

VI TELEFILTER**Filter Specification****TFS 135****1/5****1. Measurement condition**

Ambient temperature T_A :	23 °C	
Input power level:	0 dBm	
Terminating impedances at f_C *:	input:	1,5 k Ω // -6,0 pF
	output:	1,5 k Ω // -5,0 pF

2. Characteristics

Remark:

Reference level for the relative attenuation a_{rel} of the TFS 135 is the insertion loss. 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 T_{c_f} is valid both for the reference frequency f_C and the frequency response of the filter in the operating temperature range.

Data		typ. value	tolerance / limit
Insertion loss (reference level)	a_e	14,5 dB	max 16,0 dB
Centre frequency (at ambient temperature T_A)	f_C ()	-	135,420 MHz \pm 200 kHz
Relative attenuation	a_{rel}		
f_C	$f_C \pm 1,25$ MHz	-	max 3 dB
$f_C \pm 4$ MHz	$f_C \pm 6$ MHz	35 dB	min 30 dB
$f_C \pm 6$ MHz	$f_C \pm 15$ MHz	38 dB	min 35 dB
$f_C \pm 15$ MHz	$f_C \pm 24$ MHz	40 dB	min 38 dB
Group delay ripple:	$f_C \pm 1,0$ MHz	35 ns	max 80 ns
Temperature coefficient of frequency (T_{c_f})		-19 ppm/K	-
Frequency deviation of f_C over temperature T:		$\Delta f_C(\text{Hz}) = T_{c_f}(\text{ppm/K}) \times (T - T_A) \times f_{CAT}(\text{MHz})$	
Operating temperature range			- 10 °C ... + 85 °C
Storage temperature range			- 25 °C.... + 85 °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.

generated: _____

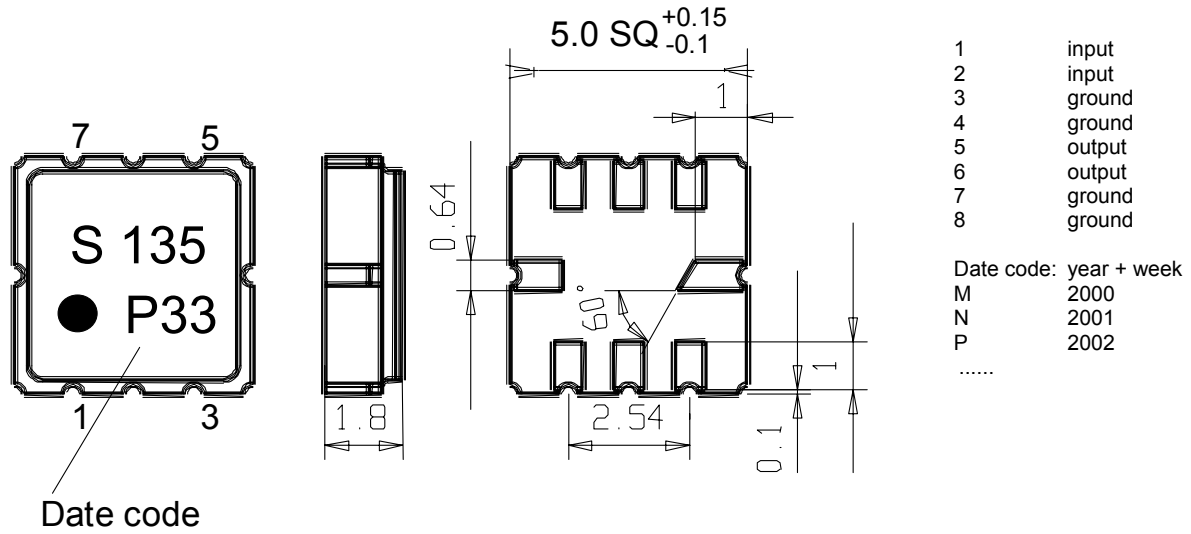
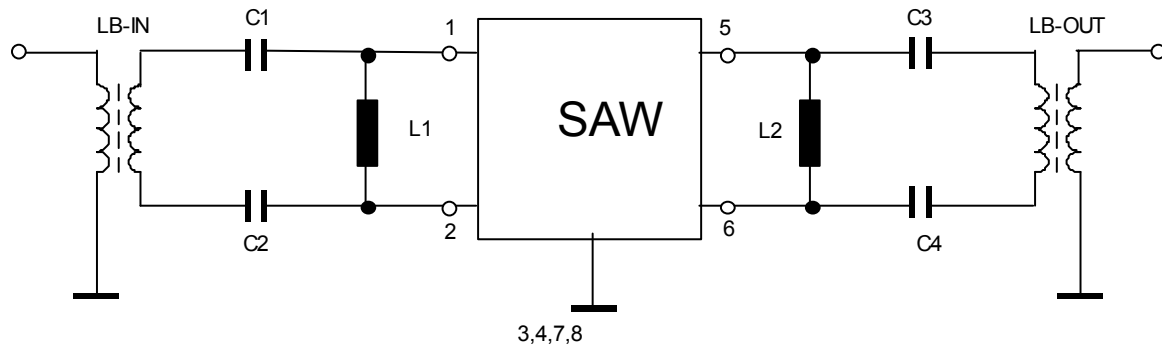
checked / approved: _____

VI TELEFILTER**Potsdamer Straße 18****D 14 513 TELTOW / Germany****Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30****E-Mail: ftf@telefilter.com**

VI TELEFILTER reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information

3. Construction, pin configuration and 50 Ω - matching network

(All dimensions in mm)

**50 Ω test circuit****VI TELEFILTER**

Potsdamer Straße 18

D 14 513 TELTOW / Germany

Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30

E-Mail: ttf@telefilter.com

VI TELEFILTER reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information

4. Stability characteristics

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;

5. Packing

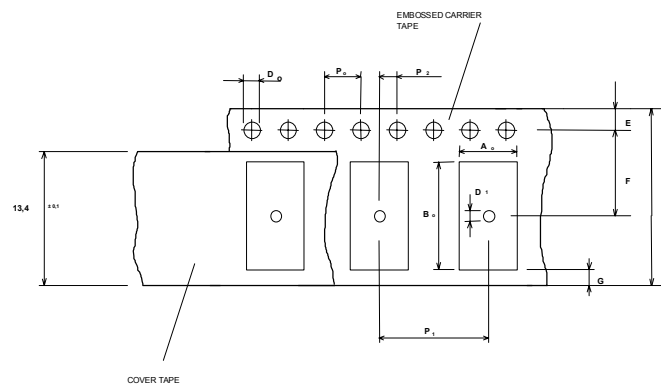
Tape & Reel: DIN IEC 286 – 3, with exception of value for N and minimum bending radius;
tape type II, embossed carrier tape with top cover tape on the upper side;

max. pieces of filters per reel:
reel of empty components at start:
reel of empty components at start including leader:
trailer

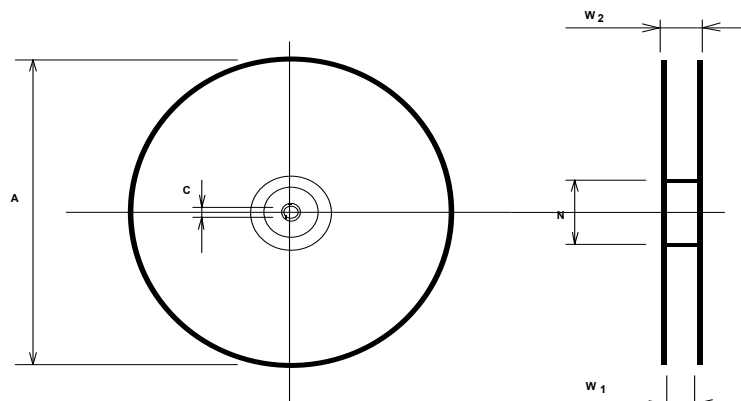
3000
min 300 mm
min 500 mm
min 300 mm

Tape (all dimensions in mm)

W	: 12 ± 0,3
Po	: 4 ± 0,1
Do	: 1,5 + 0,5
D1	: 1,5 + 0,5
E	: 1,75 ± 0,1
F	: 7,5 ± 0,1
G (min)	: 0,75
P2	: 2 ± 0,05
P1	: 8 ± 0,1
D1 (min)	: 1,5
Ao	: 5,3 ± 0,1
Bo	: 5,3 ± 0,1

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

A	: 330
W1	: 12,4 + 0,2
W2 (max)	: 18,4
N (min)	: 50
C	: 13 + 0,2 / -0,5



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.

VI TELEFILTER**Potsdamer Straße 18****D 14 513 TELTOW / Germany****Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30****E-Mail: ftf@telefilter.com**

VI TELEFILTER reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information

6. 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.

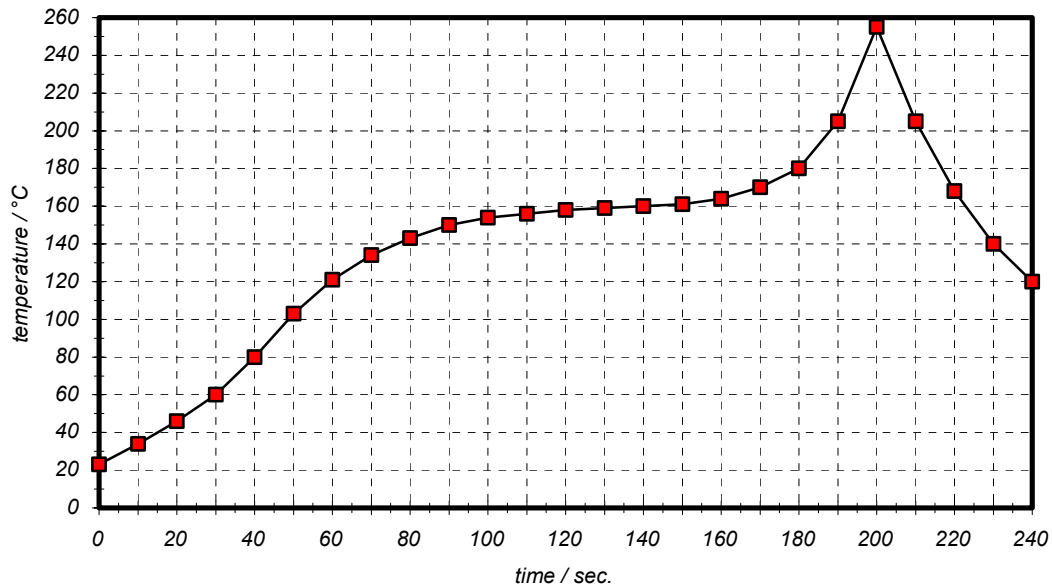
Air reflow profile

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

VI TELEFILTER

Potsdamer Straße 18

D 14 513 TELTOW / Germany

Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30

E-Mail: tf@telefilter.com

VI TELEFILTER reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information

7. History

Version	Reason of Changes	Name	Date
1.0	generate specification	Pfeiffer	18.09.2001
1.1	typical values added changing relativ attenuation in stopband terminating impedance added (primary value)	Pfeiffer	24.10.2001
1.2	terminating impedance changed (preliminary value)	Pfeiffer	16.11.2001
1.3	changed matching configuration → balanced driven	Pfeiffer	27.11.2001
1.4	terminating impedance changed changing relativ attenuation in stopband	Pfeiffer	14.01.2002
1.5.	changing max insertion loss changing range of centre frequency	Pfeiffer	05.07.2002

VI TELEFILTER**Potsdamer Straße 18****D 14 513 TELTOW / Germany****Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30****E-Mail: fft@telefilter.com**

VI TELEFILTER reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information