

VI TELEFILTER**Filter specification****TFS 167 G****1/5****Measurement condition**

Ambient temperature: 23 °C
 Input power level: 0 dBm
 Terminating impedances at f_C *: input: 325 Ω // -8,0 pF
 output: 325 Ω // -8,0 pF

Characteristics**Remark:**

Reference level for the relative attenuation a_{rel} of the TFS 167 G is the maximum of the pass band attenuation a_{max} . The maximum of the pass band attenuation a_{max} 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 3dB filter attenuation level relative to the insertion loss a_e . The nominal frequency f_N is fixed at 167,0 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 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	Tolerance/Limitation
Insertion loss (Reference level)	a_e	1,4 dB	max. 3,0 dB
Nominal frequency	f_N	-	167,0 MHz
Pass band	PB	318 kHz	$f_N \pm 75$ kHz
Amplitude variation in PB		-	max. 1 dB
Amplitude ripple in PB	p-p	-	max. 0,5 dB
Relative attenuation	a_{rel}		
$f_N \pm 0,4$ MHz ... $f_N \pm 0,6$ MHz		9,0 dB	min. 5 dB
$f_N \pm 0,6$ MHz ... $f_N \pm 20,0$ MHz		18,0 dB	min. 10 dB
$f_N - 20$ MHz ... $f_N - 137$ MHz		40 dB	min. 30 dB
$f_N + 20$ MHz ... $f_N + 103$ MHz		40 dB	min. 30 dB
$f_N + 103$ MHz ... $f_N + 105$ MHz		65 dB	min. 40 dB
$f_N + 105$ MHz ... $f_N + 833$ MHz		40 dB	min. 30 dB
Absolute group delay in PB		1,71 μ s	max. 2,0 μ s
Group delay ripple in PB		240 ns	max. 300 ns
Intermodulation ratio For two -20dBm input signals @ $f_N + 0,800$ MHz and $f_N + 1,600$ MHz @ $f_N - 0,800$ MHz and $f_N - 1,600$ MHz		-	min. 100 dB
Input Return loss		18,0 dB	min. 15,0 dB
Output Return loss		20,0 dB	min. 10,0 dB
Input power level		-	max. 22 dBm
Temperature coefficient of frequency Tc_f		40 °C	-
Frequency inversion temperature		-0,032 ppm/k ²	-
Operating temperature range		-	- 5 °C .. + 85 °C
Storage temperature range		-	- 40 °C.. + 90 °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.

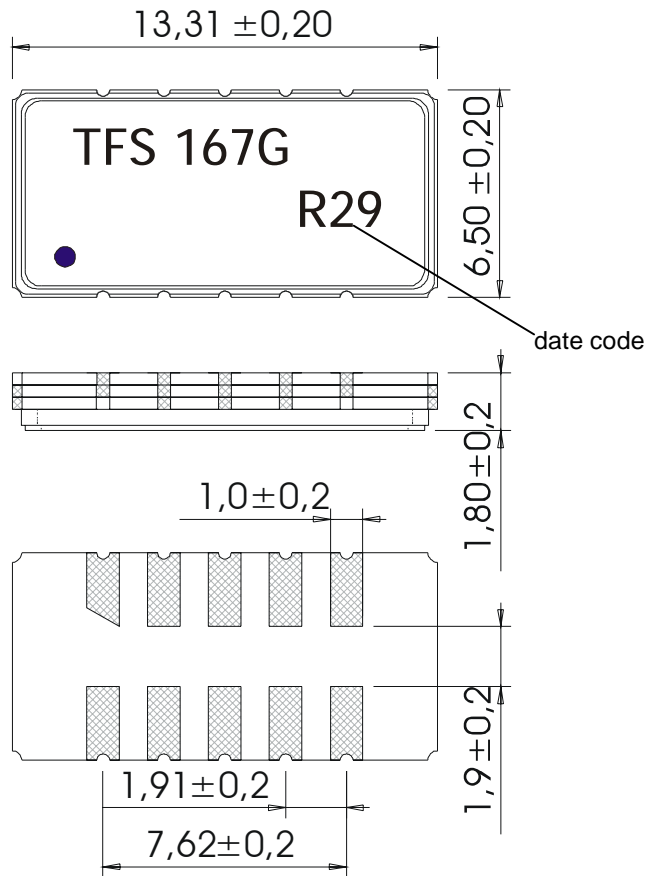
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Construction and Pin Connection

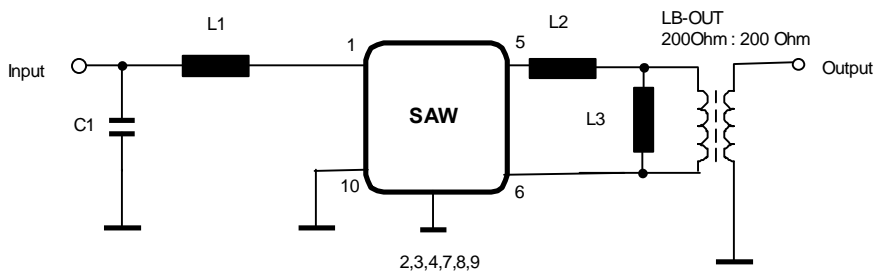
(All dimensions in mm)



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

date code: year + week
 N 2001
 P 2002
 R 2003
 ...

50 Ω matching 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

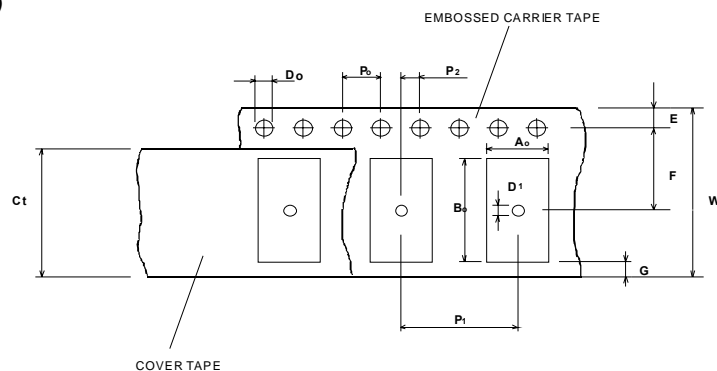
Tape & Reel: DIN IEC 286 – 3, with exception of value for N and minimum bending radius;
tape type II, embossed carrier tape with top cover tape on the upper side;

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

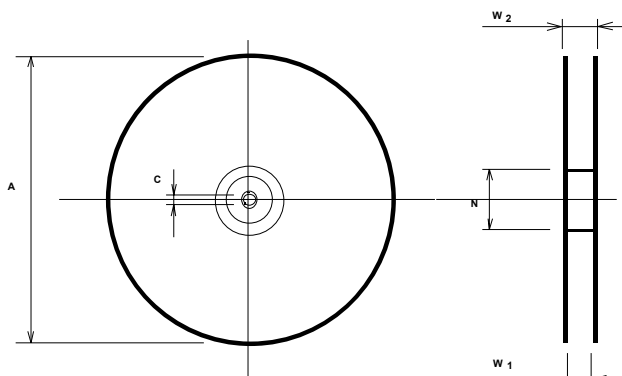
mm

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	: 24,4 +2
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 °C	over 200 °C	255 °C ± 5 °C
Time:	60 sec. - 90 sec.	20 sec. - 25 sec.	

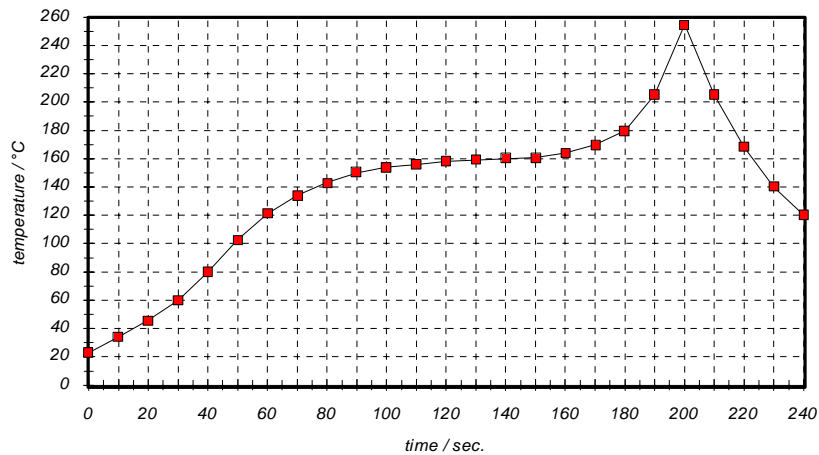
Chip-mount air reflow profile

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 167 G****5/5****History**

Version	Reason of Changes	Name	Date
1.0	generate development specification according to customer requirements	Dr. S. Sabah	24.04.2003
2.0	generate Filter specification ; add of typ. values and terminating impedance	Dr. S. Sabah	23.07.2003
2.1	change of relative attenuation	Roizengaft	07.11.2003
2.2	change of relative attenuation, change of definition of insertion loss, add amplitude ripple in passband	Roizengaft	14.11.2003

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