1. Measurement condition

Ambient temperature T_A: 25 °C
Input power level: 0 dBm
Terminating impedances in f_C: for input: 50 Ω | 0 pF.
for output: 50 Ω | 0 pF.

2. Characteristics

Remark:
Reference level for the relative attenuation a_{rel} of the **TFS 402** 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 reference frequence f_C is the arithmetic mean value of the upper and lower frequencies at the **6 dB** filter attenuation level relative to the insertion loss a_e. The nominal frequency f_N is fixed on **402,76 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 also if the centre frequency f_C is shifted due to a production tolerance for the centre frequency f_C.

Data		**typ. value**	**tolerance / limit**
Insertion loss (Reference level)	a_e		max 24 dB
Nominal frequency	f_N		402,76 MHz
Reference frequency f_C at ambient temperature (f_{CTA})			402,76 ± 1 MHz
Pass band (-1 dB) in the operating temperature range:			f_N - 15,25 MHz ... f_N + 15,25 MHz
Amplitude ripple in pass band (p-p):		-	max. 1,0 dB
with sliding interval 1 MHz in pass band (p-p):		-	max. 0,5 dB
Relative attenuation	a_{rel}		
f_N	f_N ± 15,25 MHz	-	max. 1 dB
f_N ± 24,5 MHz	f_N ± 100 MHz	-	min. 38 dB
f_N - 401 MHz	f_N - 100 MHz	-	min. 25 dB
f_N + 100 MHz	f_N + 600 MHz		min. 25 dB
Group delay		470 µs	-
Deviation from linear phase in pass band (p-p):			max. 4,5 °
The part will not show any critical pyroelecric effect for temperature changes of			0,5 °C / min
Temperature coefficient of frequency (Tc_f)			- 72 ppm/°C
Frequency deviation of f_C over temperature T:		$\Delta f_C(Hz) = Tc_f(ppm/K) \times (T - T_A) \times f_{CTA}$ (MHz)	
Operating temperature range	to work without damage	- 40 °C ... + 85 °C	
Storage temperature range		- 40 °C ... + 85 °C	

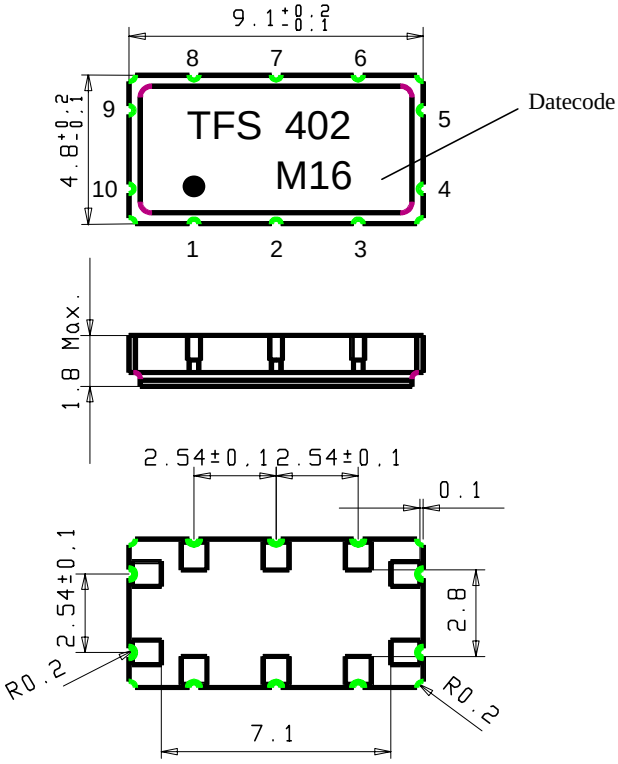
Responsible: **Generated:**

Checked / approved :

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

Vectron International, Inc.
267 Lowell Road
Hudson, NH 03051 / USA
Tel: (603) 598-0070 Fax: (603) 598-0075
E-Mail: vti@vtinh.com

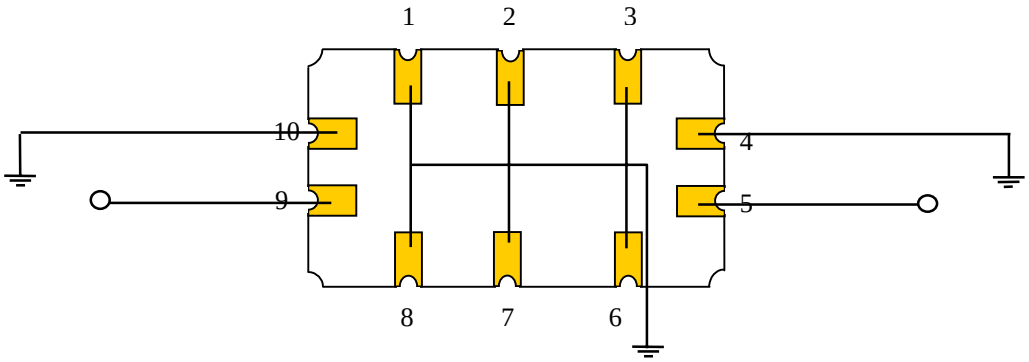
3. Package, pin grid 2,54 mm (All dimensions in mm)



1	Package Ground
2	Package Ground
3	Package Ground
4	Output RF Return
5	Output
6	Package Ground
7	Package Ground
8	Package Ground
9	Input
10	Input RF Return
11	Package Ground
12	Package Ground

Datecode:	Year+week
K	1998
L	1999
M	2000
...	

4. 50 Ω - Matching network:



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

Vectron International, Inc.
267 Lowell Road
Hudson, NH 03051 / USA
Tel: (603) 598-0070 Fax: (603) 598-0075
E-Mail: vti@vtinh.com

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. Damp heat: (cycle)	25 °C to 55°C / 95% r.H. / 10 cycles DIN IEC 68 - 2 – 30 Db
4. Resistance to solder heat (reflow):	max. 2 times reflow process; for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4;

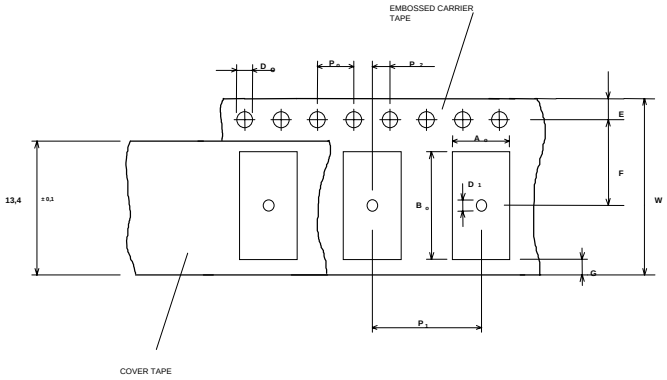
Packing

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:	3000
Real of empty components at start:	min 300 mm
Real of empty components at start including leader:	min 500 mm
Trailer	min 300 mm

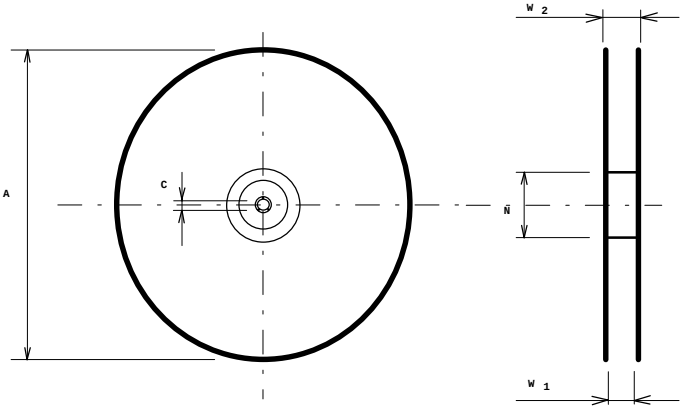
Tape (all dimensions in mm)

W	:	16	± 0,3
Po	:	4	± 0,1
Do	:	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	:	9,7	± 0,1



Reel (all dimensions in mm):

A	:	330	
W1	:	16,4 +2	
W2 (max)	:	22,4	
N (min)	:	>= 90	
C	:	13	± 0,25



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.

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

Vectron International, Inc.
267 Lowell Road
Hudson, NH 03051 / USA
Tel: (603) 598-0070 Fax: (603) 598-0075
E-Mail: vti@vtinh.com

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

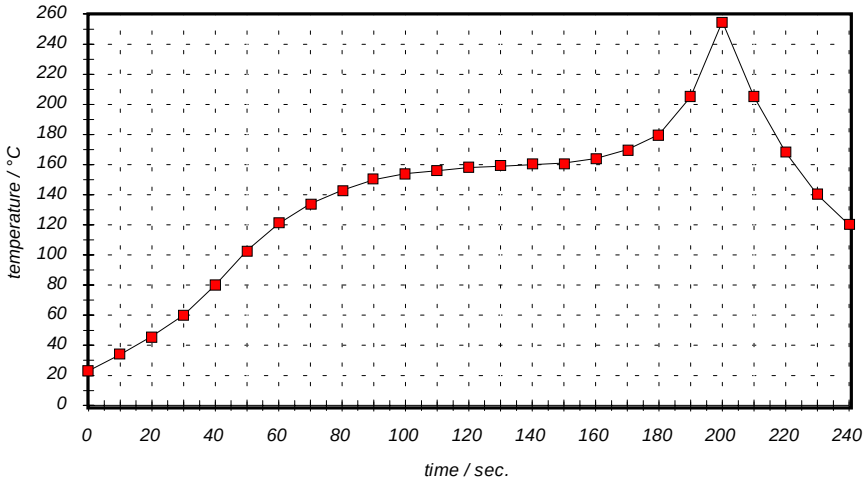


Table for temperature vs. time during the air reflow process

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

Vectron International, Inc.
267 Lowell Road
Hudson, NH 03051 / USA
Tel: (603) 598-0070 Fax: (603) 598-0075
E-Mail: vti@vtinh.com

History

Version	Reason of Changes	Name	Date
2.0	(former development specification version1.2 changed) - insertion loss, 23dB➔24dB - weekly date code introduced - pass band spec and stopband attenuation spec changed to be valid at room temperature only (frequency drift already included in customer limit scheme)	Steiner	17.04.2000

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

Vectron International, Inc.
267 Lowell Road
Hudson, NH 03051 / USA
Tel: (603) 598-0070 Fax: (603) 598-0075
E-Mail: vti@vtinh.com