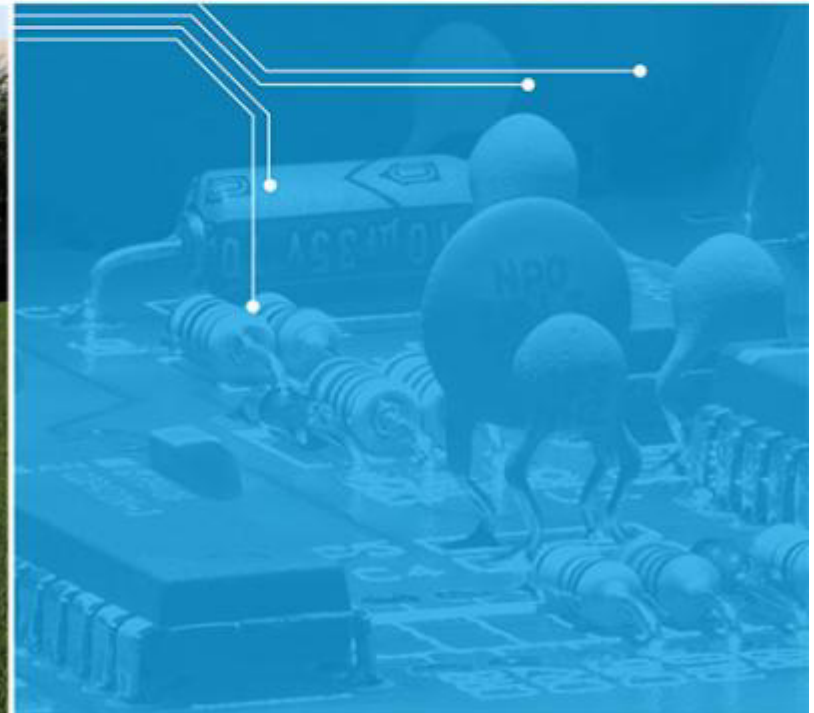




TTI, Inc.
The Specialist in Electronic Component Distribution
A Berkshire Hathaway Company





TTI, Inc.

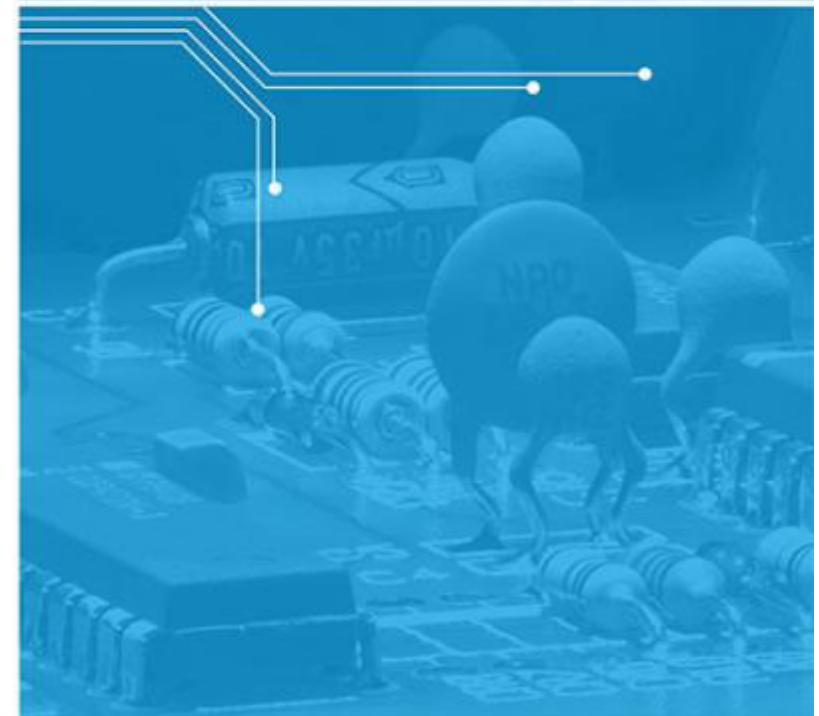
The Specialist in Electronic
Component Distribution

TTI Asia公司介绍

Presented by

LiWei Chen,
Industry Marketing Director – TBU,
Greater China

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Contents may not be distributed or repeated by third-parties without the consent of TTI, Inc.





tenure relays
filters **QUALITY** **SPECIALIST**
value **PEOPLE & PARTS** Diodes & Rectifiers
capacitors **SENSORS** **IP & E** ecia continuity
Supply Chain
6σ
CE OF MIND **TRUST**
Best-in-Class
AVAILABLE TO SELL **RESPECT** Low Turns
RIGHT PARTS RIGHT QUANTITY RIGHT TIME **RELATIONSHIPS**
1 SYSTEM **HUMBLE** GTPAT preferred INVENTORY **RESISTORS** OTD
magnetics CONTINUITY **focus** DISTRIBUTOR OF THE YEAR
COMMITMENT **DOY** **CONNECTIONS** **INTEGRITY**
ISO9001 PPAP **GLOBAL** circuit inventory protection
switches TQM
ASEN 9100

发展, 愿景, 业绩



我们的使命

40多年坚持不懈

TTI, Inc. 是一家专业的被动元件，连接器，机电组件和分立器件的授权分销商，致力于实现下述三个主要目标：

- 成为我们客户和供应商最优选的电子器件分销商，按时提供准确的产品
- 通过不断地提升，满足并超越我们内部和外部客户的需求
- 为勤勉工作、专注、博学、品格高尚，认同公司及公司理念的人才提供一个舒适如家的环境





TTI Asia 概览

Asia 总部
新加坡

2017 营业收入
\$3.46亿美金

销售覆盖
27 个办事处

2001
成立第一家企业

2017
467名员工



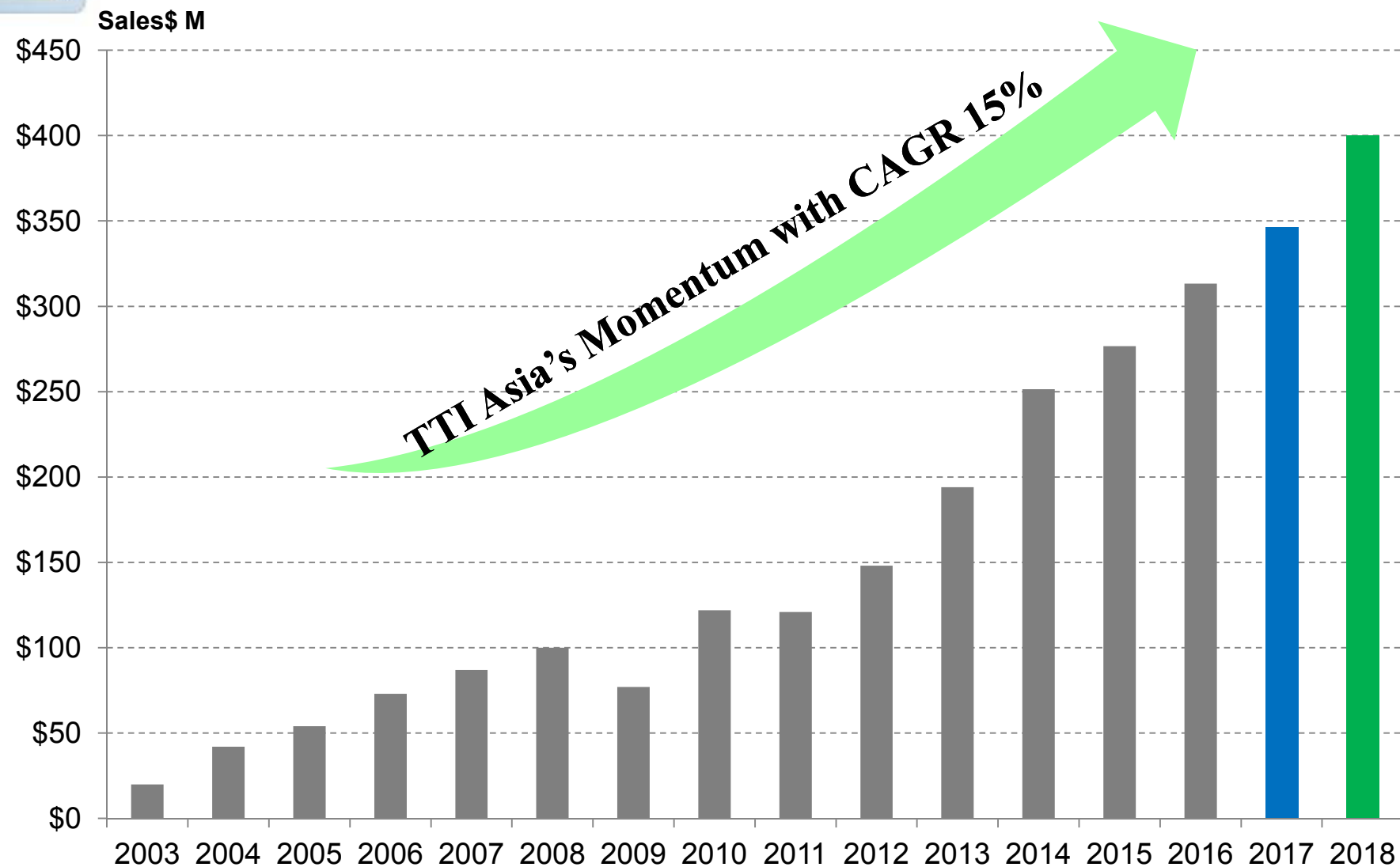
网站
www.ttiasia.com

232.000s.f.
配送中心，位于新加坡、香港和上海

2017
销售至
>5,700个客户



TTI Asia 销售额





TTI 亚太销售覆盖及配送中心



销售 & 仓库

4 Primary Distribution Centers
(USD & RMB W/Hs in Shanghai)

15 销售办事处

12 本地销售

The Specialist in Electronic Component Distribution



是什么让我们成为IP&E市场的领先者？ 我们拥有领先的 元器件品牌供应商



A Berkshire Hathaway Company

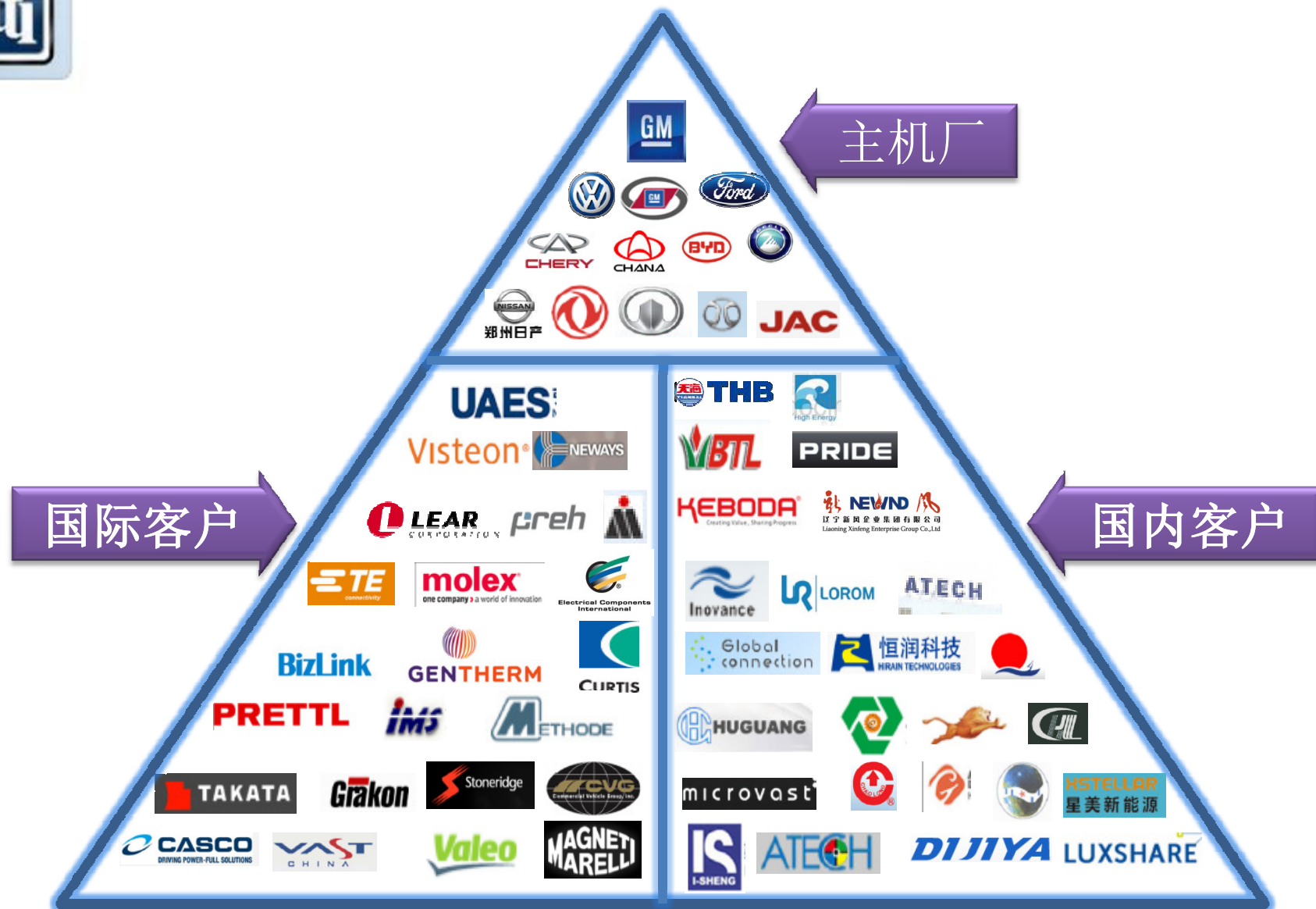


Transportation Segment

molex



我司主要汽车客户





车身电子 (Body Electronics)

主要用途

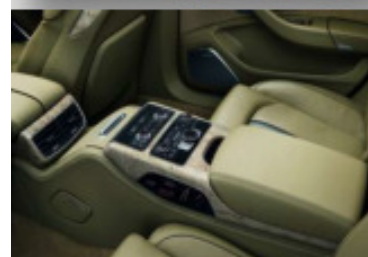
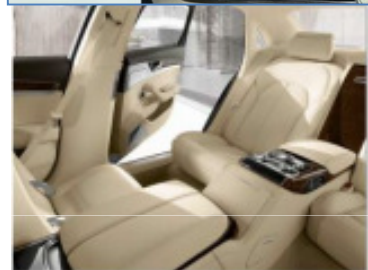
- Lighting System
- Wire Harness
- Side Mirror
- Sun Roof

推广产品

- MX150™
- STAC 64
- Mizu P25
- CMC

客户

- 江苏彤明车灯
- 埃泰克汽车电子
- 艾铭思汽车电子
- 南京奥联汽车电子





高级驾驶辅助系统 (ADAS)

主要用途

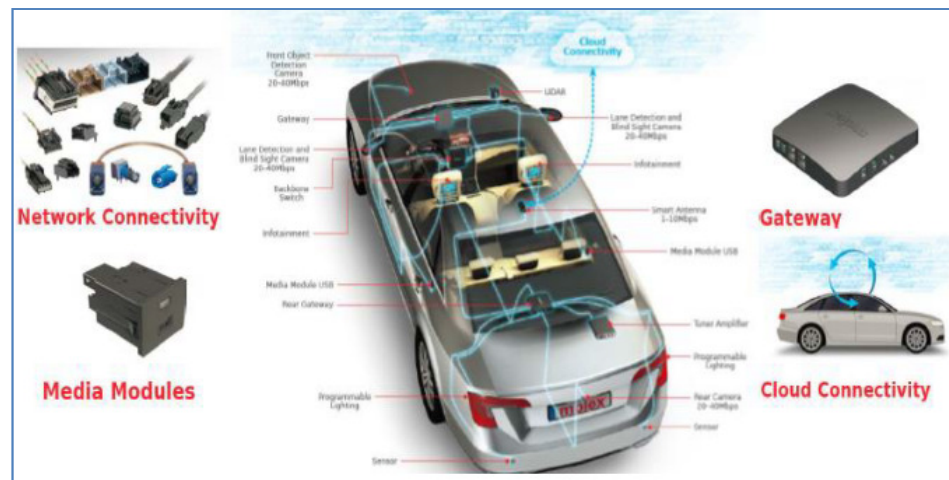
- 车辆高速网络传输
- 互联网
- 信息娱乐, 导行系统

推广产品

- Mini 50 Sealed
- USB, HS Autolink
- Antenna, Fakra
- PEDOT

客户

- 大连东软汽车电子
- 苏州智华汽车电子
- 为升电装工业
- 麦格纳汽车镜像





发动机控制单元 (ECU)

主要用途

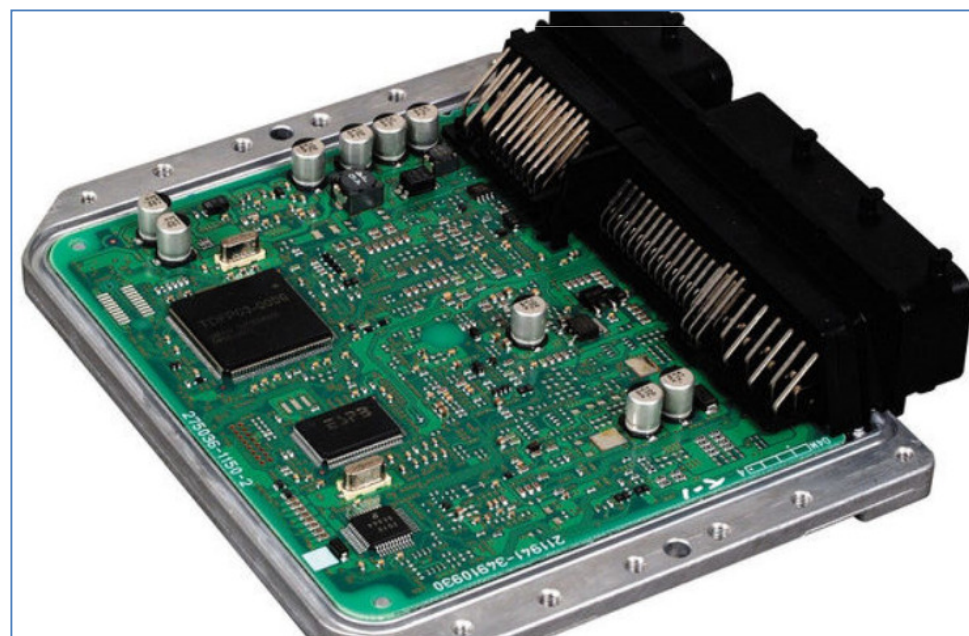
- 发动机控制单元
- 变速箱系统
- 电子式驻煞车系统
- 保险丝盒

推广产品

- CMC
- MX 150 Sealed
- Mizu P25
- O2 Sensor

客户

- 武汉菱电汽车电子
- 大连亿特科技
- 上海海能汽车电子
- 无锡威孚高科





电动汽车 (EV)

主要用途

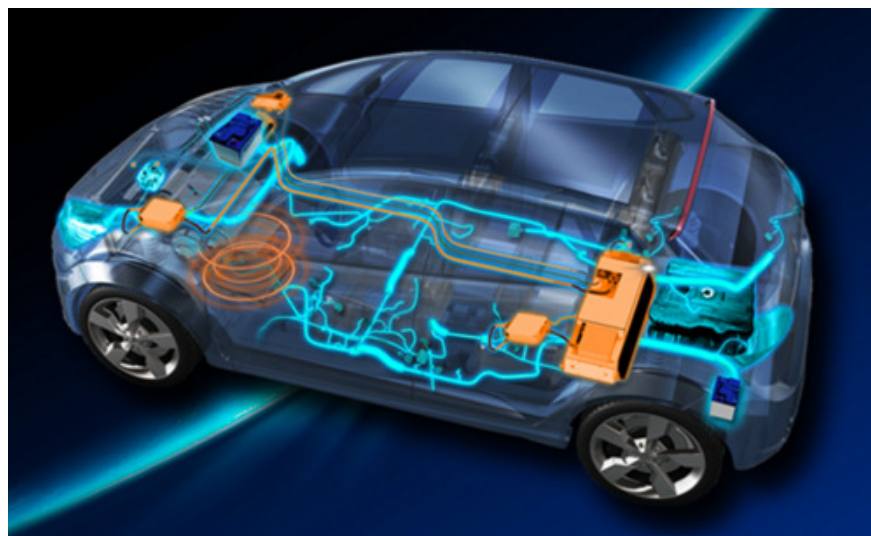
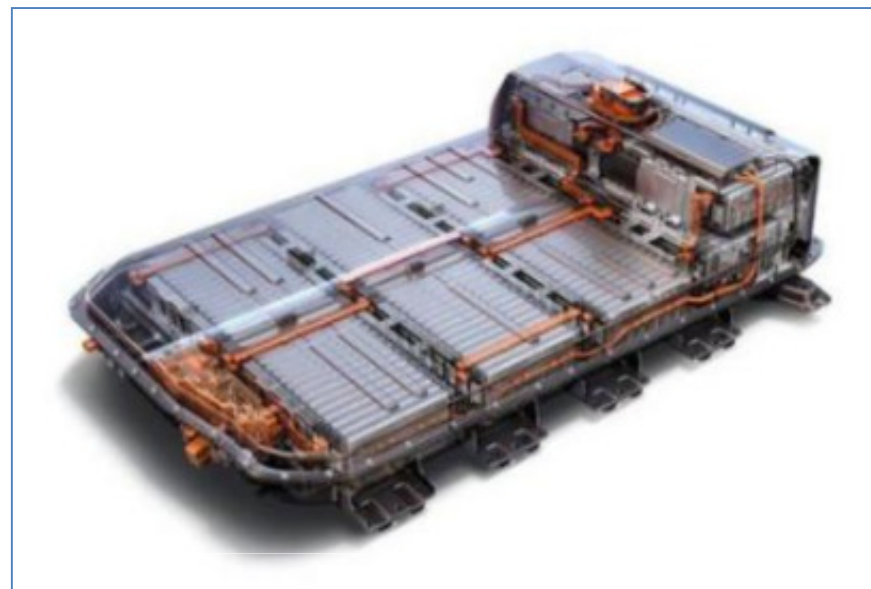
- 电池管理系统
- 电机控制器
- 车载充电器
- 电池包

推广产品

- STAC 64
- MX 150 Sealed
- Mizu P25
- DuraClick

客户

- 杭州富特科技
- 创驱(上海)新能源
- 北京智行鸿远汽车
- 苏州汇川技术





Strong Wang Won "Molex APS Product Manager of the Year 2017 (China)"



Strong Wang, Field Sales Manager, TTI Asia (left) received the award from Fred Bell, Global Distribution VP, Molex (right).

Strong Wang, our Field Sales Manager, was award "Molex APS Product Manager of the Year 2017 (China)" during Molex APS 2018 workshop in Xian on Apr 20, 2018. It represents the really "Strong" contribution, demand creation, & great engagement with Molex Management and regional sales with great performance especially in Xiaomi mobile phone business in 2017. Let us congratulate Strong winning this recognition from Molex.

Molex Announces TTI ASIA as Distributor of the Year – Asia Pac South



For the second year running TTI Asia was awarded the Distributor of the Year – Asia Pac South. TTI's score was the highest among all the distributors in terms of POS growth, Demand Creation projects, inventory holding and NPI investment. Anthony Chan received the award from Fred Bell and commented "We are honored to receive this prestigious award for the second year running, it is a tribute to our strong relationship and the focused direction of our sales teams to find new opportunities and expand our customer base."

L – R: Gene Wong, Distribution Corporate Account Manager, Molex; Daniel Loh, Distribution Corporate Account Manager, Molex; Cheong Tuck Meng, Senior Manager, Distribution-APS, Molex; Allison Hung, Senior Director, Sales-APS, Molex; Fred Bell, Vice President, Global Distribution, Molex; Anthony Chan, Vice President, Sales & Operations, Asia, TTI; Keith Lam, Regional Vice President of Sales, South Asia, TTI; Sam Sung, Product Management Director, TTI; Frankie Wong, Regional Sales Manager, Molex; Raymond Chan, District Sales Manager, Molex; Tami Lee, Field Sales Manager, TTI; Paul Chen, Area Sales Manager, TTI

The **Specialist** in Electronic Component Distribution

The Largest Dedicated Inventory In the World of Passive
Interconnect & Electromechanical Components



A Berkshire Hathaway
Company

Best in Class Supply Chain
Services & Logistics

Unmatched Financial
Stability & Resource

Supporting Prototyping to Production With
Peace of Mind Every Step of the Way

The #1 Distributor of the Leading
IP&E Manufacturers in the World

A Billion Dollar Inventory Pipeline – The Ultimate Safeguard Against Going Line Down

www.ttiinc.com

Molex TTI Live Broadcast Seminar - Auto



Jason Tong

molex[®]
one company > a world of innovation

简要概况

全球创新电子解决方案供应商

73

制造工厂

遍布

21

国家

40k+

全球员工

\$5B+

营收

100,000+

产品

涉及行业:

通讯 数据 消费品 工业 移动设备 汽车 医疗 航空航天/国防军工

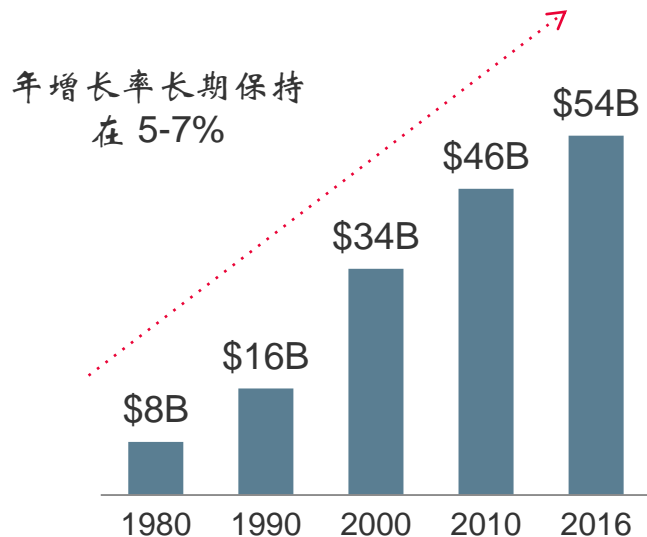
服务全球市场

全球设计，全球制作，全球运输



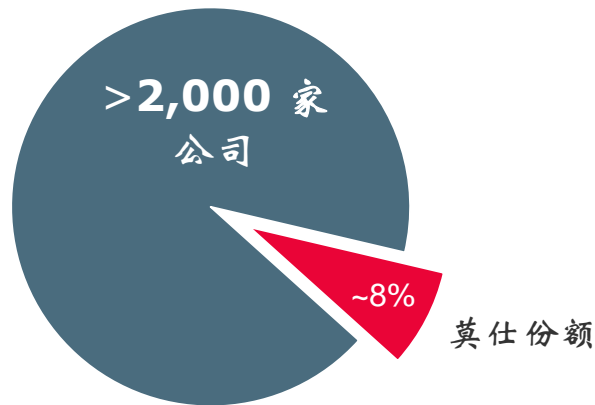
在竞争激烈的市场中保持领先地位

持续增长的市场¹



注解1: 全球连接器市场 (Bishop Associates)

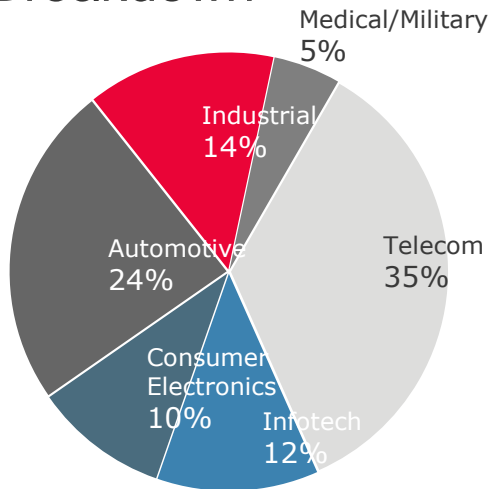
在竞争激烈行业
保持排名前三



重组机会

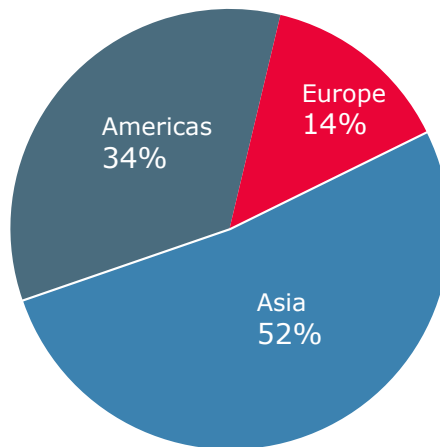
按照行业和地理划分

Market Breakdown



Well balanced by market

Geographic Breakdown



Strong presence in high-growth Asia

关于科氏工业

- 家族企业，位于堪萨斯州的威奇托
- 最大的私营公司之一，年营收约为 1200 亿美元*
- 拥有遍布众多行业、背景多样化的多家公司
- 现在具有更好的市场定位，通过各种收购机会来满足客户不断增长的需求



*来源于福布斯杂志

在竞争激烈的市场中保持领先地位

收购企业

AFFINITY MEDICAL
a **molex** company

FCT
a **molex** company

Flamar
a **molex** company

ISI
a **molex** company

**Phillips
Medisize**
a **molex** company

PROTEK
Medical
a **molex** company

OPLINK
a **molex** company

SDP-Telecom
a **molex** company

整合产品线

Brad

GWconnect

Polymicro Technologies

Sensorcon

Soligie

Temp-Flex

Woodhead

SST

战略投资

nucurrent

Vasa
Applied Technologies Ltd

STROBE

OSSiQ

excelfore

MultiPhy

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DataCom & Specialty Solutions

数据通信与专业解决方案 DSS



Consumer & Commercial Solutions

消费品与商用解决方案 CCS



Transportation & Industrial Solutions

交通运输与工业解决方案 TIS



Medical & Pharma Solutions

医疗&制药解决方案 MPS



Products Introduction

- MX150
- **CMC/CMX**
- μ PDB
- Stac64
- Mini50 Sealed & Unsealed
- Mizu-P25
- DuraClik
- StAK50h
- CMS solution



MX150™ Sealed Connection System

High performance 1.5mm system
designed for power and signal
applications up to 22A

MX150™ Overview

- Field proven and used at major OEM's globally
- Superior Performance
 - -40°C up to +150°C
 - IP6k7 & IP6k9k with Backshells
 - Current: up to 22 Amps
- Mat Seal offers reduced package size & reduced labor
- USCAR Interface
- Easy to use and simple to service
 - Product Shipped in One-Piece
 - Standard Screwdriver for Servicing
 - Terminal Extraction Tool



MX150™ Core Product Offering

- Single Row Mat Seal, Blade & Receptacle:
 - 1X2, 1X3, 1X4, 1X5, 1X6
- Dual Row Mat Seal, Blade & Receptacle:
 - 2X2, 2X3, 2X4, 2X6, 2X8, 2X10
- Hybrid, Blade & Receptacle
 - 16 way: Twelve 1.5 circuits & Four 2.8 circuits (CS)
- Cable Seal, Blade & Receptacle
 - 1x2
 - 1x3
- Terminals for all of the above
 - Plating Options: Sn, Ag, Au
 - Wire Sizes: 14–22 AWG & 0.35–0.50mm² ISO



MX150™ Extensions

- Yellow version available for Safety applications
- **V0 version now available (UL1977 Certified)**
 - 1x2, 2x4, 2x6, 2x10 Receptacle
 - 2x6 Panel Mount
- Panel Mount
 - 2x3, 2x6
- Twistlock
 - 2x3, 2x4, 2x6, 2x8



MX150™ Extensions

- Backshells

- Blade

- 1x2, 2x3, 2x6, 16w Hybrid

- Receptacle

- 1x2, 1x3, 2x3, 2x6, 16w Hybrid

- Roadmap

- 2x10 Blade & Receptacle PPAPed: May 2018

- 2x8 Blade & Receptacle PPAP: July 2018

- 2x4 Blade & Receptacle PPAP: July 2018



12w Mat Seal Hybrid

- Hybrid System, Blade & Receptacle
 - Ten 1.5 circuits, Two 2.8 circuits
- Terminal Cavity:
 - 1.50mm: MX150 Mat Sealed
 - 2.80mm: Sumitomo Unsealed (Mat Sealed)
- Wire Ranges (ISO):
 - 1.5mm terminals: 0.35mm² thru 1.50mm²
 - 2.8mm terminals: 1.00mm² thru 2.50mm²
- Molex Product Series:
 - Blade: 160112
 - Receptacle: 160111



12w Mat Seal Hybrid

- Features & Benefits
 - Mat Seal design for all circuits
 - Eliminates the need for cable/ wire seals
 - Flashover option available for 1.5mm & 2.8mm cavities
 - Four key options available: A, B, C, D
 - 11mm clip slot standard on Blade & optional on Receptacle
 - CPA optional
 - Designed to accommodate a Backshell
- Specifications: GMW3191 2012 & USCAR-2 Rev 6
- Environment: T3, V1, S2
- PPAP Complete & now available

MX150™ 8/9/10w Hybrid Connectors

- Specifications: GMW3191 2012 & USCAR-2 Rev 6
- Environment: T3, V1, S2 (S3 w/ WDC)
- Hybrid, Blade & Receptacle
 - 8 way: Six 1.5 circuits & Two 6.3 circuits
 - 9 way: Six 1.5 circuits, Two 2.8 circuits, One 6.3 circuit
 - 10 way: Six 1.5 circuits & Four 2.8 circuits
- Terminal Cavity & Wire Ranges:
 - 1.5mm: MX150 Mat Sealed; 0.35mm² thru 1.50mm²
 - 2.8mm: FCI Apex Sealed (SWS); 0.50mm² thru 4.00mm²
 - 6.3mm: FCI Apex Sealed (SWS); 6.00mm²
- Additional Features & Benefits:
 - Flashover available for 1.5 cavities
 - Designed to accommodate a backshell



8w, 9w, 10w Hybrids

- Features & Benefits:

- Four key options available: A, B, C, D
- Flashover for 1.5mm cavities
- 11mm clip slot standard on Blade & optional on Receptacle
- CPA optional
- Designed to accommodate a Backshell

- Specifications: GMW3191 2012 & USCAR-2 Rev 6

- Environment: T3, V1, S2

- Receptacle PPAP ECD:

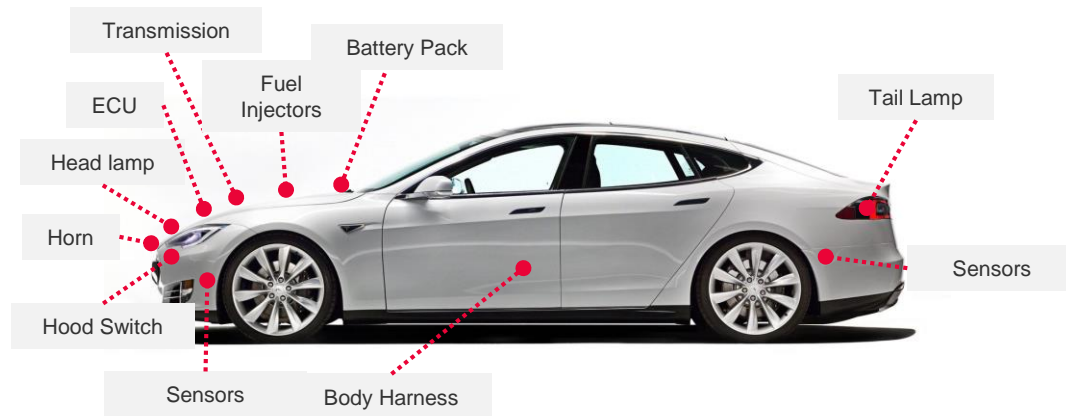
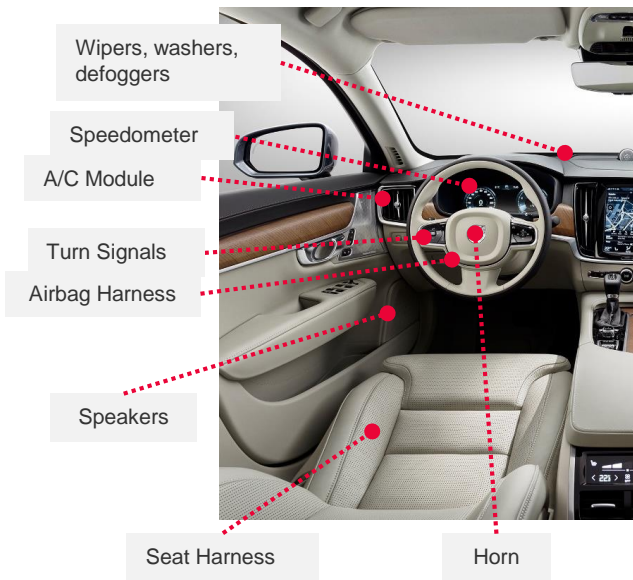
- 8 way: PPAP Complete & Now Available
- 9 & 10 way: January 2019

- Blade PPAP ECD: On Hold

- Timing from tool kick off to PPAP is approximately 52 wks assuming terminals are available at start of PV testing



MX150™ Applications



MX150™ Markets

- Automotive
- Commercial Vehicle
- Motorcycles / Scooters
- Buses
- Marine Equipment
- Industrial Equipment
- Construction Equipment
- Agriculture Vehicles



CMC/CMX Sealed Hybrid Connection System



molex[®]
one company > a world of innovation

CMC/CMX Overview

- Field proven system and used at major OEM globally
- High performance sealing – meets IP67 & IP6k9k
- High density offers minimized package size
- Mate assist to ensure low mate force
- Terminal Position Assurance (TPA)
- Terminals available in Tin & Gold versions
- Headers offered in one, two or three bays



48-Circuit CMC Connector



32-Circuit CMC Connector




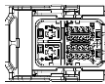
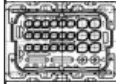

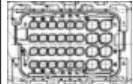
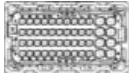
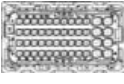

CP Terminals



CMC Header 112-circuit

molex[®]

CMC Receptacles Portfolio

| RECEPTACLES | | 22ckt | 24ckt | 28ckt | 32ckt | 36ckt | 48ckt | 53ckt |
|---|---|---|---|--|---|---|---|---|
| 0,6 mm CP [pcs] |  | 20 | 18 | 18 | 24 | 30 | 40 | 40 |
| 1,5 mm CP [pcs] | | - | 6 | 5 | 8 | 6 | 8 | 8 |
| 2,8 mm CP [pcs] | | 2 | - | 5 | - | - | - | 5 |
| Existing color Codings | | Blk, Brn, Blu, | Blk, Gry, | Blk, Gry, Brn | Blk, Gry, Brn, Blu, Grn | Blk, Brn | Blk, Gry Brn, Grn | Blk, Gry Brn, Grn |
| Product Series Check website for drawings, specs and 3D models | | 64326 | 64319 | 64318 | 64319 | 64320 | 64320 | 64321 |
| Connector Interface | |  |  |  |  |  |  |  |



22-ckt CMC
#64326



28-ckt CMC
#64318



32-ckt CMC
#64319

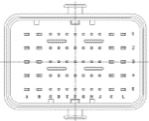
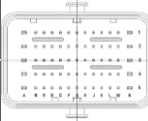





48-ckt CMC
#64320



53-ckt CMC
#64321

CMX Receptacles Portfolio

| RECEPTACLES | 55ckt | 65ckt | 70ckt | 104Ckt | 120Ckt |
|--|---|---|--|---|---|
| 0,6 mm CTX [pcs] | 35 | 55 | 56 | 82 | 102 |
| 1,5 mm CTX [pcs] | 20 | 10 | 8 | 16 | 16 |
| 2,8 mm CTX [pcs] | - | - | 6 | 6 | 2 |
| Existing color Codings | Blk, Brn | Blk, Brn | Blk | Blk | Blk |
| Product Series Check website for drawings, specs and 3D models | 34885 | | 64327 | 64328 | 64329 |
| Connector Interface |  |  |  |  |  |

55ckt CMX



65ckt CMX














Molex Confidential Information

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70-104-120ckt CMX

molex[®]

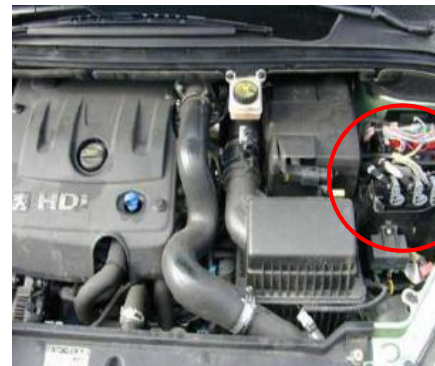
CMC/CMX Headers Portfolio

| HEADER | 28ckt | 32ckt | 36ckt | 48ckt | 80ckt | 53ckt | 96ckt | 112ckt | 120Ckt | 154ckt |
|--|---|---|---|---|--|---|---|---|---|---|
| Ckt size/ pocket | 28 | 32 | 48/36 | 48 | 32+48 | 53 | 48+48 | 32+48+3 2 | 55+65 | 48+53+53 |
| 0,6 mm / 1,5mm / 2,8mm / [pcs] | 18 / 5 /5 | 24 / 8 / - | 30 / 6 / - | 40 / 8 / - | 64 / 16 / - | 40 / 8 / 5 | 80 / 16 / - | 88 / 24 / - | 90/30/- | 120 / 24 / 10 |
| Version | R/A | R/A | R/A | R/A & Straight | R/A | R/A | R/A | R/A | R/A | R/A |
| Product Numbers Check website for drawings, specs and 3D models | 47745 -0X00 | 64334 -0100 / 64334 -0300 | 47732 -0361 | 36638- xxxx 500762 -048X 560083 -4801 | 50222 5-0801 | 98997- 1002 | 36638- xxxx | 64333- 0100 | 56004 5-1201 | 34763- 00XX |
| PCB Mounting | THT Wave Solder | THT Wave Solder | THT Wave Solder | THT Wave Solder | THT Wave Solder | THT Wave Solder | THT Wave Solder | THT Wave Solder | THT Wave Solder | Pressfit EON |
| Header picture |  |  |  |   |  |  |  |  |  |  |

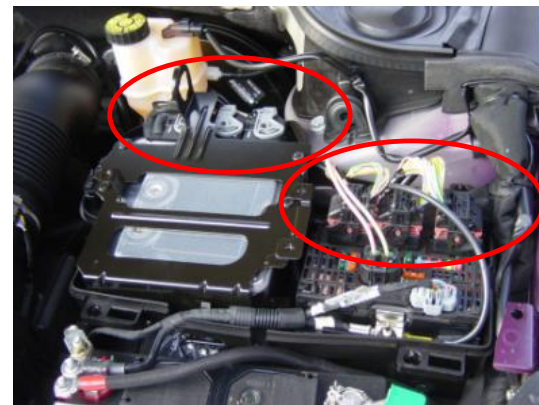
Markets & Applications

■ Powertrain & Body Electronics Applications

- Engine Control Units (ECU's)
- Automatic Gear Boxes
- Suspension controller
- Parking brake
- Lighting control system
- Fuse box
- Electric doors



Diesel Engine
32-circuit CMC + 48-circuit CMC + 32-circuit CMC
for Engine Management



Powertrain ECU application: 112-ckt hdr mating to CMC
Fuse box using CMC connectors 28ckt x 3
32+48+32-ckt connectors

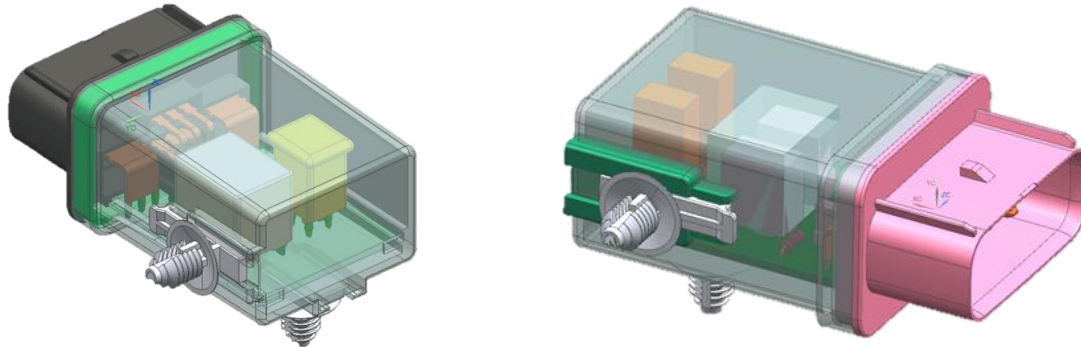
molex

Micro PDB (micro Power Distribution Box)

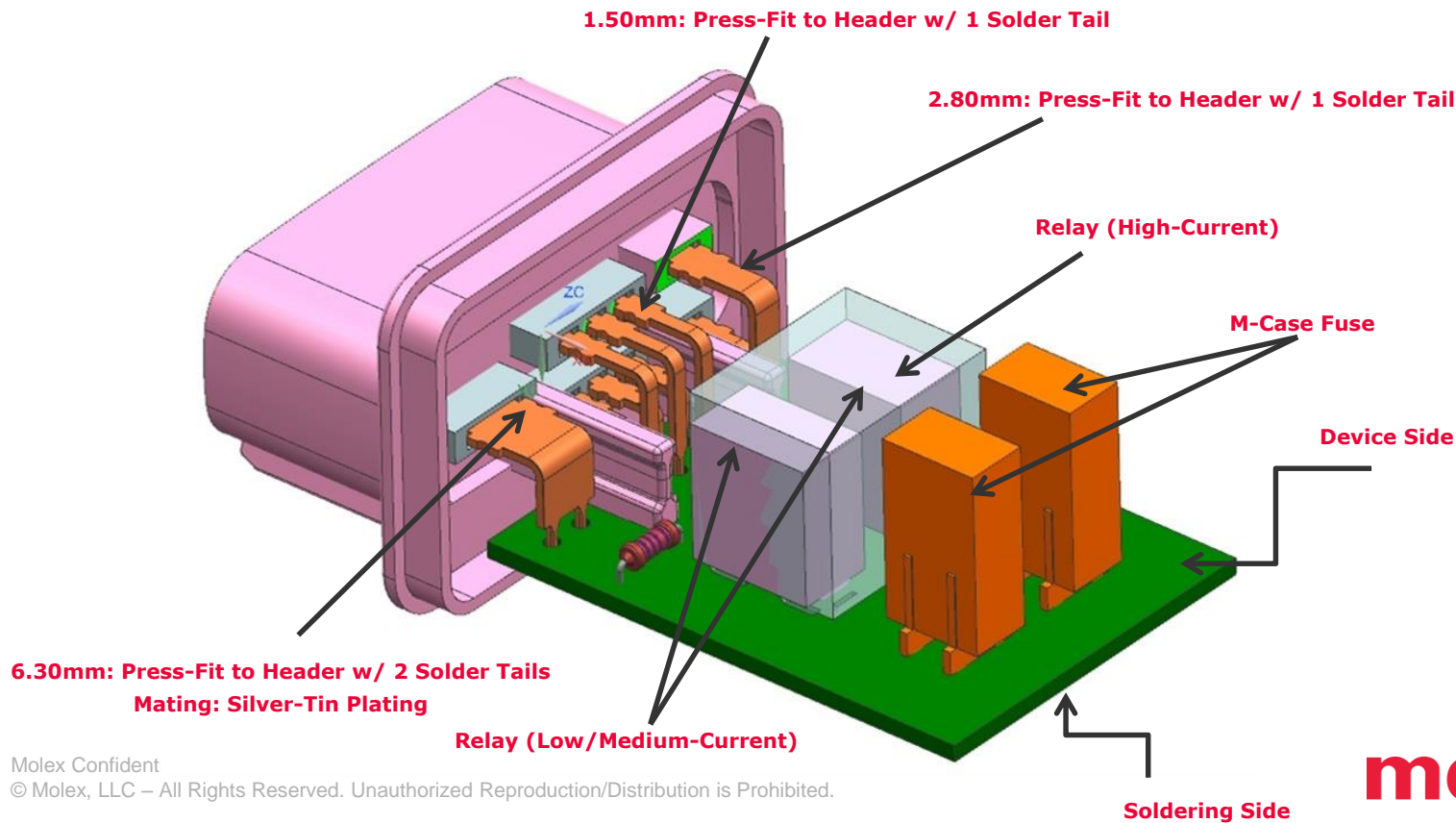


Molex μ PDB - Offers the most cost effective method to:

- 1) Add additional power switching and circuit protection to your vehicle wiring architecture
- 2) Relocate power switching and circuit protection close to the device
- 3) Add power switching and circuit protection redundancy (ADAS/Autonomous vehicles)
- 4) Integration of most pcb mounted components



uPDB (micro Power Distribution Box)

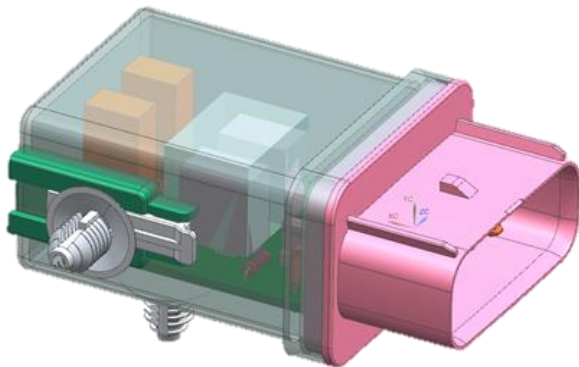


Overview

- Fully Submersible Module
- Small footprint
- 3 Standard Connector Configurations
- Can be easily modified for a wide variety of applications
- Modular design
- Simple and inexpensive attachment to vehicle
- Most cost effective solution

General Requirements

- Environmental & Performance
 - Meets USCAR-2 criteria
 - Sealable to IP6k7 for all applications
 - Operating Temperature -40C to +110C
 - Less than 75N to mate fully populated interface
 - Mating interface utilizes standard fully released terminals



Features and Benefits

| Feature | Benefit |
|--|--|
| Sealed system | Can be mounted in multiple locations within the vehicle |
| Small footprint | Space and weight savings |
| Modular custom design | No unused components or materials. Part is custom designed for your specific application |
| Ability to package relays/fuses close to application | No need to run wiring back to main PDB |
| Connectorized design | Not hard-wired. Reduces cost, eliminates mistakes |
| Modules are stackable | Space savings, convenience |
| Attaches same as a connector | Eliminates the need for additional mounting hardware (time, \$) |

Summary

- Smallest package size
- Easily customized by application
- Most cost effective and simplest attachment to vehicle

The Molex μ PDB offers:

The lowest cost solution for adding additional power switching and circuit protection to the vehicle



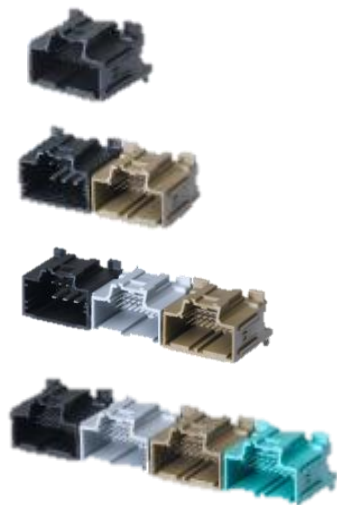
Stac64™ Connector System

Available multi-bay configurations, the Stac64™ connectors support unsealed automotive applications with optimum design flexibility without the need for costly custom tooling

Stac64™ Product Family – Overview

Headers

1, 2, 3 and 4-bay configurations
From 8-80 circuits;



Receptacles

Signal versions: 8, 12, 16, 20- circuits
Hybrid versions: 10, 14-circuits



Terminals

0.64 mm
1.50 mm
2.80 mm



CTX64



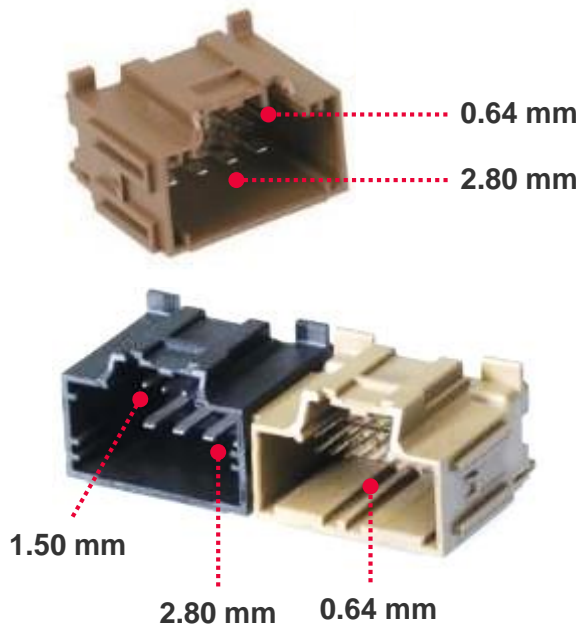
MX150



2.80mm
(to contact Molex)

*Note : Header :Right Angel ; Vertical Header; Mylar Version; PAP Version
Receptacle :General Market Version ; GM Application ; Ford Application*

Stac64™ Product Family Feature



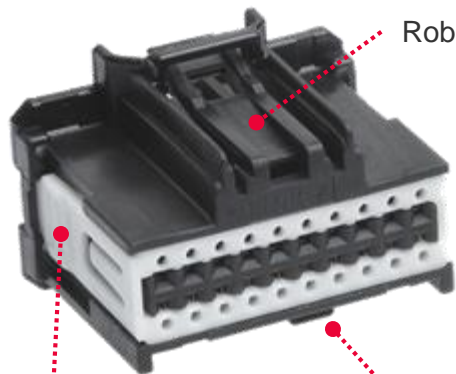
- Terminal current (max):
 - 2.80 mm - 30.0 A
 - 1.50 mm - 20.0 A
 - 0.64 mm - 6.0 A
- Available 0.64 signal circuit size:
 - 8-, 12-, 16-, 20-circuits
- Available hybrid circuit size:
 - 10- and 14-circuits
 - 10-ckt configuration: 4x 2.8mm + 6x 1.5mm
 - 14-ckt configuration: 4x 2.8mm + 10x 0.64mm

Stac64™ Applications

- Automotive
 - Door Zone Modules
 - Interior Lighting and Navigation
 - Navigation Systems
 - Power Seat Modules
 - Radios/In-car entertainment
 - Instrument panel clusters
 - Battery Management System
- Commercial Vehicle
 - Interior electronic modules
 - Body electronic modules
- Interior Electronic Modules



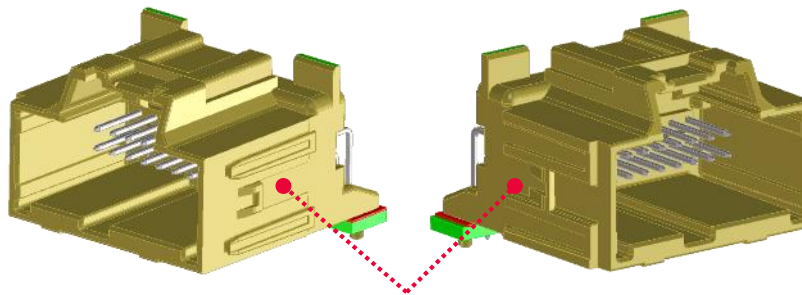
Stac64™ Product Features



Robust latch design

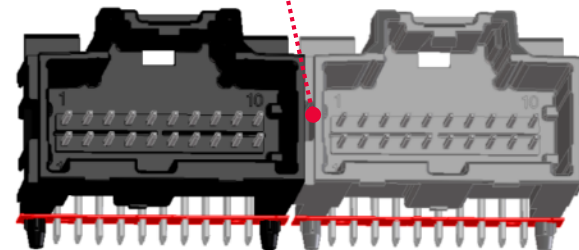
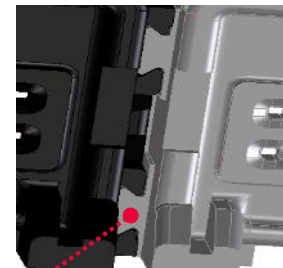
Hand-released Terminal
Position Assurance (TPA)
actuator improves part servicing
and protects from seated TPA's

Improved
polarization
effectiveness



Stacking lock feature (up to 4 bays),
220N unlocking force

Locking feature is
hidden from view
when headers are
stacked (or ganged)



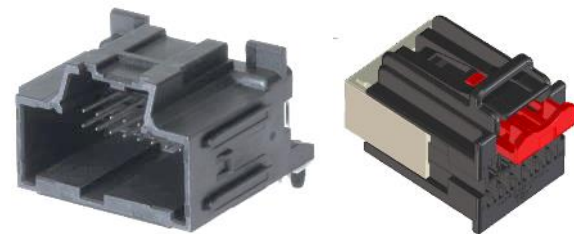
Why Stac64™ ?

- **Unique stackable design and Hybrid Version**
 - No tooling cost required for custom multi-bay headers; Provide more design flexibility to customer
- **Decreased time-to-market**
 - Headers available in typically 2 weeks vs. longer lead-times for custom solutions offered by our competition
- **True USCAR color-coding**
 - Headers and receptacles color and mechanical key-matched to assist assembly operation
- **Widely embraced by many OEM's**
 - Ford, GM, Chrysler, Chery, Tata, BYD, PSA, SAIC, FAW, NISSAN, Hyundai, Tesla, etc.
- **Standard product offering**
 - Tooled, validated and readily available for use off the shelf; and a new multi-bay header can be created on customer request
- **Competitive price**
 - Due to low-cost manufacturing logistics
- **Proven reliability**
 - Very reliable and robust Header, Receptacle and Terminal

Stac64 Extension - UL V0 Connector System

■ Product Description:

- **Stac64 Headers with V0 compliant material :**
Available in Q4,2018
- **34729 series and 31410 series connector with V0 compliant material**
Available in Q2,2019





Mini50 Sealed Connector

Mini50 Sealed Market and Applications

■ Automotive and non-automotive transportation

- Power Steering
- Cameras
- Sensors (parking, radar, crash, etc.)
- Braking
- Exterior Lighting
- Mirrors



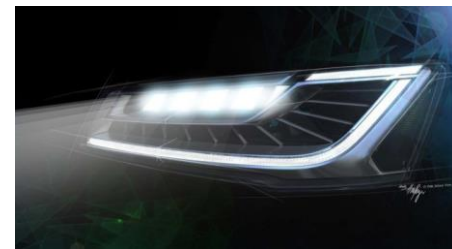
Transportation Industry



Automotive Industry



Exterior / Mirrors / Cameras



Lighting

i
Molex does not supply a sealed header.
Most device makers prefer to mold an
interface into a component of their
choice, mating to the Mini50 connector.
Molex can supply the interface drawings
and models

Mini50 Sealed Connector

| Features | Benefits |
|---------------|--|
| Rounded shape | Allows for through hole harness routing |
| Vertical ISL | Strong secondary terminal retention |
| Front cover | Individual test pin and servicing access |

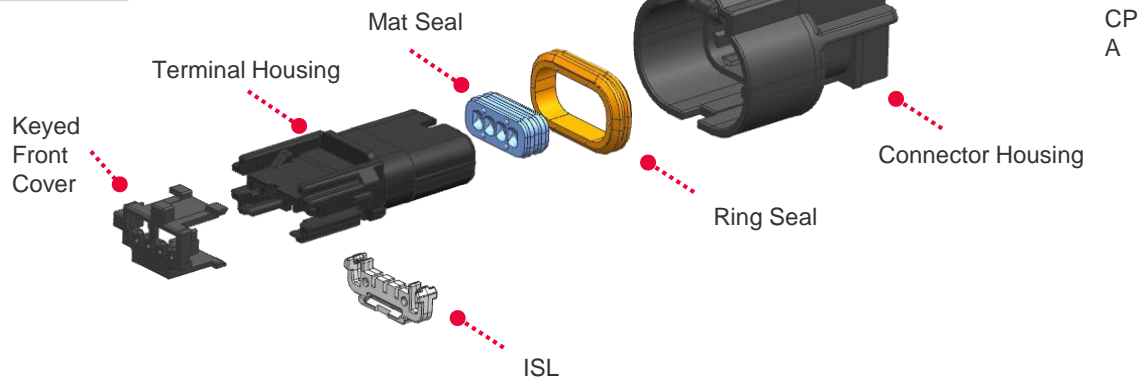
**MX64™ Sealed
1x4 (USCAR)**



**Mini50™ Sealed
1x4**



Approximate 25% reduction in size for the 4-circuit receptacle



Mini50 Sealed Keys

- 4 keys/polarizations available, controlled by the front cover
 - Reduces risk of performance variation between the different key options
 - Reduces mold complexity on terminal housing



Key A



Key B

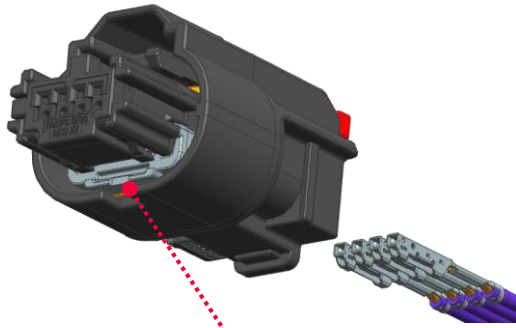


Key C

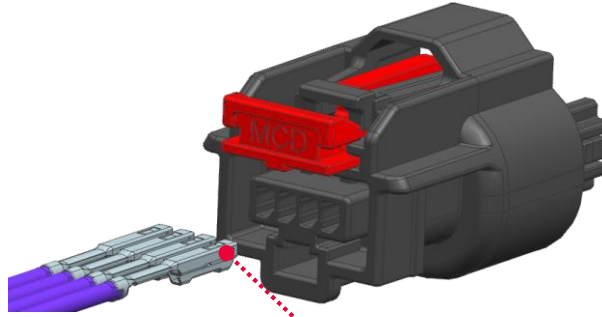


Key D

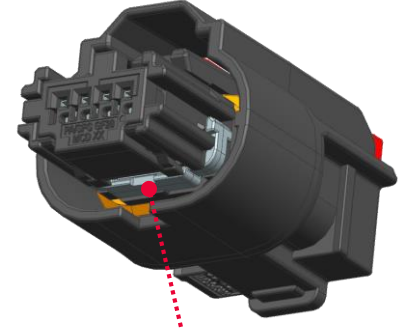
Mini50 Sealed ISL Operation



Check ISL is open



Insert crimped terminals



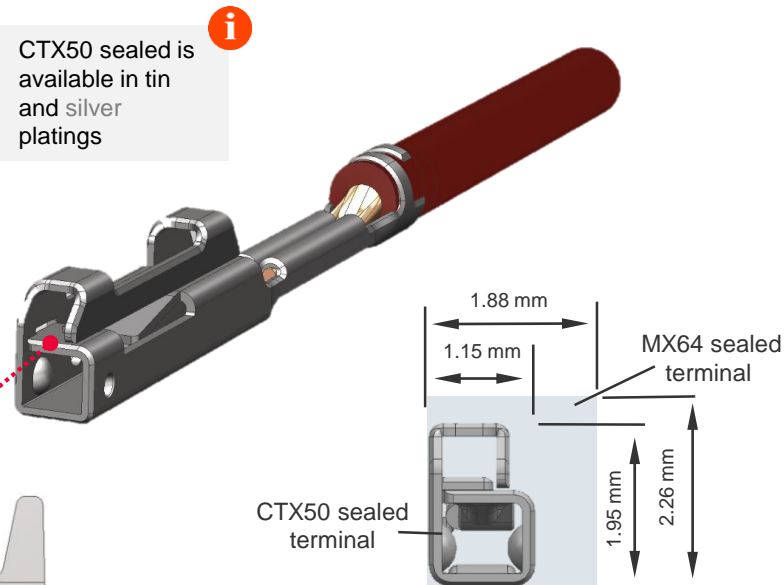
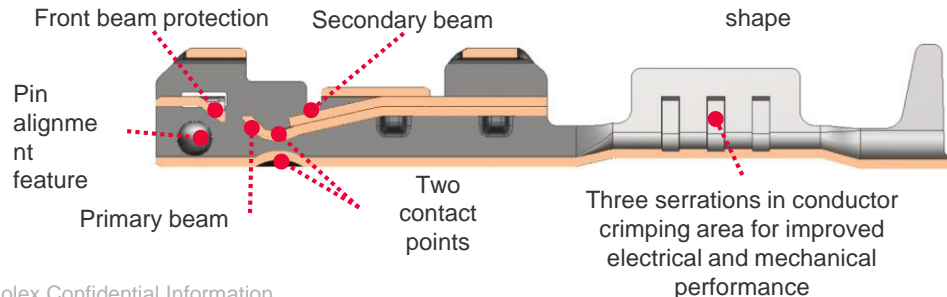
Close ISL

CTX50 Sealed Terminal

- Based on USCAR compliant CTX50 unsealed terminal

- Designed for 0.95-1.4 mm OD cable
- Polarization achieved by terminal shape maintaining seal integrity
- Beam design strengthened
- Tin rated to 105°C, Silver to 125°C

CTX50 sealed is available in tin and silver platings



Cross-sectional area is 47% smaller vs. USCAR 0.64mm terminal

Mini50 Sealed Product Roadmap

- Single row: Available 2017

- 1x6 and 1x8 also planned

1x2



1x4



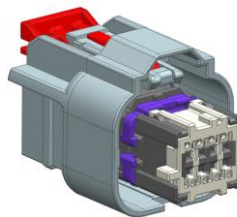
1x10



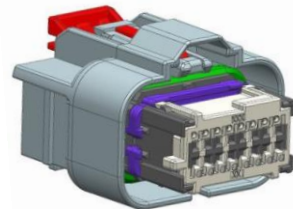
- Dual row: Available 2018

- 2x2, 2x3, 2x6, and 2x10 also planned

2x4



2x8



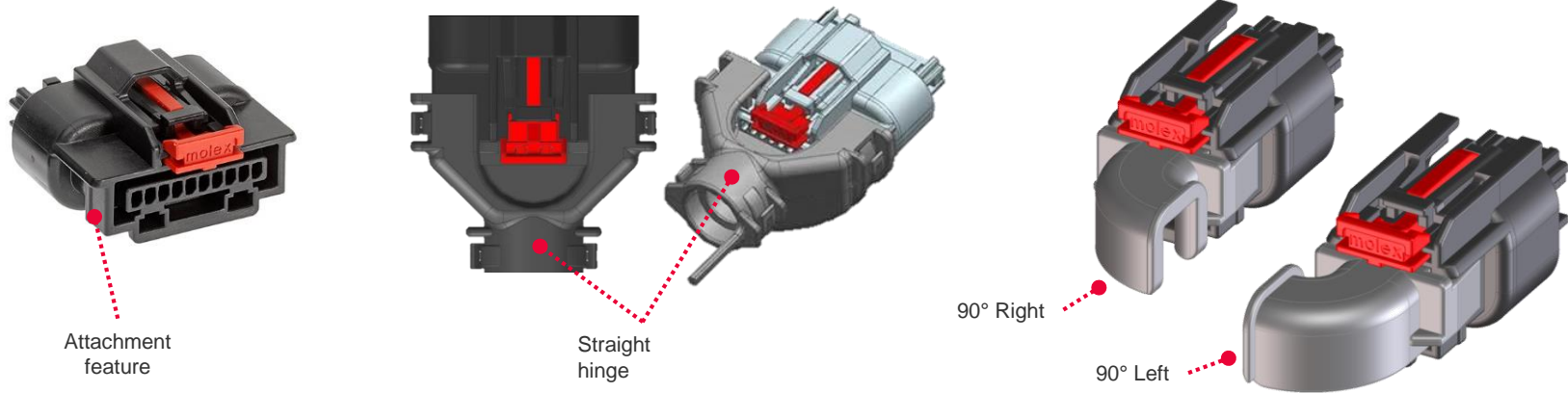
Mini50 Sealed Product Roadmap

| SR Circuit Sizes | Release Date | DR Circuit Sizes | Release Date |
|------------------|---------------|------------------|--------------|
| 1x2 | June 2018 | 2x2 | Group 2 |
| 1x3 | - | 2x3 | Group 1 |
| 1x4 | June 2017 | 2x4 | August 2018 |
| 1x6 | Group 2 | 2x6 | Group 2 |
| 1x8 | Group 1 | 2x8 | August 2018 |
| 1x10 | February 2018 | 2x10 | Group 2 |

- Group 1 will be the next circuit sizes added
- Group 2 will then follow to complete the full Mini50 sealed family
- Roadmap may change based on customer demand

Mini50 Sealed Backshell

- Connector design includes a backshell attachment feature
 - Required for high pressure spray applications (S3)
 - Improves IP rating from IP68 to IP69K



Mini50 Sealed Technical Summary

- Sealed receptacle, single row series: 34967

| | |
|--------------------------|---|
| — Environment | T2-V1-S2 (Sn) T3-V1-S2 (Ag) |
| — Features | Small wire sealing, reduced CPA and latch size |
| — Interface Pitch | 1.8mm |
| — Terminals | CTX50 Sealed (34905 series) |
| — Wire Range Metric | 0.13mm ² and 0.35mm ² thin-wall |
| — Materials | SPS/Nylon - 20% GF, PBT 30% GF, SPS 30% GF |
| — Plating | Tin or Silver |
| — Validation Requirement | USCAR-2 rev.6 |

Mini50 Sealed Summary

- Size reduction over 0.64 mm connector, while maintaining durability
- Bridged with CPA option design, in 4 polarizations
- No parting lines on sealing surfaces – IP68 rating, IP69K with backshell
- Robust ISL and terminal
 - >60N crush resistance/partial terminal seating detection
 - >60N terminal retention
- ‘Molded in’ cavity plug strategy
- CTX50 sealed terminal
 - Based on proven CTX50 unsealed terminal design



Mini50™ Connector System

Achieve a space saving over 0.64mm connectors in a sealed or unsealed system. With smaller terminals fit to more low-current circuits in automotive applications

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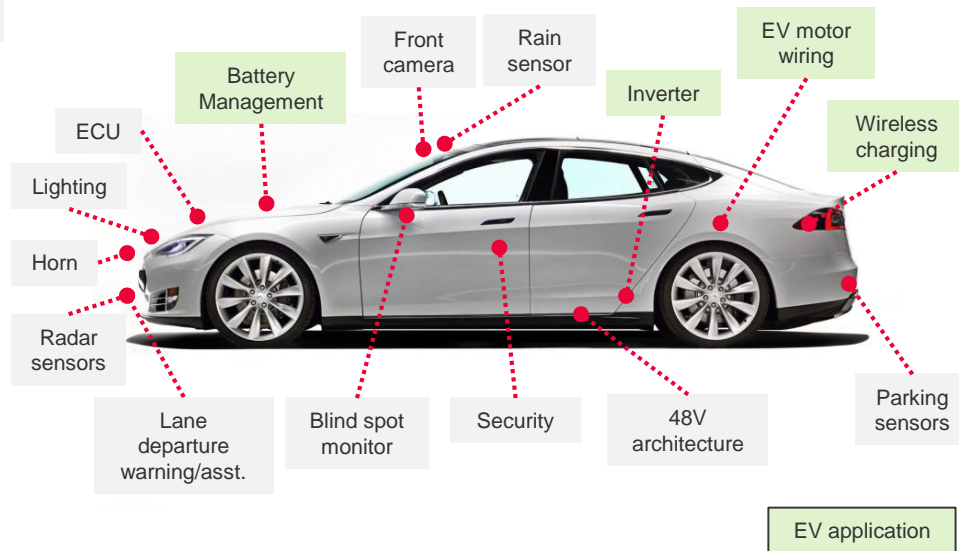
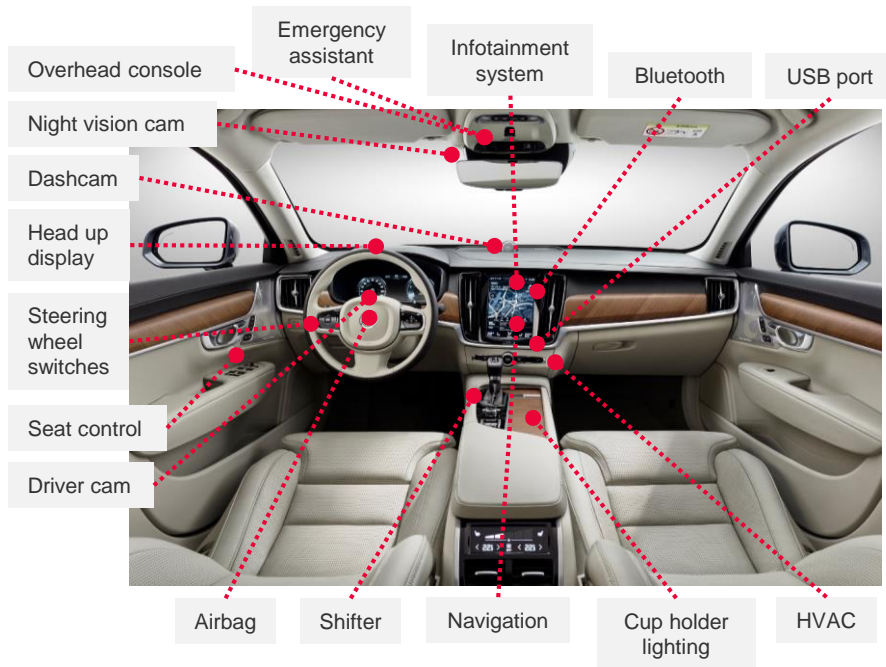
molex®

Introduction to Mini50™

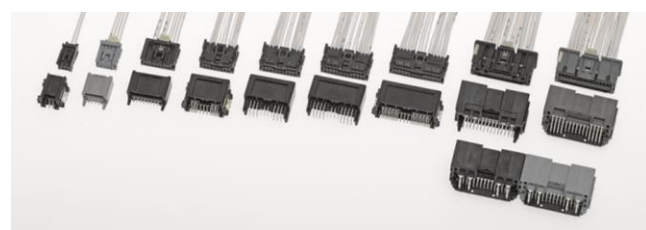
- A 0.5 mm connector system, certified to automotive standards, available as both an unsealed and sealed solution
- Enables device manufacturers to package 2 to 114 circuits in smaller spaces by utilizing smaller pins and terminals, providing an applied cost saving



Mini50™ Applications



Mini50 Unsealed



What is it:

0.5mm unsealed wire-to-board headers and 'Gen I' receptacle connectors. Is the USCAR interface for 0.5 unsealed applications

Vision:

Offer the smallest automotive grade connector system that meets USCAR-2 specification for automotive electrical connector systems. 50% smaller than a 0.64 system

Options:

- Circuit sizes range from 2 to 38ckts (114ckt in multi-bay assembly)
- **Header** – Tin or gold plating. SMT and through-hole R/A or vertical configurations
- **Connector** – With or without optional CPA
- **Terminal** – CTX50 unsealed, tin or gold (0.13 - 0.35 wires)

Main Customers:

Ford, GM, FCA, BAIC, BYD, Renault, Nissan, Hyundai-Kia, John Deere, etc.

Typical Applications:

In-vehicle switches, infotainment, seat/mirror controls, camera modules, battery management systems (BMS), lighting, Bluetooth, HVAC, etc.

Other things to know:

- Can be used for BroadR-Reach 100Mbps Ethernet in all configurations and 1000Base-T1 1Gbps Ethernet as a 2ckt single pair link

Goals:

- **Short term:** Increase market share at more OEM's (JLR, Volvo and in Asia). Offer a V0 option
- **Long term:** Reduce package size

What's New:

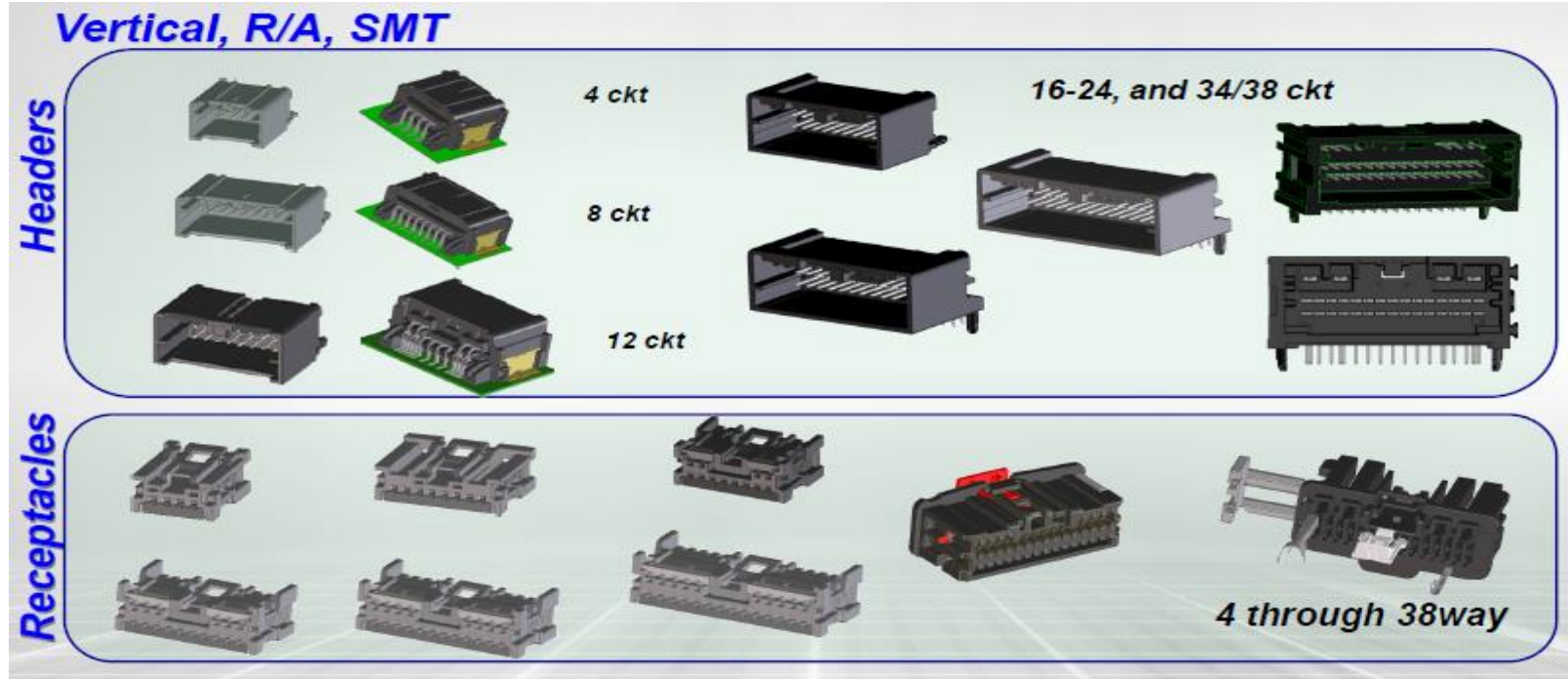
- **Mini50 Gold:** Has high conductivity suited to safety and low-current applications. Resists corrosion prevalent in automotive environments
- **Mini50 Gen II Connectors:** Will replace Gen I receptacle dual-row connectors. Additional information on next page



0.50mm System Product List

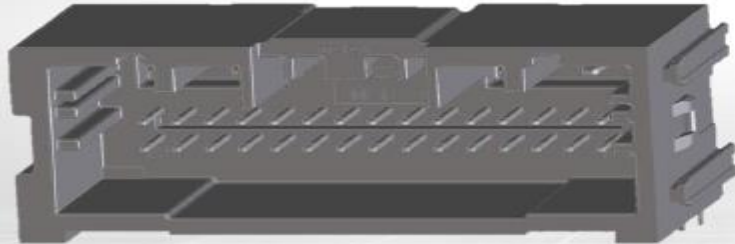
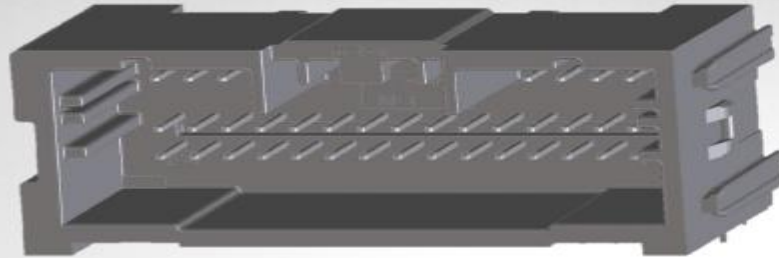
| Product | Unsealed | Sealed | Circuits | Plating | Configurations | Specifications | Available |
|-------------------------------|----------|--------|---------------|-------------|-----------------|----------------|-----------|
| Mini50 USCAR headers | Y | | 2 to 38 | Tin, Gold | SMT, T/H | USCAR | Yes |
| Mini50 Gen I connectors | Y | | 2 to 38 | | Optional CPA | USCAR | Yes |
| CTX50 unsealed terminals | Y | | | Tin, Gold | S, M and L grip | USCAR | Yes |
| ConnTAK50 AK headers | Y | | 8, 10, 20, 22 | Tin | SMT | LV-214 | Oct 2018 |
| ConnTAK50 AK connectors | Y | | 8, 10, 20, 22 | | Optional CPA | LV-214 | Oct 2018 |
| TAK50 unsealed terminal | Y | | | Tin | S and L grip | LV-214 | Yes |
| Mini50 Inline connectors | Y | | 2 | | | USCAR | Dec 2018 |
| CTX50 blade unsealed terminal | Y | | | Tin | S, M and L grip | USCAR | Dec 2018 |
| Mini50 sealed connector (SR) | | Y | 2, 4, 10 | | Optional CPA | USCAR | Yes |
| Mini50 sealed connector (DR) | | Y | 8, 16 | | Optional CPA | USCAR | Dec 2018 |
| CTX50 sealed terminals | | Y | | Tin, Silver | S and L grip | USCAR | Yes |

Molex – Mini50 Unsealed



Molex – Mini50 Unsealed

34 / 38 way 0.50 3 row system

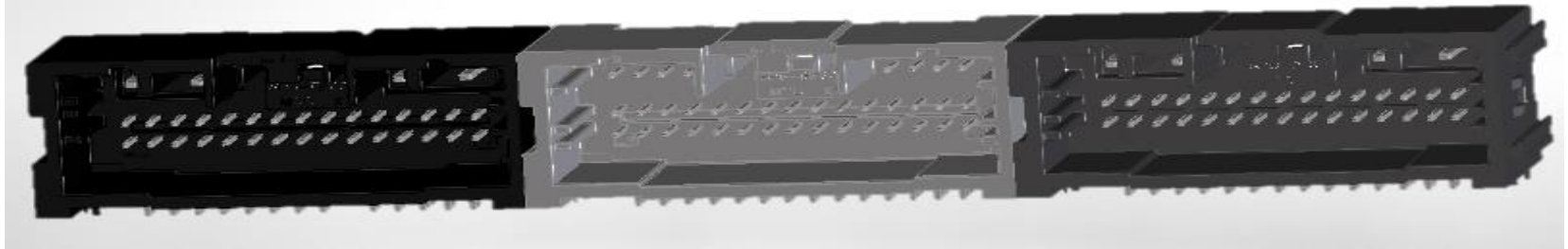


- **2.0 mm horizontal terminal pitch**
- **Matte Tin Plated Terminal**
- **Through Hole, IR Reflow Capable**
- **3 Key Options – Color Code**
 - **Pin Alignment Plate**

Molex – Mini50 Unsealed

**34way 0.50 / 1.20mm Hybrid
38way 0.50 3 row system
STACKED ASSEMBLIES**

- *Can be stacked together, mix and match, up to 3-bays*
 - *Shipped as single header solution*



Molex – Mini50 Unsealed

Receptacles

34way 0.50 / 1.20mm Hybrid

38way 0.50 3 row system



- *2.0 mm horizontal terminal pitch*
- *3 Key Options – Color Code*
 - *ISL – shipped assembled*
 - *1.2 terminals are Tyco MCON LL*

Molex – Mini50 Unsealed

非密封的应用

- 导航仪
- 音频播放器
- 开关
- 车灯
- 后视镜
- 方向盘
- 传感器



Mirrors



HVAC



Mirrors / Cameras

特征

- 独立的端子锁紧部件
- 小尺寸
- 耐高温材料

优势

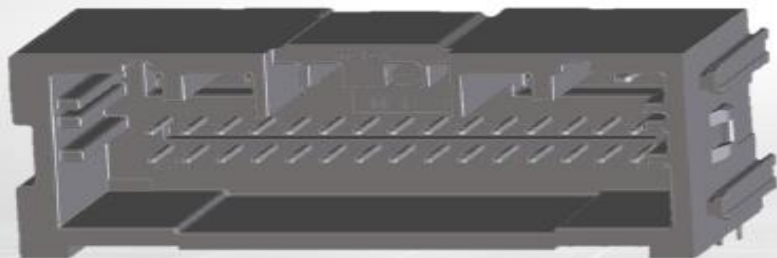
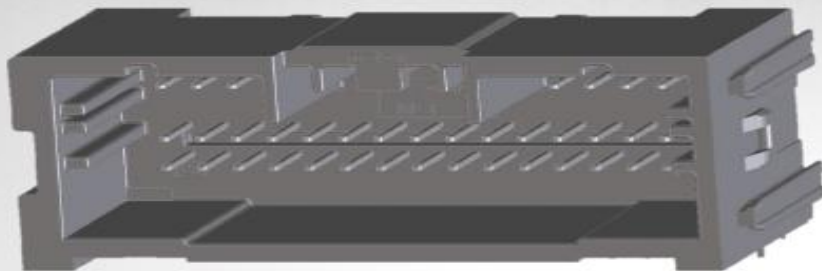
- 端子保持力高
- 减少间距: 2.00mm, 减小尺寸
- 260°C

Molex – Mini50 Unsealed



Molex – Mini50 Unsealed

34 / 38 way 0.50 3 row system

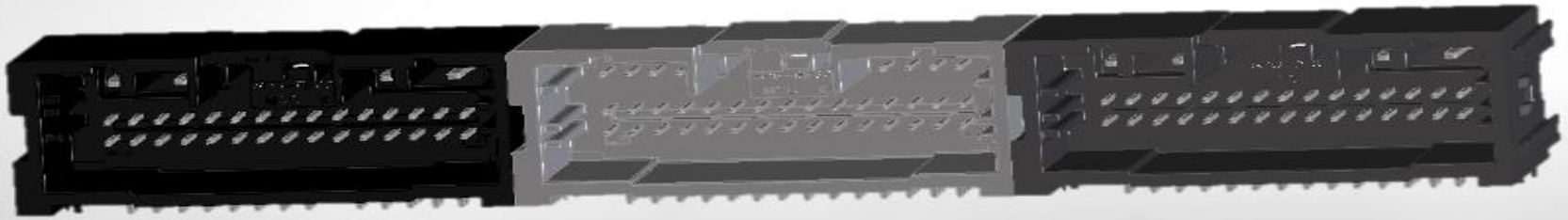


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Molex – Mini50 Unsealed

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38way 0.50 3 row system
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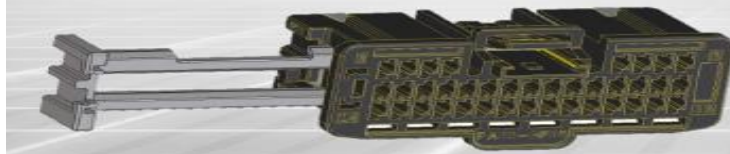


Molex – Mini50 Unsealed

Receptacles

34way 0.50 / 1.20mm Hybrid

38way 0.50 3 row system



- *2.0 mm horizontal terminal pitch*
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 - *1.2 terminals are Tyco MCON LL*

Molex – Mini50 Unsealed

非密封的应用

- 导航仪
- 音频播放器
- 开关
- 车灯
- 后视镜
- 方向盘
- 传感器



Mirrors



HVAC



Mirrors / Cameras

特征

- 独立的端子锁紧部件
- 小尺寸
- 耐高温材料

优势

- 端子保持力高
- 减少间距: 2.00mm, 减小尺寸
- 260°C

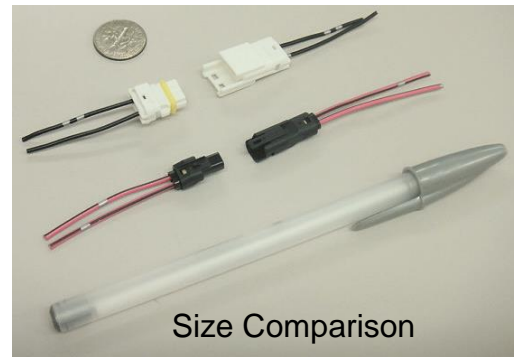


Mizu-P25™ Sealed Connector Family

Great product for space
constrained applications that
require dustproof and waterproof
protection

Mizu-P25™ Overview

- Miniature Wire-to-Wire Connector System
- 'Splash Proof' Connectors
- Over 20 years in the field
- Meets JIS D0203, S2
- Meets IP67
- High Voltage & Low Voltage versions available
- Features:
 - Positive locks for secured mating retention
 - Spring-beam terminal design provides high pressure and small deflection for high vibration applications



Mizu-P25™ Competitive Advantage

| | Molex Mizu-P25™ | JST JWPF | Elco 9515 |
|-------------------------------|-----------------------------------|----------------|---------------|
| Mated Diameter (approx.) | 8.90mm | 10.00mm | >10.00mm |
| Waterproof Rating | IP67 | IEC 68529 IPX7 | Not published |
| UL/TUV Heat-resistance Rating | 600V UL/ 600V cUL/ 450V TUV | Not published | Not published |
| Positive Locks | Yes | Yes | Yes |

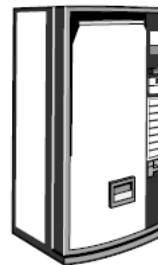
- Only miniature sealed system in the market certified to IP67
→ *Better waterproof protection*
- Smallest mated diameter
- Superior heat-resistance rating

Mizu-P25™ Applications

- Mirrors
- Lamps
- Steering
- Door electronics
- Seating
- Steering
- LED lighting
- Vending machines
- Heated toilet seats
- Parking sensors
- Air conditioners



Heated Toilet Seats



Vending Machines



Mirror Module



Mizu-P25™ Connector Family



125 Volts Type
50147, 50148, 52213, 52266



250 Volts Type
50038, 50039, 52116, 52117



Crimp Terminal Series 52213



Crimp Terminal Series 52117



Plug, Black,
Series 52266



Female Receptacle, Red,
Series 52116

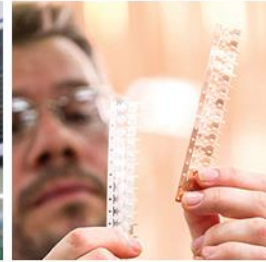
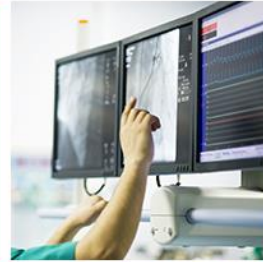


Plug, White,
Series 52116



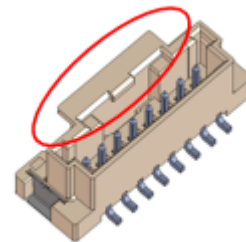
Female Receptacle, White,
Series 52116

DuraClik™ Standard/TPA/ISL Non-Sealed Wire to Board connector

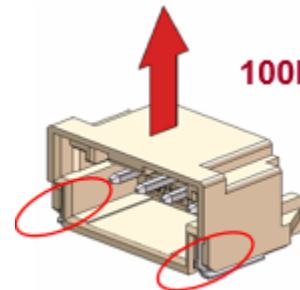


Feature

- Right Angle(502352) / Vertical(560020) available in tin and gold plating
- Mates with all three receptacles: Standard ,ISL and TPA
- Inner lock System
- Flat surface for easy pick and place
- High PCB retention force to withstand vibration
























EASY PICK AND PLACE



100N per 2nails

SHOCKPROOF SMT DESIGN

Feature comparison

| Feature | DuraClik™ | DuraClik™ISL | DuraClik™TPA |
|--------------------------|--|--|---|
| Small Size |  | | |
| Audible Click |  |  |  |
| High temperature | 105C |  125C |  125C |
| Retention Force | 9.8N |  50N | 20N |
| Has a retainer | |  |  |
| Box shaped terminal |  |  |  |
| Lance design | Terminal lance | Terminal lance | Housing lance |
| Circuit sizes - released |  2-15 | 2,3,4,5,6,8,9,10,12 |  2- 15 |
| Plating |  Tin / Au |  Tin/ Au |  Tin/ Au |
| Color coding |  Natural/ Black |  Natural/ Black Red/Blue | Natural/Black |
| Inertial Locking | | |  2-8ckt |
| LV214 | |  | |

Applicable wire

| Type | Parts Number | Conductor size(mm2) | Applicable wire | Insulation Dia. (Φ mm) |
|----------|--------------|---------------------|---------------------------------|------------------------|
| Standard | 560085 | 0.38 | AVSS0.3 | 1.4 |
| | | 0.125-0.34 | AWG #22-#26 | 0.95-1.4 |
| | 50212 | 0.049-0.22 | AWG #24-#30 | 0.8-1.4 |
| TPA | 505153 | 0.38 | AVSS0.3/ AVSS0.3f/ AESSX0.3f | 1.5mm MAX |
| | | 0.20-0.34 | AWG#22-#24 | 1.15-1.4 |
| ISL | 560124 | 0.38 | AVSS0.3 | 1.4 |
| | | 0.35 | FLRY-A0.35/Mocar150C 0.35 | 1.3mm MAX |

Potential Application

- Fast growing LED lighting market



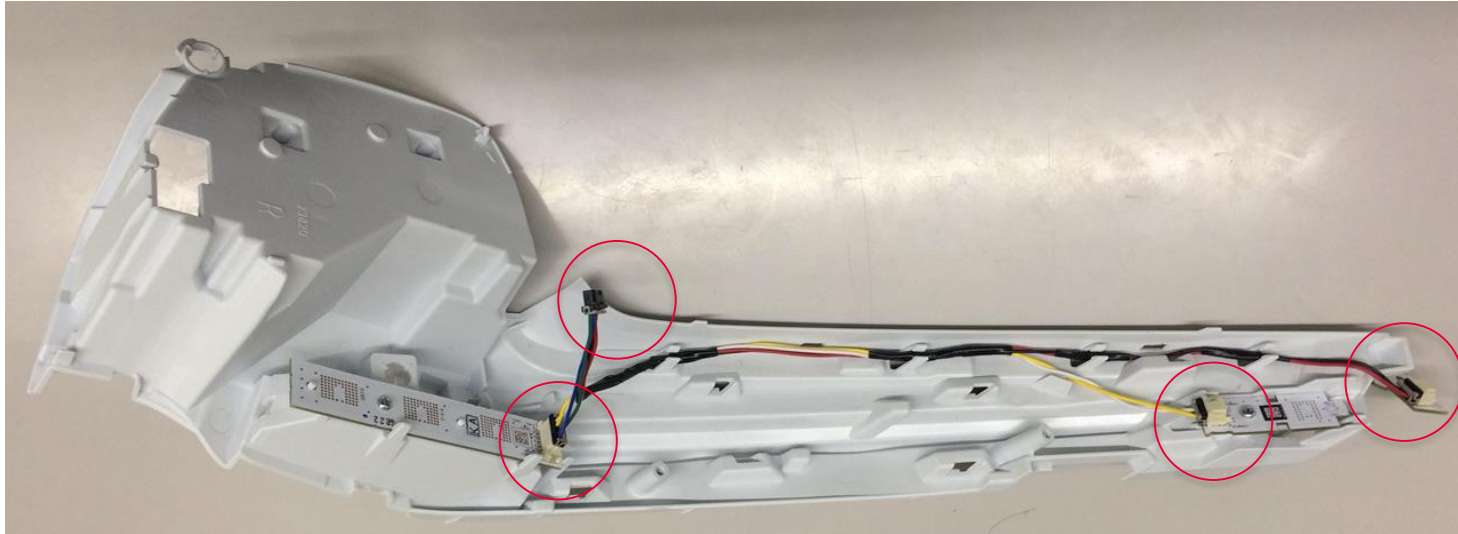
- ✓ Automotive move to LED Lighting
- ✓ Replacing from PA (JST) to DuraClik by higher price – higher performance
- ✓ DuraClik is going to De facto standard interface at LED Lighting
- ✓ In addition of many other application where compact & robust & high performance connector system is needed: sensing, steering wheel
- ✓ Toyota Application (example below, several connectors are used in one Head lamp lighting system from Stanley Japan for Toyota)



- ✓ DuraClik is also applied on non Automotive harsh environment application: CVs, Industrial...
- ✓ Heat cooker and Drone

Example of LED Application

- Stanley rear LED lighting module for TPA





stAK50h™ Connector System

Leveraging industry-approved terminal design, stAK50h™ unsealed hybrid connectors deliver both signal and Ethernet connectivity through one low-footprint connector

molex®

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stAK50h™ Markets and Applications

■ Automotive

- Comfort, Infotainment and Driver Assist
- Body Electronics
- Safety/Chassis
- In-Vehicle Networking

■ Commercial Vehicles

- Interior Electronic Modules
- Body Electronic Modules



Power Seat Modules



Car infotainment systems



Car navigation systems



Car interior lighting, instrument panel clusters and door-zone modules

stAK50h™ Development

- 0.5mm terminal cavity is developed around the released AK Cavity Spec
- 1.2mm terminal cavity is developed around the released AK Cavity Spec
- 2.8mm terminal cavity is developed around the released TE Cavity Spec
- CPA and connector latch designs are shared with Mini50™
- Pre-staged Independent Secondary Terminal Lock (ISL) developed around Mini50™ sealed



Molex TAK50



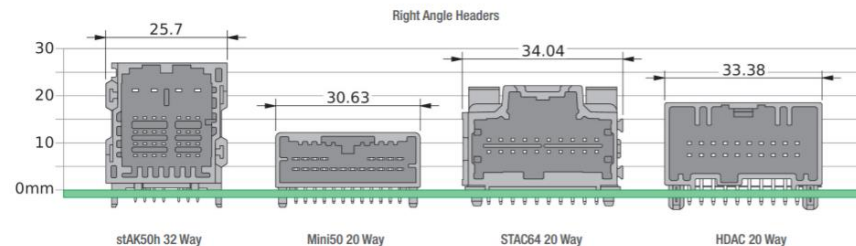
Delphi OCS / JST MSA 1.2



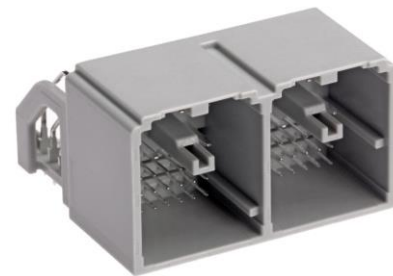
TE MCP2.8



stAK50h™ Features

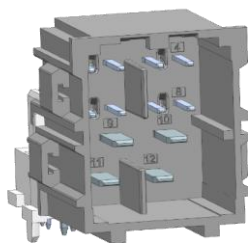


| Feature | Benefit |
|---|--|
| Stackable and modular header design | Eliminates costly custom tooling, engineering and validation time needed for multi-bay configuration |
| Proprietary compliant-pin technology using CA-19010 grade material for mating headers | Ensures cost-effective manufacturing with consistent quality, meeting all press-fit application requirements |
| 0.5, 1.2 and 2.8 mm terminals – developed around NanoMQS, MCP2.8 and AK (Arbeitskreis) specifications | Support a wide range of low-current signal (3A) to high-current power (30A) applications |
| Compliant to USCAR-2 and global automotive OEM standards | Enables faster time-to-market |
| Standard USCAR color-coded housings | Support visual polarization as well as assembly of connector systems |
| PCB stand-offs molded into PAP housings | Provide additional trace-routing real estate under the headers |

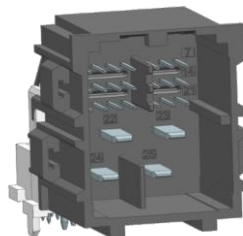


stAK50h™ Header

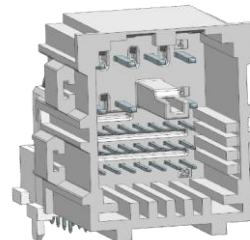
- Mate to stAK50h™ connectors
- Blade sizes:
 - 0.5 mm x 0.4 mm
 - 1.2 mm x 0.6 mm
 - 2.8 mm x 0.8 mm
- Single or multi-bay option
- Multiple configurations:
 - Solder or EoN pins
 - R/A or Vertical



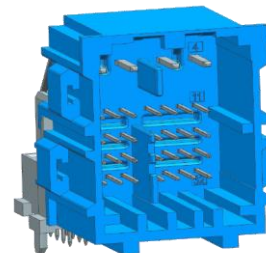
12ckt



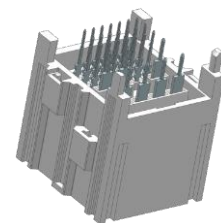
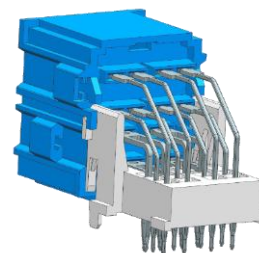
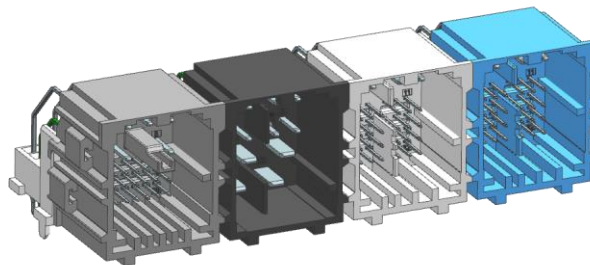
25ckt



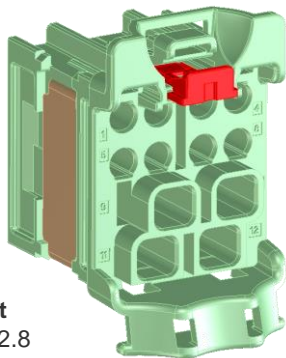
27 / 28ckt



32ckt



stAK50h™ Connector



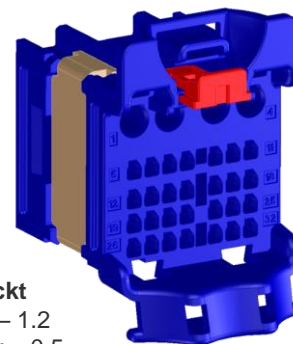
12ckt
4x – 2.8
8x – 1.2



25ckt
4x – 2.8
21x – 0.5



27 / 28 / 29ckt
Up to 8x – 1.2
Up to 21x – 0.5



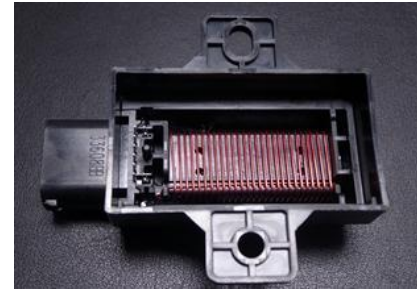
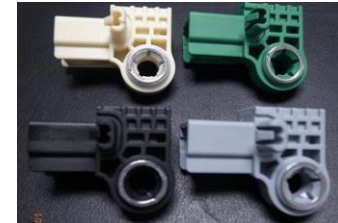
32ckt
4x – 1.2
28x – 0.5



Fits package for GM infotainment and
BCM/ELM programs

Sensor Applications

- ☐ Side Impact
- ☐ Park Assist
- ☐ Roll Over
- ☐ Remote Satellite
- ☐ Tire Pressure monitoring System



PEDOT* Clear Conductive Sensors



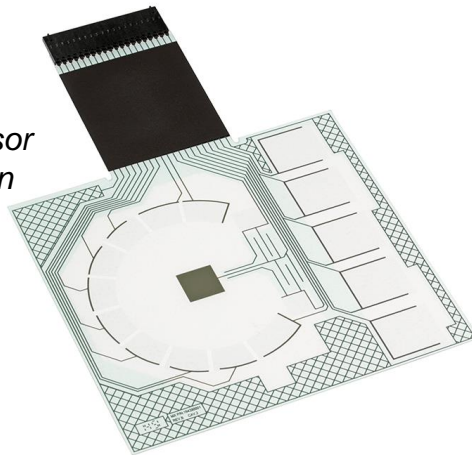
*Poly (3, 4-ethylenedioxythiophene)

molex[®]
one company ▶ a world of innovation

Molex Introduces PEDOT* Clear Conductive Sensors

- Offers flexibility and translucent circuits
 - Enabling keypad backlighting on curved surfaces for capacitive user interface panels

*PEDOT Clear Conductive Sensor
with Rotary Dial Functionality on
Polyester Substrate*



*Poly (3, 4-ethylenedioxythiophene)



Markets and Applications



Home Appliance (Controls)

- Refrigeration
- Cooking
- Laundry
- Dishwashers
- HVAC



Connector Home

- Smart Speaker
- Thermostat
- Streaming Media Devices
- Home Automation Equipment



Automotive (Controls)

- Center Stack
- On-Door Controls
- Map Light
- Seat Controls

This is not a definitive list of applications for this product, it represents some of the more common uses



Competitive Analysis*

| Product and Technical Differences | | |
|-----------------------------------|--------------------------|--------------------------|
| Attribute | Molex PEDOT | Indium Tin Oxide (ITO) |
| Resistivity | 500 Ohms | 150 Ohms |
| Transparency | 80 to 85% | 90 to 92% |
| Flexibility | At least 50,000 cycles | At most 100 cycles |
| Appearance | Slight visible blue tint | Invisible |
| Pitch for Tail | 1.00mm minimum | 0.50mm or smaller |
| Tail finishing | Carbon ink overprint | Gold plating on FPC tail |

*Information gathered from the world wide web at the time of this product launch



CMS – Networking Segment

- Continued Focus on the Core Strengths of our Business

HSAutolink™



- USCAR-30 Infotainment interface standard (Mini-b)
- Continued Investment in Capacity, footprint expansion: DG, PHL, GDL, IND
- Supports USB2.0 & LVDS up to 2Gb/s

Capacity & Footprint Expansion

HSAutoLink™ II



- Ruggedized interface in both sealed and unsealed, 6ckt and 12ckt
- Ideal “Y” cable configuration breakouts
- Supports USB3.0 & LVDS up to 6 Gb/s
- Supports automotive Ethernet

Capacity & Footprint Expansion

HSAutolink™ Illuminated Type A & C



- Consumer charging/data transfer interface supporting USB A or C
- Industry leading 20,000 durability cycles
- Dimmable or non Dimmable options
- Supports USB2.0 and 5V/3A integrated power delivery

Tooled & Looking for Opportunities



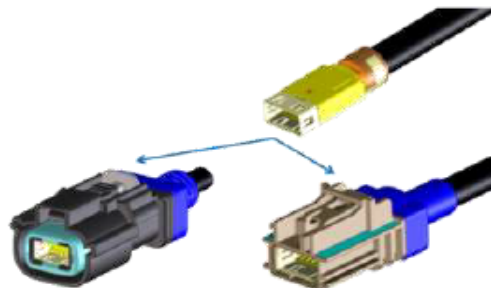
How is Molex supporting today the Industry

- In 2004 Molex Launched it's **HSAutoLink™** system for Ford SYNC
 - ⦿ SAE/USCAR- 30 leveraged technology.
- Since 2007, more than **200 Million connector systems** already on the field.
- Connector interface released @ Ford, GM, FIAT/Chrysler, Tata, Tesla and RSA/Nissan for future multimedia Platform



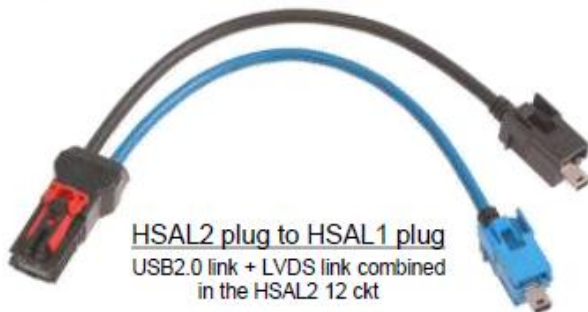
Technology- HSALII

- Sealed and Unsealed - optimized electrically one time for all 'end-to-end' requirements.
- Electrical Optimization for 5 Gb/s performance and next generation needs.
 - USB 3.0
 - LVDS 2 Gb/s +
- Integrated Technologies
 - USB and LVDS Links
 - Multiple USB Links
 - A single PCB Header to "Y" cable configurations
- Superior EMI/EMC performance.
 - Maximize the shield coverage.



HSAutoLink™ II : Product Design overview

- Some Illustrations / Use cases for integrated technology

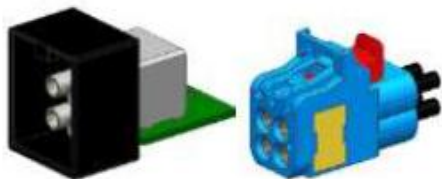




New Networking Products

■ NEW High Speed Solutions

Mini-Fakra



- Next Generation Coaxial interface
- High data rate applications: High Resolution Cameras, 4k LCD, Sensors and On-board Computers
- Targeted up to 20 Gb/s
- Supports standard & next gen LVDS.

Samples Available

HSAL2/Mini50 Hybrid



- Hybrid system combining HSAL2 and Mini-50 into single solution
- Ideal for mixed signaling: LVDS USB2.0, BroadR-Reach™
- Supports 10Mbps - 1Gbps unshielded automotive Ethernet

Samples Available

HSD



- 2 pair interface ideal for LVDS infotainment and ADAS applications
- Data rates up to 6Gbps
- Buy-Resale components, Molex produced assemblies
- Supports automotive Ethernet

Samples Available



CMS – Modules & Smart Chargers Segment

- Focus on standard product offering

Single Port Panel Mount



- 12V supply
- 1.5A charging power
- Backlit logo
- Fits existing rocker panel switch cut out
- Planned release Q1 2017

Single Port Panel Mount



- 12V supply
- 2.4A smart charging
- Backlit logo
- Planned release Q2 2017

Dual Port Panel Mount



- 12V supply
- 2.4A smart charging
- LED halo lighting
- Dust cover option available
- Planned release Q2 2017

Single Port Charge + Data w/ Aux



- 12V supply
- 1.5A smart charging
- LED backlit icon
- Dust cover option available
- Planned release Q3 2017



CMS – Modules & Smart Chargers Segment

- Development roadmap for future standard product offerings

Single Port and Dual Port Circular Panel Mount Chargers



- Single & dual port Type A USB options
- Single & dual port Type C options



- Circular design fits into existing cigarette lighter cutout
- Thermal management circuit



- 12V supply
- 2.4A type A charging
- 3.0A type C charging
- Planned release for all four variants Q1 2018



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