Measurement condition

Ambient temperature:	23	°C
Input power level:	0	dBm
Terminating impedance: *		
Input:	370 Ω || -13,7 pF	
Output:	360 Ω || -13,0 pF	

Characteristics

Remark:

The reference level for the relative attenuation a_{rel} of TFS238 is the minimum of the pass band attenuation a_{min}. This value 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 1 dB filter attenuation level relative to the insertion loss a_e. The given values for the relative attenuation a_{rel} and 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	9,8	dB	max.	12	dB
Nominal frequency	f_N	-			238,5	MHz
Centre frequency	f_C	238,5	MHz		-	
Relative attenuation	a_{rel}					
f_N .... $f_N \pm$ 2,5 MHz		0,4	dB	max.	1	dB
$f_N \pm$ 5 MHz .... $f_N \pm$ 7,5 MHz		23	dB	min.	13	dB
$f_N \pm$ 7,5 MHz .... $f_N \pm$ 9 MHz		38	dB	min.	23	dB
$f_N \pm$ 9 MHz .... $f_N \pm$ 10 MHz		50	dB	min.	40	dB
$f_N \pm$ 10 MHz .... $f_N \pm$ 100 MHz		60	dB	min.	47	dB
Phase variation within $f_N \pm$ 2,5 MHz		1,1	deg rms	max.	4	deg rms
Temperature coefficient of frequency (Tc_f)**		-18	ppm/K		-	
Operating temperature range		-		- 20 °C .... + 85		°C
Storage temperature range		-		- 40 °C .... + 85		°C
Input power level		-		max.	20	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.

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

generated:

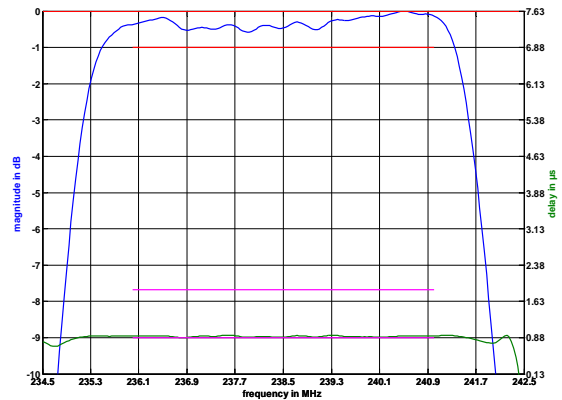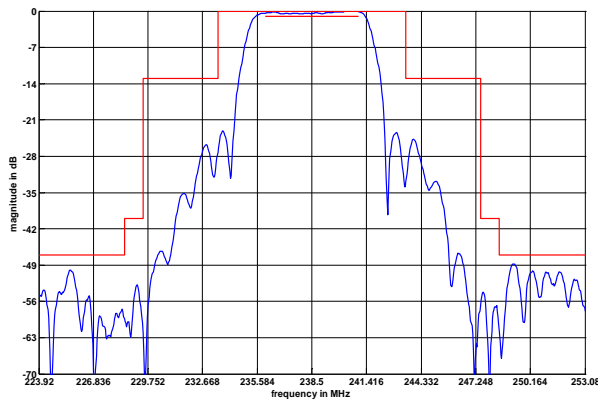**checked / approved:**

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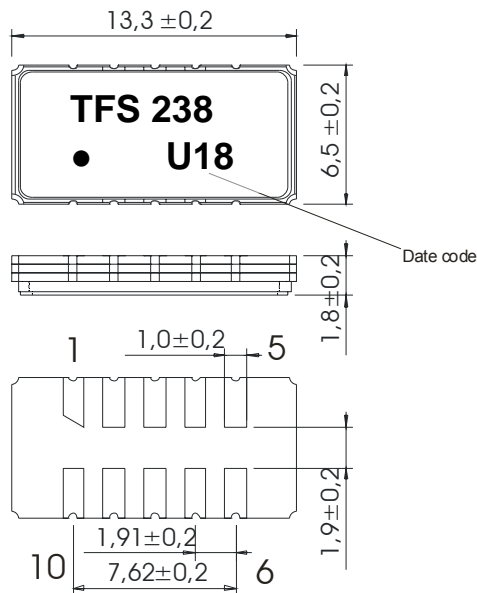**E-Mail:** tft@telefilter.com

VI TELEFILTER   **Filter specification**   **TFS 238**   **2/5**

Filter characteristic

Construction and pin connection

(All dimensions in mm)

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

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

50 Ohm Test circuit
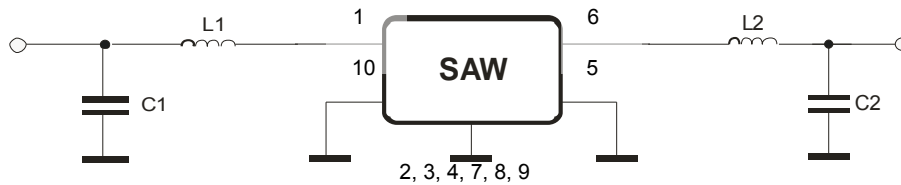
Stability characteristics

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VI TELEFILTER   **Filter specification**   **TFS 238**   **3/5**

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, please refer to the attached "Air reflow temperature conditions" on page 4;

Packing

Tape & Reel:	DIN 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;

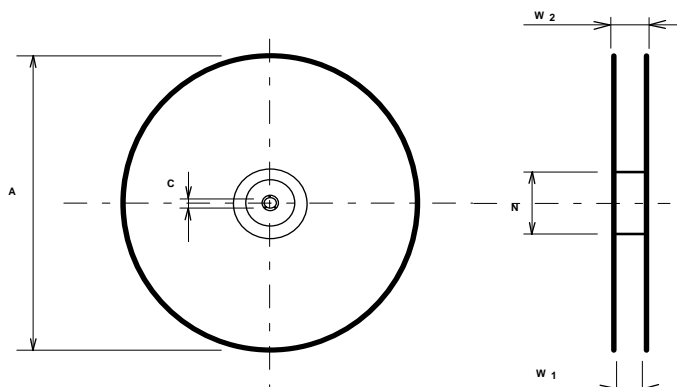|	
max. pieces of filters per reel:	1700
reel of empty components at start:	min 300 mm
reel of empty components at start including leader:	min 500 mm
trailer	min 300 mm

Tape (all dimensions in mm)

W	:	24	± 0,3
Po	:	4	± 0,1
Do	:	1,5	+ 0,1
E	:	1,75	± 0,1
F	:	11,5	± 0,1
G (min)	:	0,60	
P2	:	2	± 0,1
P1	:	12	± 0,1
D1(min)	:	1,5	
Ao	:	7,1	± 0,2
Bo	:	13,9	± 0,2
Ct	:	21,5	± 0,1
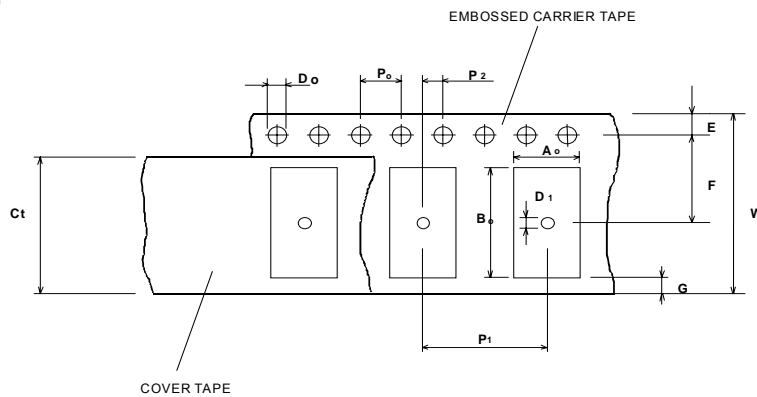
Reel (all dimensions in mm):

A	:	330
W1	:	24,40 +2,0
W2 (max)	:	30,4
N (min)	:	60
C	:	13 ± 0,5/-0.2

The minimum bending radius is 45 mm. The mounting surface of the filters faces the bottom side of the embossed carrier tape. Markings on the filters can be read if the upper side of the carrier tape is regarded with the sprocket holes on its

VI TELEFILTER   **Filter specification**   **TFS 238**   **4/5**

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 238** | **5/5** |

History

Version	Reason of Changes	Name	Date
1.0	generation of specification	Pfeiffer	24.10.2002
1.1	changing package and relative attenuation adding phase linearity over passband	Pfeiffer	29.11.2002
1.2	changing package and packing	Pfeiffer	13.02.2003
1.3	typical values, matching configuration and terminating impedances added	Pfeiffer	21.03.2003
2.0	typical values and terminating impedances changed	Pfeiffer	16.06.2003
2.1	typical values and terminating impedances changed relative attenuation at $f_N \pm 7,5$ MHz ... $f_N \pm 9$ MHz added	Pfeiffer	05.09.2003
2.2	- terminating impedance corrected - filter characteristic added - air reflow temperature conditions changed - stability characteristics modified	Pfeiffer	19.05.2006