

**VI TELEFILTER**

**Filter specification**

**TFS 248C1**

**Measurement condition**

Ambient temperature:	23	°C
Input power level:	0	dBm
Terminating impedance: *		
Input:	63 Ω    -1,7 pF	
Output:	63 Ω    -1,7 pF	
Source:	50 Ω	
Load:	200 Ω	

**Characteristics**

Remark:

The reference level for the relative attenuation  $a_{rel}$  of the TFS 248C1 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 3 dB filter attenuation level relative to the insertion loss  $a_e$ . The nominal frequency  $f_N$  is fixed at 248,6 MHz without any tolerance. The given values for both the relative attenuation  $a_{rel}$  and the group delay ripple have to be achieved 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  $f_c$ .

<b>Data</b>		<b>typ. value</b>		<b>tolerance / limit</b>	
<b>Insertion loss</b> (reference level)	$a_e$	3,0	dB	max.	3,5 dB
<b>Nominal frequency</b>	$f_N$	-			248,6 MHz
<b>Centre frequency</b>	$f_C$	248,6	MHz		-
<b>Passband</b>	PB			$f_N \pm$	120 kHz
<b>Pass band ripple</b>		0,1	dB	max.	0,5 dB
<b>Bandwidth</b>	BW				
3 dB		6,6	MHz	min.	5,0 MHz
<b>Relative attenuation</b>	$a_{rel}$				
$f_N - 248,5$ MHz ... $f_N - 12$ MHz		57	dB	min.	25 dB
$f_N + 10$ MHz ... $f_N + 21$ MHz		19	dB	min.	10 dB
$f_N + 21$ MHz ... $f_N + 251,4$ MHz		67	dB	min.	25 dB
@ $f_N + 22,8$ MHz		56	dB	min.	50 dB
@ $f_N + 52,0$ MHz		56	dB	min.	50 dB
@ $f_N + 74,8$ MHz		56	dB	min.	50 dB
@ $f_N + 104,0$ MHz		56	dB	min.	50 dB
@ $f_N + 126,8$ MHz		56	dB	min.	50 dB
<b>Group delay</b>		150	ns	max.	300 ns
<b>Group delay ripple within PB</b>		20	ns	max.	100 ns
<b>Input power level</b>		-		max.	20 dBm
<b>Operating temperature range</b>	OTR	-			- 25 °C ... + 75 °C
<b>Storage temperature range</b>		-			- 40 °C ... + 85 °C
<b>Temperature coefficient of frequency</b>	$TC_f$ **	- 36	ppm/K		-

\*) 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.

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

**Generated:**

**Checked / Approved:**

**Tele Filter GmbH**  
**Potsdamer Straße 18**  
**D 14 513 TELTOW / Germany**  
**Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30**  
**E-Mail: [tft@telefilter.com](mailto:tft@telefilter.com)**

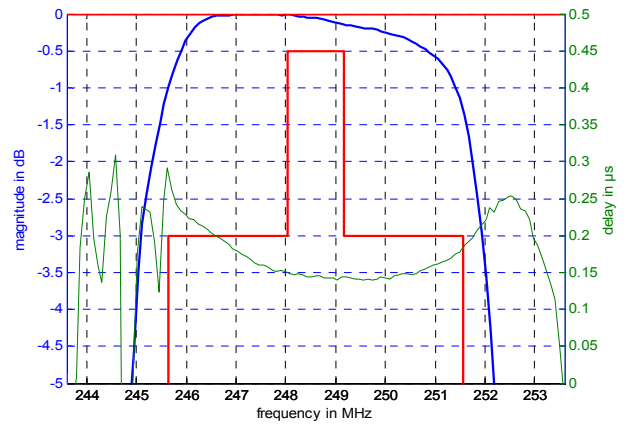
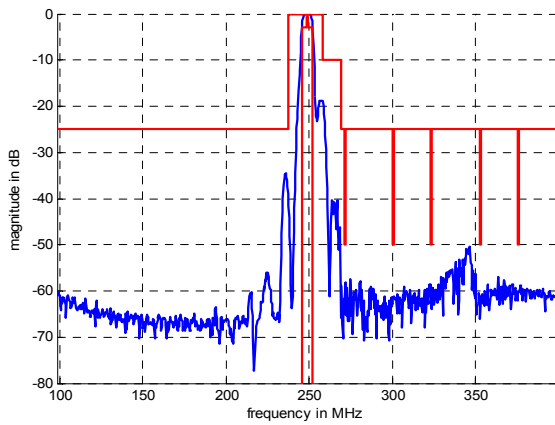
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**VI TELEFILTER**

**Filter specification**

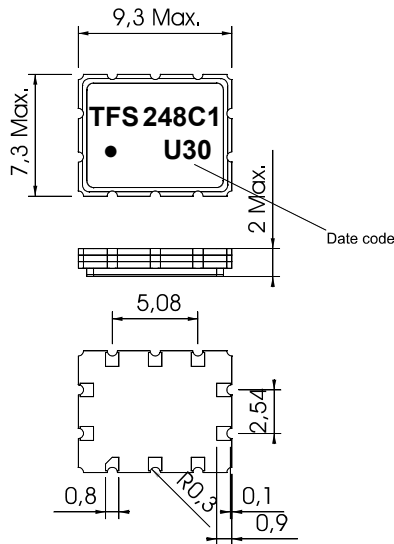
**TFS 248C1**

**Filter characteristic**



**Construction and pin connection**

(All dimensions in mm)

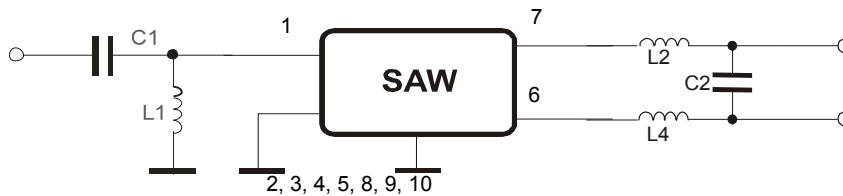


1	Input
2	Ground
3	Ground
4	Ground
5	Ground
6	Output
7	Output
8	Ground
9	Ground
10	Ground

Date code: Year + week

U	2006
V	2007
W	2008
...	

**50/200 Ω Test circuit**



**Tele Filter GmbH**  
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 E-Mail: [tft@telefilter.com](mailto:tft@telefilter.com)

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**Stability characteristics, reliability**

After the following tests the filter shall meet the whole specification:

1. Shock: 500g, 1 ms, half sine wave, 3 shocks each plane;  
DIN IEC 68 T2 - 27
2. Vibration: 10 Hz to 500 Hz, 0,35 mm or 5 g 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: three times max.;  
for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4;

This filter is RoHS compliant (2002/95/EG, 2005/618/EG)

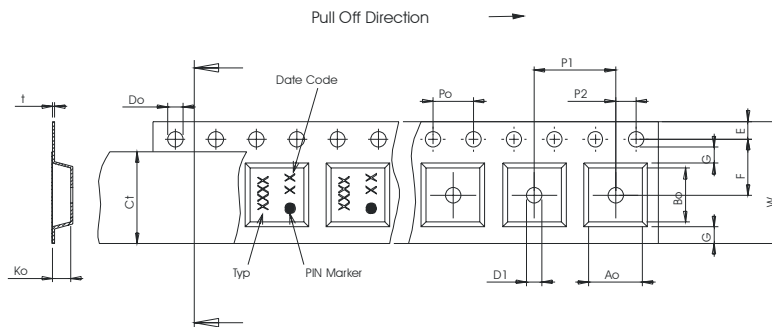
**Packing**

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:	2000
reel of empty components at start:	min. 300 mm
reel of empty components at start including leader:	min. 500 mm
trailer:	min. 300 mm

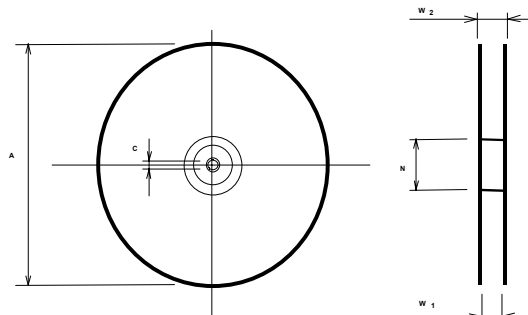
**Tape (all dimensions in mm)**

- W : 16,00 ± 0,3
- Po : 4,00 ± 0,1
- Do : 1,50 +0,1/-0
- E : 1,75 ± 0,10
- F : 7,50 ± 0,10
- G(min) : 0,60
- P2 : 2,00 ± 0,1
- P1 : 12,00 ± 0,1
- D1(min) : 1,50 +0,1/-0
- Ao : 7,60 ± 0,10
- Bo : 9,60 ± 0,10
- Ct : 13,5



**Reel (all dimensions in mm)**

- A : 330
- W1 : 16,4
- W2(max) : 22,4
- N(min) : 50
- C : 13,0



The minimum bending radius is 45 mm.

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**Air reflow temperature conditions**

Conditions	Exposure
Average ramp-up rate (30°C to 217°C)	less than 3°C/second
> 100°C	between 300 and 600 seconds
> 150°C	between 240 and 500 seconds
> 217°C	between 30 and 150 seconds
Peak temperature	max. 260°C
Time within 5°C of actual peak temperature	between 10 and 30 seconds
Cool-down rate (Peak to 50°C)	less than 6°C/second
Time from 30°C to Peak temperature	no greater than 300 seconds

**Chip-mount air reflow profile**



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**VI TELEFILTER****Filter specification****TFS 248C1****5/5****History**

<b>Version</b>	<b>Reason of Changes</b>	<b>Name</b>	<b>Date</b>
1.0	- generate according to customer specification	Dr. Sabah	25.09.01
1.1	- correct of pin connections	Dr. Sabah	12.11.01
1.2	- add of input power level - change of development specification to Filter specification - add of typical filter data and terminating impedance	Dr. Sabah	08.01.02
1.3	- add filter characteristic - change drawing of package (construction, pin connection) - change drawing of test circuit - change drawing of packing (tape and reel)	Noack	04.08.04
1.4	-change marking of package	Noack	24.08.04
1.5	- add source and load impedance - change air reflow profile	Noack	13.05.05
1.6	- change stability characteristics and packing	Strehl	25.07.2006

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