

VI TELEFILTER**Filter specification****TFS 230****1/5****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.

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

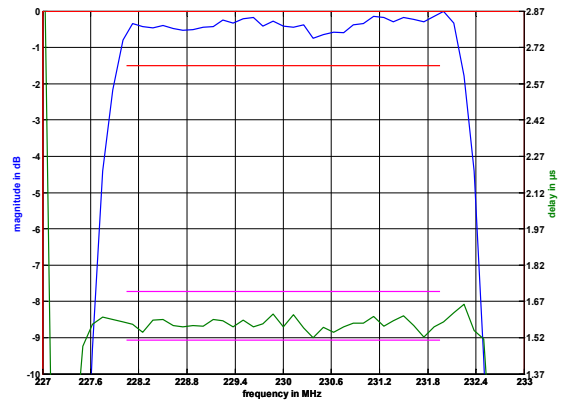
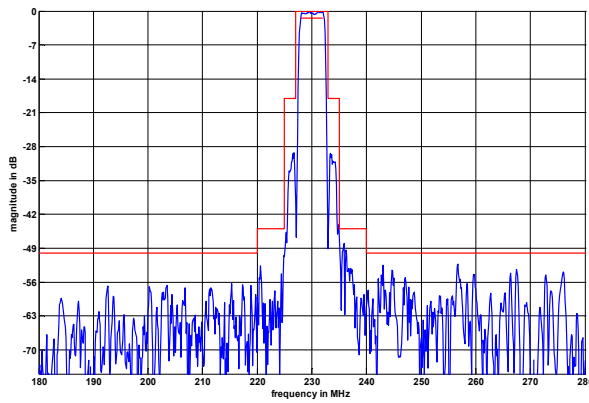
**) $\Delta f(\text{Hz}) = TC_f(\text{ppm/K}^2) \times (T - T_0)^2 \times f_{T_0}(\text{MHz})$

Generated:**Checked / approved:**

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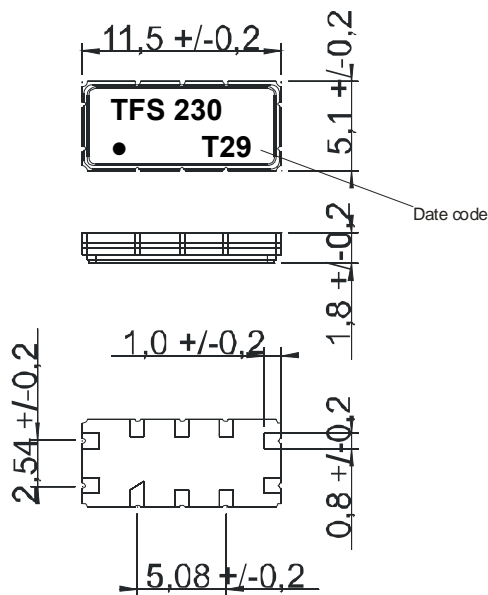
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Filter characteristic



Construction and pin connection

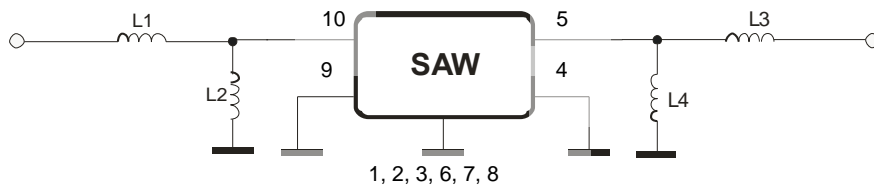
(All dimensions in mm)



- 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;

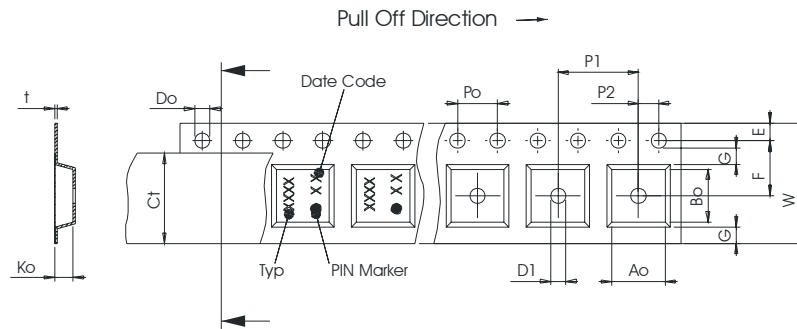
Packing

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

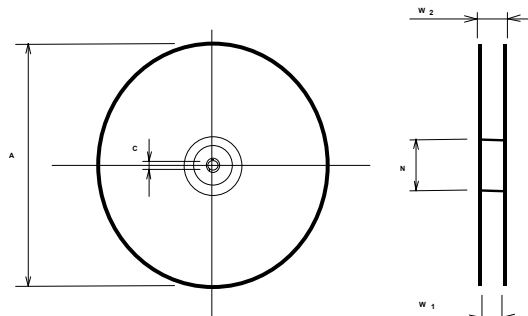
Tape (all dimensions in mm)

- 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.

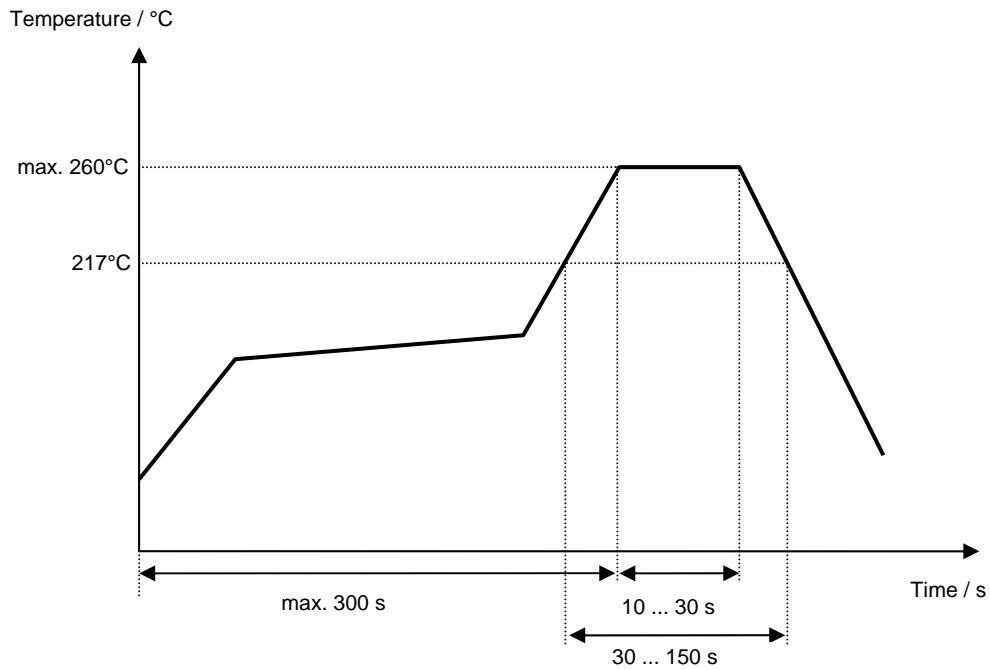
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Air reflow temperature conditions

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



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

Version	Reason of Changes	Name	Date
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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