z-QUAD SMALL FORM-FACTOR PLUGGABLE PLUS (zQSFP+ OR QSFP28) INTERCONNECT SYSTEM

Quick Reference Guide

te.com/products/QSFP

Introducing zQSFP+ Interconnect System

TE Connectivity's (TE) zQSFP+ interconnects offer an increased data rate of 28 Gbps in an industry standard, scalable design that allows for backwards compatibility with QSFP/QSFP+ cables and transceivers, providing a simple upgrade path from 10 Gbps to 28 Gbps. The complete portfolio of interconnects deliver a large range of simple and customizable design options to meet most customer requirements.

Features and Benefits

Increased Data Rates

- 2.5 times more throughput than traditional QSFP solutions

- Data transfer rates of 28 Gbps

- Supports 100 Gbps Ethernet (28 Gbps x 4), and 100 Gbps InfiniBand (IB) Enhanced Data Rate (EDR) requirements

Industry Standard and Customizable Design

- Industry standard interface

- Backwards compatible with QSFP/QSFP+ cables and transceivers

- Higher loss budget for optics and copper cables at 10 Gbps

Comprehensive Portfolio and Inventory

- Dual sourced product available through Molex, LLC.

- Features behind and through bezel cages with various lightpipe and heat sink options

- Well-stocked distribution channel

Improved EMI Performance

- Increased data rates make EMI protection more challenging

- Provide excellent EMI protection through 28 Gbps
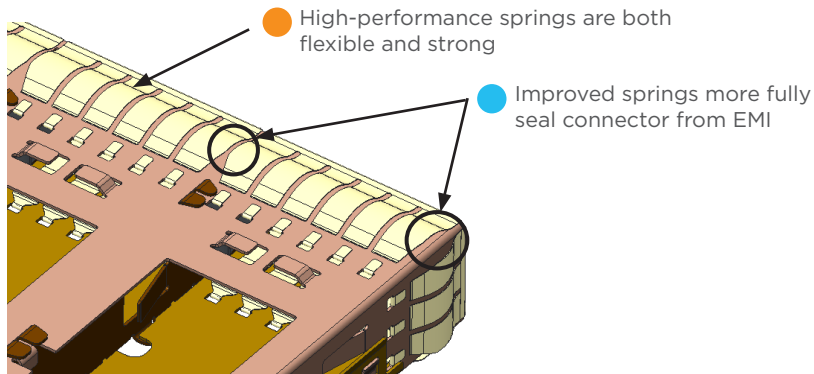
Applications

Product Applications

- Network Interface

- Switches

- Servers

- Routers

- Wireless Base Stations

- Test and Measurement Equipment

Applications by Protocol

- 100 Gigabit Ethernet

- 100 Gbps InfiniBand (IB) Enhanced Data Rate (EDR) requirements

- 128G Fibre Channel

- 25G/50G Consortium

Enhanced QSFP28 Cages

High-performance springs are both flexible and strong

Improved springs more fully seal connector from EMI

Reference part numbers 2170709-x on page 7

Lower Assembly Insertion Force

Our new enhanced QSFP28 cages can help increase assembly throughput by providing a 55% reduction in force needed to insert the line card into the front bezel. The reduction in insertion force makes assembly easier, faster, and reduces the risk for damage which can lead to reduced EMI performance.
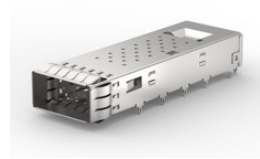
Improved EMI Performance

EMI sealing enhancements on these new cages provide 10 dB EMI performance improvement over current QSFP28 products.
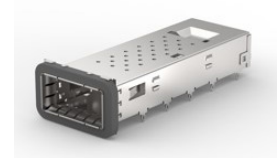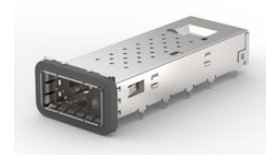
1xN Mechanical Options

Bezel Mount

- Behind bezel cages use a gasket applied by the customer to the cage or bezel sheet metal
- EMI spring versions and gasket versions share the same PCB footprint and bezel cutout
- TE offers low insertion force EMI springs to assist in assembly of high density products

Through Bezel with EMI Springs

Through Bezel with EMI Gasket

Behind Bezel (customer applies gasket)

Single

Dual

Quad

Lightpipe Options

- TE offers 1, 2 or 4 lightpipe options per port
- Standard lightpipes are designed to support up to 1.00mm height 0805 style LEDs
- Lightpipes are shipped with an organizer to prevent optical cross-talk

Heat Sink Styles

- TE offers SAN, LAN and Networking height heatsinks
- Custom heatsinks are available upon request
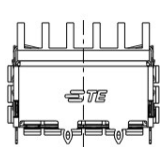- Height is max height of assembly from surface of PCB
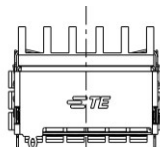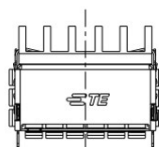
PCI (13.7mm height)

SAN (16.0mm height)

NET (23.0mm height)

Rear EONs

- Rear pins are used to improve EMI grounding and cage retention to the PCB
- TE offers all styles outlined in the SFF-8662 footprint
- Rear EONs will be dependent upon the customer's routing preference and technical specifications

2 rear EONs

1 rear EONs

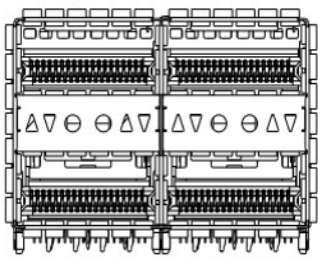0 rear EON's

2xN Mechanical Options

Bezel Mount

- Through bezel assemblies with EMI springs or EMI gaskets are available
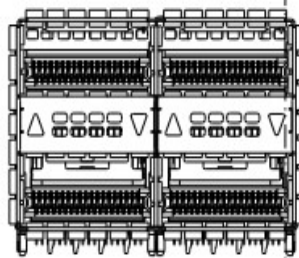
- Custom gasketing options are available upon request

Through Bezel with EMI Springs
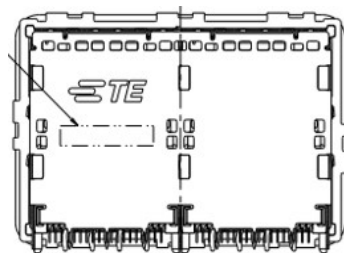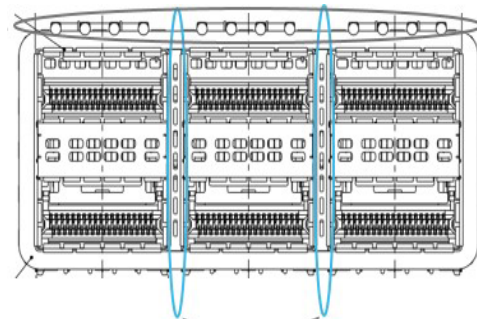

Through Bezel with EMI Gasket

Single (per port)

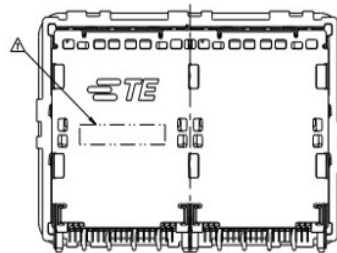

Dual (per port)

Lightpipe Options

- TE offers zero, single and dual lightpipe options per port

- For higher lightpipe counts, the customer may add lightpipes underneath their PCB to indicate lower port activity

- The thermal footprint design offers 4x lightpipes assembled above the cage

- Lightpipes are designed to support up to 0.80mm height 0805 style LEDs

Thermally Enhanced Footprint

- Available in stacked configurations only

- Lightpipes are assembled above the cage to allow for airflow in the port separator area

- In configurations above 2x1, there are air channels in between port columns to allow for increased airflow

3 rear EONs

0 rear EONs

Rear EONs

- Rear pins are used to improve EMI grounding and cage retention to the PCB

- TE offers zero or three rear pins per port column

- Rear EONs will be dependent upon the customer's routing preference and technical specifications

Part Number Detail

Cages

Base Part Number	Ports	Cage Applications	EMI Suppression	Lightpipes Applied Per Port			Heat Sinks	Applied		
				Single	Dual	Quad	NET	PCI	SAN
2170754	1x1	Through Bezel	EMI Gasket	Yes	Yes	Yes	Yes	Yes	Yes
2170705	1x1	Through Bezel	EMI Springs	Yes	Yes	Yes	Yes	Yes	Yes
2170773	1x1	Through Bezel	EMI Springs	Yes	Yes	Yes	No	No	No
2170753	1x1	Through Bezel	EMI Gasket	No	No	No	Yes	Yes	Yes
2170752	1x1	Through Bezel	EMI Gasket	No	No	No	No	No	No
2170704	1x1	Through Bezel	EMI Springs	No	No	No	Yes	Yes	Yes
2170703	1x1	Through Bezel	EMI Springs	No	No	No	No	No	No
1551892	1x1	Behind Bezel	C	No	No	No	Yes	Yes	Yes
1551891	1x1	Behind Bezel	C	No	No	No	No	No	No
2170814	1x2	Through Bezel	EMI Gasket	Yes	Yes	Yes	Yes	Yes	Yes
2170813	1x2	Through Bezel	EMI Gasket	Yes	Yes	Yes	No	No	No
2170808	1x2	Through Bezel	EMI Springs	Yes	Yes	Yes	Yes	Yes	Yes
2170807	1x2	Through Bezel	EMI Springs	Yes	Yes	Yes	No	No	No
2170812	1x2	Through Bezel	EMI Gasket	No	No	No	Yes	Yes	Yes
2170811	1x2	Through Bezel	EMI Gasket	No	No	No	No	No	No
2170806	1x2	Through Bezel	EMI Springs	No	No	No	Yes	Yes	Yes
2170805	1x2	Through Bezel	EMI Springs	No	No	No	No	No	No
2227103	1x2	Behind Bezel	C	Yes	Yes	No	Yes	Yes	Yes
2227103	1x2	Behind Bezel	C	No	No	No	Yes	Yes	Yes
2227104	1x2	Behind Bezel	C	No	No	No	Open Top		
2170769	1x3	Through Bezel	EMI Gasket	Yes	Yes	Yes	Yes	Yes	Yes
2170740	1x3	Through Bezel	EMI Springs	Yes	Yes	Yes	Yes	Yes	Yes
2170739	1x3	Through Bezel	EMI Springs	Yes	Yes	Yes	No	No	No
2170768	1x3	Through Bezel	EMI Gasket	No	No	No	Yes	Yes	Yes
2170767	1x3	Through Bezel	EMI Gasket	No	No	No	No	No	No
2170738	1x3	Through Bezel	EMI Springs	No	No	No	Yes	Yes	Yes
2170737	1x3	Through Bezel	EMI Springs	No	No	No	No	No	No
2173239	1x3	Behind Bezel	C	No	No	No	Yes	Yes	Yes
2173238	1x3	Behind Bezel	C	No	No	No	Open Top		
2170785	1x4	Through Bezel	EMI Gasket	Yes	Yes	Yes	Yes	Yes	Yes
2170784	1x4	Through Bezel	EMI Gasket	Yes	Yes	Yes	No	No	No
2170747	1x4	Through Bezel	EMI Springs	Yes	Yes	Yes	Yes	Yes	Yes
2170746	1x4	Through Bezel	EMI Springs	Yes	Yes	Yes	No	No	No

Part Number 1551920-2: zQSFP+ Surface Mount Connector for use with all 1xN cages

Notes:
C = Customer Applied Gasket
1xN cages: require a SMT connector to complete the assembly
2xN cages: connectors and cages come as one integrated assembly
All cages use EMI Plug 1888810-2

Cages (con't)

Base Part Number	Ports	Cage Applications	EMI Suppression	Lightpipes Applied Per Port			Heat Sinks	Applied	
				Single	Dual	Quad	NET	PCI	SAN
2170783	1x4	Through Bezel	EMI Gasket	No	No	No	Yes	Yes	Yes
2170782	1x4	Through Bezel	EMI Gasket	No	No	No	No	No	No
2170745	1x4	Through Bezel	EMI Springs	No	No	No	Yes	Yes	Yes
2170744	1x4	Through Bezel	EMI Springs	No	No	No	No	No	No
2227249	1x4	Behind Bezel	C	No	No	No	Yes	Yes	Yes
2227250	1x4	Behind Bezel	C	No	No	No	Open Top		
2170790-1	1x4	Through Bezel	EMI Springs	No	No	Yes	Custom Height		
2170790-2	1x4	Through Bezel	EMI Springs	No	No	Yes	Custom Height		
2170790-3	1x4	Through Bezel	EMI Springs	No	No	Yes	Custom Height		
2170790-4	1x4	Through Bezel	EMI Springs	No	No	Yes	Custom Height		
2170790-5	1x4	Through Bezel	EMI Springs	No	No	Yes	Custom Height		
2170708	1x6	Through Bezel	EMI Springs	Yes	Yes	Yes	Yes	Yes	Yes
2170734	1x6	Through Bezel	EMI Springs	Yes	Yes	Yes	No	No	No
2170707	1x6	Through Bezel	EMI Springs	No	No	No	Yes	Yes	Yes
2170706	1x6	Through Bezel	EMI Springs	No	No	No	No	No	No
2198373	2x1	Through Bezel	EMI Gasket	0/1			No	No	No
2227224	2x1	Through Bezel	EMI Gasket	0/1			No	No	No
2287054	2x1	Through Bezel	EMI Gasket	2			No	No	No
2227666	2x1	Through Bezel	EMI Springs	0/1			No	No	No
2227669	2x1	Through Bezel	EMI Springs	0/1			No	No	No
2227669	2x1	Through Bezel	EMI Springs	2			No	No	No
2170608	2x1	Through Bezel	EMI Gasket	2**			Thermal Footprint		
2214593	2x2	Through Bezel	EMI Gasket	0/1			No	No	No
2227225	2x2	Through Bezel	EMI Gasket	0/1			No	No	No
2287054	2x2	Through Bezel	EMI Gasket	2			No	No	No
2227667	2x2	Through Bezel	EMI Springs	0/1			No	No	No
2227670	2x2	Through Bezel	EMI Springs	0/1			No	No	No
2289129	2x2	Through Bezel	EMI Springs	2			No	No	No
2214565	2x3	Through Bezel	EMI Gasket	0/1			No	No	No
2227226	2x3	Through Bezel	EMI Gasket	0/1			No	No	No
2287054	2x3	Through Bezel	EMI Gasket	2			No	No	No
2227668	2x3	Through Bezel	EMI Springs	0/1			No	No	No
2227671	2x3	Through Bezel	EMI Springs	0/1			No	No	No
2227671	2x3	Through Bezel	EMI Springs	2			No	No	No
2170610	2x3	Through Bezel	EMI Gasket	1/2**			Thermal Footprint		

Part Number 1551920-2: zQSFP+ Surface Mount Connector for use with all 1xN cages

Notes:
C = Customer Applied Gasket
1xN cages: require a SMT connector to complete the assembly
2xN cages: connectors and cages come as one integrated assembly
All cages use EMI Plug 1888810-2

Accessories

Type	Description	Part Number(s)
Surface Mount Connector	zQSFP+ SMT connector (For use with all 1xN cages)	1551920-2
Behind Bezel	1x1 Heat Sink Clip	2007304-5
	1xN Heat Sink Clip	2227644-3, -4, -6
	1x1 Single Lightpipe	2173481-1
	1xN Single Lightpipe	2173482-1, -2, -3, -7
Through Bezel	1x1 Heats Sink Clip	2007304-5
	1xN Heat Sink Clip	2227644-3, -4, -6
	1x1 Single Lightpipe	2170720-1
	1x1 Dual Lightpipe	2170762-1
	1x1 Quad Lightpipe	2170777-1
	1xN Single Lightpipe	2170720-1
	1xN Dual Lightpipe	2170761-1
	1xN Quad Lightpipe	2170762-1

Direct Attach Copper Cable Assemblies

TE's QSFP28 passive copper cable assembly features eight differential copper pairs, providing four data transmission channels at speeds up to 28 Gbps per channel, and meets 100G Ethernet, 25G Ethernet and InfiniBand Enhanced Data Rate (EDR) requirements.

Offered in a broad range of wire gages – from 26AWG through 33AWG – this 100G copper cable assembly features low insertion loss and low cross talk. This next generation cable assembly shares the same mating interface with QSFP+ form factors, making it backward compatible with existing QSFP ports. QSFP28 can be used with current 10G and 14G applications with substantial signal integrity margin.

In addition to 100G to 100G straight cables, TE offers break out assemblies with a 100G QSFP28 module on one end breaking out to four 25G SFP28 or two 50G QSFP28 modules on the opposite end of the assembly.

Features and Benefits

- Compatible with IEEE 802.3bj, IEEE 802.3by and InfiniBand EDR
- Supports aggregate data rates of 100Gbps
- Optimized construction to minimize insertion loss and cross talk
- Customized 360° cable braid termination limits EMI radiation
- Backward compatible with existing QSFP+ connectors and cages
- Pull-to-release slide latch design
- 26AWG through 33AWG cable
- Straight and breakout assembly configurations available
- Customizable EEPROM mapping for cable signature
- RoHS compliant

Base Part Number	Description	AWG	Dash to Length (meters)				
			1	2	3	4	5
2829040	InfiniBand EDR	33	-2				
		30	-4	-6			
		26		-7	-8		
2231368	100G Ethernet	33	-16	-18			
		30	-1	-2	-8		
		28			-3	-21	
		26		-14	-7	-4	-12
2821033	QSFP28 Break out to 4x SFP28	33	-8				
		30	-1	-10	-2		
		28			-4		
		26			-12	-5	-3
2821309	QSFP28 Break out to 2x QSFP28	33	-7				
		30	-1	-2	-4		
		28			-8		
		26		-5	-3		-9

Contact your TE Representative for customized lengths.

Frequently Asked Questions

What data rate does zQSFP+ support?

zQSFP+ provides four data transmission channels at speeds up to 28 Gbps per channel, and meets 100G Ethernet (4x28Gbps) and InfiniBand Enhanced Data Rate (EDR) requirements.

Is TE's footprint compatible with other suppliers?

TE's behind bezel cages are not compatible with all sources. TE through bezel 1xN and stacked products are footprint compatible and dual sourced with Molex, LLC. zQSFP+ connectors and cages are designed to meet SFF-8662.

Are heat sinks available?

Yes, TE offers a generous portfolio of heat sink heights and styles, as well as custom heat sinks upon request.

Is application tooling required?

Single port cage assemblies require only flat-rock tooling, while 1xN and stacked assemblies normally require specific application tooling.

For More Information

TE Technical Support Center

USA:	1.800.522.6752
Canada:	1 .905.475.6222
Mexico:	52.0.55.1106.0800
Latin/S. America:	54.0.11.4733.2200
Germany:	49.0.6251.133.1999
UK:	44.0.800.267666
France:	33.0.1.3420.8686
Netherlands:	31.0.73.6246.999
China:	86.0.400.820.6015

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