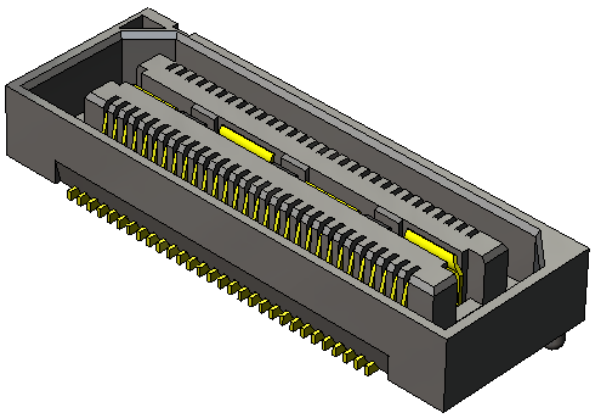
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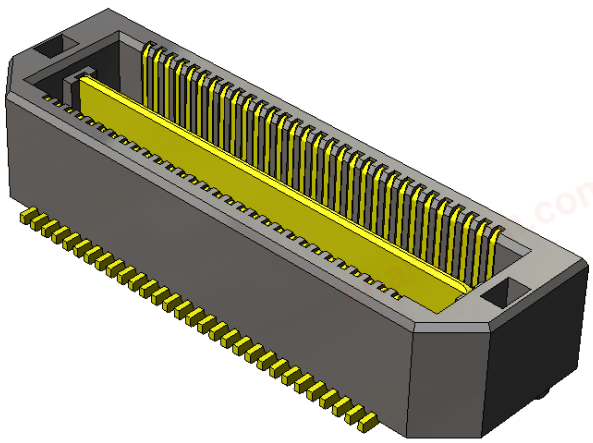
## Product Specification

**Series:** QSH / QTH 0,50 mm (.0197”) Q Strip® High Speed Ground Plane Socket / Terminal Strips

**I meiyQSH Series** – Socket, Vertical Orientation



**QTH Series** – Terminal, Vertical Orientation



**Other configurations available for:**

- Co-planar and perpendicular board-to-board applications
- Rugged features / end options
- Packaging options

See www.samtec.com for more information.


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**Series:** QSH / QTH 0,50 mm (.0197") Q Strip® High Speed Ground Plane Socket / Terminal Strips

## 1.0 SCOPE

**1.1** This specification covers performance, testing and quality requirements for Samtec QSH/QTH Series 0,50 mm (.0197") Q Strip® High Speed Ground Plane Socket/Terminal Strip connector system. These socket and terminal strips are available in Vertical, Edge Mount and Right Angle configurations for parallel, perpendicular and coplanar board-to-board applications. All information contained in this specification is for a 5 mm mated height vertical configuration unless otherwise noted.

## 2.0 DETAILED INFORMATION

**2.1** Product prints, footprints, catalog pages, test reports and other specific, detailed information can be found at www.samtec.com?QSH and www.samtec.com?QTH.

## 3.0 TESTING

**3.1 Current Rating:** Signal: 2A (One Pin Powered Per Row)
**3.2 Voltage Rating:** 175 VAC
**3.3 Operating Temperature Range: -**55°C to +125°C
**3.4 Operating Humidity Range:** 90% to 95% (Per EIA-364-31)
**3.5 Electrical:**

| ITEM | TEST CONDITION | REQUIREMENT | STATUS |
|---|---|---|---|
| Withstanding Voltage | EIA-364-20 (No Flashover, Sparkover, or Breakdown) | 525 VAC | Pass |
| Insulation Resistance | EIA-364-21 (1000 MΩ minimum) | 5,000 MΩ | Pass |
| Contact Resistance (LLCR) | EIA-364-23 | Δ 15 mΩ maximum (Samtec defined)/ No damage | Pass |

**3.6 Mechanical:**

| ITEM | TEST CONDITION | REQUIREMENT | STATUS |
|---|---|---|---|
| Durability | EIA-364-09C | 100 cycles (10µ" Au), 500 cycles (30µ" Au) | Pass |
| Random Vibration | EIA-364-28 Condition V, Letter B 7.56 G 'RMS', 50 to 2000 Hz, 2 hours per axis, 3 axis total , PSD 0.04 | Visual Inspection: No Damage<br>LLCR: Δ 15 mΩ maximum<br>Event Detection: No interruption > 50 Nanoseconds | Pass |
| Mechanical Shock | EIA-364-27 100 G, 6 milliseconds, sawtooth wave, 11.3 fps, 3 shocks/direction, 3 axis (18 total shocks) | Visual Inspection: No Damage<br>LLCR: Δ 15 mΩ maximum<br>Event Detection: No interruption > 50 Nanoseconds | Pass |
| Normal Force | EIA-364-04 | 30 grams minimum for gold interface | Pass |


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**Series:** QSH / QTH 0,50 mm (.0197") Q Strip® High Speed Ground Plane Socket / Terminal Strips

### 3.7 Environmental:

| ITEM | TEST CONDITION | REQUIREMENT | STATUS |
|---|---|---|---|
| Thermal Shock | EIA-364-32<br>Thermal Cycles: 100 (30 minute dwell)<br>Hot Temp: 85°C<br>Cold Temp: -55°C<br>Hot/Cold Transition: Immediate | Visual Inspection: No Damage<br>LLCR: Δ 15 mΩ<br>DWV: 525 VAC<br>IR: >50,000 MΩ | Pass |
| Thermal Aging (Temp Life) | EIA-364-17<br>Test Condition 4 @ 105°C Condition B for 250 hours | Visual Inspection: No Damage<br>LLCR: Δ 15 mΩ<br>DWV: 525 VAC<br>IR: >50,000 MΩ | Pass |
| Cyclic Humidity | EIA-364-31<br>Test Temp: 25°C to 65°C<br>Relative Humidity: 90 to 95%<br>Test Duration: 240 hours | Visual Inspection: No Damage<br>LLCR: Δ 15 mΩ<br>DWV: 525 VAC<br>IR: >50,000 MΩ | Pass |
| Gas Tight | EIA-364-36<br>Gas Exposure: Nitric Acid Vapor<br>Duration: 60 min.<br>Drying Temp.: 50°C +/- 3°C<br>Measurements: Within 1 hour of Exposure | LLCR: Δ 15 mΩ | Pass |


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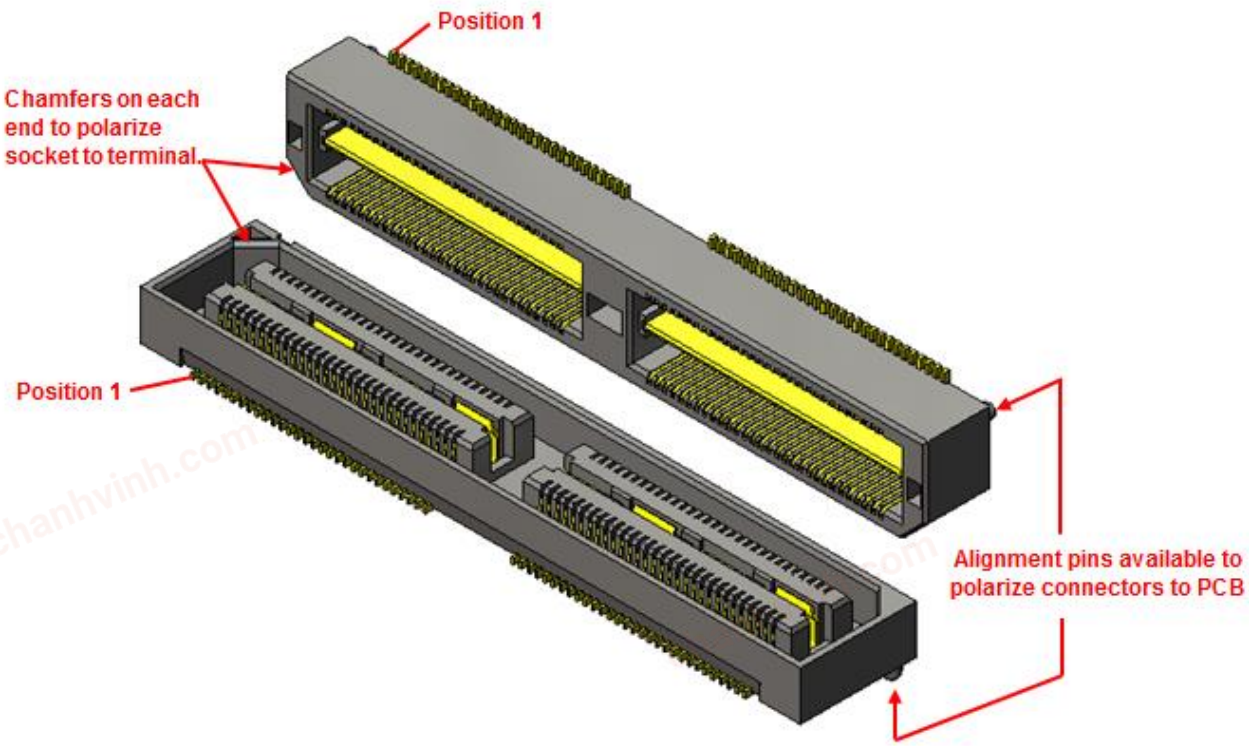
**Series:** QSH / QTH 0,50 mm (.0197") Q Strip® High Speed Ground Plane Socket / Terminal Strips

## 4.0 MATED SYSTEM

### 4.1 Mated Views:

Mated view information can be found at link below:
http://suddendocs.samtec.com/prints/qxh%20mated%20document-mkt.pdf

## 5.0 POLARIZING FEATURES




## 6.0 HIGH SPEED PERFORMANCE

**6.1** Based on a 3 dB insertion loss

| Stack Height | Single-Ended Signaling | Differential Pair Signaling |
|---|---|---|
| 5mm | 9.5 GHz / 19 Gbps | 10.5 GHz / 21 Gbps |

**6.2 System Impedance:** 50 ohm for single-ended and 100 ohm for differential pair


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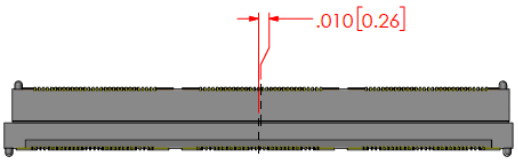


**Series:** QSH / QTH 0,50 mm (.0197”) Q Strip® High Speed Ground Plane Socket / Terminal Strips

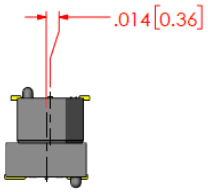
## 7.0 PROCESSING RECOMMENDATIONS

### 7.1 Mating Alignment Requirements:

**7.1.1** The Allowable initial linear misalignment.




INITIAL X AXIS LINEAR MISALIGNMENT



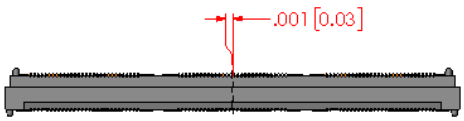

INITIAL Y AXIS LINEAR MISALIGNMENT

NON APPLICABLE

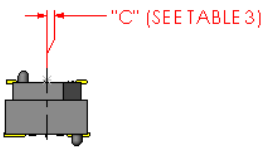
INITIAL Z AXIS LINEAR MISALIGNMENT

**7.1.2** Allowable final linear misalignment.

| TABLE 3 | |
|---|---|
| OPTION | "C" |
| QTH-DV to QSH-DV | .001 [0.03] |
| QTH-DV to QSH-RA | .001 [0.03] |
| QTH-RA to QSH-DV | .002 [0.05] |
| QTH-RA to QSH-RA | .002 [0.05] |




FINAL X AXIS LINEAR MISALIGNMENT




FINAL Y AXIS LINEAR MISALIGNMENT

SEE MATED VIEWS DOCUMENT

FINAL Z AXIS LINEAR MISALIGNMENT


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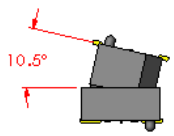
**Series:** QSH / QTH 0,50 mm (.0197") Q Strip® High Speed Ground Plane Socket / Terminal Strips

### 7.2 Mating Angle Requirements:

#### 7.2.1 Allowable initial angular misalignment

| TABLE 1 | |
|---|---|
| POS | "A" = DEG |
| -030 | 5.1 |
| -060 | 2.5 |
| -090 | 1.7 |
| -120 | 1.3 |
| -150 | 1.0 |

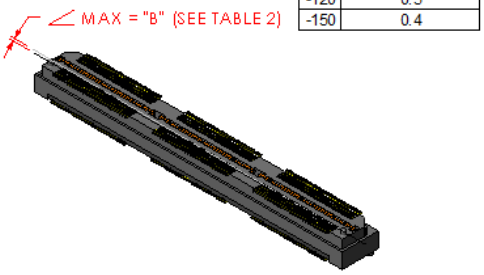
| TABLE 2 | |
|---|---|
| POS | "B" = DEG |
| -030 | 2.2 |
| -060 | 1.1 |
| -090 | 0.7 |
| -120 | 0.5 |
| -150 | 0.4 |




INITIAL X AXIS ANGULAR MISALIGNMENT




INITIAL Y AXIS ANGULAR MISALIGNMENT



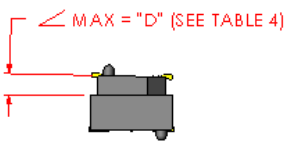

INITIAL Z AXIS ANGULAR MISALIGNMENT

#### 7.2.2 Allowable final angular misalignment

| TABLE 4 | |
|---|---|
| OPTION | "D"= DEGREES |
| QTH-DV to QSH-DV | 1.3 |
| QTH-DV to QSH-RA | 1.3 |
| QTH-RA to QSH-DV | 4.0 |
| QTH-RA to QSH-RA | 4.0 |

| TABLE 5 | |
|---|---|
| POS | "E" = DEGREES |
| -030 | 0.52 |
| -060 | 0.26 |
| -090 | 0.17 |
| -120 | 0.13 |
| -150 | 0.10 |

| TABLE 6 | | | | |
|---|---|---|---|---|
| POS | "F" = DEG QTH-DV to QSH-DV | "F" = DEG QTH-DV to QSH-RA | "F" = DEG QTH-RA to QSH-DV | "F" = DEG QTH-DV to QSH-RA |
| -030 | 0.43 | 0.27 | 0.65 | 0.65 |
| -060 | 0.21 | 0.14 | 0.30 | 0.30 |
| -090 | 0.14 | 0.09 | 0.19 | 0.19 |
| -120 | 0.11 | N/A | N/A | N/A |
| -150 | 0.09 | N/A | N/A | N/A |




FINAL X AXIS ANGULAR MISALIGNMENT




FINAL Y AXIS ANGULAR MISALIGNMENT




FINAL Z AXIS ANGULAR MISALIGNMENT

**7.3 Multiple Connector Applications**: Not recommended for application in which multiple connectors are mated to a single daughtercard. For more information, please contact **IPG@samtec.com**.


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**7.4** Due to variances in equipment, solder pastes and applications (board design, component density, etc.), Samtec does not specify a recommended reflow profile for our connectors. The processing parameters provided by the solder paste manufacturer should be employed and can usually be found on their website.

All of Samtec's surface mount components are lead free reflow compatible and compliant with the profile parameters detailed in IPC/JEDEC J-STD-020 which requires that components be capable of withstanding a peak temperature of 260°C as well as 30 seconds above 255°C.

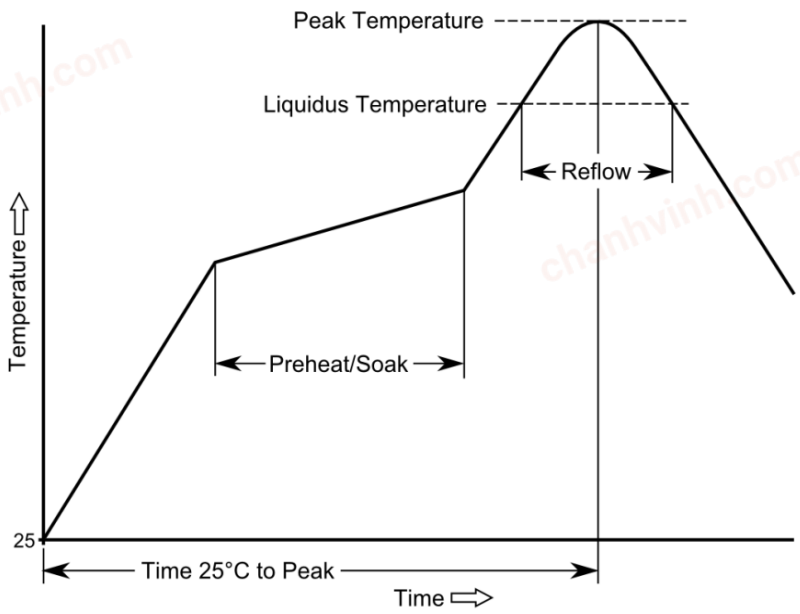
**Samtec Recommended Temperature Profile Ranges (SMT)**

**Sn-Pb Eutectic Assembly**

| Preheat/Soak (100°C-150°C) | Max Ramp Up Rate | Reflow Time (above 183°C) | Peak Temp | Time within 5°C of 235°C | Max Ramp Down Rate | Time 25°C to Peak Temp |
|---|---|---|---|---|---|---|
| 60-120 sec. | 3°C/s max. | 40-150 sec. | 235°C | 20 sec. max. | 6°C/s max. | 6 min. max. |

**Pb-Free Assembly**

| Preheat/Soak (150°C-200°C) | Max Ramp Up Rate | Reflow Time (above 217°C) | Peak Temp | Time within 5°C of 260°C | Max Ramp Down Rate | Time 25°C to Peak Temp |
|---|---|---|---|---|---|---|
| 60-120 sec. | 3°C/s max. | 40-150 sec. | 260°C | 30 sec. max. | 6°C/s max. | 8 min. max. |




**7.4.1**

These guidelines should not be considered design requirements for all applications.
Samtec recommends testing interconnects on your boards in your process to guarantee optimum results.

**7.5 Maximum Reflow Passes:** The parts can withstand three reflow passes at a maximum component temperature of 260°C.


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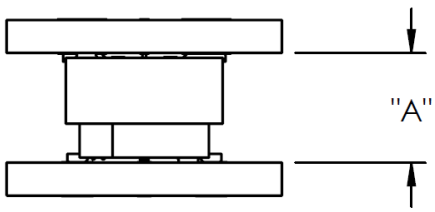
**7.6 Stencil Thickness:** The recommended stencil thickness is .006" (0,15 mm).

**7.7 Placement:** Machine placement of the parts is recommended.

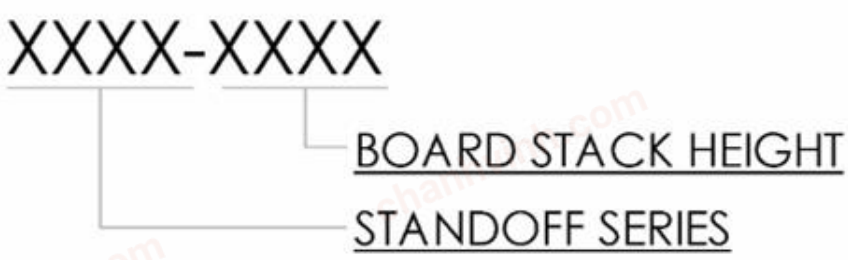
**7.8 Reflow Environment:** Samtec recommends the use of a low level oxygen environment (typically achieved through Nitrogen gas infusion) in the reflow process to improve solderability.

**7.9 Rework Guidelines:** Samtec recommends following these rework guidelines as needed: QXX/BXX Connector Rework Methods

**7.10 Hardware:** Board-to-board standoffs are recommended to provide a robust mechanical connection. Samtec offers several different types, which can be found here: Samtec Standoff Offerings.




| | QSH LEAD STYLE | |
|---|---|---|
| | -01 | |
| QTH LEAD STYLE | Nominal Connector Stack Height "A" in [mm] | Standoff |
| -01 | .198 [5.03] | XXXX-0515 |
| -02 | .316 [8.03] | XXXX-0815 |
| -03 | .434 [11.03] | XXXX-1115 |
| -04 | .630 [16.00] | XXXX-1615 |
| -05 | .748 [19.00] | XXXX-1915 |
| -06 | .866 [22.00] | XXXX-2215 |
| -07 | .984 [25.00] | XXXX-2515 |
| -08 | 1.181 [30.00] | XXXX-3015 |
| -08 | .552 [14.03] | XXXX-1415 |
| -10 | .592 [15.03] | XXXX-1515 |





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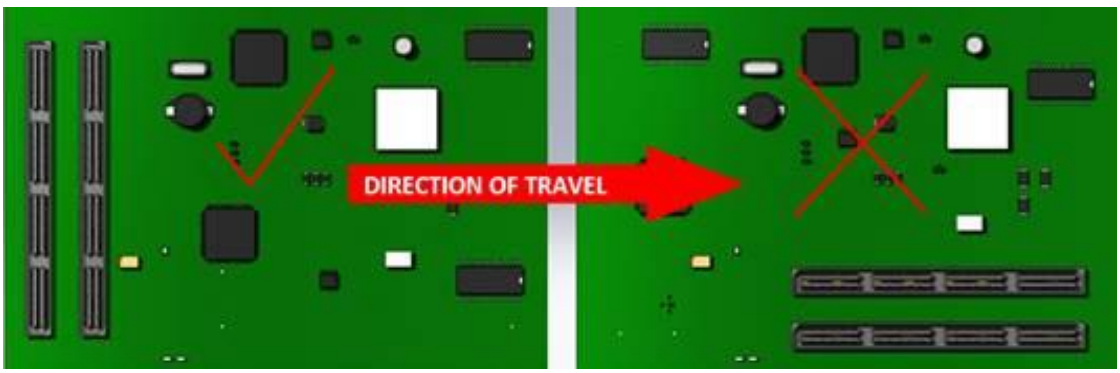
**Series:** QSH / QTH 0,50 mm (.0197") Q Strip® High Speed Ground Plane Socket / Terminal Strips

**7.11 Cleaning:** Samtec, Inc. has verified that our connectors may be cleaned in accordance with the solvents and conditions designated in the EIA-364-11 standard

**7.12 Inverted Reflow:** For applications of QTH-120-07/-08 components requiring inverted reflow soldering, use of an epoxy adhesive is recommended. For more information on the use of epoxy adhesives, please visit the Processing page on our website or contact Samtec's Interconnect Processing Group at IPG@samtec.com

## 8.0 DIRECTION OF BOARD TRAVEL THROUGH REFLOW OVEN

**8.1** To minimize the potential for connector warpage, Samtec recommends the layout configuration shown below left. This allows the connectors to heat more evenly.




## 9.0 ADDITIONAL RESOURCES

**9.1** For additional mechanical testing or product information, contact our Customer Engineering Support Group at **CES@samtec.com**

**9.2** For additional information on high speed performance testing, contact our Signal Integrity Group at **SIG@samtec.com**

**9.3** For additional processing information, contact our Interconnect Processing Group at **IPG@samtec.com.**

**9.4** For RoHS, REACH or other environmental compliance information, contact our Product Environmental Compliance Group at **PEC@samtec.com**

## USE OF PRODUCT SPECIFICATION SHEET

This Product Specification Sheet ("PSS") is a brief summary of information related to the Product identified. As a summary, it should only be used for the limited purpose of considering the purchase/use of Product. For specific, detailed information, including but not limited to testing and Product footprint, refer to Section 2.0 of this document and the links there provided to test reports and prints. This PSS is the property of Samtec, Inc. ("Samtec") and contains proprietary information of Samtec, our various licensors, or both. Samtec does not grant express or implied rights or license under any patent, copyright, trademark or other proprietary rights and the use of the PSS for building, reverse engineering or replication is strictly prohibited. By using the PSS, the user agrees to not infringe, directly or indirectly, upon any intellectual property rights of Samtec and acknowledges that Samtec, our various licensors, or both own all intellectual property therein. The PSS is presented "AS IS". While Samtec makes every effort to present excellent information, the PSS is only provided as a guideline and does not, therefore, warrant it is without error or defect or that the PSS contains all necessary and/or relevant information about the Product. The user agrees that all access and use of the PSS is at its own risk. **NO WARRANTIES EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY KIND WHATSOEVER ARE PROVIDED.**