 70°C
- Mixed Flowing gas – EIA 364-65, Class IIA – 7 days unmated and 7 days mated

REFERENCE DATA

- GS- 12-622 – Product specification- QSFP / QSFP+ connectors, cages & cable assemblies – passive & actively equalized
- GS- 20-126 – Application specification – SFP+ connectors & cages

APPLICABLE INDUSTRY STANDARDS

- SFF-8436 QSFP+ Copper and Optical Modules
- SFF-8074i SFP Small Form-Factor Pluggable Transceiver rev 1.0
- SFF-8431 Enhanced SFF Pluggable
- SFF-8472 Diagnostic Monitoring Interface for Optical Transceivers
- IEEE 802.3 Gigabit-Ethernet standard



PART NUMBERS

10099113 – QSFP / QSFP+ 38 position connector

10099114 – QSFP / QSFP+ 1x1 cage with EMI fingers

10099115 – QSFP / QSFP+ cage heat sink

10099116 – QSFP / QSFP+ cage heat sink clip

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