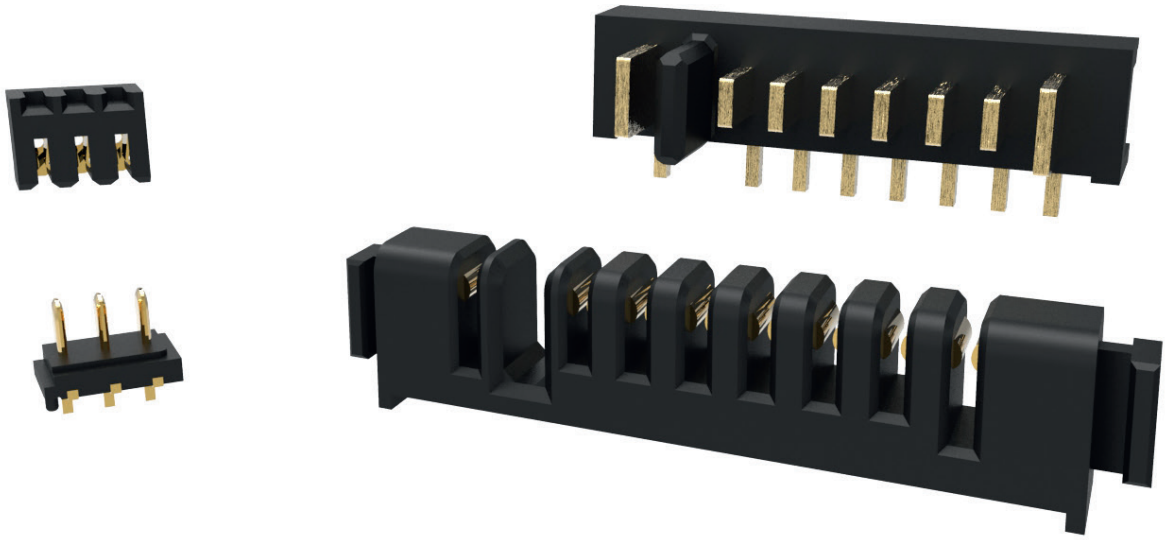


Battery Pack Connectors

As the size of mobile equipment shrinks and the space for battery packs continues to decrease, the need to balance current carrying capabilities, ensure higher amps and support quicker charging times becomes more important. TE Connectivity (TE) offers a range of battery pack interconnect solutions that are not only designed on both a 2.0 mm to 2.5 mm centerline but come with many positioning options. This portfolio of products supports the various requirements for design engineers and provides what is necessary for reliable connections between a main PCB and a battery pack.

Features

- 2.0mm – 2.5mm centerline
- Positions sizes include a range from 3, 5, 7, 8 to 10
- Through Hole (DIP) & Surface Mount (SMT) PCB termination
- Voltage keys to ensure proper mating and sequencing
- Contacts are made of high conductivity copper alloy
- Various PCB retention features

Benefits

- Minimizes PCB real estate consumption while giving flexibility to meet power requirements
- Provides flexibility when being designed for thinner applications
- Ensures proper mating and grounding during assembly
- Supports a current range from 2 to 8 amps per pin at maximum
- Provides the conditions needed to meet drop test requirements

Industries

- Appliances
- Consumer Electronics
  - Digital Cameras
  - PCs
  - Business Equipment
- Industrial
- Medical

www.te.com/products/batterypack

Mating Connectors

Choosing the right battery connectors is critical to create a reliable solution. Parts can be mated with boards that are coplanar, parallel or perpendicular. Please refer to the customer drawings to ensure that the length of all pins and sockets do not exceed its mating counterpart. To determine where the voltage key is located, if you are looking at a PCB the connector would be facing downward on the edge of the PCB similar to the following images as well as the recommended PCB layout in the customer drawing.

Mating Configurations

The number of pins must be equal to the number of mates. The following tables shows the combinations of plug attributes that mate with the receptacle attributes. You will need to choose the PNs with the corresponding attributes.

1.) Co-planar – When both plug and receptacle are mated, the PCBs are on the same plane.

Connector Type	Mount Angle	PCB Mount Style	Voltage Key	Mate	Connector Type	Mount Angle	PCB Mount Style	Voltage Key
Plug	R/A	TH or SMT	Left (X Pins)		Receptacle	R/A	TH or SMT	Right (X Pins)
Plug	R/A	TH or SMT	Right (X Pins)		Receptacle	R/A	TH or SMT	Left (X Pins)

2.) Parallel - When both plug and receptacle are mated, the PCBs do not intersect, thus are parallel.

Connector Type	Mount Angle	PCB Mount Style	Voltage Key	Mate	Connector Type	Mount Angle	PCB Mount Style	Voltage Key
Plug	R/A	TH or SMT	Left (X Pins)		Receptacle	R/A	TH or SMT	Left (X Pins)
Plug	R/A	TH or SMT	Right (X Pins)		Receptacle	R/A	TH or SMT	Right (X Pins)
Plug	Vertical	TH or SMT	Left (X Pins)		Receptacle	Vertical	TH or SMT	Left (X Pins)
Plug	Vertical	TH or SMT	Right (X Pins)		Receptacle	Vertical	TH or SMT	Right (X Pins)

3.) Perpendicular – When both plug and receptacle are mated, the PCBs meet at a right angle.

Connector Type	Mount Angle	PCB Mount Style	Voltage Key	Mate	Connector Type	Mount Angle	PCB Mount Style	Voltage Key
Plug	R/A	TH or SMT	Left (X Pins)		Receptacle	Vertical	TH or SMT	Left (X Pins)
Plug	R/A	TH or SMT	Right (X Pins)		Receptacle	Vertical	TH or SMT	Right (X Pins)
Plug	Vertical	TH or SMT	Left (X Pins)		Receptacle	R/A	TH	Left (X Pins)
Plug	Vertical	TH or SMT	Right (X Pins)		Receptacle	R/A	SMT	Right (X Pins)

Battery Pack Connectors

The charts on this page highlight the relationship between the key product features. Once the part number has been determined, the user can go onto TE website (www.te.com) to access the customer drawings.

2.0mm Centerline

3 Positions											
PN	Type	Mount Angle	PCB Mount	Voltage Key	PCB Mount Retention	Post Length (mm)	Locating Boss	Length (mm)	Width (mm)	Height (mm)	Spec Group
2199011-1	Plug	Vert	TH	N/A	Solder Pads	1.8	With	6.5	5.8	1.55	A
1612898-1	Plug	Vert	TH	N/A	Solder Pads	1.8	With	6.5	4.8	2.6	A
1612901-1	Rec	R/A	SMT	N/A	N/A	N/A	With	8	4	2.6	A

7 Positions											
PN	Connector Type	Mount Angle	PCB Mount	Voltage Key	PCB Mount Retention	Post Length (mm)	Locating Boss	Length (mm)	Width (mm)	Height (mm)	Spec Group
1827654-1	Plug	R/A	TH	Left (2 Pins)	Board Locks	1.5	Without	22.6	5.6	4	B
1827654-2	Plug	R/A	TH	Left (2 Pins)	Board Locks	2.1	Without	22.6	5.6	4	B
1-1827654-1	Plug	R/A	TH	Left (2 Pins)	Board Locks	1.5	Without	22.6	5.6	4	B
1827684-3	Rec	R/A	SMT	Left (2 Pins)	Without	1.8	Without	18.8	7.5	4	B
1-1827684-2	Rec	R/A	SMT	Left (2 Pins)	Without	3.2	Without	18.8	7.5	4	B
1827685-3	Rec	Vert	TH	Left (2 Pins)	Without	3.2	Without	18.8	4	7.5	B
1827685-4	Rec	Vert	TH	Left (2 Pins)	Without	2.2	Without	18.8	4	7.5	B
1-1932008-1	Rec	R/A	SMT	Left (2 Pins)	Without	1.9	Without	18.8	7.5	5.65	B

8 Positions											
PN	Connector Type	Mount Angle	PCB Mount	Voltage Key	PCB Mount Retention	Post Length (mm)	Locating Boss	Length (mm)	Width (mm)	Height (mm)	Spec Group
1747785-1	Plug	R/A	SMT	Left (1 Pin)	Mounting Holes	1.5	With	28.1	7	4.8	C
1747786-1	Rec	Vert	SMT	Left (1 Pin)	Without	1.5	With	23.2	4.8	6.55	C

2.5mm Centerline

5 Positions											
PN	Connector Type	Mount Angle	PCB Mount	Voltage Key	PCB Mount Retention	Post Length (mm)	Locating Boss	Length (mm)	Width (mm)	Height (mm)	Spec Group
6318792-1	Plug	R/A	TH	Right (1 Pin)	Boardlock(s)	2	Without	24.6	10	3.95	D
6318790-1	Plug	R/A	TH	Right (1 Pin)	Boardlock(s)	2	Without	20.8	7	2.95	F
9-1612503-1	Plug	R/A	TH	Left (1 Pin)	Boardlock(s)	1.6	Without	21.6	5.6	4.8	E
6376042-2	Plug	R/A	TH	Left (1 Pin)	Mounting Holes	2	Without	24.6	7	5.6	F
1565986-1	Rec	Vert	TH	Right (1 Pin)	Without	3	With	17.8	6.6	7.5	E
1565986-2	Rec	Vert	TH	Right (1 Pin)	Without	1.8	With	17.8	6.6	7.5	E
1473969-1	Rec	R/A	TH	Right (1 Pin)	Without	2.5	Without	17.8	7.5	6.6	E
6318430-2	Rec	R/A	TH	Right (1 Pin)	Without	2.5	With	17.8	9.5	5	G
1747367-1	Rec	R/A	SMT	Left (1 Pin)	Without	3	Without	17.8	6.6	4.6	E

Battery Pack Connectors

2.5mm Centerline (Continued)

8 Positions											
PN	Connector Type	Mount Angle	PCB Mount	Voltage Key	PCB Mount Retention	Post Length (mm)	Locating Boss	Length (mm)	Width (mm)	Height (mm)	Spec Group
1717445-5	Plug	R/A	TH	Left (1 Pin)	Without	2.3	Without	26.3	5.5	6.4	H
1717445-6	Plug	R/A	TH	Left (1 Pin)	Without	2.3	Without	26.3	5.5	6.4	H
1717478-1	Rec	Vert	TH	Left (1 Pin)	Without	1.5	Without	32.7	4.8	7.25	I
1717478-2	Rec	Vert	TH	Left (1 Pin)	Without	2	Without	32.7	4.8	7.25	I
1717620-1	Rec	R/A	TH	Left (1 Pin)	Without	1.5	Without	32.7	7.25	4.8	I
1746798-1	Rec	R/A	TH	Right (1 Pin)	Without	1.5	Without	32.7	7.25	4.8	I

10 Positions											
PN	Connector Type	Mount Angle	PCB Mount	Voltage Key	PCB Mount Retention	Post Length (mm)	Locating Boss	Length (mm)	Width (mm)	Height (mm)	Spec Group
1123684-7	Plug	R/A	TH	Right (1 Pin)	Mounting Holes	2	Without	37.1	7	4.8	J
6318548-7	Plug	R/A	TH	Right (1 Pin)	Mounting Holes	2	Without	37.1	7	6.6	J
6123738-7	Plug	R/A	SMT	Right (1 Pin)	Mounting Holes	3	Without	37.1	9.5	2	J
1746092-1	Plug	R/A	TH	Left (1 Pin)	Mounting Holes	2.05	Without	37.1	7	4.8	J
1674232-1	Plug	R/A	TH	Left (1 Pin)	Mounting Holes	2	With	37.1	7	6.6	J
1674232-2	Plug	R/A	TH	Left (1 Pin)	Mounting Holes	2.6	With	37.1	7	6.6	J
1-1473776-7	Rec	Vert	SMT	Left (1 Pin)	Without	1.5	With	32.7	4.8	6.55	J
1674231-1	Rec	Vert	TH	Left (1 Pin)	Without	1.5	Without	32.7	4.8	7.25	J

Product Ratings, and Specifications

For better understanding of the product capabilities and limitations, please refer to TE specifications. The following table is intended to be used with the product selector matrix. The product selector matrix has a column on the far right that indicates Product Spec. Group and that aligns with the first column on the left in the graph below.

					Performance Ratings			Durability Rating (Cycles)	
Spec Group	Pitch (mm)	Positions	Product Spec	Qualification Report	Voltage (Volts DC)	Current (Amps)	Operating Temp	Plug	Receptacle
A	2.0	6	108-5846	501-5452	30	2	`-20°to+80°C	10,000	3,000
B	2.0	7	108-78292	501-5665	30	6	`-20°to+80°C	6,000	2,000
C	2.0	8	108-5850	501-5470	30	8	`-20°to+80°C	6,000	2,000
D	2.5	5	108-5599	501-5264	30	6	`-20°to+80°C	6,000	2,000
E	2.5	5	108-5783	501-5392	30	7	`-20°to+80°C	10,000	5,000
F	2.5	5	108-78211	501-5264	30	6	`-20°to+80°C	6,000	2,000
G	2.5	5	108-5652	501-5315	30	6	`-20°to+80°C	10,000	5,000
H	2.5	8	108-5775	501-305	30	6	`-20°to+80°C	6,000	2,000
I	2.5	8	108-5866		30	10	`-20°to+80°C	6,000	2,000
J	2.5	10	108-5775	501-305	30	6	`-20°to+80°C	6,000	2,000
K	5.0	5	108-1501	501-305	50	8	`-30°to+70°C	5,000	1,000

Note: UL file for product series is UL E28476.

Power Terminology

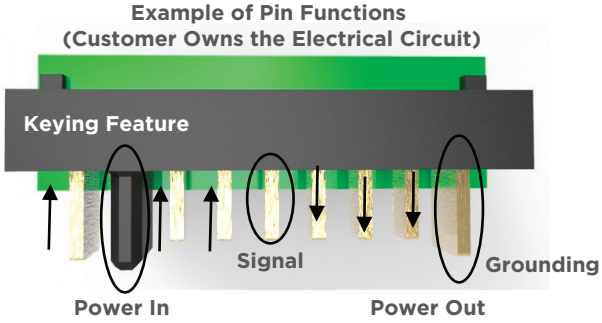
Current Carrying Capacity - Refers to the maximum current an insulated conductor is capable of carrying without exceeding its insulation and / or jacket-temperature limitations under specified ambient conditions.

T-Rise - Refers to the change in temperature of a terminal from a no-load condition to full-current load. TE products are tested at 30°C per EIA 364-70A / IEC 60512-5-1.

De-rating - Refers to the specified reduction in output power required for operation at elevated temperatures. De-rating is necessary when loading multiple contacts between a system and battery pack.

Keying Feature -
A mechanical arrangement that allows connectors of the same size and type to be mated.

Example of Pin Functions
(Customer Owns the Electrical Circuit)



Grounding Pin -
The longest pin is typically used as a conductor that provides a return path for the current from an electrical device to ground

Battery pack interconnects typically require the flow of power both in and out from the system to the battery pack. For example, if you use an eight-position connector, there are three pins that are reserved for power flowing out of the system to the battery pack and another three pins for flowing power from the battery pack into the system. Normally, there are a few pins reserved for both grounding and signal requirements.

The maximum carrying capacity of a battery pack connector cannot simply be calculated by multiplying the maximum current per pin by the number of contacts. The maximum current listed in TE' s 108 specifications is for a single contact. Therefore, when many contacts are used to transfer power, the maximum current carrying capacity of each individual contact decreases as more than one contact is used to transfer power.

Current Rating Example

Example assumes 1 contact can carry 7 amps. The total current is for both in and out power so to calculate the one way maximum. current, divided total current by 2.

Current ratings are based on the same equivalent wire gauge for both the header and the battery housing contacts. Equivalent wire gauge means that the current rating of conductor is equivalent to that of copper wire. Such conductor could be the copper PCB traces for header assembly contacts or conductive strips used for battery housing assembly contacts.

Loaded Contacts	Current/ Pin (Derated)	Total Current
1	7	7
2	6.8299	13.6598
3	6.1754	18.5262
4	5.572	22.288
5	5.0134	25.067

For example, if a PCB trace is desired for only 1 header assembly contact requiring current rating of 7 amperes, one can refer to EIA RS-214 to find out if a 0.4 mm^2 equivalent wire gauge is necessary for a 30°C temperature rise above ambient. The example above uses a 1.57 mm PCB. Additional de-rating of 15% (current wise) is advised for PCB thickness of 0.8 mm or less, and for conductor thickness of 0.108 mm or more.

Frequently Asked Questions

Question 1
What is the current rating of the product?

Answer 1
Please refer to page 4 for the maximum current per pin. To understand the maximum current per pin, please refer to page 5, where an example of de-rating is provided. If multiple contacts are loaded, the maximum current per pin must be de-rated. One cannot simply multiply the maximum current per pin by the number of contacts.

Question 2
What is Sequencing?

Answer 2
The process of performing a series of operations in a predetermined order. Longer blade contacts enables you to sequence your operations.

Question 3
Where can I find more information about Battery Pack connectors?

Answer 3
You can find additional information for TE' s standard battery pack connectors at www.TE.com/products/batterypack. Samples can be ordered through TE' s sample system on the part details page.

Question 4
What questions should I ask when designing-in Battery Pack connectors?

Answer 4
Understanding the product attributes will help understand the best TE solution for your application. The most important physical attributes are number of positions, connector type, mount angle, PCB mount, voltage key, PCB mount retention, locating boss, and XYZ dimensions. It is also important to collect the total current needed between the system and battery pack, the durability mating cycles, as well as the operating temperature.

FOR MORE INFORMATION

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