

Product Name: ZX118LSHM-CS-40 Samtec Connector Saver - Breakout Adapter Rugged Hermaphroditic Razor Beam – Page 1 OF 3

**Product Description:** 05 pins x 2 rows, 10 pins Samtec Connector Saver - breakout adapter. Offering 0.5mm pitch LSHM Rugged Hermaphroditic Razor Beam Samtec connectors on connector saver module with debug access point providing full feature breakout adapter for purpose of test & measurement. LSHM connector is Hermaphroditic, self mating connector series, therefore ZX118LSHM-CS module would be transparent to any design. Please see figures 2.1 and 2.2 on **page 2** for detail pin to pin configuration. ZX118LSHM-CS utilizes LSHM-DV connector series where the bottom LSHM pin 1 is connected to the top LSHM pin 2 connector. When the ZX118LSHM-CS is mated with Host & target, it would be transparent since the ZX118LSHM-CS does pin swapping between the onboard LSHM connectors. Please see **page 2** for details.

- 1- Each LSHM signal is routed to associated LSHM connector through board to board via. Pin 1 of the bottom LSHM connector is connected to pin 2 of the top LSHM connector.
- 2- All signals have 0.275" ( 7mm) trace access on both top and bottom layers of the PCB.
- 3- All traces have 10mils ( 0.275mm ) width, enabling soldering of any probe wires ( 36AWG solid copper – See package includes )
- 4- All traces are 50 Ohms impedance controlled.
- 5- Four, 4, layers PCB design, inner layers are GND planes.
- 6- Accessible GND test point, The test point is connected to inner GND planes as well as the connector's shield.
- 7- Offering Extended height LSHM connector ( 0.315" – 8.00mm ) , providing interface clearance from host components.
- 8- Ease of interface with single channel and differential scope probes.
- 9- User may relocate any LSHM signal by cutting trace before the via and solder to new location or external test equipment.
- 10- Mates with any height & formfactor LSHM connector series such as DV ( Straight ) , DH ( Right Angle ) or RH ( Reverse Right Angle ) .
- 11- The module is shipped with 12pc of probing wires – See package includes, ZX00BC2PH1

**Electrical:** Insertion loss > -2dB @8GHz  
Trace impedance: 50 Ω  
Operating Temperature: -55°C to +125°C  
Trace width: 10mils ( 0.254mm )  
Trace to Trace Spacing: 10mils ( 0.254mm)  
Trace Length: 0.275" ( 7mm )  
Trace to Trace via: 30mils (0.8mm) from end of PCB trace  
PCB Clearance : 0.315" ( 8.0mm ) from Host PCB  
LSHM-04 Lead Style is used on ZX118LSHM-CS-40  
Mated with host clearance : Min: 6.5mm Max: 9.27mm  
ZX00BC2PH1 : 36AWG Bare copper wire to pin header

**Application:** Manufacturing test measurement & re-use, bringup, testing , debugging

**Mates with :** Samtec Rugged Hermaphroditic Razor Beam LSHM  
Mates with any height & formfactor LSHM connector / cable assembly  
LSHM-140-01-F-DV-A-S LSHM-140-01-L-DV-A-S  
LSHM-140-01-F-DH-A-S LSHM-140-01-L-DH-A-S  
LSHM-140-01-F-RH-A-S LSHM-140-01-L-RH-A-S

**Pitch:** 0.50mm (0.020") High Speed connector

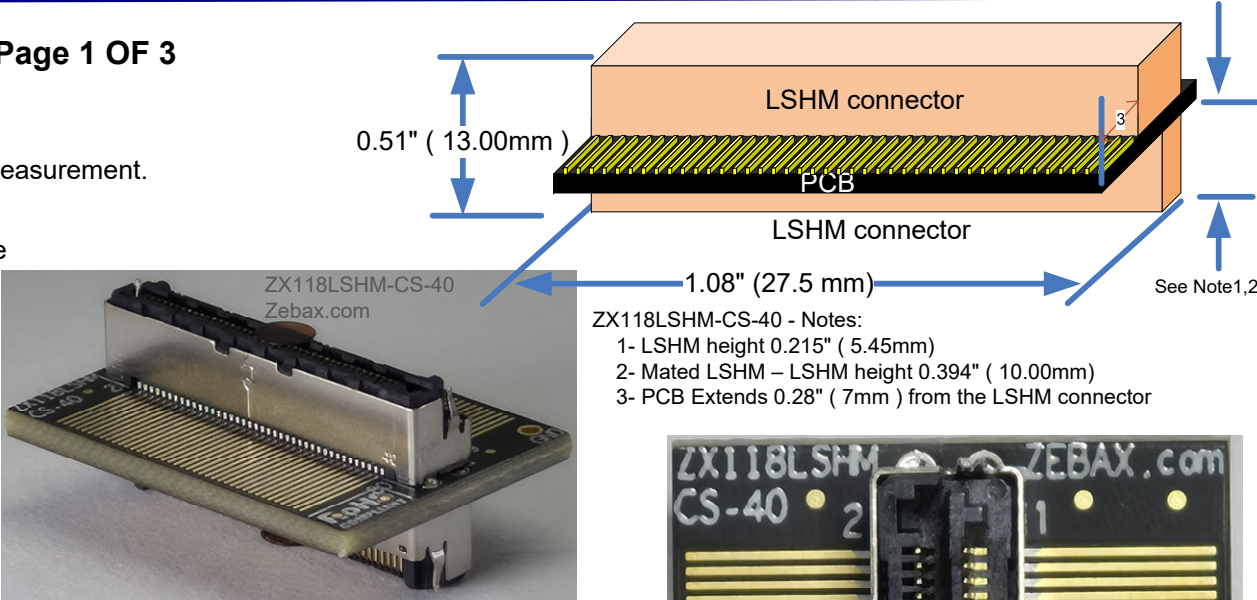
**Access:**  
For signal measurements:  
1- Recommendation: Use 36AWG solid copper wire with pin header,ZX00BC2PH1 or similar

For signal relocation:  
1- Cut the trace to the connecting via ( 30 mils [ 0.8mm ] before end of trace )  
2- Using 36AWG solid copper wire, make the required connections. See Signal Access & re-route, **Page 3**

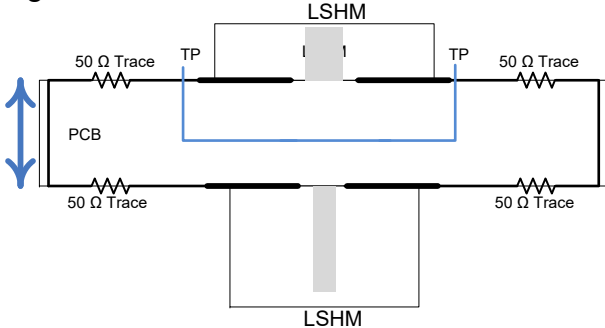
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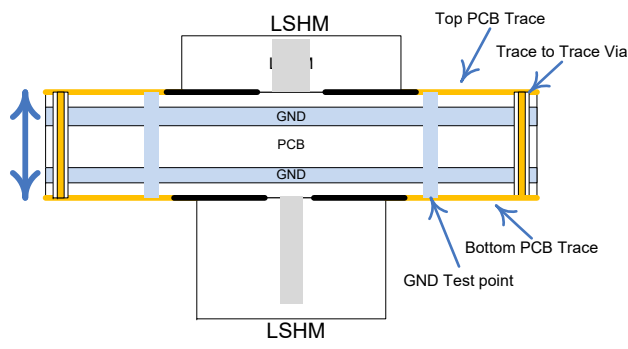


ZX118LSHM-CS-40 -Simplified Circuit Diagram

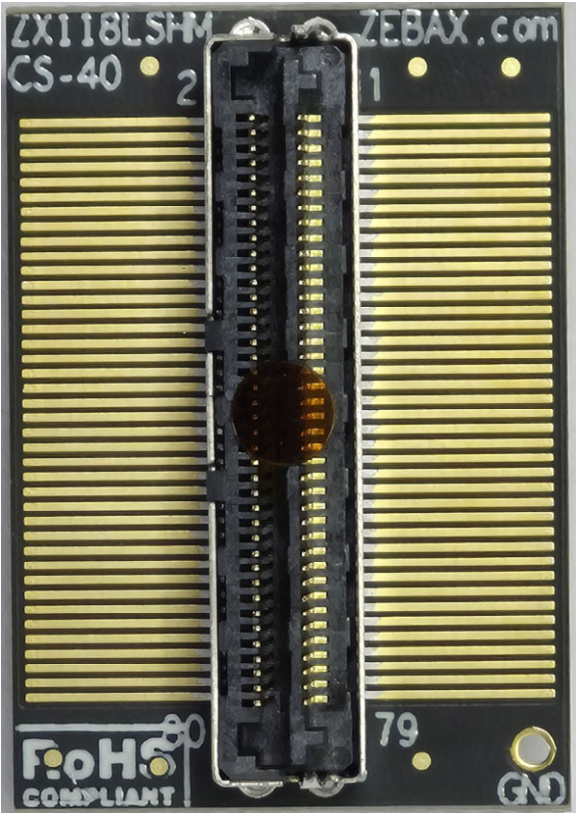


All traces are controlled 50 Ω impedance  
The GND Test Point , has direct connection to inner PCB ground planes

ZX118LSHM-CS-40 Cross section view



4 Layers PCB design - where 2 inner layers are Ground planes



ZX118LSHM-CS-40 Top View

**ZX118LSHM-CS-40 package includes:**

Part number	Quantity	Description
ZX118LSHM-CS-40	1	Connector Saver Breakout Adapter module
ZX00BC2PH1	12	36AWG Bare Copper wire to pin header wire assembly

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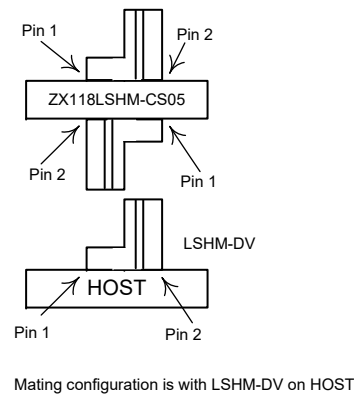
**SPECIFIED DIMENSIONS ARE INCHES (MM). ROHS COMPLIANT**  
**ASSEMBLY DRAWING**  
**ITEM: ZX118LSHM-CS-40**

**DESCRIPTION:** Samtec Connector Saver - Rugged Hermaphroditic Razor Beam

<b>CHECKED:</b> M. MAHIN	<b>DRAWN:</b> KADIJEH	<b>REVISION:</b> 1.0 <b>SHEET:</b> 1 OF 3
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**LSHM Hermaphroditic connector mating configuration:** LSHM connector is Hermaphroditic, self mating connector series, therefore ZX118LSHM-CS module would be transparent to any design using LSHM -DV or -DH connector series. Please see figure 2.1 exhibiting “Mated pin configuration details”. ZX118LSHM-CS utilizes LSHM-DV connector series where the bottom LSHM connector pin 1 is connected to the top LSHM connector pin 2. When the ZX118LSHM-CS is mated with Host & target ( Host & Target using -DV or -DH connector series ), it would be transparent since the ZX118LSHM-CS does pin swapping between the onboard LSHM connectors. If using LSHM-RH connector series, please use figure 2.2 as reference identifying pin numbering on your host & target.

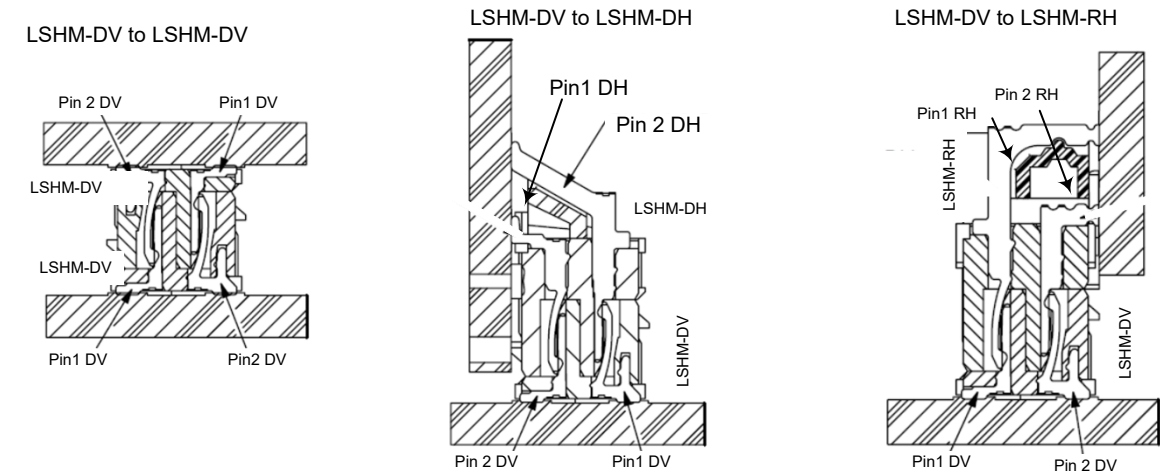
Figure 2.1: ZX118LSHM-CS mated pin configuration details



**ZX118LSHM-CS Pin numbering:** The listed LSHM connector silkscreen pin numbering on top and bottom layers of the PCB are listed as reference to the LSHM connectors. Since the ZX118LSHM-CS would be transparent to user ( see “**LSHM Hermaphroditic connector mating configuration**” section above ) the LSHM connector’s pin numbers would be identical to the host LSHM connector pin numbers as seen from ZX118LSHM-CS’s **top** layer. Special care must be given if special rework required between the top & bottom LSHM connectors pins as the pin 1 , 3, 5, 7, 9, .. of bottom LSHM connector are connected to pin 2, 4, 6, 8, 10, .. of the top LSHM connector.

**Mated Pin Details:** Figure 2.2 exhibits LSHM connector family mated pin interface. -DV connectors are Straight , -DH connector series are Right Angle and the -RH are Reverse Right Angle connectors. All LSHM connector series mate with each other. However; attention must be paid to pin to pin interface ensuring expected design interface configuration. Below diagrams are provided as standard pin to pin interface configuration using LSHM Hermaphroditic connector series.

Figure 2.2 – LSHM Mated Pin Details – LSHM connector formactors are: -DV Straight , -DH : Right Angle , -RH : Reverse Right Angle

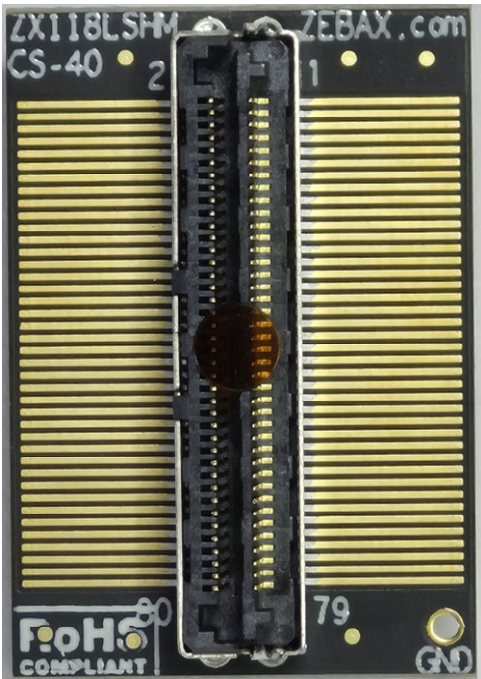


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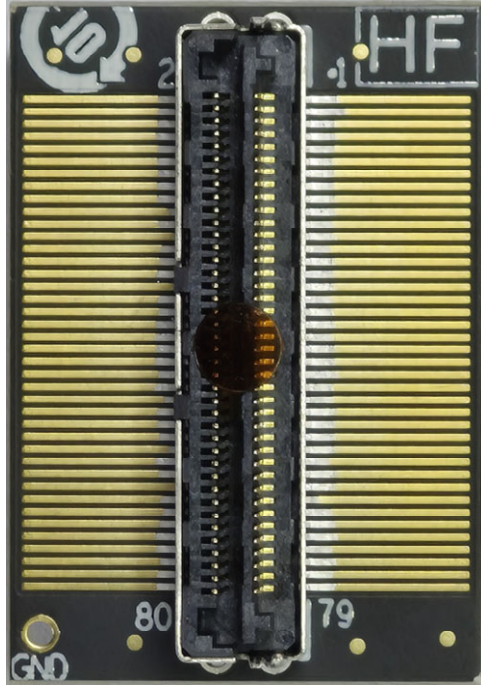
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ZX118LSHM-CS-40 Top View



ZX118LSHM-CS-40 Bottom View



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**Typical Application:** ZX118LSHM-CS-40 is designed for purpose of test and debugging at full connector’s bandwidth. It provides new approach in usage of breakout adapters by :

- 1- Utilizing single or differential scope probe.
- 2-Enabling design changes, by re-assignment of any signal by means of cut and solder, where any signal may be cut and assigned to new location by jumper wires.

**Scope Probe wire Installation:**

- 1- It is recommended to keep the probe wire length at 0.5" ( 1.2cm ) long.
- 2- In order to avoid ground loop problems, please use the shortest Ground probe wire interfacing to the nearest GND reference. ZX118LSHM-CS-40 provides one GND test point to be utilized as GND reference interface with the host.
- 3- Both Keysight as well as Tektronix offer variety of single ended as well as differential probes along with their accessories, below are few probes from each vendor:
  - a) Keysight differential probe or similar N2795A, N2796A, 1168V, 1134B along with E2677B differential Solder-in probe, N5426A ZIF Tip, N2884A Fine Wire ZIF Tip and more – See the figure “probe head accessories”.
  - b) Tektronix offers several single-ended as well as differential probes such as : P6245, P6248, P6247, P6246 or any of TDP7000 series and more
- 4- Please follow your vendor’s guideline in installation of probe wires & accessories.

**Signal Access & re-route:**

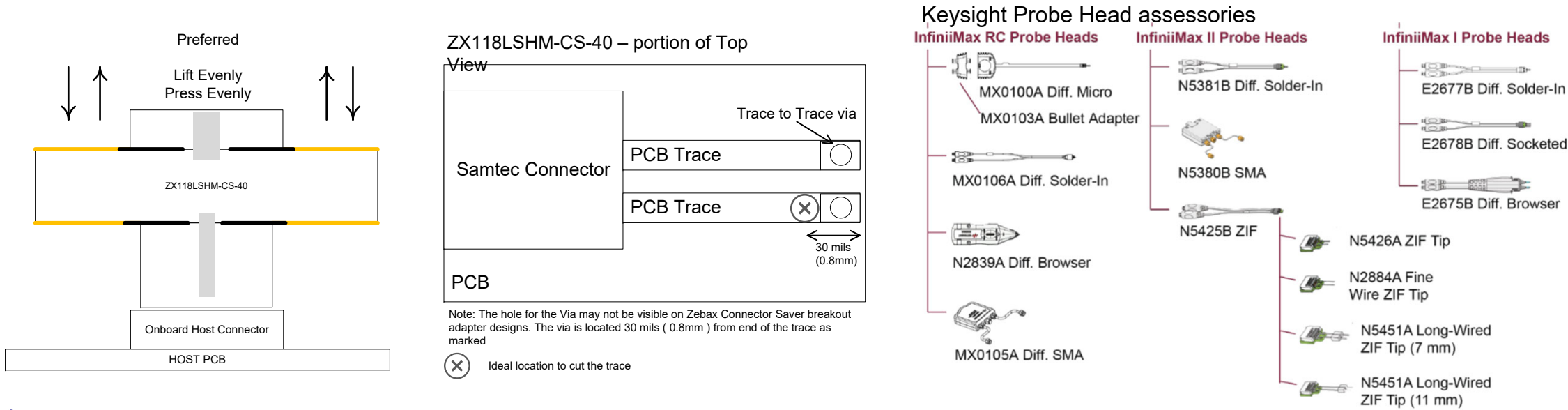
Re-routing any signal on ZX118LSHM-CS-40 may be implemented by cutting the trace min. of 30 mils ( 0.8mm ) before end of the trace on top or bottom side of the PCB. The Via ( inner connecting via ) at end of the trace connects the top layer’s signal ( trace ) to bottom layer’s signal ( trace ). The inner connecting via may not be visible on most of Zebax designs. The via has clearance of 30mils from end of the trace.

ZX118LSHM-CS-40 module is 4 layers PCB where the inner layers are Ground layers. They are connected to the GND test point . For improved signal integrity, please connect the GND test point to system GND reference point. See Cross Section View figure on Page 1 for details.

**Mating and Un-mating:**

Uneven or off—angle forces during mating and un-mating of ZX118LSHM-CS-40 from host or daughter card may cause overstress and damage to the contacts, housing or solder joints. Severe side-to-side rocking motions should be prohibited.

Un-mate ZX118LSHM-CS-40 by lifting one end of the connector ( peeling ) is permitted. However, this should only be done to initiate separation of the mated contacts at one end of the interfaced connector. The separation angle should be kept as low as possible as the contacts continue to un-mate, thereby spreading out the un-mating forces over the length of the interface connectors. The connectors should not be “peeled” beyond a 20° angle. See Figure below.



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