

**VI TELEFILTER**

**Filter specification**

**TFS 280L**

**Measurement condition**

Ambient temperature:	22	°C
Input power level:	0	dBm
Terminating impedance: *		
Input:	187 Ω	-8.6 pF
Output:	63 Ω	-7.3 pF

**Characteristics**

**Remark:**

Reference level for the relative attenuation  $a_{rel}$  of the TFS280L 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 -3 dB filter attenuation level relative to the insertion loss  $a_e$ . The nominal frequency  $f_N$  is fixed at 280 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  $f_c$ .

<b>D a t a</b>	<b>typ. value</b>		<b>tolerance / limit</b>		
<b>Insertion Loss</b>	$a_e$	9.5 dB	max.	11	dB
<b>Nominal Frequency</b>	$f_N$	-		280	MHz
<b>Centre Frequency</b>	$f_c$	280 MHz		-	
<b>Relative Attenuation</b>	$a_{rel}$				
$f_N \dots f_N \pm 7,5 \text{ MHz}$	$f_N \pm 7,5 \text{ MHz}$	0,5 dB	max.	1	dB
$f_N \pm 7,5 \text{ MHz} \dots f_N \pm 8,5 \text{ MHz}$	$f_N \pm 8,5 \text{ MHz}$	1,5 dB	max.	3	dB
$f_N \pm 15 \text{ MHz} \dots f_N \pm 17 \text{ MHz}$	$f_N \pm 17 \text{ MHz}$	20 dB	min.	10	dB
$f_N \pm 17 \text{ MHz} \dots f_N \pm 100 \text{ MHz}$	$f_N \pm 100 \text{ MHz}$	42 dB	min.	40	dB
<b>Group Delay Ripple</b>					
$f_N - 7,5 \text{ MHz} \dots f_N + 7,5 \text{ MHz}$	$f_N + 7,5 \text{ MHz}$	30 ns	max.	40	ns
<b>Operating Temperature Range</b>	OTR	-		- 40°C ... + 85°C	
<b>Storage Temperature Range</b>		-		- 40°C ... + 85°C	
<b>Temperature Coefficient of Frequency</b>	$TC_f^{**}$	- 87 ppm/K		-	
<b>Input Power Level</b>		-	max.	15	dBm

\*) 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.

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

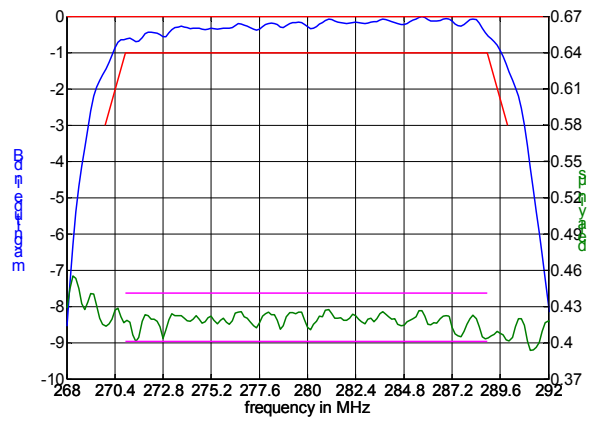
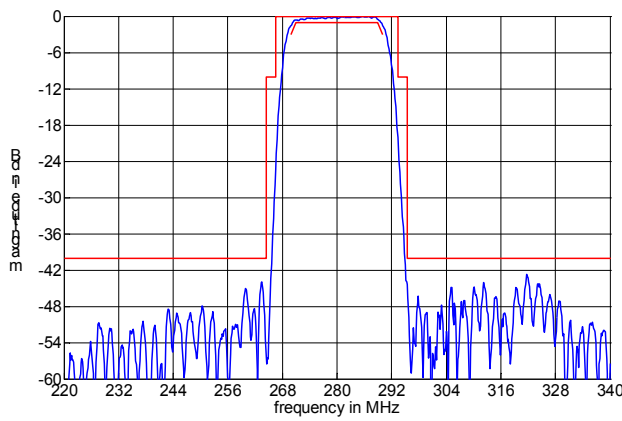
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**Checked / Approved:**

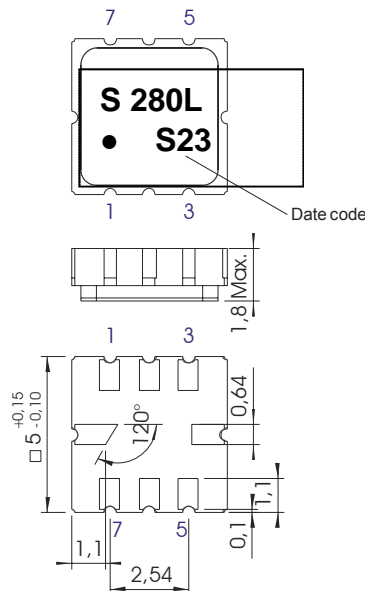
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**Filter characteristic**



**Construction and pin connection**

(All dimensions in mm)

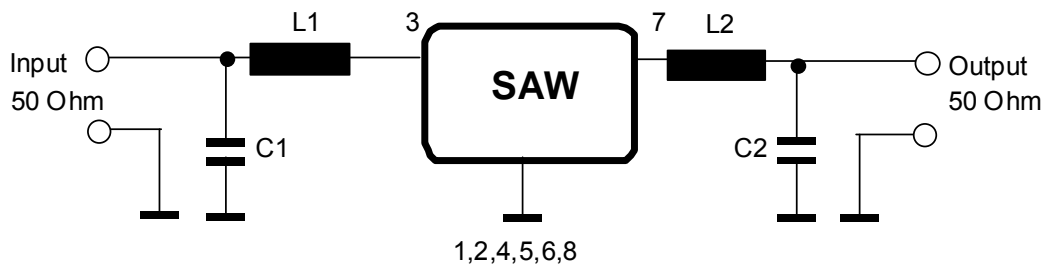


1	Ground
2	Input RF Return
3	Input
4	Ground
5	Ground
6	Output RF Return
7	Output
8	Ground

Date code: Year + week	
S	2004
T	2005
U	2006
...	

**50 Ω matching network**



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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;

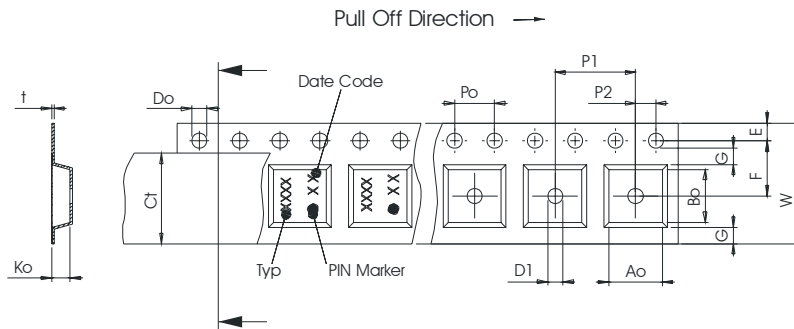
**Packing**

Tape & Reel: 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 peer 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

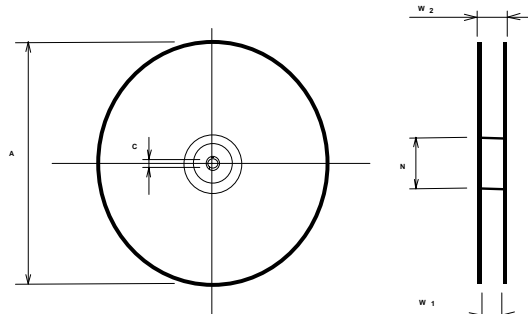
**Tape (all dimensions in mm)**

- W : 12,00 ± 0,3
- Po : 4,00 ± 0,1
- Do : 1,50 +0,1/-0
- E : 1,75 ± 0,1
- F : 5,50 ± 0,05
- G(min) : 0,75
- P2 : 2,00 ± 0,05
- P1 : 8,00 ± 0,1
- D1(min) : 1,50
- Ao : 5,30 ± 0,1
- Bo : 5,30 ± 0,1
- Ct : 9,5 ± 0,1



**Reel (all dimensions in mm)**

- A : 330
- W1 : 12,4 +2/-0
- W2(max) : 18,4
- N(min) : 50
- C : 13,0 +0,5/-0,2



The minimum bending radius is 45 mm.

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**Air reflow temperature conditions**

1st and 2nd air reflow profile

<b>Name:</b>	pre-heating periods	main-heating periods	peak temperature
<b>Temperature:</b>	150 °C - 170 °C	over 200 °C	255 °C ± 5 °C
<b>Time:</b>	60 sec. - 90 sec.	20 sec. - 25 sec.	

**Chip-mount air reflow profile**

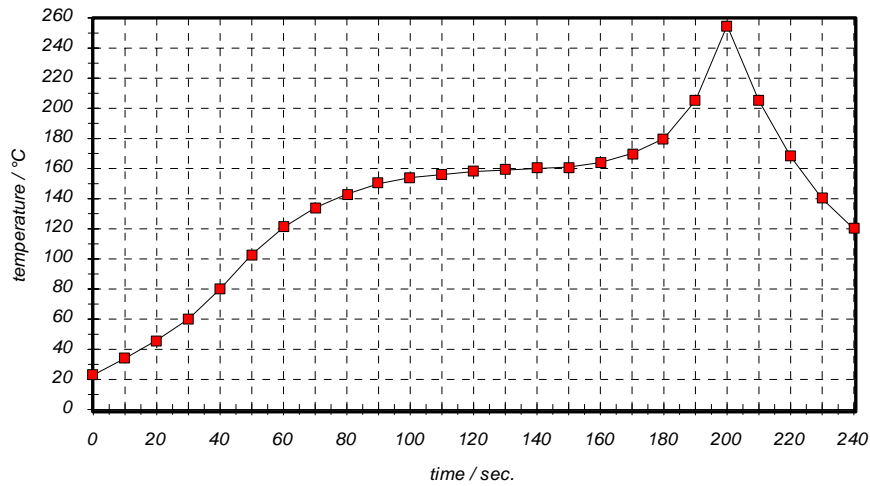


Table for temperature vs. time during the air reflow process

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 280L****5/5****History**

<b>Version</b>	<b>Reason of Changes</b>	<b>Name</b>	<b>Date</b>
1.0	generate specification	Chilla	03.12.2003
1.1	changed relative attenuation changed group delay ripple changed date code changed construction	Chilla	29.03.2004
1.2	created Filter specification added terminating impedance changed max. insertion loss changed max. group delay ripple extended frequency range for 40 dB attenuation added typical values added filter characteristic	Chilla	01.06.2004
1.3	changed input power level	Chilla	18.10.2004

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