Measurement Condition

Ambient Temperature:	23	°C
Input Power Level:	0	dBm
Terminating impedances *	Input:	T.B.D.
	output:	T.B.D.

Characteristics

Remark:
Reference level for the relative attenuation a_{rel} of the TFS 190 D is the insertion loss. The insertion loss a_e is defined as the minimum of attenuation in pass band. The centre frequency f_c is the arithmetic mean value of the upper and lower frequencies at the 3 dB filter attenuation level relative to the insertion loss a_e. The nominal frequency f_N is fixed on 190,000 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 also 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**		**Limit**		
Insertion Loss (Reference level)	$a_e = a_{min}$	8	dB	max.	10	dB
Nominal Frequency	f_N	-			190	MHz
5 dB - Bandwidth	BW	1,6	MHz	min.	1,26	MHz
Pass Band Ripple f_N ± 0,300 MHz	-	0,3	dB	max.	1,2	dB
Relative Attenuation	a_{rel}					
f_N ± 0,63 MHz		-		max.	5	dB
f_N ± 1,25 MHz ... f_N ± 20 MHz		-		min.	35	dB
f_N - 1,25 MHz		45	dB	min.	35	dB
f_N + 1,25 MHz		45	dB	min.	35	dB
f_N ± 2,05 MHz		40	dB	min.	37	dB
Group delay ripple f_N ± 0,630 MHz		-		max.	1	µs
Operating Temperature Range				- 40 °C ... + 65 °C		
Temperature coefficient of frequency	TC_f**	-0,036	ppm/K²	-		
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.

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

Generated: _____

Checked / approved: _____

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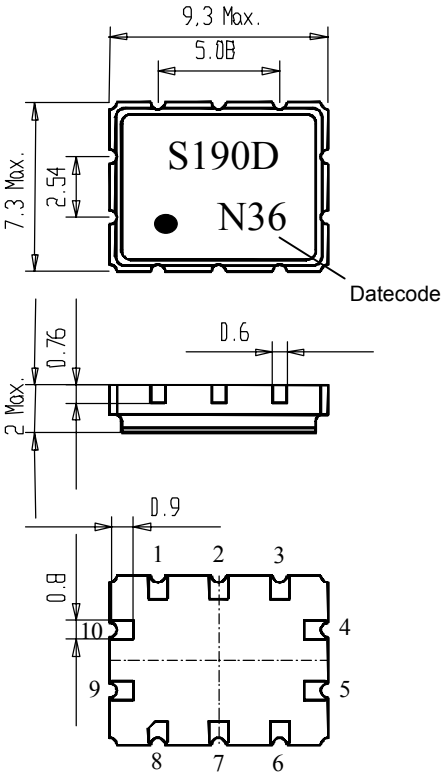
Construction and pin connection

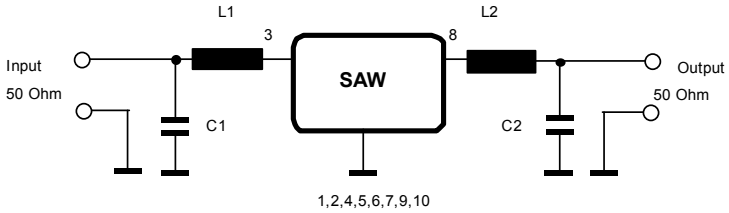


Pinning

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

Datecode	Year+month
L	1999
M	2000
N	2001
...	

50 Ω test circuit (unbalanced)



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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, 1,5 mm or 20g 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):	max. 2 times reflow process; for temperature conditions refer to the attached "Air reflow temperature conditions" on sheet 4;

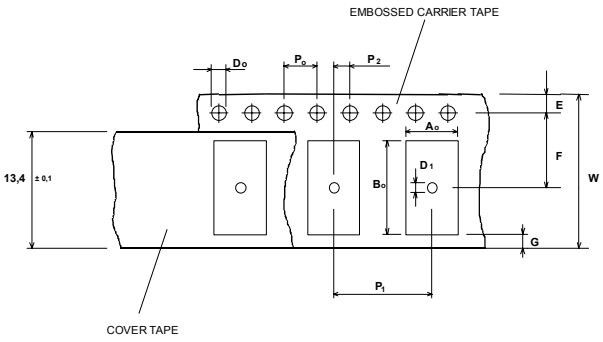
Packing

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:	2000
reel of empty components at start:	min 300 mm
reel of empty components at start including leader:	min 500 mm
trailer	min 300 mm

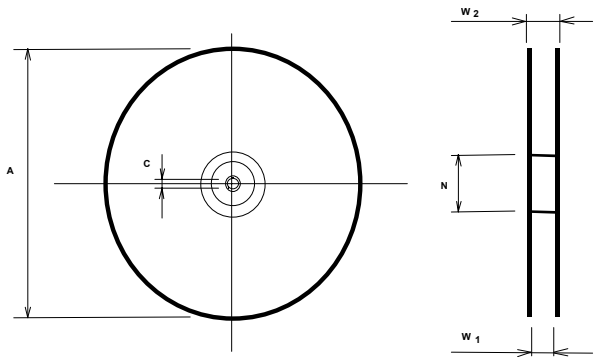
Tape (all dimensions in mm)

W	: 16	± 0,3
Po	: 4	± 0,1
Do	: 1,5	+ 0,1
D1	: 1,5	+ 0,1
E	: 1,75	± 0,1
F	: 7,5	± 0,1
G (min)	: 0,6	
P2	: 2	± 0,1
P1	: 12	± 0,1
D1(min)	: 1,5	
Ao	: 7,6	± 0,1
Bo	: 9,6	± 0,1



Reel (all dimensions in mm):

A	: 330	
W1	: 16,4	+2
W2 (max)	: 22,4	
N (min)	: >= 60	
C	: 12,8	± 0,1



The minimum bending radius is 45 mm. The mounting surface of the filters faces the bottom side of the embossed carrier tape. The marking of the filters is able to read if the view is directed on the upper side of the carrier tape with the sprocket holes on the right side of the tape.

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Air reflow temperature conditions

1st and 2nd air reflow profile

Name:	pre-heating periods	main-heating periods	peak temperature
Temperature:	150 °C - 170 °C	over 200 °C	255 °C ± 5 °C
Time:	60 sec. - 90 sec.	20 sec. - 25 sec.	

Chip-mount air reflow profile

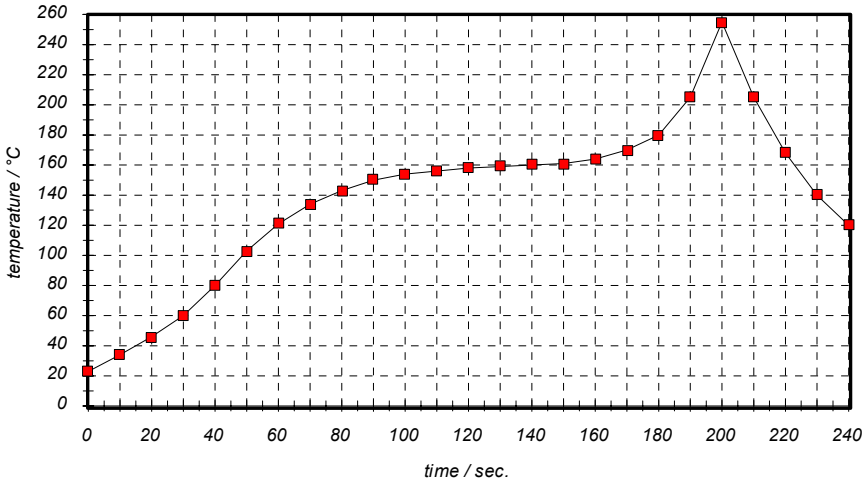

Table for temperature vs. time during the air reflow process

Tolerance of temperatures: ± 5 °C

time / sec.	temperature / °C	time / sec.	temperature / °C
0	23	140	160
10	34	150	161
20	46	160	164
30	60	170	170
40	80	180	180
50	103	190	205
60	121	195	230
70	134	200	255
80	143	205	230
90	150	210	205
100	154	215	180
110	156	220	165
120	158	230	140
130	159	240	120

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History

Version	Reason of Changes	Name	Date
1.0	generate specification according to customer requirements	Jaffer	31.07.2001
1.1	Add “frequency inversion temperature” Add “storage temperature” Add “temperature coefficient of frequency” Correct “packing” information	Herrler	01.08.2001
1.2	temperature range adjusted according to customer demands	Steiner	06.08.2001
1.3	Change Input and Output pins	Herrler	16.08.2001
1.4	remove of source/load impedance . remove of phase linearity correct of tape and reel dimentions filter specification	Dr. Sabah	07.09.2001

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