

**VI TELEFILTER****Filter specification****TFS 35A****1/5****1. Measurement condition :**

Ambient temperature $T_A$ :	25 °C
Input power level:	0 dBm
Terminating impedances in $f_c$ *):	for input: 310. $\Omega$   -25,7 pF.
	for output: 690 $\Omega$   -10,1 pF.
Source impedance .	50 $\Omega$ .
Load impedance .	50 $\Omega$ .

**2. Characteristics :**

Remark: Reference level for the relative attenuation  $a_{rel}$  of the TFS 35A 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 reference 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 nominal frequency  $f_N$  is fixed at 35,42 MHz without tolerance. All specified values are guaranteed in operating temperature range. Measurement of filter response will be done at temperatures of -40°C , 25°C and 85°C for each part.

<b>D a t a</b>	<b>typ. value</b>	<b>tolerance / limit</b>
<b>Insertion loss</b> (Reference level) $a_e$	14,8 dB	max. 17 dB
<b>Nominal frequency</b> $f_N$	-	35,42 MHz
<b>Centre frequency</b> $f_c$ at ambient temperature ( $f_{CTA}$ )	35,42 MHz	-
<b>Pass band :</b> <b>PB</b>		$f_c \dots f_c \pm 0,80$ MHz
<b>Amplitude ripple in PB (p-p) :</b>	0,6 dB	max. 1,6 dB
<b>Bandwidth :</b> <b>BW</b>		
1 dB	2,01 MHz	min. 1,7 MHz
3 dB	2,44 MHz	-
21 dB	3,32 MHz	max. 3,74 MHz
<b>Relative attenuation in O.T.R. :</b> $a_{rel}$		
34,62 MHz ... 36,22 MHz	0,8 dB	max. 1,6 dB
0,1 MHz ... 7 MHz	55...27 dB	-
7 MHz ... 28 MHz	55...50 dB	min. 35 dB
28 MHz ... 31 MHz	35 dB	min. 30 dB
31 MHz ... 33,5 MHz	40...30 dB	min. 21 dB
37,34 MHz ... 39,84 MHz	27...42 dB	min. 21 dB
39,84 MHz ... 62,42 MHz	45...60 dB	min. 35 dB
62,42 MHz ... 72,42 MHz	36 dB	min. 30 dB
72,42 MHz ... 110,42 MHz	70...80 dB	min. 40 dB
<b>Group delay ( mean value in PB ):</b>	1,4 $\mu$ s	max. 1,7 $\mu$ s
<b>Group delay ripple in PB (p-p) :</b>	200 ns	max. 300 ns
<b>Deviation from linear phase in PB (p-p) :</b>	$\pm 2$ degree	-
<b>Triple transit attenuation compared to main signal</b>	35 dB	
<b>Crosstalk attenuation compared to main signal</b>	50 dB	
<b>Temperature coefficient of frequency ( <math>T_c</math> )</b>	- 20 ppm/K	-
<b>Frequency deviation of <math>f_c</math> over temperature</b>	$\Delta f_c(\text{Hz}) = T_c(\text{ppm/K}) \times (T - T_A) \times f_{CTA}(\text{MHz})$	-
<b>Operating temperature range ( O.T.R. )</b>	-	- 40 °C ... + 85 °C
<b>Storage temperature range</b>	-	- 55 °C ... + 125 °C

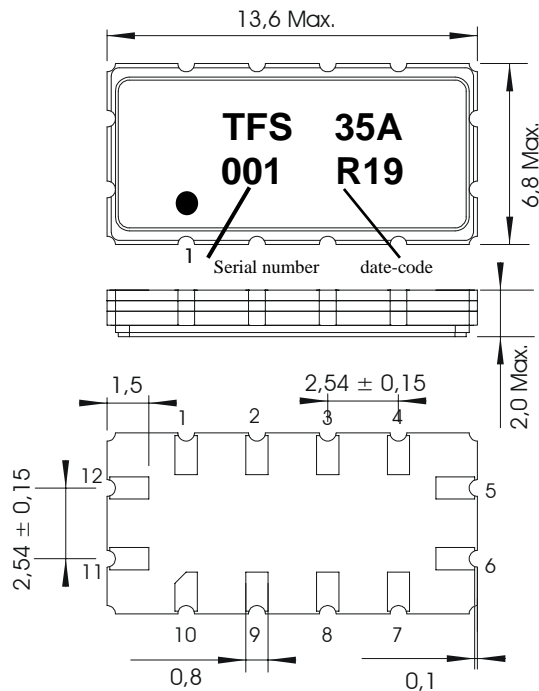
\*) The terminating impedances depend on parasitics and q-values of matching elements and the board used, and are to be understood as reference values only. Should there be additional questions do not hesitate to ask for an application note or contact our design team.

**Generated:****Checked / approved:**

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### 3. Package and pin connection : (All dimensions in mm)



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

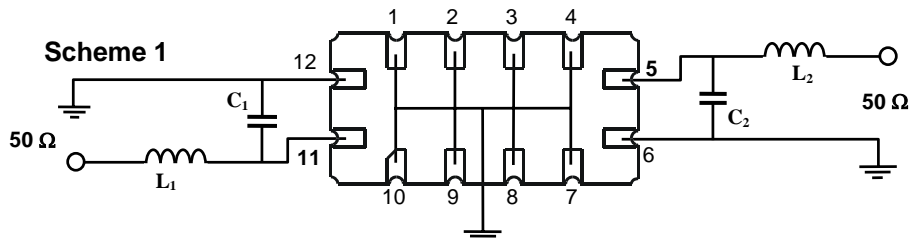
#### Unbalanced :

Pin 11	<b>Input</b>
Pin 12	Input RF Return
Pin 5	<b>Output</b>
Pin 6	Output RF Return
Pin 1-4, 7-10	Package Ground

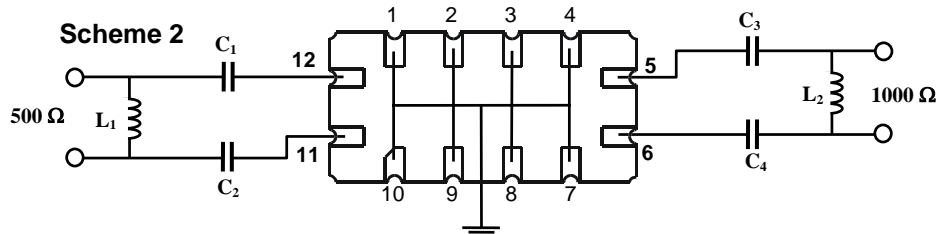
#### Balanced :

Pin 11	<b>Input</b>
Pin 12	<b>Input</b>
Pin 5	<b>Output</b>
Pin 6	<b>Output</b>
Pin 1-4, 7-10	Package Ground

#### 4.1 50 Ω matching network ( for details refer to application note ):



#### 4.2 Matching network for 500 Ω x 1000 Ω ( for details refer to application note ):



For final test we use scheme 1.

**5.1. 100% Screening Tests :**

After the following tests the filter shall meet the whole specification. Electrical tests after test 4, test 5 and 7.

1. Internal Visual Inspection: according to MIL-STD-883 method 2017
2. Stabilization Bake: 16 hrs at 125°C under Vacuum according to MIL-STD-883 Method 1008 Condition B
3. Temperature Cycling: -55 °C to 125°C / 30 min. each / 10 cycles  
DIN IEC 68 part 2 – 14 Test N equivalent MIL-STD-202 Method 107
4. Shock: 500g, 18 ms, half sine wave, 3 shocks each plane;  
DIN IEC 68 T2 - 27
5. Burn-in: 160hrs at 125°C ( no input power ) according to MIL-STD-883 Method 1015
6. Seal test: gross leak bubble test – Fluorocarbon liquid at 125°C ± 5°C  
MIL-STD-202 Method 112 Condition D  
Fine leak spot test – Helium detector according to MIL-STD-202 Method 112 Condition C
7. External Visual Inspection: according to MIL-STD-883 method 2009

**5.2. Qualification Tests :**

1. Resistance to solder heat (reflow): reflow possible: twice max.;  
for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4;
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. Life test: storage of 2 pcs for 1000 hrs at 125°C ( no input power ) MIL-STD-883 Method 1005. The test will be done using samples which were handled according to point 5.1.

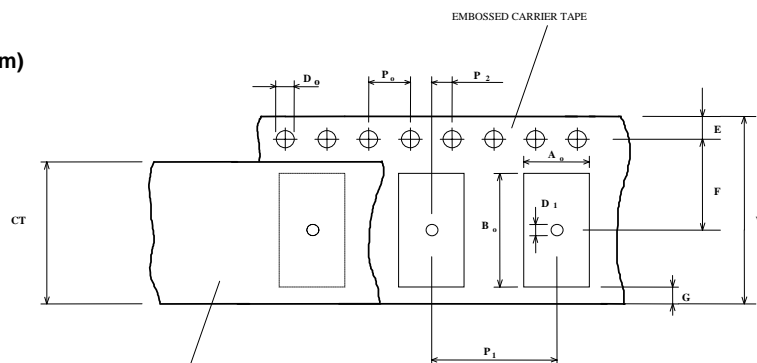
**6. Packing :**

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;

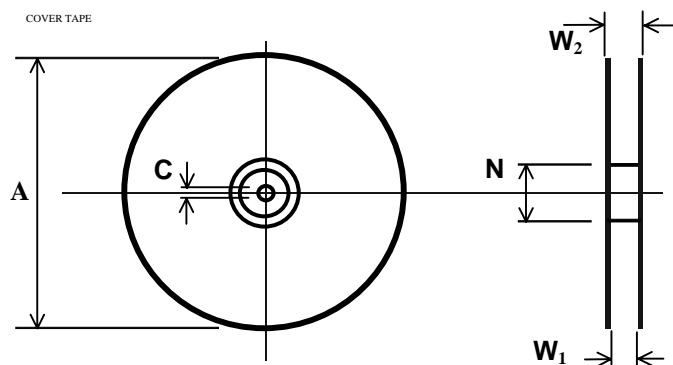
max. pieces of filters per reel:	1700
reel of empty components at start:	min 300 mm
reel of empty components at start including leader:	min 500 mm
Trailer	min 300 mm

**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)	:	0,6
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	:	24,4 + 2
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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## 7. 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.	

Air reflow profile

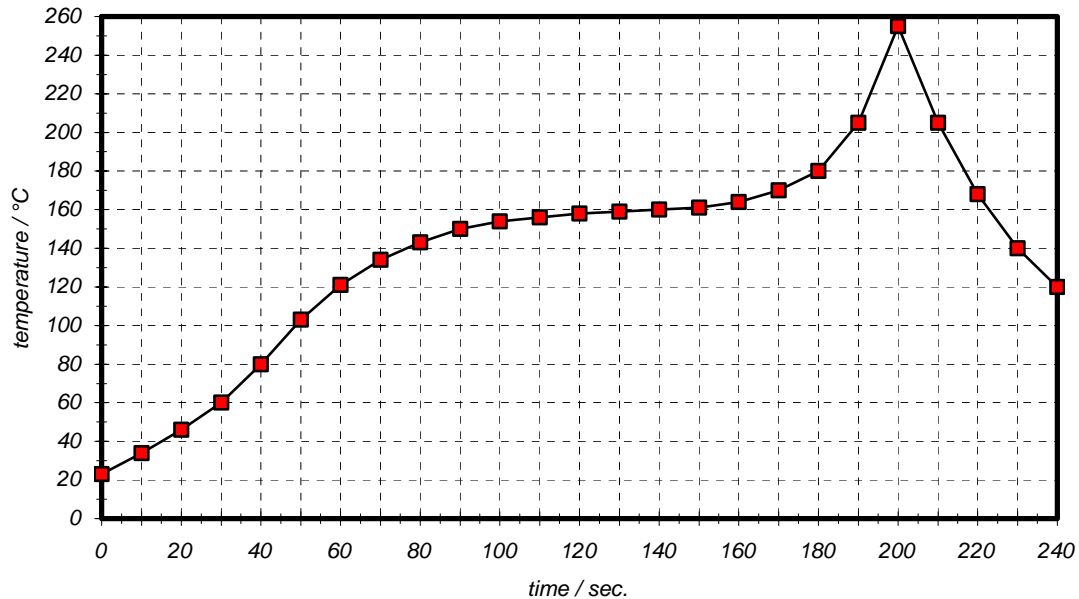


Table for temperature vs. time during the air reflow process

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

**8. History**

<b>Version</b>	<b>Reason of changes</b>	<b>Name</b>	<b>Date</b>
1.0	- Generate development specification according customer requirements.	Dunzow W.	23.01.2003
1.1	- Change storage temperature range. - Add information about measured temperatures.	Dunzow W.	07.02.2003
1.2	- Add further test to stability characteristics. - Add serial number to marking.	T. Kirschner	24.02.2003
1.3	- Change Paragraph 5.1 to 5.2 and wise versa - Change the quantity mentioned in 5.2.3 from 15pcs. to 2pcs. - Guarantee to use samples having 100% screening test for test 5.2.3	B. Küppers	27.02.2003
1.4	- Change from development specification to filter specification. - Add termination impedances and typical values.	Dr. Wall	06.05.2003