ept connectors

New Products

October 2018

Symbols

Mating configuration


Parallel


Perpendicular


Horizontal


Direct Connector


Cable

Termination


SMT


Press-fit


Through-Hole


THTR

Application


Power

High Speed


High Density


Rugged


EMC

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Table of contents

Zero8 – 0.8 mm SMT for Board-to-Board Applications

Scalable & Robust

The product group Zero8 with ScaleX technology offers a high level of design, stacking and pin count scalability. This connector series is available with double sided shielding. The shielding can be omitted in future variations.

The robust ScaleX connector technology ensures a secure contact during mechanical stress (vibration, shock) and compensates for unit tolerances in all directions (x,y,z). The connector's sophisticated geometry protects its contacts from faulty handling.

ScaleX - Double sided, robust contact technology in a versatile and scalable connector system.

For more information please visit www.ept.de/Zero8

Key Features:

- up to 16 Gbps
- 12 to 80 pins
- 1.4 A operational current
- 500 mating cycles
- reliable contact
- optimized contact damage prevention
- packed in Tape & Reel

Applications:

- board-to-board (mezzanine) from 6 - 20 mm
- parallel and perpendicular connection
- optional: unshielded version

Termination

SMT

Application

High Density

High Speed

EMC

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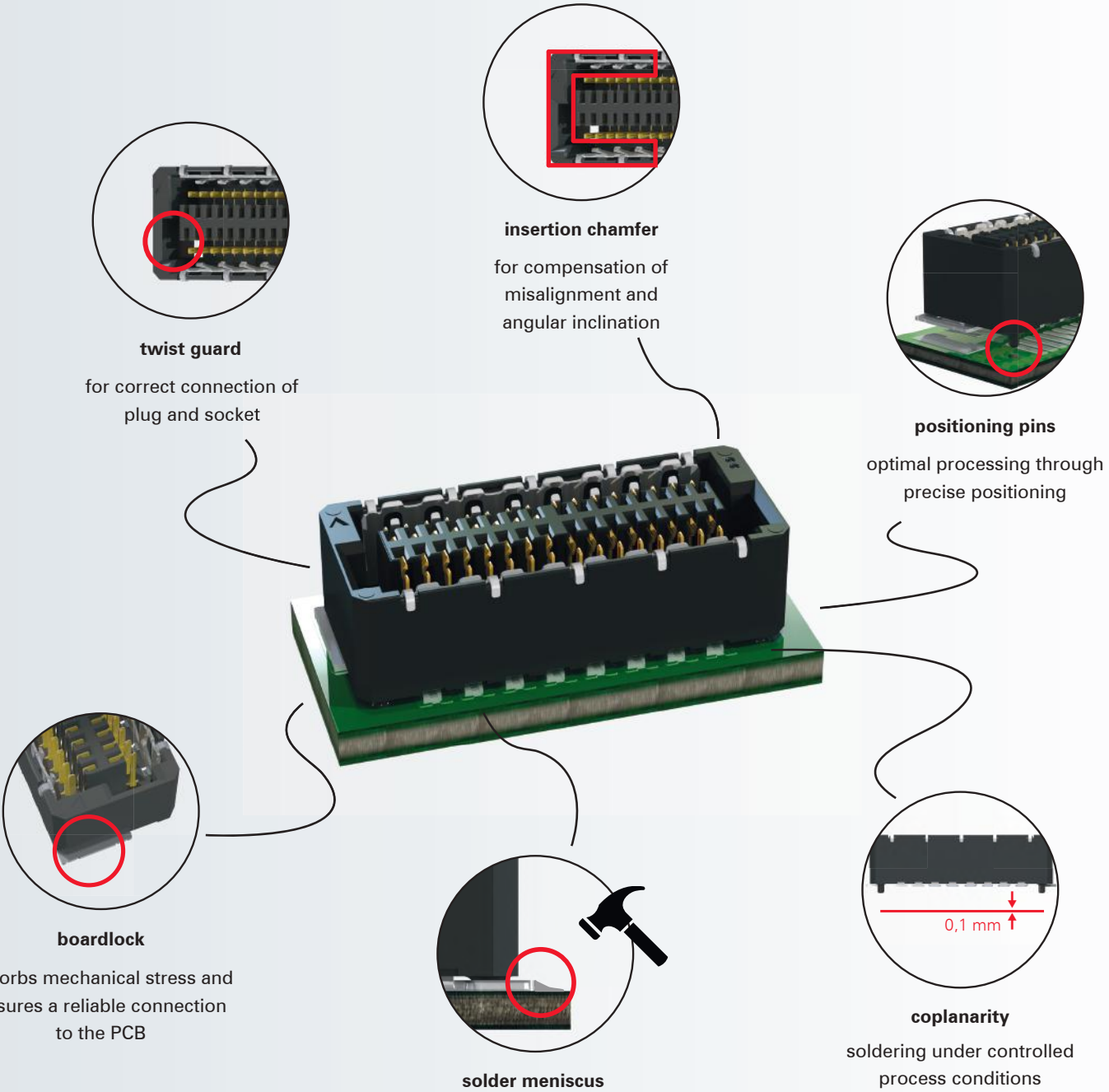
Zero8 – Product Overview

Type of Zero8 connector		Height	Number of pins	Mating configuration			Page
				Parallel	Horizontal	Perpendicular	
	Socket low-profile	4.85 mm	12 ... 80	✓		✓	Coming soon
	Socket mid-profile	7.85 mm	12 ... 80	✓		✓	12
	Plug low-profile	1.15 mm	12 ... 80	✓		✓	Coming soon
	Plug mid-profile	2.65 mm	12 ... 80	✓		✓	14
	Socket angled		12 ... 80		✓	✓	Coming soon
	Plug angled		12 ... 80		✓	✓	Coming soon

Advantages of the Zero8 Connector



twist guard

for correct connection of plug and socket

insertion chamfer

for compensation of misalignment and angular inclination

positioning pins

optimal processing through precise positioning

boardlock

absorbs mechanical stress and ensures a reliable connection to the PCB

solder meniscus

guarantees a robust surface mount connection

coplanarity

soldering under controlled process conditions

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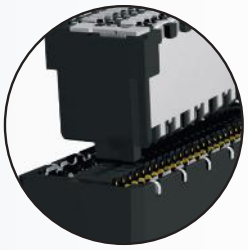
Your Advantages

double sided contact system

double sided contact system for a secure connection in the industrial environment (shock, vibration, thermal cycles, corrosive gas)

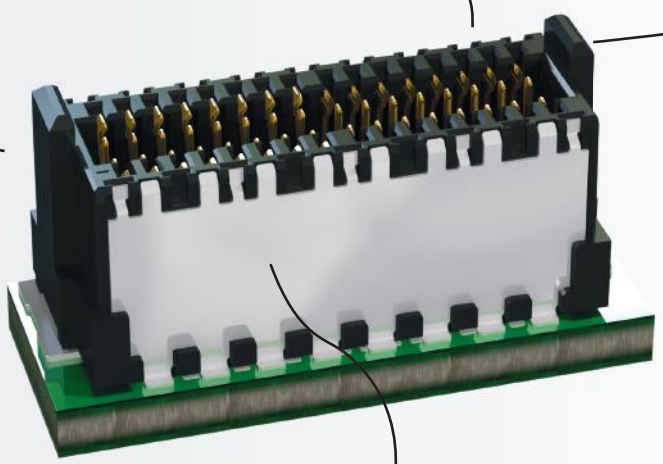
smooth contact surface

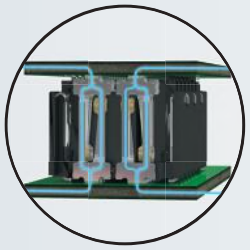
smooth surface: the contact on the homogenous rolled side with high-end surface allows for up to 500 mating cycles



protected contacts

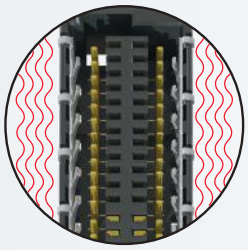
optimized contact and casing geometry reduce damage to contacts





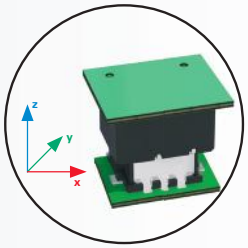
data flow

HF optimized contact geometry ensures data transfer speeds of up to 16 Gpbs



EMC shielding

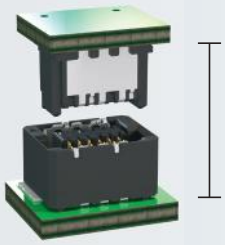
double sided shielding ensures a high electromagnetic compatibility for optimal signal integrity in the industrial environment



tolerance compensation

high reliability through tolerance compensation

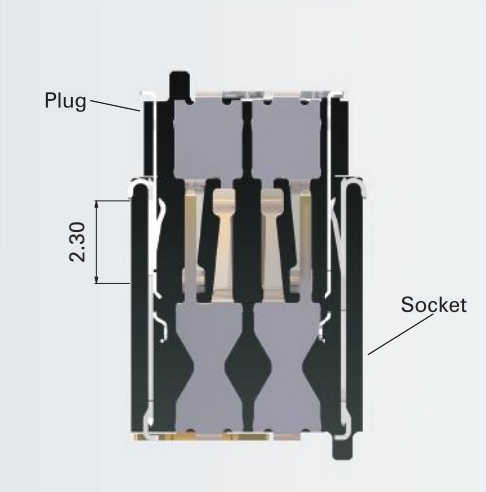
PCB Distances Board-to-Board



Board-to-Board distances of 6.00 to 20.00 mm can be achieved using Zero8 connections.

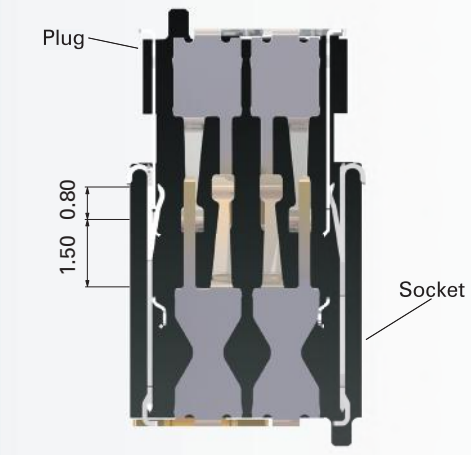
					
PCB distance (min. - max.)	6.00 - 7.50 mm	7.50 - 9.00 mm	9.00 - 10.50 mm	10.50 - 12.00 mm	12.00 - 20.00 mm
Socket height	low-profile 4.85 mm (coming soon)	low-profile 4.85 mm (coming soon)	mid-profile 7.85 mm (see page 12)	mid-profile 7.85 mm (see page 12)	high-profile (coming soon)
Plug height	low-profile 1.15 mm (coming soon)	mid-profile 2.65 mm (see page 14)	low-profile 1.15 mm (coming soon)	mid-profile 2.65 mm (see page 14)	high-profile (coming soon)

Connection for min. PCB distance



The minimum possible board-to-board distance is achieved by plugging the connector all the way in to the stop position.

Connection for max. PCB distance



The plug and socket can be inserted anywhere within a range of 1.5 mm, thus allowing for the maximum possible board-to-board distance. The remaining 0.8 mm ensure secure contact mating.

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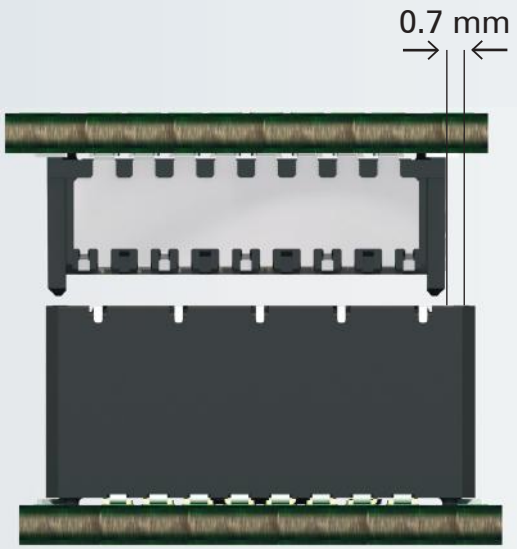
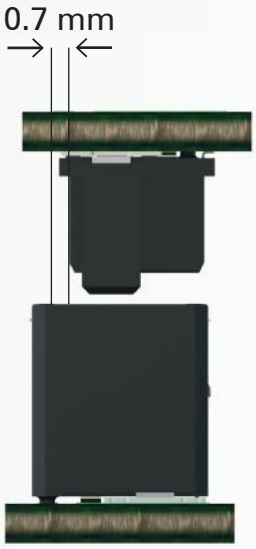
Misalignment Zero8 Connectors

Allowed misalignment tolerances

longitudinal: ± 0.7 mm



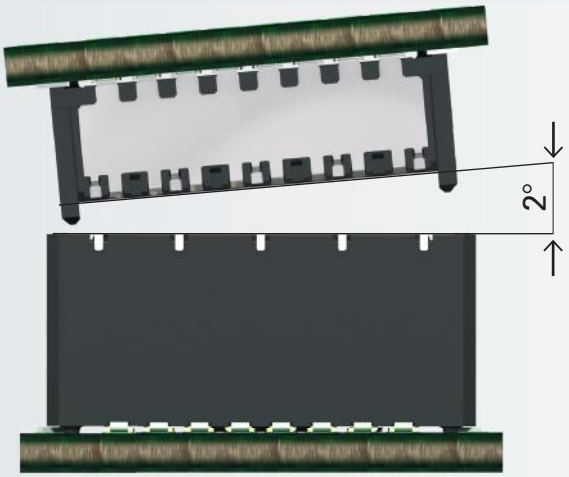
transverse: ± 0.7 mm



Angular Inclination Zero8 Connectors

Allowed angular inclination tolerances

longitudinal: ± 2°

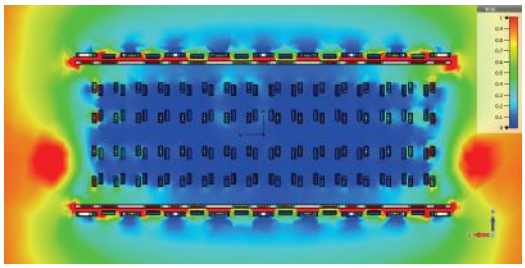
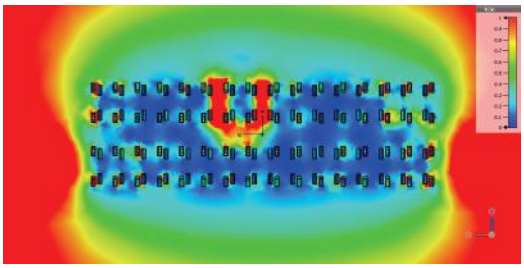
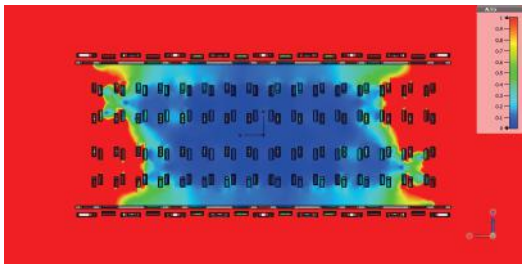
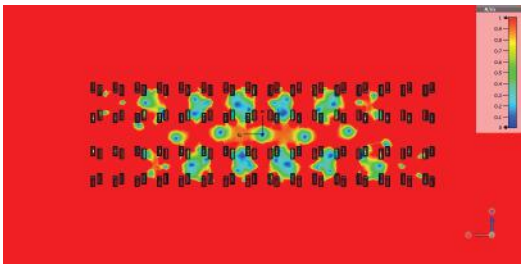


transverse: ± 4°

Electromagentic Compatibility

The double sided shielding concept guarantees a interference-free HighSpeed transfer for the industrial environment: The utilized shielding material works especially well for components with high electromagentic compatibility requirements and guarantees a coupling inductivity of max. 10pH for the connector.

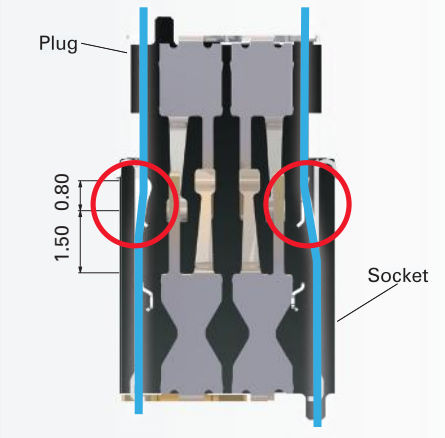
Electric and magnetic field strength influence of the connector can be simulated through the coupling inductivity.

Shielded Connector	Unshielded Connector
Electric Field Strength	
	
Magnetic Field Strength	
	

The extensive shielding concept uses multiple contact points to channel interferences away from mass connections.

Secure connections of individual PCB distances of 6 - 20 mm are guaranteed by the shielding concept's extended mating area of 2.3 mm.

The shielding concept not only protects the connector from electromagentic influences but also the neighboring components, should the connector be a source of interference.



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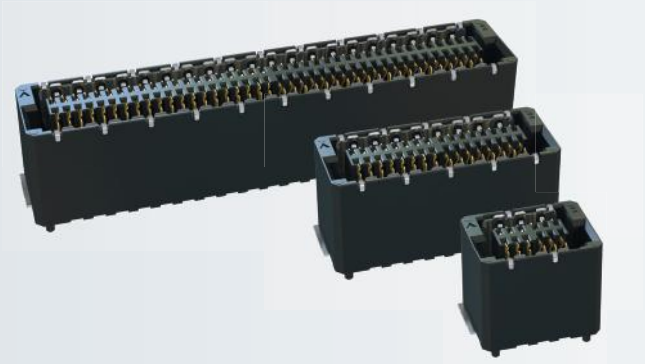
Technical specification	Zero8	
	Test Standard	0.8 mm SMT Board-to-Board Connectors
Basics		
Number of pins		12 / 20 / 32 / 52 / 80
Termination		SMT
Operating temperature range		-55°C bis +125°C
Material		
Insulator material		LCP
CTI value	IEC 60112	150
Contact material		Copper alloy
Contact surface		Au over Ni
Termination area		Sn over Ni
Mechanical		
Pitch		0.8 mm
Mating- and separating force per Contact shielded / unshielded		≤ 1.2 N / ≤ 0.6 N
Durability	IEC 60512-9-1:2010	Performance level I: 500 mating cycles
Coplanarity		max. 0.1 mm
Vibration, sinusoidal	IEC 60512-6-4:2002	10 - 2000 Hz 20 g
Contact mating problems if vibrations occur, sinusoidal	IEC 60512-2-5:2003	< 1 µs
Shock, semi-sinusoidal	IEC 60512-6-3:2002	50 g 11 ms
Contact mating problems if shocks occur, semi-sinusoidal	IEC 60512-2-5:2003	< 1 µs
Electrical		
Operational current	IEC 60512-5-2:2002	max. 1.4 A at 20°C (52 pins)
Contact resistance	IEC 60512-2-1:2002	max. 25 mΩ
Clearance and creepage		min. 0.25 mm
Insulation resistance	IEC 60512-3-1:2002	min. 5 GΩ
Test voltage	IEC 60512-4-1:2003	500 V AC
Data transfer speed		16 Gbps
Coupling inductivity		10 pH
Processing		
Soldering temperature	JEDEC J-STD-020E	max. SMT reflow soldering temperature 20 - 40 s at 260°C
MSL	JEDEC J-STD-020E	1
Packaging		Tape and Reel
Assembly		Pick and place
Approval		
UL file		E130314
Environment		RoHS compliant



Typ: Socket straight mid-profile
7.85 mm unmated

Number of pins: 12 to 80

Pitch: 0.8 mm

Operational current: 1.4 A bei 20°C (52 pins)

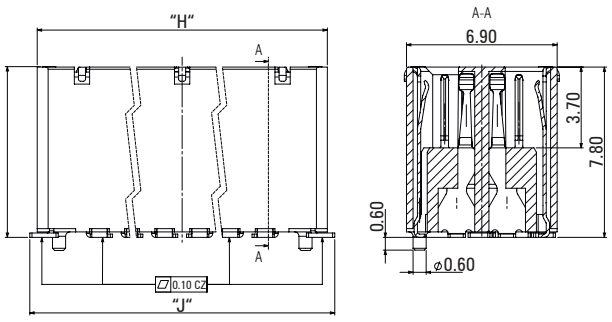
Packaging: Tape & Reel

Approval: cULus RoHS COMPLIANT

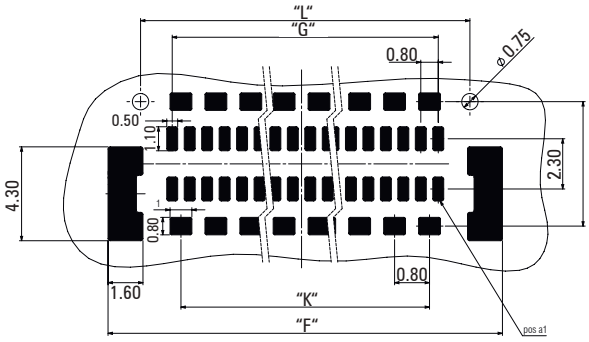
Technical Specifications on page 11

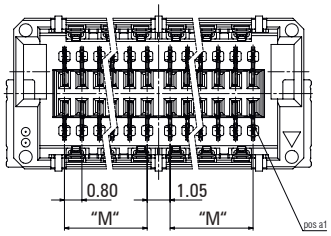
For drawings and technical data visit www.ept.de

Dimensions in mm



recommendation PCB layout





Pins	„F"	„G"	„H"	„J"	„K"	„L"	„M"
12	9.88	4.00	8.90	9.58	3.20	6.90	1.60
20	13.08	7.20	12.10	12.78	6.40	10.10	3.20
32	17.88	12.00	16.90	17.58	11.20	14.90	5.60
52	25.88	20.00	24.90	25.58	19.20	22.90	9.60
80	37.08	31.20	36.10	36.78	30.40	34.10	15.20

Mating connector / Application:

for parallel applications (p. 14-15)

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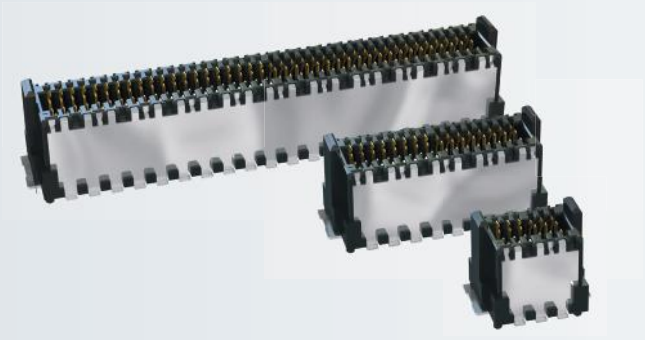
Socket mid-profile - Performance level I

Number of pins	Part number	PU (Tape & Reel)
12	406-53112-51	250
20	406-53120-51	
32	406-53132-51	
52	406-53152-51	
80	406-53180-51	

On request

- different number of pins
- other performance level



Typ: Plug straight mid-profile
2.65 mm unmated

Number of pins: 12 to 80

Pitch: 0.8 mm

Operational current: 1.4 A at 20°C (52 pins)

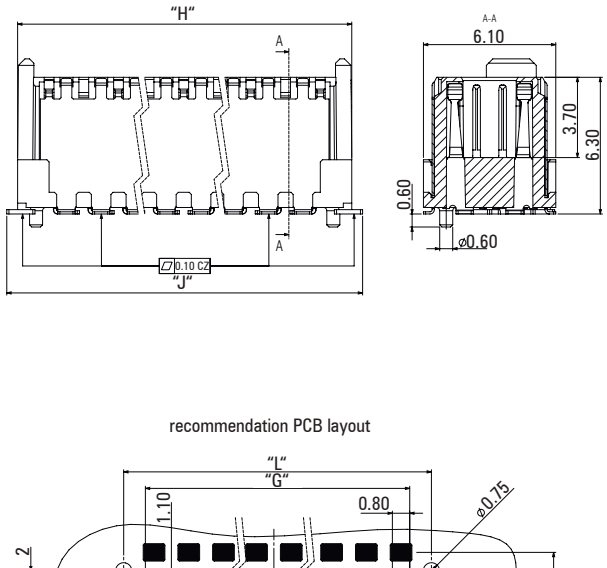
Packaging: Tape & Reel

Approval: cULus RoHS COMPLIANT

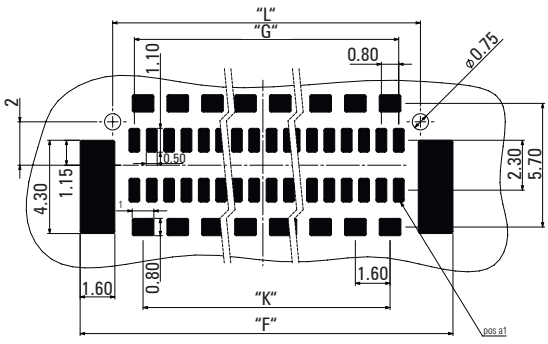
Technical Specifications on page 11

For drawings and technical data visit www.ept.de

Dimensions in mm



recommendation PCB layout



Pins	„F"	„G"	„H"	„J"	„K"	„L"	„M"
12	9.00	4.00	7.70	8.70	3.20	6.00	1.60
20	12.20	7.20	10.90	11.90	6.40	9.20	3.20
32	17.00	12.00	15.70	16.70	11.20	14.00	5.60
52	25.00	20.00	23.70	24.70	19.20	22.00	9.60
80	36.20	31.20	34.90	35.90	30.40	33.20	15.20

Mating connector / Application:

for parallel applications (p. 12-13)

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Plug mid-profile - Performance level I

Number of pins	Part number	PU (Tape & Reel)
12	405-53112-51	250
20	405-53120-51	
32	405-53132-51	
52	405-53152-51	
80	405-53180-51	

On request

- different number of pins
- other performance level

EC.8 – 0.8 mm SMT Edge Card Connector

Easy-to-use, HighSpeed, compact

ept expands its connector selection with a versatile 0.8 mm pitch solution. The EC.8 connector is built for speed: Compared to traditional connectors the EC.8 is made up of less components. This reduces changes in diameter and direction as well as reflections of the signal - the application receives quick, high integrity signals, at transfer speeds of up to 24 Gbps.

The edge card technology excels in the areas of data transfer and signal integrity. Well thought out features increase usability. Nothing stands in the way of its implementation into your HighSpeed applications.

For more information please visit www.ept.de/EC8

Key Features:

- Edge card connector
- 20 to 200 pins
- 24 Gbps transfer rate
- 3.2 A operational current
- 500 mating cycles
- packed in Tape & Reel, Tray
- 1.60 mm edge card thickness

Applications:

- embedded
- industrial automation
- datacom

Termination

SMT

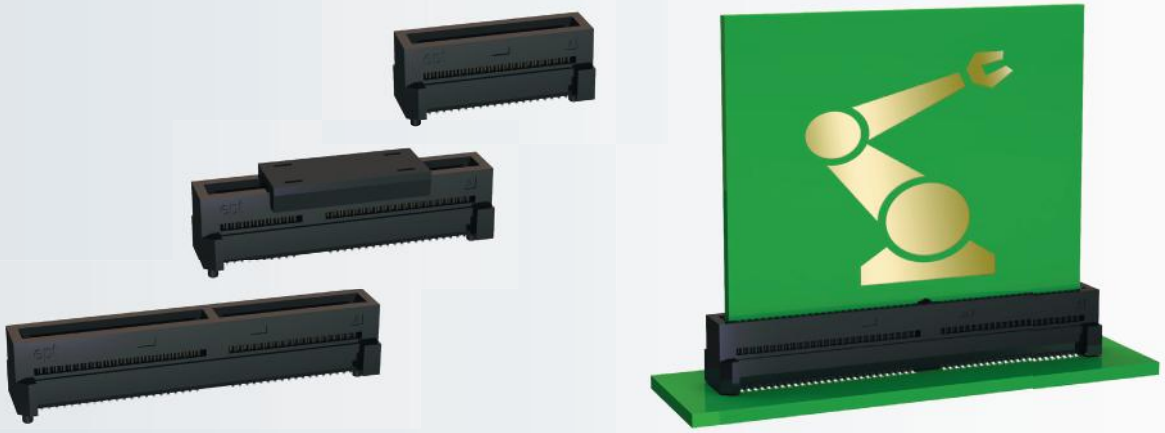
Application

High Density

Perpendicular

Edge Card Connector

HighSpeed



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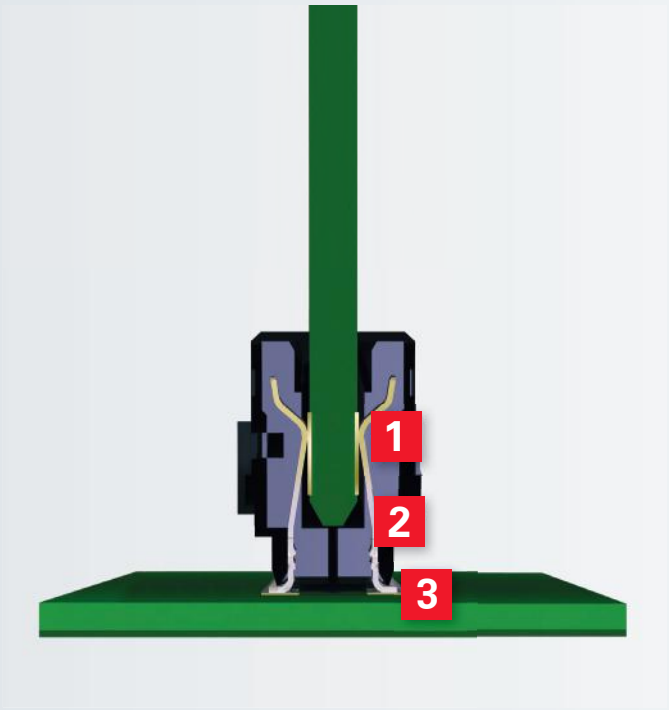
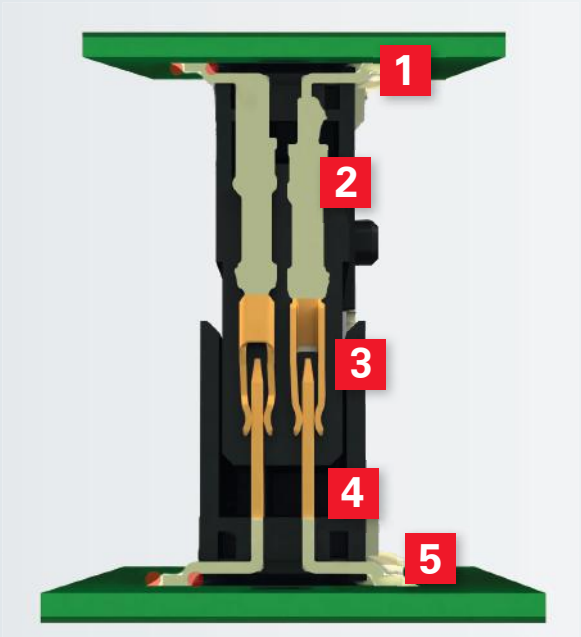
EC.8 – Edge Card Connector vs. Connector Pair

The edge card connector enables a direct connection to the printed circuit board without the necessity of a connector mate. This results in fewer points of contact and junctions in comparison to a female-male connection setup. The operational current and transfer rate properties are therefore positively affected.

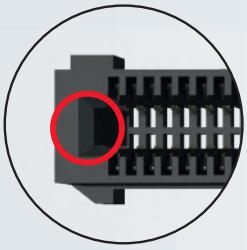


R Contact junction [1]
R Contact [2]
R PCB connection [3]



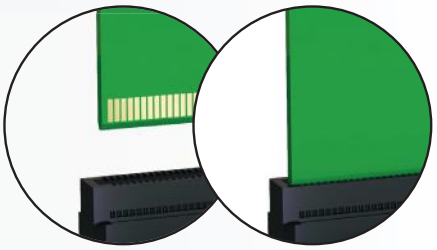
R PCB connection [1]
R Contact [2]
R Contact junction [3]
R Contact [4]
R PCB connection [5]

Advantages of the EC.8 Edge Card Connector



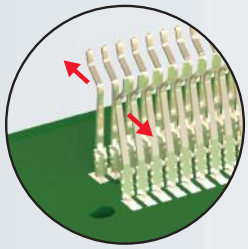
insertion chamfer

for compensation of misalignment and angular inclination



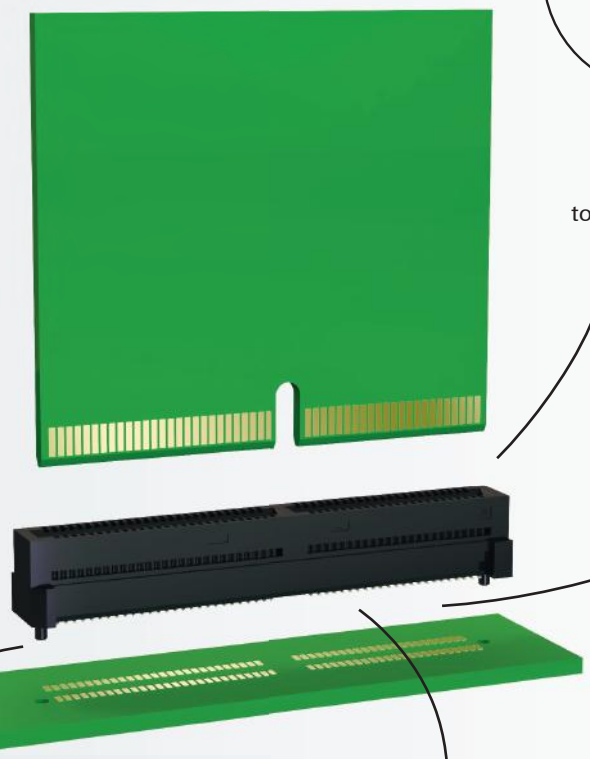
acoustic and haptic feedback

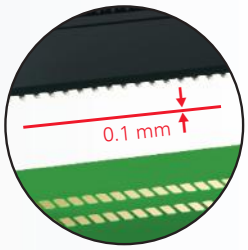
to secure an accurate connection with the edge card



tolerance compensation

allows for easy plugging and card thickness deviation



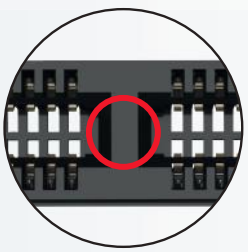


coplanarity

soldering under controlled process conditions

misalignment pins

prevents misalignment on the board



coding key

anti-twist safeguard and tolerance compensation for the edge card

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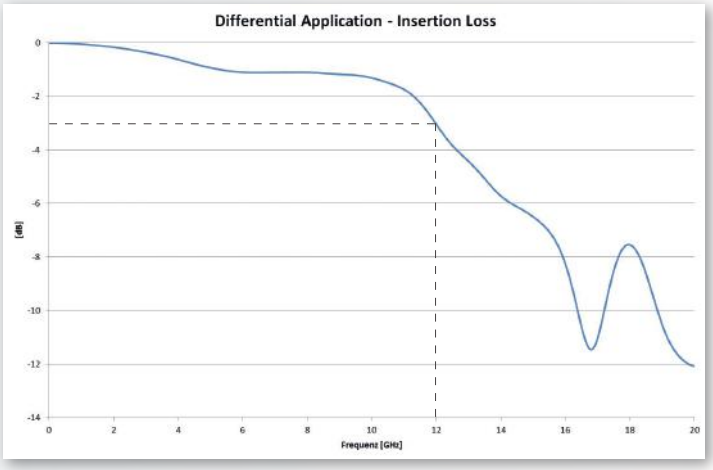
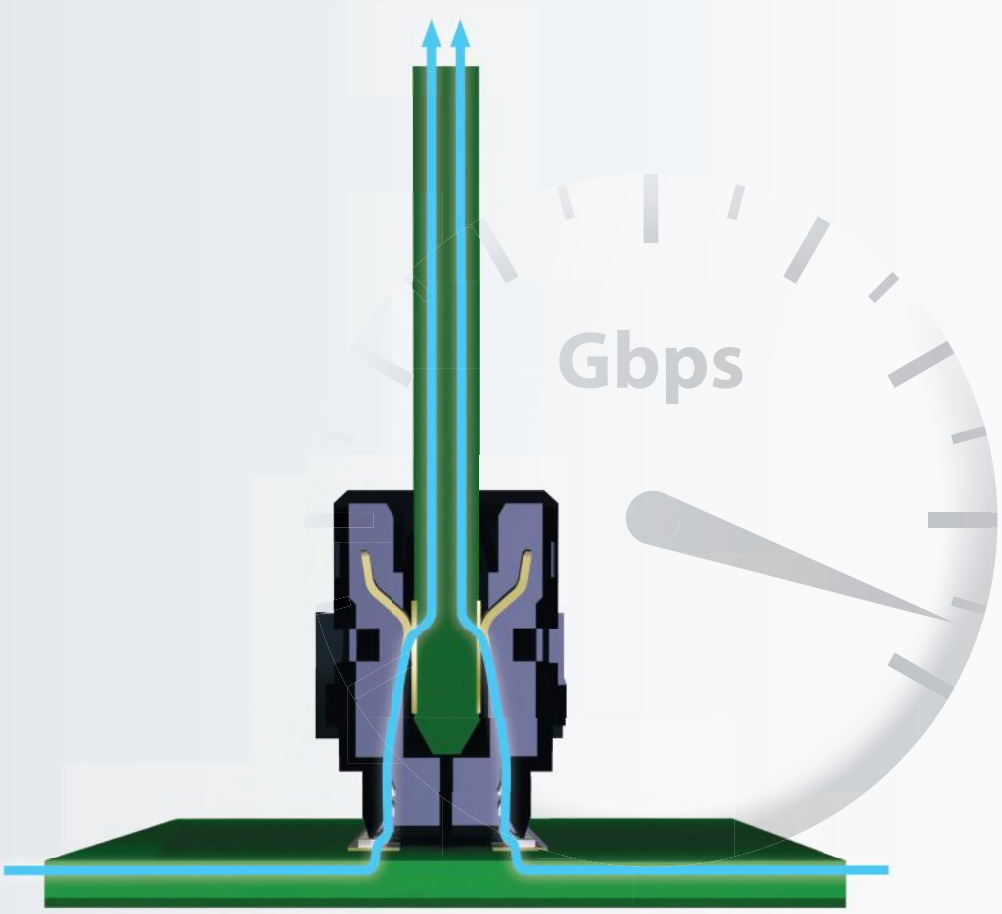
HighSpeed - EC.8

The EC.8 edge card connector setup supports up to 24 Gbps!

Edge card connectors are present in many HighSpeed applications. The EC.8 connector is ready for a seamless integration as well. Since „HighSpeed" depends on much more than pure transfer rates many simulations have been carried out in ept development labs during which the signal integrity has been assessed based on a specific set of criteria.

A detailed report of the HighSpeed properties as well as the s-parameters of a simulation based on your own design are available upon request: **sales@ept.de**

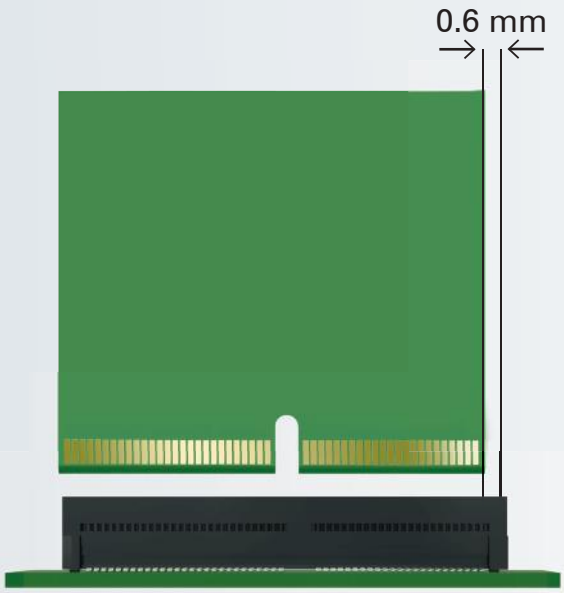




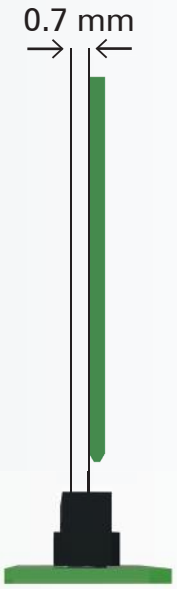
Misalignment EC.8 Connectors

Allowed misalignment tolerances

longitudinal: ± 0.6 mm



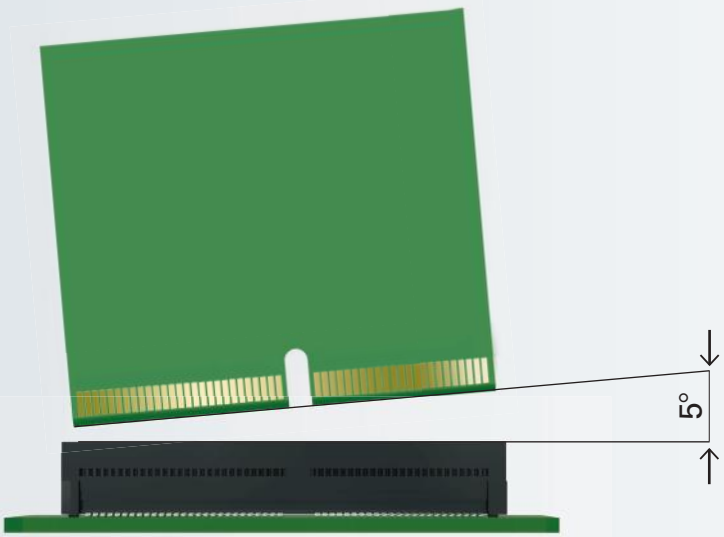
transverse: ± 0.7 mm



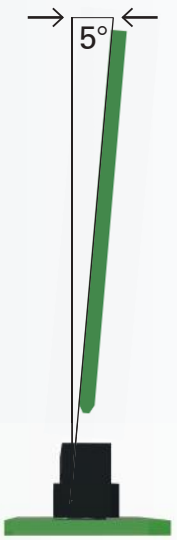
Angular Inclination EC.8 Connectors

Allowed angular inclination tolerances

longitudinal: ± 5°



transverse: ± 5°



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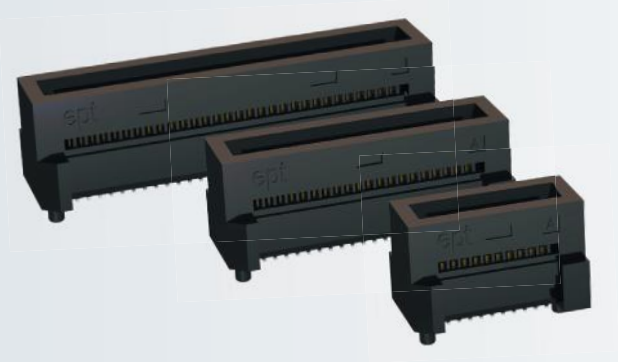
Technical Specifications

Technical specifications	Test Standard	EC.8 0.8 mm SMT Edge Card Connectors
Basics		
Number of pins		20 / 40 / 60 / 80 / 100 / 120 / 140 / 160 / 180 / 200
Termination		SMT
Operating temperature range		-55°C to +125°C
Material		
Insulator material		LCP
CTI value	IEC 60112	200
Contact material		Copper alloy
Contact surface		Au over PdNi over Ni
Termination area		Sn over Ni
Mechanical		
Pitch		0.8 mm
PCB thickness		1.60 mm
Mating force per pin		≤ 0.635 N
Seperating force per pin		≥ 0.06 N
Durability	IEC 60512-9-1:2010	Performance level I: 500 mating cycles
Coplanarity		≤ 0.1 mm
Vibration, sinusoidal	IEC 60512-6-4:2002	10 - 2000 Hz 20 g
Contact mating problems if vibrations occur, sinusoidal	IEC 60512-2-5:2003	≤ 1µs
Shock, semi-sinusoidal	IEC 60512-6-3:2002	50 g 11 ms
Contact mating problems if shocks occur, semi-sinusoidal	IEC 60512-2-5:2003	≤ 1µs
Electrical		
Operational current	IEC 60512-5-2:2002	3.2 A @ 20°C (8 of 140 pins) 1.35 A @ 20°C (140 pins)
Contact resistance	IEC 60512-2-1:2002	≤ 15 mΩ
Clearance and creepage		0.25 mm
Insulation resistance	IEC 60512-3-1:2002	≥ 1 GΩ
Test voltage	IEC 60512-4-1:2003	1100 V DC
Data transfer rate		24 Gbps
Processing		
Soldering temperature	JEDEC J-STD-020E	20 - 40 s at 260°C
MSL	JEDEC J-STD-020E	1
Packaging		Tape and Reel, Tray (starting at 160p)
Assembly		Pick and place
Approval		
UL file		E130314
Environment		RoHS compliant

Edge Card Connector (without key)



Type: Edge card connector straight
7.8 mm height

Number of pins: 20 to 60

Pitch: 0.8 mm

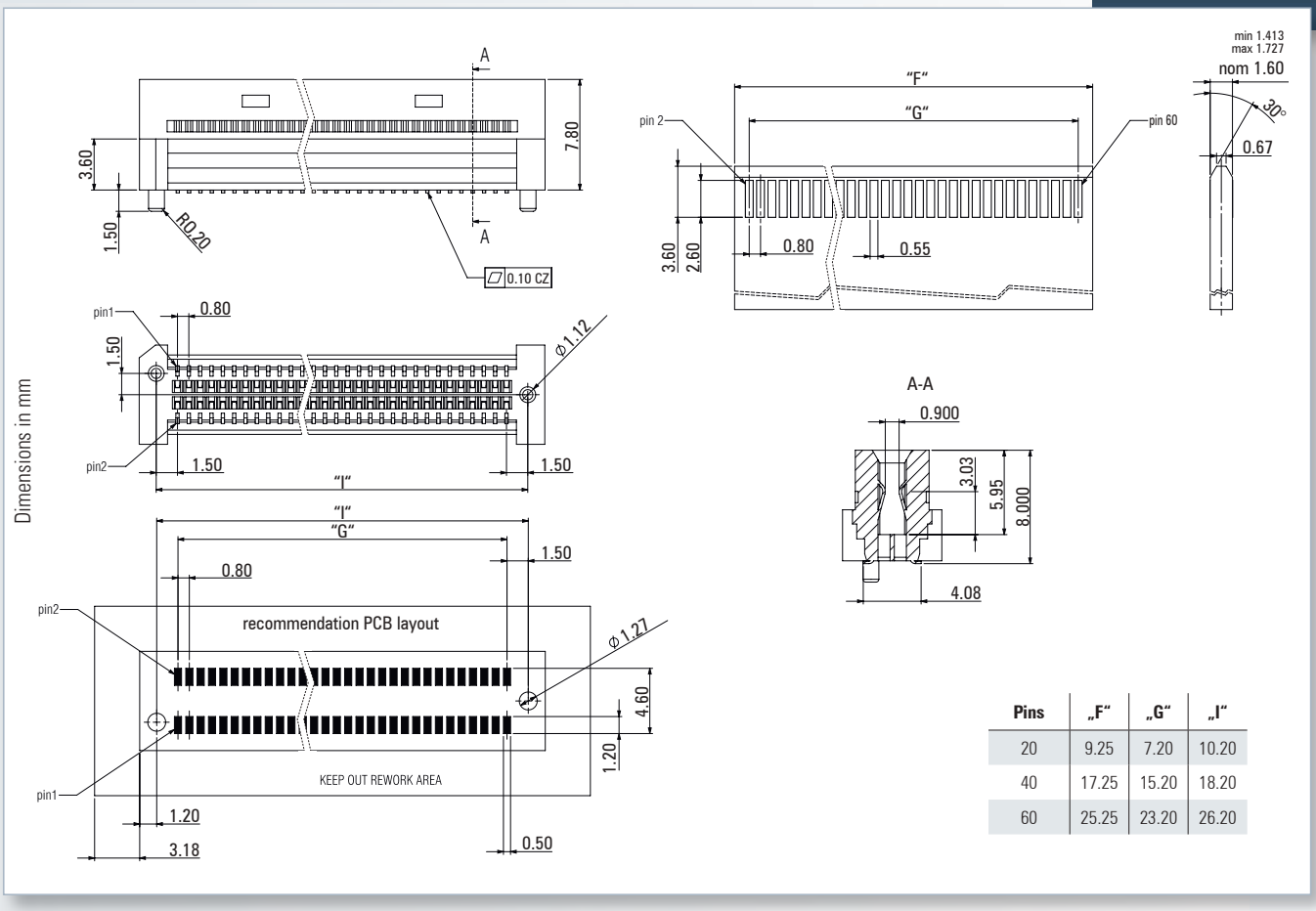
Operational current: 3.2 A at 20°C (140 pins)

Packaging: Tape & Reel

Approval: cULus RoHS COMPLIANT

Technical Specification on page 21

For drawings and technical data visit www.ept.de



Pins	„F"	„G"	„I"
20	9.25	7.20	10.20
40	17.25	15.20	18.20
60	25.25	23.20	26.20

More Options:

for connectors with key (p. 24-25)

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Edge Card Connector - Performance Level I

Number of pins	Part number	PU (Tape & Reel)
20	408-52020-000-11	250
40	408-52040-000-11	
60	408-52060-000-11	

EC.8

Edge Card Connector (with key)

Type: Edge card connector straight
7.8 mm height

Number of pins: 60 to 200

Pitch: 0.8 mm

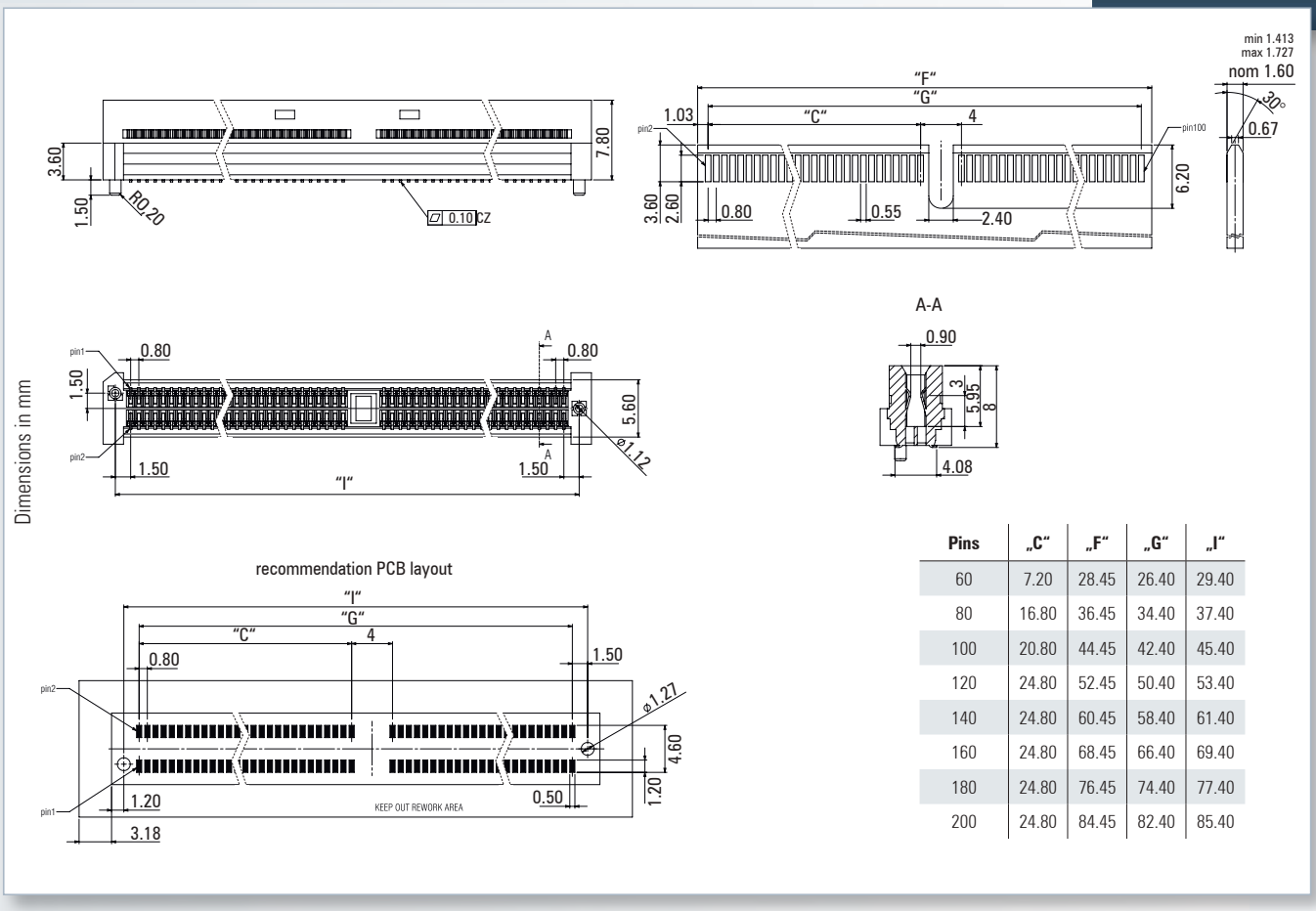
Operational current: 3.2 A at 20°C (140 pins)

Packaging: Tape & Reel, Tray

Approval:

Technical Specification on page 21

For drawings and technical data visit www.ept.de



Pins	„C“	„F“	„G“	„I“
60	7.20	28.45	26.40	29.40
80	16.80	36.45	34.40	37.40
100	20.80	44.45	42.40	45.40
120	24.80	52.45	50.40	53.40
140	24.80	60.45	58.40	61.40
160	24.80	68.45	66.40	69.40
180	24.80	76.45	74.40	77.40
200	24.80	84.45	82.40	85.40

More Options:

for connectors without key (p. 22-23)

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Edge Card Connector - Performance Level I

Number of pins	Part number	PU (Tape & Reel)
60	408-52060-100-11	250
80	408-52080-100-11	
100	408-52100-100-11	
120	408-52120-100-11	
140	408-52140-100-11	

Edge Card Connector - Performance Level I

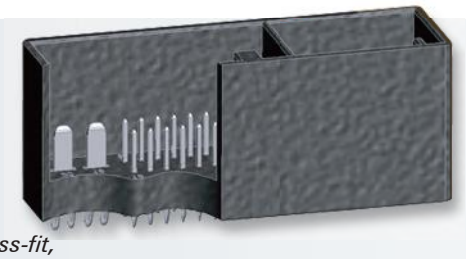
Number of pins	Part number	PU (Tray)
160	408-52160-100-12	90
180	408-52180-100-12	
200	408-52200-100-12	
	408-52200-103-12 (strengthened element along insulator)	

On Request

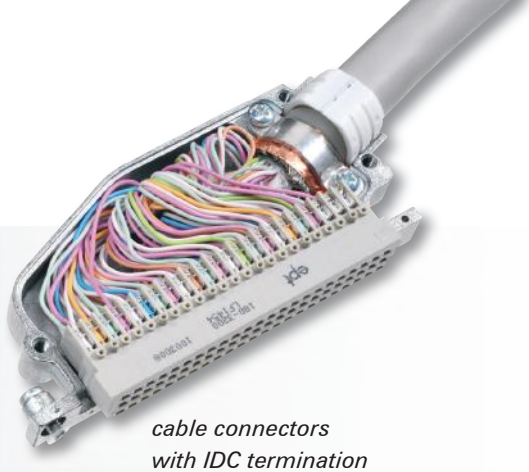
- Tape & Reel available

Customized Connectors

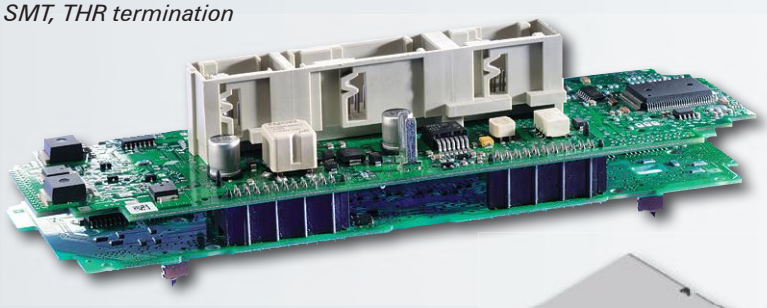
Individually developed and produced



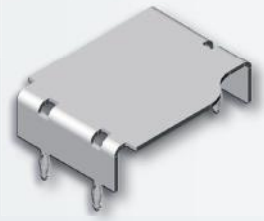
Male- & Female connectors in Press-fit, SMT, THR termination

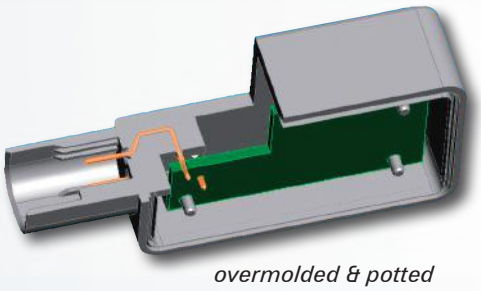


cable connectors with IDC termination



stamped terminal pins, sockets and shields





overmolded & potted connectors

"One Stop Supplier" for Customer Specific Connectors

Precision meets Passion

With its exceptional experienced employees, in-house tool-shop, and high vertical integration of manufacturing processes, ept is the perfect partner for customer specific connector solutions. Over the last 40 years, ept has proven to successfully develop and manufacture customized connectors in a variety of designs in different applications. ept's expertise is focused on stamped termination connectors, including examples of customized connector solutions such as shown above.

In-house from Your Request to SOP (Start of Production)

Starting with your request for a connection, ept's engineers are very experienced to develop a suitable, cost efficient and high quality product design. It is one of ept's major strengths to focus on a cost efficient design from the very beginning. In several projects we were able to reduce total cost of ownership up to 30% by adjusting the customers' original design for an optimized manufacturing process. Furthermore, cost efficiencies could be achieved by using already existing tools and equipment for customized applications.

ept's Project Managers follow a straight and targeted approach, based on the high requirements of APQP (Advanced Product Quality Planning) according to TS 16949. They make sure that deadlines are met, responses are given in short-notice, and possible problems are uncovered before you know of them. All required tools and equipment such as stamping dies, injection molding

Key features

- 40+ years of experience
- own Tool Shop
- fully vertical integration in manufacturing
- exceptional flexibility
- quick responsiveness
- cost efficiency
- excellent quality

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Individually developed and produced

tools, assembling, inspection and packing equipment can be designed and made in ept's in-house tool shop. Hence, distances are short, response time is quick and, finally, reaction times on your requests are short. Furthermore, our in-house tool shop allows you to have functional prototypes available within 4 to 8 weeks after project kick-off.

Highest Quality and Flexibility over Lifetime

As in the development phase, ept is using an in-house approach during mass production of a program's life cycle. All production processes including stamping, reel-to-reel plating, molding, assembling, testing, and packaging are accomplished in-house and under ept's direct control. Hence, required changes to the product design and/or production process will be achieved quickly, smoothly, competent, and without disturbance of sub-suppliers. On top, and as ept is a family owned company with a flat hierarchy, you may escalate crucial requests easily even up to ept's owners.

With its more than 1.200 employees, ept operates manufacturing sites worldwide, such as in Germany, the Czech Republic, the USA, and China. Therefore, we can use the best suitable manufacturing location for your needs, such as local content requirements. Nevertheless and in any case, ept's passionate employees are dedicated to put quality and precision in first place of your valued project.

ept – Your Partner

Share your applications or connector ideas with us. We are happy to analyze your concept and provide you with a feasibility study and an initial cost estimation.

International presence - the ept locations

ept´s roots are looked in the scenic landscape of southern Bavaria and from there ept has set out to become an international company. With production locations and sales offices in several countries as well as competent partners all over the world, ept is able to offer its connectors and solutions worldwide.

ept – your global partner

For your local contact please refer to **www.ept.de**

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ept connectors

ept designs, produces and distributes electronic connectors for highquality applications. Founded by Bernhard Guglhör over 40 years ago, we are proud to remain an independent and family owned company. Today, we employ over 1.200 people at six locations worldwide.

Over decades we have built trusting and successful partnerships with our customers, who are the primary focus of all. Our products and core competencies are used in high-level applications.

With our motto "Precision with Passion" ept stands for the highest quality and reliability under the personal and individual touch of dedicated employees.

We are looking forward to working with you.
Your ept-Team

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