

VI TELEFILTER**Filter Specification****TFS 116****1/5****Measurement condition**

Ambient temperature: 23 °C
 Input power level: 0 dBm
 Terminating impedances
 for input: 740 Ohm // -4,0 pF
 for output: 740 Ohm // -4,0 pF
 External coil: 290 nH

Characteristics**Remark:**

Reference level for the relative attenuation a_{rel} of the TFS 116 is the insertion loss. The insertion loss a_e is defined as the insertion loss at the nominal frequency f_N . 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 116.6 MHz without tolerance. The specified values have to be reached in operating temperature range.

D a t a		typ. Value		tolerance/limit		
Insertion loss (Reference level)	a_e	2,3	dB	1,6 ... 3,6	dB	
Nominal frequency	f_N	-		116,600	MHz	
Centre frequency	f_C	116,605	MHz	-		
1 dB bandwidth	BW	-		-		
Relative attenuation	a_{rel}					
$f_N \pm 0,8 \text{ MHz} \dots f_N \pm 1,8 \text{ MHz}$		43	dB	min. 20	dB	
$f_N \pm 1,8 \text{ MHz} \dots f_N \pm 6 \text{ MHz}$		42	dB	min. 30	dB	
$f_N \pm 6 \text{ MHz} \dots f_N \pm 100 \text{ MHz}$		25...80	dB	min. 10	dB	
VSWR @ f_N		1,4 : 1		max. 1,8 : 1		
Group delay @ f_N	GD	2,7	μs	max. 8,2	μs	
Input power		-		max. 13	dBm	
Operating temperature range				- 5 °C ... + 80 °C		
Temperature coefficient of frequency	TC	ca. - 0,036	ppm/K ²			
Frequency inversion temperature		+ 35 °C				

Generated:**Checked / approved:**

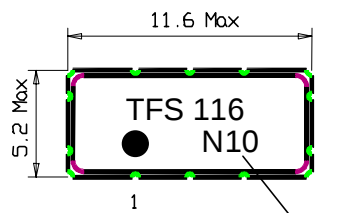
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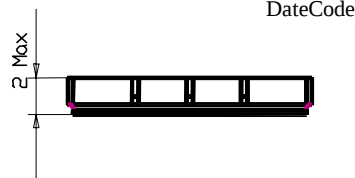
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VI TELEFILTER**Filter Specification****TFS 116****2/5****Construction, pin configuration and 50 Ω - matching network**

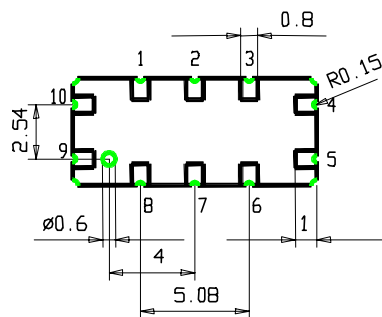
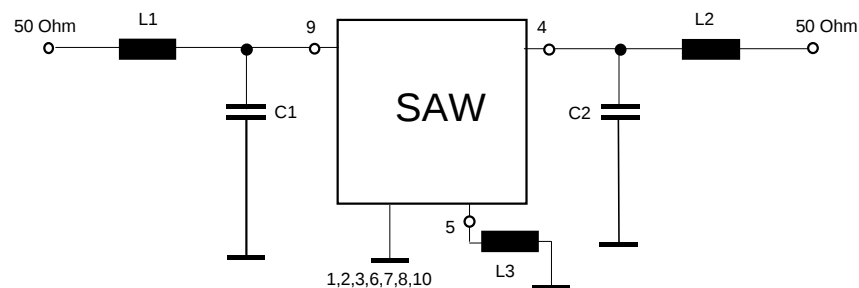
(All dimensions in mm)



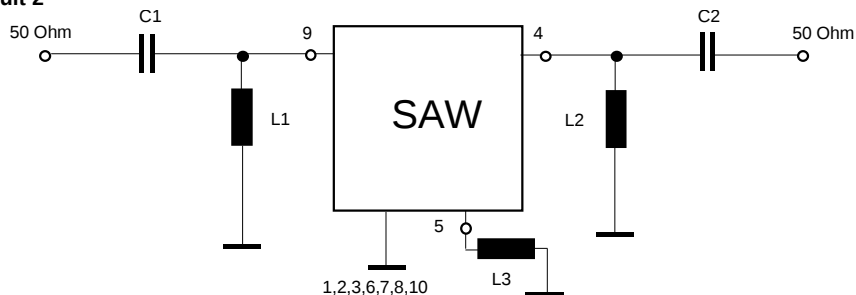
Datecode: Year+week
 L 1999
 M 2000
 N 2001
 ...



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

**50 Ohm Test circuit 1**

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50 Ohm Test circuit 2**VI TELEFILTER**

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VI TELEFILTER**Filter Specification****TFS 116****3/5****Stability Characteristics**

After the following tests the filter shall meet the whole specification:

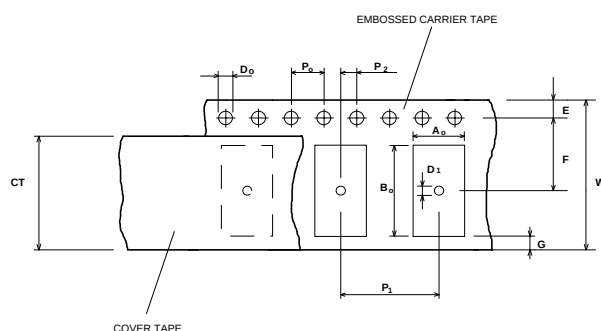
1. Shock: 500g, 18 ms, half sine wave, 3 shocks each plane;
DIN IEC 68 T2 - 27
2. Vibration: 10 Hz to 500 Hz, 0,35 mm or 5g respectively, 1 octave per min, 10 cycles per plan, 3 plans;
DIN IEC 68 T2 - 6
3. Damp heat: 25 °C to 55°C / 95% r.H. / 10 cycles
(cycle) DIN IEC 68 - 2 – 30 Db
4. Resistance to 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:	3000
	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)

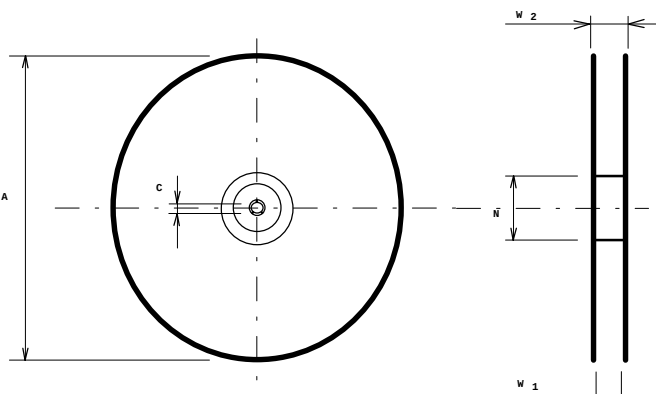
W	: 24 ± 0,3
Po	: 4 ± 0,1
Do	: 1,5 ± 0,1
E	: 1,75 ± 0,1
F	: 7,5 ± 0,1
G (min)	: 0,6
P2	: 2 ± 0,1
P1	: 8 ± 0,1
D1(min)	: 1,5
Ao	: 5,6 ± 0,1
Bo	: 11,8 ± 0,1
CT	: 21,5 ± 0,1



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Reel (all dimensions in mm):

A	:	330
W1	:	24,4 +2
W2 (max)	:	30,4
N (min)	:	60
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. 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 116****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.	

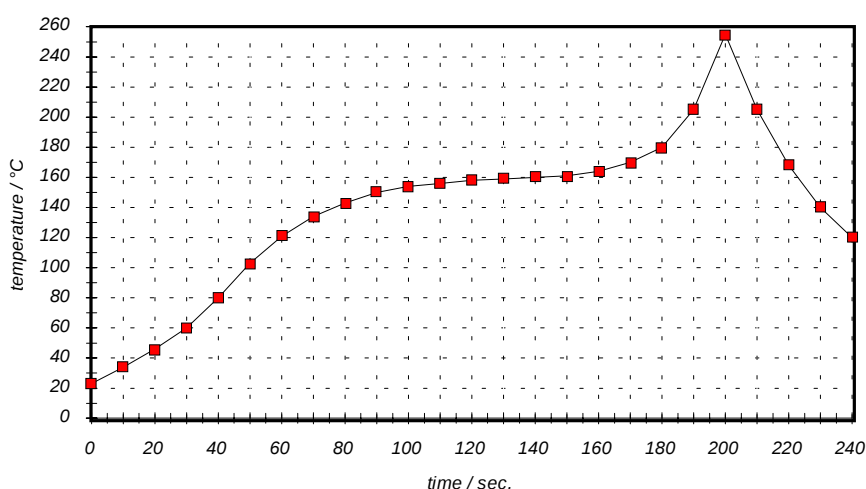
Chip-mount air reflow profile

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 116****5/5****History**

Version	Reason of Changes	Name	Date
1.0	Generate specification according to customer requirements	Dr. Wall	20.12.2000
1.1	Change from development specification to filter specification. Add typical filter data. Add termination impedances.	Dr. Wall	07.03.2001
1.2	Change filter frequency from 117,6 to 116,6 MHz. Remove typical data. Change filter name from TFS117A to TFS116. Change from filter specification to development specification.	Dr. Wall	09.03.2001
1.3	Add termination impedances. Add typical filter data. Define window for insertion loss. Change development specification to filter specification.	Dr. Wall	29.05.2001