

VI TELEFILTER**Filter Specification****TFS 167D****1/5****Measurement condition**

Ambient Temperature: 23 °C
 Input Power Level: 0 dBm
 Terminating Impedance at f_c^* :
 input: 450 Ω // -7.5 pF
 output: 470 Ω // -6.6 pF

Characteristics

Remark: Reference level for the relative attenuation a_{rel} of the TFS 167D 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 temperature coefficient of frequency TC_f is valid for both the reference frequency f_c and the frequency response of the filter in the operating temperature range.

D a t a		typ. Value	Limit
Insertion Loss (Reference Level)	$a_e = a_{min}$	4,8 dB	max. 7,0 dB
Nominal Frequency	f_N	-	167,0 MHz
Pass Band	PB	-	$f_N \pm 75$ kHz
Average Group Delay within PB		2,05 μ s	max. 2,3 μ s
Group Delay Variation within PB		200 ns	max. 400 ns p-p
Relative Attenuation	a_{rel}		
f_N	$f_N \pm 75$ kHz	-	max. 1,5 dB
$f_N \pm 0,2$ MHz ...	$f_N \pm 0,4$ MHz	-	min. 2,0 dB
$f_N \pm 0,4$ MHz ...	$f_N \pm 0,6$ MHz	23 dB	min. 20 dB
$f_N \pm 0,6$ MHz ...	$f_N \pm 0,8$ MHz	38 dB	min. 25 dB
$f_N - 137,0$ MHz ...	$f_N - 17,0$ MHz	75 dB	min. 60 dB
$f_N - 17,0$ MHz ...	$f_N - 0,8$ MHz	45 dB	min. 35 dB
$f_N + 0,8$ MHz ...	$f_N + 13,0$ MHz	38 dB	min. 35 dB
$f_N + 13,0$ MHz ...	$f_N + 833,0$ MHz	75 dB	min. 60 dB
Return loss in PB		12 dB	min. 10 dB
Operating Temperature Range ° C			-5 +85
Storage Temperature Range			-40.... +100 ° C
Temperature Coefficient of frequency TC_f		- 0,036 ppm / K ²	-
Out of band intermodulation		-135 dBm	min. -120 dBm
input signals at 167,8 and 168,6 MHz at -20 dBm input signals at 166,2 and 165,4 MHz at -20 dBm			
Input power			max. 15 dBm**

*) 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.

***) a power of 20 dBm can be applied shortly, for 10 years life time the cycle time should be less than 1:100

generated:

checked / approved:

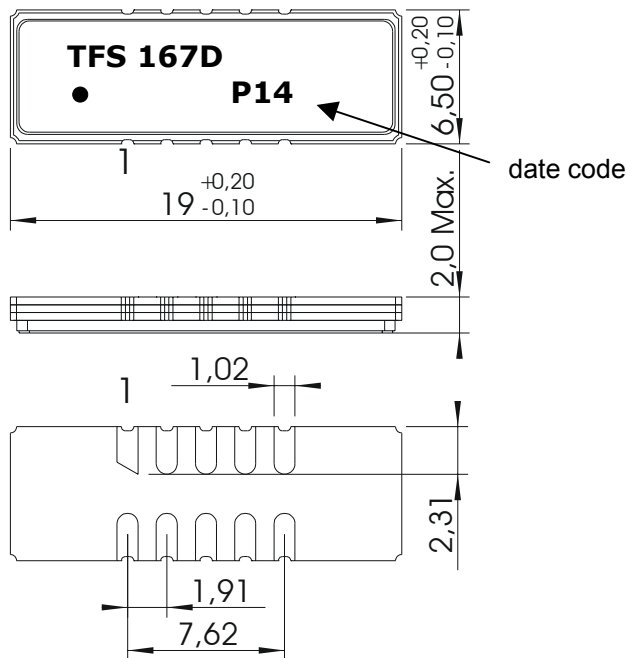
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Construction and pin connection

(All dimensions in mm)



single ended

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

balanced

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

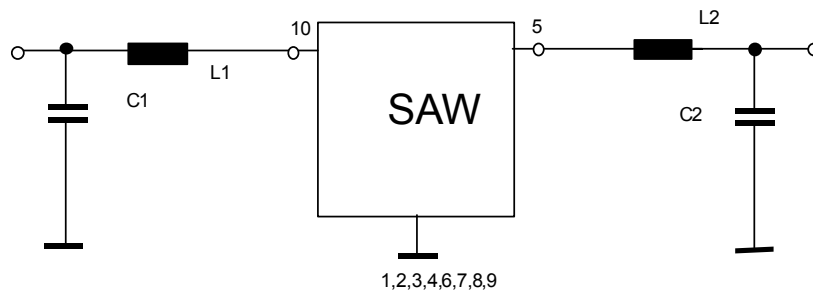
date code:

- M
- N
- P
- ...

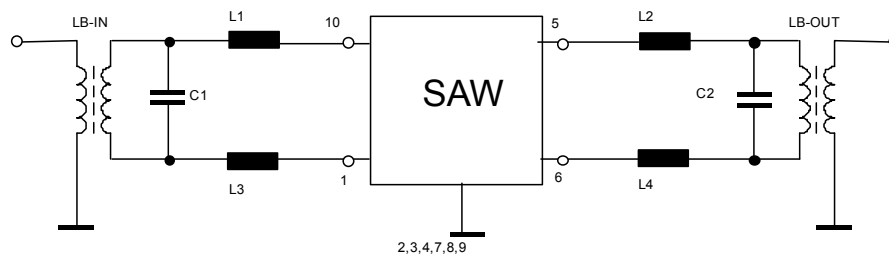
year + week

- 2000
- 2001
- 2002

50 Ω matching circuit, single ended



200 Ω matching circuit, differential



optional possible: matching circuit, input 50 Ω single ended / output 200 Ω differential

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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;

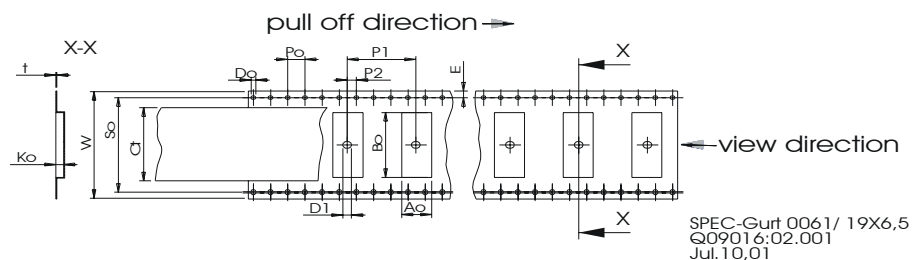
Packing

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;

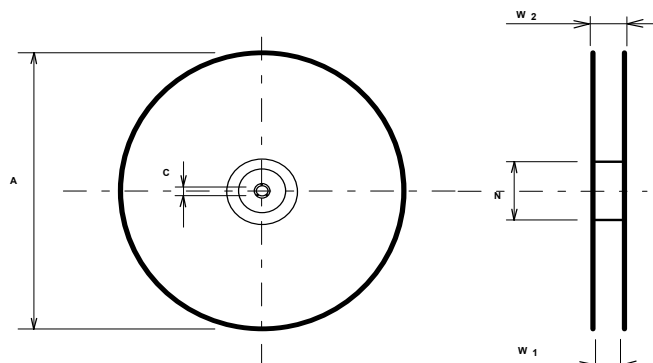
max. pieces of filters per reel:	2000
Reel of empty components at start:	min 300 mm
Reel of empty components at start including leader:	min 500 mm
Trailer	min 300 mm

Tape (all dimensions in mm)

W	: 32 ± 0,3
Po	: 4 ± 0,1
Do	: 1,5 ± 0,5
E	: 1,75 ± 0,1
So	: 28,4 ± 0,1
P2	: 2 ± 0,1
P1	: 12 ± 0,1
D1(min)	: 2
Ao	: 7,1 ± 0,1
Bo	: 19,6 ± 0,1
Ko	: 2,0 ± 0,1
t	: 0,35 ± 0,05
Ct	: 25,5 ± 0,1

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

A	: 330
W1	: 32,4 +2
W2 (max)	: 38,4
N (min)	: 100
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 in the above shown direction.

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Air reflow temperature conditions1st 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.	

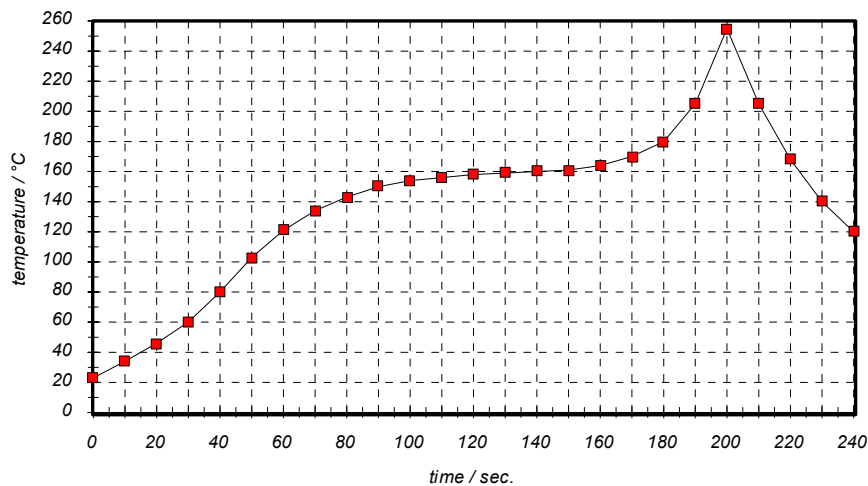
Chip-mount air reflow profile

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

VI TELEFILTER**Filter Specification****TFS 167D****5/5****History**

Version	Reason of Changes	Name	Date
1.0	- generation of specification according to customer requirements	Pfeiffer	14.11.2001
1.1	- terminating impedances added - typical values added	Pfeiffer	27.03.2002

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