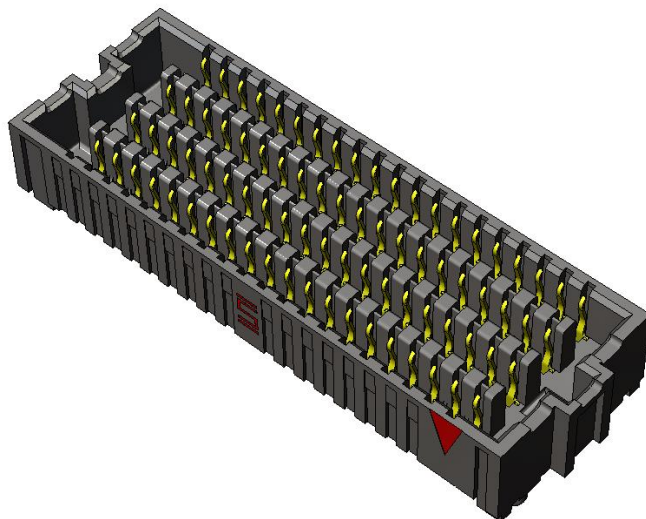
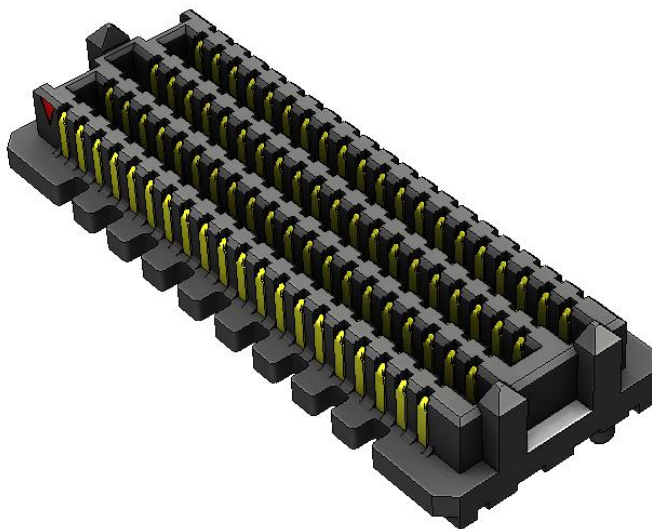


**Series:** SEAM / SEAF .050" (1,27 mm) SEARAY™ High Density, High Speed Open Pin Field Array

**SEAF Series** – Socket, Vertical Orientation



**SEAM Series** – Terminal, Vertical Orientation



**Other configurations available for:**

Co-planar and perpendicular board-to-board applications

See [www.samtec.com](http://www.samtec.com) for more information.



**Series:** SEAM / SEAF .050" (1,27 mm) SEARAY™ High Density, High Speed Open Pin Field Array

### 1.0 SCOPE

- 1.1** This specification covers performance, testing and quality requirements for Samtec's SEAM/SEAF Series .050" SEARAY™ High Density, High Speed Open Pin Field Array connectors. All information contained in this specification is for a 7,00 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?SEAM](http://www.samtec.com?SEAM) and [www.samtec.com?SEAF](http://www.samtec.com?SEAF).

### 3.0 TESTING

- 3.1 Current Rating:** 1.6 A per contact with 30 contacts (10x3) powered  
**3.2 Voltage Rating:** 240 VAC  
**3.3 Operating Temperature Range:** -55°C to +125°C for Gold plating/ -65°C to +150°C for Palladium-Nickel plating.  
**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)	725 VAC	Pass
Insulation Resistance	EIA-364-21 (5000 MΩ minimum)	15,000 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	1000 cycles (30μ Au) 5000 cycles (30μ PdNi)	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 LLCR: Δ 15 mΩ maximum 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 LLCR: Δ 15 mΩ maximum Event Detection: No interruption > 50 nanoseconds	Pass
Normal Force	EIA-364-04	30 grams minimum for gold interface and 50 grams minimum for Palladium-Nickel interface	Pass

**Series:** SEAM / SEAF .050" (1,27 mm) SEARAY™ High Density, High Speed Open Pin Field Array

### 3.7 Environmental:

ITEM	TEST CONDITION	REQUIREMENT	STATUS
Thermal Shock	EIA-364-32 Thermal Cycles: 100 (30 minute dwell) Hot Temp: 85°C Gold Plating/ 150°C Palladium-Nickel plating Cold Temp: -55°C Gold Plating / -65°C for Palladium-Nickel plating Hot/Cold Transition: Immediate	Visual Inspection: No Damage LLCR: $\Delta$ 15 m $\Omega$ DWV: 725 VAC IR: >15,000 M $\Omega$	Pass
Thermal Aging (Temp Life)	EIA-364-17 Test Condition 4 @ 105°C Condition B for 250 hours Gold plating Test Condition 10 @ 150°C Condition D for 1000 hours Palladium-Nickel plating	Visual Inspection: No Damage LLCR: $\Delta$ 15 m $\Omega$ DWV: 725 VAC IR: >15,000 M $\Omega$	Pass
Cyclic Humidity	EIA-364-31 Test Temp: 25°C to 65°C Relative Humidity: 90 to 95% Test Duration: 240 hours	Visual Inspection: No Damage LLCR: $\Delta$ 15 m $\Omega$ DWV: 725 VAC IR: >15,000 M $\Omega$	Pass
Gas Tight	EIA-364-36 Gas Exposure: Nitric Acid Vapor Duration: 60 min. Drying Temp.: 50°C +/- 3°C Measurements: Within 1 hour of Exposure	LLCR: $\Delta$ 15 m $\Omega$	Pass

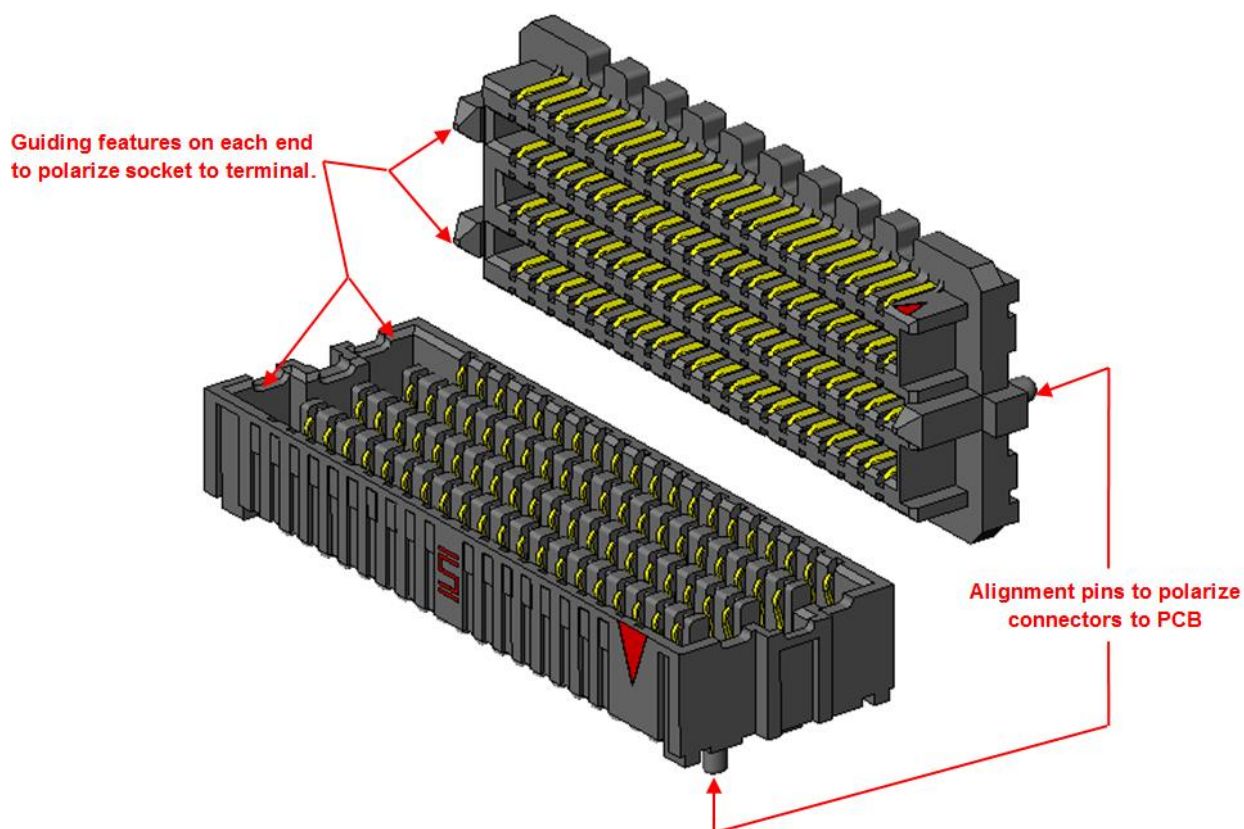
**Series:** SEAM / SEAF .050" (1,27 mm) SEARAY™ High Density, High Speed Open Pin Field Array

## 4.0 MATED SYSTEM

Mated view information can be found at link below:

<http://www.samtec.com/documents/webfiles/cpdf/SEAX%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
7 mm	12.50 GHz	13.00 GHz

(For other stack heights SI data, please see Samtec series webpage)

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

Series: **SEAM / SEAF** .050" (1,27 mm) SEARAY™ High Density, High Speed Open Pin Field Array

## 7.0 PROCESSING RECOMMENDATIONS - For more information, please see below:

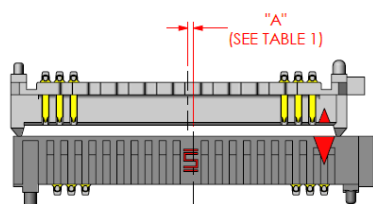
- SEAX-DV: [Processing Recommendations Document](#)
- SEAX-RA: [Processing Recommendations Document](#)

### 7.1 Mating Alignment Requirements:

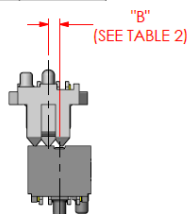
#### 7.1.1 Allowable initial linear misalignment.

TABLE 1			
ROWS	"A"		
	NO GP	-GP	-RA W/GP
-04	.042 [1.07]	.059 [1.50]	.075 [1.91]
-05	.039 [0.99]		
-06	.039 [0.99]		
-08	.039 [0.99]		
-10	.039 [0.99]		
-14	.039 [0.99]		

TABLE 2			
ROWS	"B"		
	NO GP	-GP	-RA W/GP
-04	.040 [1.00]	.059 [1.50]	.075 [1.91]
-05	.057 [1.45]		
-06	.057 [1.45]		
-08	.043 [1.09]		
-10	.043 [1.09]		
-14	.032 [0.81]		



INITIAL X AXIS LINEAR MISALIGNMENT

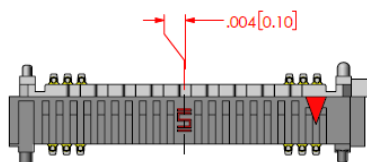


INITIAL Y AXIS LINEAR MISALIGNMENT

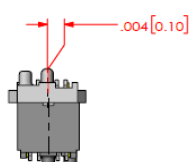
NON APPLICABLE

INITIAL Z AXIS LINEAR MISALIGNMENT

#### 7.1.2 Allowable final linear misalignment.



FINAL X AXIS LINEAR MISALIGNMENT



FINAL Y AXIS LINEAR MISALIGNMENT

SEE MATED VIEWS DOCUMENT

FINAL Z AXIS LINEAR MISALIGNMENT

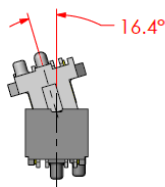
Series: **SEAM / SEAF** .050" (1,27 mm) SEARAY™ High Density, High Speed Open Pin Field Array

## 7.2 Mating Angle Requirements

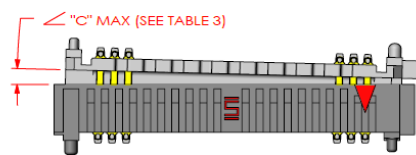
### 7.2.1 Allowable initial angular misalignment

NO OF POS	"C" = DEG		
	NO GP	-GP	-RA W/-GP
-10	6.1	7.2	N/A
-15	4.3	4.6	N/A
-20	2.9	3.4	2.89
-25	2.3	2.7	N/A
-30	1.9	2.2	2.25
-40	1.4	1.6	1.84
-50	1.1	1.3	1.56

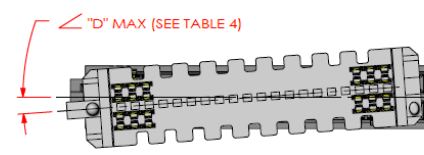
NO OF POS	"D" = DEG		
	NO GP	-GP	-RA W/-GP
-10	8.3	8.8	N/A
-15	5.3	5.6	N/A
-20	3.9	4.2	2.4
-25	3.1	3.3	N/A
-30	2.6	2.8	1.9
-40	1.9	2.0	1.5
-50	1.5	1.6	1.3



INITIAL X AXIS ANGULAR MISALIGNMENT



INITIAL Y AXIS ANGULAR MISALIGNMENT



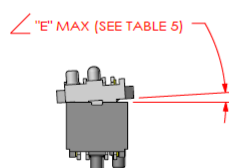
INITIAL Z AXIS ANGULAR MISALIGNMENT

### 7.2.2 Allowable final angular misalignment

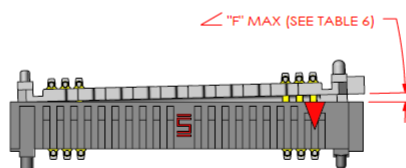
ROWS	"E" = DEG
-04	3.3
-05	2.3
-06	2.3
-08	1.8
-10	1.4
-14	1.0

NO OF POS	"F" = DEG
-10	2.5
-15	1.6
-20	1.2
-25	.95
-30	.79
-40	.58
-50	.46

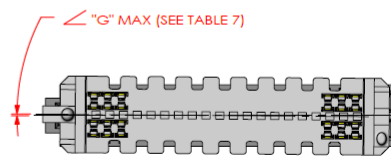
NO OF POS	"G" = DEG
-10	.66
-15	.42
-20	.31
-25	.24
-30	.20
-40	.15
-50	.12



FINAL X AXIS ANGULAR MISALIGNMENT



FINAL Y AXIS ANGULAR MISALIGNMENT



FINAL Z AXIS ANGULAR MISALIGNMENT

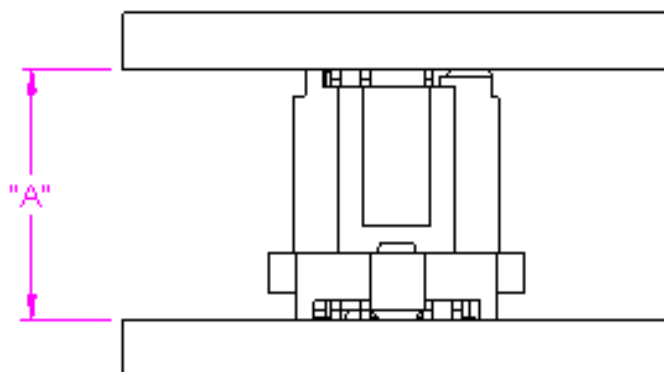
**7.3 Maximum Reflow Passes:** The parts can withstand three reflow passes at a maximum component temperature of 260°C.

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

**7.5 Placement:** Machine placement and complete seating of the parts in the Z-axis is strongly recommended.

**Series:** SEAM / SEAF .050" (1,27 mm) SEARAY™ High Density, High Speed Open Pin Field Array

**7.6 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](#).



SEAM LEAD STYLE	SEAF LEAD STYLE							
	-05.0		-06.0		-06.5		-07.5	
	Nominal Connector Stack Height "A" (mm)	Standoff	Nominal Connector Stack Height "A" (mm)	Standoff	Nominal Connector Stack Height "A" (mm)	Standoff	Nominal Connector Stack Height "A" (mm)	Standoff
-02.0	7.00	XXXX-0700	8.00	XXXX-0800	8.50	XXXX-0850	9.50	XXXX-0950
-03.0	8.00	XXXX-0800	9.00	XXXX-0900	9.50	XXXX-0950	10.50	XXXX-1050
-03.5	8.50	XXXX-0850	9.50	XXXX-0950	10.00	XXXX-1000	11.00	XXXX-1100
-05.5	10.50	XXXX-1050	11.50	XXXX-1150	12.00	XXXX-1200	13.00	XXXX-1300
-06.5	11.50	XXXX-1150	12.50	XXXX-1250	13.00	XXXX-1300	14.00	XXXX-1400
-07.0	12.00	XXXX-1200	13.00	XXXX-1300	13.50	XXXX-1350	14.50	XXXX-1450
-09.0	14.00	XXXX-1400	15.00	XXXX-1500	15.50	XXXX-1550	16.50	XXXX-1650
-11.0	16.00	XXXX-1600	17.00	XXXX-1700	17.50	XXXX-1750	18.50	XXXX-1850
-13.0	18.00	XXXX-1800	19.00	XXXX-1900	19.50	XXXX-1950	20.50	XXXX-2050

XXXX-XXXX

BOARD STACK HEIGHT

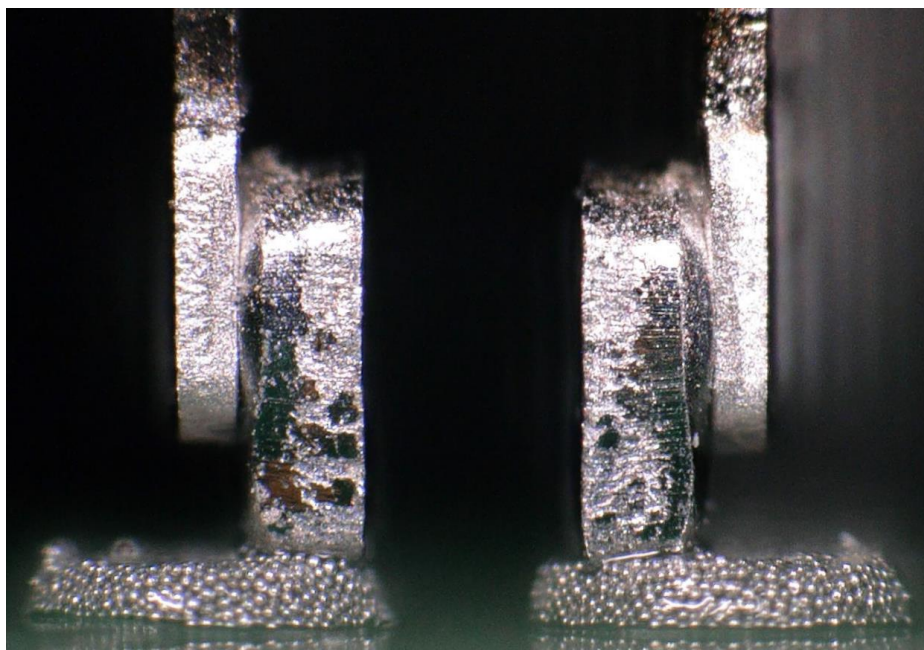
STANDOFF SERIES



**Series:** SEAM / SEAF .050" (1,27 mm) SEARAY™ High Density, High Speed Open Pin Field Array

## 7.7 Solder Screen Printing Process:

- 7.7.1 Complete solder pad coverage is critical. The recommended aperture size of .035" (0,89mm) is intentionally larger than the pad to ensure that the solder charge comes into contact with the solder paste. If this does not occur, proper wetting will not be achieved (see Fig. 7.7.3). Automated inspection of each print is recommended. If solder paste does not completely cover the solder pad, the assembly should be rejected, cleaned and re-printed.
- 7.7.2 Stencil cleaning may need to be monitored more frequently to ensure complete solder pad coverage is maintained.



**Fig. 7.7.3** - Solder charge location relative to solder print. Notice good contact between solder charges and solder paste.

**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 Fixture Tool (For SEAX-RA Only):** Although not every application requires it, Samtec recommends the use of a Fixture Tool for the 8 and 10 row versions of the SEARAY™ connector to maintain co-planarity through the reflow process. Each SEARAY™ connector utilizes a specific Fixture Tool based on the connector's gender, number of positions and number of rows. Follow this link for more details or visit Samtec's Processing Information page on our website: [http://suddendocs.samtec.com/literature/seax-ra\\_fixtures.pdf](http://suddendocs.samtec.com/literature/seax-ra_fixtures.pdf)

**7.10 Thermal Profile:** 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.



Series: [SEAM](#) / [SEAF](#) .050" (1,27 mm) SEARAY™ High Density, High Speed Open Pin Field Array

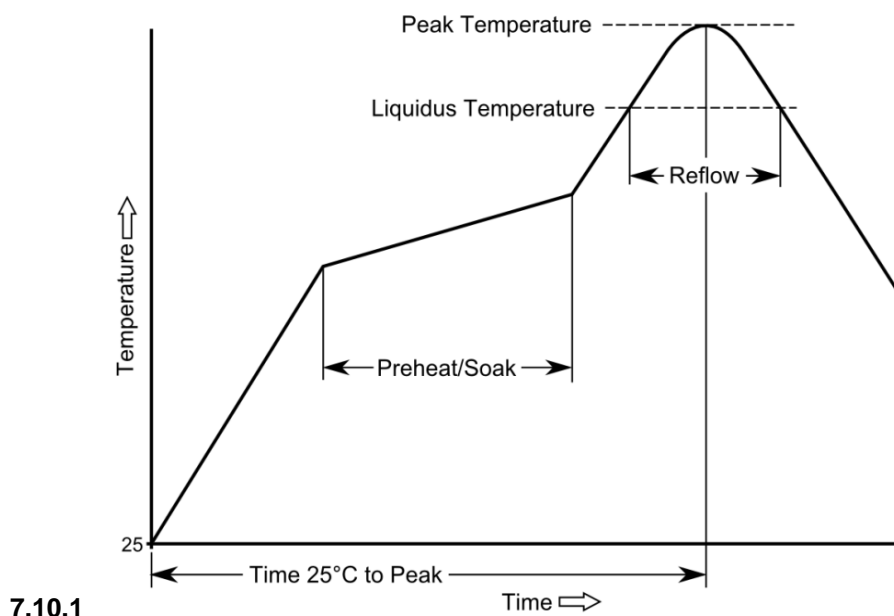
## Samtec Recommended Temperature Profile Ranges (SMT)

### 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.



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.

## 7.11 Rework Guidelines: Samtec recommends following these rework guidelines as needed: [Grid Array Rework Guidelines](#)

7.11.1 Samtec recommends a minimum spacing of .125" (3,18mm) between adjacent connectors to allow adequate room for hot-air rework equipment.

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#### **7.12 Handling:**

- 7.12.1** These connectors are typically packaged in trays or tape-and-reel which protect the solder charges from damage. They should be handled like any other BGA or IC device.
- 7.12.2** Avoid resting the connector on the solder charges except during final placement onto the board.
- 7.12.3** When using tape-and-reel packaging, ensure the bottom of the pocket is protected as it travels through the feeder.
- 7.12.4** Avoid touching the solder charges.
- 7.12.5** When a partially used tray needs to be stored, use the flat cover from the original shipment or an empty tray to cover connectors. Band trays using flex wrap or rubber bands.

- 7.13 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.

For more detailed processing information, please visit the Technical Library on the SEAF Series Technical Specification page: <http://www.samtec.com/technical-specifications/Default.aspx?SeriesMaster=SEAF>

## **8.0 ADDITIONAL RESOURCES**

- 8.1** For additional mechanical testing or product information, contact our Customer Engineering Support Group at [CES@samtec.com](mailto:CES@samtec.com)
- 8.2** For additional information on high speed performance testing, contact our Signal Integrity Group at [SIG@samtec.com](mailto:SIG@samtec.com)
- 8.3** For additional processing information, contact our Interconnect Processing Group at [IPG@samtec.com](mailto:IPG@samtec.com).
- 8.4** For RoHS, REACH or other environmental compliance information, contact our Product Environmental Compliance Group at [PEC@samtec.com](mailto: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.**