

VI TELEFILTER

Filter specification

TFS 220F

1/5

Measurement condition

Ambient temperature:	23	°C
Input power level:	0	dBm
Terminating impedance: *		
Input:	680 Ω	-1,75 pF
Output:	680 Ω	-1,75 pF

Characteristics

Remark:

Reference level for the relative attenuation a_{rel} of the TFS220F 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 2 dB filter attenuation level relative to the insertion loss a_e . The nominal frequency f_N is fixed at 220 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 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 .

D a t a		Typ. Value	Tolerance / Limit
Insertion Loss (reference level)	a_e	-	max. 5,2 dB
Nominal Frequency	f_N	-	220 MHz
Centre Frequency	f_c	220,015 MHz	-
Bandwidth 2 dB	B W	187 kHz	min. 100 kHz
Relative Attenuation	A_{rel}		
f_N ... $f_N \pm 50$ kHz		1 dB	max. 2 dB
$f_N \pm 0,5$ MHz ... $f_N \pm 1$ MHz		41 dB	min. 10 dB
$f_N \pm 1$ MHz ... $f_N \pm 5$ MHz		46 dB	min. 20 dB
$f_N \pm 5$ MHz ... $f_N \pm 200$ MHz		56 dB	min. 40 dB
Operating Temperature Range	OTR	-	- 45 °C ... + 75 °C
Storage Temperature Range		-	- 40 °C ... + 85 °C
Frequency Inversion Temperature		15 °C	-
Temperature Coefficient of Frequency	TC_f **	-0,036 ppm/K ²	-
Input Power Level		-	max. 10 dBm

*) 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.

***) $\Delta f(\text{Hz}) = TC_f(\text{ppm/K}) \times (T - T_0)^2 \times f_{T0}(\text{MHz})$.

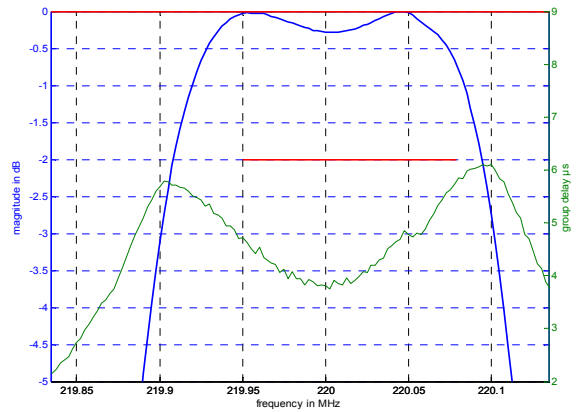
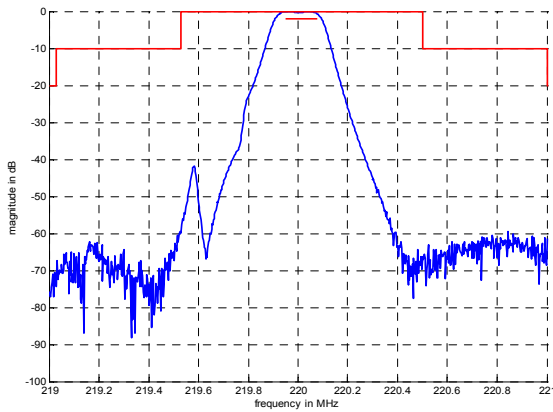
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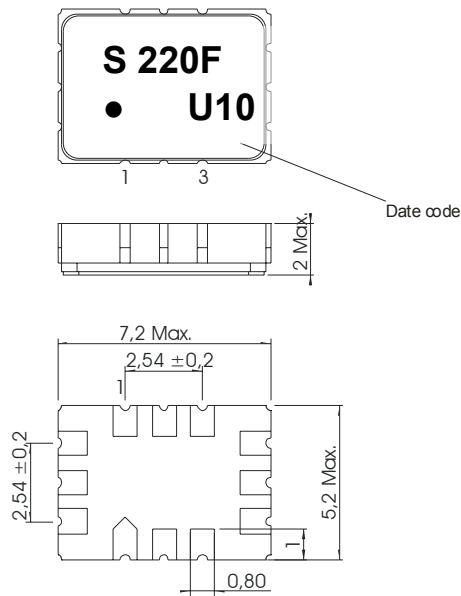
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Filter characteristic



Construction and pin connection

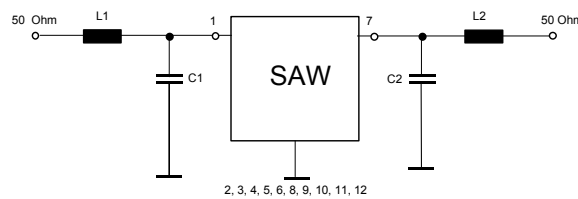
(All dimensions in mm)



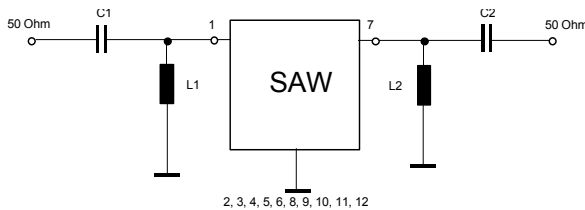
- 1 Input
- 2 Input RF Return
- 3 Ground
- 4 Ground
- 5 Ground
- 6 Ground
- 7 Output
- 8 Output RF Return
- 9 Ground
- 10 Ground
- 11 Ground
- 12 Ground

Date code: Year + week
 U 2006
 V 2007
 W 2008
 ...

50 Ω Test circuit 1



50 Ω Test circuit 2



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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: twice 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)

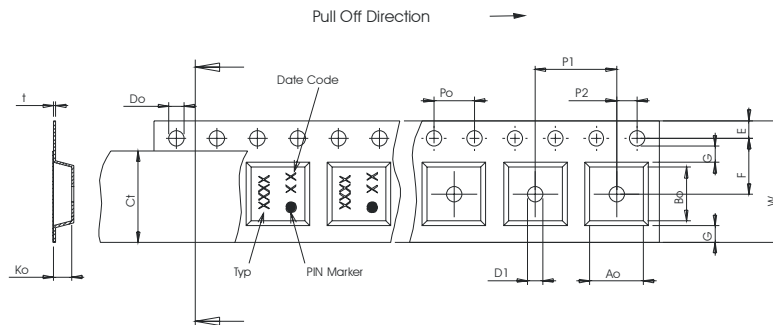
Packing

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: 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

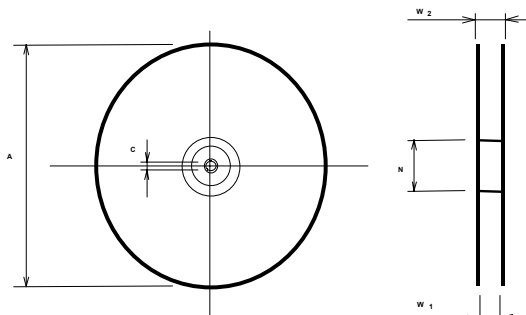
Tape (all dimensions in mm)

- 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.

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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 220F****5/5****History**

Version	Reason of Changes	Name	Date
1.0	- Generate development specification according to customers requirement	Dr. Wall	11.06.2003
1.1	- Change from development specification to filter specification - Add termination impedances and typical values	Dr. Wall	03.11.2003
1.2	- Correct stability characteristics - Correct packing - Change air reflow temperature conditions - Add filter characteristics	Alawneh	07.03.2006

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