

VI TELEFILTER

Filter Specification

TFS 111 - 1/4

1. Measurement condition

Ambient temperature T_A :	23 °C
Input power level:	0 dBm.
Terminating impedances at f_C :	for input: 890 Ω - 5,6 pF .
	for output: 680 Ω - 5,9 pF .

Characteristics

Remark:

Reference level for the relative attenuation a_{rel} of the TFS 111 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 30 dB filter attenuation level relative to the insertion loss a_e . The temperature coefficient of frequency T_{Cf} 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
Insertion loss (Reference level) a_e	11,9 dB	max. 14 dB
Centre frequency f_C at ambient temperature T_A (f_{CAT})	111 MHz	111,0 \pm 0,06 MHz
Pass band at ambient temperature T_A :	$f_C - 0,425$ MHz..... $f_C + 0,475$ MHz	
Relative attenuation a_{rel}		
$f_C - 425$ kHz $f_C + 475$ kHz	-	max. 3 dB
$f_C - 800$ kHz $f_C - 425$ kHz	-	max. 10 dB
$f_C + 475$ kHz $f_C + 800$ kHz	-	max. 10 dB
$f_C - 1395$ kHz $f_C - 1210$ kHz	-	min. 20 dB
$f_C + 1200$ kHz $f_C + 1375$ kHz	-	min. 20 dB
$f_C - 1535$ kHz $f_C - 1395$ kHz	-	min. 30 dB
$f_C + 1375$ kHz $f_C + 1500$ kHz	-	min. 30 dB
$f_C - 10$ MHz $f_C - 1535$ kHz	60...45 dB	min. 40 dB
$f_C + 1500$ kHz $f_C + 10$ MHz	45...55 dB	min. 40 dB
Group delay (mean value in pass band):	1,13 μ s	
Group delay ripple (p-p) : $f_C - 800$ kHz... $f_C + 800$ kHz	160 ns	max 300 ns
Deviation from linear phase (p-p): $f_C - 800$ kHz... $f_C + 800$ kHz	3 °	
Frequency inversion temperature (T_o)	10° C	
Temperature coefficient: 1-st order [$T_{Cf}(1)$]	+ 1,7 ppm/K	
2-st order [$T_{Cf}(2)$]	- 0,06 ppm/K ²	
Frequency deviation of f_C over temperature: *)	$\Delta f_C(\text{Hz}) = [T_{Cf}(1) \times (T - T_o) + T_{Cf}(2) \times (T - T_o)^2] \times f_{T_o}(\text{MHz})$	
Operating temperature range	- 10 °C ... + 60 °C	
Storage temperature range	- 40 °C ... + 85 °C	
Input power level	max. + 10 dBm.	

*) f_{T_o} is reference frequency f_C at frequency inversion temperature (T_o)

Generated: _____ Dunzow W.P.

Checked/Approved: _____ Dr. Bert Wall

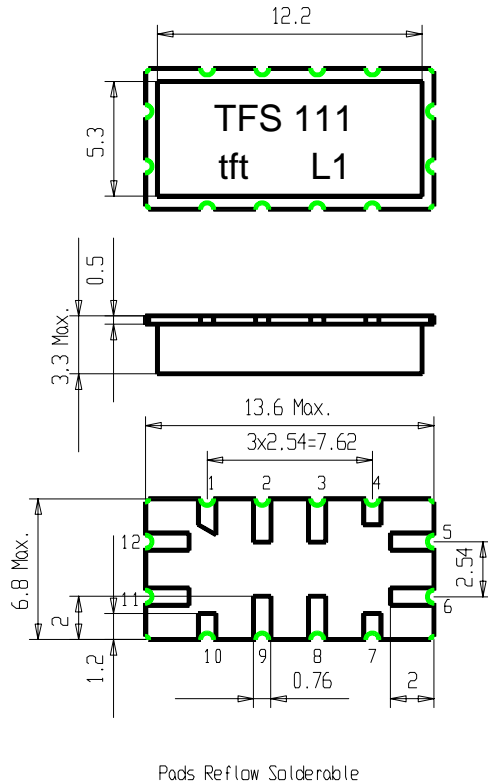
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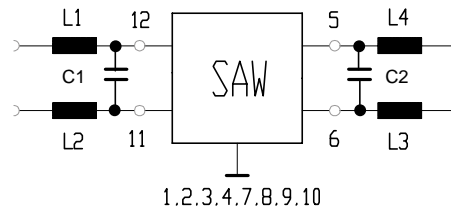
3. Package and 50 Ω - matching network (see Application Note):

(All dimensions in mm)



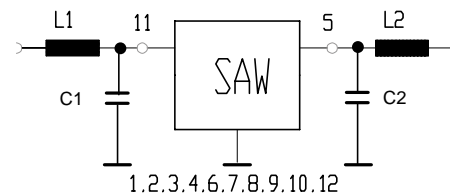
Balanced

- | | | |
|-------------------------|------------------|------------------|
| 1 Not Connected Ground | 2 Package Ground | 3 Package Ground |
| 4 Not Connected Ground | 5 Sym. Output | 6 Sym. Output |
| 7 Not Connected Ground | 8 Package Ground | 9 Package Ground |
| 10 Not Connected Ground | 11 Sym. Input | 12 Sym. Input |



Unbalanced

- | | | |
|-------------------------|------------------|--------------------|
| 1 Not Connected Ground | 2 Package Ground | 3 Package Ground |
| 4 Not Connected Ground | 5 Output | 6 Output RF-Return |
| 7 Not Connected Ground | 8 Package Ground | 9 Package Ground |
| 10 Not Connected Ground | 11 Input | 12 Input RF-Return |



VI TELEFILTER**Filter Specification****TFS 111 - 3/4****4. 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. Damp heat: 25 °C to 55°C / 95% r.H. / 10 cycles
(cycle) DIN IEC 68 - 2 – 30 Db
4. Resistance to solder heat (reflow): max. 2 times reflow process;
for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4;

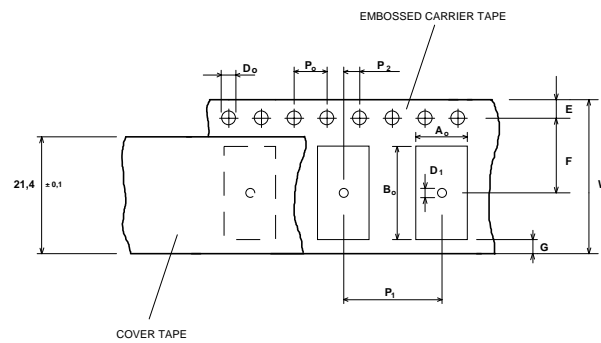
Packing:

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;

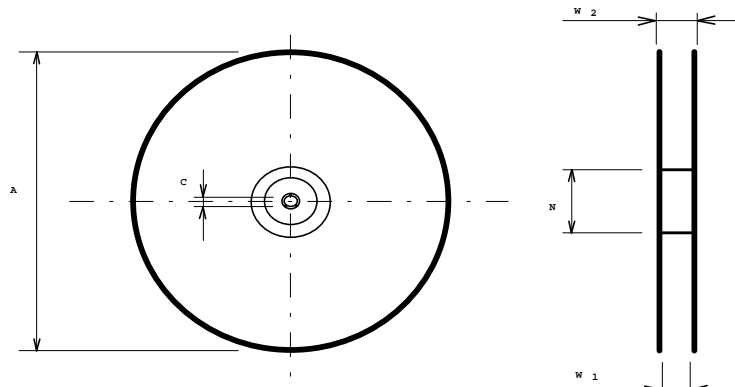
max. pieces of filters per reel: 1700
Reel of empty components at start: min 300 mm
Reel of empty components at start including leader: min 500 mm
Trailer: min 300 mm

Tape (all dimensions in mm)

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

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

A	: 330
W1	: 24,4 +2
W2 (max)	: 30,4
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 tap

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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.	

Air reflow profile

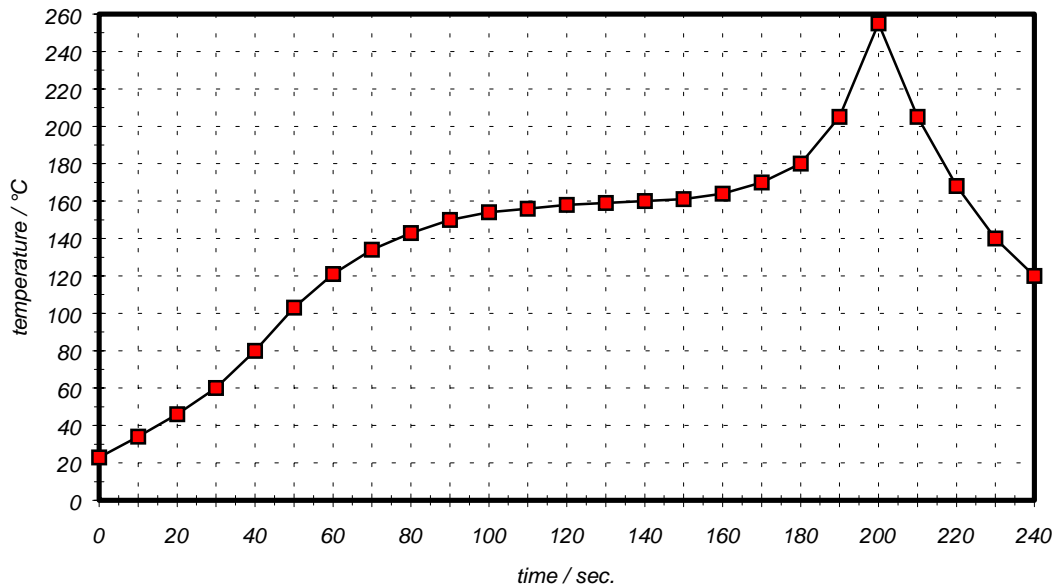


Table for temperature vs. time during the air reflow process

Tolerance of temperatures: ± 5 °C

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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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