

**VI TELEFILTER****Filter specification****TFS 38C****1/5****1. Measurement condition :**

Ambient temperature  $T_A$ : 23 °C  
 Input power level: 0 dBm.  
 Terminating impedances at  $f_C$  : 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 38C** 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 **20 dB** filter attenuation level relative to the insertion loss  $a_e$ . The nominal frequency  $f_N$  is fixed on **38 MHz** without tolerance. The temperature coefficient of frequency  $T_{c_f}$  is valid both for the reference frequency  $f_C$  and the frequency response of the filter. All specified parameters have to be reached in the operating temperature range ( **OTR** ).

Data	typ. value	tolerance / limit
<b>Insertion loss</b> (Reference level) $a_e$	22,5 dB	max. 25 dB
<b>Nominal frequency</b> : $f_N$ at temperature $T_O = 30^\circ\text{C}$	38,000 MHz	38 MHz
<b>Centre frequency</b> $f_C$ at ambient temperature $T_A = 23^\circ\text{C}$ ( $f_{CAT}$ )	38,019 MHz	
<b>Pass band ( PB ) at OTR : <math>0^\circ\text{C} \dots 60^\circ\text{C}</math> :</b>		$f_N - 2,48 \text{ MHz} \dots f_N + 2,48 \text{ MHz}$
<b>Amplitude ripple in PB (p-p) :</b>	0,15 dB	max. 0,4 dB
<b>Bandwidth</b> at ambient temperature $T_A$ ( $f_{CAT}$ ) :		
0,5 dB	5,78 MHz	min. 5,14 MHz
1 dB	6,01 MHz	
3 dB	6,47 MHz	min. 6,18 MHz
10 dB	7,21 MHz	
20 dB	7,74 MHz	
30 dB	8,10 MHz	max. 8,32 MHz
40 dB	8,30 MHz	
<b>Bandwidth</b> at OTR : $0^\circ\text{C} \dots 60^\circ\text{C}$ :		
0,5 dB - band width	5,60 MHz	min. 4,96 MHz
3 dB - band width	6,29 MHz	min. 6,00 MHz
30 dB - band width	8,28 MHz	max. 8,50 MHz
<b>Relative attenuation</b> $a_{rel}$		
$f_N \dots f_N \pm 2,48 \text{ MHz}$	0,15 dB	max. 0,4 dB
$f_N \pm 2,48 \text{ MHz} \dots f_N \pm 3,0 \text{ MHz}$	2 dB	max. 3 dB
$f_N \pm 4,25 \text{ MHz} \dots f_N \pm 6 \text{ MHz}$	40 dB	min. 30 dB
$f_N - 26 \text{ MHz} \dots f_N - 6 \text{ MHz}$	45...50 dB	min. 40 dB
$f_N + 6 \text{ MHz} \dots f_N + 20 \text{ MHz}$	45...50 dB	min. 40 dB
$f_N + 20 \text{ MHz} \dots f_N + 26 \text{ MHz}$	42...38 dB	min. 35 dB
<b>Group delay ( mean value in PB ) :</b>	1,46 $\mu\text{s}$	
<b>Group delay ripple in PB (p-p) :</b>	25 ns	max. 60 ns
<b>Deviation from linear phase in PB (p-p) :</b>	1,5 deg	
<b>Triple transit attenuation compared to main signal Crosstalk</b>	55 dB	
	60...70 dB	
<b>Temperature coefficient of frequency ( <math>T_{c_f}</math> )</b>	-75 ppm/K	
<b>Frequency deviation of <math>f_C</math> over temperature</b>	$\Delta f_C(\text{Hz}) = T_{c_f}(\text{ppm/K}) \times (T - T_A) \times f_{CAT} (\text{MHz})$	
<b>Operating temperature ( OTR ) :</b>		$0^\circ\text{C} \dots + 60^\circ\text{C}$
<b>Storage temperature range</b>		$- 25^\circ\text{C} \dots + 85^\circ\text{C}$

**Generated:** Dunzow W.

**Checked / approved:** Dr. Bert Wall

**VI TELEFILTER**

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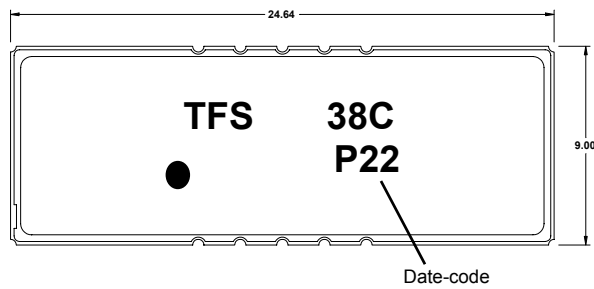
E-Mail: [ftf@telefilter.com](mailto:ftf@telefilter.com)

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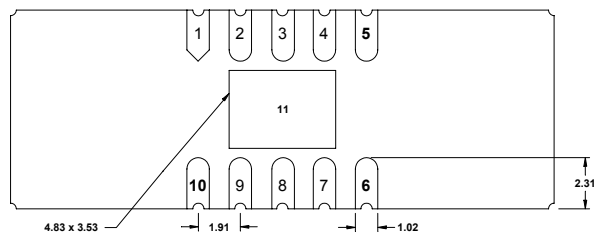
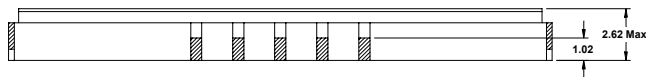
## 3. Construction and pin connection

( all dimensions in mm)

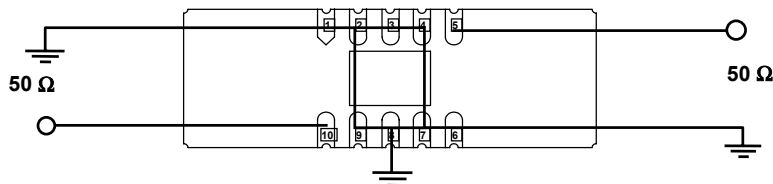
pin grid 1,91 mm



Date-code:	Year+week
M	2000
N	2001
P	2002
...	...



<b>Pin 10</b>	<b>Input</b>
Pin 1	Input RF Return
<b>Pin 5</b>	<b>Output</b>
Pin 6	Output RF Return
Pin 2-4, 7-9	Package Ground

4. 50  $\Omega$  matching networks :

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## 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 solder heat (reflow): max. 2 times reflow process;  
for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4;

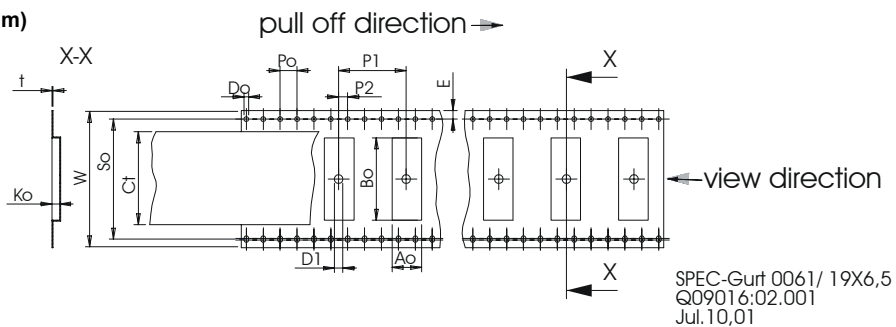
## 6. Packing :

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:	1000
reel of empty components at start:	min 300 mm
reel of empty components at start including leader:	min 500 mm
Trailer	min 300 mm

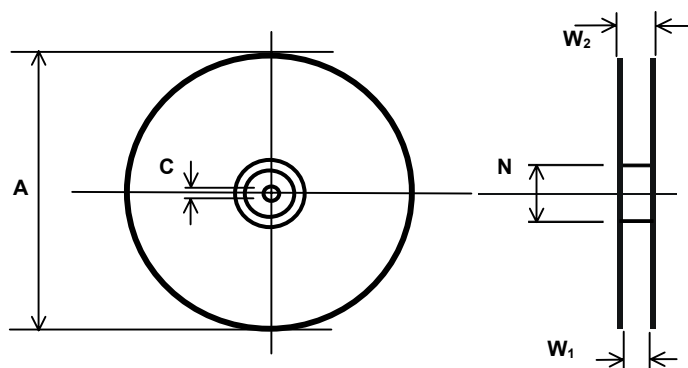
### Tape (all dimensions in mm)

W	: 44 ± 0,3
Po	: 4 ± 0,1
Do	: 1,5 + 0,1
E	: 1,75 ± 0,1
So	: 40,4 ± 0,1
P2	: 2 ± 0,15
P1	: 16 ± 0,1
D1(min)	: 2,0
Ao	: 9,3 ± 0,1
Bo	: 24,9 ± 0,1
Ko	: 2,0 ± 0,1
t	: 0,35 ± 0,05
CT	: 38,0 ± 0,1



### Reel (all dimensions in mm):

A	: 330
W1	: 44,4 + 2/-0
W2(max)	: 50,4
N(min)	: 100
C	: 13,0 +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 in the above shown direction.

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## 6. 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

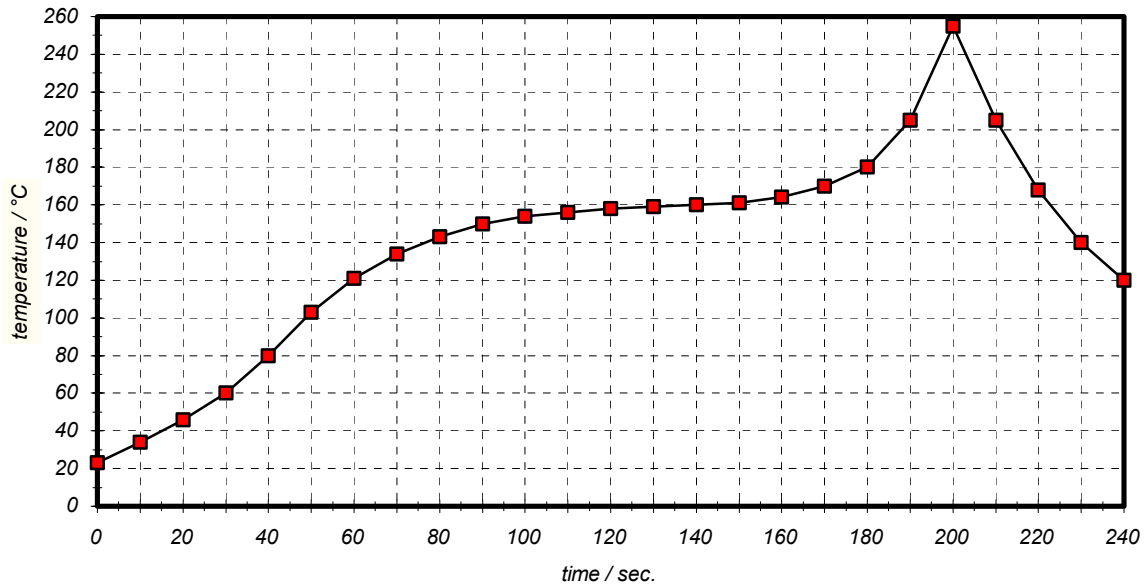


Table for temperature vs. time during the air reflow process

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

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**7. History :**

<b>Version</b>	<b>Reason of changes</b>	<b>Name</b>	<b>Date</b>
1.0	- generate development specification according to customer requirements.	Dunzow W.	07.11.2001
1.1	- generate filter specification. - add typical value. - change limit line for selection from min.30 dB to min.35...40 dB - change group delay ripple from max.90ns to max.60 ns.		

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