

VI TELEFILTER**Filter Specification****TFS 124****1/5****Measurement condition**

Ambient temperature: 23 °C
 Input power level : 5 dBm
 Terminating impedances
 for input: 1,2 kOhm // -3,3 pF
 for output: 1,2 kOhm // -3,3 pF
 External coil: 292 nH // 4 kOhm

Characteristics**Remark:**

Reference level for the relative attenuation a_{rel} of the TFS 124 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 3dB filter attenuation level relative to the insertion loss a_e . The nominal frequency f_N is fixed on 124,8 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		tolerance / limit		
Insertion loss (Reference level)	a_e	2,7	dB	max	4	dB
Centre frequency	f_c	124,79	MHz			
Nominal frequency	f_N	-			124,8	MHz
3 dB bandwidth		173	kHz	min	52	kHz
Relative attenuation	a_{rel}					
f_N	$f_N \pm 26$ kHz	1	dB	max	3	dB
$f_N \pm 125$ kHz	$f_N \pm 250$ kHz	6	dB		-	
$f_N \pm 250$ kHz	$f_N \pm 0,7$ MHz	37	dB		-	
$f_N + 0,7$ MHz	$f_N + 30$ MHz	36 ... 65	dB	min	35	dB
$f_N - 0,7$ MHz	$f_N - 10$ MHz	36 ... 65	dB	min	35	dB
$f_N - 10$ MHz	$f_N - 17$ MHz	36 ... 65	dB	min	34	dB
$f_N - 17$ MHz	$f_N - 30$ MHz	36 ... 65	dB	min	35	dB
Group delay ripple	$f_N \pm 26$ kHz	0,45	µs	max	0,75	µs
Input power level		-		max	10	dBm
Intermodulation in the composite signal by						
$f_N + 50$ kHz and $f_N + 100$ kHz each of -14 dBm		85	dBm	max	-60	dBm
$f_N - 50$ kHz and $f_N - 100$ kHz each of -14 dBm		85	dBm	max	-60	dBm
Temperature coefficient of frequency (* TC_f)		- 0,032	ppm/K ²		-	
Frequency inversion temperature (To)		20	°C		-	
Operating temperature range					- 40 °C ... + 85°C	
Storage temperature range					- 40 °C ... + 85°C	

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

*) f_{T0} is reference frequency f_c at frequency inversion temperature (To)

Generated:**Checked / approved:**

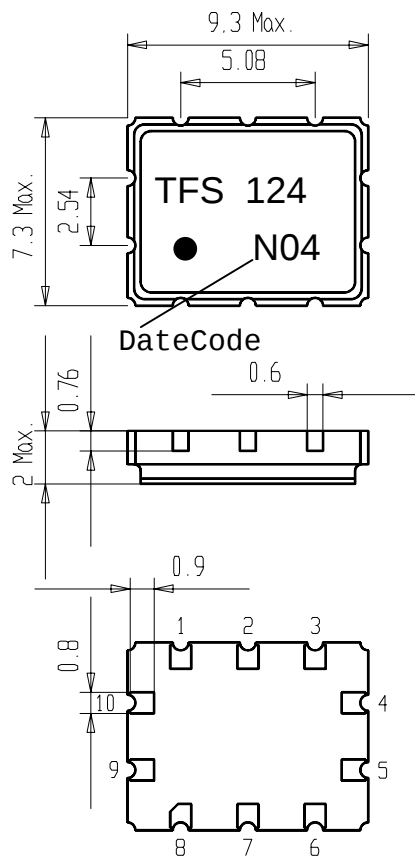
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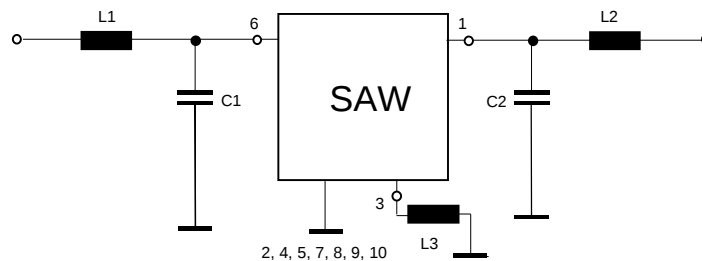
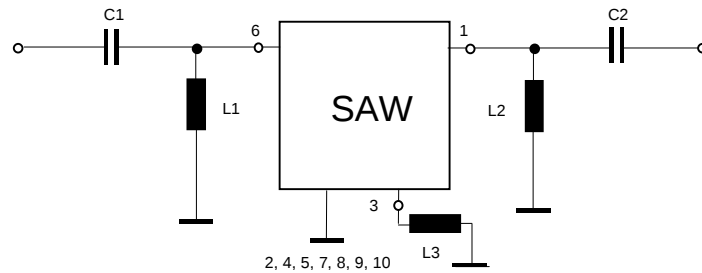
VI TELEFILTER**Filter Specification****TFS 124****2/5****Construction, pin configuration and 50 Ω - matching network**

(all dimensions in mm)



Pin 1	Output
Pin 2,4,5,7,8,9,10	Ground
Pin 3	External coil
Pin 6	Input

Datecode:	Year+week
L	1999
M	2000
N	2001
...	

50 Ohm Test circuit 1**50 Ohm Test circuit 2**

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VI TELEFILTER**Filter Specification****TFS 124****3/5****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. Damp heat: 25 °C to 55°C / 95% r.H. / 10 cycles
(cycle) DIN IEC 68 - 2 - 30 Db
4. Resistance to solder heat (reflow): max. 2 times reflow process;
for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4;

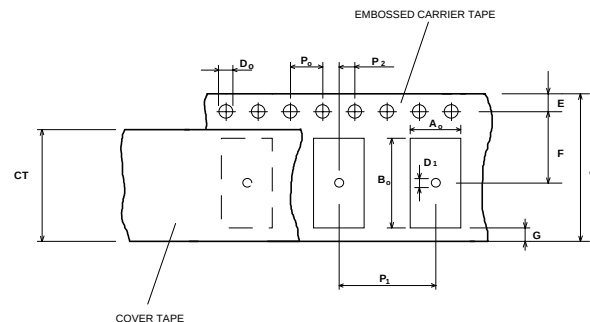
Packing

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

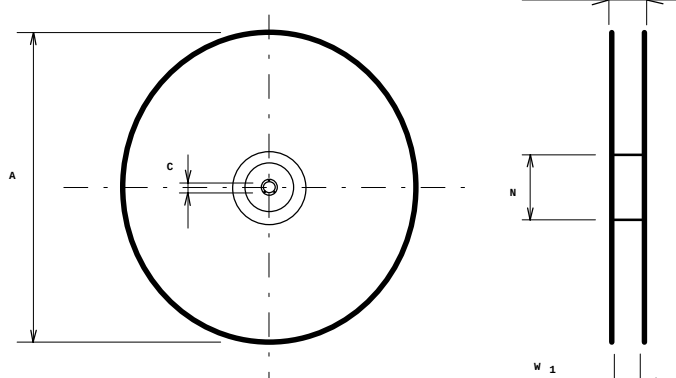
2000
min 300 mm
min 500 mm
min 300 mm

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)	: 0,6
P2	: 2 ± 0,1
P1	: 12 ± 0,1
D1(min)	: 1,5
Ao	: 7,6 ± 0,1
Bo	: 9,6 ± 0,1
CT	: 13,5 ± 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.

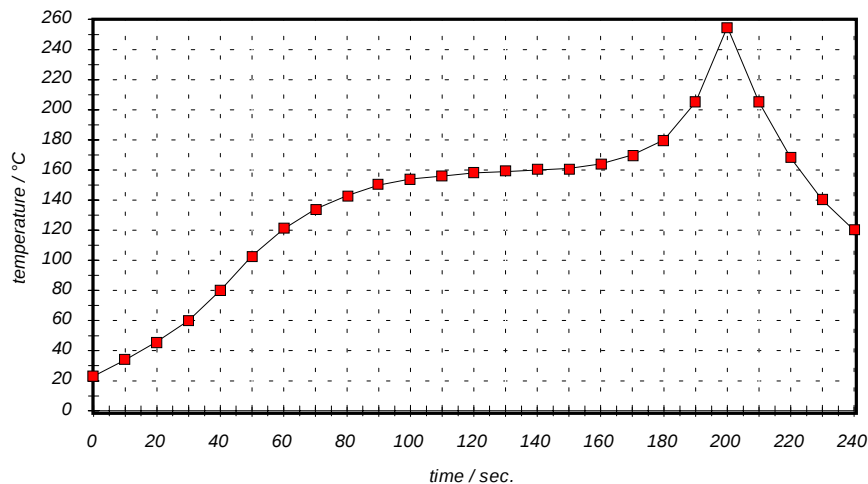
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VI TELEFILTER**Filter Specification****TFS 124****4/5****Air reflow temperature conditions****1st and 2nd air reflow profile**

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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VI TELEFILTER**Filter Specification****TFS 124****5/5****History**

Version	Reason of Changes	Name	Date
1.1	Generation of development specification	Dr. Wall	10.05.2000
1.2	Add termination impedances	Dr. Wall	21.12.2000
1.3	Change from development specification to filter specification Add typical filter data State limit value for group delay ripple Correct tape and reel information	Dr. Wall	24.01.2001
1.4	Change group delay to group delay ripple Increase stop band attenuation from 33 dB to 34-35 dB	Dr. Wall	29.01.2001
1.5	Correct stop band attenuation in lower stop band	Dr. Wall	01.02.2001

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