Measurement condition

Ambient temperature:	20 ... 25 °C
Input power level:	5 ± 2 dBm
terminating impedances *	
Input:	1,1 kΩ || -5.1pF
Output:	1,1 kΩ || -5.2pF

Characteristics

Remark:
The reference level for the relative attenuation a_{rel} of TFS 211C is the minimum of the pass band attenuation a_{min}. This value 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 1 dB filter attenuation level relative to the insertion loss a_e. The given values for the relative attenuation a_{rel} and the group delay ripple have to be reached 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	$a_e = a_{min}$	6 ... 7 dB	min. 4,5 dB max. 8 dB
Nominal frequency	f_N	-	211,0 MHz
Centre frequency	f_c	211,0 MHz	-
Relative attenuation	a_{rel}		
f_N - 200 kHz ... f_N + 200 kHz		0,5 dB	max. 1 dB
1 MHz ... f_N - 1,8 MHz		-	min. 30 dB
f_N ± 600 kHz ... f_N ± 1,2 MHz		-	min. 10 dB
f_N ± 1,2 MHz ... f_N ± 1,8 MHz		-	min. 20 dB
f_N + 1,8 MHz ... f_N + 7,0 MHz		-	min. 30 dB
f_N + 7,0 MHz ... 1,0 GHz		-	min. 45 dB
1,0 GHz ... 2,0 GHz		-	min. 40 dB
2,0 GHz ... 3,0 GHz		35 dB	-
3,0 GHz ... 4,0 GHz		30 dB	-
Group delay ripple	GD		
f_N - 200 kHz ... f_N + 200 kHz		-	max. 350 ns
Input power level		-	max. + 10 dBm
Permissible DC voltage		-	max. 10 V
Operating temperature range **		-	- 35 °C ... + 85 °C
Storage temperature range		-	- 35 °C ... + 85 °C
Temperature coefficient	TC ***	- 0,036 ppm/K²	-
Frequency inversion temperature	T_0	25 °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.

**) If the filter is used between -10°C and -35°C all given frequencies may be changed down to max. - 30 kHz

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

Generated:

Checked / approved:

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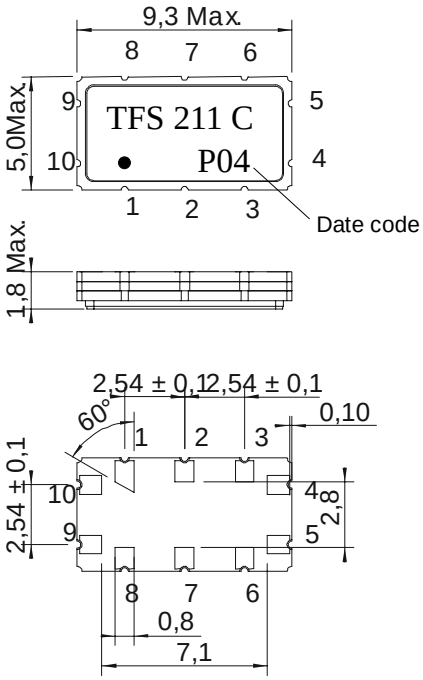
Construction and pin connection

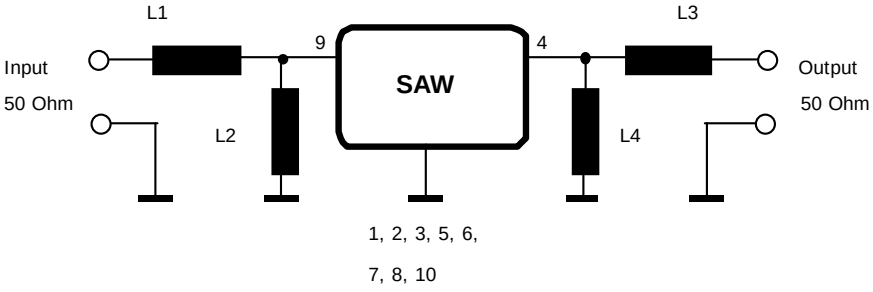
(All dimensions in mm)



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

Datecode	Year + week
M	2000
N	2001
P	2002
...	

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, 1,5 mm or 20g 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;

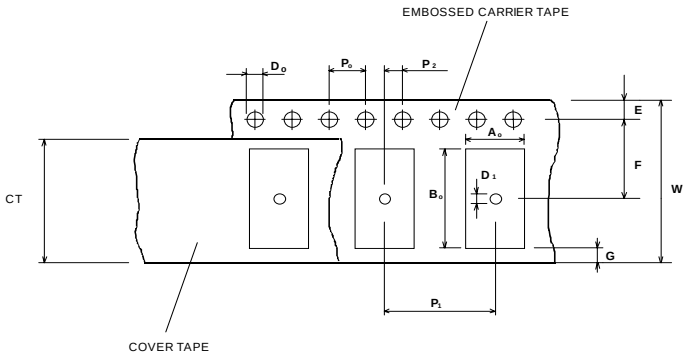
Packing

Tape & Reel: 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

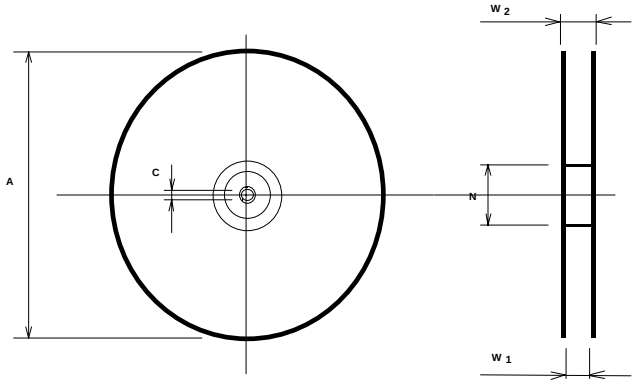
Tape (all dimensions in mm)

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 ± 0,1
P1	:	8 ± 0,1
D1(min)	:	1,5
Ao	:	5,30 ± 0,1
Bo	:	9,70 ± 0,1
CT	:	13,5 ± 0,1



Reel (all dimensions in mm):

A	:	330
W1	:	16,40 +2,0
W2 (max)	:	22,4
N (min)	:	50
C	:	13,0 + 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 °C	over 200 °C	255 °C ± 5 °C
Time:	60 sec. - 90 sec.	20 sec. - 25 sec.	

Chip-mount air reflow profile

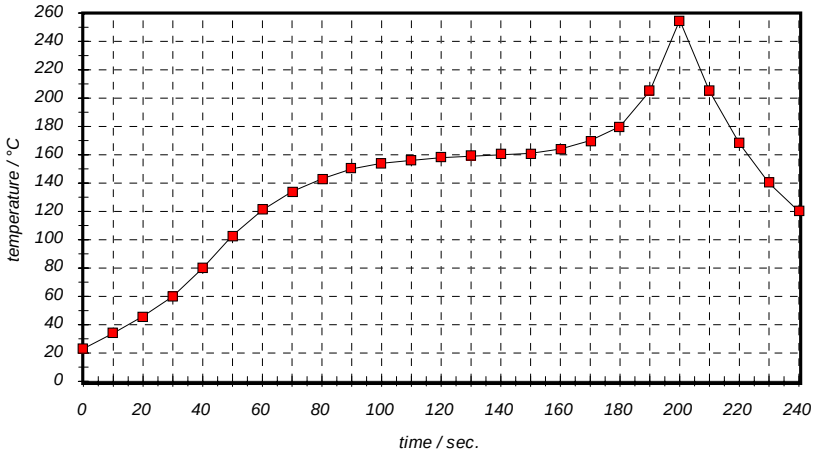

Table for temperature vs. time during the air reflow process

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
2.0	generate detailled specification - add terminating impedances - add matching circuit - add tape and reel dimensions, stability characteristics and reflow profile	Steiner	24.01.2001
2.1	Use harder conditions for “Stability characteristics” Change pin 1 marker Add footnotes Correct “Tape and reel” information	Herrler	15.08.2001
3.0	new packae with pin 1 marking introduced	Steiner	23.01.2002

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