

**VI TELEFILTER****Filter Specification****TFS 238****1/5****Measurement condition**

Ambient temperature  $T_A$ : 23 °C  
 Input power level: 0 dBm  
 Terminating impedances at  $f_C$  \*: input: 450  $\Omega$  // -8,3 pF  
 output: 430  $\Omega$  // -7,3 pF

**Characteristics**

## Remark:

The reference level for the relative attenuation  $a_{rel}$  of TFS238 is the minimum of the pass band attenuation  $a_{min}$ . This value is defined as the insertion loss  $a_e$ . The centre frequency  $f_C$  is the arithmetic mean value of the upper and lower frequencies at the 1 dB filter attenuation level relative to the insertion loss  $a_e$ . The given values for the relative attenuation  $a_{rel}$  and 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  $f_C$ .

Data		typ. value	tolerance / limit
<b>Insertion loss</b> (reference level)	$a_e$	9,8 dB	max. 12 dB
<b>Nominal frequency</b>	$f_N$	-	238,5 MHz
<b>Centre frequency</b>	$f_C$	238,5 MHz	-
<b>Relative attenuation</b>	$a_{rel}$		
$f_N$	$f_N \pm 2,5$ MHz	0,4 dB	max. 1 dB
$f_N \pm 5$ MHz	$f_N \pm 7,5$ MHz	23 dB	min. 13 dB
$f_N \pm 7,5$ MHz	$f_N \pm 9$ MHz	38 dB	min. 23 dB
$f_N \pm 9$ MHz	$f_N \pm 10$ MHz	50 dB	min. 40 dB
$f_N \pm 10$ MHz	$f_N \pm 100$ MHz	60 dB	min. 47 dB
<b>Phase variation</b> within $f_N \pm 2,5$ MHz		1,1 deg rms	max. 4 deg rms
<b>Temperature coefficient of frequency</b> ( $TC_f$ )**		-18 ppm/K	-
<b>Frequency deviation of <math>f_C</math> over temperature T:</b>		$\Delta f_C(\text{Hz}) = TC_f(\text{ppm/K}) \times (T - T_A) \times f_{CAT}(\text{MHz})$	
<b>Operating temperature range</b>		-	- 20 °C .... + 85 °C
<b>Storage temperature range</b>		-	- 40 °C .... + 85 °C
<b>Input power</b>		-	max. 20 dBm

\*) 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.

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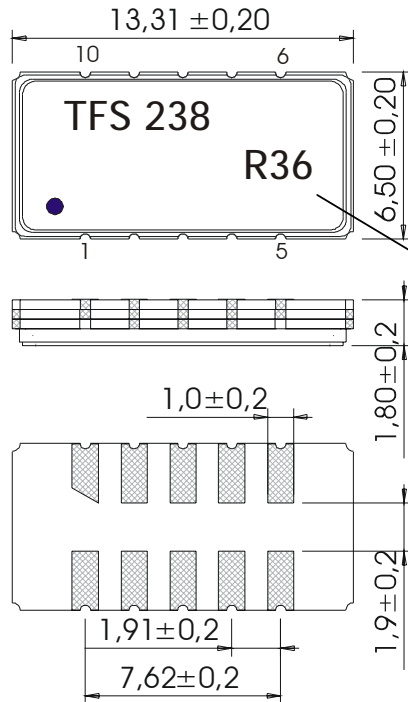
checked / approved: \_\_\_\_\_

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**Construction, pin configuration and 50 Ω - matching network**

(All dimensions in mm)



1	output
2	ground
3	ground
4	ground
5	input rf return
6	input
7	ground
8	ground
9	ground
10	output rf return

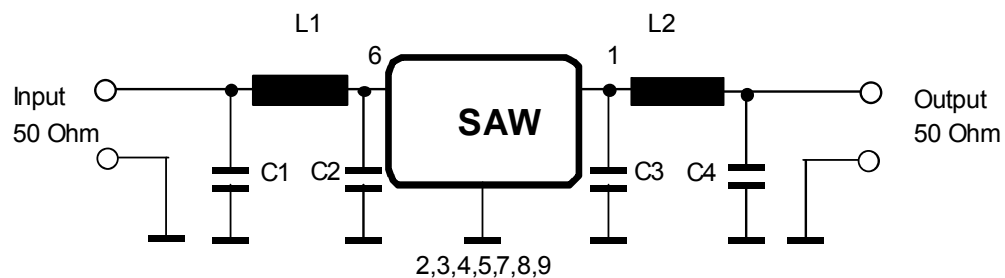
date code: year + week

N 2001

P 2002

R 2003

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**50 Ω test 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, please refer to the attached "Air reflow temperature conditions" on page 4;

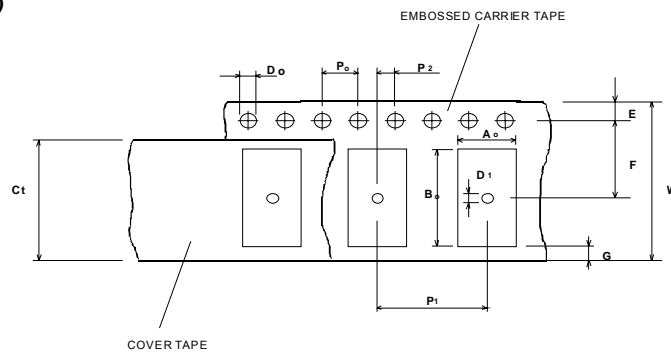
**Packing**

Tape & Reel: DIN 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;

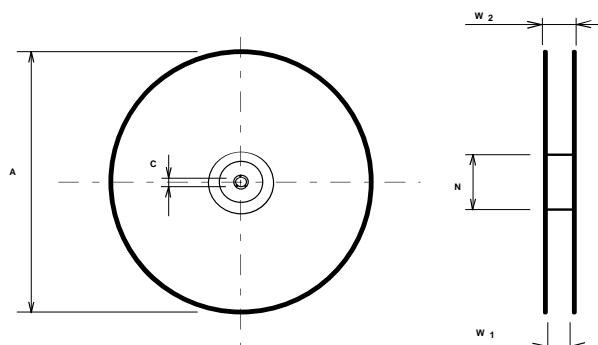
max. pieces of filters per reel:	1700
reel of empty components at start:	min 300 mm
reel of empty components at start including leader:	min 500 mm
trailer	min 300 mm

**Tape (all dimensions in mm)**

W	: 24 ± 0,3
Po	: 4 ± 0,1
Do	: 1,5 ± 0,1
E	: 1,75 ± 0,1
F	: 11,5 ± 0,1
G (min)	: 0,60
P2	: 2 ± 0,1
P1	: 12 ± 0,1
D1(min)	: 1,5
Ao	: 7,1 ± 0,2
Bo	: 13,9 ± 0,2
Ct	: 21,5 ± 0,1

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

A	: 330
W1	: 24,40 +2,0
W2 (max)	: 30,4
N (min)	: 60
C	: 13 ± 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 °	Cover 200 °C	255 °C ± 5 °C
Time:		60 sec. - 90 sec.	20 sec. - 25 sec.

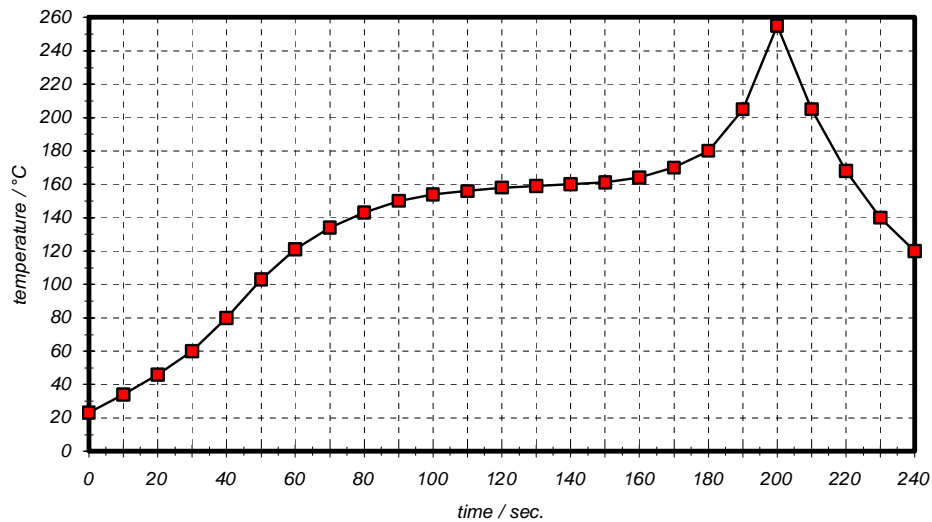
**Air reflow profile**

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>
1.0	generation of specification	Pfeiffer	24.10.2002
1.1	changing package and relative attenuation adding phase linearity over passband	Pfeiffer	29.11.2002
1.2	changing package and packing	Pfeiffer	13.02.2003
1.3	typical values, matching configuration and terminating impedances added	Pfeiffer	21.03.2003
2.0	typical values and terminating impedances changed	Pfeiffer	16.06.2003
2.1	typical values and terminating impedances changed relative attenuation at $f_N \pm 7,5 \text{ MHz}$ ... $f_N \pm 9 \text{ MHz}$ added	Pfeiffer	05.09.2003

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