

**VI TELE FILTER****Filter Specification****TFS 225 - 1/5****Measurement Condition**

Ambient temperature: 23 °C  
 Input power level: 0 dBm  
 Terminating impedances  
     for input: 680 Ω || -2.5 pF  
     for output: 680 Ω || -2.5 pF  
 Coupling coil: 150 nH

**Construction and Pin Configuration**

See page 2

**50 Ω test circuit and theoretical values of matching elements**

see page 3

**Stability characteristics and packing**

see page 4

**Air reflow temperature conditions**

see page 5

**Characteristics**

Remark:

Reference level for the relative attenuation  $a_{rel}$  of the TFS 225 is the minimum of the pass band attenuation  $a_{min}$ . The minimum of the pass band attenuation  $a_{min}$  is defined as the insertion loss  $a_e$ . The centre frequency  $f_0$  is the arithmetic mean value of the upper and lower frequencies at the 3 dB filter attenuation level relative to the insertion loss  $a_e$ . The given values for the relative attenuation  $a_{rel}$  and for the group delay ripple have to be reached at the frequencies given below also if the centre frequency  $f_0$  is shifted due to the temperature coefficient of frequency  $TC_f$  in the operating temperature range and due to a production tolerance for the centre frequency  $f_0$ .

D a t a		typ. Value		Limit	
<b>Insertion Loss</b> (Reference Level)	$a_e = a_{min}$	3	dB	max 5	dB
<b>Center Frequency</b>	$f_0$	225,0	MHz	-	
<b>Relative Attenuation</b>	$a_{rel}$				
225,0 MHz ± 80	kHz	-		max 2	dB
225,0 MHz ± 400	kHz ... 225,0 MHz ± 600	-		min 25	dB
225,0 MHz ± 600	kHz ... 225,0 MHz ± 800	-		min 40	dB
225,0 MHz ± 800	kHz ... 225,0 MHz ± 1,6	-		min 45	dB
225,0 MHz ± 1,6	MHz ... 225,0 MHz ± 15	-		min 50	dB
<b>Group Delay</b> GD		-			
Group Delay Ripple	225,0 MHz ± 80 kHz	1	µs	max 1,5	µs
<b>Operating Temperature Range</b>		- 25 °C ... + 80 °C			
<b>Storage Temperature Range</b>		- 30 °C ... + 85 °C			
<b>Temperature Coefficient of Frequency</b>	$TC_f$	ca. - 0,036 ppm/K <sup>2</sup>			
<b>Frequency Inversion Temperature</b>		+ 20 ... + 30 °C			

Generated: \_\_\_\_\_

Checked / Approved: \_\_\_\_\_

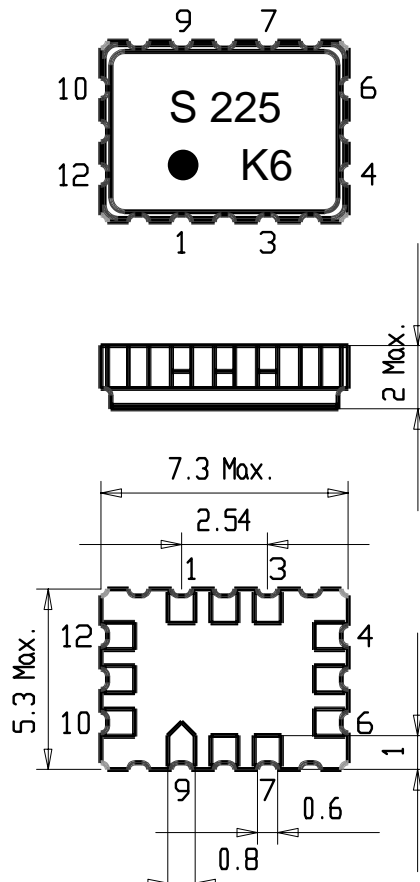
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**VI TELE FILTER****Filter Specification****TFS 225 - 2/5****Construction and Pin Configuration**

(All Dimensions in mm)



- |    |                |
|----|----------------|
| 1  | Input          |
| 2  | Input          |
| 3  | Ground         |
| 4  | Coupling coil  |
| 5  | Package Ground |
| 6  | Ground         |
| 7  | Output         |
| 8  | Output         |
| 9  | Ground         |
| 10 | Ground         |
| 11 | Package Ground |
| 12 | Ground         |

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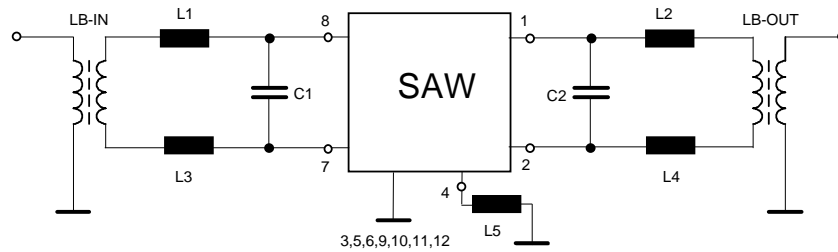
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**50  $\Omega$  test circuit and theoretical values of matching elements****Remark:**

The values of the matching elements which are given below are calculated from the source and load impedance. If the values of the matching elements are not equal to standard values the best standard values are given in brackets. If standard matching elements instead of the exact values are used it can not be guaranteed that the specification will be fulfilled.

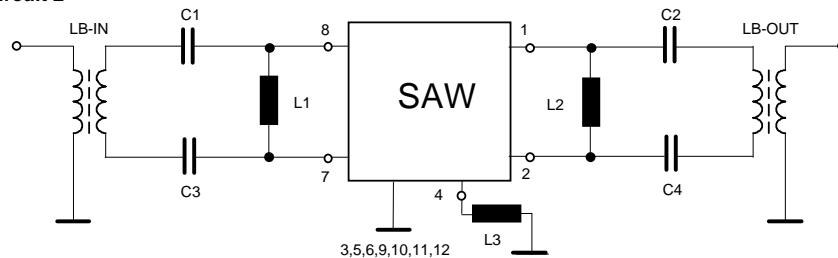
Because these are theoretical values they have to be modified on PCB's corresponding to the existing parasitics.

**50 Ohm Test circuit 1**

$$L1 = L2 = L3 = L4 = 62 \text{ nH} \quad (68\text{nH})$$

$$C1 = C2 = 1,2 \text{ pF}$$

$$L5 = 150 \text{ nH}$$

**50 Ohm Test circuit 2**

$$C1 = C2 = C3 = C4 = 8 \text{ pF} \quad (8.2 \text{ pF})$$

$$L1 = L2 = 81 \text{ nH} \quad (82 \text{ nH})$$

$$L3 = 150 \text{ nH}$$

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**VI TELE FILTER****Filter Specification****TFS 225 - 4/5****Stability Characteristics**

After the following tests the filter shall meet the whole specification:

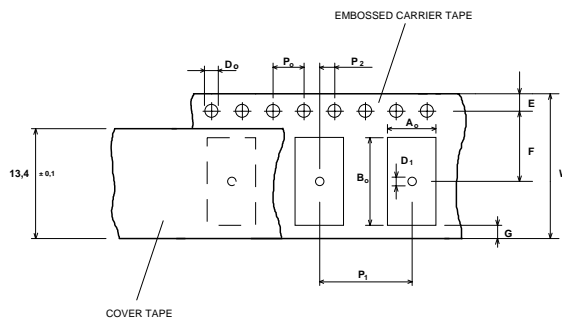
1. Shock: 500g, 18 ms, half sine wave, 3 shocks each plane;  
DIN IEC 68 T2 - 27
2. Vibration: 10 Hz to 500 Hz, 0,035 mm or 5g respectively, 1 octave per min, 10 cycles per plan, 3 plans;  
DIN IEC 68 T2 - 6
3. Damp heat:  
(steady state) 90 % to 95 % rel. humidity, 55 °C, 10 days;  
DIN IEC 68 - 2 - 30
4. Resistance to  
solder heat (reflow): max. 2 times reflow process;  
for temperature conditions refer to the attached "Air reflow temperature conditions" on sheet 4;

**Packing**

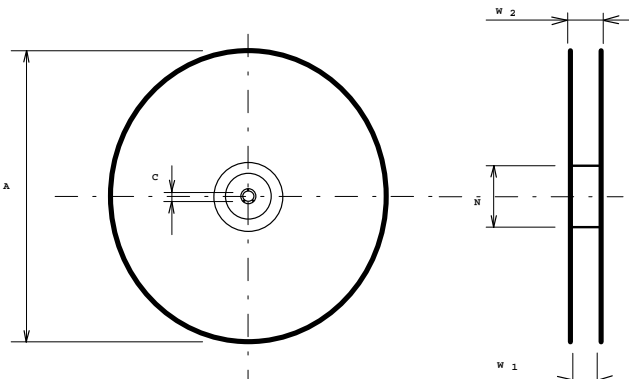
Tape & Reel: IEC 286 - 3, with exception of value for N and minimum bending radius;  
tape type II, embossed carrier tape with top cover tape on the upper side;  
max. pieces of filters per reel: 3000

**Tape (all dimensions in mm)**

W	: 16 ± 0,3
Po	: 4 ± 0,1
Do	: 1,5 + 0,5
D1	: 1,5 + 0,5
E	: 1,75 ± 0,1
F	: 7,5 ± 0,1
G (min)	: 0,75
P2	: 2 ± 0,05
P1	: 8 ± 0,1
D1(min)	: 1,5
Ao	: 5,4 ± 0,1
Bo	: 7,4 ± 0,1

**Reel (all dimensions in mm):**

A	:	330
W1	:	16,4 +2
W2 (max)	:	22,4
N (min)	:	>= 90
C	:	13 ± 0,25



The minimum bending radius is 45 mm. The mounting surface of the filters faces the bottom side of the embossed carrier tape. The marking of the filters is able to read if the view is directed on the upper side of the carrier tape with the sprocket holes on the right side of the tape.

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**VI TELE FILTER****Filter Specification****TFS 225 - 5/5****Air Reflow Temperature Conditions**

1st and 2nd air reflow profile

Name:	pre-heating periods	main-heating periods	peak temperature
Temperature:	150 °C - 170 °C	over 200 °C	255 °C ± 5 °C
Time:	60 sec. - 90 sec.	20 sec. - 25 sec.	

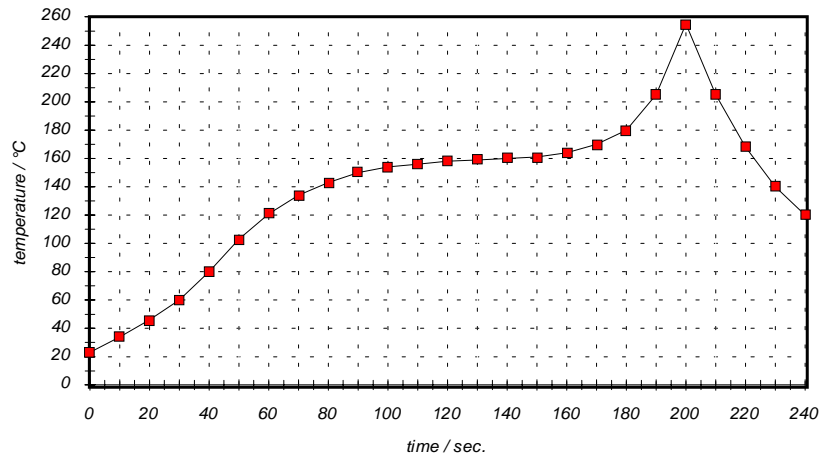
**Chip-mount air reflow profile**

Table for temperature vs. time during the air reflow process

Tolerance of temperatures: ± 5 °C

time / sec.	temperature / °C	time / sec.	temperature / °C
0	23	140	160
10	34	150	161
20	46	160	164
30	60	170	170
40	80	180	180
50	103	190	205
60	121	195	230
70	134	200	255
80	143	205	230
90	150	210	205
100	154	215	180
110	156	220	165
120	158	230	140
130	159	240	120

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