

Microchip

Filter specification

TFS 248 E

1/5

Measurement condition

Ambient temperature: 23 °C
 Input power level: 0 dBm
 Terminating impedances at f_C *)
 Input: 560 Ω || -5.9pF
 Output: 500 Ω || -6.3 pF

Characteristics

Remark:

The reference level for the relative attenuation a_{rel} of TFS 248E is the minimum of the pass band attenuation a_{min} . This value is defined as the insertion loss a_e . The nominal frequency f_N is fixed at 248,6 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 .

D a t a	typ. Value	Limit
Insertion Loss (at ambient temperature) $a_e = a_0$		max. 6,0 dB ***)
Nominal Frequency f_N	-	248,6 MHz
Centre Frequency f_C	248,6 MHz	-
Passband Ripple (p-p) $f_N \pm 100$ kHz	0,6 dB	max. 1,0 dB
Relative Attenuation ****)		
a_{rel}		
$f_N \pm 330$ kHz ... $f_N \pm 600$ kHz	17 dB	min. 12 dB
$f_N \pm 600$ kHz ... $f_N \pm 0,8$ MHz	38 dB	min. 34 dB
$f_N \pm 0,8$ MHz ... $f_N \pm 1,6$ MHz	50 dB	min. 48 dB
$f_N \pm 1,6$ MHz ... $f_N \pm 2,2$ MHz	53 dB	min. 48 dB
$f_N - 2,2$ MHz ... $f_N - 29,2$ MHz	60 dB	min. 53 dB
$f_N - 29,2$ MHz ... $f_N - 238,6$ MHz	70 dB	min. 60 dB
$f_N + 2,2$ MHz ... $f_N + 100$ MHz	60 dB	min. 53 dB
@- $f_N + 22,8$ MHz	68 dB	min. 60 dB
@- $f_N + 52,0$ MHz	70 dB	min. 60 dB
@- $f_N + 74,8$ MHz	70 dB	min. 60 dB
@- $f_N + 104,0$ MHz	75 dB	min. 60 dB
@- $f_N + 126,8$ MHz	75 dB	min. 60 dB
Group Delay Ripple (p-p) $f_N \pm 100$ kHz	0,2 μ s	max. 0,5 μ s
Input power level		
<=100 hours	-	max. 20 dBm
<=15 years	-	max. 5 dBm
Operating Temperature Range	-	- 20 °C ... + 80 °C
Temperature Coefficient **) TC	0,032 ppm/K ²	
Frequency inversion temperature (T_o)	25 °C	
Storage temperature range		- 40 °C+ 85 °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.

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

***) insertion loss includes matching network with coils with Q value>=40.

****) if a frequency range / point is defined twice the larger attenuation value is valid

generated:

checked / approved:

Microchip Frequency Technology GmbH

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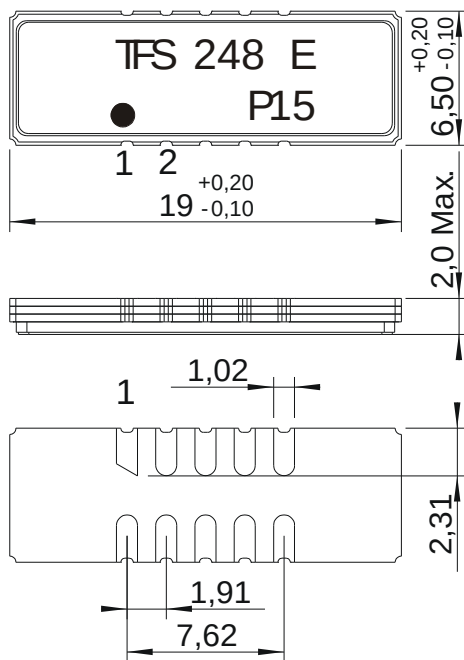
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Construction and Pin Connection

(All dimensions in mm)

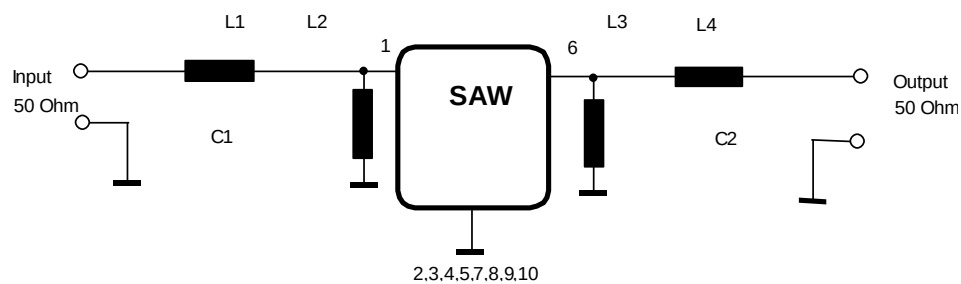


1	Input
2	Ground
3	Ground
4	Ground
5	Output RF return
6	Output
7	Ground
8	Ground
9	Ground
10	Input RF-return

Datecode Year+week

M	2000
N	2001
P	2002
...	

50 Ω matching circuits



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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;

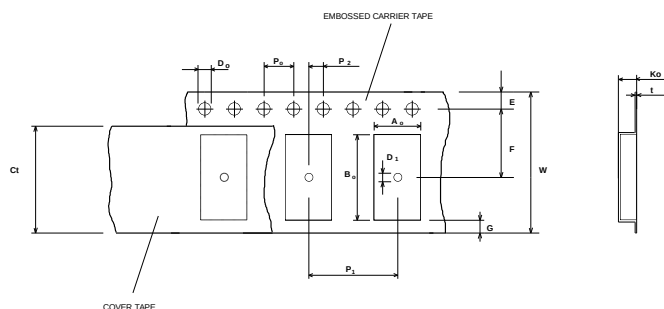
Packing

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;

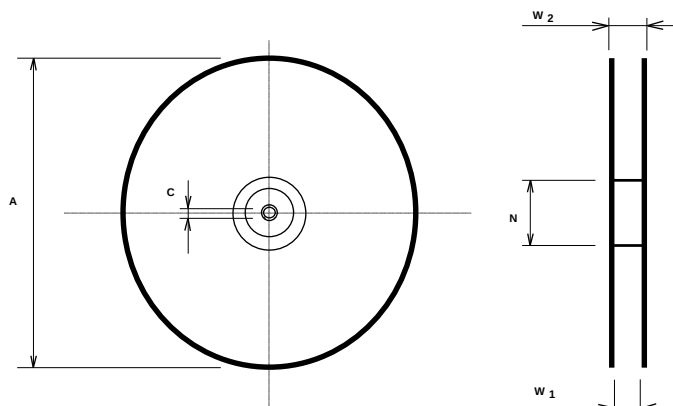
max. pieces of filters per reel:	2000
reel of empty components at start:	min 300 mm
reel of empty components at start including leader:	min 500 mm
trailer	min 300 mm

Tape (all dimensions in mm)

W	: 32 ± 0,3
Po	: 4 ± 0,1
Do	: 1,5 ± 0,1
E	: 1,75 ± 0,1
F	: 14,2 ± 0,1
P2	: 2 ± 0,1
P1	: 12 ± 0,1
D1(min)	: 2,0
Ao	: 7,1 ± 0,1
Bo	: 19,6 ± 0,1
t	: 0,35 ± 0,05
Ct	: 25,5 ± 0,1

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

A	: 330
W1	: 32,4 +2
W2 (max)	: 38,4
N (min)	: 100
C	: 13 + 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.	

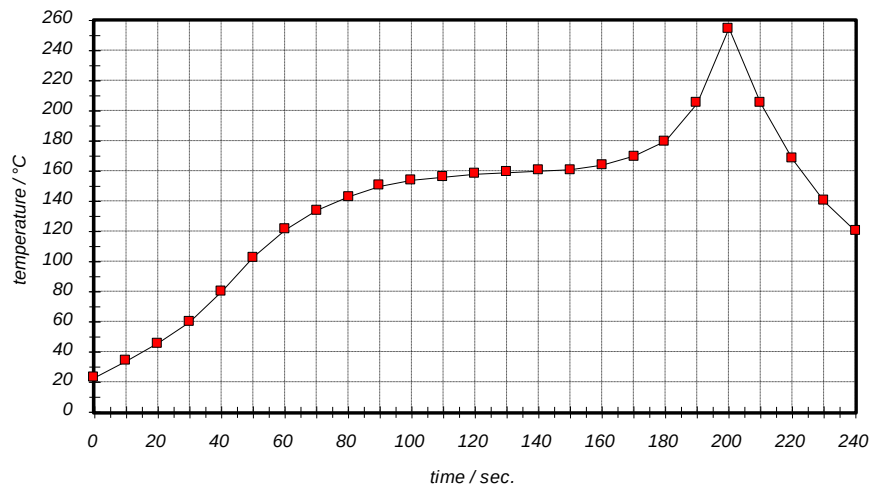
Chip-mount air reflow profile

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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Microchip**Filter specification****TFS 248 E****5/5****History**

Version	Reason of Changes	Name	Date
Development specification			
1.0	New specification	Steiner	03.05.2001
1.1	specification changed according to customer needs - insertion loss explanation added - stopband corrected	Steiner	07.05.2001
filter specification			
2.0	- terminating impedances and typical values added - change of temperature stability added - passband with extended	Steiner	02.11.2001
development specification			
3.0	- new specification according to the requirements ZF_Filter_v2.xls	Steiner	21.01.2002
4.0	- new specification with tighter transition band according to customer specification v3.0 05.03.2002	Steiner	
filter specification			
5.0	- typical values and terminating impedances added - limit lines adjusted to cover possible spurious responses	Steiner	05.04.2002
6.0	- package changed back to 19x6mm	Steiner	08.04.2002

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