

**VI TELEFILTER**

**Filter specification**

**TFS 230**

**Measurement Condition**

Ambient Temperature: 23 °C  
 Input Power Level: 0 dBm  
 Terminating impedances \*: for input: 1,95 kΩ // -5,0 pF  
 for output: 1,67 kΩ // -5,3 pF

**Characteristics**

**Remark:**

The reference level for the relative attenuation  $a_{rel}$  of the TFS 230 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 230,0 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.

<b>D a t a</b>		<b>typ. Value</b>	<b>Limit</b>
<b>Insertion loss</b> (Reference level)	$a_e = a_{min}$	12,3 dB	max. 14,5 dB
<b>Nominal frequency</b>	$f_N$	-	230,0 MHz
<b>1.5 dB - bandwidth</b>	BW	4,3 MHz	min. 3,9 MHz
<b>Pass band ripple</b> $f_N \pm 1,950$ MHz		0,8 dB	max. 1,5 dB
<b>Relative attenuation</b>	$a_{rel}$		
$f_N \pm 3,0$ MHz ... $f_N \pm 5,0$ MHz		30 dB	min. 18 dB
$f_N \pm 5,0$ MHz ... $f_N \pm 10,0$ MHz		47 dB	min. 45 dB
$f_N \pm 10,0$ MHz ... $f_N \pm 100,0$ MHz		57 dB	min. 50 dB
<b>Group delay ripple</b> $f_N \pm 1,950$ MHz	$\varphi$	130 ns	max. 200 ns
<b>VSWR</b> $f_N \pm 1,950$ MHz		1,8 : 1	max. 2 : 1
<b>Operating temperature range</b>		-	- 40 °C ... + 85 °C
<b>Storage temperature range</b>		-	- 40 °C ... + 85 °C
<b>Temperature coefficient of frequency</b>	$TC_f$ **)	- 0,04 ppm/K <sup>2</sup>	-
<b>Frequency inversion temperature</b>	$T_0$	25 °C	-

\*) 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.

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

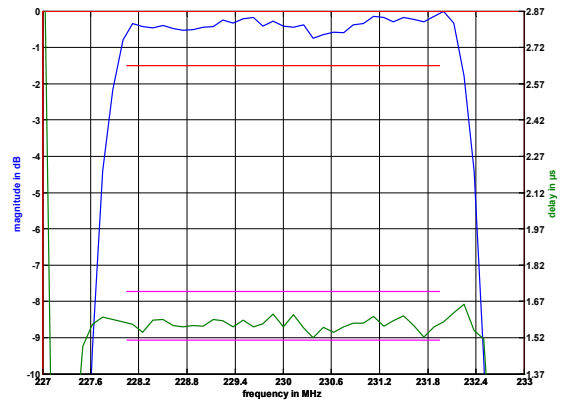
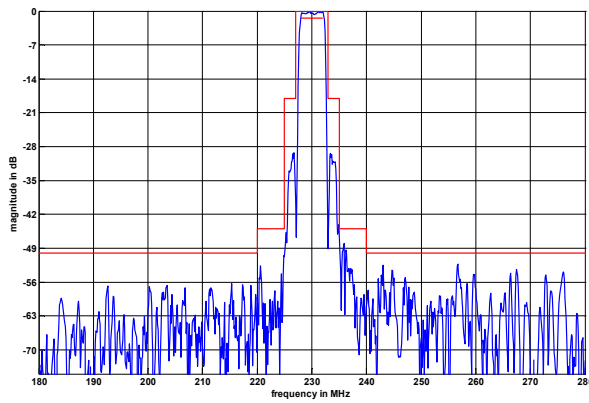
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**Checked / approved:** \_\_\_\_\_

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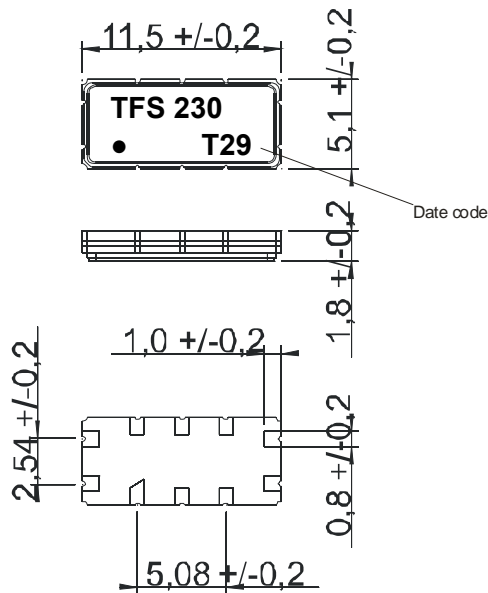
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**Filter characteristic**



**Construction and pin connection**

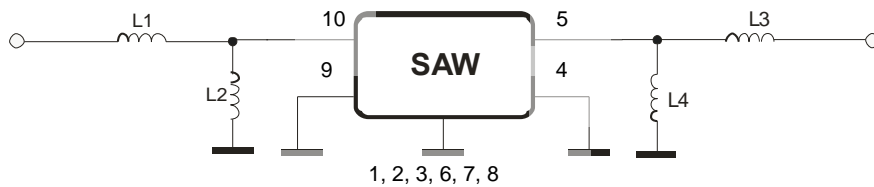
(All dimensions in mm)



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

Date code: Year + week  
 T 2005  
 U 2006  
 V 2007  
 ...

**50 Ω Test circuit**



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**Stability characteristics**

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;

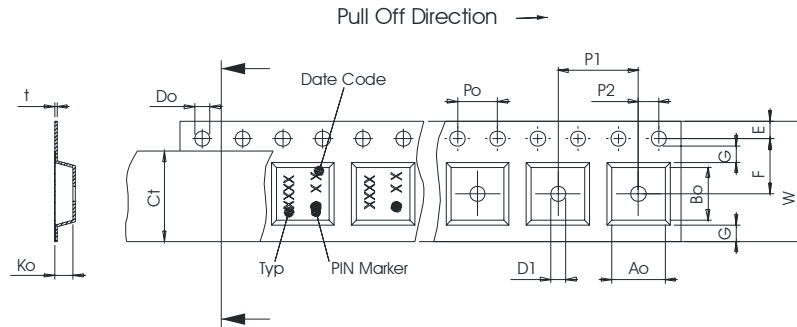
**Packing**

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 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

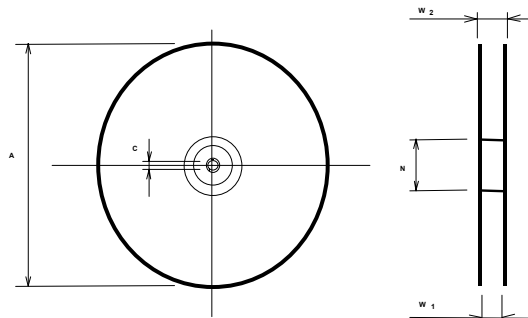
**Tape (all dimensions in mm)**

- W : 24,00 ± 0,3
- Po : 4,00 ± 0,1
- Do : 1,50 +0,1/-0
- E : 1,75 ± 0,1
- F : 11,50 ± 0,1
- G(min) : 0,60
- P2 : 2,00 ± 0,1
- P1 : 8,00 ± 0,1
- D1(min) : 1,50
- Ao : 5,60 ± 0,1
- Bo : 11,80 ± 0,1
- Ct : 21,5 ± 0,1



**Reel (all dimensions in mm)**

- A : 330
- W1 : 24,4 +2/-0
- W2(max) : 30,4
- N(min) : 60
- C : 13,0 +0,5/-0,2



The minimum bending radius is 45 mm.

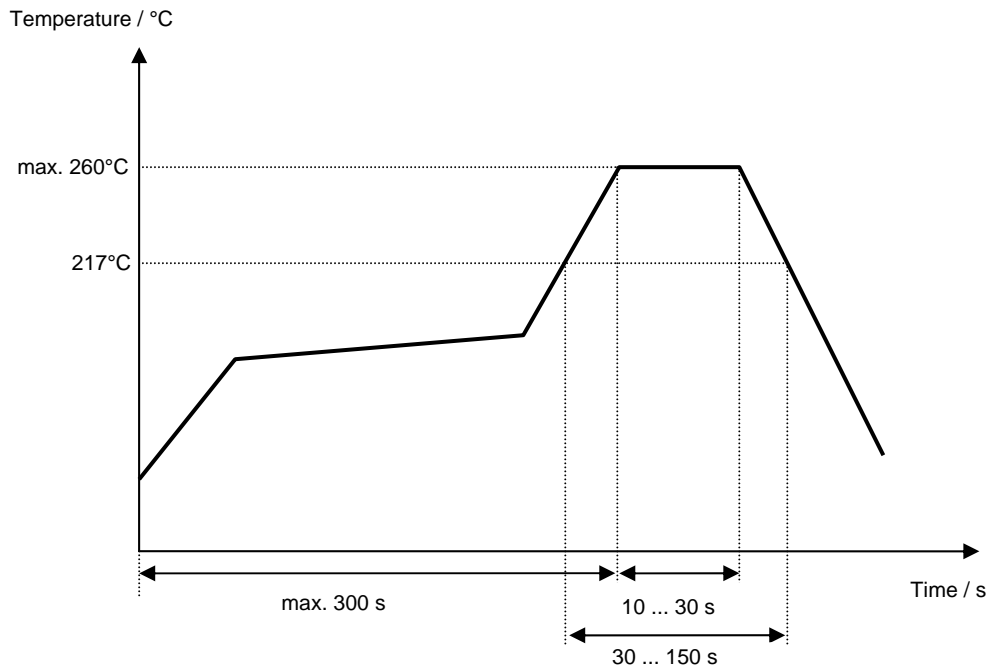
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**Air reflow temperature conditions**

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**



**VI TELEFILTER****Filter specification****TFS 230****5/5****History**

<b>Version</b>	<b>Reason of Changes</b>	<b>Name</b>	<b>Date</b>
1.2	- modified package	Steiner	07.04.2000
1.3	loss changed from 17dB to 14,5 dB package changed from 13x6mm to 11x5mm	Steiner	23.05.2000
2.0	extended specification - tape and reel information added - airflow profile information added - terminating impedances added - loss definition corrected	Steiner	08.03.2001
2.1	- air reflow temperature conditions modified - terminating impedance changed - limits for group delay ripple and pass band ripple changed - filter characteristic added - construction corrected - stability conditions modified	Pfeiffer	11.05.2005
2.2	- operating temperature range extended - typical values and filter characteristic modified	Pfeiffer	14.07.2005

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