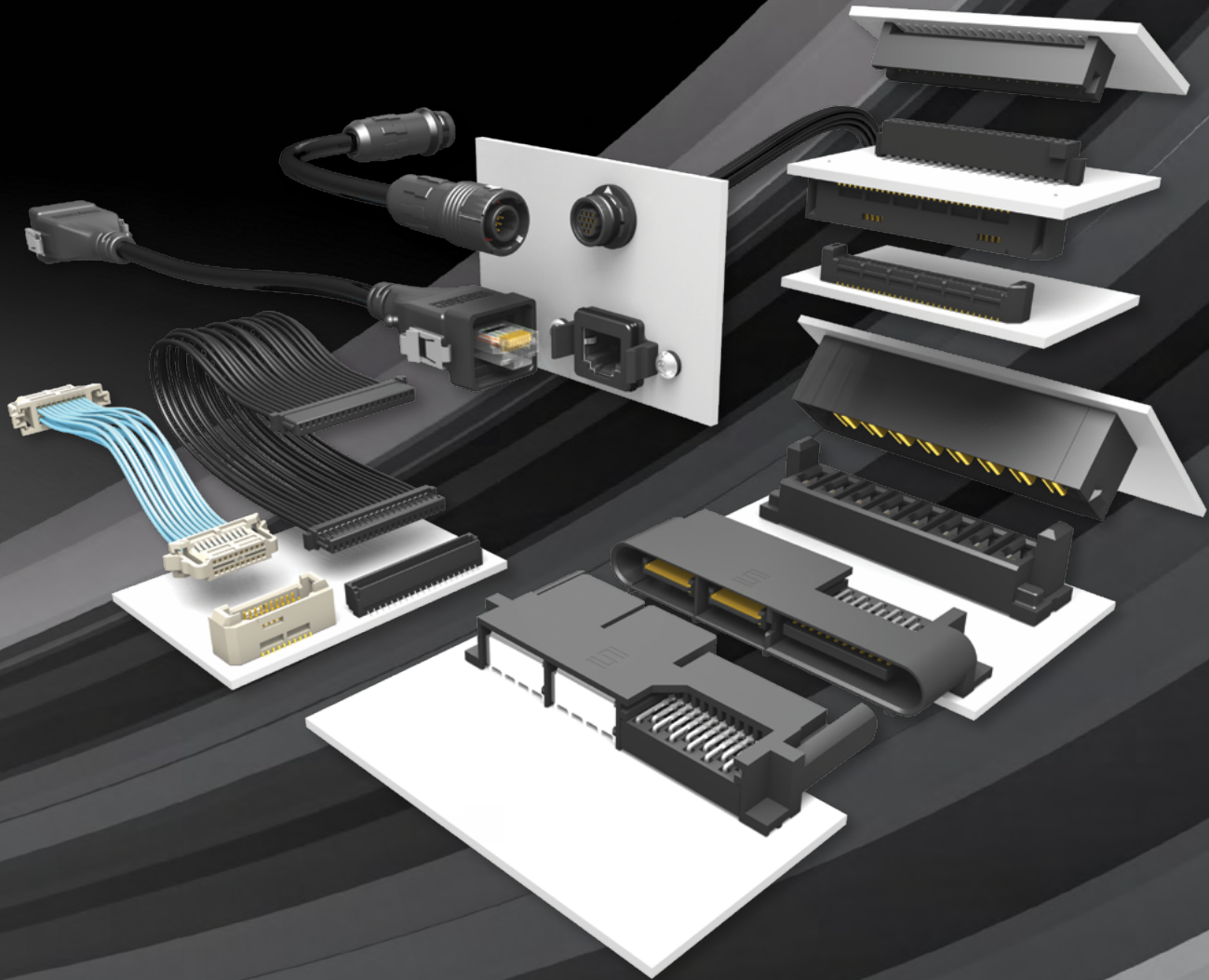




RUGGED

INTERCONNECT SOLUTIONS GUIDE

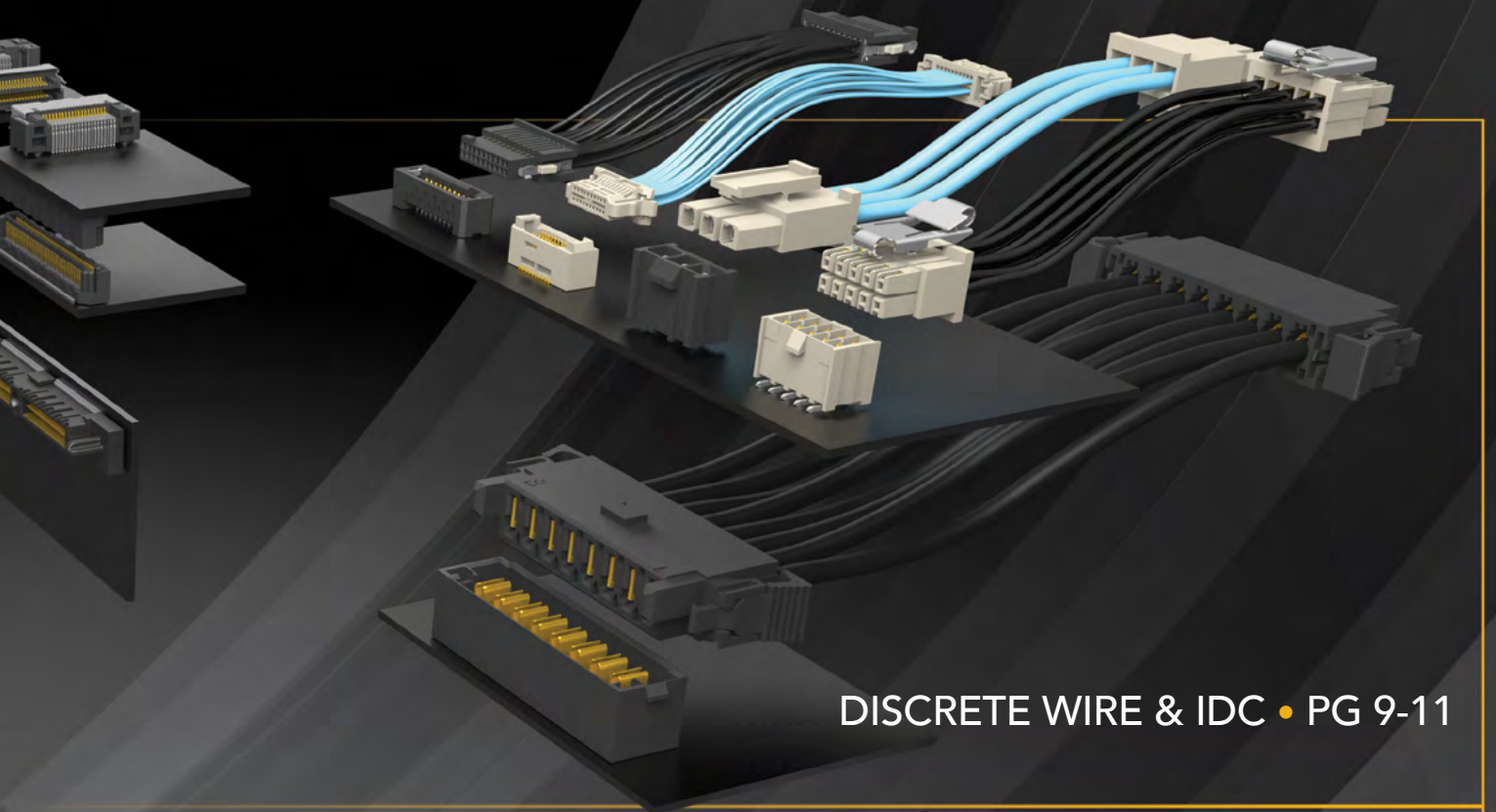
JANUARY 2015

RUGGED

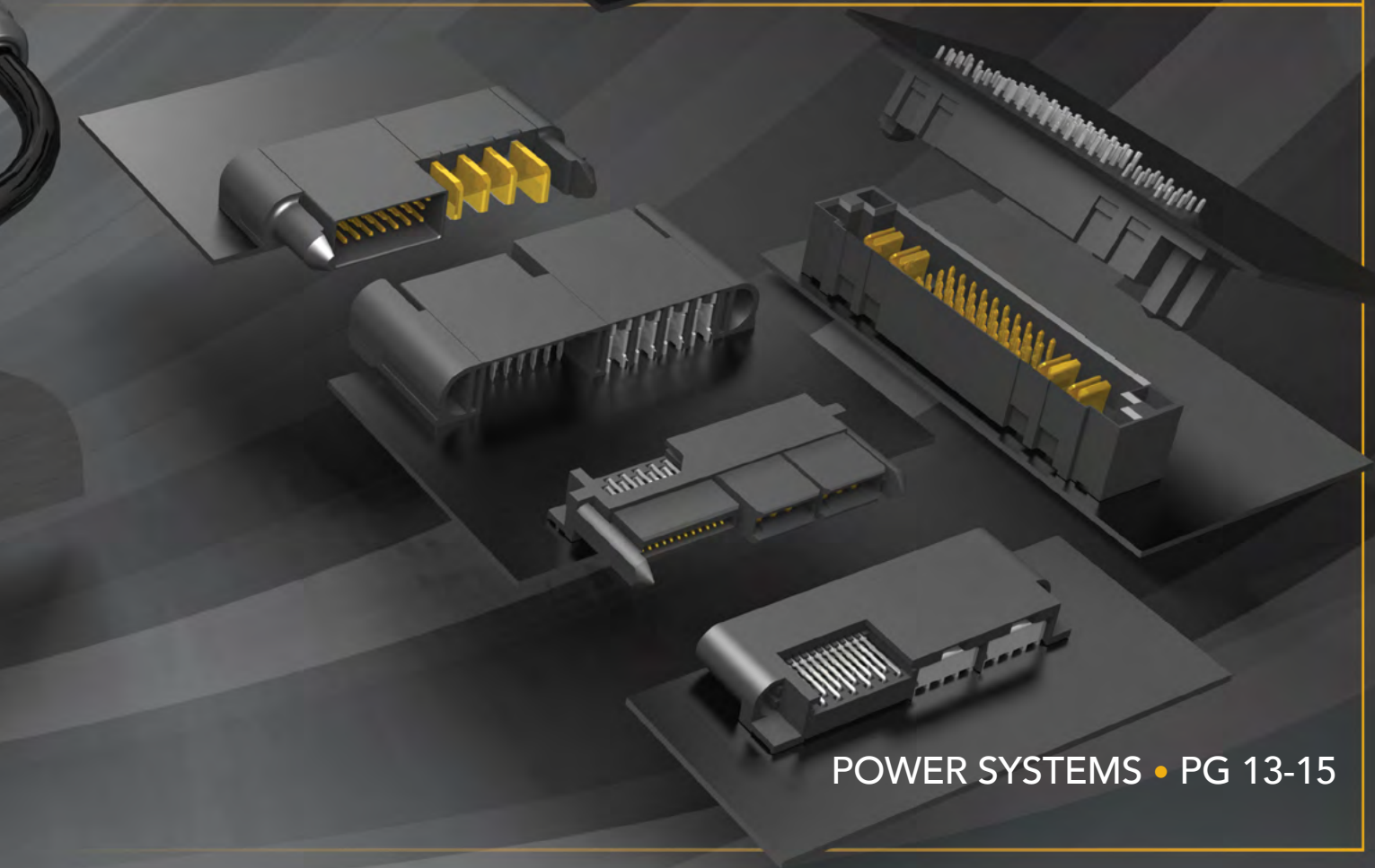
INTERCONNECT SOLUTIONS

MICRO RUGGED CONNECTORS • PG 5-8

SEALED I/O SYSTEMS • PG 17-19



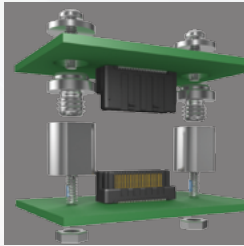
DISCRETE WIRE & IDC • PG 9-11



POWER SYSTEMS • PG 13-15

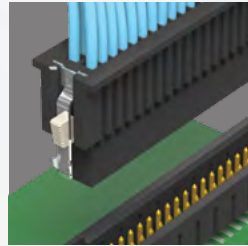
RUGGED FEATURES & OPTIONS

Maximum flexibility with standard or optional rugged features and systems designed to help improve reliability for harsh environment applications.



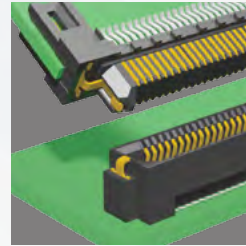
JACK SCREWS

Ideal for high normal force, zippering and other rugged applications



POSITIVE LATCHING

Manually activated latches increase unmating force by up to 200%



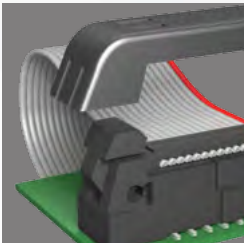
FRICTION LOCKS

Metal or plastic friction locks increase retention / withdrawal force



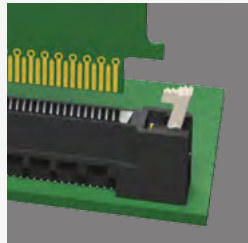
RETENTION PINS

Increase unmating force by up to 50%



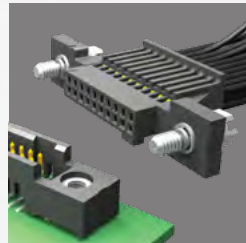
RUGGED IDC

Ejector headers, locks and caps



BOARD LOCKS

Boards are mechanically locked together



SCREW DOWNS

Secure mechanical attachment to the board



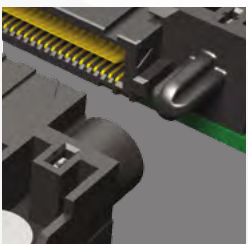
BOARD STANDOFFS

Precision machined standoffs for 5 mm to 30 mm board spacing



WELD TABS

Significantly increase shear resistance of connector to PCB



ALIGNMENT PINS / POSTS

Easy and secure mating



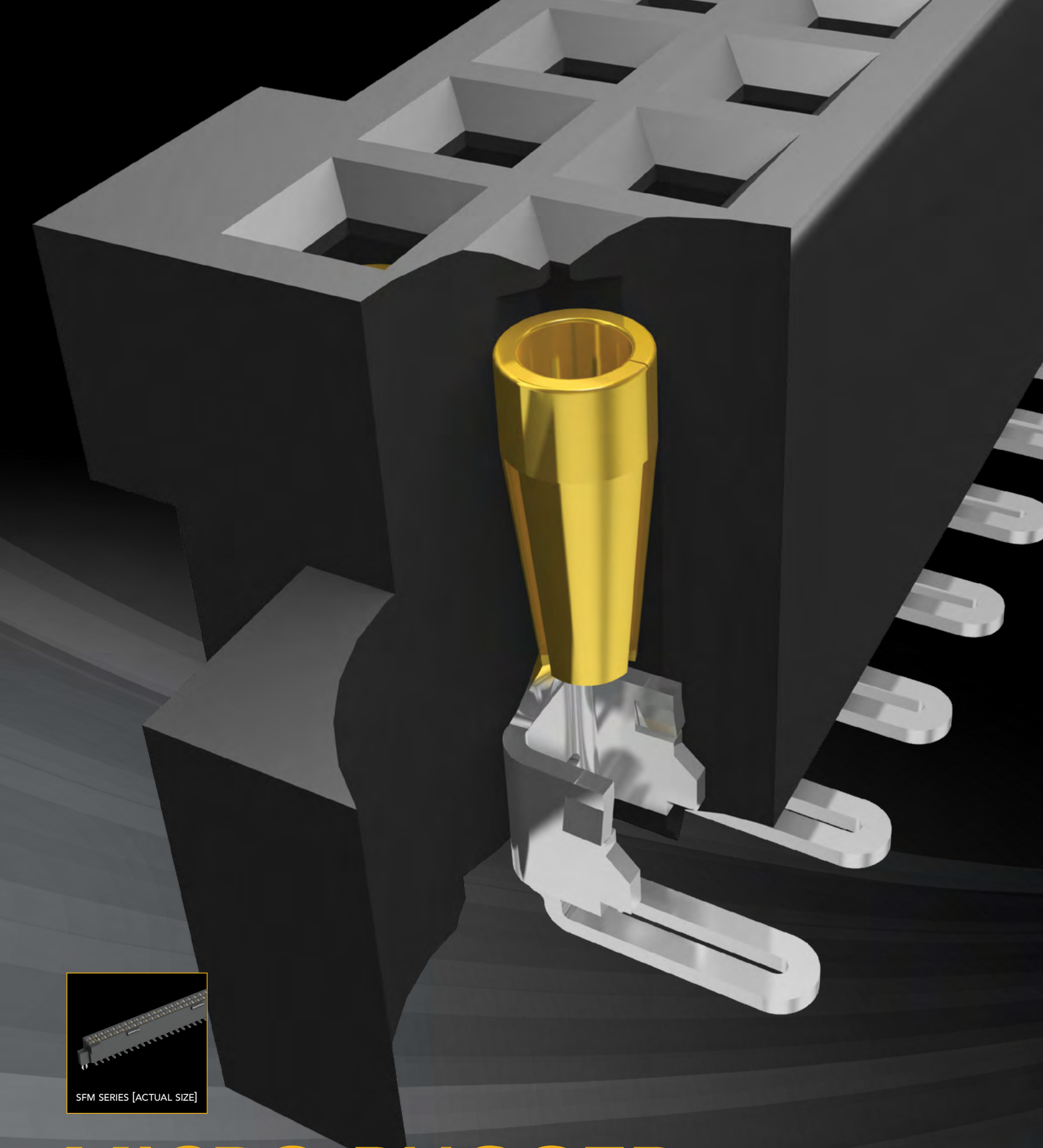
CAPTIVE PANEL SCREWS

Secure mechanical attachment to the panel



IP68 / IP67 SEALING

Maximum sealing for dust and waterproof tightness



MICRO RUGGED

0,50 mm to 2,00 mm PITCH • HIGH SPEED • HIGH MATING CYCLES

MICRO RUGGED CONNECTORS

TIGER EYE™ CONTACT SYSTEM

HIGH RELIABILITY • MULTI-FINGER • BeCu
HIGH MATING CYCLES • THREE PITCHES



1,27 mm Pitch Tiger Eye™ System

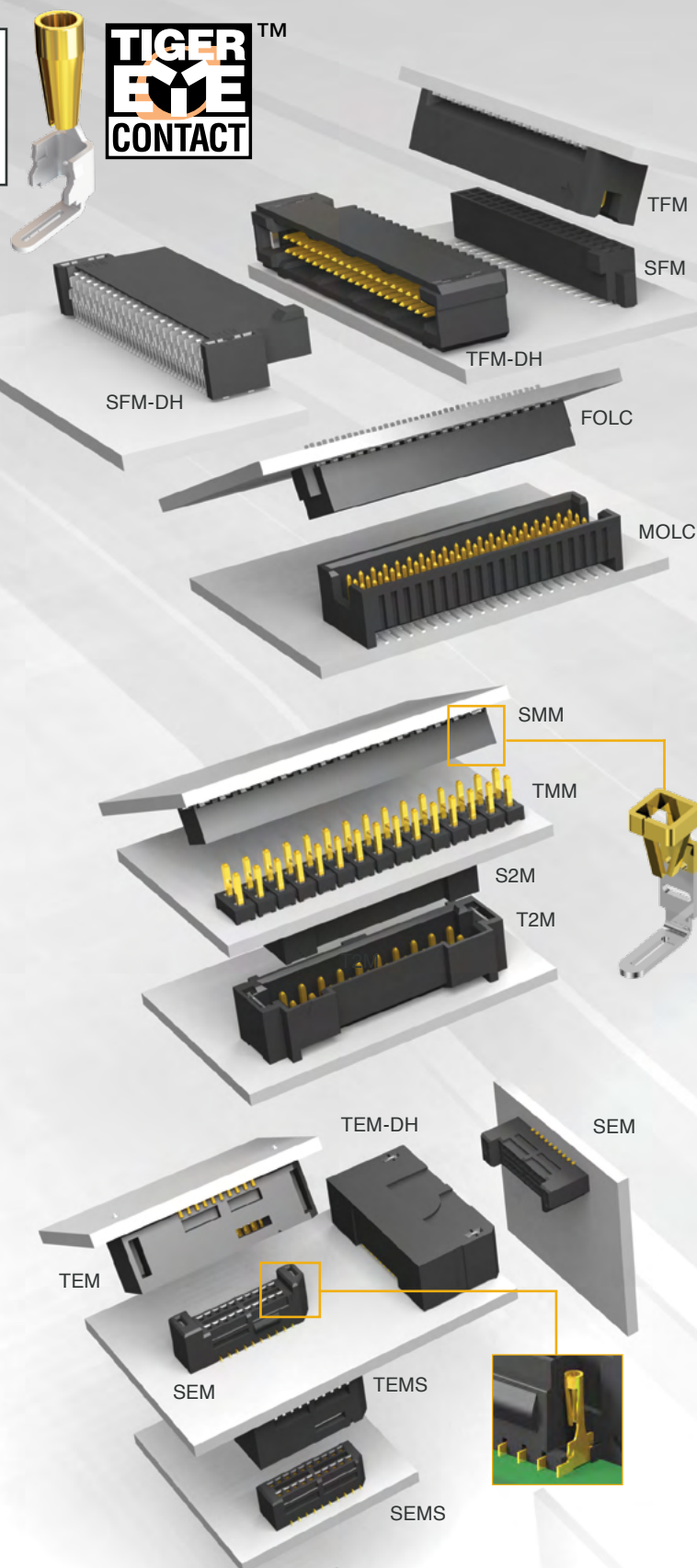
- Total pin counts from 3 to 200
- Vertical and right angle for parallel, perpendicular or coplanar applications
- Friction latching system for higher withdrawal forces (optional)
- Screw down, alignment pin, locking clip and weld tab options
- Shrouded, polarized and keyed
- Choice of mated heights
- Cost-saving Tiger Eye™ LITE Phosphor Bronze contact systems for applications where Beryllium Copper is not required
- Mating discrete wire, flat and twisted pair IDC cable systems

2,00 mm Pitch Tiger Eye™ System

- Wide range of stack heights
- Vertical and right angle mating headers for backplane applications
- Optional dual screw downs, weld tabs and locking clips
- Mating discrete wire and IDC cable systems

0,80 mm Pitch Tiger Eye™ System

- 6 mm, 7 mm and 10 mm stack heights
- Vertical and right angle mating headers for micro backplane applications
- Locking clip, alignment pins and optional weld tab features
- Mating discrete wire cable systems





EDGE RATE® CONTACT SYSTEM

28+ Gbps • OPTIMIZED FOR SI PERFORMANCE
ROBUST WHEN "ZIPPERED" DURING UNMATING
RUGGED DESIGN • INCREASED CONTACT WIPE

Edge Rate® Rugged Connectors

- 0,50 mm and 0,80 mm pitch
- Right angle and edge mount
- Up to 40% PCB space-savings with 0,50 mm pitch system
- 0,80 mm pitch system with 1,50 mm contact wipe, and 50Ω and 100Ω solutions
- Stack heights from 7 mm to 12 mm (0,50 mm pitch) and 7 mm to 16 mm (0,80 mm pitch)
- Metal friction latches available

Q Rate® Slim Ground Plane System

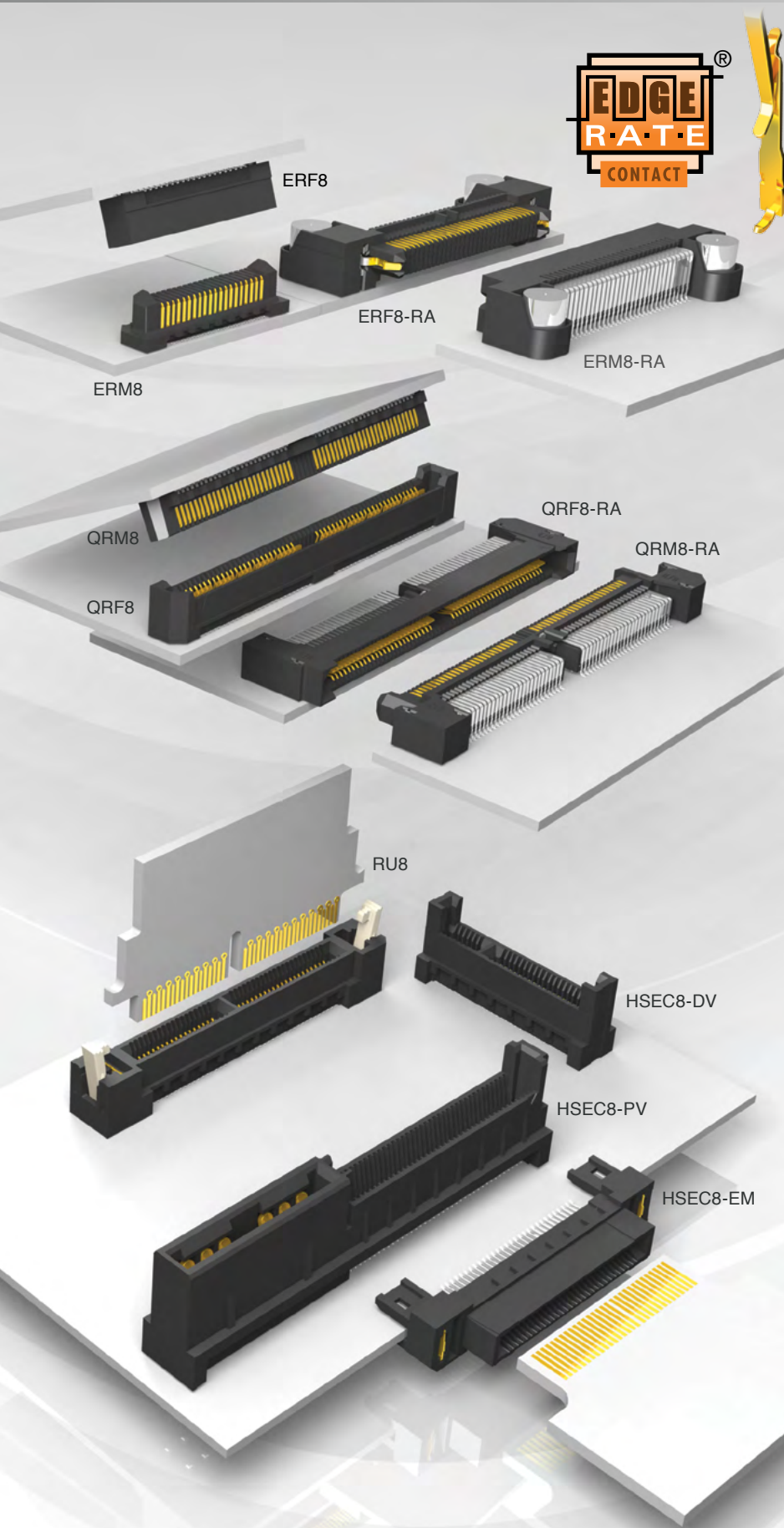
- Slim 4,60 mm body saves 35% PCB space
- 0,80 mm pitch
- Widely accepted industry standard integral power / ground plane
- Right angle for perpendicular and coplanar mating
- 7 mm, 9 mm, 10 mm, 12 mm and 14 mm mated heights



Slim Q Rate® footprint saves 35% PCB space

High Speed Edge Card Systems

- 0,80 mm pitch Edge Rate® sockets
- Vertical, right angle and edge mount designs for parallel, perpendicular and coplanar mating
- RiseUp® elevated board stacking to 30 mm
- Power / signal combo to 60 A per power bank
- Optional rugged board locking and cable latching features



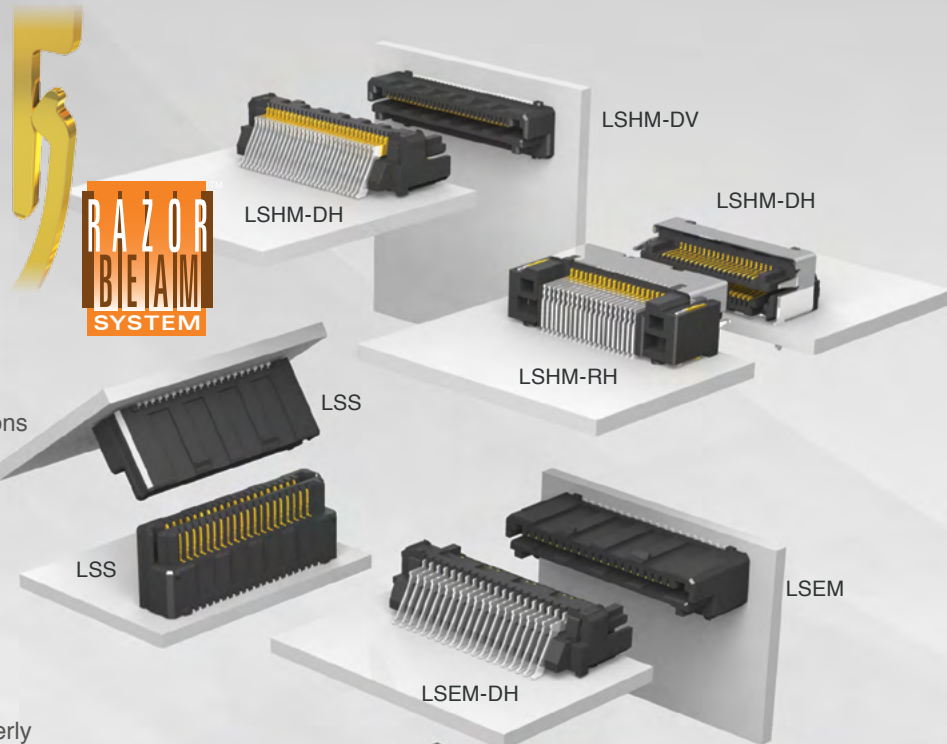
MICRO RUGGED CONNECTORS

ULTRA MICRO INTERFACES

HIGH SPEED • HIGH DENSITY • SELF-MATING
HIGH RETENTION, LOW COST CONTACTS
SLIM ROW-TO-ROW DESIGN

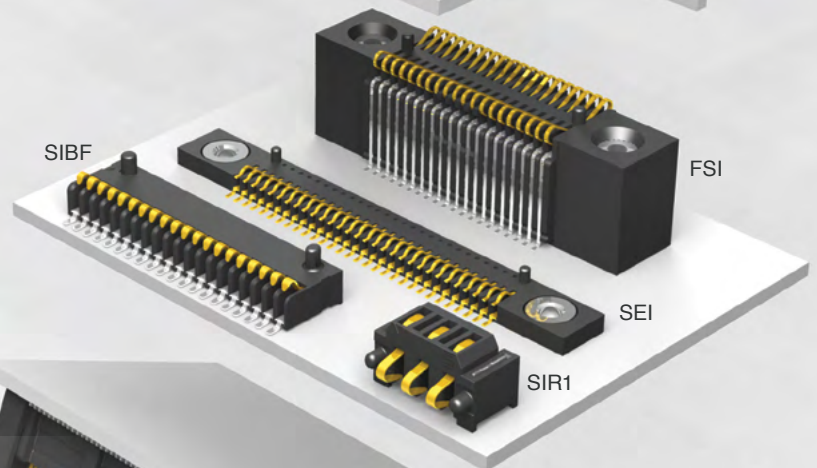
Ultra Micro Razor Beam™ Interfaces

- 0,50 mm, 0,635 mm and 0,80 mm pitch
- Stack height flexibility from 5 mm to 12 mm
- Parallel, perpendicular and coplanar applications
- Lubricated contacts available
- Up to 100 contacts
- Supports 28+ Gbps speed requirements:
 - 0,50 mm pitch performance up to 23 Gbps
 - 0,635 mm pitch performance up to 20 Gbps
 - 0,80 mm pitch performance up to 40 Gbps
- Shrouded with audible click when mated properly
- Shield option for EMI protection



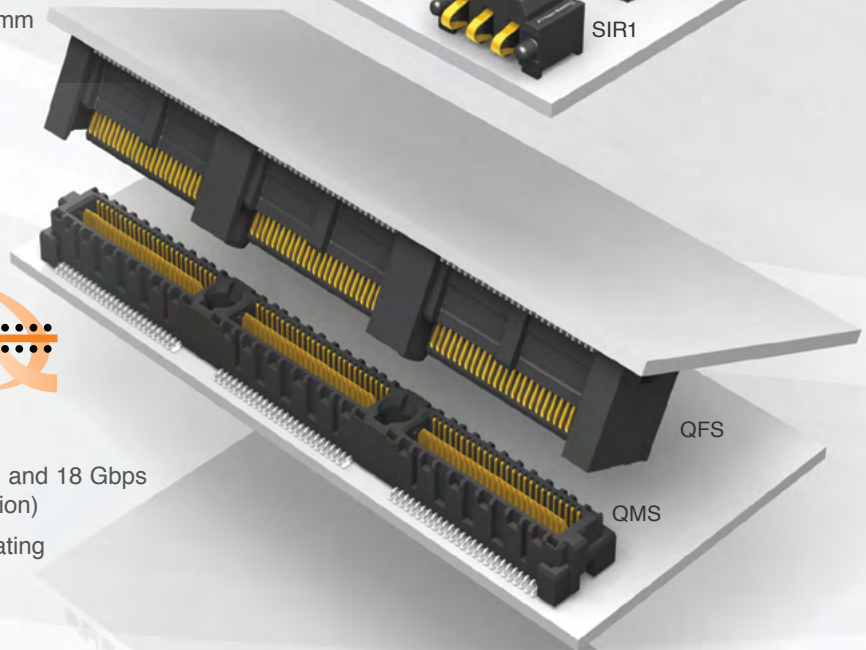
One Piece Interfaces

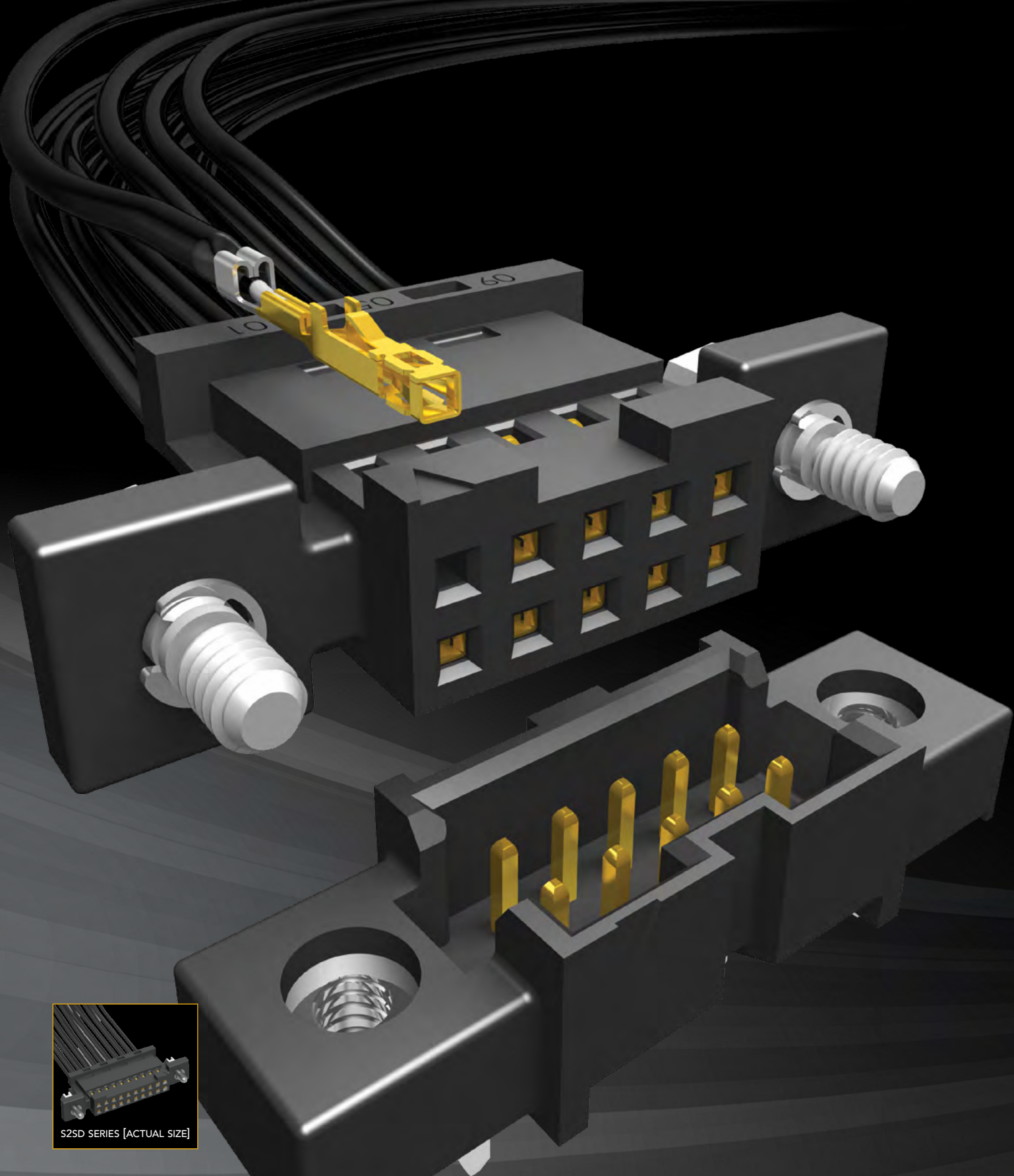
- 1,00 mm pitch with low 1,65 mm profile
- 1,27 mm pitch with large 1 mm contact deflection
- 2,54 mm pitch with vertical and right angle options
- Robust screw mount mechanical hold-down options
- Elevated profile designs: 3 mm, 6 mm, and 10 mm



Q2™ Rugged Ground Plane System

- Increased insertion depth
- 15.7 A - integral power / ground plane
- 0,635 mm pitch
- RF, power, retention pin and shielding options
- Up to 156 signal pins standard
- Up to 48 signal pairs standard
- Application specific hot plugging
- Performance up to 34 Gbps with single-ended and 18 Gbps with differential routing (depending on orientation)
- Right angle for perpendicular and coplanar mating
- Mating high speed cable assemblies





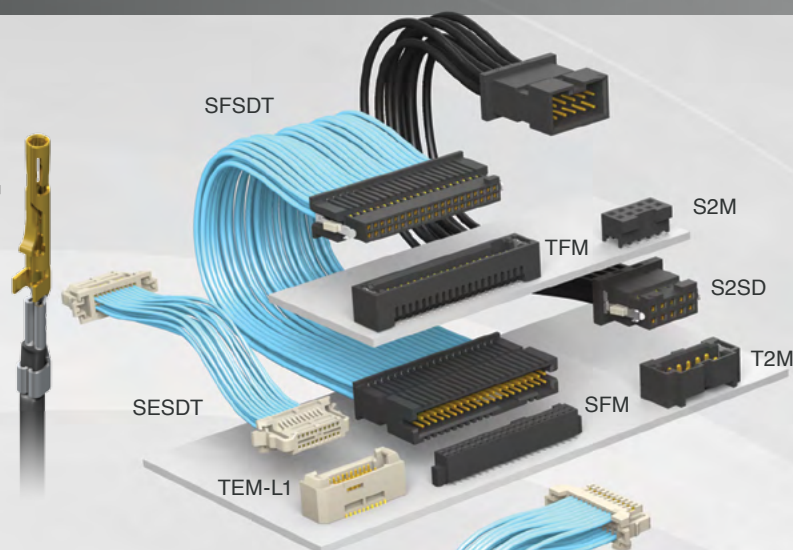
DISCRETE WIRE & IDC

0,80 mm to 2,00 mm PITCH • MICRO RUGGED • POWER SYSTEMS

DISCRETE WIRE & IDC

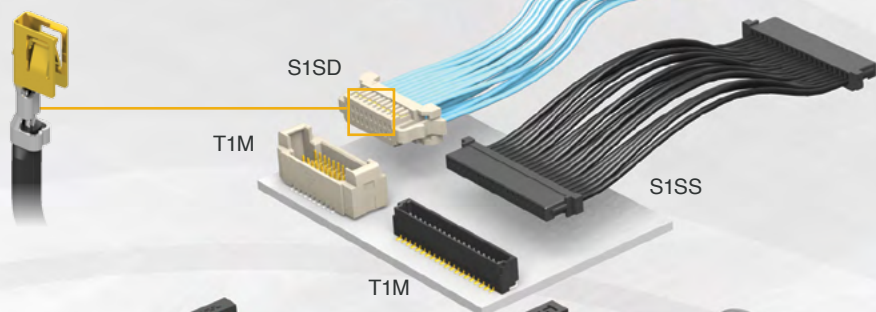
Micro Rugged Tiger Eye™ System

- High reliability multi-finger BeCu Tiger Eye™ contact system
- Metal or plastic latching system
- 0,80 mm, 1,27 mm and 2,00 mm pitch
- Screw down options
- Shrouded, polarized and keyed for rugged applications
- Choice of single or double-ended
- PVC or *Teflon® cable



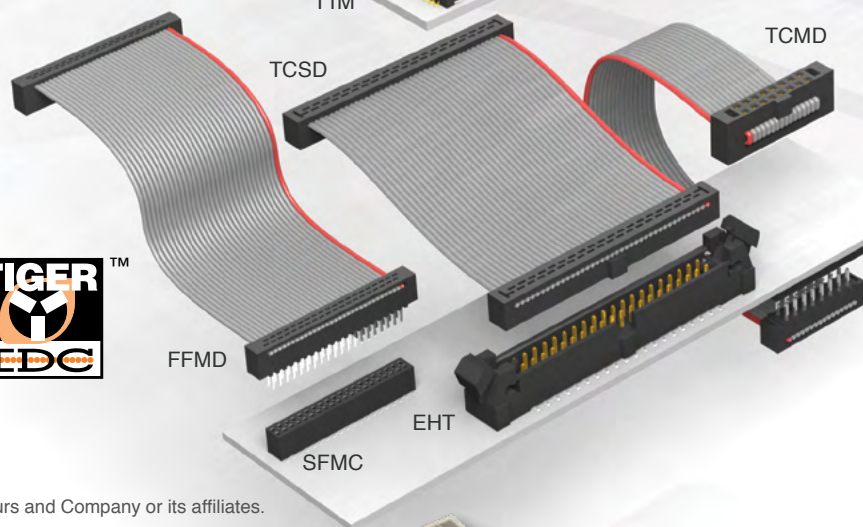
Micro Rugged 1,00 mm Pitch System

- Dual leaf contact system
- 2 through 20 I/Os
- Vertical and right angle PCB connectors
- Single and double row
- PVC or *Teflon® cable
- Standard latching system



Micro Rugged IDC Cable System

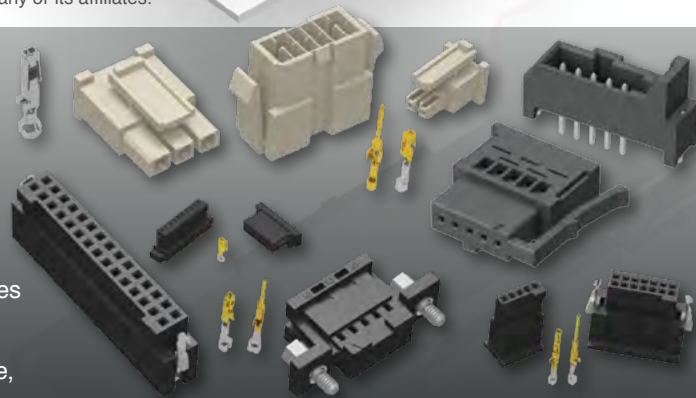
- 1,27 mm and 2 mm pitch systems
- High performance Tiger Eye™ contacts
- Choice of socket and plug terminations
- Exceptionally low 5,08 mm profile
- Ejector headers with optional locking caps
- Variety of options including rugged strain relief

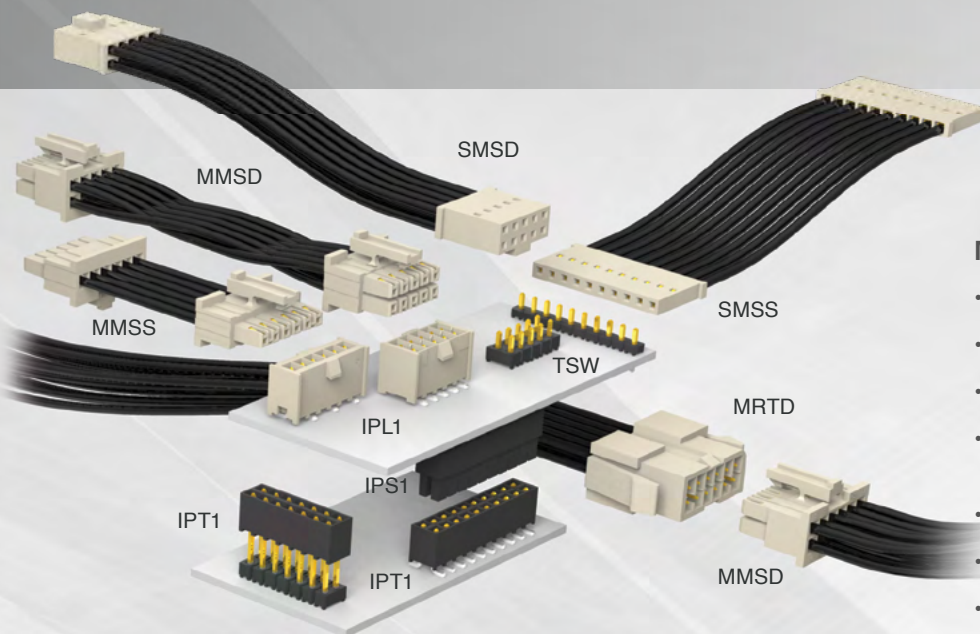


* DuPont™ Teflon® is a registered trademark of the E.I. du Pont de Nemours and Company or its affiliates.

DISCRETE WIRE & IDC CABLE COMPONENTS

- A broad selection of housings and contacts for build-it-yourself design and application flexibility
- High reliability BeCu Tiger Eye™ contacts on 0,80 mm, 1,27 mm and 2,00 mm pitches, 32 - 24 AWG wire, housings, screw downs, plastic and metal latches
- 1,00 mm dual leaf contacts, 30 - 28 AWG wire, housings and latches
- 2,00 mm IDC components, 24 AWG wire and latches
- Mini Mate® and Power Mate® housings, contacts, 30 - 16 AWG wire, plastic and metal latches





Mini Mate® System

- 4.8 A / contact*
- .100" pitch
- Individually shrouded contacts
- Cable-to-board, cable-to-cable and board-to-board systems
- Optional polarized position feature
- Elevated stack height options
- Rugged Tiger Buy™ contacts
- Universal jumper mates with unshrouded .025" (0,64 mm) square header

* Current Rating with 20 AWG, 1 contact powered



Power Mate® System

- 10.3 A / contact*
- .165" pitch
- Discrete wire and board-to-board system with individually shrouded contacts
- Optional polarized guide posts
- Vertical through-hole & surface mount sockets
- 5,00 mm and 6,35 mm pitch discrete wire power systems also available; see page 14

* Current Rating with 16 AWG, 1 contact powered



DISCRETE WIRE TOOLING

- Hand tools for low volume, pre-production and repair applications
- Quick-change semi-automatic crimp applicators compatible with industry standard equipment
- Wire ranges from 32 to 10 AWG
- Wide variety of additional application specific hardware and field service capabilities
- Visit samtec.com/discretewire or samtec.com/tooling



DESIGN SOLUTIONS & SUPPORT

Innovative design tools, resources and support make the design and implementation of your specific rugged, industrial or other harsh environment application simple.

Solutionator® Online Product Design Tool

- Quickly build components or a full cable assembly to your specifications with Samtec's online Solutionator®
- Create components in four easy selections
- Create cable assemblies by selecting connector specifications, wire type and assembled length
- Crimp-style dual leaf contact system, high reliability Tiger Eye™ contact systems, Mini Mate®, Power Mate® and PowerStrip™ power systems available
- Variety of options for AccliMate™ Sealed I/O systems, including shells, pin counts, signal, power and I/O interfaces
- Calculate performance, current rating and voltage drop
- Live chat with engineers for custom options
- Design your discrete wire system at www.samtec.com/discretewire and your AccliMate™ system at sealedio.samtec.com

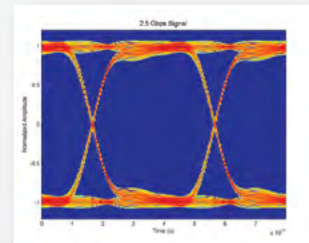
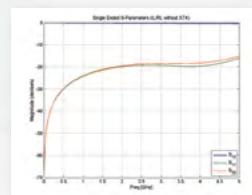


Simulator™ Real-time Online Performance Data

- Real-time performance simulations for assemblies help take the guesswork out of designing your system
- Simulator™ integrates and blends data from separate models to project insertion loss, return loss, NEXT and FEXT, along with supporting eye patterns
- Stand-alone program for additional standard high speed connectors and cables
- Test your system at www.samtec.com/simulator

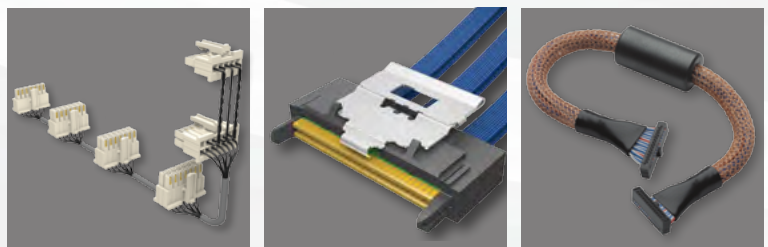


Simulator™
REAL-TIME HIGH SPEED PERFORMANCE DATA



Easy Modified & Custom Rugged Designs

- Twisted pair cable
- Custom color-coded standard and *Teflon® cable
- Wire stripping (for cable assemblies only)
- Breakouts to other connectors
- Sleeving, custom pinouts, daisy chains
- Special polarizations, rugged housings
- Rugged locking, latching and screw systems
- Contact the Application Specific Products Group at asp@samtec.com



Custom ruggedizing solutions for your specific application - made easy.

* DuPont™ Teflon® is a registered trademark of the E.I. du Pont de Nemours and Company or its affiliates.



POWER SYSTEMS

UP TO 60 A PER BLADE • CHOICE OF PITCHES • MATING CABLES

POWER SYSTEMS

PowerStrip™/20



- 23.5 A / blade*
- Up to 8 power blades on .150" pitch (UPT/UPS Series)
- 7 mm and 10 mm stack heights
- Vertical, right angle and hermaphroditic
- Optional locking clips

* Current rating with 1 blade powered

PowerStrip™/30



- 28.8 A / blade*
- Power only or power / signal combo
- Up to 8 power blades on 5.00 mm pitch (MPT/MPS Series)
- Right angle and hermaphroditic headers (MPPT Series)
- Right angle versions with screw downs also available
- Power / signal combination (MPTC/MPSC Series) with up to 80 signal contacts on 2.00 mm x 2.00 mm pitch
- Optional locking clips
- Discrete wire cable assemblies with choice of 14 AWG or 16 AWG wire and rugged latching system
- Discrete wire components and application tooling available
- "Hinging" PowerStrip™/30 for 90° mating radius, blind mating (FMPT/FMPS Series)

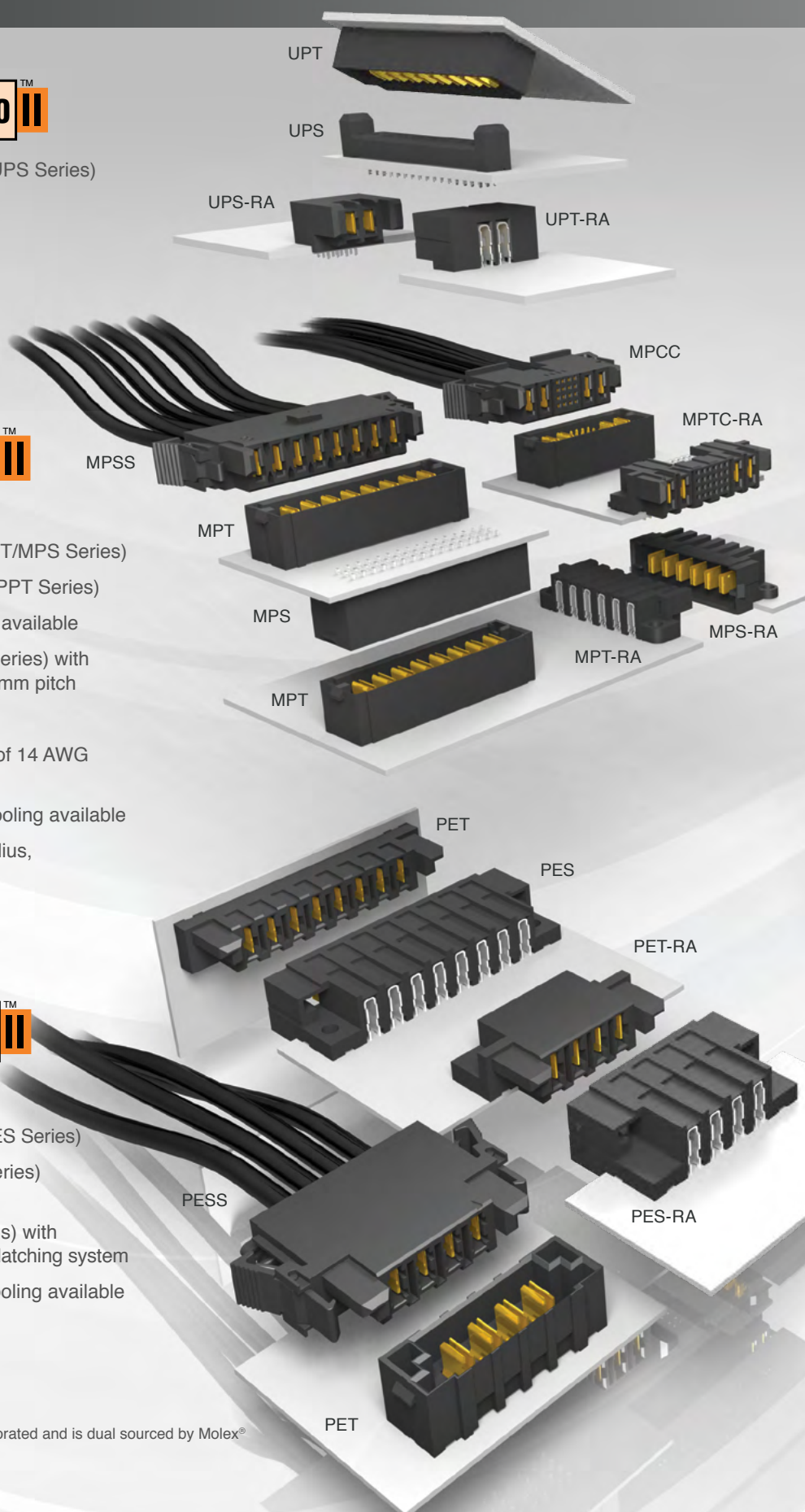
* Current rating with 1 blade powered

PowerStrip™/40

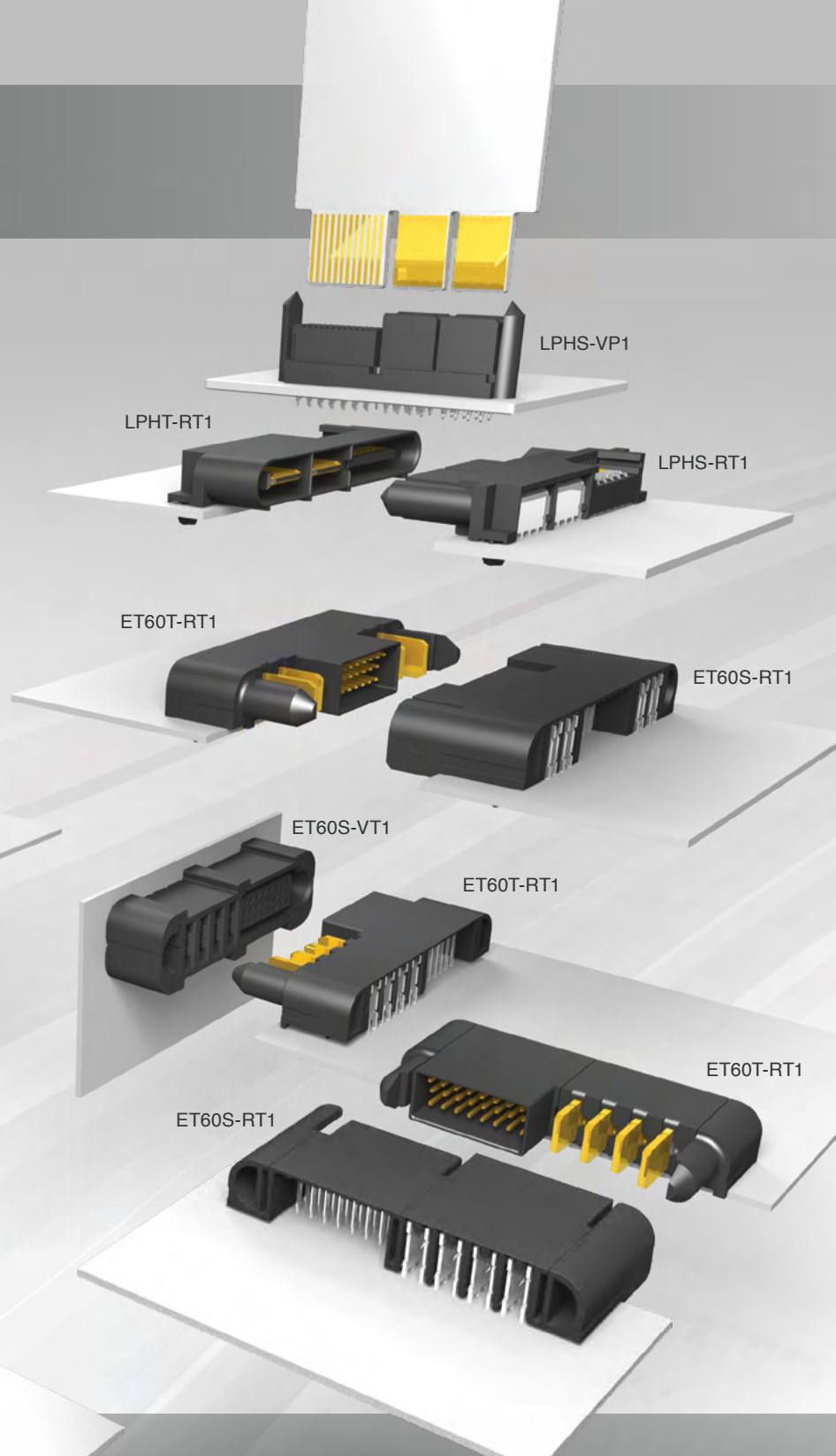


- 58.7 A / blade*
- Power only or power / signal combo
- Up to 8 power blades on .250" pitch (PET/PES Series)
- Power / signal combination (PETC/PESC Series) with up to 40 signal contacts on .100" pitch
- Discrete wire cable assemblies (PESS Series) with choice of 10 AWG or 12 AWG wire & rugged latching system
- Discrete wire components and application tooling available

* Current rating with 1 blade powered



** EXTreme Ten60Power™ is a trademark of Molex Incorporated and is dual sourced by Molex®



EXTreme LPHPower™

- Up to 30 A / blade*
- Power / signal combo
- Double stacked blades increase density
- Low 7,5 mm profile (right angle)
- Power blades on 12,00 mm spacing
- Signal pins on .050" spacing

* Four blades powered



EXTreme Ten60Power™

- Up to 60 A / blade*
- Flexible modular system
- Power only or power / signal combo
- Low 10 mm profile (right angle)
- Power blades on 5,50 mm spacing for high current DC
- Signal pins on .100" spacing
- Rated for resistance to arcing for hot-plug applications
- Press fit tail option (vertical socket)

* Two blades powered at 95° C



Other Power Solutions

- Add-on power modules for up to 20 A with 1,27 mm and 0,80 mm pitch grid SEARAY™
- Combination signal / power high speed edge card for up to 60 A
- Board-to-board systems with individually shrouded contacts up to 9.3 A

POWER INTEGRITY SERVICES

- Standard power test data, including current carrying capacity, working voltage, voltage drop and resistance, is available for selected power systems; for testing procedures, visit www.samtec.com/powertesting
- Current Cycling Testing Data, which demonstrates connector performance in realistic and common applications, is available for select series
- Power Integrity Guidelines are based on test data and proven design parameters, and are designed to help in connector selection and PCB design maximization

- Power Integrity Certified® products undergo testing and additional requirements unique to Samtec; to be certified, products must:
 - pass Current Cycling Test EIA 365-55
 - have current carrying capacity, resistance and amps vs. number of contacts data available
 - have Power Integrity Guidelines developed
- Visit www.samtec.com/powerintegrity for Guideline details and a current list of Power Integrity Certified® products



EXTENDED LIFE PRODUCT™



E.L.P.™ Products are tested to rigorous standards which evaluate contact resistance in simulated storage and field conditions.

E.L.P.™
EXTENDED LIFE PRODUCT

- 10 year Mixed Flowing Gas (MFG)
- High Mating Cycles (250 to 2,500)
- Certain plating and/or contact options will apply
- For complete details on Samtec's E.L.P.™ program and test results for Extended Life Products, please visit www.samtec.com/ELP or email the Customer Engineering Support Group at CES@samtec.com

Pitch	Type	Contact	Series*
0,50 mm	Q Series® Strip	Blade & Beam	QSH/QTH
	Basic Strip	Blade & Beam	BSH/BTH
0,635 mm	Q Series® Strip	Blade & Beam	QSS/QTS
	Basic Strip	Blade & Beam	BSS/BTS
0,80 mm	Edge Rate® Strip	Edge Rate®	ERF8/ERM8
	Q Rate® Strip	Edge Rate®	QRM8/QRF8
	Q Series® Strip	Blade & Beam	QSE/QTE
	Basic Strip	Blade & Beam	BSE/BTE
	Strip	Tiger Eye™	SEM/TEM
1,00 mm	Strip	Tiger Claw™	CLM/FTMH
1,27 mm	SEARAY™ Array	Edge Rate®	SEAF/SEAM
	Strip	Tiger Eye™	SFM/TFM
	Strip	Tiger Claw™	CLP/FTSH
	Strip	Tiger Beam™	FLE/FTSH
2,00 mm	Strip	Tiger Eye™	SMM/TMM
	Strip	Tiger Claw™	CLT/TMMH
2,54 mm	Strip	Tiger Claw™	SSM/TSM
	Strip	Tiger Claw™	BCS/TSW

* Tested socket/terminal combination shown. Other mating headers also available. Contact Samtec if header design you need is not shown.



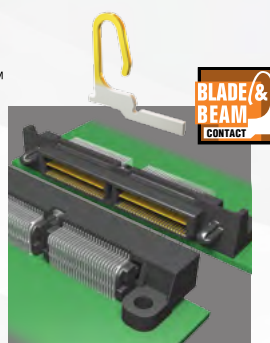
TIGER EYE™

High Reliability
High Mating Cycles
Multi-finger Contact



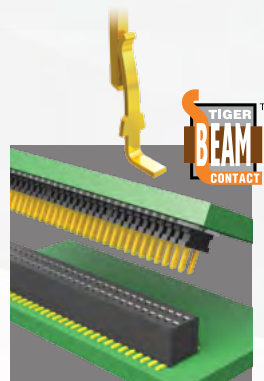
TIGER CLAW™

Dual Wipe Contact
Pass-through Applications
Ultra Low Profile



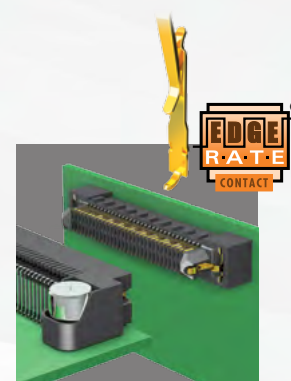
BLADE & BEAM

Mating / Alignment "Friendly"
Cost Effective
Special Plating Required



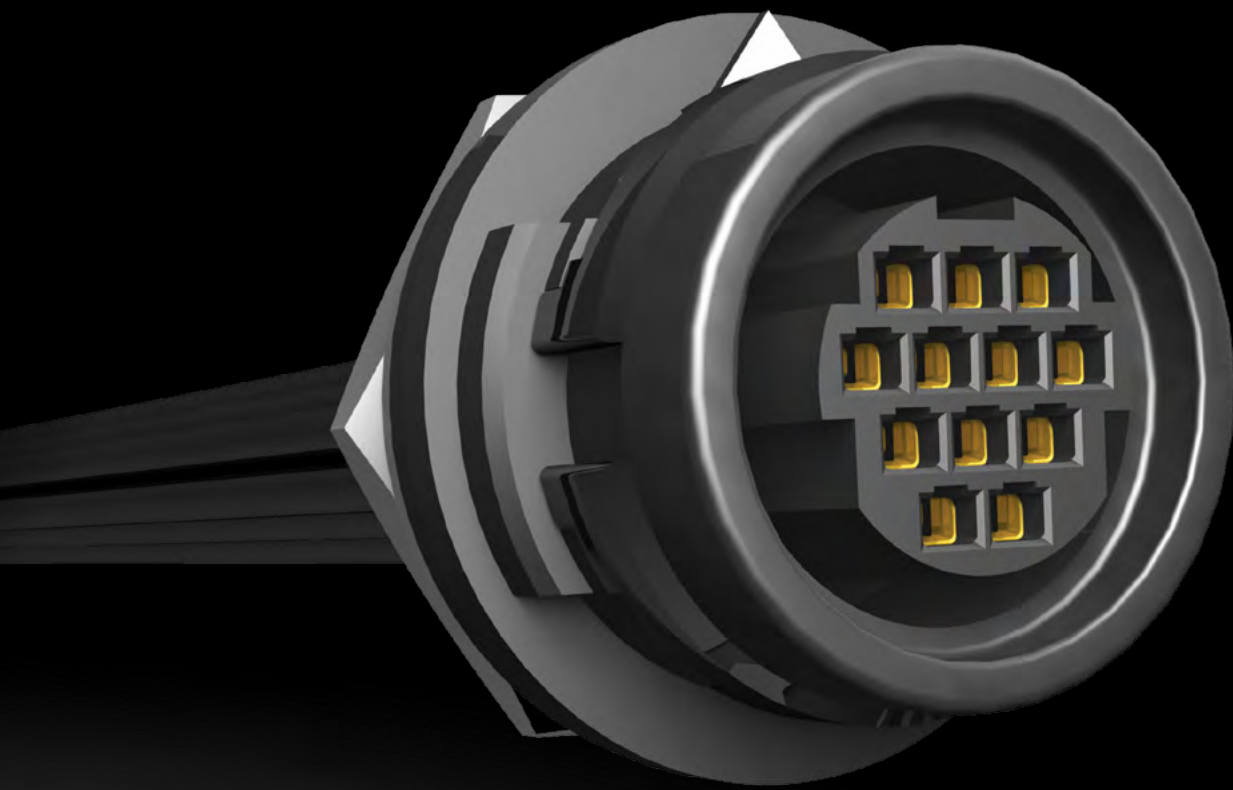
TIGER BEAM™

Best Cost
Reliable Performance
Post & Beam Contact



EDGE RATE®

Designed for Signal Integrity
Superior Impedance Control
Reduced Broadside Coupling



MCP SERIES [ACTUAL SIZE]

SEALED I/O SYSTEMS

12 mm, 16 mm, 22 mm CIRCULARS • SPACE-SAVING RECTANGULARS

SEALED I/O SYSTEMS

ACCLIMATE™ CIRCULARS

BAYONET OR PUSH-PULL • METAL OR PLASTIC
12 MM, 16 MM & 22 MM SHELLS • 8 SERIES
CHOICE OF TERMINATIONS • IP67 & IP68

Flexible Sealed Circular Assemblies

- Flexible pin count, size, location and gender (18 standard pinouts)
- Variety of socket and terminal options:
 - Signal pins (0,50 mm or 1,00 mm DIA)
 - Power pins (1,50 mm DIA)
 - RF connectors
 - Signal / power and signal / RF combinations
- Variety of panel interface termination options:
 - Discrete wire terminated with connectors
 - Blunt cut cable, solder cups and PCB mount
- Custom cable bundling including mix-and-match 30 to 14 AWG and RG 316
- Metal or plastic shells
- Bayonet style meets IP68 requirements for dustproof and waterproof sealing
- Mini push-pull system meets IP67 requirements for dustproof and waterproof sealing

IP68 Threaded Circulares

- Shell size 10 and 17
- Ethernet, USB and Mini USB
- Ethernet field termination kits and assembly tooling for long cable runs and small openings
- Signal and power systems also available

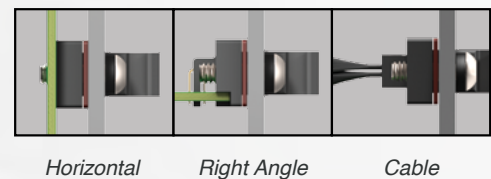
Components Kits for Field Termination

- Kitted components facilitate efficient field assembly
- Standard solder cups or crimp contacts for termination to the wire
- Bulk cable with mix-and-match wire type and gauge, bundled to assure IP68 performance
- Miniature push-pull latching system is IP67 protected against dust and water
- Metal or plastic shells



SPACE-SAVING DESIGN
IDEAL FOR LOW PROFILE APPLICATIONS
PUSH-TO-SEAL LATCHING SYSTEM

- Rectangular design with maximum density for low profile sealed applications
- Audible click when properly mated
- Quick connect / disconnect with positive latching system
- Ethernet and USB signal systems
- Eye Speed® high speed system with rugged Edge Rate® contacts
- Ethernet field termination kits
- Flexible panel mounting options



The diagram compares two RJ45 port footprints. On the left, a standard RJ45 port is shown with a footprint of 1.65 sq inch (1060 sq mm). Its dimensions are 46.00 mm (1.81 inches) in width and 23.00 mm (.906 inches) in height. On the right, a larger RJ45 port is shown with a footprint of 2.25 sq inch (1450 sq mm). Its dimensions are 38.10 mm (1.50 inches) in width and 38.10 mm (1.50 inches) in height. The comparison is labeled 'vs.' between the two.

Diagram illustrating the size comparison between two connectors:

- Left Connector (1.25 sq inch / 800 sq mm):** Dimensions are (48,25) 1.90 and (16,75) .660.
- Right Connector (2.25 sq inch / 1450 sq mm):** Dimensions are (38,10) 1.50.

The diagram shows that the 2.25 sq inch connector is significantly larger than the 1.25 sq inch connector.



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