

**VI TELEFILTER****Filter Specification****TFS 402****1/5****1. Measurement condition**

Ambient temperature $T_A$ :	25 °C	
Input power level:	0 dBm	
Terminating impedances in $f_C$ :	for input:	50 $\Omega$   0 pF.
	for output:	50 $\Omega$   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 frequency  $f_C$  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
<b>Insertion loss</b> (Reference level) $a_e$		max 24 dB
<b>Nominal frequency</b> $f_N$		402,76 MHz
<b>Reference frequency</b> $f_C$ at ambient temperature ( $f_{CTA}$ )		402,76 $\pm$ 1 MHz
<b>Pass band (-1 dB)</b> in the operating temperature range:		$f_N - 15,25$ MHz ... $f_N + 15,25$ MHz
<b>Amplitude ripple in pass band (p-p):</b>	-	max. 1,0 dB
<b>with sliding interval 1 MHz in pass band (p-p):</b>	-	max. 0,5 dB
<b>Relative attenuation</b> $a_{rel}$		
$f_N$	$f_N \pm 15,25$ MHz	-
$f_N \pm 24,5$ MHz	$f_N \pm 100$ MHz	-
$f_N - 401$ MHz	$f_N - 100$ MHz	-
$f_N + 100$ MHz	$f_N + 600$ MHz	-
<b>Group delay</b>	470 $\mu$ s	-
<b>Deviation from linear phase in pass band (p-p):</b>		max. 4,5 °
<b>The part will not show any critical pyroelectric effect for temperature changes of</b>		0,5 °C / min
<b>Temperature coefficient of frequency ( <math>T_c</math> )</b>		- 72 ppm/°C
<b>Frequency deviation of <math>f_C</math> over temperature T:</b>	$\Delta f_C(\text{Hz}) = T_{c_f}(\text{ppm/K}) \times (T - T_A) \times f_{CTA} (\text{MHz})$	
<b>Operating temperature range</b> to work without damage	- 40 °C ... + 85 °C	
<b>Storage temperature range</b>	- 40 °C ... + 85 °C	

Responsible:

Generated: \_\_\_\_\_

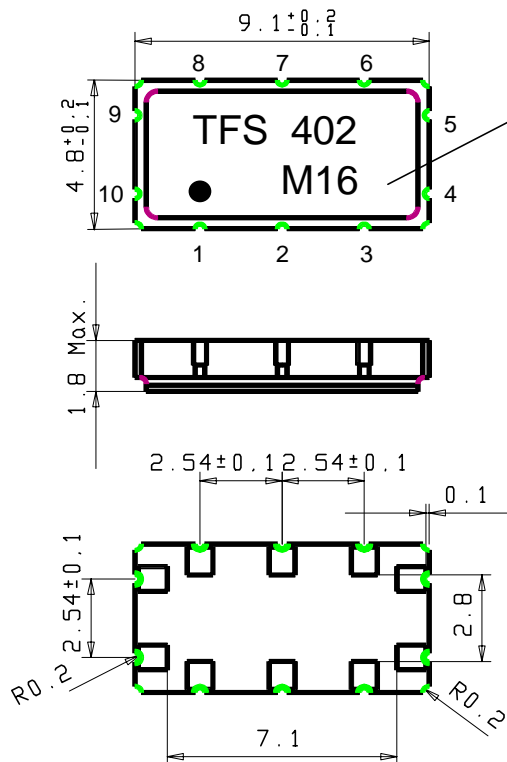
Checked / approved : \_\_\_\_\_

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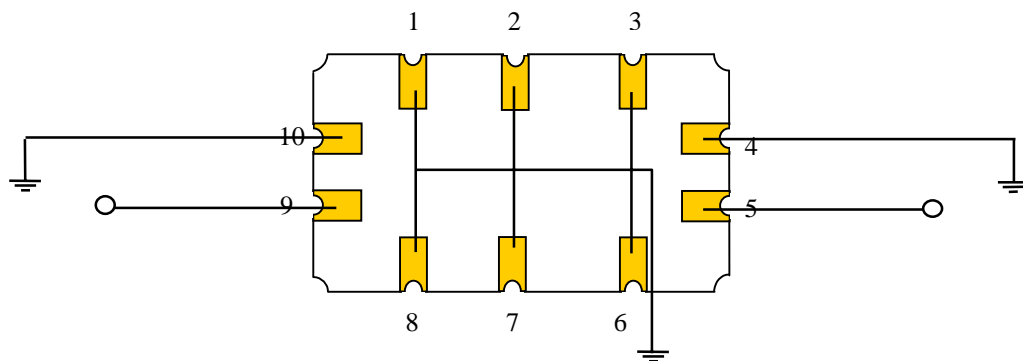
### 3. Package, pin grid 2,54 mm (All dimensions in mm)



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:



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## 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

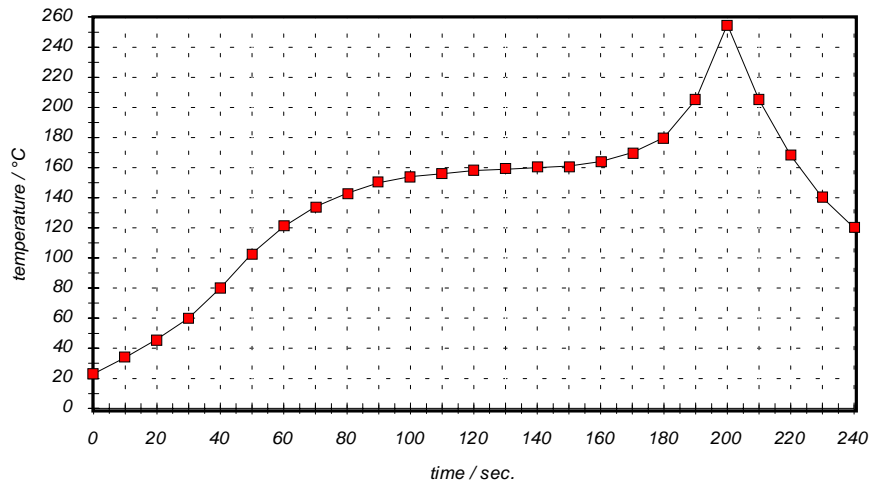


Table for temperature vs. time during the air reflow process

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

**History**

<b>Version</b>	<b>Reason of Changes</b>	<b>Name</b>	<b>Date</b>
2.0	(former development specification version 1.2 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

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