Measurement condition

Ambient temperature T_A: 23 °C
Input power level: 0 dBm
Terminating impedance at f_c:
input: 1,15 kΩ || -6,5 pF
output: 1,05 kΩ || -6,5 pF

Characteristics

Remark:
Reference level for the relative attenuation a_{rel} of the **TFS 249A** is the minimum of the pass band attenuation a_{min} . **It 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 on **249,6 MHz** without tolerance. The given values for the relative attenuation a_{rel} and for the group delay ripple have to be reached at the frequencies given below also 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		
Insertion loss (Reference level)	a_e	14,0	dB	max.	20,0	dB
Nominal frequency	f_N	-			249,6	MHz
Centre frequency	f_c	249,6	MHz			
1 dB Bandwidth		4,72	MHz	min.	3,84	MHz
3 dB Bandwidth		5,71	MHz		-	
30 dB Bandwidth		9,08	MHz		-	
40 dB Bandwidth		9,60	MHz	max.	11,0	MHz
Passband ripple	within ± 1,92 MHz		-	min.	1,0	dB
Relative attenuation	a_{rel}					
f_N ...	f_N ± 1,92 MHz	0,4	dB	max.	1,0	dB
f_N ± 3,08 MHz	f_N ± 5,5 MHz	10	dB	min.	3,0	dB
f_N ± 5,5 MHz	f_N ± 15 MHz	48	dB	min.	40,0	dB
f_N ± 15 MHz	f_N ± 30 MHz	60	dB	min.	50,0	dB
Group delay ripple	within ± 1,92 MHz	35	ns	max.	50,0	ns
Return loss:	within ± 1,92 MHz	16	dB	min.	10,0	dB
Operating temperature range				- 10 °C ... + 80 °C		
Temperature coefficient of frequency (Tc_f) *)		0,032	ppm/ K²			
Frequency inversion temperature T_O		32	°C			
Storage temperature range				- 30 °C ... + 85 °C		

***)** $\Delta f_C(Hz) = Tc_f(ppm/K^2) \times (To - T_A)^2 \times f_{TO}(MHz)$

Generated:

Checked/Approved:

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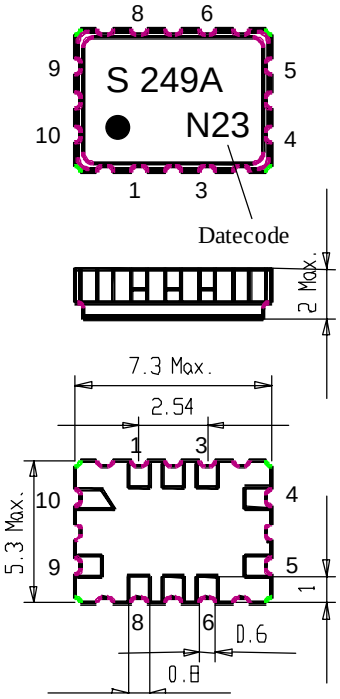
Construction and pin connection

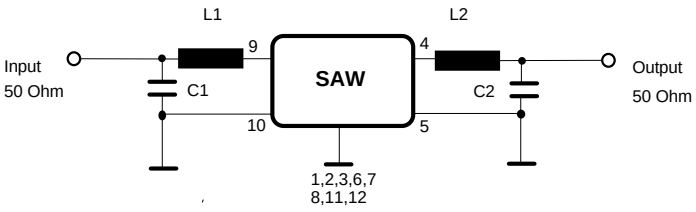
(All dimensions in mm)



1	Ground
2	Ground
3	Ground
4	Output
5	OutputRF Return
6	Ground
7	Ground
8	Ground
9	Input
10	Input RF Return

Datecode:	Year+week
L	1999
M	2000
N	2001
...	

50 Ω matching network:



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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. Damp heat: (cycle)	25 °C to 55°C / 95% r.H. / 10 cycles 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;

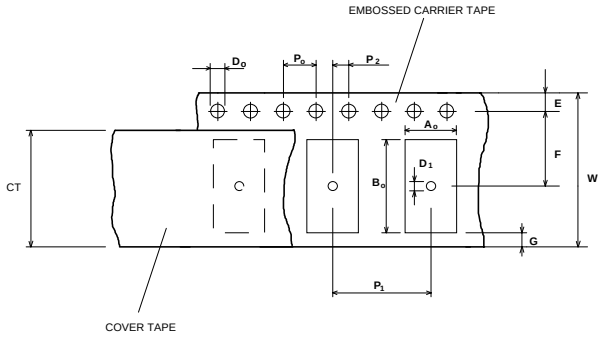
Packing

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:	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

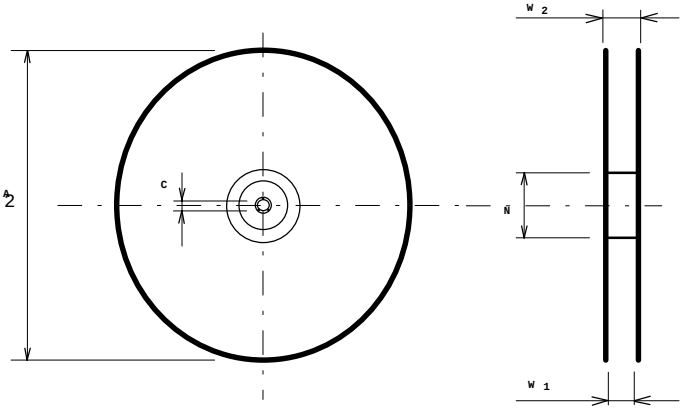
Tape (all dimensions in mm)

W	:	16 ± 0,3
Po	:	4 ± 0,1
Do	:	1,5 + 0,1
E	:	1,75 ± 0,1
F	:	7,5 ± 0,1
G (min)	:	0,60
P2	:	2 ± 0,10
P1	:	8 ± 0,10
D1(min)	:	1,5
Ao	:	5,5 ± 0,1
Bo	:	7,5 ± 0,1
CT	:	13,5 ± 0,1



Reel (all dimensions in mm):

A	:	330
W1	:	16,4 +2,0
W2 (max)	:	22,4
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. 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 tape.

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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 °C	over 200 °C	255 °C ± 5 °C
Time:	60 sec. - 90 sec.	20 sec. - 25 sec.	

Chip-mount air reflow profile

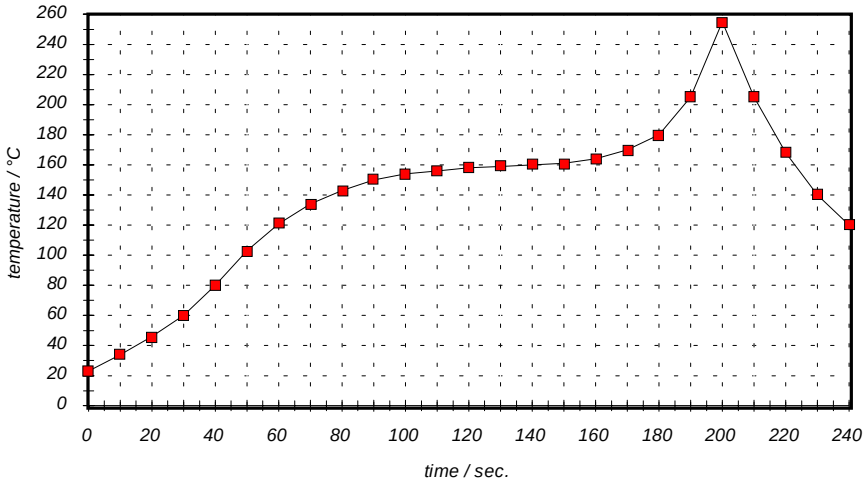

Table for temperature vs. time during the air reflow process

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

Version		Reason of Changes	Name	Date
Development specification				
1.0	-	generated according to Hudson's specification	Dr. Sabah	30.08.2000
1.1	-	Changed: group delay ripple:100ns 50ns		
	-	Changed: terminating impedance	Dr. Sabah	07.09.2000
1.2	-	change the 40 dB bandwidth to max 11 MHz	Steiner	28.05.2001
Filter specification				
2.0		final filter specification	Steiner	08.06.2001
	-	typical values and terminating impedances added		

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