

VI TELEFILTER

Filter specification

TFS 224A

Measurement condition :

Ambient temperature T_A : 23 °C
 Input power level: 0 dBm
 Terminating impedances at f_C^*) : for input: 1200 Ω | - 5,32 pF
 for output:: 1200 Ω | - 5,25 pF

Characteristics

Remark:

The reference level for the relative attenuation a_{rel} of the TFS 224A is the minimum of the pass band attenuation. This value is defined as the insertion loss a_e . The nominal frequency f_N is fixed at 224,88 MHz without any tolerance. The values of relative attenuation a_{rel} are guaranteed for the whole operating temperature range. The frequency shift of the filter in the operating temperature range is included in the production tolerance scheme.

D a t a		typ. value	tolerance / limit
Insertion loss (reference level)	a_e	6,5 dB	max. 9 dB
Nominal frequency	f_N	-	224,88 MHz
Passband		-	$f_N \pm 0,3$ MHz
Pass band ripple		0,5 dB	max. 1 dB
Relative attenuation	a_{rel}		
f_N ... $f_N \pm 0,3$ MHz		-	max. 1 dB
$f_N \pm 0,75$ MHz ... $f_N \pm 2,4$ MHz		-	min. 3 dB
$f_N \pm 2,4$ MHz ... $f_N \pm 8$ MHz		40 dB	min. 33 dB
$f_N \pm 8$ MHz ... $f_N \pm 15$ MHz		47 dB	min. 40 dB
$f_N \pm 15$ MHz ... $f_N \pm 50$ MHz		52 dB	min. 45 dB
Group delay	mean value in PB	765 ns	765 \pm 10 ns
Group delay ripple within PB		50 ns	-
Deviation from linear phase			
$f_N \pm 0,675$ MHz		1,7 ° rms	max. 3,5 ° rms
VSWR within PB		1,5 : 1	max. 2 : 1
Operating temperature range	OTR	-	- 30 °C ... + 80 °C
Storage temperature range		-	- 40 °C ... + 85 °C
Frequency inversion temperature		25 °C	-
Temperature coefficient of frequency	TC_f^{**}	-0,03 ppm/K ²	-

*) The terminating impedances depend on parasites 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.

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

Generated:

Checked / Approved:

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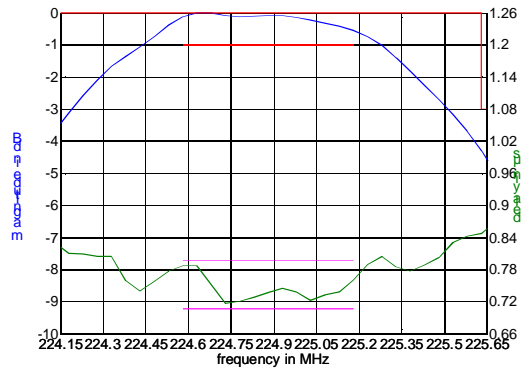
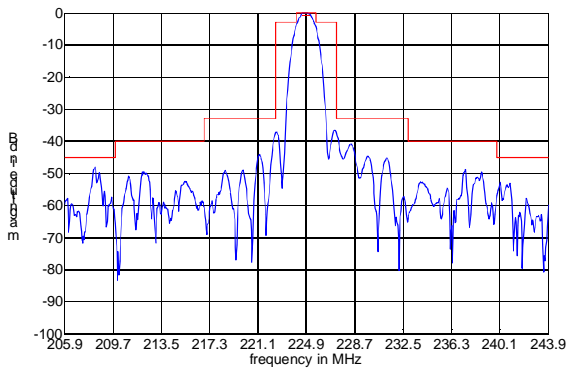
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Filter specification

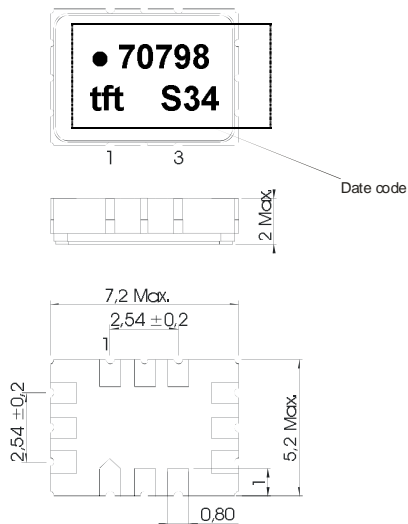
TFS 224A

Filter characteristic



Construction and pin connection

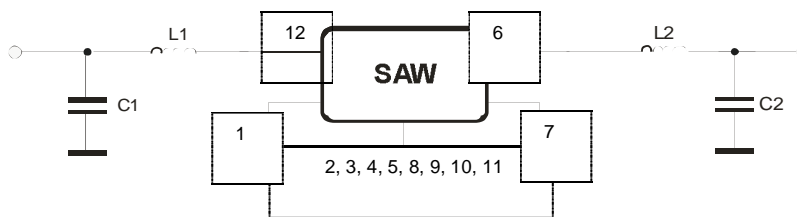
(All dimensions in mm)



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

Date code:	Year + week
S	2004
T	2005
U	2006
...	

50 Ω Test circuit



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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): reflow possible: twice max.;
for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4;

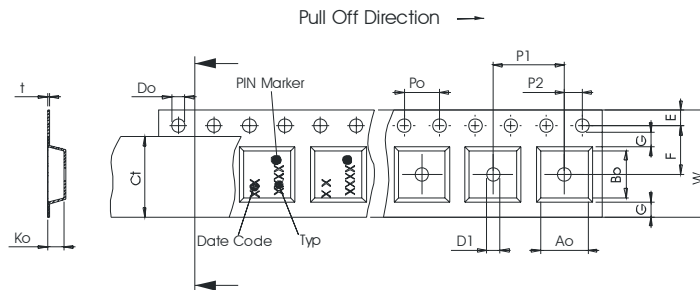
Packing

Tape & Reel: IEC 286 – 3, with exeption 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 peer reel:	3000
reel of empty components at start:	min. 300 mm
reel of empty components at start including leader:	min. 500 mm
trailer:	min. 300 mm

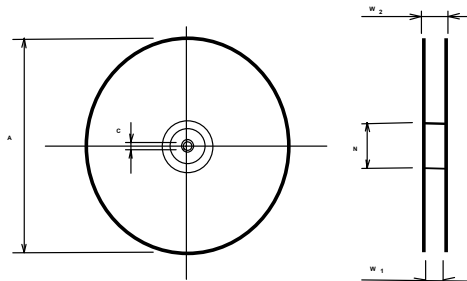
Tape (all dimensions in mm)

- W : 16,00 ± 0,3
- Po : 4,00 ± 0,1
- Do : 1,50 +0,1/-0
- E : 1,75 ± 0,1
- F : 7,50 ± 0,1
- G(min) : 0,60
- P2 : 2,00 ± 0,1
- P1 : 8,00 ± 0,1
- D1(min) : 1,50
- Ao : 5,50 ± 0,1
- Bo : 7,50 ± 0,1
- Ct : 13,5 ± 0,1



Reel (all dimensions in mm)

- A : 330
- W1 : 16,4 +2/-0
- W2(max) : 22,4
- N(min) : 50
- C : 13,0 +0,5/-0,2



The minimum bending radius is 45 mm.

Air reflow temperature conditions

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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

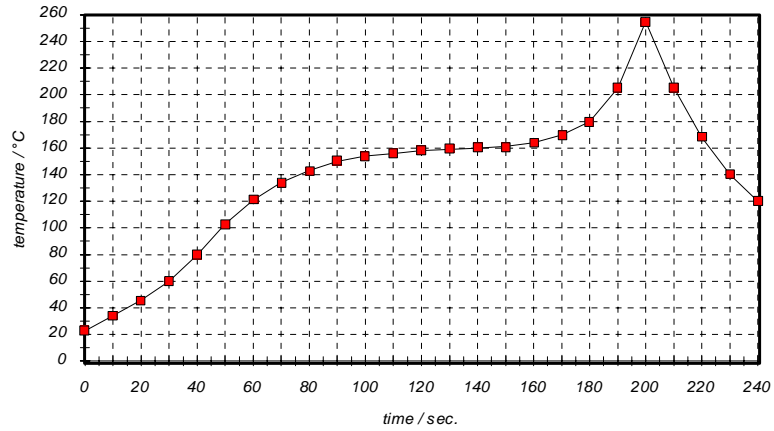


Table for temperature vs. time during the air reflow process

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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VI TELEFILTER**Filter specification****TFS 224A****5/5****History**

Version	Reason of changes	Name	Date
1.1...1.5	- generate filter specification of TFS 224A.	Dunzow W.	11.02.2000.
1.6	- change limit values of group delay (mean value in pass band) from 763 ± 10 ns to 765 ± 10 ns according to customer requirement.	Dunzow W.	12.09.2000.
1.7	- change marking. - correct termination impedance.	Dunzow W.	29.10.2002.
1.8	- labelling changed - filter characteristic added - change remark - remove centre frequency	Pfeiffer	16.08.2004
1.9	- labelling corrected	Steiner	03.09.2004

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