

VI TELEFILTER

Filter specification

TFS 238C

1/5

Measurement condition

Ambient temperature:	23	°C
Input power level:	0	dBm
Terminating impedance: *		
Input:	408 Ω	-8.4 pF
Output:	395 Ω	-9.5 pF

Characteristics

Remark:

Reference level for the relative attenuation a_{rel} of the TFS 238C 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 1dB filter attenuation level relative to the insertion loss a_e . The nominal frequency f_N is fixed at 238,5 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)										$a_e = a_{min}$		9,1	dB	max.	12,0	dB
												-			-	
Nominal frequency										f_N		-			238,5	MHz
Centre frequency										f_C		238,5	MHz			
Passband										PB		11,8	MHz		$f_N \pm 5,0$	MHz
Pass band ripple **												0,2	dB	max.	1,0	dB
Relative attenuation										a_{rel}						
f_N	-	100	MHz	...	f_N	-	20	MHz	53	dB	min.	47	dB			
f_N	-	20	MHz	...	f_N	-	10	MHz	35	dB	min.	30	dB			
f_N	-	10	MHz	...	f_N	-	8,5	MHz	15	dB	min.	10	dB			
f_N	+	8,5	MHz	...	f_N	+	10	MHz	12	dB	min.	10	dB			
f_N	+	10	MHz	...	f_N	+	20	MHz	34	dB	min.	30	dB			
f_N	+	20	MHz	...	f_N	+	100	MHz	52	dB	min.	47	dB			
Return loss within PB												18	dB	min.	10	dB
Phase linearity **										p-p		2.6	deg	max.	4	deg
Input power level ***												-		max.	20	dBm
Operating temperature range										OTR		-		- 20 °C ... + 85°C		
Storage temperature range												-		- 45 °C ... + 85°C		
Temperature coefficient of frequency										TC_f ****		-22	ppm/K			

*) 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.

**) Over any 4 MHz continuous bandwidth within the 10 MHz passband.

***) Maximum value for 10 years operation.

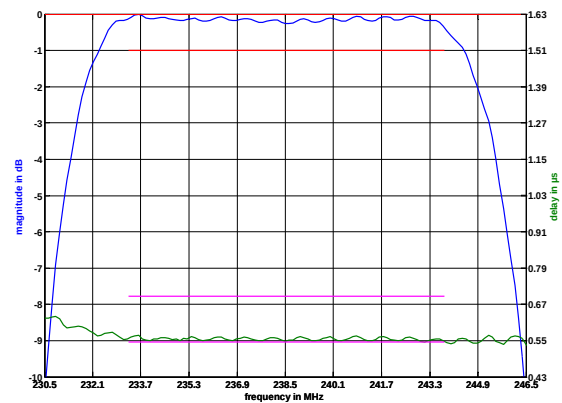
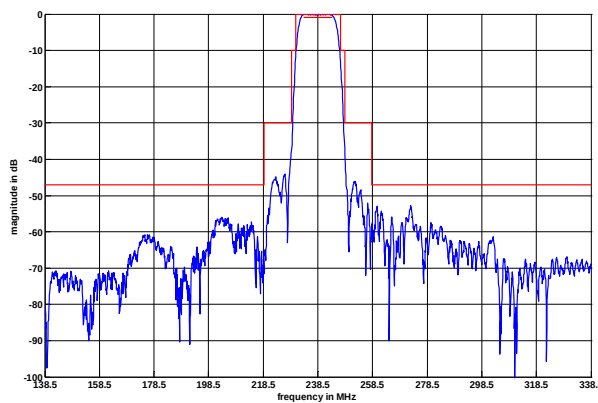
****) $\Delta f_c(\text{Hz}) = TC_f(\text{ppm/K}) \times (T - T_0) \times f_{T0}(\text{MHz})$.

Generated:

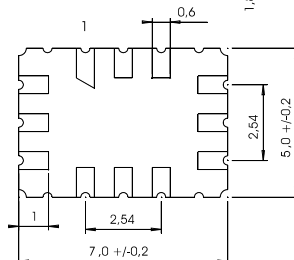
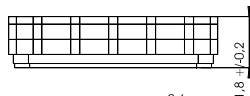
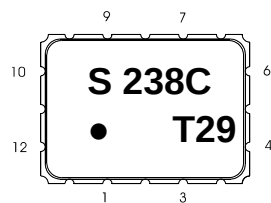
Checked / Approved:

Tele Filter GmbH
Potsdamer Straße 18
D 14 513 TELTOW / Germany
Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30
E-Mail: tft@telefilter.com

VI TELEFILTER reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

VI TELEFILTER**Filter specification****TFS 238C****2/5****Filter characteristic****Construction and pin connection**

(All dimensions in mm)



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

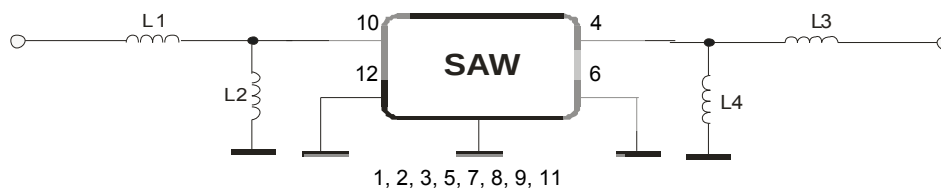
Date code: Year + week

S 2004

T 2005

U 2006

...

50 Ohm Test circuit**Tele Filter GmbH****Potsdamer Straße 18****D 14 513 TELTOW / Germany****Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30****E-Mail: tft@telefilter.com**

VI TELEFILTER reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

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

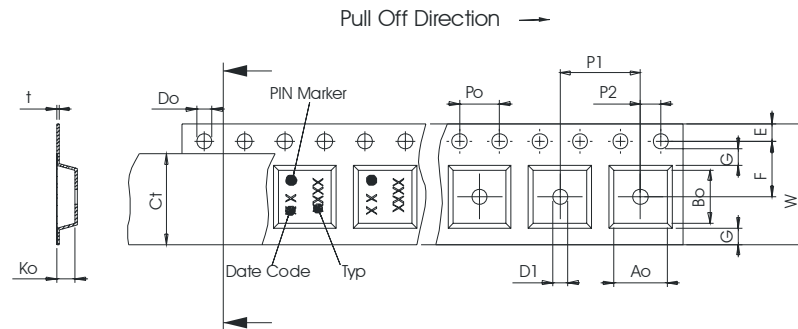
Packing

Tape & Reel: IEC 286 – 3, with exeption of value for N and minimum bending radius;
tape type II, embossed carrier tape with top cover tape on the upper side;

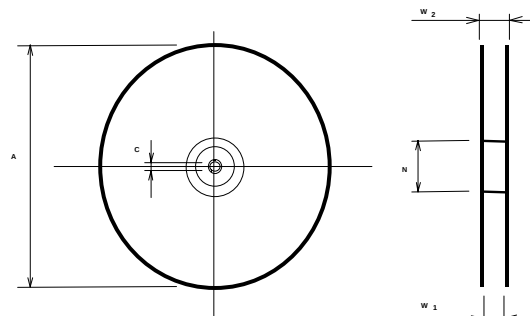
max. pieces of filters peer reel: 3000
reel of empty components at start: min. 300 mm
reel of empty components at start including leader: min. 500 mm
trailer: min. 300 mm

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



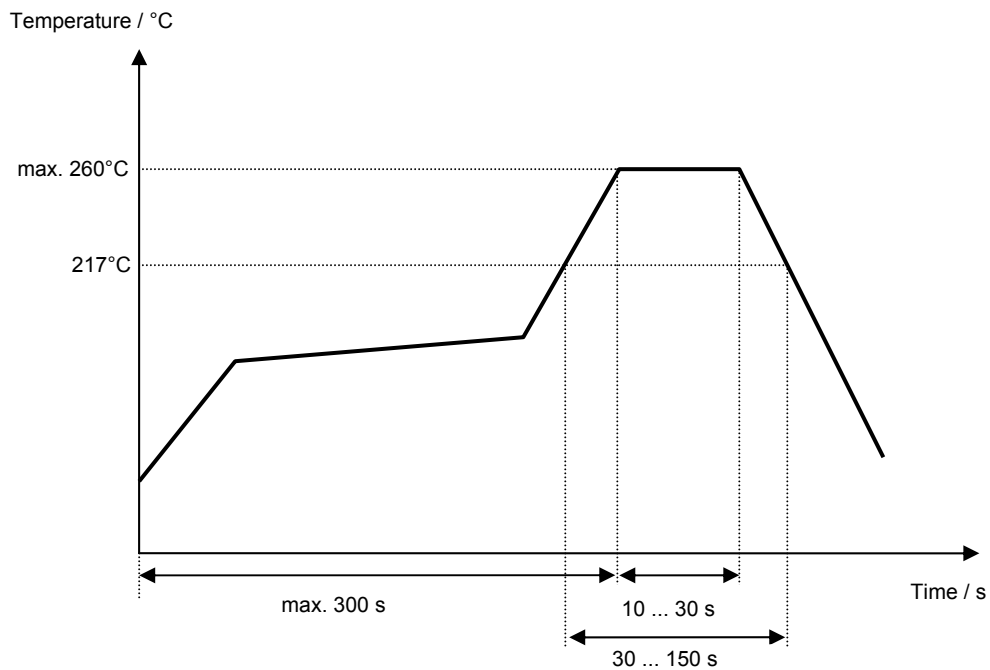
The minimum bending radius is 45 mm.

Tele Filter GmbH
Potsdamer Straße 18
D 14 513 TELTOW / Germany
Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30
E-Mail: tft@telefilter.com

VI TELEFILTER reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

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 238C****5/5**

Version	Reason of Changes	Name	Date
1.0	- Generation of development specification	Chilla	27.07.2004
1.1	- Construction and pin connection changed	Chilla	28.07.2004
1.2	- Add 30 dB relative attenuation - Change 10 dB relative attenuation to $f_n \pm 8,5$ MHz	Chilla	18.08.2004
1.3	- Create filter specification - add terminating impedance - add typical values - add filter characteristic - add test circuit - changed air flow temperature conditions	Chilla	20.07.2005