

VI TELEFILTER**Preliminary Specification****TFS 400 K****1/5****Measurement condition**

Ambient temperature:	23	°C
Input power level:	10	dBm
Terminating impedance: *		
Input:	375 Ω	-1.9 pF
Output:	375 Ω	-1.9 pF
External coil:	47 nH	

Characteristics**Remark:**

Reference level for the relative attenuation a_{rel} of the TFS400K 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 1 dB filter attenuation level relative to the insertion loss a_e . The nominal frequency f_N is fixed at 400 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 / limit	
Insertion Loss (reference level)		a_e	4,5 dB	max.	6,5 dB
Nominal Frequency		f_N	400,04 MHz		400 MHz
Bandwidth 3 dB		B W	T.B.D.		-
Relative Attenuation		a_{rel}			
f_N	... $f_N \pm 82,5$ kHz		0,4 dB	max.	1 dB
$f_N \pm 500$ kHz	... $f_N \pm 700$ kHz		28 dB	min.	15 dB
$f_N \pm 700$ kHz	... $f_N \pm 1$ MHz		43 dB	min.	27 dB
$f_N \pm 1$ MHz	... $f_N \pm 13$ MHz		50 dB	min.	40 dB
Group Delay Ripple					
$f_N \pm 82,5$ kHz			0,6 μ s	max.	1 μ s
Operating Temperature Range		OTR	-	-40 °C ... + 85 °C	
Storage Temperature Range			-	- 40 °C ... + 85 °C	
Frequency Inversion Temperature			20 °C	-	
Temperature Coefficient of Frequency		TC_f **	-0,036 ppm/K ²	-	

*) 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. These values have to be confirmed by balanced s-parameter measurement.

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

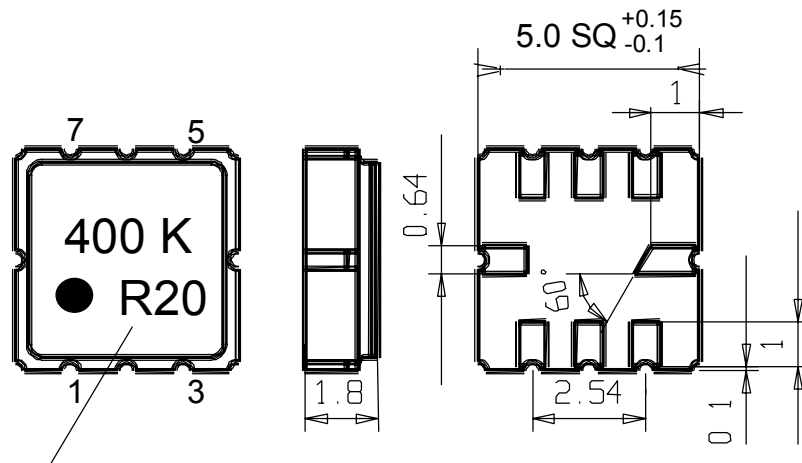
Generated:**Checked / Approved:**

TELEFILTER GmbH
Potsdamer Straße 18
D 14 513 TELTOW / Germany
Tel: (+49) 3328 4784-52 / Fax: (+49) 3328 4784-30
E-Mail: tft@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.

VI TELEFILTER**Preliminary Specification****TFS 400 K****2/5****Construction, pin configuration and 50 Ω - matching network**

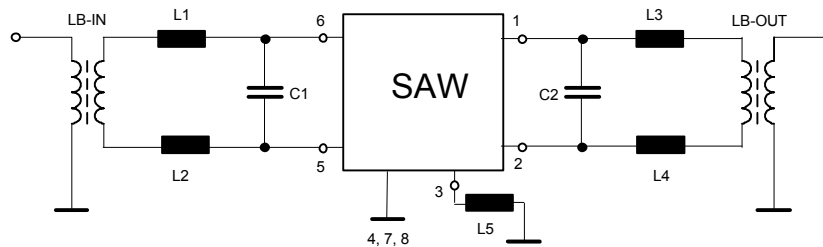
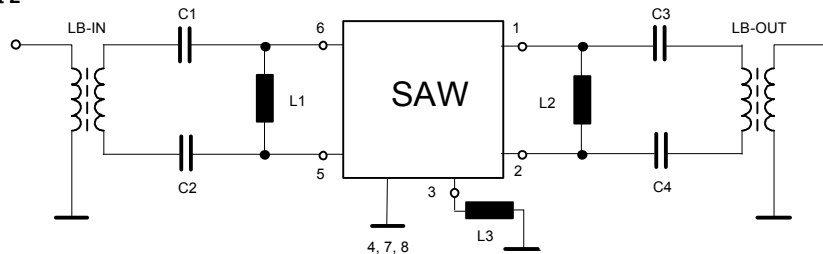
(all dimensions in mm)

**Date code**

Pin 1 Sym. Output
 Pin 2 Sym. Output
 Pin 3 External Coil
 Pin 4,8 Package Ground

Pin 5 Sym. Input
 Pin 6 Sym. Input
 Pin 7 Ground

Date code: Year + week
 N 2001
 P 2002
 R 2003
 ...

50 Ohm Test circuit 1**50 Ohm Test circuit 2**

TELEFILTER GmbH
 Potsdamer Straße 18
 D 14 513 TELTOW / Germany
 Tel: (+49) 3328 4784-52 / Fax: (+49) 3328 4784-30
 E-Mail: tft@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.

VI TELEFILTER**Preliminary Specification****TFS 400 K****3/5****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 older heat (reflow): reflow possible: twice max.;
for temperature conditions, please refer to the attached "Air reflow temperature conditions" on page 4

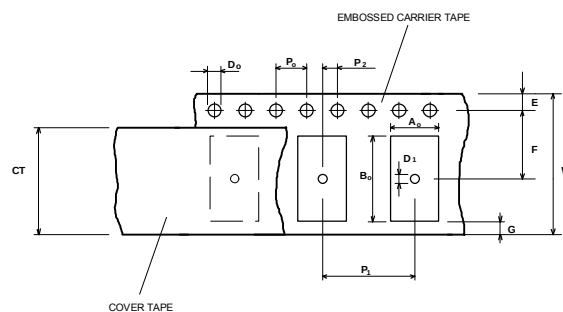
Packing

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:
reel of empty components at start:
reel of empty components at start including leader:
trailer

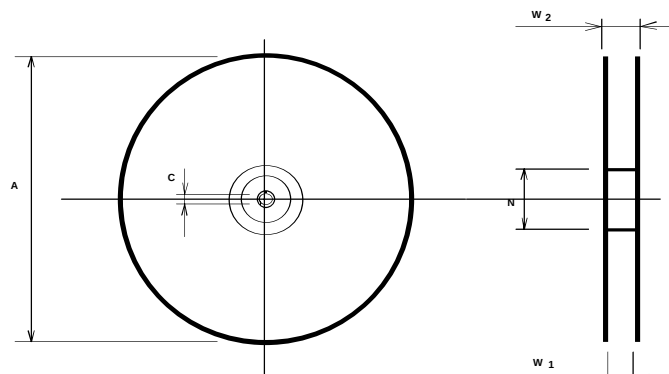
3000
min 300 mm
min 500 mm
min 300 mm

Tape (all dimensions in mm)

W	: 12 ± 0,3
Po	: 4 ± 0,1
Do	: 1,5 ± 0,1
E	: 1,75 ± 0,1
F	: 5,5 ± 0,05
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
CT	: 9,5 ± 0,1

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

A	: 330
W1	: 12,4 + 2
W2 (max)	: 18,4
N (min)	: 50
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 with the sprocket holes on the right side of the tape.

TELEFILTER GmbH
Potsdamer Straße 18
D 14 513 TELTOW / Germany
Tel: (+49) 3328 4784-52 / Fax: (+49) 3328 4784-30
E-Mail: tft@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.

VI TELEFILTER**Preliminary Specification****TFS 400 K****4/5****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.	

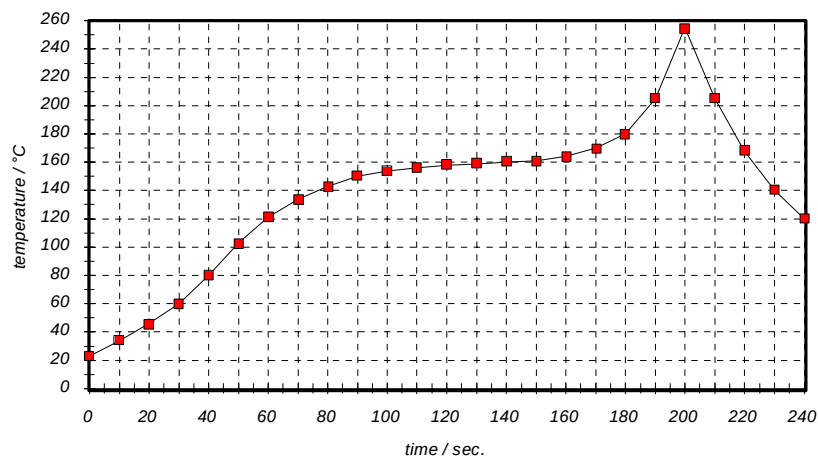
Chip-mount air reflow profile

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**Preliminary Specification****TFS 400 K****5/5****History**

Version	Reason of Changes	Name	Date
1.0	- Generate development specification.	Pfeiffer	12.05.2003
2.0	- Modification of electrical data based on TFS400B to support a group delay ripple of 1 μ s maximum. - Correct reel dimensions.	Dr. Wall	11.06.2003
3.0	- Add 1 dB pass band of 160 kHz. - Shift 15 dB limit line to +-500 kHz - Shift 27 dB limit line to +-700 kHz - Remove values for termination impedances and coupling coil. - Add 50 Ohm test circuit configuration.	Dr. Wall	19.06.2003
3.1	- Change frequency band for 1 dB pass band and group delay ripple requirement	Dr. Wall	03.07.2003
3.2	- Change from development specification to preliminary specification - Add preliminary values for termination impedances - Add typical values	Dr. Wall	01.12.2003

TELEFILTER GmbH
Potsdamer Straße 18
D 14 513 TELTOW / Germany
Tel: (+49) 3328 4784-52 / Fax: (+49) 3328 4784-30
E-Mail: tft@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.