

VI TELEFILTER**Preliminary Specification****TFS 211D****1/5****Measurement condition**

Ambient temperature T_A : 23 °C
 Input power level: 0 dBm
 Terminating impedances at f_C *:
 input: 740 Ω // -7,7 pF (preliminary value)
 output: 280 Ω // -8,8 pF (preliminary value)

Characteristics**Remark:**

The reference level for the relative attenuation a_{rel} of TFS211D 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 3 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 .

Data		typ. value		tolerance / limit
Insertion loss (reference level)	a_e	4,8	dB	max. 6,5 dB
Nominal frequency	f_N	-		211 MHz
Centre frequency (at ambient temperature)	f_C	211	MHz	± 25 kHz
Relative attenuation	a_{rel}			
f_C $f_C \pm 50$ kHz	$f_C \pm 50$ kHz	0,75	dB	max. 1,5 dB
$f_C \pm 50$ kHz $f_C \pm 80$ kHz	$f_C \pm 80$ kHz	1,3	dB	max. 2 dB
$f_C \pm 80$ kHz $f_C \pm 100$ kHz	$f_C \pm 100$ kHz	2,2	dB	max. 3 dB
$f_C \pm 0,2$ MHz $f_C \pm 0,4$ MHz	$f_C \pm 0,4$ MHz	5	dB	min. 3 dB
$f_C \pm 0,4$ MHz $f_C \pm 0,6$ MHz	$f_C \pm 0,6$ MHz	28	dB	min. 25 dB
$f_C \pm 0,6$ MHz $f_C \pm 0,8$ MHz	$f_C \pm 0,8$ MHz	42	dB	min. 40 dB
$f_C \pm 0,8$ MHz $f_C \pm 20$ MHz	$f_C \pm 20$ MHz	42	dB	min. 38 dB
		49	dB	min. 46 dB
Group delay ripple within $f_C \pm 100$ kHz		250	ns	max. 500 ns
Absolute group delay within $f_C \pm 100$ kHz		2,5	μ s	max. 5 μ s
Temperature coefficient of frequency (TC_f)**		- 0,036	ppm/K ²	-
Frequency inversion temperature T_0		27	°C	-
Operating temperature range		-		0 °C ... + 85 °C
Storage temperature range		-		- 40 °C ... + 85 °C
VSWR within $f_C \pm 100$ kHz		16	dB	min. 10 dB
Input power		-		max. 10 dBm
DC voltage between any two terminals		-		± 30 V
Out of band intermodulation		65	dBm	60 dBm (preliminary limit value)
input signals: 10 dBm at 211,8 MHz and 212,6 MHz				
input signals: 10 dBm at 210,2 MHz and 209,4 MHz				

*) 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.

***) $\Delta f(\text{Hz}) = TC_f(\text{ppm/K}^2) \times (T - T_0)^2 \times f_{T0}(\text{MHz})$

generated: _____

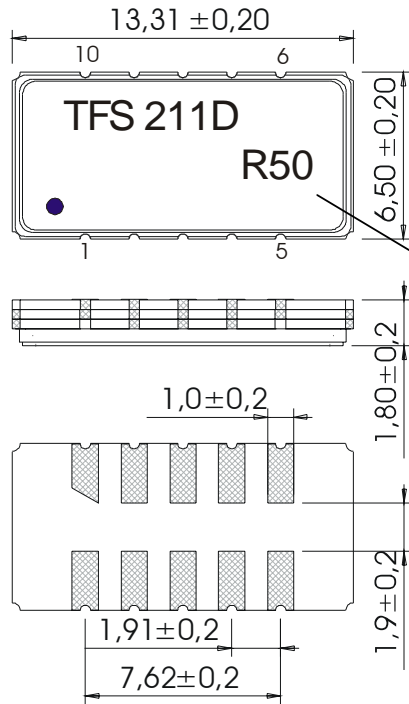
checked / approved: _____

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Construction, pin configuration and 50 Ω - matching network

(All dimensions in mm)



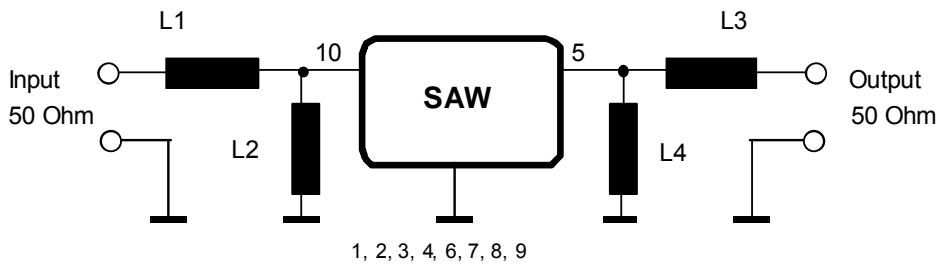
date code

- 1 input rf return
- 2 ground
- 3 ground
- 4 ground
- 5 output
- 6 output rf return
- 7 ground
- 8 ground
- 9 ground
- 10 input

date code: year + week

- N 2001
- P 2002
- R 2003
-

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, 0,35 mm or 5g 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;

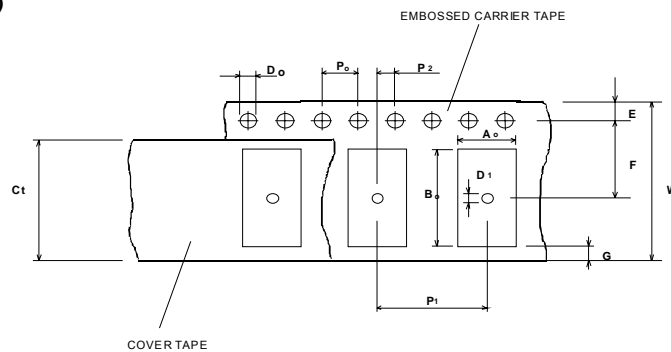
Packing

Tape & Reel: 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;

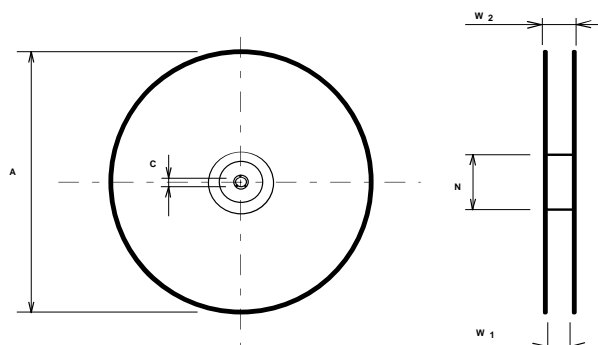
max. pieces of filters per reel:	1700
reel of empty components at start:	min 300 mm
reel of empty components at start including leader:	min 500 mm
trailer	min 300 mm

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)	: 0,60
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	: 24,40 +2,0
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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Air reflow temperature conditions

1st and 2nd air reflow profile

Name:	pre-heating periods	main-heating periods	peak temperature
Temperature:	150 °C - 170 °	Cover 200 °C	255 °C ± 5 °C
Time:		60 sec. - 90 sec.	20 sec. - 25 sec.

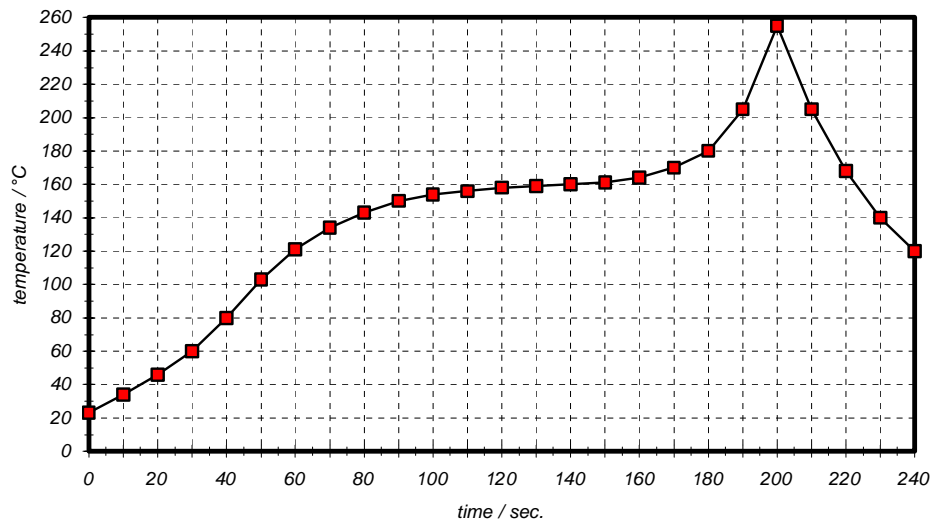
Air reflow profile

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

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History

Version	Reason of Changes	Name	Date
1.0	generation of development specification	Pfeiffer	01.08.2003
1.1	typical values, terminating impedances (preliminary values) and matching configuration added	Pfeiffer	30.09.2003
1.2	relative attenuation at $f_C \pm 0,6$ MHz modified out of band intermodulation limits added	Pfeiffer	10.12.2003

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