

VI TELEFILTER**Filter Specification****TFS 208 H****1/5****Measurement Condition**

Ambient temperature: 23 °C
 Input power level: 0 dBm
 Source impedance: 200 Ω balanced
 Load impedance: 50 Ω single ended
 Terminating impedances: *) input: 410 Ω // -10,3 pF
 output: 264 Ω // -12,7 pF

Characteristics

Remark: Reference level for the relative attenuation a_{rel} of the TFS 208H is the attenuation at 208 MHz. Reference for the echo response attenuation is the main time response lobe, the reference time is defined as t_0 . The nominal frequency f_N is fixed at 208 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 .

Data		typ. Value	Limit
Absolute attenuation	within $f_N \pm 0,1$ MHz	7 dB	6 ... 8,5 dB
Nominal frequency	f_N	-	208 MHz
Pass band ripple			
f_N	$f_N \pm 0,1$ MHz	0,05 dB	max. $\pm 0,25$ dB
$f_N \pm 0,1$ MHz ...	$f_N \pm 0,2$ MHz	0,1 dB	max. $\pm 0,5$ dB
$f_N \pm 0,2$ MHz ...	$f_N \pm 0,5$ MHz	0,6 dB	max. ± 1 dB
1 dB-bandwidth		1180 kHz	min. 1000 kHz
Relative attenuation a_{rel}			
f_N ...	$f_N \pm 0,5$ MHz	-	max. 1 dB
$f_N \pm 1,2$ MHz ...	$f_N \pm 1,8$ MHz	15 dB	min. 9 dB
$f_N \pm 1,8$ MHz ...	$f_N \pm 6$ MHz	28 dB	min. 25 dB
$f_N \pm 6$ MHz ...	$f_N \pm 13$ MHz	50 dB	min. 35 dB
$f_N - 13$ MHz ...	$f_N - 198$ MHz	65 dB	min. 50 dB
$f_N + 13$ MHz ...	$f_N + 242$ MHz	65 dB	min. 50 dB
Echo response attenuation a_{rel}			
$t_0 + 1$ μs		35 dB	min. 20 dB
$t_0 + 2$ μs		45 dB	min. 30 dB
$t_0 + 3$ μs		55 dB	min. 40 dB
$t_0 + 4$ μs		70 dB	min. 40 dB
$t_0 + 5$ μs		80 dB	min. 50 dB
Group delay	at f_N	525 ns	max. 750 ns
Group delay ripple	within $f_N \pm 0,5$ MHz	100 ns	max. 150 ns
Input power level		-	max. + 10 dBm
VSWR	within $f_N \pm 0,5$ MHz	18 dB	max. 2:1
IP3 **)		65 dBm	min. 60 dBm
Operating temperature range		-	- 10 °C ... + 85 °C
Storage temperature range		-	- 40 °C ... + 125 °C
Temperature coefficient of frequency	TC_f ***	-0,036 ppm/K ²	-
Frequency inversion temperature	T_0	15 °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.

***) $f_{in,1}=208$ MHz; $f_{in,2}=208,1$ MHz; $P_{in}=4$ dBm+loss @ f_N ; $f_{out,1}=207,9$ MHz; $f_{out,2}=208,2$ MHz; then $P_{out}<-56$ dBm

****) $\Delta f(\text{Hz}) = TC_f(\text{ppm/K}^2) \times (T-T_0)^2 \times f_{T0}(\text{MHz})$

generated: _____

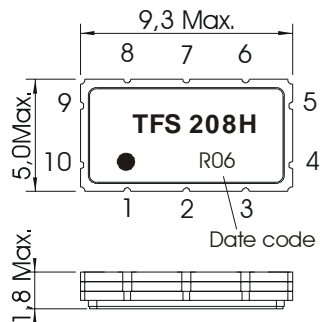
checked / approved: _____

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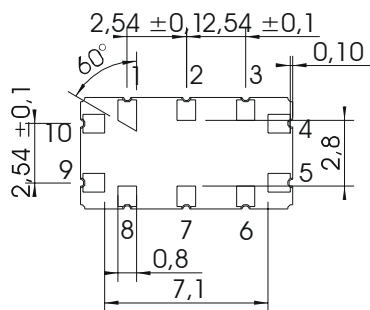
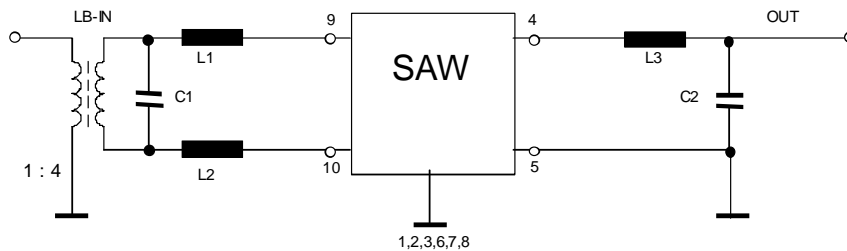
Construction and pin configuration

(all dimensions in mm)



1	ground
2	ground
3	ground
4	output
5	output if return
6	ground
7	ground
8	ground
9	input
10	input

date code:	year + week
N	2001
P	2002
R	2003
....

**matching circuit: input 200 Ω balanced driven / output 50 Ω single ended**

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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 refer to the attached "Air reflow temperature conditions" on page 4;

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:

reel of empty components at start:

reel of empty components at start including leader:

trailer

3000

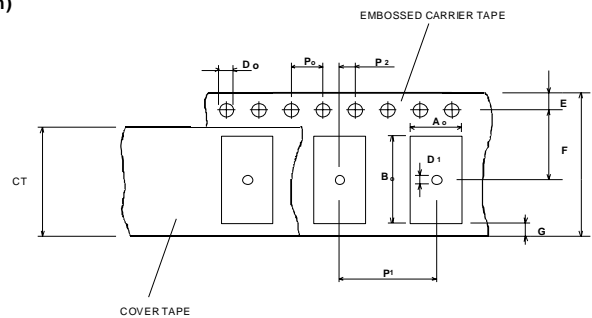
min 300 mm

min 500 mm

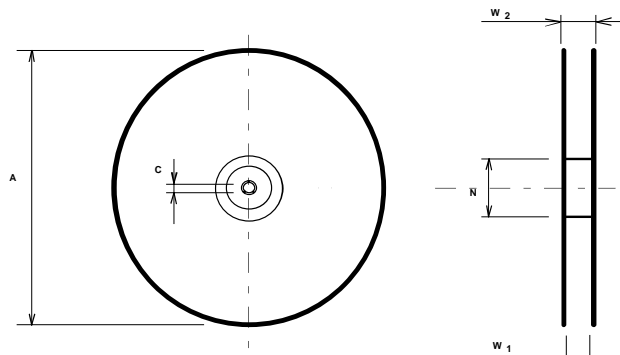
min 300 mm

Tape (all dimensions in mm)

W	: 16 ± 0,3
Po	: 4 ± 0,1
Do	: 1,5 ± 0,1
E	: 1,75 ± 0,1
F	: 7,5 ± 0,1
G (min)	: 0,60
P2	: 2 ± 0,1
P1	: 8 ± 0,1
D1 (min)	: 1,5
Ao	: 5,30 ± 0,1
Bo	: 9,70 ± 0,1
CT	: 13,5 ± 0,1

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

A	: 330
W1	: 16,40 ± 2,0
W2 (max)	: 22,4
N (min)	: 50
C	: 13,0 ± 0,5/-0,2



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

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.	

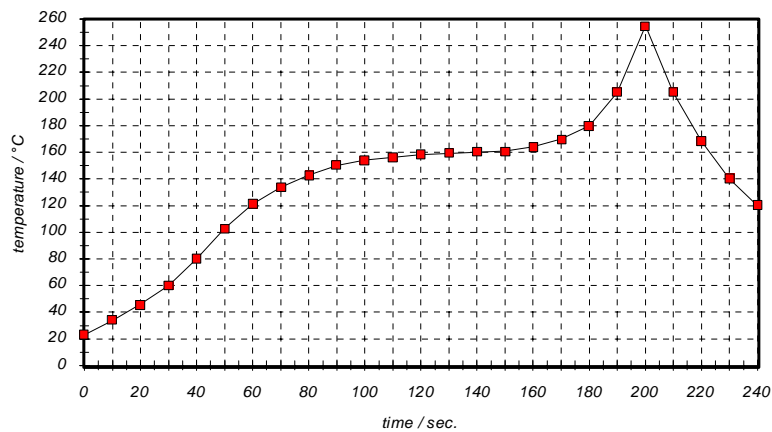
Chip-mount air reflow profile

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
Development specification			
1.0	generation of development specification	Chilla	17.07.2002
1.1	terminating impedance (preliminary values) and typical values of relative attenuation added	Pfeiffer	25.09.2002
1.2	1 dB-bandwidth added	Pfeiffer	05.11.2002
1.3	terminating impedance and typical values of relative attenuation changed	Pfeiffer	05.02.2003

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