CABLINE®-VS II

Part No. Plug: 20846-0**T-0# Receptacle: 20849-0**E-0#

Product Specification

Qualification Test Report No.

TR-17060 (Plug P/N : 20846-0**T-01, Receptacle P/N : 20849-0**E-01)

TR-18048 (Plug P/N : 20846-0**T-02, Receptacle P/N : 20849-0**E-02)

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9	S22047	February 4, 2022	R.Morita	T.Masunaga	H.Ikari
8	S21574	November 5, 2021	T.Ono	T.Masunaga	H.Ikari
7	S21552	October 29, 2021	T.Ono	T.Masunaga	H.Ikari
6	S21239	May 26, 2021	M.Nakamura	T.Masunaga	H.Ikari

1. Scope

This product specification defines the test conditions and the performances of the CABLINE-VS II Connector , a wire-to-board connector of 0.5mm contact pitch.

2. Product Name and Parts No.

2.1 Product Name

CABLINE-VS II

2.2 Parts No.

Plug: 20846-0**T-0#
Receptacle: 20849-0**E-0#

3. Rating

3.1 Applicable Cable

Micro Coax ･･･AWG#【44、42、40、38、36】
Discrete ･･･AWG#【36、34、32】

3.2 Operating Conditions

Amperage : 0.1A AC/DC [AWG#44] per contact/up to 40contacts
0.24A AC/DC [AWG#42] per contact/up to 40contacts
0.3A AC/DC [AWG#40] per contact/up to 40contacts
0.5A AC/DC [AWG#38] per contact/up to 23contacts
0.8A AC/DC [AWG#36] per contact/up to 10contacts
1.0A AC/DC [AWG#34] for power per contact/up to 9contacts
1.0A AC/DC [AWG#32] for power per contact/up to 9contacts
Voltage: 100V AC (per contact)
Operating temperature: 223 to 378K(-40℃ to 105℃) (Containing temperature rise by current)
Operating humidity: 85% max

3.3 Storage Conditions

Storage temperature: 248 to 333K(-25℃ to 60℃)
Storage humidity: 85% max. (Non-condensing)

4. Test and Performance

Test Condition

Unless otherwise specified, all tests and measurements shall be performed under the following conditions in accordance with MIL-STD-202.

Temperature: 288K to 308K(15℃ to 35℃)
Pressure: 866hPa to 1066hPa(650mmHg to 800mmHg)
Relative humidity: 45 to75% R.H.

4.1. Electrical Performance

1. Contact resistance	
Reference standard:	MIL-STD-202-307
Test conditions:	Solder the receptacle connector to the test board and mate the plug connector together, then apply 20mV MAX. DC open circuit voltage and 10mA MAX. DC closed circuit current. Measure the contact resistance of signal and GROUND at the section shown in Fig.1 by the four terminal methods.

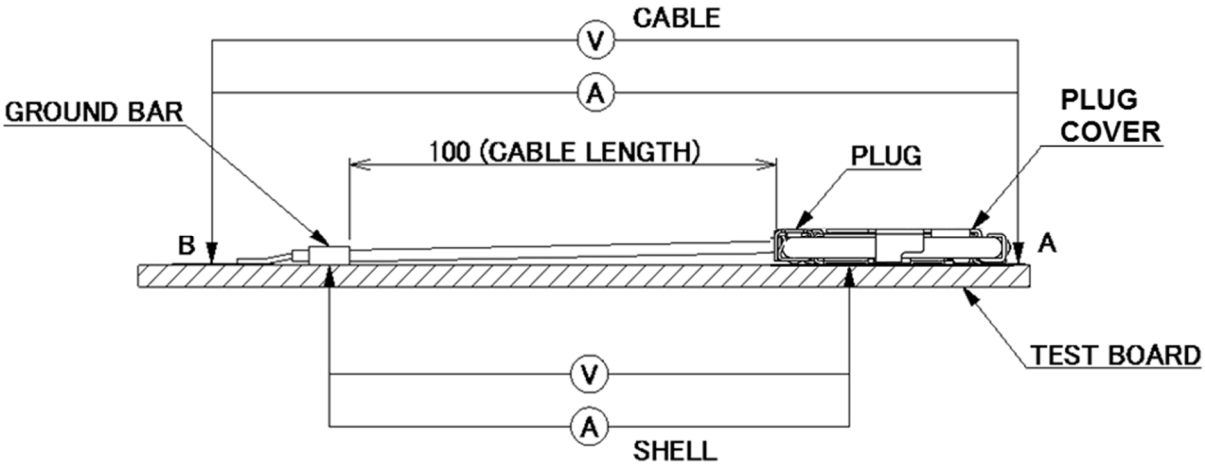


Fig.1

Pass criteria:	Contact Initial： 140mΩMAX.(AWG#32) 180mΩMAX.(AWG#34) 275mΩMAX.(AWG#36) 360mΩMAX.(AWG#38) 600mΩMAX.(AWG#40) 700mΩMAX.(AWG#42) 1080mΩMAX.(AWG#44) After testing：⊿R 40mΩ MAX. Ground Shell Initial：50 mΩ MAX. After testing：⊿R40mΩ MAX.	Initial contains the following conductor resistance of a cable 100mm. 60mΩMAX.(AWG#32) 100mΩMAX.(AWG#34) 195mΩMAX. (AWG#36) 280mΩMAX. (AWG#38) 520mΩMAX. (AWG#40) 620mΩMAX. (AWG#42) 1000mΩMAX.(AWG#44)

2. Insulation resistance	
Reference standard:	MIL-STD-202-302
Test conditions:	Mate the plug and receptacle connector together, and then apply DC 250 V between the neighboring contacts and between contacts and SHELL.
Pass criteria:	Initial: 1000 MΩ MIN. After testing: 500 MΩ MIN.

3. Dielectric withstanding voltage	
Reference standard:	MIL-STD-202-301
Test conditions:	Mate the receptacle and plug connector together, then apply AC 250V(rms) between the neighboring contacts and between contacts and SHELL for a minute.
Pass criteria:	No abnormalities such as creeping discharge, flashover, insulator breakdown occur.

4. Temperature rising	
Reference standard:	-
Test conditions:	Mate the plug and receptacle connector together, and apply rating current per contact. Measure delta T over ambient.
Pass criteria:	Over ambient ⊿T30 ℃ MAX.

4.2. Mechanical Performance

1. Mating force and Un-mating force	
Reference standard:	-
Test conditions:	Solder the receptacle connector to the test board, then place the board and plug on push-on/pull-off machine. Repeat mating/unmating 30 cycles at a speed 25±3mm/min. along the mating axis. Measure the mating and unmating force at the initial and after 30cycles.
Pass criteria:	Mating force 20 P Initial: 9.70 N MAX. 30cycles: 9.70 N MAX. 30 P Initial: 14.55 N MAX. 30cycles: 14.55 N MAX. 40 P Initial: 19.40 N MAX. 30cycles: 19.40 N MAX. Unmating force 20 P Initial: 2.00 N MIN. 30cycles: 2.00 N MIN. 30 P Initial: 3.00 N MIN. 30cycles: 3.00 N MIN. 40 P Initial: 4.00 N MIN. 30cycles: 4.00 N MIN.

2. Durability	
Reference standard:	-
Test conditions:	Solder the receptacle connector to the test board, then place the board and plug on the push-on/pull-off machine, and repeat mating and unmating 30cycles at a speed 25±3mm/min. along the mating axis.
Pass criteria:	Contact resistance: Shall meet4.1.1

3. Contact retention force	
Reference standard:	-
Test conditions:	Place the connector on the push-on/pull-off machine, then apply force to the contact from opposite direction of the contact insertion at a speed of 25±3mm/min. Measure the force when the contact dislodges from the connector.
Pass criteria:	Plug contact retention force: 0.60N MIN. Receptacle contact retention force: 0.20N MIN.

4. Connector Lock	
Reference standard:	-
Test conditions:	Mate, and place them on the push-on/pull-off machine, then apply 10N (1.02kgf) force on the connector along the mating axis.
Pass criteria:	The lock does not damage and cancel.

5. Cable retention force	
Reference standard:	-
Test conditions:	Place the plug connector on the push-on/pull-off machine and pull the cable along the cable axis at a speed 25±3mm/min. Measure the force when the discontinuity occurs.
Pass criteria:	20P: 9.80 N MIN. 30P: 14.70 N MIN. 40P: 19.60 N MIN.

4.2. Mechanical Performance

6. Vibration	
Reference standard:	MIL-STD-202-201
Test conditions:	Solder the receptacle connector to the test board, then mate plug connector, and place them on the vibrator. Then apply the following vibration. During the testing, run 100mA DC to check electrical discontinuity. Frequency: 10Hz→55Hz→10Hz/approx. 1min. Directions: 3 mutually perpendicular directions. Total Amplitude: 1.52mm Sweep duration: 2 hours for each direction, a total of 6 hours.
Pass criteria:	Contact resistance: Shall meet 4.1.1. Electrical discontinuity: No electrical discontinuity greater than 1μs shall occur. Appearance: No abnormality adversely affecting the performance shall occur.

7. Shock	
Reference standard:	MIL-STD-202-213, Test condition A.
Test conditions:	Solder the receptacle connector to the test board, then mate plug connector, and place them on the shock machine. Then apply the following shock. MAX.G: 50G Duration: 11msec Wave Form: Half Sinusoidal Directions: 6 mutually perpendicular direction Cycle: 3 cycles each direction
Pass criteria:	Contact resistance: Shall meet 4.1.1. Electrical discontinuity: No electrical discontinuity greater than 1μs shall occur. Appearance: No abnormality adversely affecting the performance shall occur.

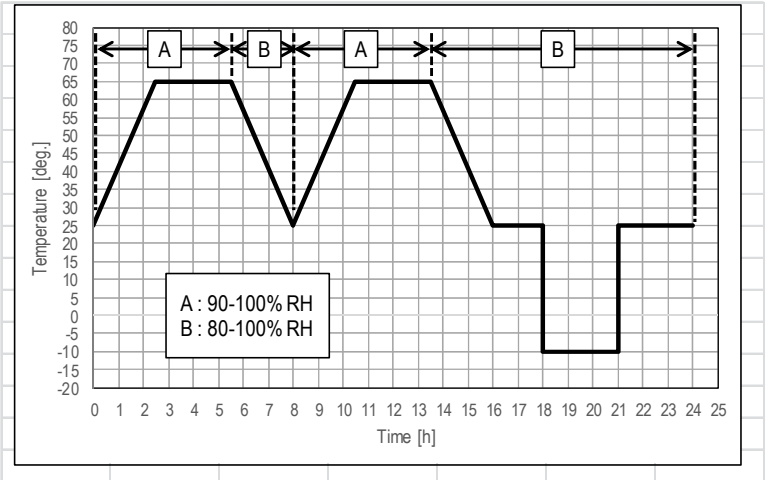
4.3. Environmental Performance

1. Thermal shock	
Reference standard:	-
Test conditions:	Solder the receptacle connector to the test board, then mate plug connector, and expose them to the following environment. Temperature: 218K(-55℃),30min.→378K(105℃),30min. Transition time: 5min. MAX. Cycle: 5 cycles
Pass criteria:	Contact resistance: Shall meet 4.1.1. Appearance: No abnormality adversely affecting the performance shall occur.

2. High temperature life	
Reference standard:	-
Test conditions:	Solder the receptacle connector to the test board, then mate plug connector, and expose them to the following environment. Temperature: 378±2K (105±2℃) Duration: 250 hours
Pass criteria:	Contact resistance: Shall meet 4.1.1. Contact retention force: Shall meet 4.2.3. Appearance: No abnormality adversely affecting the performance shall occur.

4.3. Environmental Performance

3. Humidity (Steady state)	
Reference standard:	MIL-STD-202-103, Test condition A.
Test conditions:	Solder the receptacle connector to the test board, then mate plug connector, and expose them to the following environment. Temperature: 313±2K (40±2℃) Humidity: 90～95%RH Duration: 240 hours
Pass criteria:	Contact resistance: Shall meet 4.1.1. Insulation resistance: Shall meet 4.1.2. Dielectric withstanding voltage: Shall meet 4.1.3. Appearance: No abnormality adversely affecting the performance shall occur.

4. Humidity (Cycling)	
Reference standard:	MIL-STD-202-106.
Test conditions:	Solder the receptacle connector to the test board, then mate plug connector, and expose them to the following environment. Temperature: 298[263]～338K (25[-10]～65℃) Humidity: 90[80]～100%RH Duration: 10cycles (240hours) 
Pass criteria:	Contact resistance: Shall meet 4.1.1. Insulation resistance: Shall meet 4.1.2. Dielectric withstanding voltage: Shall meet 4.1.3. Appearance: No abnormality adversely affecting the performance shall occur.

5. Saltwater spray	
Reference standard:	MIL-STD-202-101, Test condition B.
Test conditions:	Solder the receptacle connector to the test board, then mate plug connector, and expose them to the following environment. Temperature: 308±2K (35±2℃) Saltwater density: 5±1% [by weight] Duration: 48 hours
Pass criteria:	Contact resistance: Shall meet 4.1.1. No abnormality adversely affecting the performance shall occur.

4.3. Environmental Performance

6. H_2S gas	
Reference standard:	-
Test conditions:	Solder the receptacle connector to the test board, then mate plug connector, and expose them to the following environment. Temperature: 313±2K (40±2℃) Relative humidity: 80±5%RH Gas: H_2S 3±1ppm Duration: 96 hours
Pass criteria:	Contact resistance: Shall meet 4.1.1. Appearance: No abnormality adversely affecting the performance shall occur.

4.4. Others

1. Solderability	
Reference standard:	-
Test conditions:	Immerse the contact soldering part to flux of RMA or R type for 5 to 10 seconds, then dip the part into the solder bath of 518±5K （245±5℃） for 5±0.5seconds.
Pass criteria:	More than 95% of the dipped surface shall be evenly wet.

2. Resistance to soldering heat	
Reference standard:	-
Test conditions:	Reflow temperature: See Fig.2. Cycle: 2

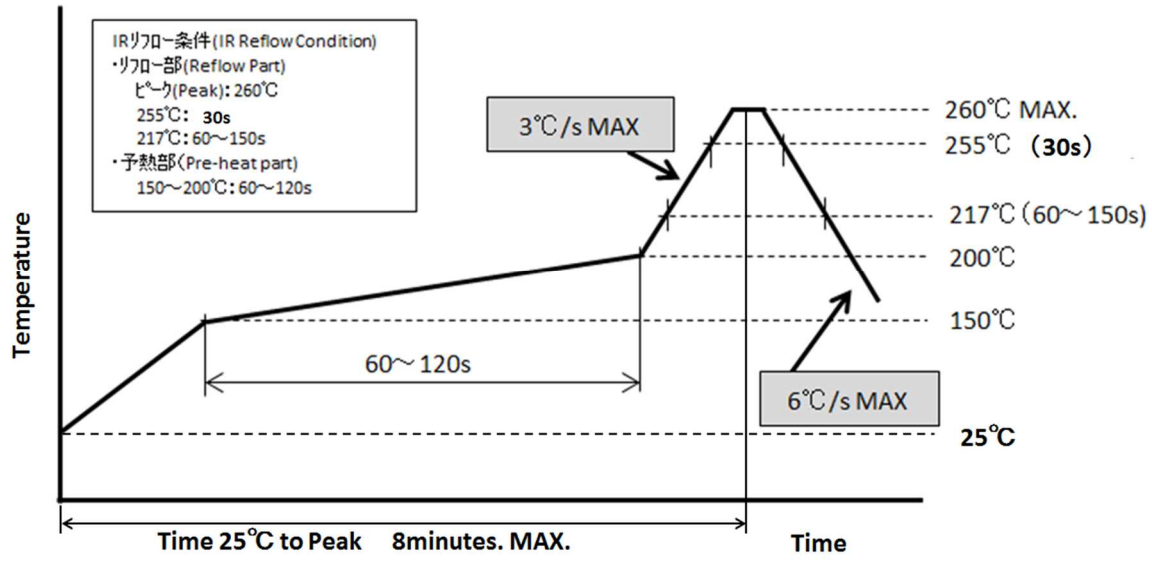


Fig.2

Pass criteria:	No deformation nor defect adversely affecting the performance occur.

4.5 Test Sequence and Specimen Quantity

Table.1 Test Sequence and Sample Quantity

Test Item	Group												
	A	B	C	D	E	F	G	H	J	K	L	M	N
Contact Resistance	2,6			1,3,5	1,3	1,3	1,5	1,5,7	1,3	1,3			
Insulation Resistance							2,6	2,8					
D. W. Voltage							3,7	3,9					
Temperature rising													1
Mating Force	1,5												
Un-mating Force	3,7												
Durability	4							4 (10cycles)					
Contact Retention Force		1,3											
Conn.Lock			1										
Cable Retention Force	8												
Vibration				2									
Shock				4									
Thermal Shock					2								
High Temperature Life		2				2							
Humidity (Steady State)							4						
Humidity (Cycling)								6					
Salt Water Spray									2				
H2S Gas										2			
Solder ability											1		
Soldering Heat Resistance												1	
Specimen Quantity.	5 pcs.	20 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	10 pcs.	10 pcs.	5 pcs.

※Numbers indicate test sequences.

5. Recommended Metal Mask

Refer to drawing for the recommended metal mask thickness and opening dimension.

6. Precautions for Handling Cable Connectors

Refer to instruction manual：HIM-17015 for the handling of CABLINE-VS II.