

**VI TELEFILTER****Preliminary Specification****TFS 238 A****1/5****Measurement condition**

Ambient temperature  $T_A$ : 25 °C  
 Input power level: 0 dBm  
 Terminating impedances at  $f_C^*$ :  
 input: 1000  $\Omega$  // - 7,2 pF  
 output: 670  $\Omega$  // - 7,8 pF

**Characteristics**

## Remark:

Reference level for the relative attenuation  $a_{rel}$  of the TFS 238A is the insertion loss. The minimum of the pass band attenuation  $a_{min}$  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 3 dB filter attenuation level relative to the insertion loss  $a_e$ . The temperature coefficient of frequency  $T_C$  is valid both for the reference frequency  $f_C$  and the frequency response of the filter in the operating temperature range.

Data		typ. value		tolerance / limit
<b>Insertion loss</b> (reference level at ambient temperature)	$a_e$	9,5	dB	min. 8,9 dB max. 10,9 dB
<b>Nominal frequency</b>	$f_N$	-		238,4 MHz
<b>Centre frequency</b>	$f_C$	238,4	MHz	-
<b>Passband Ripple (p-p)</b>	$f_N \pm 500$ kHz	0,4	dB	max. 1 dB
<b>Relative attenuation</b>	$a_{rel}$			
$f_N$	$f_N \pm 0,5$ MHz	0,4	dB	max. 1 dB
$f_N \pm 0,5$ MHz	$f_N \pm 0,615$ MHz	1	dB	max. 5 dB
$f_N \pm 0,9$ MHz	$f_N \pm 1,25$ MHz	25	dB	min. 20 dB
$f_N \pm 1,25$ MHz	$f_N \pm 4$ MHz	35	dB	min. 30 dB
$f_N - 4$ MHz	$f_N - 228,4$ MHz	55	dB	min. 47 dB
$f_N + 4$ MHz	$f_N + 111,6$ MHz	60	dB	min. 47 dB
<b>Phase variation within <math>f_N \pm 630</math> kHz</b>		1,2	deg rms	max. 4 deg rms
<b>Triple transit response suppression</b>		27	dB	min. 20 dB
<b>Operating temperature range</b>		-		- 20 °C.... + 85 °C
<b>Storage temperature range</b>		-		- 55 °C.... + 125 °C
<b>Temperature coefficient of frequency</b>	$T_C$ ***	-0,036	ppm/K <sup>2</sup>	-
<b>Frequency inversion temperature</b>	$T_0$	35	°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.

\*\*) This power level is allowed for short term operation (10% of life time) only, the max. input power for continuous operation is 15 dBm

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

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

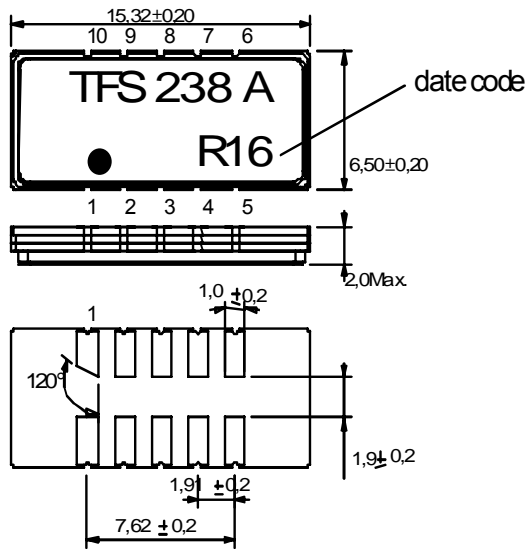
checked / approved: \_\_\_\_\_

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

(all dimensions in mm)

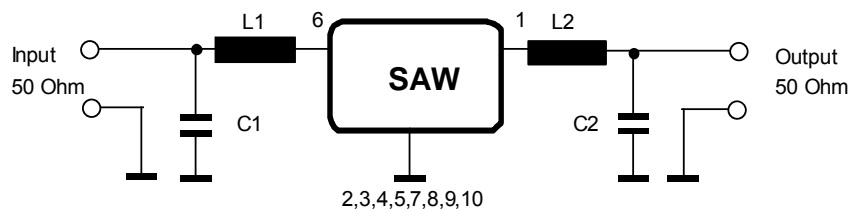


- 1 output
- 2 ground
- 3 ground
- 4 ground
- 5 input rf return
- 6 input
- 7 ground
- 8 ground
- 9 ground
- 10 output rf return

date code: year + week

- N 2001
- P 2002
- R 2003
- .....

**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;

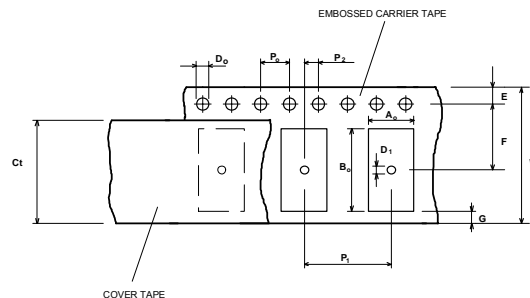
**Packing**

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;

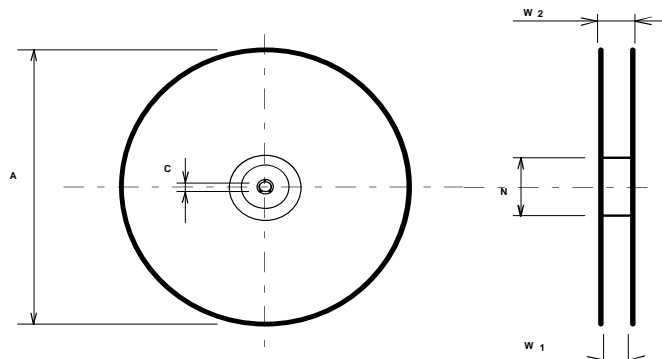
max. pieces of filters per reel:	2000
reel of empty components at start:	min 300 mm
reel of empty components at start including leader:	min 500 mm
trailer	min 300 mm

**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 : 15,9 ± 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.

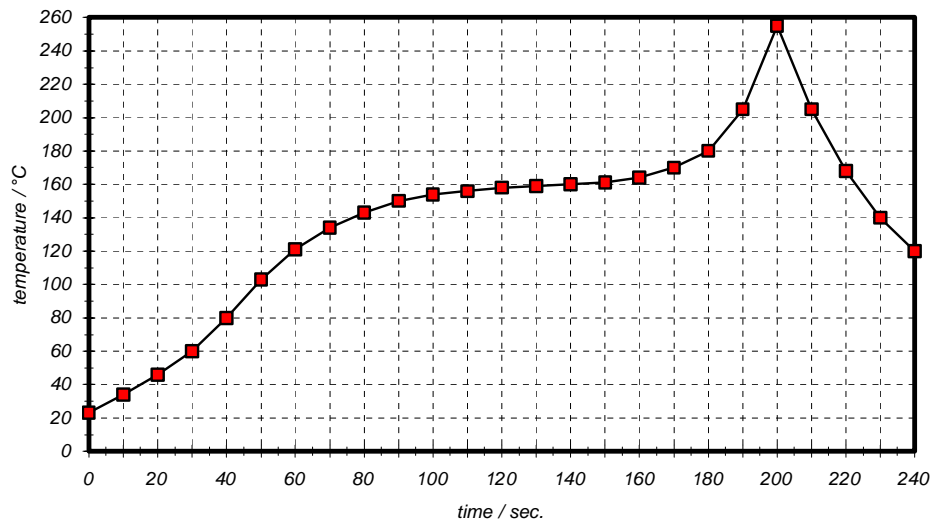
**Air reflow profile**

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	10.02.2003
1.1	typical values of relative attenuation and terminating impedance (preliminary values) added	Pfeiffer	10.04.2003

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