SOLUTIONS GUIDE

PORTABLE AND HANDHELD DEVICES

TE connectivity

http://www.te.com/usa-en/solutions/portable-and-handheld-devices.html

PORTABLE AND HANDHELD DEVICES

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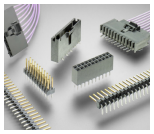


HANDHELD AND PORTABLE DEVICES

INNOVATIVE SOLUTIONS

Electromechanical and electronic components that ease the transition to higher data rates, increased protection and smaller packaging

TE connectivity

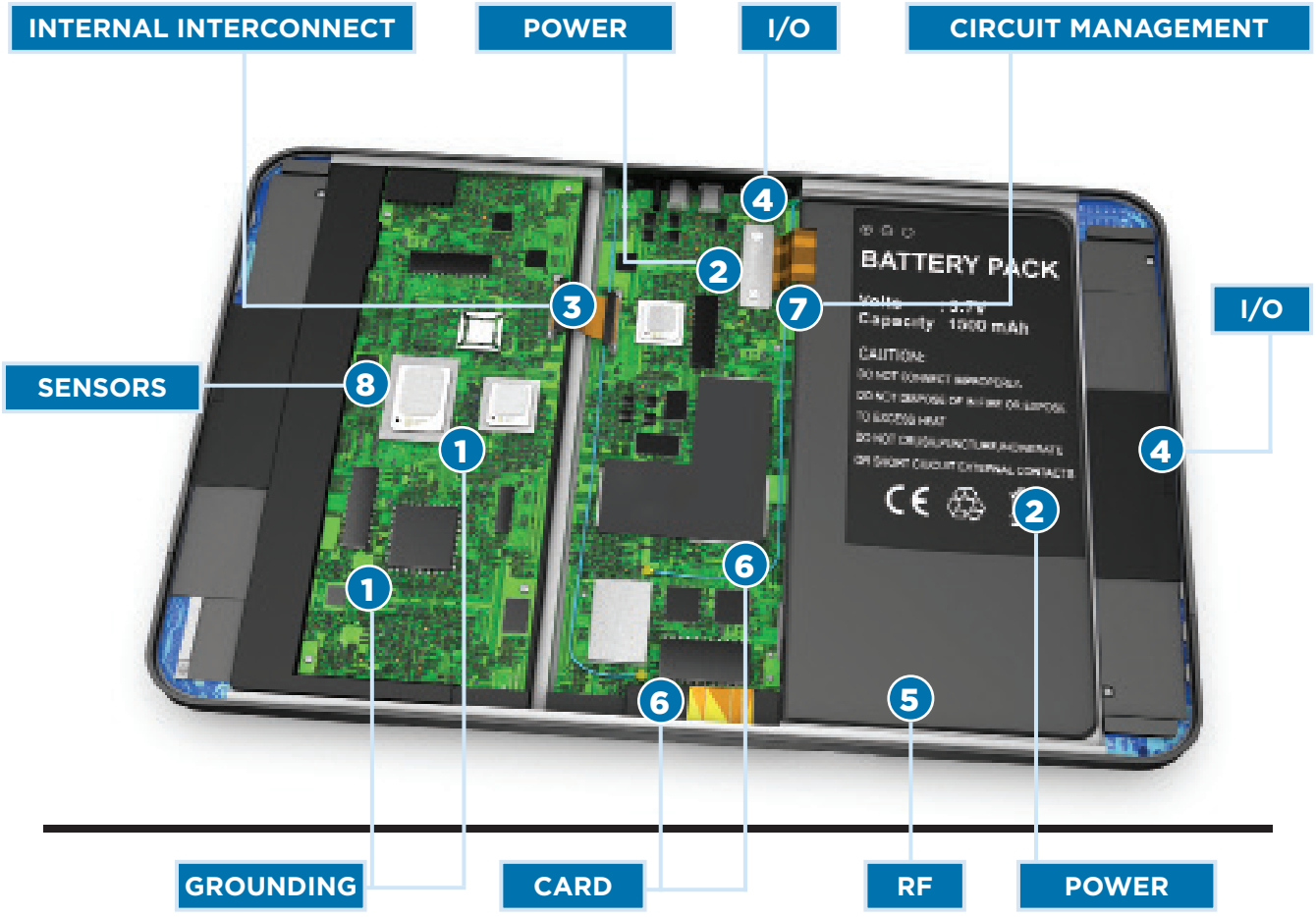
DESIGN NAVIGATOR

	Pitch (mm)	Max Current Rating (A)[1]	Protection from EMI/RFI Noise	Circuit Protection Products Available	High Vibration Performance	Low Profile Design	Standards
1 GROUNDING							
Solder Pads	1	•				•	N/A
Spring Fingers - PCB Grounding Contacts	1	•			•	•	N/A
Spring Probes	1	•			•	•	N/A
2 POWER							
Battery Connectors	10			•		•	N/A
3 INTERNAL INTERCONNECT							
0.8mm Free Height (FH) Board-to-Board Connectors	0.5			•		•	N/A
AMP CT & Mini CT Wire-to-Board Connectors	4			•		•	N/A
AMPMODU 50/50 Grid Board-to-Board & Wire-to-Board Conn.	0.5			•	•	•	UL, CSA
AMPMODU System 50 Board-to-Board & Wire-to-Board Conn.	3			•	•	•	UL, CSA
Card Edge Connectors for PCI Express Applications	1.1		•	•			MIL-STD-202*
Economy Power (EP) 2.5 Wire-to-Board Connectors	4.5			•		•	UL, CSA
Flexible Printed Circuit (FPC) Connectors	1			•	•	•	N/A
Grace Inertia Wire-Applied Connectors	7			•		•	UL, CSA
LCD Coaxial Embedded Display Interface (LCEDI) Conn.	1	•		•	•	•	VESA*
M.2 NGFF	0.5			•		•	Industry*
M8/M12 I/O Connector Systems	5	•	•	•	•		UL, CSA
Micro MATE-N-LOK Wire-Applied Connectors	5			•		•	UL, CSA, VDE
Mini-Universal MATE-N-LOK Wire-Applied Connectors	11.2			•		•	UL, CSA, VDE (250 V Max)
Signal Double Lock Wire-Applied Connectors	3			•		•	UL, CSA, VDE
Sockets	N/A			•	•		UL
Wire-to-Board High Performance Interconnects (HPI)	1-3			•	•	•	N/A
4 INPUT/OUTPUT (I/O)							
Cable Assemblies	N/A	•	•	•	•		UL, CSA, VDE
CHAMP Docking Series I/O Connectors	0.3	•	•	•	•	•	Mobile, Tablet*
Connectors for HDMI Standards	N/A	•		•		•	HDMI*
Industrial Ethernet Products	0.5	•	•	•	•		UL, CSA, ODVA Ethernet/IP, Profinet, CC-Link IE*
Micro USB Connectors	N/A			•		•	Industry*
Products Designed for DisplayPort Standard	N/A	•		•		•	VESA*
RJ45 Modular Jacks & Plugs	1.5	•	•	•	•	•	RU, UL, CSA, TIA-1096-A*
RJ point five Connector Systems	0.5	•	•	•	•	•	N/A
USB 2.0 Connectors	0.5		•	•			Industry*
USB 3.0 Connectors	0.9		•	•			Industry*
USB Stacked 3.0 Connectors	0.9		•	•			Industry*
5 RF							
Antenna Products	N/A			•			N/A
Switching Coax Connectors	0.5	•	•	•	•	•	ETSI*
6 CARD							
Connectors for Micro Secure Digital (SD)	0.5	•	•	•		•	SDA*
Connectors for Secure Digital (SD) Memory Cards	0.5	•	•	•		•	SDA*
Serial ATA (SATA)	1.27			•	•	•	Industry*
SIM Card Connectors	0.5	•		•		•	ETSI*
7 CIRCUIT MANAGEMENT							
Cable ID Labels	N/A						UL 969
Circuit Protection Devices	N/A			•			N/A
Force Guided Relays	8						UL, VDE, TUV, CQC, Industry*
Precision Resistors	N/A						N/A
Pressure Sensitive Adhesive Labels	N/A						UL, CSA, Mil, Industry*
Signal Relays	2						UL, VDE, TUV, CQC, Industry*
Slide Switches	3					•	N/A
Tactile Switches	50					•	N/A
8 SENSORS							
Humidity Sensors	N/A					•	N/A
Piezo Film Sensors	N/A					•	N/A
Position Sensors	N/A					•	N/A
Pressure Sensors	N/A					•	N/A
Temperature Sensors	N/A					•	N/A
Vibration Sensors	N/A				•	•	N/A

UL – Underwriters Laboratories Listed
RU – Recognized Under
CSA – Canadian Standards Association

* Industry / Mil – Meets product specific industry standards or Mil specs (see product page on te.com for more detail)

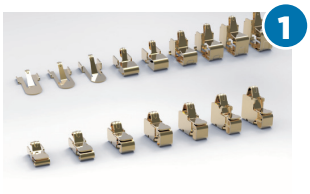
TE offers solutions for your space-saving design needs.



Products within each component type can be applied to small devices across various industries.

1. Grounding
2. Power
3. Internal Interconnect
4. Input/Output (I/O)
5. RF
6. Card
7. Circuit Management
8. Sensors

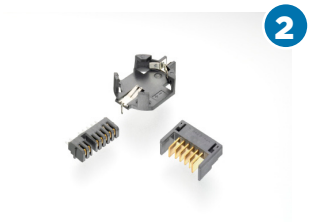
Featured Products



1 Spring Fingers - PCB Grounding Contacts

- Gain design versatility with small footprint
- Eliminate the cost of specialized equipment with a design utilizing standard equipment for soldering and pick-and-place
- Allow for quick design changes with a common footprint

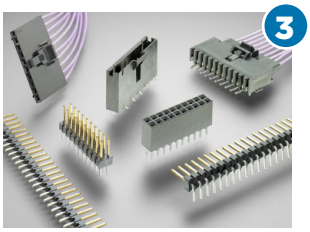
Website
Quick Reference Guide
Video



2 Battery Connectors

- Save space with low profile design
- Quick charge capability with high current capacity
- Battery to board design flexibility with multi-directional mating

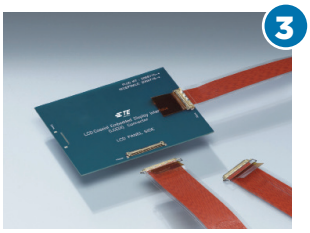
Website
Quick Reference Guide



3 AMPMODU System 50 Board-to-Board & Wire-to-Board Connectors

- Save board space with high density ribbon cable connector design
- Achieve high vibration performance and reliability with integral latch locking to shrouded headers
- Support PC board processing and drainage with high temperature housings and stand-offs

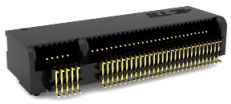
Website
Catalog
Quick Reference Guide



3 LCD Coaxial Embedded Display Interface (LCEDI)Connectors

- Minimize overall package size with low profile design
- Improve retention with full lock mechanism and pull bar option
- Standardize inventory due to intermateablilty with I-PEX CABLINE-VS series

Website
Quick Reference Guide



3 M.2 (NGFF)

- Support enhanced data rates, including PCI Express 3.0, SATA 3.0 and USB 3.0
- Save more than 20% PCB real estate compared to the PCIe Mini Card
- Provide a range of profile heights to meet design needs

Website
Quick Reference Guide
Product Presentation
Video

3 Micro MATE-N-LOK Wire-Applied Connectors

- Maximize board space with single and dual row, vertical and right angle configurations
- Prevent accidental unmating in high vibration applications with positive latches
- Accommodate wire sizes from 30 to 20 AWG with a broad range of crimp, snap-in, pin and receptacle contacts

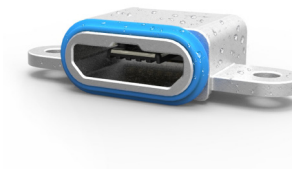
Website
Quick Reference Guide
Data Sheet

3 Sockets

- Quick and easy replacement of central processing units (CPU's) without soldering
- Ensure a secure fit with automated socket placement during product manufacturing
- Compliant with environmental regulations and withstands lead-free process temperatures

Website I
Website II

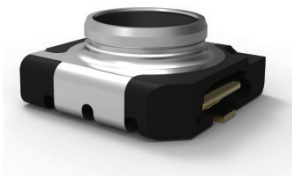
Featured Products



4 Waterproof IPX8 Micro USB Connector

- Prevent intrusion of water and other particulate materials with IP68 sealing protection
- Provide improved signal separation and enhanced mechanical stability with staggered contact design
- Offer the lowest profile product integrating a metal shield and waterproof structure into one piece

Website



5 Switching Coax Connectors

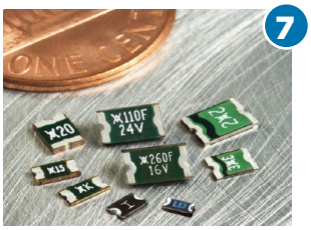
- Save space with ultra-low profile design
- Improve interconnection reliability with high force contacts
- Support today's faster and more efficient applications with improved data rates

Website I
Website II
Catalog

6 SIM Card Connectors

- Meet unique design requirements with large portfolio covering several styles and card sizes
- Improve applied cost with fully-automated processing
- Gain support across all regions with global manufacturing footprint

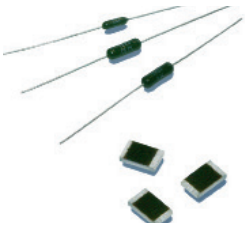
Website
Quick Reference Guide



7 Circuit Protection Devices

- Help protect sensitive electronics from overcurrent and overvoltage events
- Achieve protection requirements and equipment compliance with regulatory safety certifications such as UL, IEC, TIA & ITU-T
- Help protect against thermal runaway damage caused by component failure, overcharging or short circuit

Website
eLearning Module



7 Precision Resistors

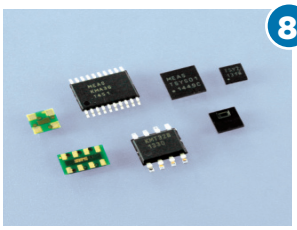
- Maintain long term application stability in ultra-low temperature conditions
- Minimize electronic noise with thin film precision resistor design
- Reduce inventory cost with lead-time and packaging flexibility

Website I
Catalog

7 Tactile Switches

- Achieve system longevity with extended lifecycle design
- Prevent potential liquid or particle contamination with IP67 sealed design
- Save space with ultra-low profile design

Website
Catalog I
Catalog II
eLearning Module



8 Sensors

- Help enable space and energy savings with compact designs featuring low power consumption
- Ensure reliable operation for critical applications with accurate readings
- Improve efficiency for precise feedback and control with fast response times

Website

LET'S CONNECT

TE Connectivity (TE) is on the cutting edge of technology innovation and a world leader in connectivity with more than 50 years of experience. TE has an extensive understanding of electromechanical and electronic components providing solutions in support of designs with space constraints. This solutions guide will allow you to easily select the components required for small devices, while providing access to additional online information through TE.com. TE's advanced technology in product development can help ease the transition to higher data rates, increased protection and smaller packaging with our industry leading components.

Technical Support

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SMART CONNECTIVITY SOLUTIONS ENABLE THE WEARABLE REVOLUTION WHITE PAPER

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SMART CONNECTIVITY SOLUTIONS ENABLE THE WEARABLE REVOLUTION

Samir Vasavda, Field Application Engineer

SMART CONNECTIVITY SOLUTIONS ENABLE THE WEARABLE REVOLUTION

Heart rate, calories burned, number of hours of sleep, number of steps taken - If you are an engineer, a gadget lover or a data driven person who wants to live a healthy life, you may already be using Nike FuelBand, Jawbone Up or a Fitbit type of device to track your activity level. You have probably heard the news about Facebook paying $2 billion to buy an augmented reality company called Oculus, and Intel spending more than $100 million to buy Basis, which is a company that makes a watch that tracks your heart rate, speed, sleep and other parameters. Google Glass is already in the hands of many developers, and Google has announced Android wear. Samsung has a second version of the Galaxy Gear watch. Apple recently announced a smart watch (Apple Watch) that will ship in early 2015. Motorola has already released their smart watch Moto 360 just recently. How about a Pebble watch? Microsoft Band is a new wearable device which will compete with others in the market.

“Get ready for the wearables onslaught.”

The Era of Smart Wearables is Coming

The world of technology is going through another transformation. We went from mainframes to desktop PCs in about two decades, from desktops to laptop PCs in a decade or so, and from laptops to smartphones and tablets in less than a decade. Another revolution is brewing, and it will most likely take less than a decade to happen. It’s the smart wearables that are always connected. Dr. Mudhafar Hassan-Ali, leading the product development of wearables at TE Connectivity (TE), said, “Connectivity is the name of the game.” TE’s Menlo Park campus has an entire team dedicated to develop solutions specifically for wearable products.

Special Connectivity Solutions are Enablers

Connectivity solutions will enable the consumer electronics developers to make wearables. Let’s talk about external connectivity for power and data. Standard connectors may not fit into wearables due to size, aesthetics and technology. Eyewear needs to be thin, lightweight and aesthetically pleasing. A watch or any other wearable often must meet the same criteria. From a technology standpoint, customers want hermetically sealed devices so they can perform well under water or can resist sweat, dust and other foreign objects. To make this feasible, users want devices with no holes or minimum openings. Contactless solutions can address these issues.

Real estate is also a huge challenge. Eyewear or any other wearables are designed with minimum space for other non-essential functions. To address these challenges, key connectivity industry players are designing solutions for wireless power-charging and contactless data transmission.

Wireless Power

Technology experts are seeing a trend of “increased sensing.” There will either be more functionality in the same space or the same functionality in a smaller form factor. Thus, providing power is a huge challenge as well as an opportunity.

Wireless power is based on resonant inductive coupling. This point has encouraged the creation of multiple standards consortia. A consortium called Wireless Power consortium (WPC) is working on a Qi (taken from Chinese word for natural energy and pronounced “Chi”) standard. Another consortium called Alliance for Wireless Power and Power Manage Alliance (A4WP), which now has joined by Power Matter Alliance (PMA).

There are two main hurdles to overcome in wireless charging. The first is charging from a distance where devices are not tightly coupled. Therefore, the goal is to achieve spatial freedom. The second challenge is the design of the coil (inductor or antenna) and how to make it fit inside the tiny and complex-shaped devices.

A combination of better battery technologies (flexible, thinner, lighter, faster) and power “harvesting” whether it is using solar, mechanical movement, body heat or other means is being looked at by startups and established companies in Silicon Valley and other places around the world.

Contactless Data

Contactless data is done using electromagnetic radiation. It requires close proximity between the cable and the device. It is also referred to as short-range communication and is done at extra high frequency (EHF) at 60 GHz band using the ISM (industrial, scientific and medical) bands, a non-licensed spectrum. It is used to penetrate plastic and is compatible with USB, VESA and SATA standards. The challenges are high power requirements and a need for intelligence to wake up and sleep. It also requires RF expertise for robustness, low electromagnetic interference (EMI) and regulatory compliance such as Federal Communications Commission (FCC) compliance.

Antennas

For external input/output (I/O) components, antennas have played a big role in providing freedom from wires for connectivity. Almost everything is becoming mobile. For example, one of the largest global antenna suppliers ships more than 500 million antennas every year. In the wearable space, the challenge is the shape and size of antennas, which are becoming smaller and more complex.

The solution is to make antennas using traditional methods as well as technologies like MID (molded interconnect devices) and LDS (laser direct structuring) for 3D antennas.

Some new antennas are designed using multiple protocols, i.e., LTE, Bluetooth and Wi-Fi, among others. The antennas can be either multi-band or tunable. The frequencies can be:

For WLAN / WWAN / Voice

- 802.11 (a/b/g/n): 2400 - 2483.5 & 4900 - 5875 MHz
- LTE: 700 – 3700 MHz, multiband, Metaspan antenna technology
- GSM/UMTS: 850 – 2170 MHz, single and multiband
- WiMax: 2300 – 3800 MHz

Others

- ISM 900/ZigBee: 902 - 928 MHz
- Bluetooth wireless technology: 2400 - 2483.5 MHz
- ZigBee: 2400 - 2483.5 MHz
- UWB: 3168 - 10560 MHz
- Global Navigation Satellite Systems (GNSS): GPS 1565 - 1585 MHz & Glonass
- DVB-H: 1670 - 1675 MHz
- NFC: 13.56 MHz

FCC and other agency regulatory compliance is a must.

TE has antenna development lab in Aptos, California, close to Silicon Valley, where unique and customized antenna solutions can be designed, developed and tested. The lab has engineering expertise and resources needed to make quick prototypes and changes to suit customer needs. TE also has facilities in Harrisburg-US, Taiwan, Japan, South Korea and China, which includes 7 RF chambers, CST and HSS simulation facilities.

Other Connectivity Components

For connecting multiple PCBs (rigid and flexible), board-to-board connectors are getting smaller, with the smaller pitches reaching 0.35 mm. Current can range from 1.5A for power and 0.3A for signal. Retention force can be as high as 10N while insertion force can be 15N max.

Board-to-flex connectors are very useful for devices with height constraints.

As mobile device complexity and functionality increase, there is a growing need for thinner devices with multiple antennas, higher data rates and increased operating frequencies.

EMI shields are stamped one- and two-piece metal cages that help provide isolation of board-level components, minimize crosstalk and reduce EMI susceptibility without impacting system speed.

For charging, docking and grounding, pogo pins are used because of their excellent reliability and durability in a small form factor.

Spring fingers are used for grounding to prevent EMI noise and static and isolation from vibrations.

A large portfolio of the widest variety of spring fingers is available with different heights ranging from 0.8 mm to 4.3 mm. They can be used with a low force of 0.2N – 1.0 N.

SIM-card connectors could become an essential part of wearable devices, such as mini-SIM (2FF), micro-SIM (3FF), and combined micro-SIM and micro-SD connectors.

The future is bright for smart wearables. Unique interconnect product offerings from leading industry players will certainly help this exciting revolution.

Samir Vasavda is a field application engineer for TE Connectivity Ltd. and is based in Menlo Park, California.
He holds four U.S. patents and is a mechanical engineer educated at the University of North Carolina, Charlotte.

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PORTABLE AND HANDHELD DEVICES

BROAD SPRING FINGER PORTFOLIO AND SCALABILITY WHITE PAPER

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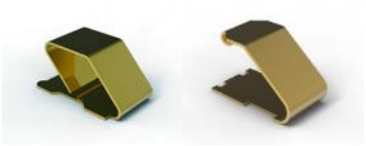
BROAD SPRING FINGER PORTFOLIO AND SCALABILITY

BROAD SPRING FINGER PORTFOLIO AND SCALABILITY

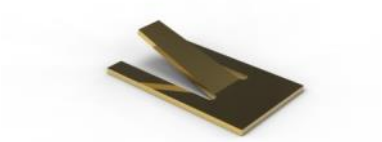
Spring fingers are small metal-formed parts that can conduct signal or power from one component to another and provide grounding to reduce EMI noise. Even though small in size, spring fingers need to be mechanically and electrically designed to handle robust applications. These applications range from mobile devices, personal computing and industrial devices, to home electronics and wearables. Spring fingers come in various sizes and working ranges that can be selected based on specific application requirements.

Box and C are standard flat contact types which provide simple cantilever spring shapes that can be used in grounding and shielding applications. The ultra low profile type has a Y-shaped spring profile designed to fit into low mated height applications, specifically antenna feeds, and the pre-loaded and pre-loaded scalable types have highly engineered geometry to handle high-speed manufacturing and more complex applications.

Spring Finger Types

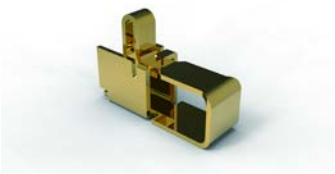


Pre-Loaded Scalable



Standard Flat Contact

Ultra Low Profile



Pre-Loaded

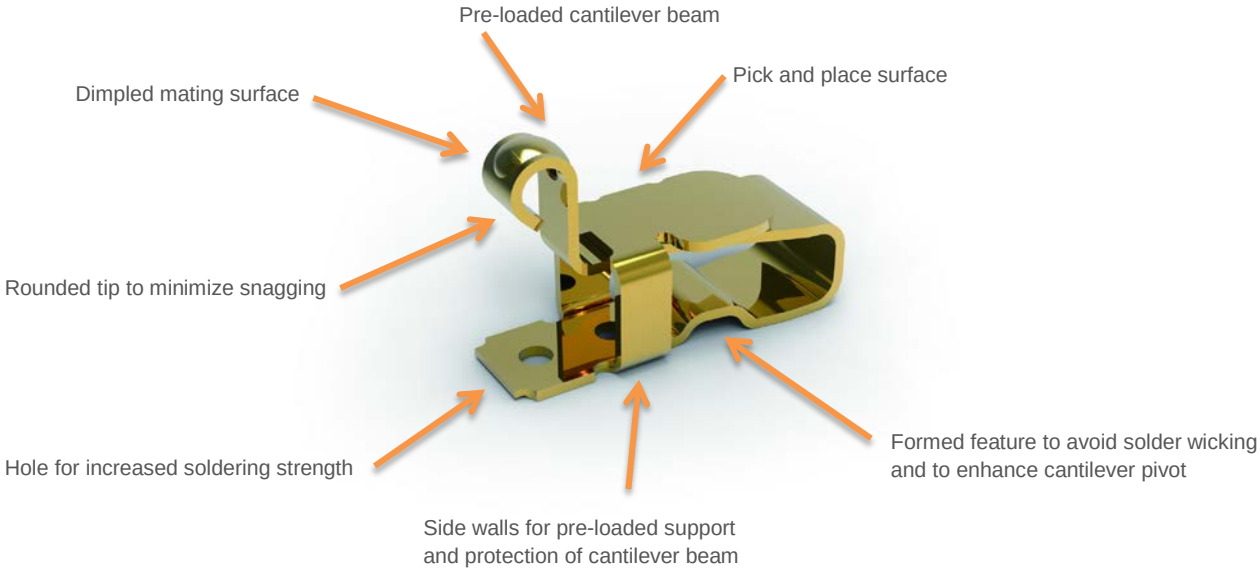
Construction and Manufacturing

Spring fingers are manufactured from spring steel or copper alloy base materials. Spring steel and copper alloy both provide unique mechanical and electrical properties. For applications where value is more important than performance, spring fingers made from spring steel can help meet this objective. For applications where performance is more important, spring fingers made from copper alloy offer increased conductivity and mechanical performance compared to spring steel. Spring fingers are typically manufactured in advanced, automated manufacturing lines that produce dimensionally stable and highly reliable spring fingers.

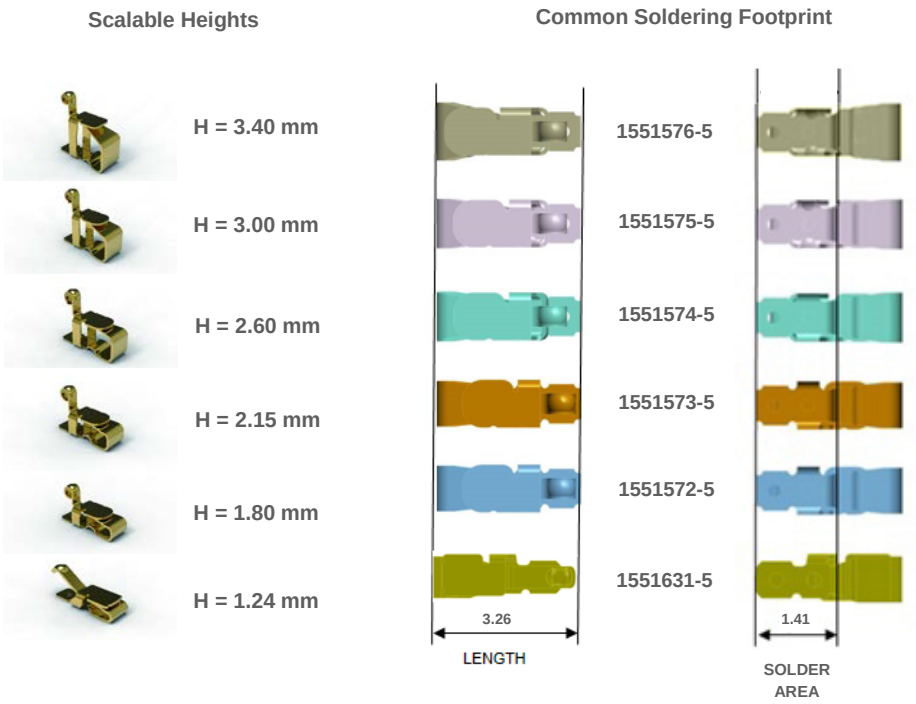
Key Features and Benefits

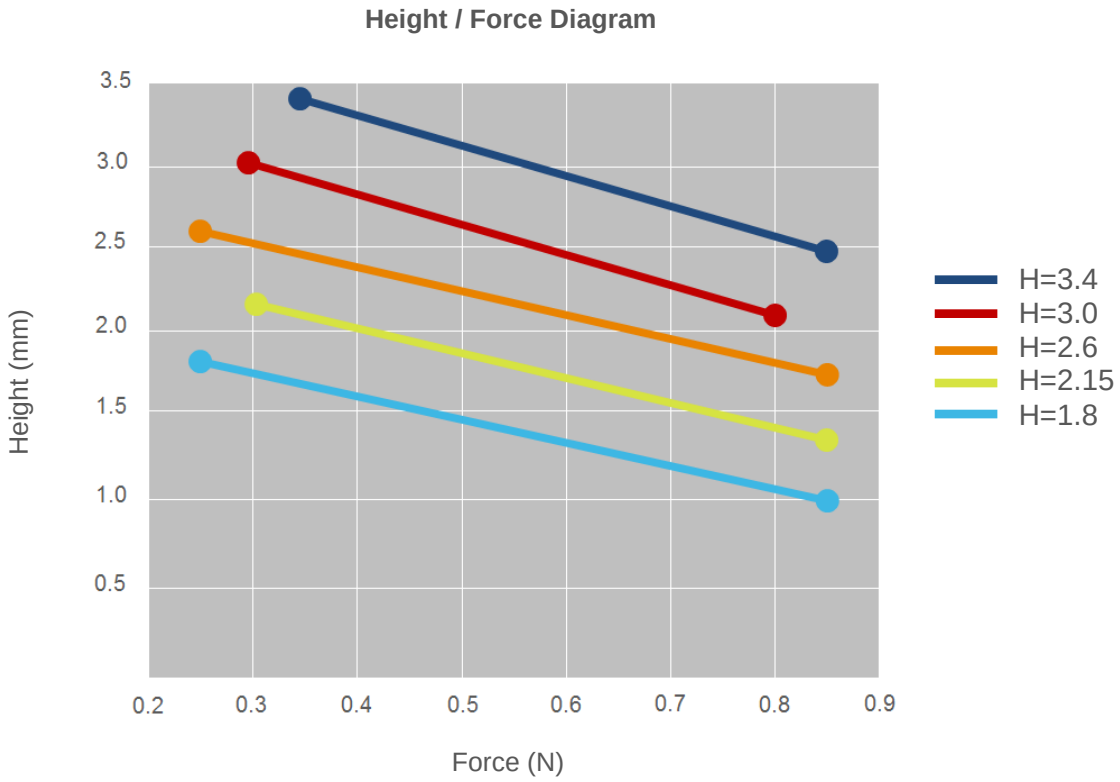
Scalable spring fingers share a common soldering footprint. This common footprint across a spring finger product family allows for easy change-out from one working height to another without the need to resize the soldering footprint or move surrounding components on the printed circuit board (PCB) to make space. This commonality minimizes the need to modify PCB design and layout when an application requires a change in working height, saving time and money. The pre-loaded cantilever beam feature increases normal force by 0.2N over a similar cantilever beam that is not pre-loaded.

Spring Finger Design Features



Scalability in Height with Common Footprint





Enhanced side walls, as shown in the spring finger product family illustration below, provide protection against operator handling and help prevent over-deflection of the spring in the application. This key design feature helps maintain the spring geometry through manufacturing and application environments.

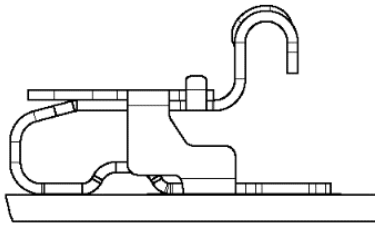
#1 #2 #3 #4 #5 #6 #7

	TE Part Number	Effective Height (mm)	Height (mm)
#1	2108693-4	0.65-0.875	1.1
#2	2108610-5	0.8-1.1	1.4
#3	2108611-5	1.1-1.4	1.7
#4	2108612-5	1.4-1.75	2.05
#5	2108613-5	1.6-2.0	2.4
#6	2108614-5	1.9-2.3	2.7
#7	2108609-5	2.2-2.6	3.0

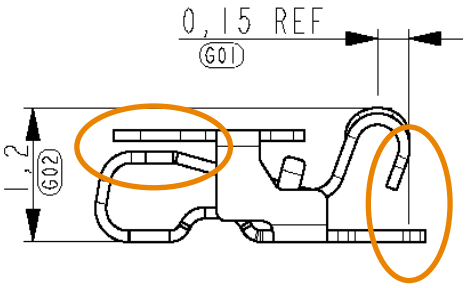
In applications that require transmitting radio frequency (RF) signals from an antenna carrier to the PCB, it is critical that the conductive path remains consistent throughout the entire working range of the spring. Depending on the spring finger design, the cantilever spring may touch supporting side walls or the pre-loaded geometry throughout the working range of the spring. In this case, the electrical path may short to the side walls or the pre-loaded geometry, which changes the RF signal path and could change the RF signals.

To minimize shorting issues, select spring fingers for RF signal application carefully. Spring finger design features, such as the clearance between the cantilever spring and side walls, must be adequate to help ensure that the cantilever spring does not short to side walls during deflection, electrically disconnect from the pre-loaded geometry, or bottom out at the application working range. (See illustration below.)

Uncompressed Spring



Compressed Spring



At working height, the cantilever spring avoids shorting to the pre-loaded geometry or side walls and bottoming out.

The non-pre-loaded spring designs shown below offer a large clearance between the cantilever spring and side walls that avoids potential shorting paths. These designs helps ensure a consistent conductive path over the working range of the spring, such as typically needed for RF antenna applications.

Type A

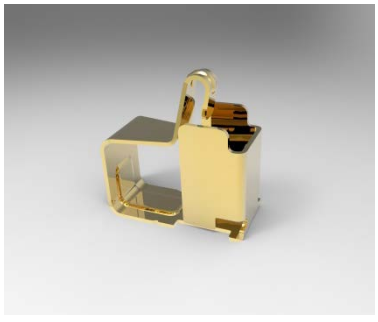
For working height between 0.4mm and 1.1mm

Type B

For working height between 1.1mm and 2.5mm

Type C

For working height between 2.5mm and 5.0mm



P/N	Type	Height (mm)	Effective Height (mm)
2199248-4	A	1.0	0.4 to .08
2199248-5	A	1.3	0.5 to 1.1
2199248-6	A	1.6	0.8 to 1.4
2199249-3	B	2.0	1.1 to 1.8
2199249-4	B	2.3	1.4 to 2.1
3-2199250-2	C	2.9	2.0 to 2.7
3-2199250-3	C	3.2	2.3 to 3.0
3-2199250-4	C	3.6	2.6 to 3.3
3-2199250-5	C	3.8	2.9 to 3.6

Today's customers demand portable consumer products that are smaller, thinner, and lighter but which offer increased functionality and performance. PCB space is becoming much more limited due to the higher component density required to deliver increased end use product functionality. As a result, component footprint, versatility, and performance will be key selection criteria for these applications. TE Connectivity offers a broad spring finger portfolio with a wide range of types and sizes to meet a diverse range of application requirements.

Visit www.te.com/products/spring-fingers for more information, products, and availability.

FOR MORE INFORMATION:

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Netherlands: +31 (0) 73-6246-999
China: +86 (0) 400-820-6015

For other country numbers, go to te.com/supportcenter

te.com

te.com/products/spring-fingers

[DOCUMENT # 1-1773861-2]

PORTABLE AND HANDHELD DEVICES

SIM CARD CONNECTORS PRODUCT GUIDE

Browse Products: http://www.te.com/usa-en/solutions/portable-and-handheld-devices.html

SIM CARD CONNECTORS

SIM (Subscriber Identity Module) and UIM (Universal Identity Module) cards are widely used in a variety of mobile applications, including, billing, security and number storage purposes in mobile devices. The SIM card parameters are defined by ISO, ETSI and GSM standards.

TE Connectivity's (TE's) outstanding technological capability delivers a high comfort for the end customer and great durability and longevity of the SIM connectors. In addition, TE has the ability to fabricate very high volume products in a cost-efficient, lean manufacturing process. The huge array of products, combined with TE's ability to redesign existing products to customer requirements, allow TE to be a reliable source for SIM and UIM card connectors.

FEATURES

- Large portfolio covering several styles and card sizes
- Connectors optimized for reliability (i.e. by spherical contact points increasing hertz stress, pre-loaded contacts and anti-retention features in the contacts.)
- The SIM connector series offers the best possible design freedom; many products are even scalable in height within the same form factor
- Best possible applied cost by fully-automated processing

BENEFITS

- Large, versatile portfolio offers the best product closest to your need
- Highly reliable connector technology helps customers reduce production line defect rates – ultimately reducing costs for quality control and service
- Very broad design freedom creates optimal possibilities for the design engineer to match the device's requirements
- Fully-automated processing leads to stable quality
- Global footprint means enhanced support for all regions

APPLICATIONS

- Mobile phones
- Tablets
- Personal computers
- Ultraportable devices
- Data cards
- Portable GSM modems
- Servers

www.te.com/products/SIMCardConnectors

TE Offers a Variety of SIM Card Connectors

Push-pull Type

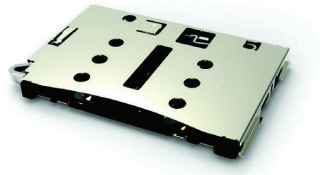
- Card guidance and card stops provides fixation of the SIM card in X, Y and Z direction
- Card is typically located inside the device shell. Consumer must open the device shell to extract the card, and must insert and eject card manually
- Full single clip, provides shielding, and prevents card bending. This ensures a stable connection with all card types
- Components underneath the SIM card are possible (optional)

Block Type

- Basic SIM connector without enhanced features in combination with an efficient manufacturing process leads to an extremely cost-effective component
- Anti-lifting contact prevents the contact from being accidentally lifted, reducing the risk of damaged contacts
- Two (2) directional mating allows for card insertion from two directions

Push-push Type

- Push to insert, push to eject mechanism provides enhanced card handling for the end user
- Push-push type connectors are typically used under the battery cover or behind a door at the device exterior
- The card detection switch senses card removal
- The connector reduces the risk of inserting the card in the wrong direction



Tray Type

- Tray type SIM connectors are typically used on the exterior of a device. The tray forms a unity with the device covers
- Tray can be fully separated from the body, allowing for easy card handling by the end user
- The connector reduces the risk of inserting the card in the wrong direction
- The card detection switch senses card removal

Combo Type

- Integrated card connector to support two cards: micro SD and micro SIM
- The stacking of two card connectors reduces the connector layout on the PCB
- There is a detect switch for micro SD
- Two types of insertion exist: cross insertion type and inline insertion type

Size comparison: Mini SIM (2FF) vs Micro SIM (3FF) vs Nano SIM (4FF)

Mini SIM/2FF
25L x 15W x 0.76H(mm)

Micro SIM/3FF
15L x 12W x 0.76H (mm)

Nano SIM/4FF
12.3L x 8.8W x 0.67H (mm)

*FF = Form Factor

Product Offerings

	P/N	Picture	Height Range	Length x Width	Description	Features and Benefits	Status	Applicable SIM Size
Push-push Type	2174918-1		1.40	26 x 17	Push-push SIM, super low profile	**Features** • Push-push function allows SIM card ejection by connector itself • Lower profile • Dual slanted contacts • Card detection switch **Benefits** • Easy to handle SIM card • Low profile saves PCB space • Dual slanted contacts provide strong mating force and minimizes contact jam • Card detect switch is available	MP GD	Mini SIM / 2FF
	2174803-2 2822541-1 *Anti-buckling*		1.27	15.98 x 15.1	Ultra low profile push-push	• Push-push function allows SIM card ejection by connector itself to help the end customer handle SIM card easily and reduces risk of inserting the card in the wrong direction, minimizes card jamming • Low profile saves space • Dual slanted contacts provide strong mating force and avoid contact jam • Card detect switch is available • 2822541-1 applies an anti-buckling feature to original connector	MP SH	Micro SIM / 3FF
Push-pull Type	*-2042647-* *-2042920-*		1.8 – 2.0	15.5 x 10	Scalable shielded SIM	**Features** • Shielded • Holes for additional components under the connector • Test holes for automatic inline testing **Benefits** • Shield protects against radio interference • Holes under the connector save space • Test holes reduce applied costs	MP SH	Mini SIM / 2FF
	-1551663-		1.8 – 2.0	15.5 x 10	Narrow shield version		MP SH	Mini SIM / 2FF

(dimenions:mm)

SIM Card Connectors

	P/N	Picture	Height Range	Length x Width	Description	Features and Benefits	Status	Applicable SIM Size
Push-pull Type	1932766-1		1.5	17.6 x 16.1	SIM 1.5mm height	**Features** • Provides card stop • Shielded • Preloaded contacts • Holes under the connector • Test holes **Benefits** • Card stop helps protect against damage to the SIM card • Shield prevents EMI, RF distortion and card bend • Preloaded anti-lifting contacts protect card from abuse • Mounting components under the connector save space • Automated testing reduces costs	MP GD	Mini SIM / 2FF
	1932768-1		1.95	16.3 x 14.8	Super low profile SIM with flange (big shield)	**Features** • One clip type (bridge type) • Shielded • Holes under the connector • Card stop and guide • Preloaded contacts • Test holes **Benefits** • Prevents card damage • Shield helps protect against EMI, RF distortion and card bend • Preloaded anti-lifting contacts protect card from abuse • Mounting components under the connector save space • Automated testing reduces costs	MP SH	Micro SIM / 2FF
	2199337-5 *Anti-buckling*		1.18	14.1 x 13.3	Anti-buckling ultra low profile push pull	• Low profile to save space • Card detect switch is available • Reduces risk of card insertion in wrong direction • Card stop confirms full insertion to user • The new contact design prevents buckling in use of a nano SIM card to an adapter	MP SH	Micro SIM / 3FF

Combo Type Connector for Micro SIM + Micro SD	2199003-2		2.5	17.75 x 14.0	Micro SIM + micro SD combo 90 degree	• Dual card reader micro SIM/micro SD type, space saving design transverse card orientation • Push-pull type • Micro SD card retention feature • Micro SD detect switch • Pick and place design on shell	MP GD	Micro SIM / 3FF & micro SD
	2199260-5 *Anti-buckling*		2.12	16.9 x 14.31	Micro SIM + micro SD Combo Inline	• Low profile design • Two cards (micro SIM/3FF & micro SD) are both supported • Push-pull type • Micro SIM slot has anti-buckling contact to make it robust and reliable • Slider to extract micro SIM card is available • Card detect switch for micro SD	MP GD	Micro SIM / 3FF & micro SD

(dimenions:mm)

SIM Card Connectors

	P/N	Picture	Height Range	Length x Width	Description	Features and Benefits	Status	Applicable SIM Size
Combo Type Connector for Micro SIM + Micro SD	2290741-1 NEW Anti-buckling 2295782-1 NEW Anti-buckling		1.32	28 x 18.3	3-in-2 Card Connector	• Accepts either two nano SIM/4FF cards, or one nano SIM/4FF and one micro SD card • Innovative anti-buckling contact design provides a more robust solution • Helps prevent damage to contacts during card insertion and removal • Proven pin-push type solution with mechanical lock function • Tray detect switch helps prevent malfunction • Space-efficient design with two cavities • About 20% PCB savings over other combo type card connectors • Better coplanarity control helps ensure fewer defects during the manufacturing process and makes the soldering process easier	MP SH	Nano SIM / 4FF & micro SD
Tray Type	2286990-1 Anti-buckling		1.35	12.26 x 17.76	Nano SIM tray side entry	• Low profile design 1.35mm • Card insertion direction is side entry type • Good click feeling to insert tray and enough tray eject length by pin insertion operation • Tray detect switch is available • Anti-buckling contact minimizes contact deformation • Both single card type & dual card type are available Contact a TE Representative for further details and other tray type requests.	MP GD	Nano SIM / 4FF
	2296830-1 Anti-buckling		1.35	12.26 x 17.76	Dual Nano SIM tray side entry		MP GD	Two piece Nano SIM / 4FF
Block Type	2286237-1 Anti-buckling		0.3	12.95 x 7.5	Block SIM Normal Entry	• Low profile design, all product HSG height is 0.3mm • Minimize the connector layout to minimize the space • Flexible layout to use several cards in one application • Both block SIM connectors can connect to mini SIM/2FF, micro SIM/3FF and nano SIM/4FF • The card position can be fixed on the application side or by adding a shell as another component • Anti-buckling contact is available for insertion/extraction direction	MP SH	Mini SIM / 2FF or Micro SIM / 3FF or Nano SIM / 4FF
	2287217-1 Anti-buckling		0.3	8 x 8.2	Block SIM Side Entry		MP GD	Mini SIM / 2FF or Micro SIM / 3FF or Nano SIM / 4FF
	2286981-1 Anti-buckling		0.3	8x 9.6	Block micro SD		MP GD	Micro SD

(dimenions:mm)

Frequently Asked Questions

Question 1
How do I decide which type of SIM connector to choose?

Answer 1
The major difference in choosing between SIM connectors depends on the design of the customer device. Push-push or tray type SIM connectors allow users to extract the SIM card from the external portion of the device. Push-pull or block type connectors require users to open the back shell of the device and manually pull out the SIM card.

Question 2
What is the purpose of an 8 position SIM connector?

Answer 2
The extra two positions support an additional function like electronic payment.

Question 3
What is the benefit of dual-slanted contact performance?

Answer 3
The dual-slanted design minimizes contact jam issues and creates a stronger mating performance, as demonstrated during the drop test.

Question 4
When should I use a micro SIM connector?

Answer 4
When the device requires the use of a micro SIM card.

Question 5
What's the scalable height?

Answer 5
The scalable height is found when the SIM card connector is scalable by a different P/N, but the connector footprint stays the same. The benefit is enabling the customer to swap the product easily when a design change occurs, thereby reducing the lead-time of TTM (Time To Market), TTV (Time To Value) and design cost.

TE Technical Support Center

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

Part numbers in this brochure are RoHS Compliant*, unless marked otherwise.
*as defined www.te.com/leadfree

te.com/products/SIMCardConnectors

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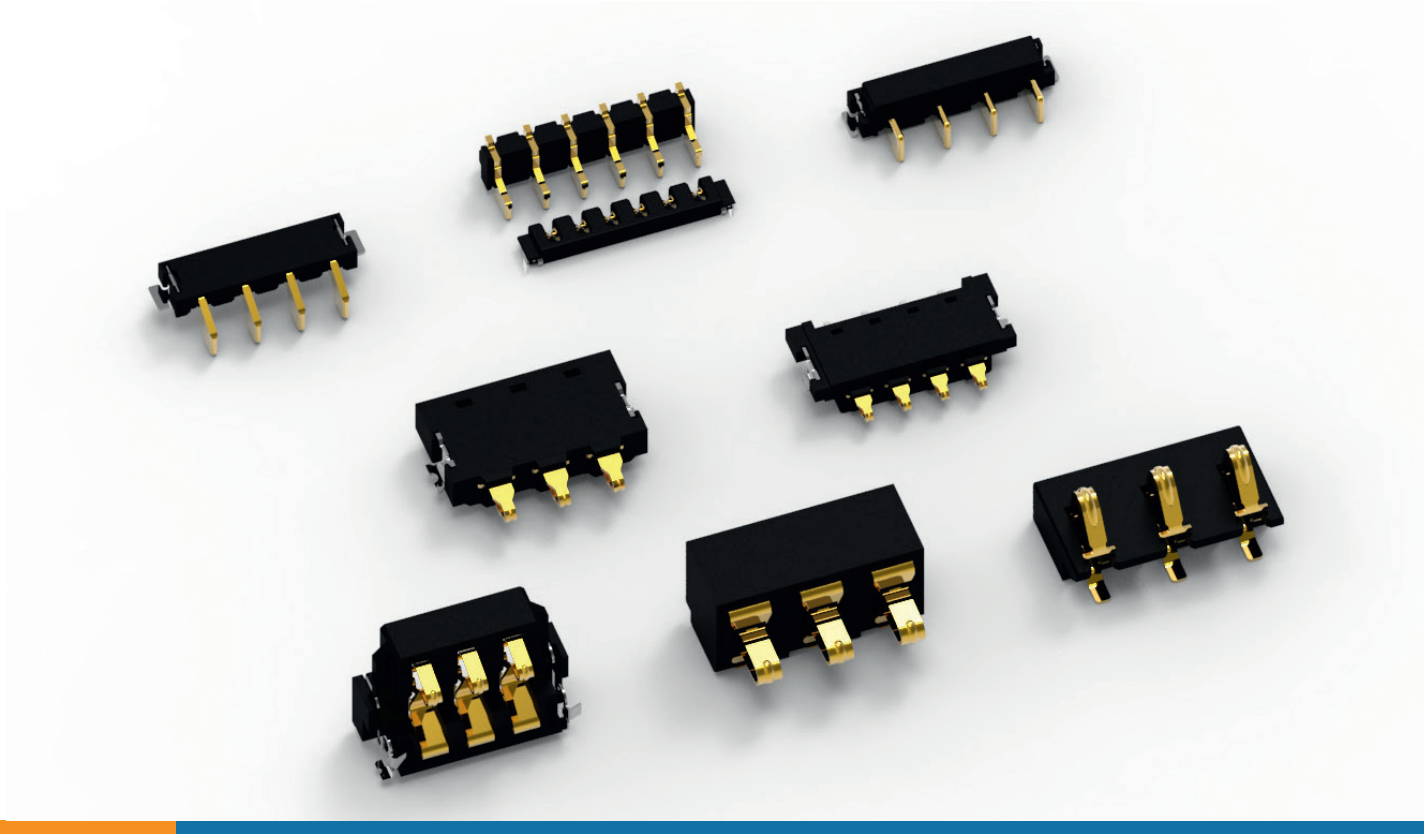
PORTABLE AND HANDHELD DEVICES

MOBILE BATTERY CONNECTORS QUICK REFERENCE GUIDE

Browse Products: http://www.te.com/usa-en/solutions/portable-and-handheld-devices.html



Mobile Battery Connectors

TE Connectivity' s (TE) series of mobile battery connectors consists of several types, including low profile battery connectors, leaf battery connectors and floating battery interconnection system (FBIS II). These products have been widely adopted across applications, such as mobile phones, tablet PCs, digital cameras and other mobile devices.

Mobile battery connectors' key benefits - low cost, high reliability and durability, low profile design and high design flexibility - allow them to be used in various fields. For example, they are used in mobile phones with removable batteries, since their high design flexibility allows them to be scaled up or down regardless of positions, working height and contact pitch. The low profile battery connector series improves cost effectiveness by reducing the number of components needed and the size of the tooling platform. They are designed for position extensions and height changes and can be used for SMT soldering and DIP type soldering, as well as fitted for a standard mount or mid-mount. TE' s technological capabilities make our mobile battery connector series a cost saving solution for our customers.

Key Features

- Can be used in mobile phone with removable battery
- 2.5 mm - 6.5 mm centerline
- Various positions include: 2, 3, 4 and 6
- Working height ranges from 0.4 mm to 6.7 mm
- Wide range of current ratings from 1.5 Amperes to 5 Amperes

Benefits

- Improve cost effectiveness by reducing the number of components needed and the size of the tooling platform
- Low profile design occupies a small area of PCB
- Design flexibility allows position extensions, height changes and customization
- Connection reliability and durability meets the general market requirements

Applications

- Mobile Phones
- Tablet PCs
- Mobile Media Players
- Digital Cameras
- Video Cameras
- Navigation Systems
- Gaming Consoles

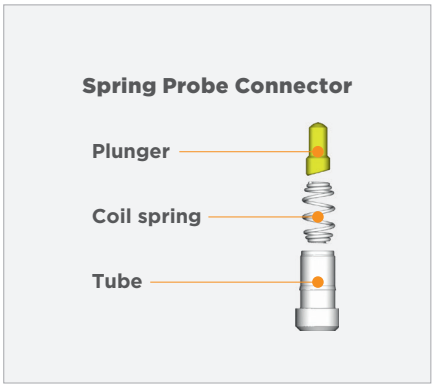
www.te.com/products/mobile-battery-connector

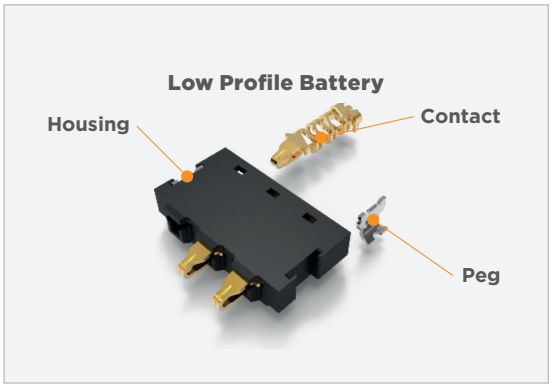
Key Features

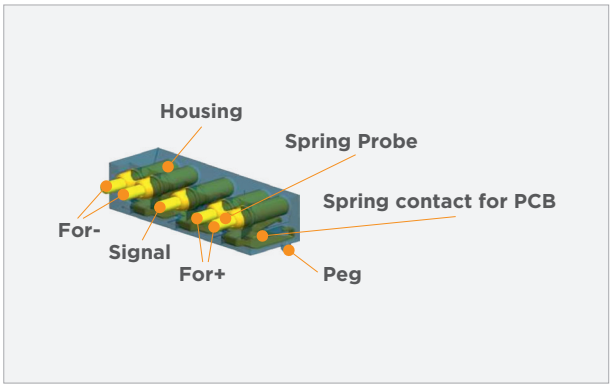
Low Profile Battery Connector

• Improved cost effectiveness by reducing components

- For removable battery connectors, spring probe connectors are typically used in mobile phones due to their low profile design. Thier disadvantage is due to a higher cost necessary as they require the customer to increase the component quantity and wide gold plating area. Moreover, they require additional pins to ensure a reliable connection. Low profile battery connectors require lesser components to achieve similar results.







Component Qty. for Battery Connector		
	Spring Probe Connector	Low Profile Battery
Spring Probe	5(x3=15)	-
Housing	1	1
Peg	2	2
Contact	5	3
	13 (23)	6

• High connection reliability and durability

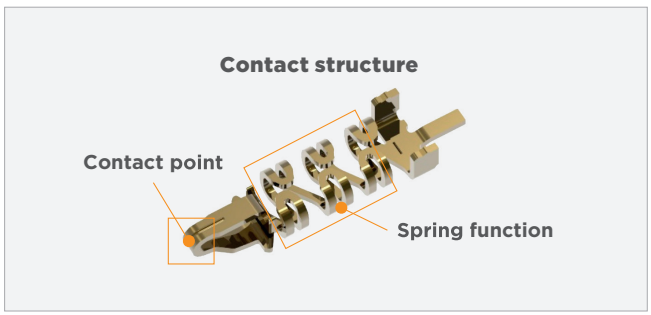
- Connection reliability is high because the contact is produced from one single material

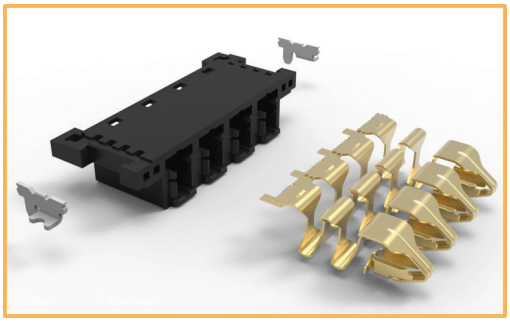
- Durability cycle stands at 5,000 cycles and meets the general market requirement

• NEW 5A low profile batter connector

- Provides a more reliable one-piece contact design

- Supports faster charging speeds required for today' s consumer devices





Key Features

Low Profile Battery Connector

• Low profile design and design flexibility allow position extensions and height changes

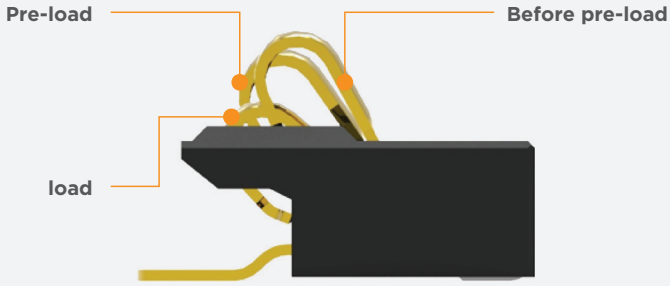
- A new contact design allows for a low profile design. Traditional solutions like the leaf battery connector that is made from one material contact do not meet the low profile design.
- Developing 4 positions and mid mount types with the same contact concept allows the development of a variety products that fits customers' requirements.

Connector height is 1.9mm, contact point is 0.8mm

Connector height from PCB is 1.4mm, contact points is 0.4mm from PCB surface

Leaf Battery

• Improved cost effectiveness • Long stroke contact • Features a pre-load contact for reliability



Pre-load Concept

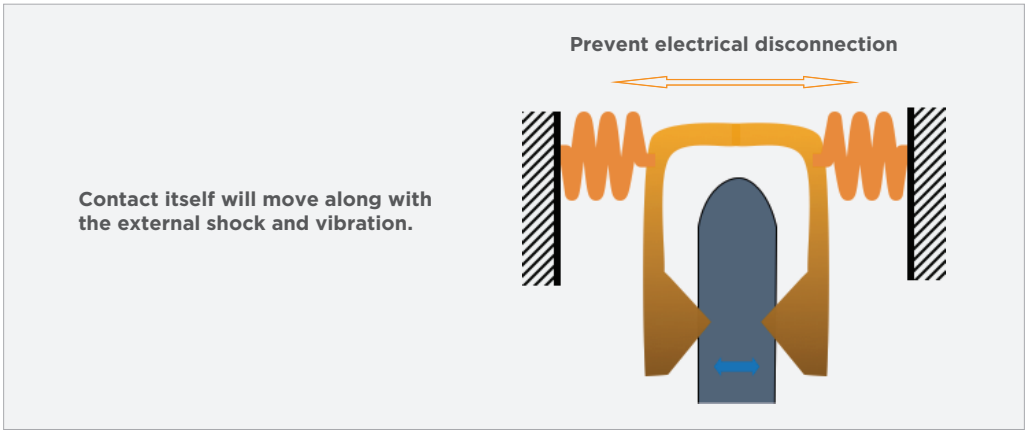
• Flexible mating direction for various applications

- Right angled and vertical mating directions are available.

Key Features

Floating Battery Interconnection System - FBIS II

- **High connection reliability and durability**
- **Features dual beam floating contact function to absorb misalignment**
- **Prevents electrical disconnection due to physical shock and vibration**

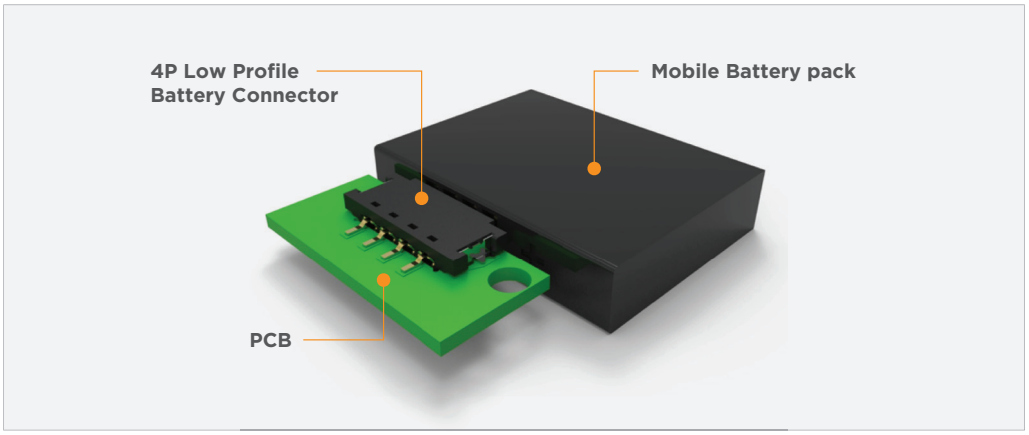


- **Flexible mating direction for various applications**

- Right angled and vertical mating directions are available.

Application Picture in the Device

Low Profile Battery Connector



Mobile Battery Connectors

	Picture	Part Number	Mount / Solder Type	Mating Direction	Pos.	Pitch	Working Height	Dimensions	Description	Status*
Low Profile Battery Connector		2229056-1	TOP Mount / SMT	Right Angle	3	2.5	0.8	9.6x4.8x1.9	Preloaded 3p SMT Low Profile Battery Connector	MP GD
		2199206-1	Mid-Mount / SMT	Right Angle	4	2.5	0.4	13.7x5.4x3.0	4p Mid-Mount Low Profile Battery Connector	MP GD
	NEW 5A 	2289817-1	Mid-Mount	Right Angle	4	2.5	-0.6 (below PCB surface)	13.7x5.4x3.0	4p Mid-Mount Low Profile Battery Connector	MP GD

	Picture	Part Number	Mount / Solder Type	Mating Direction	Pos.	Pitch	Working Height	Dimensions	Description	Status*
Leaf Battery		6337194-1	SMT	Vertical	2	4.25	5.7	7x6.2x6.8	2p 4.25 pitch Battery Connector Assembly	MP GD
		292331-3	SMT	Vertical	3	1.6	2.8	7.0x5.0x3.75	Preloaded 3p 1.6 pitch Leaf Spring Battery Connector	MP SH
		292448-1	SMT	Vertical	3	3.0	2.95	8.2x5.0x3.7	Preloaded 3p 3.0 Pitch Leaf Spring Battery Connector	MP SH
		1932076-1	SMT	Vertical	3	3.0	2.4	8.2x5.4x3.15	Preloaded 3p 3.0 pitch Leaf Spring Battery Connector	MP SH
		1982633-1	SMT	Right Angle	3	3.0	2.28	8.7x3.53x4.45	3p 3.0 pitch Leaf Battery Connector	MP SH
		1717838-1	SMT	Right Angle	3	6.5	6.6	20.0x5.0x11.5	3p 6.5 pitch Leaf Spring Battery Connector	MP GD

* MP = Mass Production
GD = Guangdong Plant
SH = Shanghai Plant

Mobile Battery Connectors

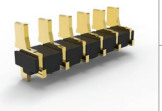
	Picture	Part Number	Mount / Solder Type	Mating Direction	Pos.	Pitch	Working Height	Dimensions	Description	Status*
Leaf Battery		2134161-1	SMT	Right Angle	3	3.2	6.6	11.3x5.7x8.6	Assembly Floating Battery Connector Small Type, 3p	MP GD
		2040647-1	SMT	Right Angle	3	3.2	6.7	13.8x5.7x9.0	Preloaded Floating Battery Connector, H=9.0	MP GD
		1981061-1	SMT	Right Angle	3	3.2	5.75	11.2x2.5x7.6	Preloaded 3p 3.2 pitch Leaf Type Battery Connector, without boss	MP GD
		1827928-1	SMT	Right Angle	3	3.2	5.75	11.2x2.5x7.6	3p 3.2 pitch Leaf Type Spring Battery Connector	MP GD
		1746142-1	SMT	Right Angle	3	3.2	3.5	12.4x3.7x6.5	Preloaded 3p 3.2 pitch Leaf Spring Battery Connector	MP GD

	Picture	Part Number	Mount / Solder Type	Mating Direction	Pos.	Pitch	Dimensions	Description	Status*
Floating Battery Interconnection System - FBIS		2108074-2	SMT	Right Angle	4	3.0	15.4x3.7x2.06	FBIS, Battery side receptacle 4p	MP SH
		2134758-1	SMT	Right Angle	4	3.0	14.2x6.1x3.4	FBIS, Plug 4p Standoff	MP SH

* MP = Mass Production
GD = Guangdong Plant
SH = Shanghai Plant

Mobile Battery Connectors

Floating Battery Interconnection System - FBIS

Picture	Part Number	Mount / Solder Type	Mating Direction	Pos.	Pitch	Dimensions	Description	Status*
	2134167-1	SMT	Right Angle	4	3.0	13.4x5.1x3.0	FBIS, Plug 4p Low	MP SH
	1932859-1	SMT	Right Angle	4	3.0	13.4x5.1x3.7	FBIS, Plug 4p High	MP SH
	1932869-1	SMT	Right Angle	6	3.0	21.4x3.25x3.9	FBIS, 6p Rec, 0.05um Gold	MP SH
	1932869-2	SMT	Right Angle	6	3.0	21.4x3.25x3.9	FBIS, 6p Rec, 1.27um Gold	MP SH
	1554953-1	SMT	Vertical	4	3.0	13.4x5.1x3.0	FBIS, Plug 4p Vertical	MP SH
	1932870-1	SMT	Vertical	6	3.0	16.4x3.65x4.67	FBIS, 6p Plug, 0.05um Gold	MP SH
	1932870-2	SMT	Vertical	6	3.0	16.4x3.65x4.67	FBIS, 6p Plug, 1.27um Gold	MP SH

* MP = Mass Production
GD = Guangdong Plant
SH = Shanghai Plant

Frequently Asked Questions

Question 1
What is the working height of the TE mobile battery connector?

Answer 1
There are two working heights for low profile battery connectors: 0.4 mm and 0.8 mm, and they are smaller in size. Leaf battery connectors: it ranges from 2.28 mm to 6.7 mm. FBIS II can mate directly.

Question 2
What is the centerline (pitch) requirement?

Answer 2
TE offers the centerline space of 2.5 mm for low profile battery connectors, 3.2 mm to 6.5 mm for leaf battery connectors and 3.0 mm for FBIS II.

Question 3
What are the positions of the TE mobile battery connector?

Answer 3
TE offers mobile battery connectors ranging from 2 to 6 positions.

Question 4
What are the major applications of the TE mobile battery connector?

Answer 4
This product series can be used in mobile phones, tablet PCs, mobile media players, digital cameras, video cameras, navigation systems and gaming consoles.

Question 5
What is the maximum current rating of the TE mobile battery connector?

Answer 5
In general, the maximum current rating for FIBS II is 1.5 amperes, leaf battery connectors is 2 amperes, and for low profile battery connectors can be up to 5 amperes. Please refer to the TE product specification for more information.

FOR MORE INFORMATION

TE Connectivity Technical Support Center

USA:	+1 (800) 522-6752	UK:	+44 (0) 800-267666
Canada:	+1 (905) 475-6222	France:	+33 (0) 1-3420-8686
Mexico:	+52 (0) 55-1106-0800	Netherlands:	+31 (0) 73-6246-999
Latin/South America:	+54 (0) 11-4733-2200	China:	+86 (0) 400-820-6015
Germany:	+49 (0) 6251-133-1999		

Part numbers in this brochure are RoHS Compliant*, unless marked otherwise.
*as defined www.te.com/leadfree

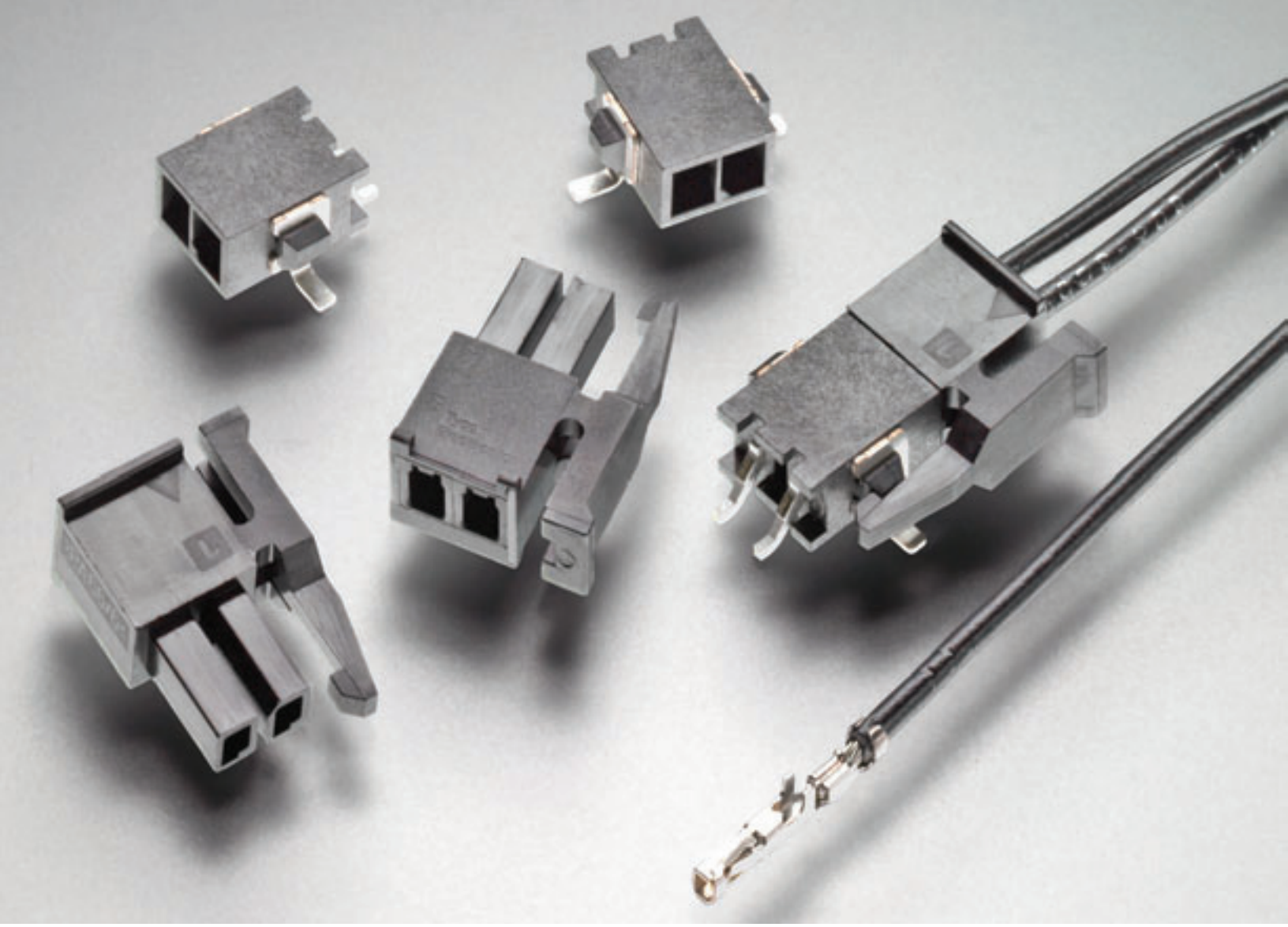
te.com

1-1773839-5 SPARKS 02/2016

PORTABLE AND HANDHELD DEVICES

LOW PROFILE MICRO MATE-N-LOK CONNECTOR CATALOG

Browse Products: http://www.te.com/usa-en/solutions/portable-and-handheld-devices.html



Introducing

Low Profile Micro MATE-N-LOK Connector System

TE connectivity

Low Profile Micro MATE-N-LOK Connector System

KEY FEATURES

- Less than 4.7 mm in vertical height required
- Right angle surface mount headers with surface mount hold-downs
- Positive latching to prevent unmating
- 2, 3, and 4 positions available
- Black and natural colors available
- Utilizes standard Micro MATE-N-LOK contacts with 24-20 and 30-26 AWG wire ranges

DESCRIPTION

The Low Profile Micro MATE-N-LOK connector system features an ultra-slim design with the reliability and performance of the Micro MATE-N-LOK line of connectors

APPLICATIONS

Ideal for LED Lighting applications

ELECTRICAL

Current Rating: 5Amp (20 AWG)

Voltage Rating: 250 VAC

MATERIALS

Phosphor bronze, pre-tin or gold plated contacts

Nylon UL 94V-0 receptacle housings

High temperature nylon headers

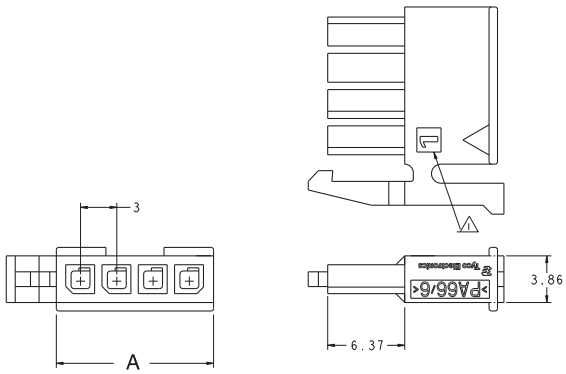
STANDARDS AND SPECS

Product Spec: 108-1836

Application Spec: 114-13000

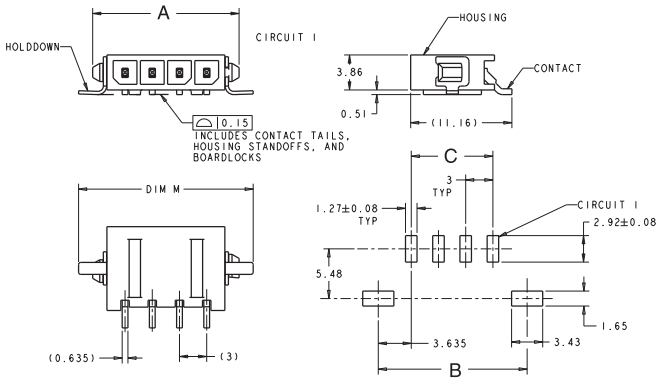
Low Profile Micro MATE-N-LOK Connector System

LOW PROFILE RECEPTACLE HOUSINGS



Positions	Color	Dimension A (in [mm])	Part Number
2	Black	.276 [7]	2029047-2
3	Black	.394 [10]	2029047-3
4	Black	.512 [13]	2029047-4
2	Natural	.276 [7]	2029102-2
3	Natural	.394 [10]	2029102-3
4	Natural	.512 [13]	2029102-4

LOW PROFILE RIGHT ANGLE SURFACE MOUNT HEADERS



Positions	Color	Dimension (in [mm]) A	B	C	Part Number
2	Black	.394 [10]	.410 [10.4]	.118 [3]	2029030-2
3	Black	.512 [13]	.528 [13.4]	.263 [6]	2029030-3
4	Black	.630 [16]	.646 [16.4]	.354 [9]	2029030-4
2	Natural	.394 [10]	.410 [10.4]	.118 [3]	2029104-2
3	Natural	.512 [13]	.528 [13.4]	.263 [6]	2029104-3
4	Natural	.630 [16]	.646 [16.4]	.354 [9]	2029104-4

FOR MORE INFORMATION

Technical Support

USA:	1-800-522-6752
Canada:	1-905-470-4425
Mexico:	1-800-733-8926
C. America:	52-55-1106-0803
South America:	55-11-2103-6000
Hong Kong:	852-2735-1628
Japan:	81-44-844-8013
UK:	44-8706-080208

te.com/industry/appliances

PORTABLE AND HANDHELD DEVICES

CONNECTORS AND ANTENNAS FOR MOBILE DEVICES
QUICK REFERENCE GUIDE

Browse Products: http://www.te.com/usa-en/solutions/portable-and-handheld-devices.html

Quick Reference Guide

Connectors and Antennas for Mobile Devices

Using its extensive experience, TE Connectivity (TE) supplies products for today's and tomorrow's mobile equipment applications, including smartphones, tablets, mobile media players, digital cameras, GPS, payment terminals, sports equipment and other portable electronics.

We also provide analyses and simulation services to allow OEM's to predict system performance, resulting in faster design cycles and lower costs.

Our early involvement programs allow us to design next generation products to support equipment requiring more speed, higher density and lower cost.

Our wide product portfolio for mobile equipment ranges from a variety of connectors to antennas, cable assemblies and others.

In addition to our products, TE offers a set of technologies, especially developed to offer low applied cost products to our customers. In an effort to understand your individual needs, our dedicated Mobile Equipment engineers are prepared to work closely with you and provide you with a great experience. The teams are dedicated to your success and located in several regions of the world. Our facilities are fully equipped with all necessary services such as quick turn sample shops, simulation equipment, test laboratories and others.

TE connectivity

TE OFFERS CONNECTIVITY SOLUTIONS FOR ALL OF YOUR MOBILE DEVICES DESIGN NEEDS.

SHIELDING AND GROUNDING PRODUCTS
- Board Level Shielding (BLS)
- Solder Pads and Spacers
- Spring Finger

INTERNAL CONNECTORS
- Board to Board Connectors
- FPC Connectors
- Wire to Board Connectors
- One Piece Board to Board Connectors

MEMORY CARD CONNECTORS
- Micro SD Card Readers

SIM CONNECTORS

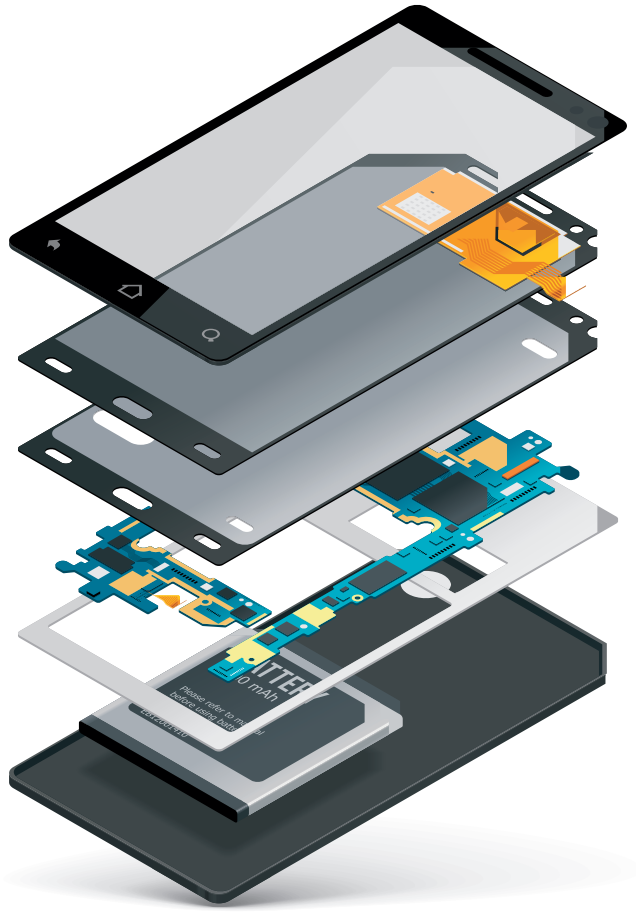
I/O CONNECTORS AND CABLE ASSEMBLIES
- Multi I/O Connectors
- Multi I/O Cable
- IP Rated I/O Connectors
- Micro USB Connectors
- Circular I/O Connectors
- Platform A/V Jack
- HDMI Connectors
- Cable Assemblies

BATTERY CONNECTORS
- One Piece Battery Connectors
- Two Piece Battery Connectors

RF CONNECTORS
- Switching Coax

SOCKETS
- Camera Sockets

ANTENNA PRODUCTS
- Customized Antenna Products
- Standard Antenna Products



D: Development, I: Introduction, C: Concept, MP: Mass production, SH: Shanghai (PRC), QD: Qingdao (PRC), GD: Guangdong (PRC), JP: Japan, SW: Switzerland, KR: Korea, CN: China. All dimensions in [mm].

SHIELDING AND GROUNDING PRODUCTS

Board Level Shielding (BLS)

Picture	Description	Key Features	Design Dimensions	Status
	EMI (Electromagnetic Interference) shields are stamped one and two-piece metal cages that help provide isolation of board level components, minimize crosstalk and reduce EMI susceptibility without impacting system speed.	• Standardized design features; • Rapid prototyping for most parts in 72 hours	All BLS products are custom made. Common sizes range from, but are not limited to, 5mmx5mmx1mm to 70mmx70mmx5mm Contact TE for specific size requirement.	MP QD

For customer inquiry please contact: bls.support@te.com
For more information: www.te.com/products/bls

Solder Pads and Spacers

Picture	Type	Plating	Dimensions	P/N	Description	Status
	Solder Pad	Au	2.0 x 1.4 x 0.1	1932685-3	Pick and Place Pad	MP SH
	Spacer	Au	2.0 x 0.50	1551962-3	Spacer plated and packaged	MP SW
	Spacer	Au	2.0 x 0.80	1551719-3	Spacer plated and packaged	MP SW

Spring Finger

Picture	Type	Uncompressed Height	Width	Effective Height	P/N	Description	Status
	Y	0.8	2.0	0.4 - 0.7	1447009-5	Spring finger 0820	MP JP
	Pre-loaded	1.8	1.15	0.95 - 1.45	1551572-5	SF 1812 Common Footprint	MP QD
	Pre-loaded	2.15	1.15	1.3 - 2.0	1551573-5	SF 2212 Common Footprint	MP QD
	Pre-loaded	2.6	1.15	1.7 - 2.4	1551574-5	SF 2612 Common Footprint	MP QD
	Pre-loaded	3.0	1.3	2.1 - 2.8	1551575-5	SF 3012 Common Footprint	MP QD
	Pre-loaded	3.4	1.4	2.3 - 3.1	1551576-5	SF 3412 Common Footprint	MP QD
	Pre-loaded	1.1	1.0	0.65 - 0.875	2108693-4	SF 1110 Common Footprint	MP QD
	Pre-loaded	1.4	1.0	0.8 - 1.1	2108610-5	SF 1410 Common Footprint	MP QD
	Pre-loaded	1.7	1.0	1.1 - 1.4	2108611-5	SF 1710 Common Footprint	MP QD
	Pre-loaded	2.1	1.0	1.4 - 1.75	2108612-5	SF 2110 Common Footprint	MP QD
	Pre-loaded	2.4	1.0	1.6 - 2.0	2108613-5	SF 2410 Common Footprint	MP QD
	Pre-loaded	2.7	1.0	1.9 - 2.3	2108614-5	SF 2710 Common Footprint	MP QD
	Pre-loaded	3	1.0	2.2 - 2.6	2108609-5	SF 3010 Common Footprint	MP QD
	Pre-loaded	1.2	1.05	0.7 - 1.0	2134078-1	Shield Finger 1210	MP QD
	Pre-loaded	1.24	1.0	0.65 - 1.1	1551631-5	SF 1210 Common Footprint	MP QD
	Pre-loaded	1.3	1.0	0.9 - 1.4	1554825-1	Shield Finger 1310	MP JP
	Pre-loaded	1.4	1.0	1.0 - 1.4	1-1447360-1	Shield Finger 1410	MP JP
	Pre-loaded	1.5	1.1	0.9 - 1.4	1565158-1	Shield Finger 1511	MP JP
	Pre-loaded	1.6	0.8	1.1 - 1.5	1565322-1	Shield Finger 1608	MP JP
	Pre-loaded	1.8	1.0	1.0 - 1.7	1857724-4	Shield Finger 1810	MP QD
	Pre-loaded	1.8	1.0	1.0 - 1.7	1551281-4	Shield Finger 1810 RF LEFT	MP QD
	Pre-loaded	1.8	1.0	1.0 - 1.7	1551401-4	Shield Finger 1810 RF RIGHT	MP QD
	Pre-loaded	1.99	2.0	1.1 - 1.9	2040761-1	Shield Finger 2020	MP QD
	Pre-loaded	2.0	1.1	1.1 - 2.1	1554901-1	Shield Finger 2011	MP JP
	Pre-loaded	2.4	1.1	1.4 - 2.3	1746854-1	Shield Finger 2411	MP JP
	Pre-loaded	3.0	1.4	1.95 - 2.9	1827625-1	Shield Finger 3014	MP JP
	Pre-loaded	3.0	1.4	1.95 - 2.9	1903646-1	Shield Finger 3014 LOW FORCE	MP JP
	C	1	2	0.4 - 0.8	2199248-4	Scalable Spring Finger	MP QD
	C	1.3	2	0.5 - 1.1	2199248-5	Scalable Spring Finger	MP QD
	C	1.6	2	0.8 - 1.4	2199248-6	Scalable Spring Finger	MP QD
	C	2	1.5	1.1 - 1.8	2199249-3	Scalable Spring Finger	MP QD
	C	2.3	1.5	1.4 - 2.1	2199249-4	Scalable Spring Finger	MP QD
	C	2.9	1.5	2.0 - 2.7	3-2199250-2	Scalable Spring Finger	MP QD
	C	3.2	1.5	2.3 - 3.0	3-2199250-3	Scalable Spring Finger	MP QD
	C	3.6	1.5	2.6 - 3.3	3-2199250-4	Scalable Spring Finger	MP QD
	C	3.8	1.5	2.9 - 3.6	3-2199250-5	Scalable Spring Finger	MP QD

For more information: http://www.te.com/products/spring-fingers

INTERNAL CONNECTORS

Board to Board Connectors

Picture	Plug/ Rec	Pos	Pitch	Stacking Height	Width	P/N	Description	Status
	Plug	10, 24, 30	0.4	0.98	2.03	*-2201196-*	0.4mm BtB H=0.98mm Plug	MP QD
	Rec	10, 24, 30	0.4	0.98	2.98	*-2201197-*	0.4mm BtB H=0.98mm Rec	MP QD
	Plug	10, 24, 30, 40, 50	0.4	0.6 - 0.8	2	*-2260336-*	0.4mm BtB H=0.7mm Plug	MP SH
	Rec	10, 24, 30, 40, 50	0.35	0.6 - 0.8	2.5	*-2822367-*	0.4mm BtB H=0.6-0.8mm Rec	MP SH
	Plug	10, 20, 24, 30, 40, 50, 60	0.35	0.6 - 1.0	2	*-2822461-*	0.4mm BtB H=0.6-1.0mm Plug	Prototype
	Rec	10, 20, 24, 30, 40, 50, 60	0.35	0.6 - 1.0	2.5	*-2822458-*	0.4mm BtB H=0.6mm Rec	Prototype
	Cover Shell	10, 20, 30, 40	0.4	0.9 (#)	4.8 (3.6)	*-2822383-*	0.4mm Board to Flex Cover Shell	Prototype
	Rec	10, 20, 30, 40	0.4	0.9 (#)	3.2	*-2822378-*	0.4mm Board to Flex Rec	Prototype

(#) Total stacking height includes FPC and cover shell part. (0.9mm stacking height is equivalent to 0.5mm 2-piece BTB)

FPC Connectors

Picture	Pitch	Flip	Contact	Positions	Height x width	P/N	Description	Status
	0.3	Back	Lower	27, 29, 31, 39, 41, 45	1.2 x 2.9	*-2013496-*	0.3 FPC Lower contact BF	MP JP
	0.3	Back	Upper	25, 27, 33, 37, 39, 41, 43	0.9 x 3.8	*-2013928-*	0.3 FPC Upper contact BF	MP JP
	0.3	Front	Lower	39, 51, 71	1.0 x 3.5	*-2041390-*	0.3 FPC Lower contact FF	MP SH
	0.25	Back	Lower	37, 41	1.3 x 3.2	*-2040832-*	0.25 FPC Lower contact BF	MP JP

Wire to Board Connectors

Picture	Pitch	Pos	Wire Size	Height	Length x width	P/N	Description	Status
	0.8	2	AWG 32	1.4	4.4 x 2.85	1981813-1 (Rec) 1981812-1 (Plug)	Micro SLP connector pair. Cable connector should be requested as a cable assembly at TE Connectivity	MP GD
	1.2	2 - 6	AWG 28	1.4	(4.2 - 9.0) x 4.3	1909783-* (Housing) 1909782-* (Header) 1909784-1 (Contact)	Top entry low profile WTB connector	MP CN

One Piece Board to Board Connectors

Picture	Type	Pitch	Pos	Working Height	Dimensions	P/N	Description	Status
	Dual row	0.7	10	0.9	11.25 x 6.25 x 0.85	1551246-2	10p Compressive BtB H=0.9mm	MP SH
	Dual row	1.25	10	1.2	5.0 x 6.5 x 0.9	2199055-2	10p Compressive BtB H=1.2mm	MP GD
	Dual row	1.6	4	1.4	4.8 x 5.0 x 1.2	2199172-1	4p Compressive BtB H=1.4mm	MP GD
	Dual row	1.6	6	1.4	4.8 x 5.0 x 1.2	2199170-1	6p Compressive BtB H=1.4mm	MP GD
	Dual row	1.6	4	1.65	5.0 x 3.18 x 1.4	2199075-2	4p Compressive BtB H=1.65mm	MP GD
	Dual row	1.6	6	1.65	5.0 x 4.78 x 1.4	1932771-1	6p Compressive BtB H=1.65mm	MP GD
	Dual row	1.6	10	1.65	5.0 x 7.98 x 1.4	2199035-2	10p Compressive BtB H=1.65mm	MP GD
	Dual row	2.0	6	3.15	5.0 x 5.38 x 2.9	2199064-2	6p Compressive BtB H=3.15mm	MP GD
	Single row	1.1	8	0.8	11.8 x 3.7 x 0.5	1551759-2	8p Compressive BtB H=0.8mm	MP SH
	Single row	1.5	10	0.9	6.80 x 17.15 x 0.3	1705536-2	10p Compressive BtB H=0.9mm	MP SH
	Single row	2.0	2	0.7	5.6 x 5.2 x 0.4	2246092-2	2p Compressive BtB H=0.7mm	MP SH
	Single row	2.0	8	0.7	17.20 x 5.20 x 0.4	1551120-5	8p Compressive BtB H=0.7mm	MP SH

MEMORY CARD CONNECTORS

Micro SD Card Readers

Picture	Switch?	Push - Push ?	Dimensions	P/N	Description	Status
	Y	Y	13.95 x 16.2 x 1.65	2201778-1	Micro SD Connector	MP QD
	Y	N	11.3 x 7.15 x 1.45	1932739-1	Micro SD connector, block type with detection switch	MP GD
	Y	N	17.75 x 14.0 x 2.5	2199003-2	Micro SD / Micro SIM Combi	MP GD

SIM CONNECTORS

SIM Connectors

Picture	Type	Card Size	Height Range	Length x width	P/N	Description	Status
	Push - Push	2FF	1.4	26 x 17	2174918-1	Super low profile SIM	MP GD
	Push - Push	3FF	1.27	15.98 x 15.1	2174803-2 (DIP) 2229333-2 (SMT)	Micro SIM Push Push reader	MP SH
	Push - Pull	2FF	1.8 - 2.0	15.5 x 10	*-2042647-* *-2042920-*	Scalable Shielded SIM	MP SH
	Push - Pull	2FF	1.8 - 2.0	15.5 x 10	*-1551663-*	Narrow shield version	MP SH
	Push - Pull	3FF	1.24	13.3 x 14.1	2108431-4	Micro SIM 1.24 8pos	MP
	Push - Pull	3FF	1.18	13.3 x 14.1	2199737-5	Micro SIM 1.18 8pos	MP
	Push - Pull	2FF	1.5	17.6 x 16.1	1932766-1	SIM 1.5mm height	MP GD
	Push - Pull	2FF	1.95	16.3 x 14.8	1932768-1	SIM 1.95mm height	MP SH

2FF: 2nd form factor or mini UICC, 3FF: 3rd form factor or micro SIM. 4FF: 4th form factor SIM

I/O CONNECTORS AND CABLE ASSEMBLIES

Multi I/O Connectors

Picture	Series	Functionality				Mount Type	Receptacle P/N	Plug P/N	Description	Status
		USB2.0	USB3.0	USB3.1	USB PD					
	HSMIO (High Speed Multi IO) 5+4	V	V	V	V	STD on	1-2199296-1	2-2199225-3	USB3.1 speed, USB PD 3A, backwards compatible with USB2.0 plug	D
						1mm offset	TBA			D
						0.86mm RVS	1-2199238-1			D
	HSMIO (High Speed Multi IO) 5+4+4 POWER	V	V	V	V	STD on	TBA	TBA	USB3.1 speed, USB PD 3A+2A of power over additional 4 contacts (100 Watt), backwards compatible with USB2.0 plug	D
						1mm offset	TBA			D
						0.86mm RVS	TBA			D
	HSMIO (High Speed Multi IO) 5+4+4 VIDEO	V	V	V	V	STD on	2199296-1	2-2199225-2 2-2199225-1	USB3.1 speed, USB PD 3A, MHL/MyDP, backwards compatible with USB2.0 plug	MP QD
						1mm offset	TBA			D
						0.86mm RVS	2199238-1			MP QD
	Multi IO 11p (5+6)	V	-	-	-	STD on	2108155-7	2108176-* 2108457-* 2108390-*	USB2.0 and 6 additional contacts (i.e. MHL). Backwards compatible with USB2.0 plug	MP QD
						RVS offset	2108171-7			
						STD offset	2108161-7			
	Multi IO 21p (10+11)	V	V	-	-	STD on	2108654-2	2108621-*	USB2.0, USB3.0 and additional contacts (power, MHL). Backwards compatible to uUSB2.0, uUSB3.0 and 11p plugs	MP QD
						RVS on	2108634-2			

Multi I/O Cable

Picture	Type	Length (mm)	P/N	Description	Status
	USB3.0 Hybrid	1200	TBD	Multi I/O to USB A PD	D
	USB3.0 Hybrid	300	TBD	Multi I/O to USB A PD	D

IP Rated I/O Connectors

Picture	Type	Mount type	Solder Leg	Standard Reversed	IP Rating	Dimensions	P/N	Description	Status
	AB	TOP	SMT	STD	IP54	8.2 x 5.0 x 3.8	1551629-2	Splash Proof Micro USB receptacle type AB	MP GD
	A	TOP	SMT	STD	IP54	8.2 x 5.0 x 3.8	2173157-2 2246077-1	Splash Proof Micro USB receptacle type B	MP GD
	AV jack	TOP	SMT	STD	IP54	13.6 x 8.3 x 4.25	2173377-6	3.5mm Audio Jack splashproof	MP GD
	B	TOP	SMT	STD	IP68 1.5m 30 min	8.97 x 6.5 x 3.04	2108877-1	Waterproof Micro USB receptacle type B, MIM (Metal Injection Molded) shell	MP QD

Micro USB Connectors

Picture	Type	Mount type	Solder Leg	Standard Reversed	Flange	Dimensions	P/N	Description	Status
	AB	TOP	SMT	STD	Y	7.5 x 5.00 x 2.51	1981584-1	Micro USB standard Rec AB	MP QD
	AB	TOP	2 DIP	STD	N	7.5 x 5.00 x 2.51	2134536-2	Micro USB flangeless	MP QD
	B	TOP	SMT	STD	Y	7.5 x 5.00 x 2.51	1981568-1	Micro USB standard Rec B	MP QD
	B	TOP	2 DIP	STD	Y	7.5 x 5.00 x 2.51	2069746-1	Micro USB 2 dip short	MP QD
	B	TOP	2 DIP	STD	Y	7.5 x 5.00 x 2.51	2013499-1	Micro USB 2 dip	MP QD
	B	TOP	4 DIP	STD	Y	7.5 x 5.00 x 2.51	2040002-1	Micro USB 4 dip	MP QD
	B	TOP	SMT	STD	N	7.5 x 5.00 x 2.51	2174507-2	Micro USB flangeless	MP QD
	B	TOP	2 DIP	RVS	N	7.52 x 6.5 x 2.48	1932788-2	Micro USB reversed flangeless	MP QD
	B	MID h=1.5	4 DIP	STD	Y	7.52 x 6.5 x 2.48	2040343-2	Micro USB mid mount	MP QD
	B	MID h=1.6	4 DIP	RVS	Y	7.52 x 6.5 x 2.48	1554266-1	Micro USB RVS mid Mnt	MP QD
	B	MID h=1.6	4 DIP	RVS	N	7.5 x 6.5 x 2.45	2134441-2	Micro USB RVS mid Mnt Flangeless	MP QD

Circular I/O Connectors

Picture	Type	Application	Barrel diameter	Dimensions	P/N	Description	Status
	DC jack	Compressive	2.0	6.8 x 5.2 x 3.5	1551548-1	2.0mm DC jack compressive	MP GD
	DC jack	Compressive	2.0	6.8 x 5.2 x 3.5	TBA	2.0mm DC jack compressive, chamfered	MP GD
	A/V jack	Compressive	3.5	13.4 x 8.3 x 4.25	1551768-1	3.5mm Audio jack compressive	MP GD
	A/V jack	Compressive	3.5	12.7 x 8.3 x 4.25	2173014-1	3.5mm Audio jack compressive, Isolated switch	MP GD
	A/V jack	SMD	3.5	13.4 x 8.1 x 3.9	2173752-2	3.5mm Audio jack SMD type tip switch	MP GD
	A/V jack	SMD mid mount	3.5	13.1 x 7.3 x 4.25	2199050-3 2199050-4 2199088-2 2199161-2	Mid mount 0.9mm offset Mid mount 0.7mm offset Mid mount 1.2mm offset (short) Mid mount 2.1mm offset	MP GD

Platform A/V Jack

Picture	Type	Positions	Customizable Housing	Dimension	Switch	P/N	Description	Status
	SMD Top	5P	V	13.4 x 8.1 x 3.9	Y	TBA	Top mount AV jack 3.5mm dia	D
	SMD Mid Mount	5P	V	13.4 x 8.1 x 4	Y	TBA	Mid mount AV jack 3.5mm dia	D
	FPC Mount	5P	V	14 x 6.3 x 3.6	Y	2246100-1	Smallest AV jack, FPC mount	D
	FPC Mount	5P	V	13.4 x 8.1 x 3.9	Y	2173752-1	FPC mount AV jack	MP GD
	FPC Mount	6P	V	14.45 x 6.3 x 4	Y	2286916-1	FPC mount AV jack tip switch	D
	FPC Mount	5P	V	20.26 x 7.4 x 5.37	Y	2286194-1	FPC mount AV jack screw hole, angled	MP GD
	Compressive Wings	5P	V	13.9 x 7.2 x 3.7	Y	TBA	AV jack compressive with side wings	D
	Compressive Top	5P	V	13.4 x 7.2 x 5	Y	TBA	AV jack compressive from top	D

HDMI Connectors

Picture	Type	Mount type	Dimensions	P/N	Description	Status
	HDMI type D	Rec	6.9 x 8.8 x 2.9	2129363-1	HDMI connector SIL contacts midmount	D

Cable Assemblies

TE provides both standard and customized cable assemblies for your mobile and wearable devices requirements.

- Connector of choice on both cable ends
- Customizable cable build up and wide variety of colors
- Fixing on wearable side can be done in several ways (magnetic, mechanical locking or friction based)

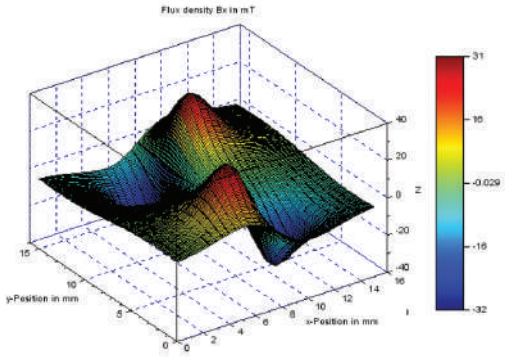
For advanced mobile and wearable devices, the interface for connecting power and data can be done in different ways. Your device can be placed in a docking station or connected by a cable assembly to your PC. In both cases, TE can provide customized cable assembly solutions.

Key Features

- Cosmetics molding and industrial design
- Platform approach to allow short design cycles, fast market introduction and low tooling investments
- Magnetic fixing option enables easy disconnection of the assembly from the device without damaging the device
- Simulation of magnetic holding force and radiation patterns of the magnets (Maxwell 3D)
- Wearable interconnect can be made waterproof to withstand outdoor activities

Applications

- Smartphones
- Smart watches
- Sport watches



Simulation of Magnetic Holding Force and Radiation Pattern

Both simulation and measuring equipment are available to test and predict holding force in case of a magnet-based connector system. Once the model of your design is finalized, we can perform these simulations. Also, the radiation pattern of magnetic fields can be measured and simulated to determine if your design is following the guidelines.

BATTERY CONNECTORS

One Piece Battery Connectors

Picture	Solder Type	Contact Height	Positions	Pitch	Dimensions	P/N	Description	Status
	SMT	0.8	3	2.5	9.6 x 4.8 x 1.9	2229056-1	3p SMT Low Profile Battery Connector H=1.9mm	MP GD
	Mid-Mount	0.4	4	2.5	13.7 x 5.4 x 3.0	2199206-1	4p Mid-Mount Low Profile Battery Connector H=1.4mm	MP GD

Two Piece Battery Connectors

Picture	Mating Direction	Product Type	Positions	Pitch	Dimensions	P/N	Description	Status
	Right Angle	Plug (Phone Side)	4	3.0	13.4 x 5.1 x 3.0	2134167-1	Floating Battery Interconnection System (FBIS), Plug 4p LOW	MP SH
	Right Angle	Plug (Phone Side)	4	3.0	13.4 x 5.1 x 3.7	1932859-1	Floating Battery Interconnection System (FBIS), Plug 4p HIGH	MP SH
	Vertical	Plug (Phone Side)	4	3.0	13.4 x 5.1 x 3.0	1554953-1	Floating Battery Interconnection System (FBIS), Plug 4p LOW	MP SH
	Standoff	Plug (Phone Side)	4	3.0	14.2 x 6.1 x 3.4	2134758-1	Floating Battery Interconnection System (FBIS), Plug 4p Standoff	MP SH
	SMT	Rec (Battery Side)	4	3.0	15.4 x 3.7 x 2.06	2108074-2	Floating Battery Interconnection System receptacle (battery side)	MP SH

RF CONNECTORS

Switching Coax

Picture	Self Alignment	Impedance	Dimensions	P/N	Description	Status
	0.5	50Ω	2.0 x 2.0 x 0.9	1551372-1	Pico switching coax to use with test probe 619361-1/619383-1	MP QD

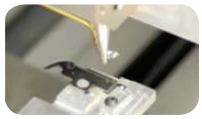
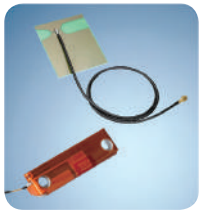
SOCKETS

Camera Sockets

Picture	Positions	P/N	Dimensions	Description	Status
	24P	2108142-1	9.25 x 9.25 x 3.9	• Stainless steel shell for ESD/EMI shielding effectiveness. • Standard product for customer platforming design and pixel extension of higher resolution camera modules.	MP KR

ANTENNA PRODUCTS

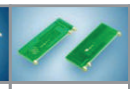
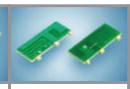
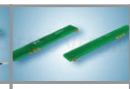
Customized Antenna Products

Picture	Manufacturing Technology	Description	Advantages
	Two Shot Molding	Two Shot molding is a mature and well understood process that remains viable for cost effective and repeatable production of antennas. The basic process has only two steps, injection molding of two distinct thermoplastic polymers and the electroless plating process, resulting in a selectively plated component.	• Design flexibility for complex 3D geometries • Ability to integrate multiple functions into one component • Tightest tolerance for pattern registration to carrier • Fewest manufacturing steps and processes • Higher yields
	Laser Direct Structuring	LDS is a three step process. First, the antenna carrier is molded in a standard single shot mold using an LDS compatible resin. Second, the desired antenna pattern is structured onto the carrier by a 3D laser system. Finally, the carrier with pattern is plated using industry standard methods where the plating adheres to the plastic only where it has been touched by the laser, thus creating a conductive pattern.	• Including same advantages as the 2-Shot technology • Ability to produce thin (0.15 mm) traces • Flexibility for pattern changes during production
	Printed	Printing is an emerging manufacturing process being used to produce antennas. The antenna carrier is molded of standard resin materials. The antenna pattern is structured onto the carrier by applying a conductive non-plate particulate in a controlled manner with a 3D print system.	• No special resins • No plating required • Flexibility for pattern changes during production • Simple/fastest/lowest cost tooling • Environment Friendly
	Stamped Metal Antennas	TE has developed a line of low profile, high performance Stamped Metal embedded antenna solutions for single-, dual-, tri- and quad band applications. Stamped Metal antennas offer OEM's a low cost and highly repeatable manufacturing solution with a number of standard or customized antenna designs.	• Lowest cost • Integrated contacts to ground plane • High volume capable production die • Additional assembly stations may be added for volume upswings
	Flexible Printed Circuit (FPC) and Printed Circuit Board (PCB) Antennas	Flexible Printed Circuits and Printed Circuit Boards are ideal for multi band antennas, allowing virtually any wireless product to operate at different frequencies without multiple antennas. TE Connectivity offers a broad range of low profile, high performance FPC and PCB embedded antennas. Similar to our Stamped Metal antennas, FPC and PCB antennas offer OEM's a low cost and highly repeatable manufacturing solution in a number of standard or customized antenna designs.	• Low cost tooling investment • Flexibility for pattern changes during production • Shortest lead time for tool build
	Speaker Acoustic Modules	TE has in-house capability for designing, assembling and testing Speaker Acoustic Modules (SAMs). The antenna and acoustic chamber are designed together as one assembly. The acoustic chamber often becomes the carrier for the antenna (MID, FPC, stamped metal). SAMs are 100% RF and acoustic tested in the production line prior to packaging.	• Space saving combination of acoustic chamber and antenna • RF test after speaker integration to SAM

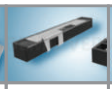
For more information: http://www.antenna.te.com

Standard Antenna Products

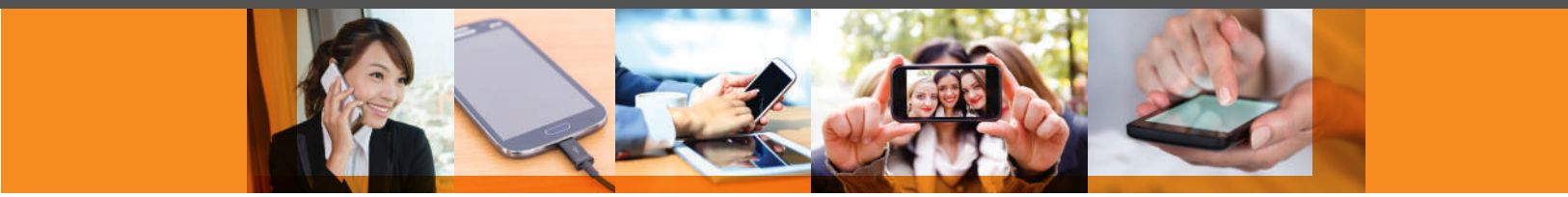
Cellular and GPS

Cellular and GPS										
	Pictures										
	Dimensions	X	38.10	38.10	37.59	35.56	49.90	38.1	110.00	74.00	6.00
		Y	15.24	15.24	11.94	17.65	20.27	15.20	14.00	10.56	
		Z/Height	1.57	1.57	1.57	1.57	1.58	1.57	1.31	1.57	6.05
	Peak Gain		+2 dBi	0 dBi, +3 dBi	+1 dBi	+2 dBi	+3 dBi	0 dBi, +1 dBi	+3.9 dBi	+3.5 dBi	0 dBi
	VSWR		< 2.5:1	< 3.0:1	< 3.0:1	< 3.0:1	< 3.0:1	< 2.5:1	< 3.0:1	< 3.0:1	< 3.0:1
	Mounting		Tab	Tab	SMT	Tab	Tab	Tab	PCB w/ U.FL Adhesive	Tab	SMT Puck
	Packaging		Bulk	Bulk	T&R	Bulk	Bulk	Bulk	Bulk	Bulk	T&R
	Bands		Single Band	Dual Band	Quad Band	Quad Band	5-Band	Dual Band	LTE all band	LTE all band	Single Band
	Special Features								GND plane independent		works on GND
Frequency Band (MHz)	Usage	Region	1513169-1	1513247-1	1513259-1	1513273-1	1513317-1	1513434-1	2118308-1*	2118310-1	1513634-1
698 - 960	LTE	Global							X	X	
824 - 894	GSM/CDMA 850/LTE	Americas	X	X	X	X	X		X	X	
880 - 960	GSM 900 /LTE	EU			X	X	X	X	X	X	
868 - 870	ISM/ ZigBee	EU	X						X	X	
1565 - 1585	GPS	Global									X
1710 - 1880	GSM 1800 /LTE	EU			X	X	X	X	X	X	
1850 - 1990	GSM/ CDMA 1900	Americas		X	X	X	X		X	X	
1920 - 2170	UMTS/LTE	Global					X		X	X	
2300 - 2700	LTE	Global							X	X	

ISM / WLAN / WiFi / ZigBee

ISM / WLAN / WiFi / ZigBee / UWB													
	Pictures												
	Dimensions	X	38.10	14.96	16.09	16.09	11.00	35.95	15.00	40.00	29.00	36.85	36.85
		Y	6.60	12.70			4.25	6.05	10.00	8.00	12.00	30.60	29.60
		Z/Height	1.57	0.79	6.05	6.05	4.00	4.28	1.00	1.00	10.00	0.30	0.30
	Peak Gain		+1 dBi	+2 dBi	+4 dBi	+2 dBi	+4.9 dBi	+4.3 dBi	+2.4 dBi	+3.7 dBi	+3 dBi	+4 dBi	+2 dBi
	VSWR		< 2.5:1	< 2.0:1	< 2.5:1	< 2.5:1	< 2.5:1	< 2.5:1	< 2.5:1	< 2.0:1	< 3.0:1	< 3.0:1	< 3.0:1
	Mounting		SMT	Tab	SMT Puck	SMT Puck	SMT	SMT	PCB w/ U.FL Adhesive	PCB w/ U.FL Adhesive	Universal Antenna Module	Flex w/ U.FL Adhesive	Flex w/ U.FL Adhesive
	Packaging		T&R	Bulk	T&R	T&R	T&R or Tray	T&R or Tray	Bulk	Bulk	Tray	Bulk	Bulk
	Bands		Single Band	Single Band	Dual Band	Single Band	Single Band	Dual Band	Single Band	Dual Band	Dual Band	Single Band	Dual Band
	Special Features				works on GND, omni-directional	works on GND, omni-directional	works on GND	works on GND	tape mount	tape mount	panel mount	tape mount	tape mount
Frequency Band (MHz)	Usage	Region	1513156-1	1513353-1	1513164-1	1513504-1	2118316-1	2118315-1	2118326-1*	2118309-1*	1513472-5*	2118059-1*	2118060-1*
902 - 928	ISM/ ZigBee	US	X										
2400 - 2483.5	Bluetooth /WLAN /ZigBee /Wi-Fi	Global		X	X	X		X		X	X	X	X
4900 - 5875	WLAN /Wi-Fi	Global					X	X	X	X			
5150 - 5875	WLAN /Wi-Fi	Global by Channel			X						X		X

*Alternate connector (MHF4) interfaces available. If you have any specific need, please contact your local TE sales representative.
For more information: http://www.antenna.te.com



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