

**VI TELEFILTER****Filter Specification****TFS 190E****1/5****Measurement condition**

Ambient Temperature: 23 °C  
 Input Power Level: 0 dBm  
 Terminating Impedance at  $f_C$ :  
     input: 307  $\Omega$  // - 12,4 pF  
     output: 107  $\Omega$  // - 16,9 pF

**Characteristics****Remark:**

The reference level for the relative attenuation  $a_{rel}$  of TFS 190E is the minimum of the pass band attenuation  $a_{min}$ . This minimum is defined as the insertion loss  $a_e$ . The nominal frequency  $f_N$  is fixed at 190 MHz without any tolerance. 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  $f_C$ .

<b>Data</b>		<b>typ. Value</b>	<b>Limit</b>
<b>Insertion Loss</b> (Reference Level)	$a_e = a_{min}$	21,5 dB	max. 24,0 dB
<b>Nominal Frequency</b>	$f_N$	-	190,0 MHz
<b>Pass Band</b>	PB	-	$f_N \pm 1,92$ MHz
<b>Group Delay Variation within PB</b>		125 ns	max. 300 ns p-p
<b>Relative Attenuation</b>	$a_{rel}$		
$f_N$ ... $f_N \pm 1,92$ MHz		-	max. 1 dB
$f_N \pm 2,50$ MHz ... $f_N \pm 3,75$ MHz		-	min. 30 dB
@ $f_N + 3,75$ MHz		52 dB	min. 45 dB
$f_N - 180,00$ MHz ... $f_N - 3,75$ MHz		55 dB	min. 48 dB
$f_N + 3,75$ MHz ... $f_N + 60,00$ MHz		55 dB	min. 43 dB
$f_N + 60,00$ MHz ... $f_N + 310,00$ MHz		55 dB	min. 50 dB
<b>Operating Temperature Range</b>			-30... +85 °C
<b>Storage Temperature Range</b>			-40... +85 °C
<b>Temperature Coefficient of frequency <math>TC_f</math></b>		- 0,036 ppm / K <sup>2</sup>	-

\*) 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.

**generated:** \_\_\_\_\_

**checked / approved:** \_\_\_\_\_

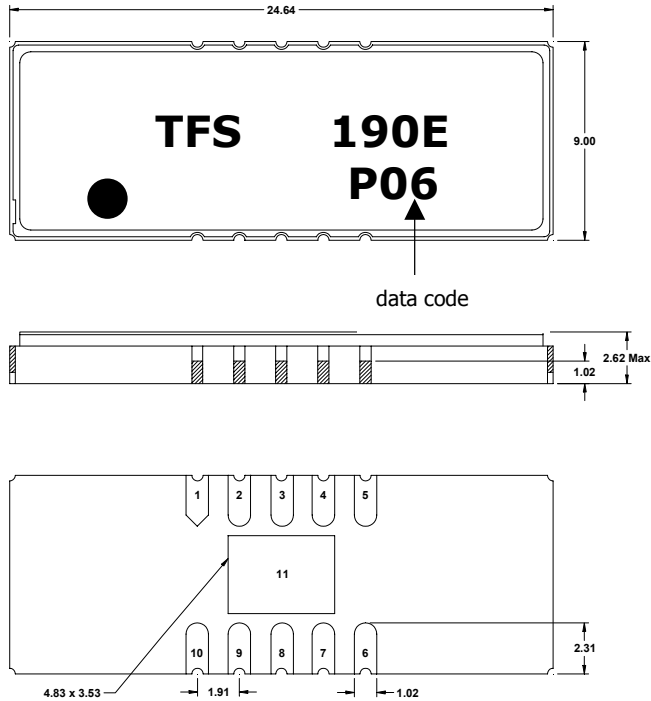
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**Construction and pin connection**

(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

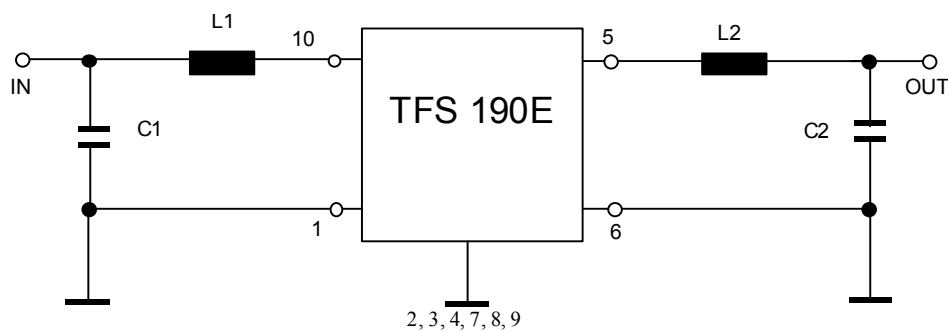
Date code Year+week

M 2000

N 2001

P 2002

...

**50  $\Omega$  matching (example)**

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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, 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;

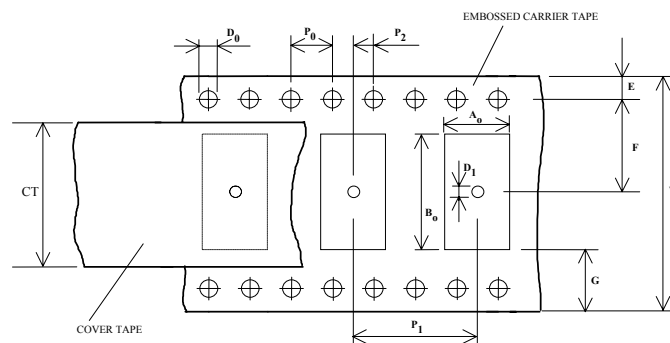
**Packing**

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;

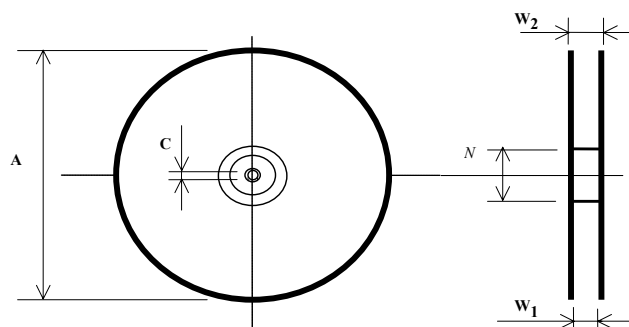
max. pieces of filters per reel:	1000
reel of empty components at start:	min 300 mm
reel of empty components at start including leader:	min 500 mm
trailer	min 300 mm

**Tape (all dimensions in mm)**

W	: 44	± 0,3
Po	: 4	± 0,1
Do	: 1,5	+ 0,1
E	: 1,75	± 0,1
F	: 20,2	± 0,15
G (min)	: 0,75	
P2	: 2	± 0,15
P1	: 16	± 0,1
D1(min)	: 2,0	
Ao	: 9,3	± 0,1
Bo	: 24,9	± 0,1
CT	: 38	± 0,2

**Reel (all dimensions in mm):**

A	: 330
W1	: 44,4
W2 (max)	: 50,4
N (min)	: 100
C	: 13,0 <sup>+0,50</sup> / <sub>-0,20</sub>



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 right.

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**Air reflow temperature conditions**1<sup>st</sup> and 2<sup>nd</sup> 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.	

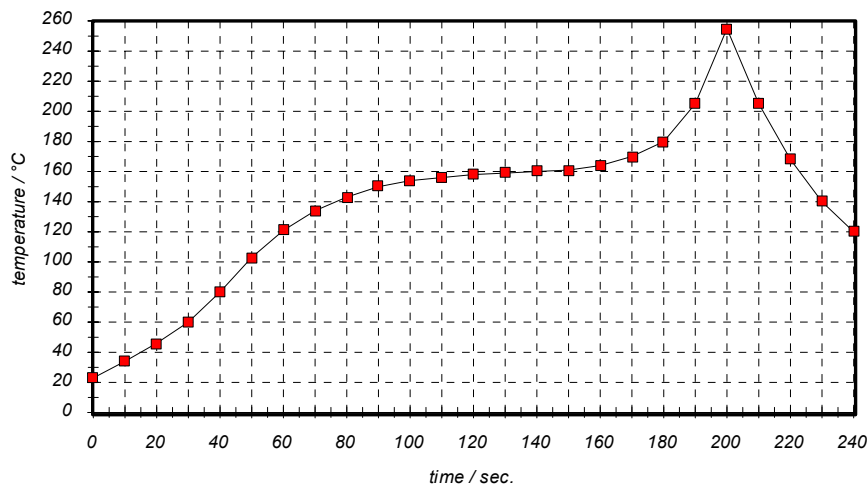
**Chip-mount air reflow profile**

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

**VI TELEFILTER****Filter Specification****TFS 190E****6/5****History**

<b>Version</b>	<b>Reason of Changes</b>	<b>Name</b>	<b>Date</b>
1.0	generation of specification according to customer requirements	Pfeiffer	30.10.2001
1.1	typical values added terminating impedance added (preliminary value)	Pfeiffer	05.02.2002

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