

**VI TELEFILTER****Filter Specification****TFS 208 K****1/5****Measurement Condition**

Ambient temperature: 23 °C  
 Input power level: 0 dBm  
 Source impedance: 50 Ω single ended  
 Load impedance: 50 Ω single ended  
 Terminating impedances: \*) input: 460 Ω // -10,7 pF  
 output: 940 Ω // - 6,8 pF

**Characteristics**

Remark: Reference level for the relative attenuation  $a_{rel}$  of the TFS 208K is the minimum of the pass band attenuation. Reference for the echo response attenuation is the main time response lobe, the reference time is defined as  $t_0$ . The nominal frequency  $f_N$  is fixed at 208 MHz without tolerance. The given values for the relative attenuation  $a_{rel}$  and for the group delay ripple have to be reached at the frequencies given below even if the centre frequency  $f_C$  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  $f_C$ .

<b>D a t a</b>	<b>typ. Value</b>	<b>Limit</b>
<b>Absolute attenuation</b> within PB	6,5 dB	6 ... 8,5 dB
<b>Nominal frequency</b> $f_N$	-	208 MHz
<b>Pass band (PB)</b>	-	$f_N \pm 0,6$ MHz
1,85 dB bandwidth	1,49 MHz	min. 1,2 MHz
<b>Relative attenuation</b> $a_{rel}$		
$f_N$ ... $f_N \pm 0,1$ MHz	0,1 dB	max. 0,4 dB
$f_N \pm 0,1$ MHz ... $f_N \pm 0,4$ MHz	0,15 dB	max. 0,7 dB
$f_N \pm 0,4$ MHz ... $f_N \pm 0,6$ MHz	0,4 dB	max. 1,85 dB
$f_N \pm 1,2$ MHz ... $f_N \pm 1,8$ MHz	6,6 dB	min. 6 dB
$f_N \pm 1,8$ MHz ... $f_N \pm 6$ MHz	18 dB	min. 15 dB
$f_N \pm 6$ MHz ... $f_N \pm 13$ MHz	48 dB	min. 40 dB
$f_N - 13$ MHz ... $f_N - 198$ MHz	55 dB	min. 50 dB
$f_N + 13$ MHz ... $f_N + 21$ MHz	52 dB	min. 42 dB
$f_N + 21$ MHz ... $f_N + 242$ MHz	65 dB	min. 50 dB
<b>Echo response attenuation</b> $a_{rel}$		
$t_0 + 1$ μs	28 dB	min. 20 dB
$t_0 + 2$ μs	39 dB	min. 30 dB
$t_0 + 3$ μs	45 dB	min. 40 dB
$t_0 + 4$ μs	65 dB	min. 40 dB
$t_0 + 5$ μs	70 dB	min. 50 dB
<b>Group delay</b> at $f_N$	705 ns	max. 800 ns
<b>Group delay ripple</b> within $f_N \pm$ PB	105 ns	max. 150 ns
<b>Input power level</b>	-	max. + 10 dBm
<b>VSWR</b> within $f_N \pm$ PB	1,5 : 1	max. 2 : 1
<b>Intermodulation products **</b>	-65 dBm	max. -60 dBm
<b>Operating temperature range</b>	-	- 10 °C ... + 85 °C
<b>Storage temperature range</b>	-	- 40 °C ... + 125 °C
<b>Temperature coefficient of frequency</b> $TC_f$ ***	-0,04 ppm/K <sup>2</sup>	-
<b>Frequency inversion temperature</b> $T_0$	45 °C	-

\*) The terminating impedances depend on parasitics and q-values of matching elements and the board used, and are to be understood as reference values only. Should there be additional questions, do not hesitate to ask for an application note or contact our design team.

\*\*)  $f_{in,1}=208\text{MHz}$ ;  $f_{in,2}=208,1\text{MHz}$ ;  $P_{in}=4\text{dBm}+\text{loss}$  @ $f_N$ ;  $f_{out,1}=207,9\text{MHz}$ ;  $f_{out,2}=208,2\text{MHz}$ ; then  $P_{out}<-56\text{dBm}$

\*\*\*)  $\Delta f(\text{Hz}) = TC_f(\text{ppm/K}^2) \times (T-T_0)^2 \times f_{T0}(\text{MHz})$

**generated:** \_\_\_\_\_

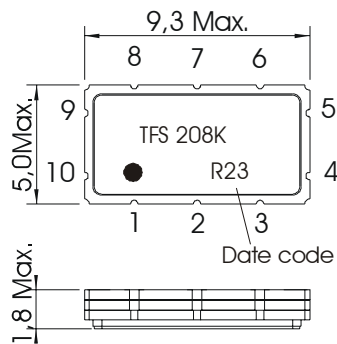
**checked / approved:** \_\_\_\_\_

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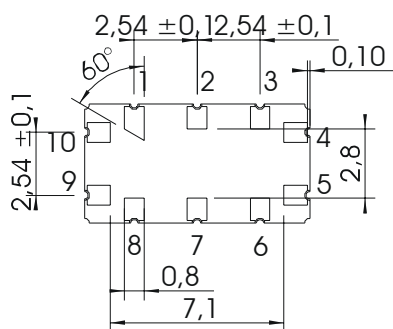
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**Construction and pin configuration**

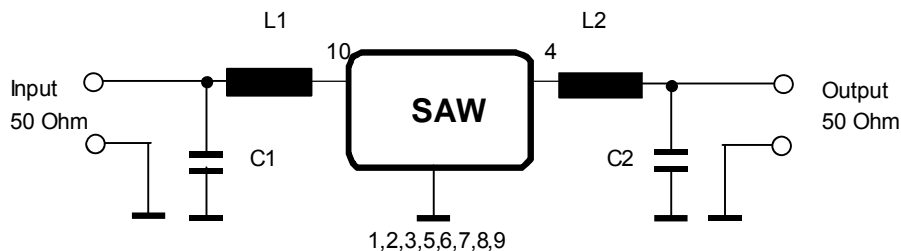
(all dimensions in mm)



1	ground
2	ground
3	ground
4	output
5	ground
6	ground
7	ground
8	ground
9	ground
10	Input



date code:	year + week
N	2001
P	2002
R	2003
....	....

**matching circuit:**

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**Stability Characteristics**

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

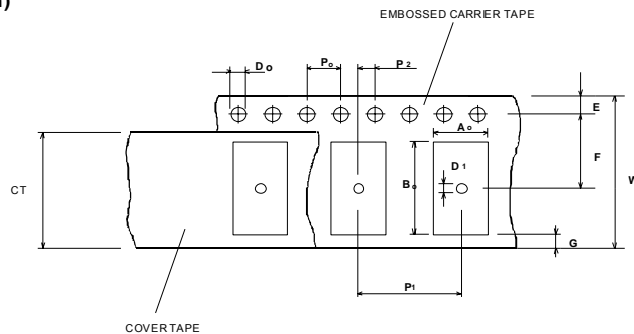
1. Shock: 500g, 18 ms, half sine wave, 3 shocks each plane;  
DIN IEC 68 T2 - 27
2. Vibration: 10 Hz to 500 Hz, 0,35 mm or 5g respectively, 1 octave per min, 10 cycles per plan, 3 plans;  
DIN IEC 68 T2 - 6
3. Change of temperature: -55 °C to 125 °C / 30 min. each / 10 cycles  
DIN IEC 68 part 2 – 14 Test N
4. Resistance to solder heat (reflow): reflow possible: twice max.;;  
for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4;

**Packing**

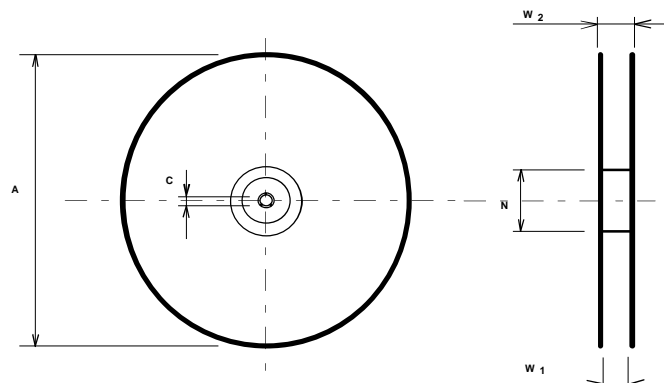
Tape & Reel: IEC 286 - 3, with exception of value for N and minimum bending radius;  
tape type II, embossed carrier tape with top cover tape on the upper side;  
max. pieces of filters per reel: 3000  
reel of empty components at start: min 300 mm  
reel of empty components at start including leader: min 500 mm  
trailer: min 300 mm

**Tape (all dimensions in mm)**

W	: 16 ± 0,3
Po	: 4 ± 0,1
Do	: 1,5 + 0,1
E	: 1,75 ± 0,1
F	: 7,5 ± 0,1
G (min)	: 0,60
P2	: 2 ± 0,1
P1	: 8 ± 0,1
D1(min)	: 1,5
Ao	: 5,30 ± 0,1
Bo	: 9,70 ± 0,1
CT	: 13,5 ± 0,1

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

A	: 330
W1	: 16,40 +2,0
W2 (max)	: 22,4
N (min)	: 50
C	: 13,0 ± 0,5/-0,2



The minimum bending radius is 45 mm. The mounting surface of the filters faces the bottom side of the embossed carrier tape. Markings on the filters can be read if the upper side of the carrier tape is regarded with the sprocket holes on its right.

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**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.	

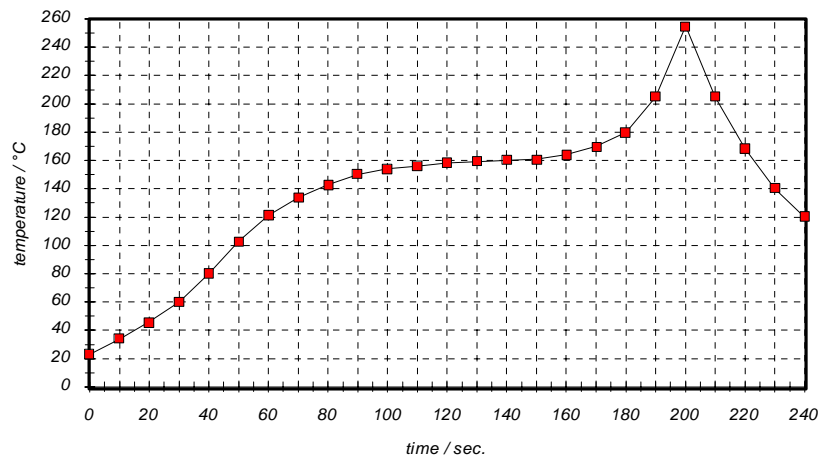
**Chip-mount air reflow profile**

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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**History**

<b>Version</b>	<b>Reason of Changes</b>	<b>Name</b>	<b>Date</b>
<b>Development specification</b>			
1.0	generation of development specification	Pfeiffer	24.01.2003
1.1	typical values and terminating impedance added	Pfeiffer	15.05.2003
1.2	relative attenuation and definition of insertion loss changed according customer specification version 2.0.0 (20.05.2003)	Pfeiffer	03.06.2003

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