1. Scope

FBB03502 series is a connector suitable for board pair FPC, The pitch of the terminal is 0.35mm, the stack height is 0.6mm, and the width is 1.9mm. The product occupies small space. Each signal terminal has two contact points, the pin of the power supply supports a maximum of 7A current, and the overall pin number can be increased or decreased according to the demand.

This product is designed with two contact points for high reliability, while using high strength metal cap structure.

2. Features

- **Rated current 7A Max**

  The maximum current of the power pin is 7A and the maximum current of the signal pin is 0.3A.

- **High reliability of contact design**

  The signal terminal supports USB3.1 Gen.2 (10Gbps) signal transmission.

- **High reliability of contact design**

  The design of two contact points ensures that both the power terminal and the signal terminal have ultra-high contact stability.

- **Good clasp feeling**

  With a snap-guide structure,，Automatic alignment within 0.2mm error range，Clear sense of snap can effectively prevent the snap is not in place, The maneuverability of docking is improved.

3. Ordering information

Refer to the drawing.

4. Connector dimensions

Refer to the drawing.

5. Material

Housing: LCP (UL 94V-0) (Meet the halogen free requirement)

Color: Black

Signal Contact: Copper alloy

Plating: Gold plated

Power Contact: Copper alloy

Plating: Gold plated

6. Accommodated P.C.B layout

Refer to the drawing.

7. Rating

Operating voltage(Max.)	30V AC/DC
Current rating(Max.)	Power pin: 7A
	Signal pin: ≤40pin 0.3A, >40pin 0.2A
Temperature range-operating	-40°C -- +85°C (Note 2)
Storage temperature	-10°C -- +60°C (Note 3)
Operating humidity	20% to 80%
Storage humidity	40% to 70% (Note 3)

Note 1: When there are more than 50 pins, the total current of all terminals is 10A (signal terminals only).

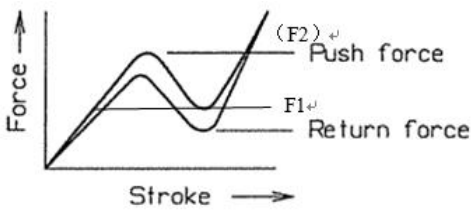
Note 2: Contains temperature rise due to current.

Note 3: Storage refers to the long-term storage of unused items before they are installed on the PCB.

The operating temperature / humidity range is suitable for temporary storage conditions, such as when there is no current after installation on the PCB, and when there is no current during transportation.

8. Performance

Test item	Requirement		Procedure
Examination Of Product	Shall meet visual requirement, show no physical damage		Shall be confirmed with eyes in accordance with each drawing. Shall be confirmed by using proper measuring instruments. (EIA 364-18)
	Structure shall be meet the design and dimensional requirements of drawing		
Electrical Performance			
Contact Resistance	Signal Pin	90 mΩ Max.	Make the BTB plugs and receptacles on board be fully mated ,then apply 20mV, 100mA current to the mated specimens, LLCR (EIA-364-23)
	Power Pin	30 mΩ Max.	
Insulation Resistance	50 MΩ Min.		Apply a voltage of 100 V DC between adjacent terminals of the plugs and receptacles. Electrification time: 2 min. (EIA 364-21 / MIL-STD-202F, Method 302, Test Condition B)
Dielectric Withstanding Voltage	Samples no breakdown.		Apply a voltage of 100 V AC between adjacent terminals of the plugs and receptacles. Electrification time: 1 min. (EIA 364-20 / MIL-STD-202F, Method 301, Test Condition B)
	Leakage current	2 mA Max.	
Mechanical Performance			
Contact Retention Force	0.2N / Pin Min.		The pull speed shall 12.5 mm per minute on the terminal assembled in the housing (Only for female group vertical pin terminal signal and power pin). (EIA 364-35)
Insertion and Withdrawal Force	Insertion Force	40N Max.	Make the specimens that are on board mated, then fix the receptacles to the machine on horizontal or perpendicular direction. Use the machine catch the plugs and separate the specimens, then make the plugs be fully mated with receptacles at a rate of 12.5 millimeters / minute on horizontal or perpendicular direction. (EIA-364-13)
	Withdrawal Force	≥10pin: 4N Min. <10pin: 3N Min. (Signal pin)	

Test item	Requirement		Procedure
SMT Retention Force	Horizontal direction	30N Min.	The product is welded to the PCB board and pushed horizontally and vertically to remove the product from the PCB at a speed of 12.5 mm per minute.
	Vertical direction	30N Min.	
X/Y Direction HSG Strength	X/Y direction HSG strength need ≥ 35N (Signal pin ≥30 pin)		BTB on PCB and mating status, make plugs and receptacles shear slip by X/Y direction until HSG broken, record curves and get the Max value dates of shear strength.
	X/Y direction HSG strength need ≥30N (Signal pin <30 pin)		
Guiding Test	No broken and scrap on plug and receptacle side		Make mating test by BTB plug and receptacle offset 0.2 mm in X/Y direction, set upper limit mating force ≥ 60N.
Resist Pressure	The terminal cannot be deformed		Perpendicular to the product plane, apply 30N force and hold for 100 seconds.
Insertion Feel	Insertion feel index ≥ 60%		Set the parameters of the load meter, select the trip-return trip and set the speed at 12.5 mm / min. Align the test head at BTB, press the thrust machine, and record the travel-power curve. Touch feel rate = (F2-F1) / F2 
Durability	Shall meet visual requirement, show no physical damage.		Make the specimens that are on board mated, then fix the receptacles to the machine on horizontal or perpendicular direction. Use the machine catch the plugs and separate the specimens, then make the plugs be fully mated with receptacles at a rate of 12.5 millimeters / minute on horizontal or perpendicular direction. Duration: 30 cycles (EIA-364-09)
	Contact Resistance changes (After test)	20 mΩ Max.	
Vibration	Shall meet visual requirement, show no physical damage.		Half-sine wave, apply 0.1A DC current. Frequency: 10-55 Hz; Half amplitude: 0.75mm Sweep time: 1 minute The connectors condition is PCB mounting and the plugs mated with receptacles, they must be tested 1 hour in each of the 3 axis (X,Y,Z), total 3 hours. (MIL-STD-202 Method 201)
	Contact Resistance changes (After test)	20 mΩ Max.	
	Discontinuity	1μsec Max.	

Test item	Requirement		Procedure
Physical Shock	Shall meet visual requirement, show no physical damage.		Half-sine wave, apply 0.1A DC current Acceleration: 50G (490m/s²) Duration: 11 ms. The connectors condition is PCB mounting and the plugs mated with receptacles, shocking apply to 3 times in each of the 6 direction of 3 axis. 18 total shock. (EIA 364-27 Test Condition A / MIL-STD-202F Method 213)
	Contact Resistance changes (After test)	20 mΩ Max.	
	Discontinuity	1μsec Max.	

Environmental Performance and others

Heat Resistance	Appearance	No Damage	Make the samples be separated and Leave them in the chamber of temperature +110°C ± 3°C for 96 hours, then it shall be subjected to standard atmospheric condition for 1 ~ 2 hours.
	Contact Resistance changes (After test)	20 mΩ Max.	
Cold Resistance	Appearance	No Damage	Make the samples be separated and Leave them in the chamber of temperature -40°C ± 3°C for 96 hours, then it shall be subjected to standard atmospheric condition for 1 ~ 2 hours.
	Contact Resistance changes (After test)	20 mΩ Max.	
Humidity	Appearance	No Damage	The specimens shall be separated and left in the chamber of 25°C ~ 65°C temperature and 90 ~ 95% humidity for 96 hours. After test drying in ambient condition for 1 hour. (EIA 364-31, Test Condition A Method III / MIL-202F, Method 103B Test Condition B)
	Contact Resistance changes (After test)	20 mΩ Max.	
Temperature Shock	Appearance	No Damage	Specimens shall be separated and exposed 5 cycles as the following table conditions.
	Contact Resistance changes (After test)	20 mΩ Max.	(EIA 364-32, Test Condition I / MIL-202F, Method 107G Condition A)
Salt Spray	Appearance	No Damage	Temperature: 35°C ± 2°C Density of salt water: 5 ± 1% Duration: 48 ± 2 hours. (EIA 364-16A / MIL-STD-202, Method 101)
	Contact Resistance changes (After test)	20 mΩ Max.	
Solderability	The surface of the portion to be soldered shall at least 95% covered area must show no voids, pin holes		Make the specimens' tail tested by the last testing step immersion into molten solder at 245 ± 5 °C for 3 ± 0.5 seconds. (EIA-364-52)

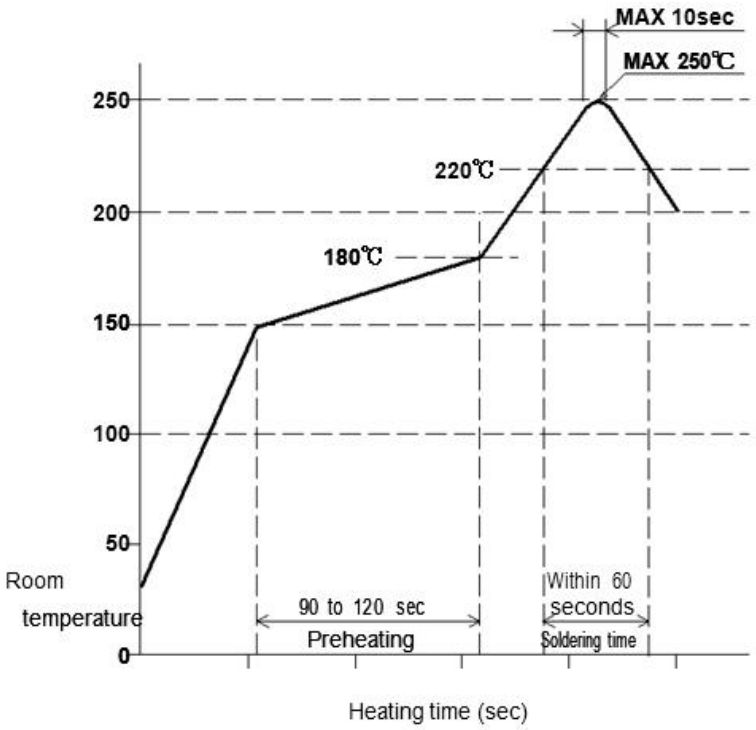
Step.	1	2	3	4
Temp. (°C)	-55 ± 3	25+10,-5	85 ± 2	25+10,-5
Exposed time (minute)	30	5	30	5

Test item	Requirement		Procedure
Resistance to Soldering Heat	Appearance	No Damage	According to the following conditions to test connector. 1. Infrared reflow soldering, the peak temperature of 260 degrees Celsius, reference temperature curve, and the requirements of the SMT 2 times; 2. Electric soldering iron, requires 300 degrees 5 seconds, 350 degrees below 3 seconds.
	Coplanarity of the solder tail should be not beyond 0.1mm		
Times of Rework Soldering	Appearance	No Damage	IR Reflow welding twice.
Temperature rise	30°C Max.		Apply the maximum rated current to the paired connectors and measure the temperature rise. (EIA 364-70, Method 1)

9. Product qualification and reliability test sequence

Number of Test Samples (Min.)	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Test Item	Test Group															
	A	B	C	D	E	F	G	H	I	J	K	M	N	L	O	P
Examination Of Product	1	1,5	1,7	1,3	1,3	1,3	1,4	1,4	1,4	1,4	1,4	1,4	1,5	1,3	1,3	1,3
Contact Resistance		2	2,8				2,5	2,5	2,5	2,5	2,5	2,5	2,6			
Insulation Resistance		3											3,7			
Dielectric Withstanding Voltage		4														
Insertion and Withdrawal Force			3,4													
Durability			5													
X/Y Direction HSG Strength				2												
Guiding Test					2											
Resist Pressure						2										
Humidity							3									
Temperature Shock								3								
Heat Resistance									3							
Cold Resistance										3						
Vibration											3					
Physical Shock												3				
Salt Spray													4			
Solderability														2		
Insertion Feel			6													
SMT Retention Force														4		
Resistance to Soldering Heat															2	
Temperature rise																2

10. Usage Precautions

Recommended Soldering Temperature	 Condition 1. Maximum temperature: 250°C Max 2. Heating stage temperature: 220°C Min, 60s Max 3. Preheating stage: 150 ~ 180°C, 90s ~ 120s 4. Number of IR reflow: 2 cycles Max Note 1: Temperature refers to the PCB surface temperature
Manual Welding Conditions Are Recommended	Soldering iron temperature: 340 ± 10°C Soldering time: 3s Max
Recommended Metal Mask Thickness and Open Area Ratio to PCB Pattern Area	Thickness: 0.08mm Aperture ratio: DS side: 100% DP side: Signal pin 100%, Power pin 80%
Motherboard Warping	Warpage from the connector center to the connector ends: 0.02mm Max
Clean	Cleaning is not recommended. If you clean this product, evaluate its performance before use (Because cleaning may damage its plugging characteristics and reduce resistance to environmental factors)

Matters Needing Attention	● Do not insert or remove the connector before it is installed on the mainboard. Otherwise, the connector may be damaged. ● Do not use only connectors to support the PCB board because contacts may be damaged or deformed. Use other methods to support the board, such as bolts and studs. ● Excessive insertion or removal may damage the connector. Pay more attention to this. ● Do not use any flux for manual welding. ● There may be slight color differences between production batches that do not affect performance. ● See the Operating Instruction for precautions when inserting and removing. ● Since the product may fall off when dropped (or otherwise shock), it is recommended to secure the paired connectors to the board using housing and cushioning materials. ● Please use the product under the recommended specifications (such as rated current, rated voltage, PCB board design and working environment, etc.). If the parameter is not recommended, smoke, fire, and short circuit may occur. For precautions, please refer to the specifications and guidelines. For conditions other than those specified in the specifications and operation guidelines, please consult our company.