VI TELEFILTER — Filter specification — TFS 403 — 1/5

Measurement condition

Ambient temperature: 23 °C
Input power level: 0 dBm
Terminating impedance: *
Input: 81 Ω || -11,5 pF
Output: 86 Ω || -12,6 pF

Characteristics

Remark:
The reference level for the relative attenuation a_{rel} of the TFS 403 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 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 nominal frequency f_N is fixed at 403,5 MHz without any tolerance. The given values for both the relative attenuation a_{rel} and the group delay ripple have to be achieved 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.

D a t a		typ. Value	Limit
Insertion loss (Reference level)	a_e	4,6 dB	max. 5,5 dB
Nominal frequency	f_N	-	403,5 MHz
Pass band	PB		f_N ± 1,5 MHz
Amplitude ripple in PB	p-p	0,6 dB	max. 1 dB
Relative attenuation	a_{rel}		
f_N	f_N ± 1,5 MHz	-	max. 1 dB
f_N ± 5,5 MHz	f_N ± 9 MHz	32 dB	min. 20 dB
f_N ± 9 MHz	f_N ± 19,5 MHz	32 dB	min. 25 dB
f_N ± 19,5 MHz	f_N ± 23,5 MHz	45 dB	min. 35 dB
f_N + 400,5 MHz	f_N + 406,5 MHz	70 dB	min. 20 dB
2 f_N ± 3 MHz		85 dB	min. 20 dB
Return loss within PB		14 dB	-
Input power level		-	max. 10 dBm
Temperature coefficient of frequency Tc_f **		-20 ppm/K	
Operating temperature range		-	- 10 °C.. + 60 °C
Storage temperature range		-	- 40 °C.. + 85 °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.
**) $\Delta f_C(Hz) = Tc_f(ppm/K) \times (T - T_A) \times f_{CTA}(MHz)$

Generated:

Checked / Approved:

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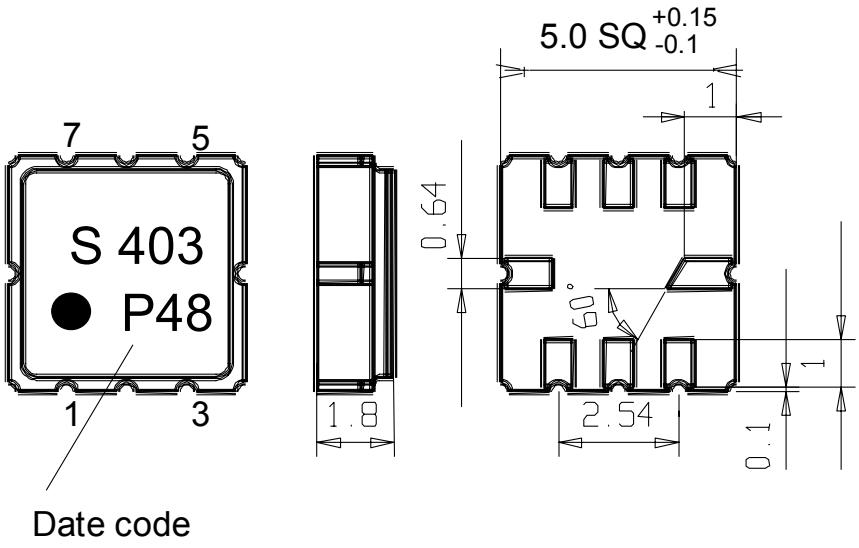
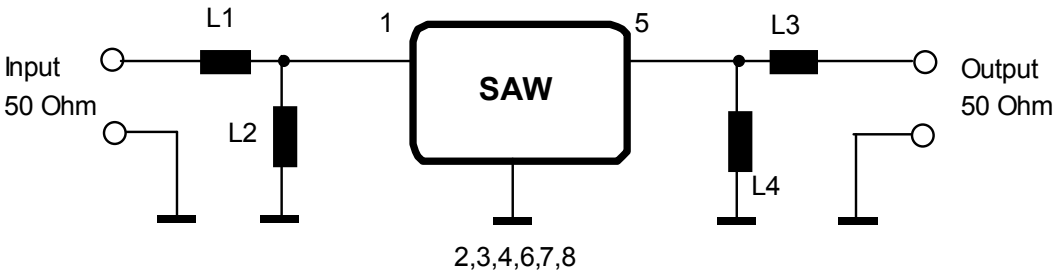
Construction and Pin Connection
(All dimensions in mm)



Pin 1	Input	Pin 5	Output	date code:	year + week
Pin 2	Input RF Return	Pin 6	Output RF Return	M	2000
Pin 3	Ground	Pin 7	Ground	N	2001
Pin 4,8	Package Ground			P	2002
				...	

50 Ω matching circuit



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Stability characteristics, reliability

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

1. Shock:	500g, 1 ms, half sine wave, 3 shocks each plane; DIN IEC 68 T2 - 27
2. Vibration:	10 Hz to 500 Hz, 0,35 mm or 5 g 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: three times max.; for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4;

This filter is RoHS compliant (2002/95/EG, 2005/618/EG)

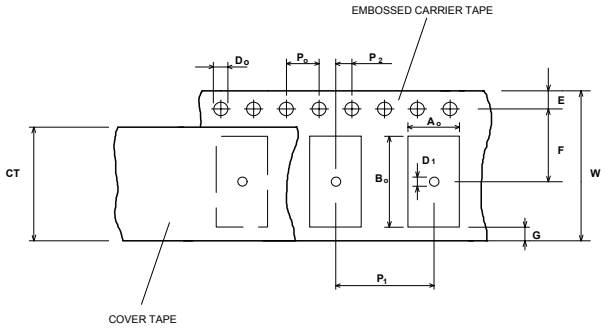
Packing

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:	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

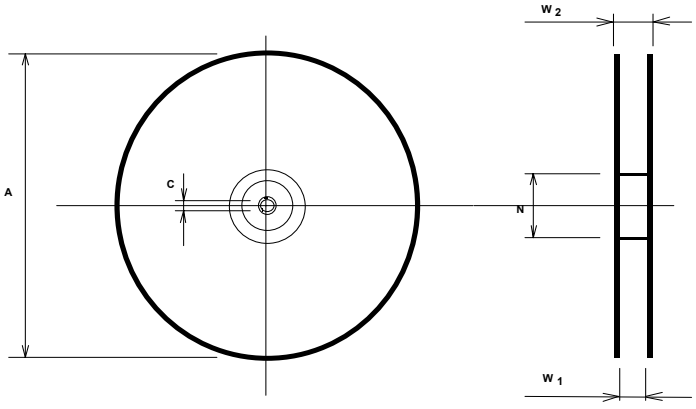
Tape (all dimensions in mm)

W	:	12	± 0,3
Po	:	4	± 0,1
Do	:	1,5	+ 0,1
E	:	1,75	± 0,1
F	:	5,5	± 0,05
G (min)	:	0,75	
P2	:	2	± 0,05
P1	:	8	± 0,1
D1(min)	:	1,5	
Ao	:	5,3	± 0,1
Bo	:	5,3	± 0,1
CT	:	9,5	± 0,1



Reel (all dimensions in mm):

A	:	330
W1	:	12,4 + 0,2
W2 (max)	:	18,4
N (min)	:	50
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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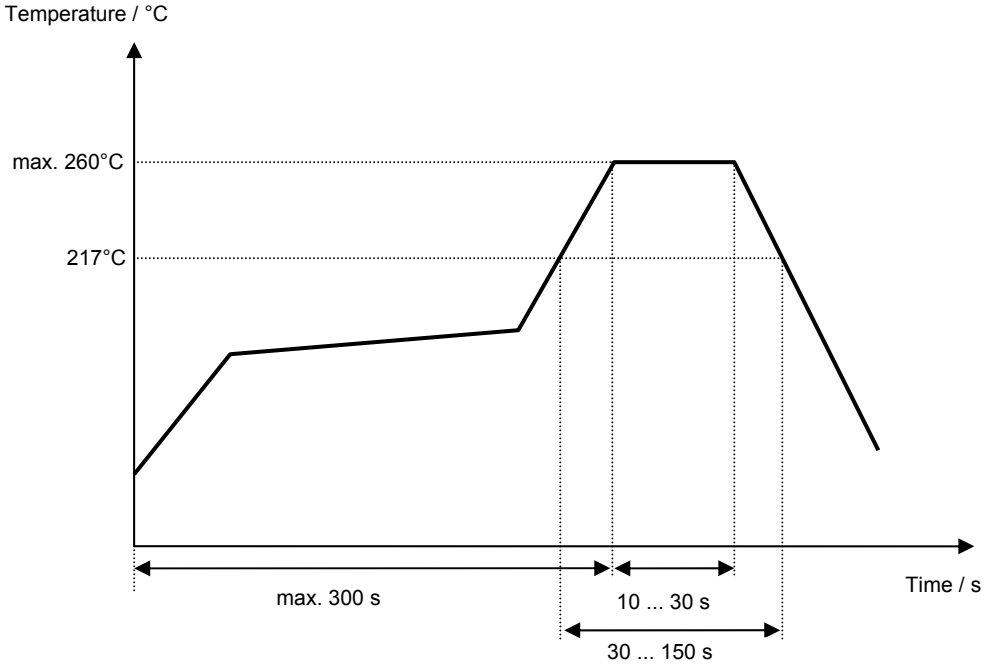
Air reflow temperature conditions

Conditions	Exposure
Average ramp-up rate (30°C to 217°C)	less than 3°C/second
> 100°C	between 300 and 600 seconds
> 150°C	between 240 and 500 seconds
> 217°C	between 30 and 150 seconds
Peak temperature	max. 260°C
Time within 5°C of actual peak temperature	between 10 and 30 seconds
Cool-down rate (Peak to 50°C)	less than 6°C/second
Time from 30°C to Peak temperature	no greater than 300 seconds

Chip-mount air reflow profile



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History

Version	Reason of Changes	Name	Date
1.0	generation of “Development specification” according to customer requirements and feasibility study	Chilla	28.05.2002
1.1	change of **Tc_f** add limit line 20 dB at 804-810 MHz	Chilla	22.08.2002
1.2	limit line at 2 f_N ±3 MHz corrected	Chilla	26.08.2002
1.3	add typical values off terminating impedance and relative attenuation	Pfeiffer	11.09.2002
1.4	change terminating impedance and typical values of insertion loss and relative attenuation	Pfeiffer	25.11.2002
1.5	change stability characteristics	Strehl	13.12.2006

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