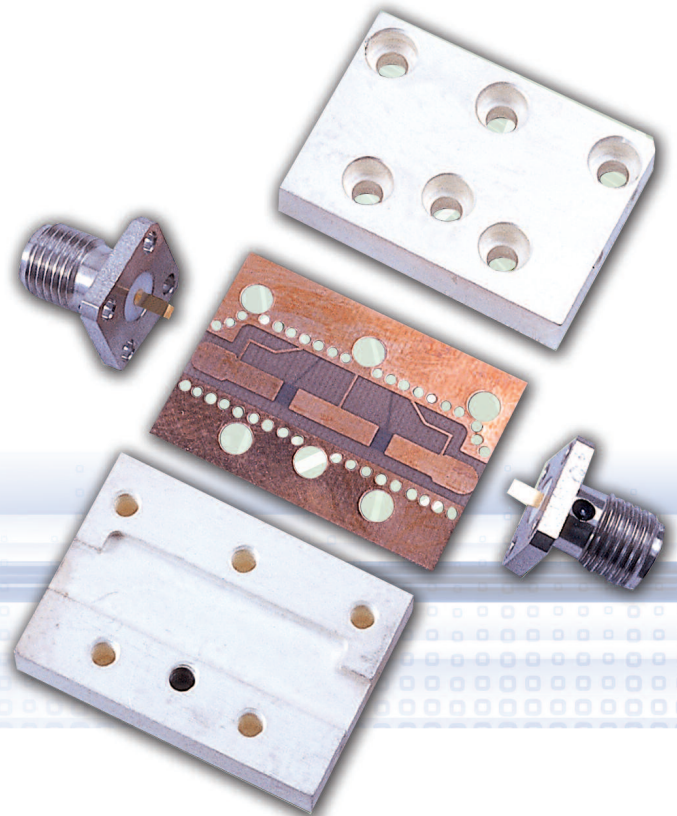


## Suspended Substrate Filters

The suspended substrate medium is useful for realizing broadband, highly-selective filters. Its main advantages are small size, high "Q" and good temperature stability. Selectivity of 50 dBc at only 15% from the band edge is achievable. Highpass and lowpass filters can be interconnected to form broadband bandpass filters or diplexers. Several other structures can be printed on suspended substrate, including combline filters, interdigital filters, hairpin filters and bandstop (notch) filters. Initially, the dual-sided board is clad with copper and then the structure is photo-etched onto it. Since the filter characteristics are determined solely by the mechanical accuracy of the housing and the printed circuit board, excellent reproducibility can be achieved by using a suspended substrate approach.

Suspended substrate filters will meet all relevant military specifications, provided proper care is taken at the design stage. These designs exhibit better temperature stability than other printed circuit realizations since the fields are mainly in air rather than in a dielectric. Interior walls in the housing hold the circuit and prevent movement that could be caused by vibration or mechanical shock. K&L's suspended substrate filters complement existing product lines as a general purpose, and are a high performance alternative to traditional broadband component filters and multiplexers.



◆ **Features:**

- Broadband Design
- Covers 3 GHz to 12 GHz Center Frequency Range
- IL Passband from 50 to 100%  
(See table below for examples)
- Excellent Environmental Performance
- Ruggedized Package Design
- Custom Designs Available\*



◆ **Specifications:**

Passband @ ≤ 1 dB (GHz)	VSWR	Avg. Power (Watts)	Shape Factor (3 dB-30 dB)	Impedance (Ohms)	**Dimensions Inches/mm		
					L	W	H
2 - 6	2:1	15	1.3:1*	50	2.1 / 53.3	1.4 / 35.6	0.5 / 12.7
2 - 8	2:1	15	1.3:1*	50	1.9 / 48.3	1.2 / 30.5	0.5 / 12.7
6 - 12	2:1	15	1.3:1*	50	2.0 / 50.8	0.9 / 22.9	0.5 / 12.7
6 - 18	2:1	15	1.3:1*	50	1.6 / 40.6	0.9 / 22.9	0.5 / 12.7
<b>Shock:</b>		20 G's, 1/2 Sine, 11 Ms					
<b>Vibration:</b>		10 G's, 10 HZ - 2000 Hz					
<b>Temperature:</b>		-55 to +85°C					
<b>Rel. Humidity:</b>		0 — 95%					

\* Designs also available to offer 3 dB - 50 dB shape factor up to 1.15:1. Contact factory for details.  
 \*\* Dimensions are determined with SMA connectors. Contact the factory for custom requirements.

◆ **To Order:**

**11 S B 10 — 4000 / T 4000 — O / O**  
**1 2 3 4 5 6 7 8 9**

Code	Description
1	Number of Elements
2	Suspended Substrate
3	Series (Bandpass)
4	Package (Contact Factory)
5	Center Frequency
6	Supplemental Codes (See Page 13)
7	Bandwidth
8	Input Connector
9	Output Connector

◆ **Connectors:**

Connector	Code
SMA Female	O
SMA Male	OP
N Female	N
N Male	NP



# Highpass — SH Series

## ◆ Features:

- Covers 2 GHz to 18 GHz Frequency Range
- Excellent Environmental Performance
- Ruggedized Package Design
- Custom Designs Available\*



## ◆ Specifications:

3 dB Cut Off (GHz)	Passband @ ≤ 1 dB (GHz)	VSWR	Avg. Power (Watts)	Shape Factor (3 dB-30 dB)	Impedance (Ohms)	**Dimensions Inches / mm		
						L	W	H
2	2.2 - 12	2:1	15	1.3:1*	50	1.5 / 38.1	1.3 / 33.0	0.5 / 12.7
3	3.3 - 12	2:1	15	1.3:1*	50	1.4 / 35.6	1.2 / 30.5	0.5 / 12.7
4	4.4 - 12	2:1	15	1.3:1*	50	1.25 / 31.8	1.1 / 27.9	0.5 / 12.7
5	5.5 - 16	2:1	15	1.3:1*	50	1.3 / 33.0	1.0 / 25.4	0.5 / 12.7
6	6.6 - 18	2:1	15	1.3:1*	50	1.3 / 33.0	1.0 / 25.4	0.5 / 12.7
7	7.7 - 18	2:1	15	1.3:1*	50	1.2 / 30.5	1.0 / 25.4	0.5 / 12.7
8	8.8 - 18	2:1	15	1.3:1*	50	1.2 / 30.5	1.0 / 25.4	0.5 / 12.7
9	9.9 - 18	2:1	15	1.3:1*	50	1.2 / 30.5	1.0 / 25.4	0.5 / 12.7
10	11 - 18	2:1	15	1.3:1*	50	1.1 / 27.9	0.9 / 22.9	0.5 / 12.7
11	12.1 - 18	2:1	15	1.3:1*	50	1.1 / 27.9	0.85 / 21.6	0.5 / 12.7
12	13.2 - 18	2:1	15	1.3:1*	50	1.0 / 25.4	0.85 / 21.6	0.5 / 12.7

Shock: 20 G's, 1/2 Sine, 11Ms

Vibration: 10 G's, 10 Hz - 2000 Hz

Temperature: -55 to +85°C

Rel. Humidity: 0 — 95%

\* Designs also available to offer 3 dB - 50 dB shape factor up to 1.15:1. Contact factory for details.

\*\* Dimensions are determined with SMA connectors. Contact the factory for custom requirements.

## ◆ To Order:

11 S H 10 — 2000 / T 6000 — O / O  
 1 2 3 4      5    6    7      8    9

Code	Description
1	Number of Elements
2	Suspended Substrate
3	Series (Highpass)
4	Package (Contact Factory)
5	Lower Limit at -3 dB
6	Supplemental Codes (See Page 13)
7	Upper Passband Limit
8	Input Connector
9	Output Connector

## ◆ Connectors:

Connector	Code
SMA Female	O
SMA Male	OP
N Female	N
N Male	NP



◆ **Features:**

- Covers 2 GHz to 18 GHz Frequency Range
- Excellent Environmental Performance
- Ruggedized Package Design
- Custom Designs Available\*



◆ **Specifications:**

3 dB Cut Off (GHz)	Passband @ ≤ 1 dB (GHz)	VSWR	Avg. Power (Watts)	Shape Factor (3 dB-30 dB)	Impedance (Ohms)	**Dimensions Inches / mm			Shock	Vibration	Temp.	Rel. Humidity
						L	W	H				
2	DC - 1.8	2:1	15	1.3:1*	50	2.0/50.8	1.5/38.1	0.5/12.7	20 G's, 1/2 Sine, 11 Ms	10 G's, 10 Hz - 2000 Hz	-55 to +85°C	0 — 95%
3	DC - 2.7	2:1	15	1.3:1*	50	1.9/48.3	1.3/33.0	0.5/12.7				
4	DC - 3.6	2:1	15	1.3:1*	50	1.8/45.7	1.0/25.4	0.5/12.7				
5	DC - 4.5	2:1	15	1.3:1*	50	1.5/38.1	1.0/25.4	0.5/12.7				
6	DC - 5.4	2:1	15	1.3:1*	50	1.3/33.0	0.9/22.9	0.5/12.7				
7	DC - 6.3	2:1	15	1.3:1*	50	1.1/27.9	0.8/20.3	0.5/12.7				
8	DC - 7.2	2:1	15	1.3:1*	50	1.1/27.9	0.75/19	0.5/12.7				
9	DC - 8.1	2:1	15	1.3:1*	50	1.1/27.9	0.75/19	0.5/12.7				
10	DC - 9	2:1	15	1.3:1*	50	1.0/25.4	0.7/17.8	0.5/12.7				
11	DC - 9.9	2:1	15	1.3:1*	50	1.0/25.4	0.7/17.8	0.5/12.7				
12	DC - 10.8	2:1	15	1.3:1*	50	1.0/25.4	0.65/16.5	0.5/12.7				
13	DC - 11.7	2:1	15	1.3:1*	50	0.9/22.9	0.65/16.5	0.5/12.7				
14	DC - 12.6	2:1	15	1.3:1*	50	0.9/22.9	0.65/16.5	0.5/12.7				
15	DC - 13.5	2:1	15	1.3:1*	50	0.9/22.9	0.6/15.2	0.5/12.7				
16	DC - 14.4	2:1	15	1.3:1*	50	0.9/22.9	0.65/16.5	0.5/12.7				
17	DC - 15.3	2:1	15	1.3:1*	50	0.9/22.9	0.65/16.5	0.5/12.7				
18	DC - 16.2	2:1	15	1.3:1*	50	.85/21.6	0.6/15.2	0.5/12.7				

\* Designs also available to offer 3 dB - 50 dB shape factor up to 1.15:1. Contact factory for details.  
 \*\* Dimensions are determined with SMA connectors. Contact the factory for custom requirements.

◆ **To Order:**

**11 S L 10 — 2000 / I 2600 — O / O**  
 1 2 3 4 5 6 7 8 9

◆ **Connectors:**

Connector	Code
SMA Female	O
SMA Male	OP
N Female	N
N Male	NP

**Code**

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

**Description**

- Number of Elements
- Suspended Substrate
- Series (Lowpass)
- Package (Contact Factory)
- 3 dB Cutoff Frequency
- Supplemental Codes (See Page 13)
- Upper Stopband Limit
- Input Connector
- Output Connector



# Diplexers — SZ Series

## ◆ Features:

- Covers 2 GHz to 18 GHz Frequency Range
- Excellent Environmental Performance
- Ruggedized Package Design
- Custom Designs Available\*



## ◆ Specifications:

5 dB Nom. Crossover Frequency (GHz)	Passband @ ≤ 1 dB (GHz)	VSWR	Avg. Power (Watts)	Shape Factor (3 dB-30 dB)	Impedance (Ohms)	**Dimensions Inches / mm		
						L	W	H
2	DC - 1.9 2.1 - 4	2:1	15	1.3:1*	50	2.6 / 66.0	1.4 / 35.5	0.5 / 12.7
4	DC - 3.8 4.2 - 8	2:1	15	1.3:1*	50	1.8 / 45.7	1.3 / 33.0	0.5 / 12.7
6	DC - 5.7 6.3 - 18	2:1	15	1.3:1*	50	1.6 / 40.6	1.6 / 40.6	0.5 / 12.7
8	DC - 7.6 8.4 - 18	2:1	15	1.3:1*	50	1.4 / 35.6	1.4 / 35.6	0.5 / 12.7
10	DC - 9.5 10.5 - 16	2:1	15	1.3:1*	50	1.3 / 33.0	1.3 / 33.0	0.5 / 12.7
12	DC - 11.6 12.6 - 18	2:1	15	1.3:1*	50	1.2 / 30.0	1.2 / 30.0	0.5 / 12.7

**Shock:** 20 G's, 1/2 Sine, 11Ms

**Vibration:** 10 G's, 10 Hz - 2000 Hz

**Temperature:** -55 to +85°C

**Rel. Humidity:** 0 — 95%

\* Designs also available to offer 3 dB - 50 dB shape factor up to 1.15:1. Contact factory for details.

\*\* Dimensions are determined with SMA connectors. Contact the factory for custom requirements.

## ◆ To Order:

11 S Z 10 — 2000 / T 4000 — 0 / 0  
 1 2 3 4      5    6    7      8    9

Code	Description
1	Number of Elements
2	Suspended Substrate
3	Series (Diplexer)
4	Package (Contact Factory)
5	Crossover at -5 dB
6	Supplemental Codes (See Page 13)
7	Upper Passband Limit
8	Input Connector
9	Output Connector

## ◆ Connectors:

Connector	Code
SMA Female	0
SMA Male	OP
N Female	N
N Male	NP