

5G多场景终端应用对连接器的新要求 及Molex的5G连接方案

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2020年11月19日 10:00-11:00直播

molex

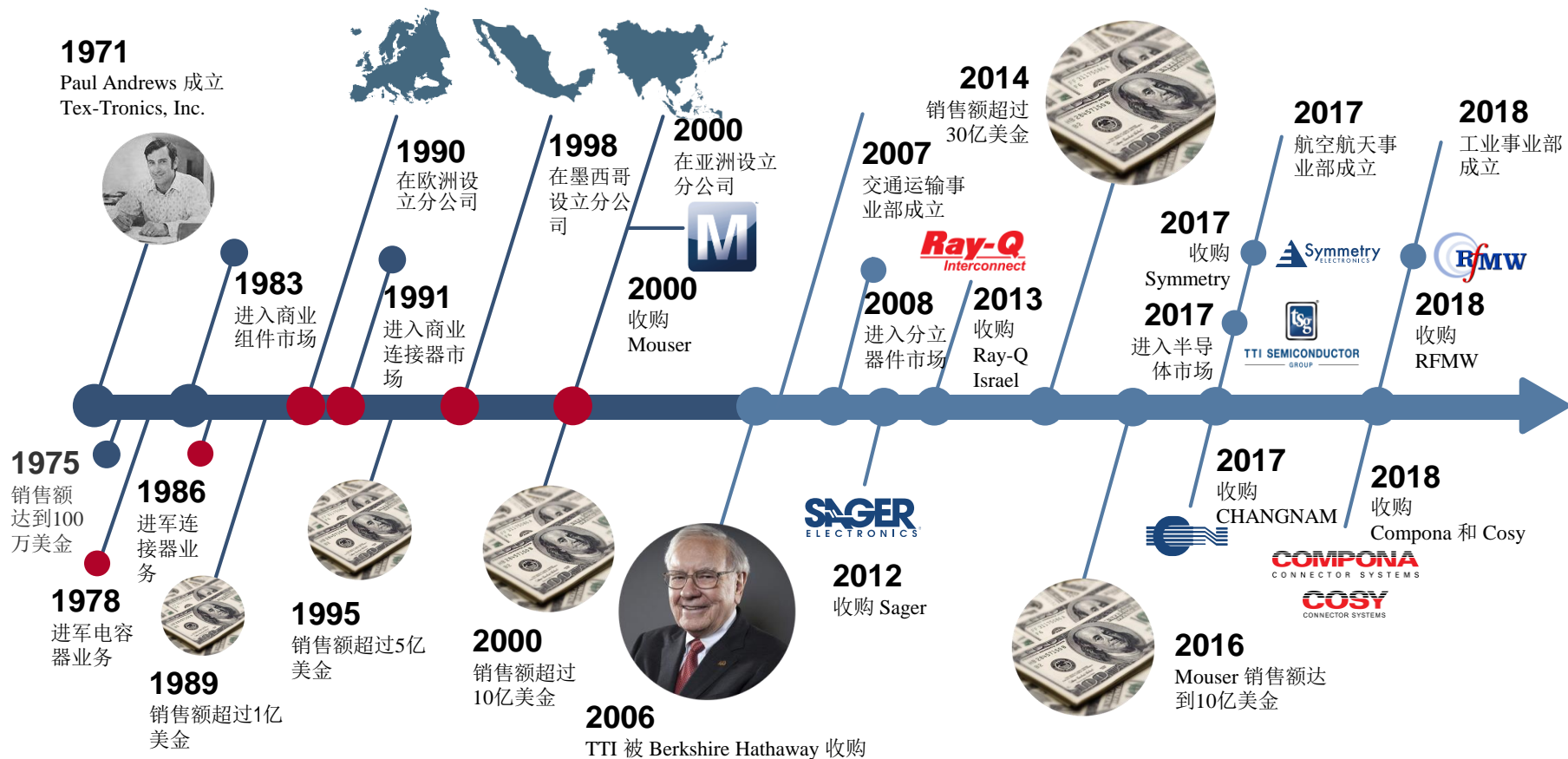


内容概要

- TTI和Molex 介绍
- 5G概要及对连接器的要求
- Molex 5G连接产品
- 总结



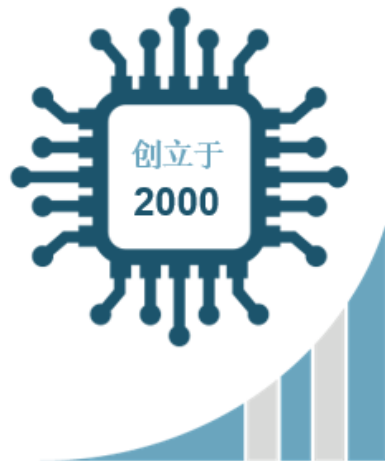
TTI 发展历程



TTI 亚太区2019年概览



The Specialist in Electronic
Component Distribution
A Berkshire Hathaway Company



8.9%
5年 CAGR



\$426M

年销售额



客户数量

4.3K

34.5K

零部件库存

总部
新加坡



16 办事处

4 仓库



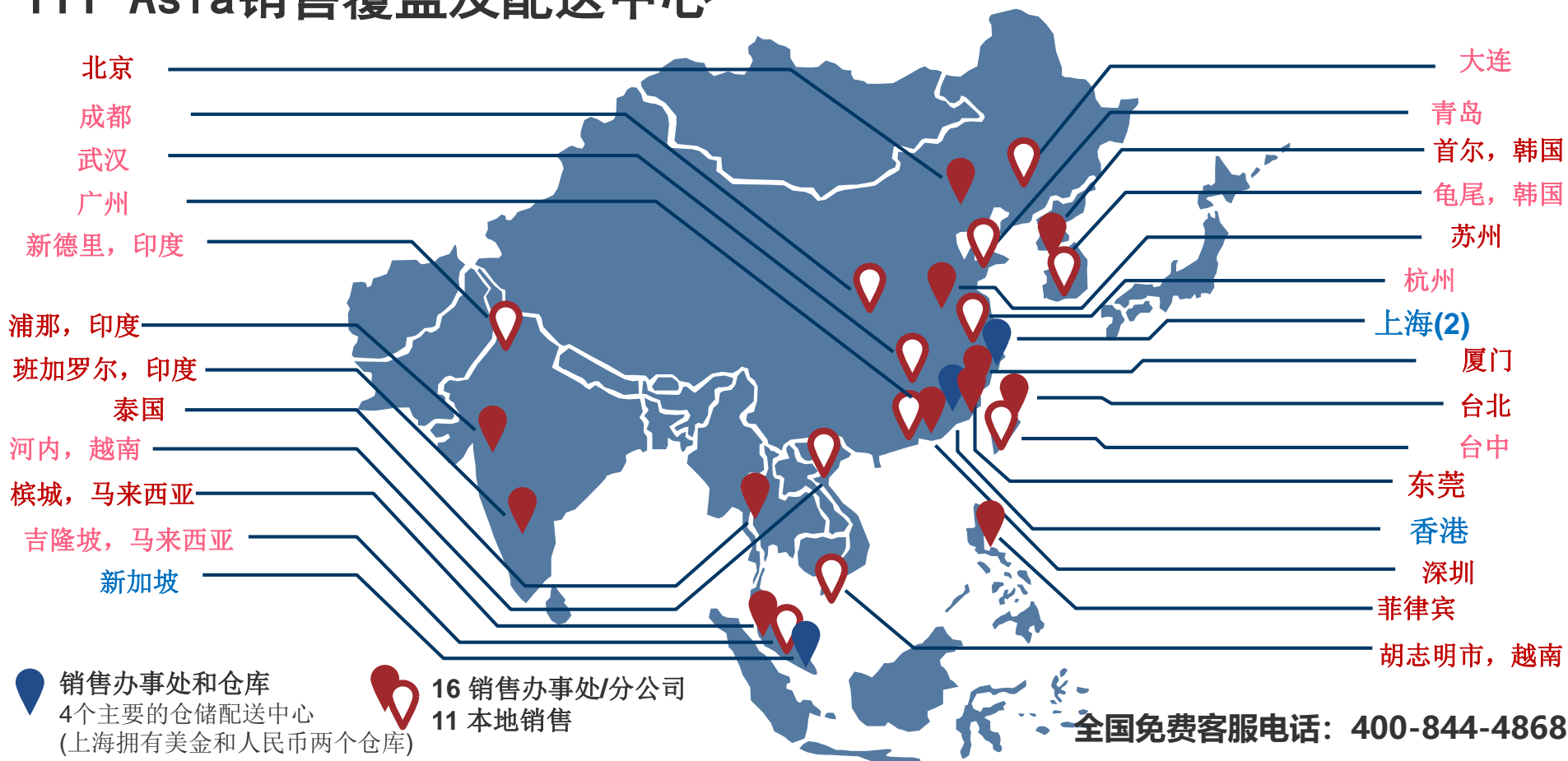
亚太视角

561

员工



TTI Asia销售覆盖及配送中心



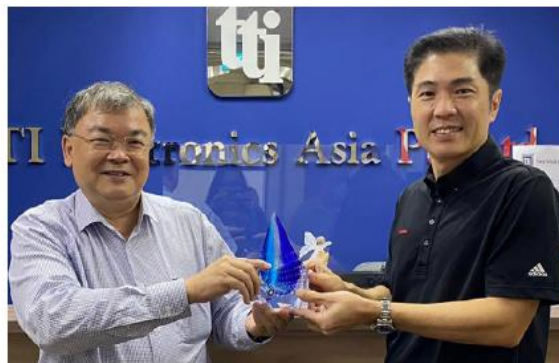
TTI Asia和Molex荣誉奖项



▲ Molex presented China Distributor of the Year award to us in TTI Hong Kong office on Aug 11, 2020. Picture from left to right: Elaine Lau, Vice President of Product & Supplier Marketing, Connectors & Electro-Mechanical, TTI Asia; Gene Wong, Distribution Corporate Account Manager, Molex; Anthony Chan, President, TTI Asia Pacific; Jamie Yung, Regional Sales Manager, Molex; Bell Lee, Vice President of Sales, Greater China, TTI Asia; Eddie Chan, General Manager, Hong Kong & Shenzhen, TTI Asia.

Molex莫仕授予TTI美德电子中国和南亚区 “2019年度最佳分销商”

该奖项旨在表彰年度区域最佳分销合作伙伴，通过业绩增长、财务、运营和执行管理等方面的卓越表现来评定。



◀ Molex presented South Asia Distributor of the Year award to us in TTI Singapore office on Aug 11, 2020. Picture from left to right: Keith Lam, Regional Vice President of Sales, South Asia, TTI Asia; Ricky Chua, Director of Sales, Molex.



Molex 介绍

- 创新的传承
- 专注于电子行业的未来
- 跨行业的专家
- 战略投资建立新实力

创新的传承

40 年代 50 年代 60 年代 70 年代 80 年代 90 年代 2000 年以后

连接器的领导者

全球化

专注于电子行业的未来

自动驾驶汽车

互联家庭

物联网

工业 4.0

互联健康

2010 年代

2020 年代
解决方案供应商

87处制造场所、21个国家

员工数量超过4.5万

产品数量超过10万

跨行业的专家



汽车

30%

更加安全、更加高效的
互联汽车已经为自动
驾驶准备就绪



医疗

10%

为各种挽救生命的疗法
提供安全的无缝连接



数据通信/电信

20%

更为迅捷的网络连
接甚至已经为更高
速度准备就绪



消费品/移动

20%

通过物联网推动互联
家庭的发展



工业

20%

即使在最恶劣的条件
下也可确保可靠性

战略投资建立新实力

AFFINITY MEDICAL
a **molex** company

Innovative Integration
a **molex** company

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

sōligie
Pulse Technology by **molex**

Woodhead
molex

**INTERCONNECT
SYSTEMS**
a **molex** company

**Polymicro
TECHNOLOGIES**
A subsidiary of **molex**

TEMP-FLEX
a **molex** company

FCT
a **molex** company

Laird

**PROTEK
Medical**
a **molex** company

TRITON
a **molex** company

Flamar
a **molex** company

Nallatech
a **molex** company

SDP Telecom
a **molex** company

Vasa
Applied Technologies Ltd.
a **molex** company

GWconnect

nucurrent
a **molex** partner

SENSORCON
Sensing Technology by **molex**

Brad
molex

OPLINK
a **molex** company

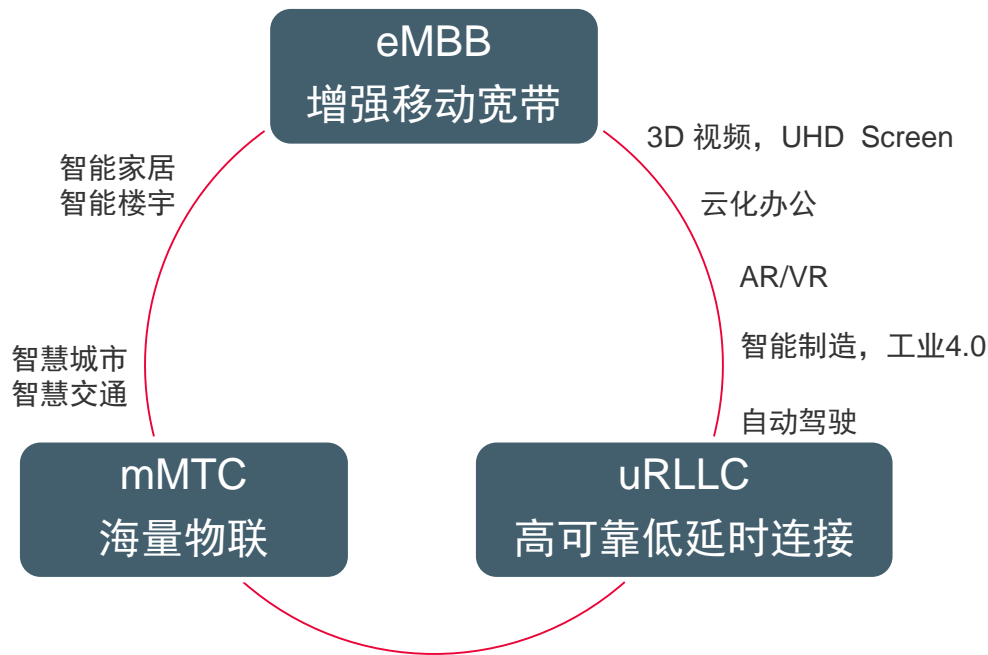
BittWare
a **molex** company



5G概要及对连接器的要求

- 5G概要
- 移动性优先
- 5G产品规划与设计考虑
- 5G对连接器的要求

5G概要



- eMBB - 增强的室内, 室外宽带, 企业协作以及增强/虚拟现实
- mMTC - 物联网、资产跟踪、智能农业、智能城市、能源监测、智能家庭和远程监控。
- uRLLC - 自动驾驶、智能电网、远程病人监控和远程医疗以及工业自动化

5G 应用包括并不仅限于

云VR/AR	车联网	智能制造
智慧能源	无线医疗	无线家庭娱乐
联网无人机	社交网络	个人AI辅助
智慧城市	全息	智慧安防

移动性优先 – 随时随地工作娱乐

- 手机，平板是我们主要的计算设备，一般通过蜂窝网，或者WiFi接入互联网
- 除了人机交互，5G的一个重要场景是机器与机器的交互，这在COVID-19疫情时代有了极大的增长。
- 5G连接方案提供了一个移动设备单一方案全时连接的可能，但是注意到WiFi也在发展，所以极有可能WiFi与5G为互补并相互竞争的存在



5G产品规划与设计考虑

- 信号完整性管理 – 高速，低时延，低抖动
- 运行频率 – FR1（Sub-6G）和 FR2（毫米波）
- 设计考虑
 - 信号传输 – 阵列天线
 - 功耗与热管理 – 克服高频的距离损失
 - 天线模块的位置和尺寸 – 更多天线，更小尺寸



5G对连接器的要求

- 连接器对信号传输路径的影响
 - 传输线效应和天线效应
 - 大电流传输能力
- 5G连接器是电子性能，机械性能，成本和生产灵活性的新平衡
- 未来的5G连接器特性
 - 低时延低噪声 – 对信号完整性的影响更小
 - 成本更优 – 嵌入更多的设备，提供比4G更好的性能
 - 鲁棒性 – 用在各种设备中，需要应对各种环境的挑战
 - 高密度 – 必须足够小，足够高效以达到5G的性能要求
 - 可生产性 – 低成本的产品不能太难生产，不能良率低



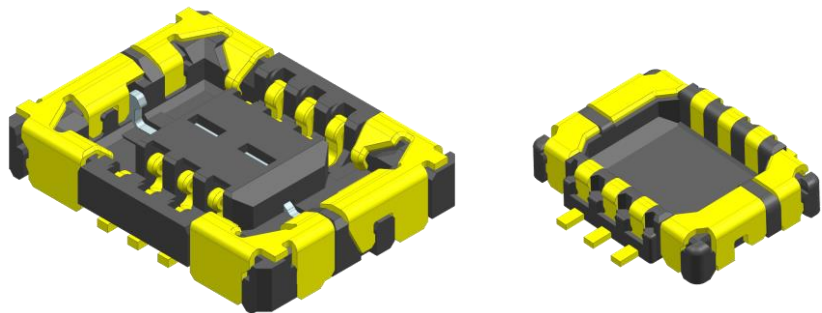


Molex 5G连接产品

- 6+4RF 板对板连接器
- Quad-row 4排板对板连接器
- FSB3/FSB5浮动板对板
- FV2R 双排屏蔽FFC连接器
- ON-Metal外置WiFi双频天线
- Multi-hub 5合1 5G/WiFi/GPS天线
- HDMI v2.1连接器
- TypeC连接器

6+4RF 板到板连接器

概要: 6 signal + 4 nail BtB (6+4RF)



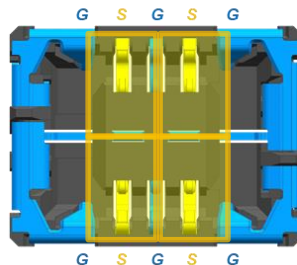
主要特点:

- ✓ 通过公座母座的接触和中心屏蔽，实现隔离，因而得到优异的信号完整性（覆盖Sub6GHz）
 - Insertion Loss : > -0.3dB @ 10GHz
 - Return Loss : > -20dB @ 10GHz
 - Isolation(X-talk) : < -40dB @ 10GHz
- ✓ 通过右图所示的4个power pin可以传输高达1A电流。

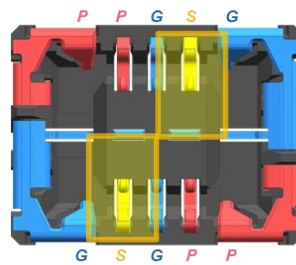
Items	Spec
Pitch	0.35 mm
Height	0.6 mm
Width	2.3 mm (Rec)
Length	3.04 mm (Rec)
Alignment	0.35 mm (Pitch) 0.30 mm (Span)
Wiping Length	0.10 mm (Terminal)
Current Terminal	0.3 A / pin
Current Power nail	Total 1 A for 4pins

Example usage:

4 RF line

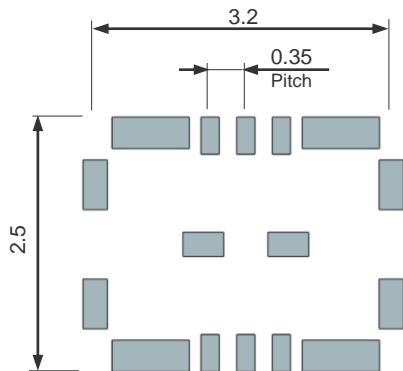
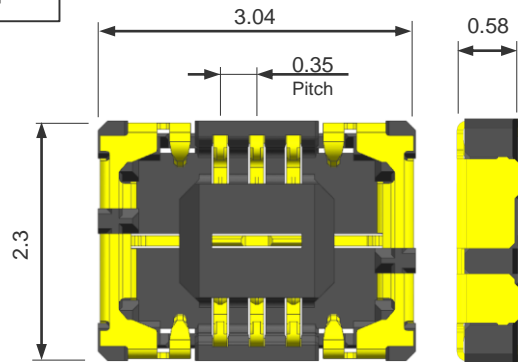


2 RF line + Powerline(Total 1A)

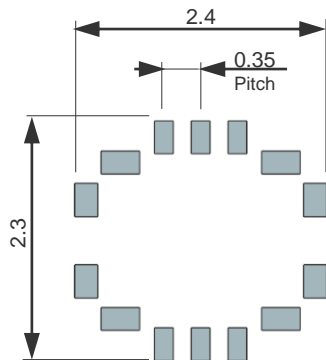
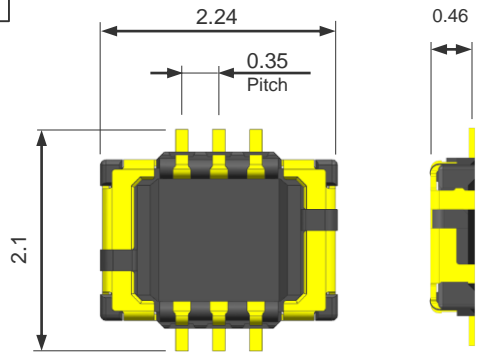


6+4RF 板对板连接器外形及信号完整性

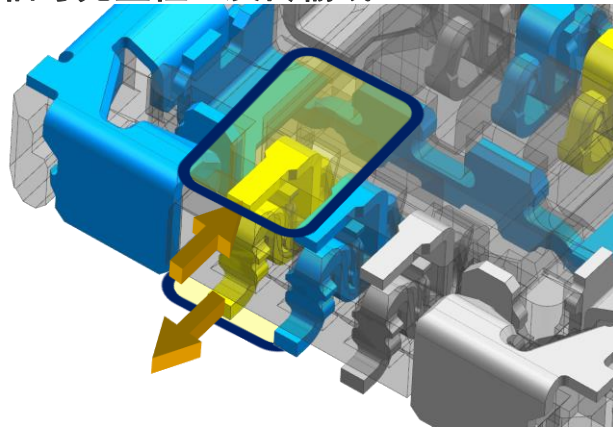
Rcpt



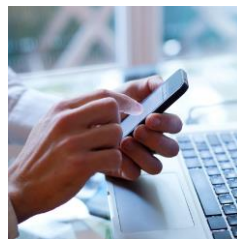
Plug



信号完整性SI及传输线



射频信号 (黄色) 由地线GND包围 (蓝色), 因而得到伪同轴缆。



手机

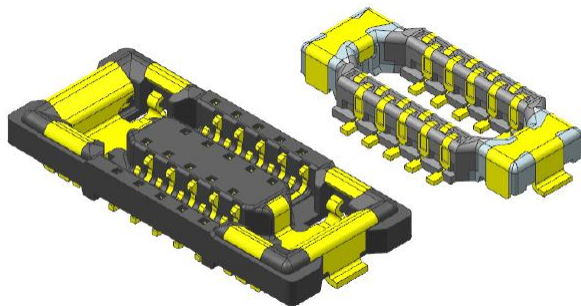


可穿戴



VR/AR

Quad-row 4排板到板连接器



主要特点:

✓ 通过2排变4排节省空间

✓ 尺寸(mm)

间距0.175mm,

宽2.0mm, 高0.6mm,

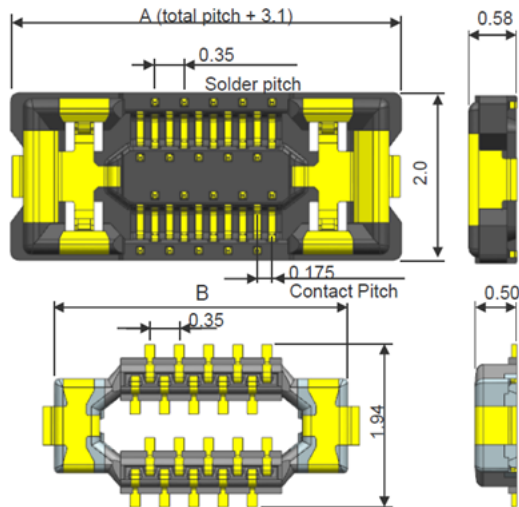
长度= (pin数/2-1) *间距+3.1mm (母座)。

Item	Spec
Pitch	0.175 mm
Height	0.60 mm
Width	2.0 mm (Rec)
Length	(Total Circuit/2-1)*pitch + 3.1 mm (Rec)
Pick-up area	---

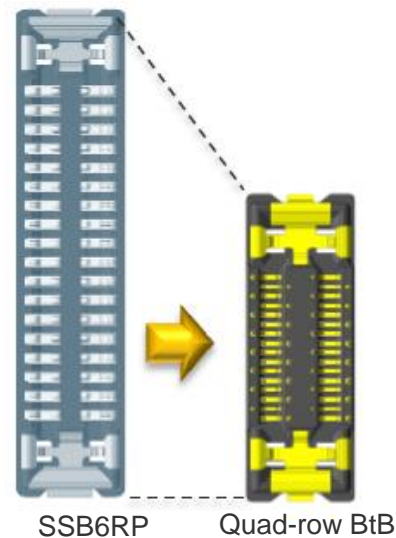
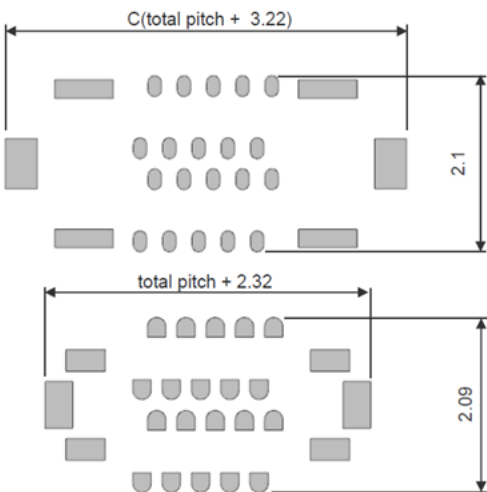
Item	Spec
Interior cover	Yes
Number of Contact	Single contact
Rating Voltage(max)	50V
Current Terminal	0.3 A / pin
Current Power Nail / Power pin	3.0 A
Contact Resistance(max)	Signal Contact: 35 milliohms(After Test 45mΩ) Nail Contact: 20 milliohms(After Test 20mΩ)
Dielectric Withstanding Voltage (Dielectric Strength)	250V
Insulation Resistance(min)	100 Mega ohm
Mating Cycle(max)	30 cycles
Insertion force	32p :19.7N Max
Retention force	32p :3.3N Min
Material	Housing : LCP UL94 V-0 BK Nail : Copper alloy Signal Terminal : Copper alloy Plating: Contact Area - Gold Solder Tail area - Gold Underplating – Nickel
Operating Temperature (Temperature Cycling)	-40 to +85°C
Circuit size	32+2(Power Nail) available soon / 36+2 just planned

Quad-row 4排板到板连接器外形尺寸

Rept & Plug



Footprint

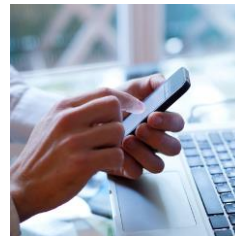


SSB6RP

Quad-row BtB

	SSB6RP	Quad-row	SSB6RP	Quad-row
height	0.6	0.6	0.6	0.6
pitch	0.35	0.175	0.35	0.175
width	2.0	2.0	2.0	2.0
Pitch +	2.8	3.1	2.8	3.1

32	8.05	5.73	71%	16.10	11.45	71%
36	8.75	6.08	69%	17.50	12.15	69%



手机

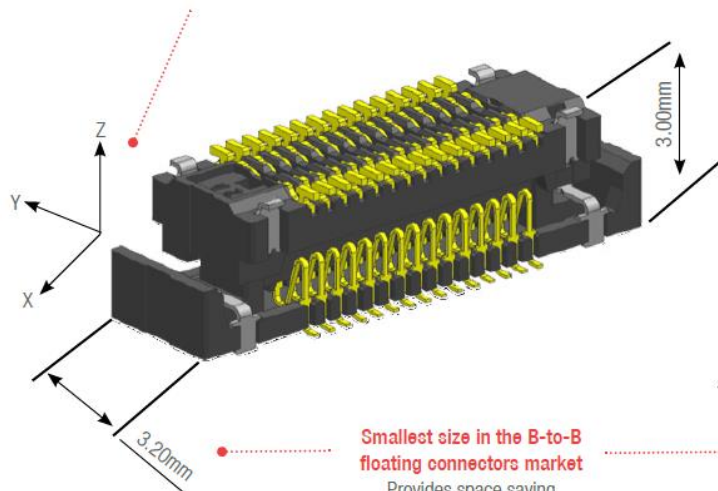


可穿戴

SlimStack板对板-0.4间距浮动 FSB3/FSB5系列

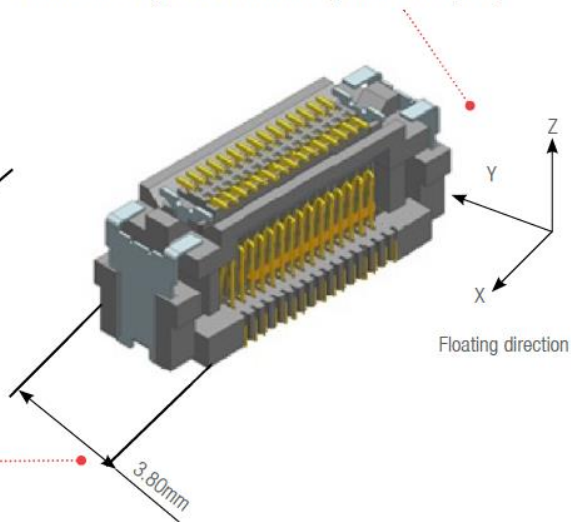
Features and Advantages

±0.30mm floating range in X-, Y- and Z- axis directions
Facilitates assembly in the event of misalignment or blind joining



SlimStack FSB3 Series Connector

±0.50mm floating range in X-, Y- and Z- axis directions
Facilitates assembly in the event of misalignment or blind joining



SlimStack FSB5 Series Connector

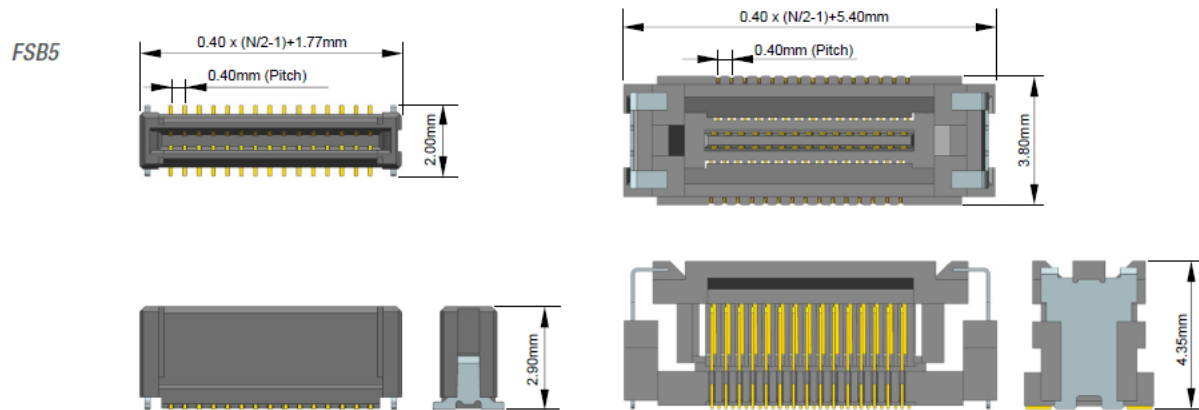
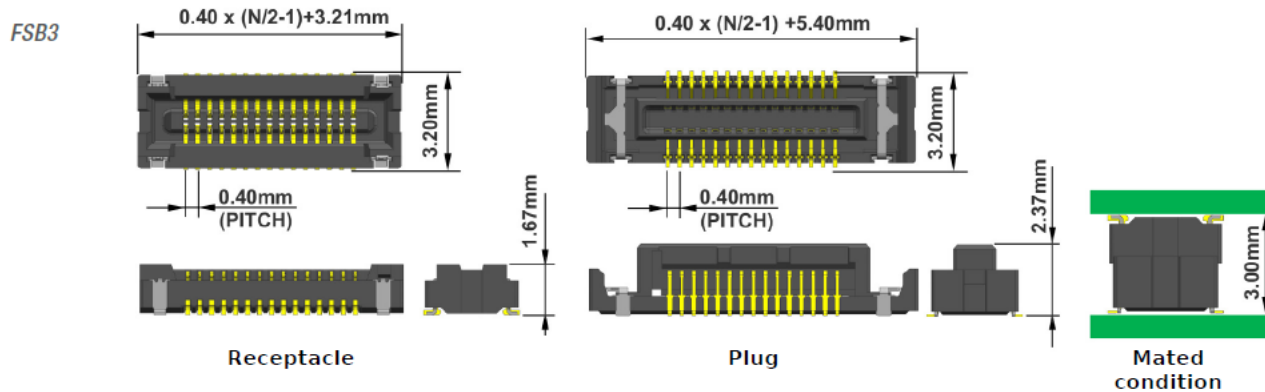
Soft floating force
Makes assembly and operations easy

High-temperature support up to 125°C
Improved design applicability

Low-halogen material
Meets industry environmental requirements

High-speed transmission
Supports a high-speed transmission rate of up to 6 Gbps

FSB3/FSB5系列 尺寸



游戏设备



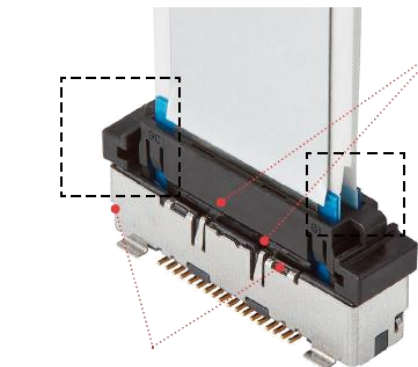
V2X应用



无人机

FV2R 系列 – 双排屏蔽FFC连接器

Features and Advantages



Positive lock latch with audible click on mating
Provides mating confirmation and high withdrawal force for secure mating retention

Ground contacts
Offer product shielding

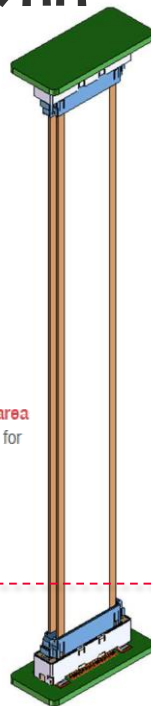
Low-halogen material
Addresses environmental considerations

Wide pick-and-place area
Provides vacuum space for SMT nozzle

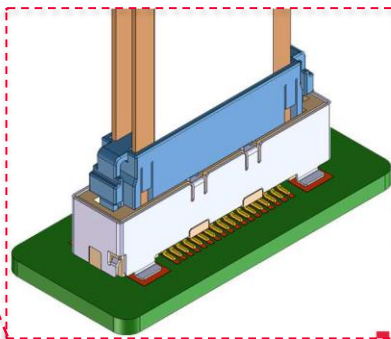
Low-profile design
Offers space savings

★ 产品特点

1. 高清视频信号传输
2. 同轴线缆替代（距离更长，成本更优）



同轴线缆方案



FV2R 系列-产品组合及应用

信号完整性测试满足
DisplayPort 1.2标准

- 插入损耗
- 回波损耗
- 近端串扰
- 远端串扰
- 差分阻抗

Pin#	Receptacle
36	205196-0360

Cable	Plug Ass'y
70mm	205195-0360
250mm	205195-0361



智能家居



无人机



安防应用



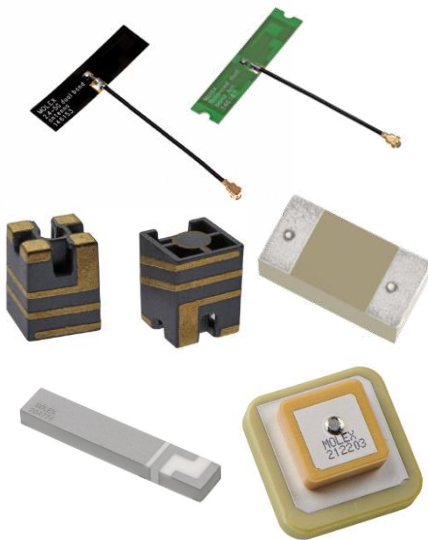
VR AR

Molex天线产品介绍

外置天线



内置天线



定制天线



ON-METAL 外置WiFi双频天线

特点： 纤薄，用于金属表面性能优异,防水

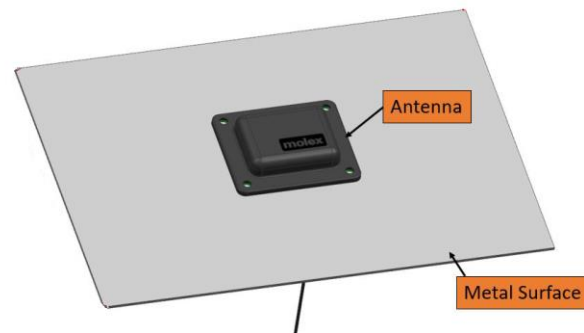
尺寸： 44.00 x 37.00 x 8.50 (mm)

频率： 2.4G/ 5.8G

回波损耗： <-6dB

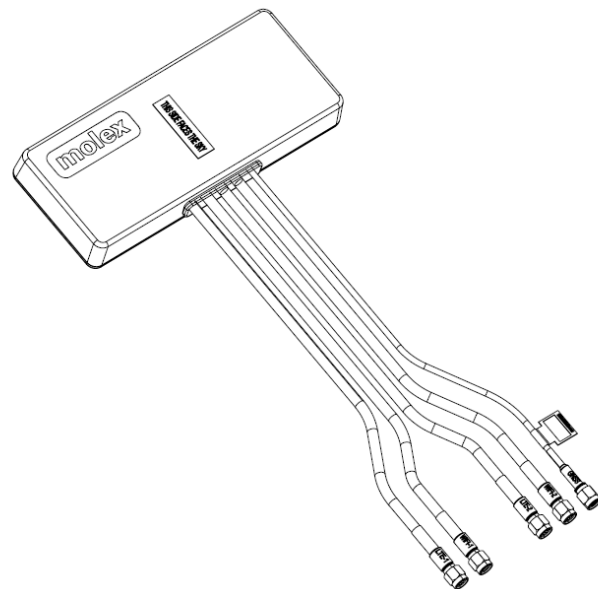
峰值增益： 1.8/5.5 dBi

应用： 带金属外壳的物联网设备，如家电，医疗设备等















Multi-hub 5合1 5G/WiFi MiMo天线模组

天线: 5G 2x2 mimo, WiFi 2x2 mimo, GPS
尺寸: 155 x 65 x 20(mm)
频率: 698MHz,960MHz /1710MHz 5000MHz @cellular
1561MHz,1602 MHz@GPS
2.4/5.8GHz@WiFi
回波损耗: <-5dB
峰值增益: 2.0~3.9 @ Cellular 1
3.3~3.4 @ WiFi 1
0~1.2 @ GPS
应用: AGV, 智慧交通, 工业物联网



Molex天线支持协议

Bluetooth		Standard: Bluetooth 4.2 core specification Frequency: 2.4GHz (ISM) Range: 50-150m (Smart/BLE) Data Rates: 1Mbps (Smart/BLE)
Zigbee		Standard: ZigBee 3.0 based on IEEE802.15.4 Frequency: 2.4GHz Range: 10-100m Data Rates: 250kbps
Thread		Standard: Thread, based on IEEE802.15.4 and 6LoWPAN Frequency: 2.4GHz (ISM) Range: N/A Data Rates: N/A
WiFi		Standard: Based on 802.11n (most common usage in homes today) Frequencies: 2.4GHz and 5GHz bands Range: Approximately 50m Data Rates: 600 Mbps maximum, but 150-200Mbps is more typical, depending on channel frequency used and number of antennas (latest 802.11-ac standard should offer 500Mbps to 1Gbps)
6LoWPAN		Standard: RFC6282 Frequency: (adapted and used over a variety of other networking media including Bluetooth Smart (2.4GHz) or ZigBee or low-power RF (sub-1GHz)) Range: N/A Data Rates: N/A
GNSS/GPS/Beidou		Protocol: GLONASS, GPS Frequency: 1.1GHz to 1.7GHz Range: N/A Data Rates: N/A

Z-Wave		Standard: Z-Wave Alliance ZAD12837 / ITU-T G.9959 Frequency: 900MHz (ISM) Range: 30m Data Rates: 9.6/40/100kbit/s
Sigfox		Standard: Sigfox Frequency: 900MHz Range: 30-50km (rural environments), 3-10km (urban environments) Data Rates: 10-1000bps
Neul		Standard: Neul Frequency: 900MHz (ISM), 458MHz (UK), 470-790MHz (White Space) Range: 10km Data Rates: Few bps up to 100kbps
Cellular		Standard: GSM/GPRS/EDGE (2G), UMTS/HSPA (3G), LTE (4G), Sub6G (5G) Frequencies: 900/1800/1900/2100MHz Range: 35km max for GSM; 200km max for HSPA Data Rates (typical download): 35-170kps (GPRS), 120-384kbps (EDGE), 384Kbps-2Mbps (UMTS), 600kbps-10Mbps (HSPA), 3-10Mbps (LTE)
NFC		Standard: ISO/IEC 18000-3 Frequency: 13.56MHz (ISM) Range: 10cm Data Rates: 100-420kbps
LoRaWAN		Standard: LoRaWAN Frequency: Various Range: 2-5km (urban environment), 15km (suburban environment) Data Rates: 0.3-50 kbps

持续扩展中，请及时查询。

HDMI 连接器

Category: I/O Connectors
Type: Type A Receptacle
Circuits: 19
Bandwidth: 48Gbps (v2.1)
Pitch: 0.50mm
Current: 0.5A



高端娱乐设备



工业自动化



外围设备



医疗设备

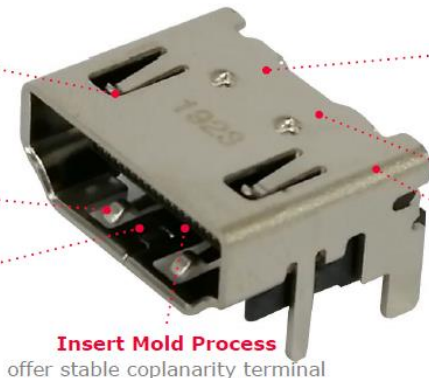
Up to 48 Gbps bandwidth
Ideal for high-bandwidth applications

Friction Lock
Provides stable mating force

10,000 mating cycles
Delivers high durability

Mylar surface option
Suitable for SMT auto process

30u', G/F Plating Thickness options
Satisfy variety of device application requirements



Insert Mold Process
offer stable coplanarity terminal

Supports 8K resolution display
Delivers high-quality display

Availability of different spec meeting HDMI v1.4 and v2.1
Suits a variety of user-application requirements

Fully shielded
Provides EMI/RFI protection

Flange Option
Offer secure connection with screw lock

Availability of different lead length options
Fix variety of user device PCB thickness requirements



TypeC连接器

■ Pin数

— 24/16/14/6 pin

■ 特性

- 支持至USB4.0 (40Gpbs)
- 立式(竖插) /卧式(横插)
- 水平横插/直立横插
- 防水 IPx5
- 沉板(多种中心高度可选)
- 高中心高度设计
- 露舌设计
- 20V/5A, 最大100W

Top-mount, 24 Circuit, USB 4.0 with 0.35mm standoff
(201267)

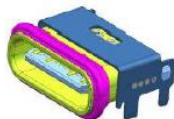


Top-mount, 24-Circuit, USB 4.0
(105450)

Vertical, 24-Circuit, USB 4.0
(204711)



Waterproof Top-Mount, 16-Circuit, USB 2.0
(2130830005)



Top-mount, 24 Circuit, USB 4.0 with Screw Hole
(205714)



Waterproof Mid-Mount, 24-Circuit, USB 3.2
(202410)



Mid-mount 0.98mm Contact Height, 24-Circuit, USB 4.0, Single Shell
(105455)



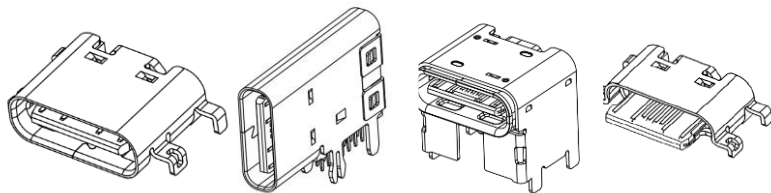
消费类



POS设备



物联网



总结

- Molex – 跨行业的连接器专家，为市场提供好用，可靠的连接产品
- 5G连接器 - 电子性能，机械性能，成本和生产灵活性的新平衡
- Molex 5G连接器
 - 6+4RF 板对板连接器 – Sub6G 射频连接器
 - Quad-row 4排板对板连接器 - 革命性超高密度板对板连接器
 - FSB3/FSB5浮动板对板 – 震动环境的可靠连接
 - FV2R 双排屏蔽FFC连接器 – 高清信号传输方案成本显著改善
 - ON-Metal外置WiFi双频天线 – 适用于金属表面的WiFi天线
 - Multi-hub 5合1天线 – 5G/WiFi MiMo GPS天线模组
 - HDMI v2.1 – 48Gbps, 8k高清视频传输
 - TypeC – USB4.0以及各类用于高速及充电的TypeC IO
- 更多连接器，请访问www.molex.com，并与授权代理商联系

打开微信扫一扫，关注莫仕和美德电子微信公众号
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