Measurement condition

Ambient temperature: 23 °C
Input power level: 0 dBm
Terminating impedance: *
Input: 780 Ω || -7,9 pF
Output: 760 Ω || -7.9 pF

Characteristics

Remark:
The reference level for the relative attenuation a_{rel} of the TFS 170N is the attenuation at nominal frequency f_N. The maximum attenuation in the pass band is defined as the insertion loss a_e. The nominal frequency f_N is fixed at 170,6 MHz without any tolerance or limit. 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	a_e	6,6	dB	max.	8	dB
Nominal frequency	f_N	-			170,6	MHz
Passband	PB	-		f_N ±	90	kHz
Amplitude ripple in PB	p-p	0,4	dB	max.	1	dB
Relative attenuation	a_{rel}					
f_N ± 90 kHz ... f_N ± 200 kHz		-0,1	dB	min.	-1	dB**
f_N ± 0,2 MHz ... f_N ± 0,4 MHz		2	dB	min.	1	dB
f_N ± 0,4 MHz ... f_N ± 0,6 MHz		23	dB	min.	13	dB
f_N ± 0,6 MHz ... f_N ± 0,8 MHz		35	dB	min.	27	dB
f_N ± 0,8 MHz ... f_N ± 1,6 MHz		45	dB	min.	40	dB
f_N ± 1,6 MHz ... f_N ± 3 MHz		48	dB	min.	43	dB
f_N ± 3 MHz ... f_N ± 5,8 MHz		55	dB	min.	47	dB
f_N ± 5,8 MHz ... f_N ± 35 MHz		60	dB	min.	50	dB
f_N ± 35 MHz ... f_N ± 75 MHz		65	dB	min.	45	dB
f_N - 75 MHz ... f_N - 170 MHz		70	dB	min.	40	dB
f_N + 75 MHz ... 2 GHz		70	dB	min.	40	dB
Time domain response* **						
5 µsec		17	dB	min.	10	dB
10 µsec		35	dB	min.	20	dB
30 µsec		80	dB	min.	76	dB
35 µsec		83	dB	min.	79	dB
≥ 40 µsec		84	dB	min.	80	dB
Group delay variation in PB		0,25	µs	max.	1	µs
VSWR in PB		1,5:1		max.	2:1	
Input Power Level		-		max.	20	dBm
Temperature coefficient of frequency Tc_f ****		-0,05	ppm/K²		-	
Frequency inversion temperature T_0		35	°C		-	
Operating temperature range		-		- 33 °C .. +	85	°C
Storage temperature range		-		- 40 °C.. +	125	°C
IIP3 *****		36	dBm	min.	30	dBm

*) The terminating impedances depend on parasites 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.
**) reference is max. loss in PB
***) Attenuation values for delays between 5µs and 35µs shall be interpolated linearly.
****) $\Delta f(Hz) = TC_f(ppm/K^2) \times (T-T_0)^2 \times f_{TO}(MHz)$
*****) f_{in1}= 170,5 MHz; f_{in2}= 170,55 MHz; P_{in}= 0 dBm $f_{measurement}$ = 170,6 MHz

generated:

checked / approved:

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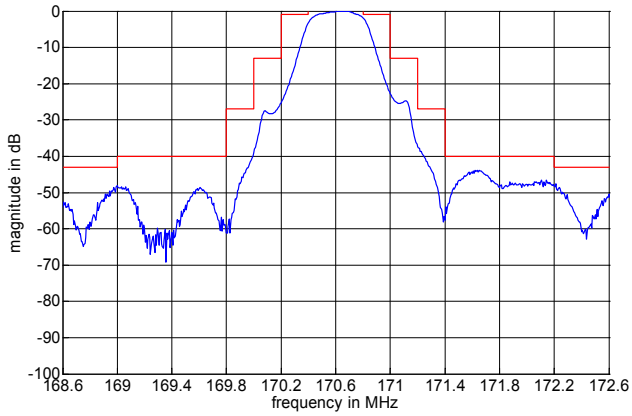
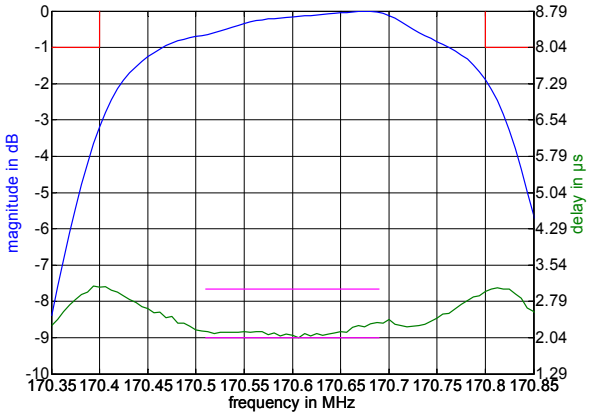
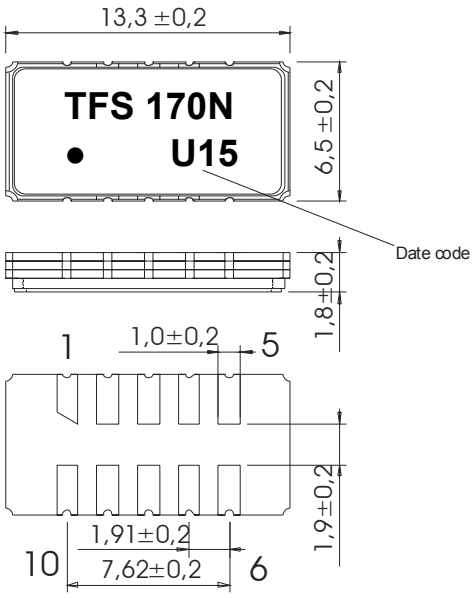
Filter characteristic





Construction and pin connection

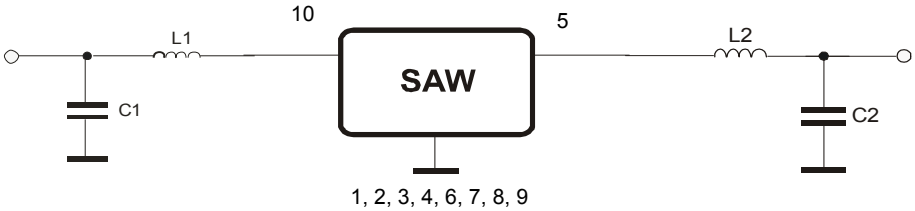
(All dimensions in mm)



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

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

50 Ω Test circuit



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Stability characteristics, reliability

After the following tests the filter shall meet the whole specification:

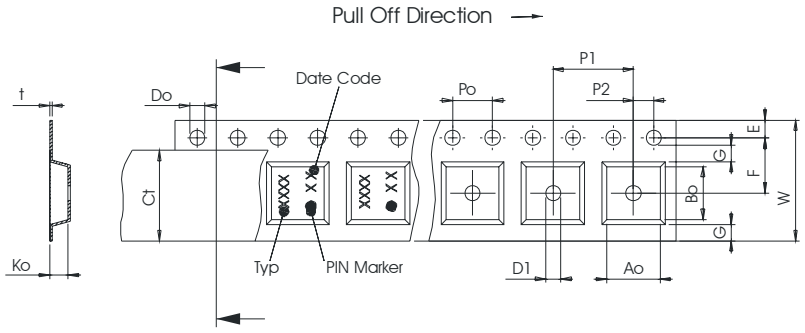
1. Shock:	500g, 1 ms, half sine wave, 3 shocks each plane; DIN IEC 68 T2 - 27
2. Vibration:	10 Hz to 500 Hz, 0,35 mm or 5 g respectively, 1 octave per min, 10 cycles per plan, 3 plans; DIN IEC 68 T2 - 6
3. Change of temperature:	-55 °C to 125°C / 30 min. each / 10 cycles DIN IEC 68 part 2 – 14 Test N
4. Resistance to solder heat (reflow):	reflow possible: three times 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

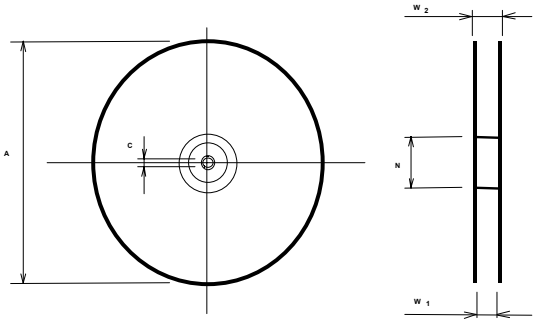
Tape & Reel: IEC 286 – 3, with exception of value for N and minimum bending radius;
tape type II, embossed carrier tape with top cover tape on the upper side;

max. pieces of filters per reel:	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	: 24,00	+0,30/-0,10
Po	: 4,00	± 0,1
Do	: 1,50	+0,1/-0
E	: 1,75	± 0,10
F	: 11,50	± 0,10
G(min)	: 0,60	
P2	: 2,00	± 0,1
P1	: 12,00	± 0,1
D1(min)	: 1,50	
Ao	: 7,10	± 0,10
Bo	: 13,90	± 0,10
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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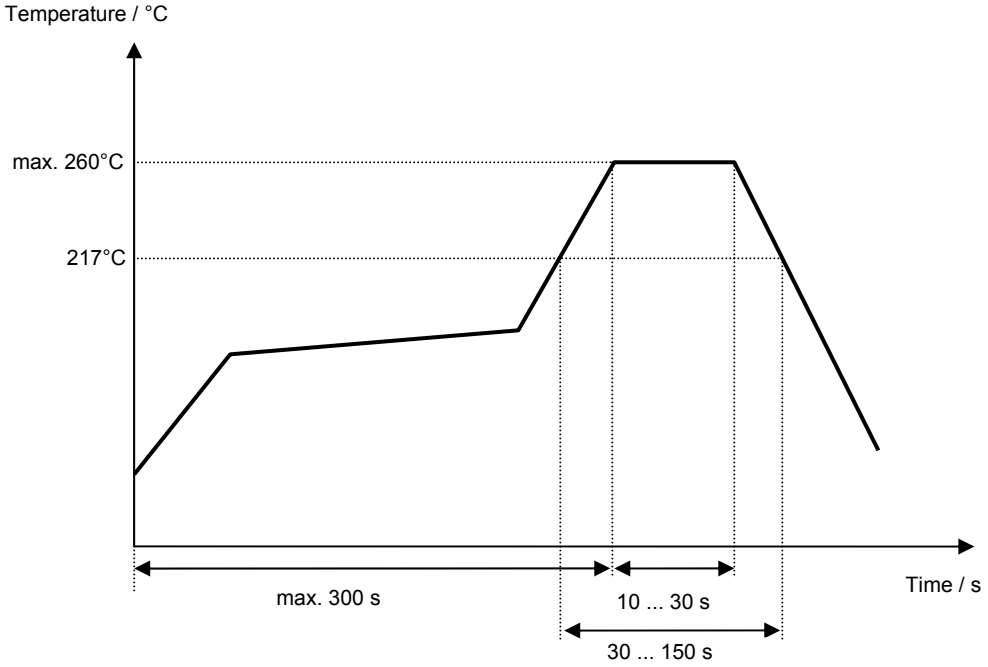
Air reflow temperature conditions

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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History

Version	Reason of Changes	Name	Date
1.0	generation of “Development specification” according to customer requirements	Pfeiffer	13.07.2004
1.1	package tolerances modified	Steiner	16.08.2004
1.2	terminating impedance added (preliminary value) typical value and filter characteristic added definition for insertion loss changed limits for relative attenuation corrected	Pfeiffer	17.09.2004
1.3	terminating impedance fixed air reflow temperature conditions modified	Pfeiffer	18.10.2004
1.4	limit for maximum input power level fixed to 20 dBm air reflow temperature conditions modified	Pfeiffer	04.11.2004
1.5	operating temperature range extended	Pfeiffer	31.03.2006
1.6	typical values and more details added for IP3 VSWR typo corrected	Pfeiffer	11.04.2006

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