Measurement condition

Ambient temperature: 25 °C
Input power level: 0 dBm
Terminating impedance: *
Input: 1050 Ω || -10,1 pF
Output: 1070 Ω || -10,5 pF

Characteristics

Remark:
The reference level for the relative attenuation a_{rel} of the TFS 190S 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 1 dB filter attenuation level relative to the insertion loss a_e. The nominal frequency f_N is fixed at 190.0 MHz without any tolerance. The given values for both the relative attenuation a_{rel} and the group delay ripple have to be achieved 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	12	dB	max.	19,0	dB
Nominal frequency	f_N				190.0	MHz
Centre frequency	f_C	190,0	MHz		-	
Passband	PB	-		f_N	± 1,92	MHz
Pass band ripple	p-p	0,5	dB	max.	1	dB
Relative attenuation	a_{rel}					
f_N ... f_N ± 1,920 MHz		0,5	dB	max.	1	dB
f_N ± 2,135 MHz ... f_N ± 2,375 MHz		6	dB	min.	3	dB
f_N - 2,375 MHz ... f_N - 2,515 MHz		24	dB	min.	17	dB
f_N - 2,515 MHz ... f_N - 3,230 MHz		44	dB	min.	40	dB
f_N + 2,375 MHz ... f_N + 2,615 MHz		24	dB	min.	17	dB
f_N + 2,615 MHz ... f_N + 3,230 MHz		44	dB	min.	40	dB
f_N ± 3,230 MHz ... f_N ± 5,250 MHz		45	dB	min.	43	dB
f_N ± 5,250 MHz ... f_N ± 20,000 MHz		50	dB	min.	45	dB
Average group delay f_N ±1,728MHz		1,45	µs	max.	2,0	µs
Group delay ripple f_N ±1,728MHz	p-p	150	ns	max.	220	ns
Phase linearity f_N ±1,728MHz	p-p	4,5	deg		-	
Return loss f_N ±1,728MHz		14	dB	min.	10	dB
Input power level				max.	10	dBm
Operating temperature range	OTR	-		0 °C ... + 80 °C		
Storage temperature range		-		-35 °C ... + 85 °C		
Temperature coefficient of frequency	TC_f **	0,04	ppm/K²		-	

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

Generated:

Checked / Approved:

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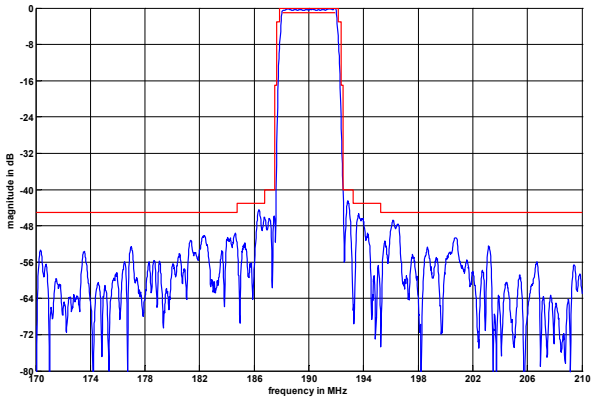
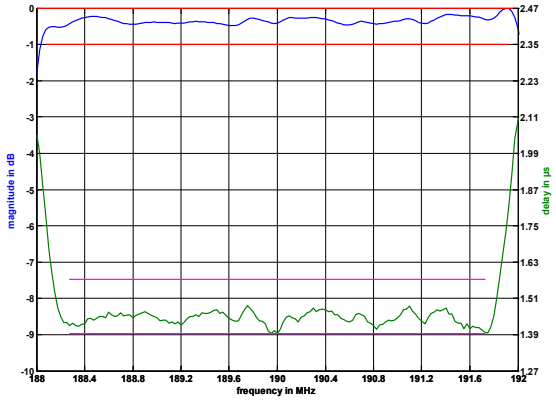
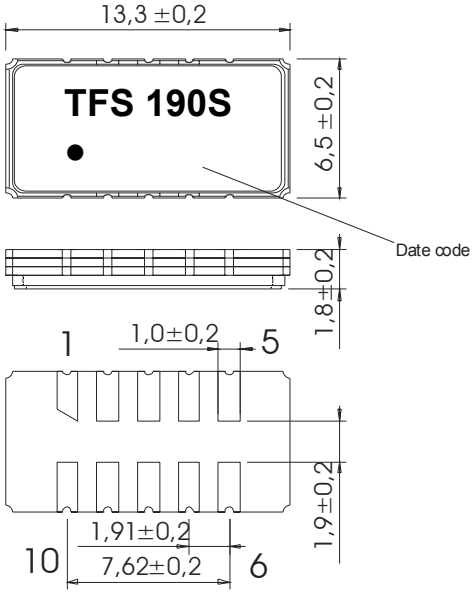
Filter characteristic





Construction and pin connection

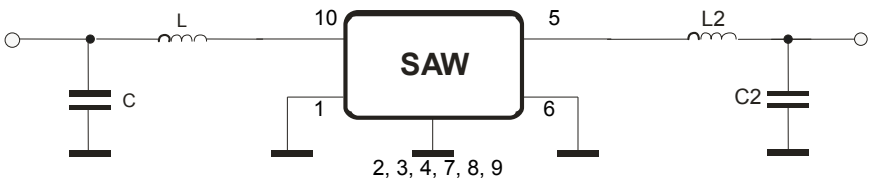
(All dimensions in mm)



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)

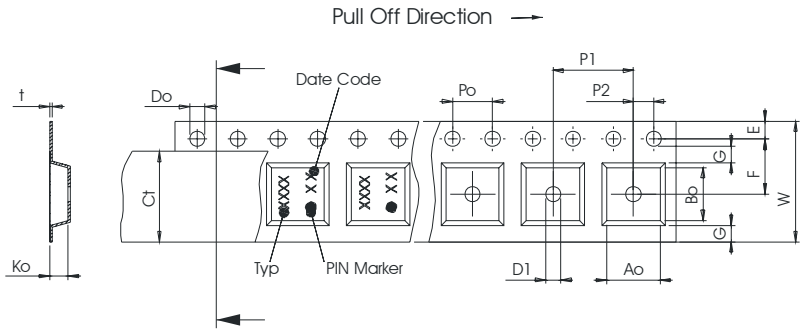
Packing

Tape & Reel: IEC 286 – 3, with 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:	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

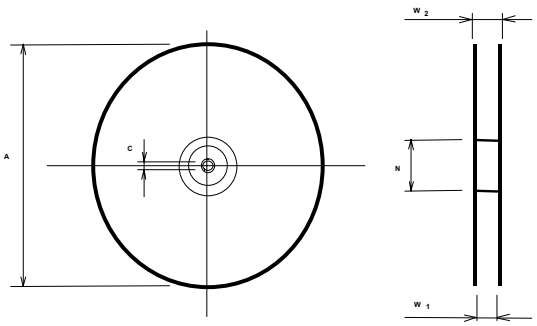
Tape (all dimensions in mm)

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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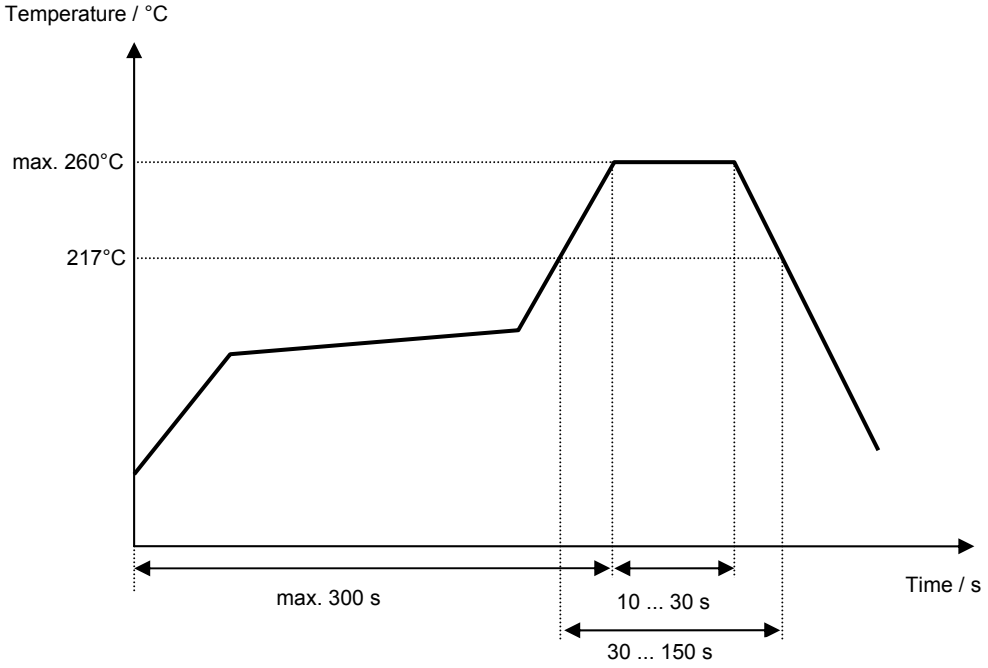
Air reflow temperature conditions

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	generated development specification	Strehl	06.06.2005
1.1	- 'return loss' and 'average group delay' : frequency range defined - matching configuration added - relative attenuation: 40 dB-limits added - temperature coefficient corrected	Pfeiffer	12.07.2005
1.2	- terminating impedance, typical values and filter characteristic added - stability characteristics modified - matching configuration changed	Pfeiffer	18.11.2005
1.3	- change of relative attenuation at f_N + 2,615 MHz … f_N + 3,230 MHz	Pfeiffer	10.10.2006

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