

**VI TELEFILTER****Filter specification****TFS 140AS****1/5****Measurement condition**

Ambient temperature:	25	°C
Input power level:	0	dBm
Terminating impedance: *		
Input:	230 $\Omega$	-12 pF
Output:	170 $\Omega$	-15 pF

**Characteristics**

## Remark:

The reference level for the relative attenuation  $a_{rel}$  of the TFS 140AS 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 20 dB filter attenuation level relative to the insertion loss  $a_e$ . The nominal frequency  $f_N$  is fixed at 140,0 MHz without any tolerance. The shift of the filter band width in the operating temperature range (OTR) is included in the production tolerance scheme.

<b>D a t a</b>		<b>typ. value</b>		<b>tolerance / limit</b>	
<b>Insertion loss</b> (reference level)	$a_e$	12,1	dB	max.	13,5 dB
<b>Nominal frequency</b>	$f_N$	-			140,0 MHz
<b>Centre frequency</b>	$f_c$	140,0	MHz	$\pm$	0,4 MHz
<b>Passband</b>	PB	-		$f_c$ $\pm$	10 MHz
<b>Pass band ripple</b>		0,3	dB	max.	1 dB
<b>Pass band variation</b>		1	dB	max.	1,5 dB
<b>Bandwidth</b>	BW				
1 dB		23,8	MHz	min.	19,12 MHz
1,5 dB		24,4	MHz	min.	20 MHz
<b>Relative attenuation</b>	$a_{rel}$				
$f_c$	$f_c \pm 9,56$ MHz	0,3	dB	max.	1 dB
$f_c \pm 9,56$ MHz	$f_c \pm 10$ MHz	0,4	dB	max.	1,5 dB
$f_c - 130,0$ MHz	$f_c - 17,2$ MHz	45	dB	min.	42 dB
$f_c + 17,2$ MHz	$f_c + 360,0$ MHz	43	dB	min.	40 dB
<b>Group delay ripple within PB</b>	p-p	55	ns	max.	70 ns
<b>Absolute group delay within PB</b>		600	ns	max.	825 ns
<b>Phase linearity within PB</b>	p-p	7	deg	max.	10 deg
<b>Input power level</b>		-		max.	10 dBm
<b>Operable temperature range</b>		-			- 40 °C ... + 85°C
<b>Operating temperature range</b>	OTR	-			+25 °C
<b>Storage temperature range</b>		-			- 45 °C ... + 85°C
<b>Temperature coefficient of frequency</b>	$TC_f$ **	-94	ppm/K		

\*) 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.

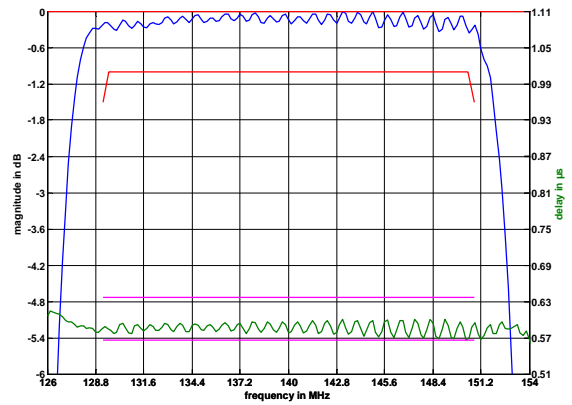
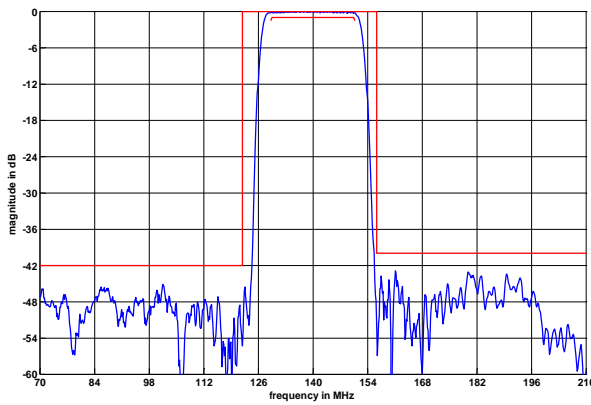
\*\*\*)  $\Delta f(\text{Hz}) = TC_f(\text{ppm/K}) \times (T - T_0) \times f_{T_0}(\text{MHz})$

**Generated:****Checked / Approved:**

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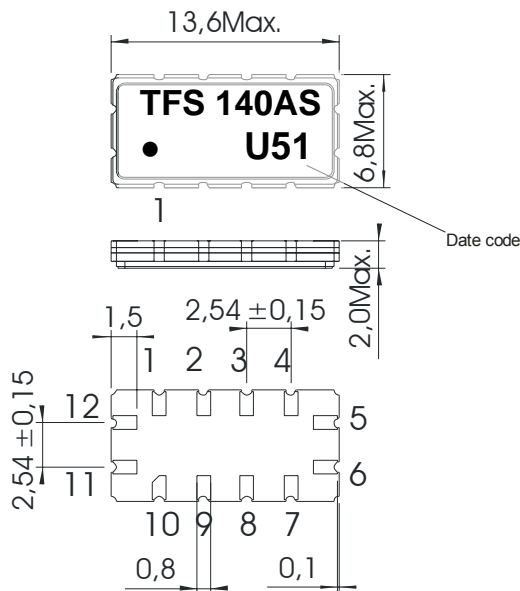
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**Filter characteristic**



**Construction and pin connection**

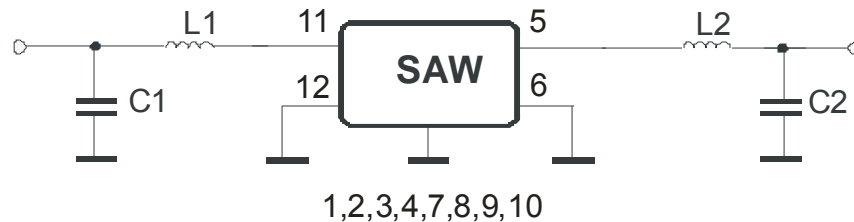
(All dimensions in mm)



- 1 Ground
- 2 Ground
- 3 Ground
- 4 Ground
- 5 Output
- 6 Output RF Return
- 7 Ground
- 8 Ground
- 9 Ground
- 10 Ground
- 11 Input
- 12 Input RF Return

Date code: Year + week  
 U 2006  
 V 2007  
 W 2008  
 ...

**50 Ohm Test circuit**



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**Stability characteristics, reliability**

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

1. Shock: 500g, 1 ms, half sine wave, 3 shocks each plane;  
DIN IEC 68 T2 - 27
2. Vibration: 10 Hz to 500 Hz, 0,35 mm or 5 g 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: three times max.;  
for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4;

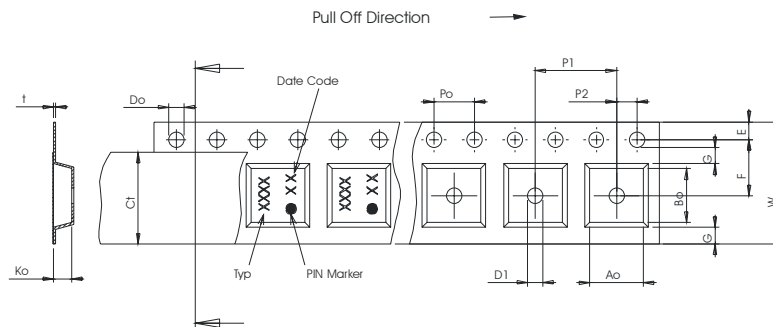
This filter is RoHS compliant (2002/95/EG, 2005/618/EG)

**Packing**

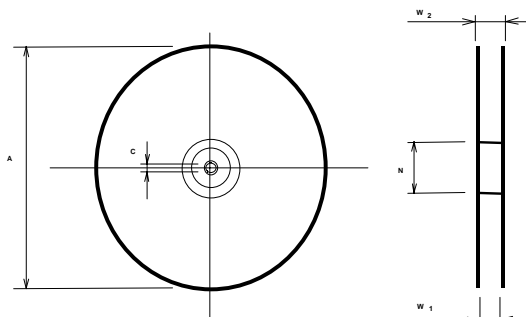
Tape & Reel: IEC 286 – 3, with exception of value for N and minimum bending radius;  
tape type II, embossed carrier tape with top cover tape on the upper side;

max. pieces of filters per reel: 1700  
 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 : 24,00 +0,30/-0,10
  - Po : 4,00 ± 0,1
  - Do : 1,50 +0,1/-0
  - E : 1,75 ± 0,10
  - F : 11,50 ± 0,10
  - G(min) : 0,60
  - P2 : 2,00 ± 0,1
  - P1 : 12,00 ± 0,1
  - D1(min) : 1,50
  - Ao : 7,10 ± 0,10
  - Bo : 13,90 ± 0,10
  - Ct : 21,5 ± 0,1



- Reel (all dimensions in mm)**
- A : 330
  - W1 : 24,4 +2/-0
  - W2(max) : 30,4
  - N(min) : 60
  - C : 13,0 +0,5/-0,2



The minimum bending radius is 45 mm.

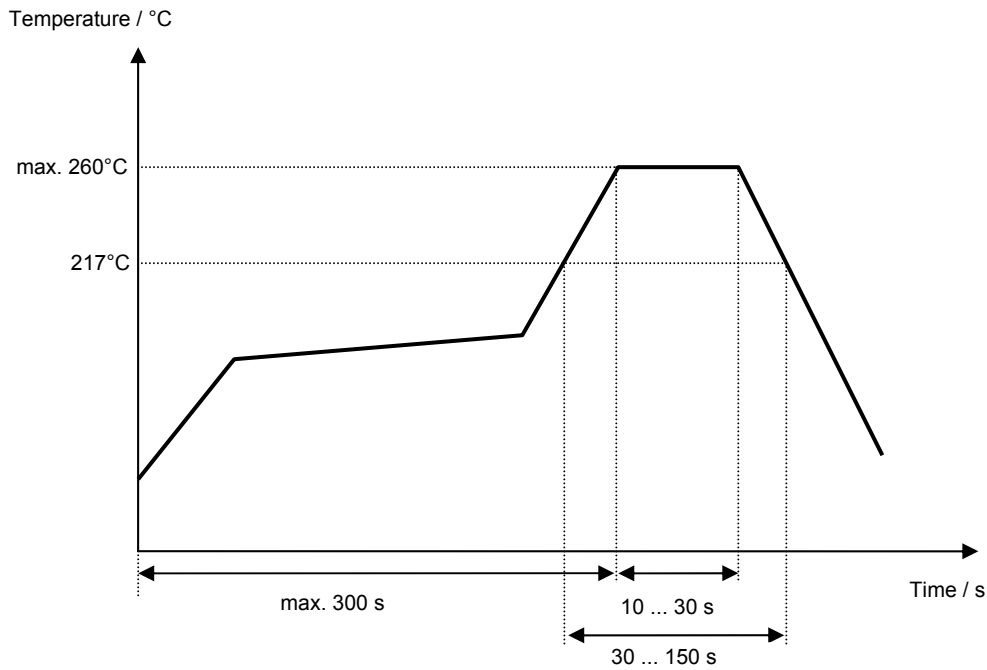
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**Air reflow temperature conditions**

Conditions	Exposure
Average ramp-up rate (30°C to 217°C)	less than 3°C/second
> 100°C	between 300 and 600 seconds
> 150°C	between 240 and 500 seconds
> 217°C	between 30 and 150 seconds
Peak temperature	max. 260°C
Time within 5°C of actual peak temperature	between 10 and 30 seconds
Cool-down rate (Peak to 50°C)	less than 6°C/second
Time from 30°C to Peak temperature	no greater than 300 seconds

**Chip-mount air reflow profile**



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**VI TELEFILTER****Filter specification****TFS 140AS****5/5****History**

<b>Version</b>	<b>Reason of Changes</b>	<b>Name</b>	<b>Date</b>
1.0	- Generation of development specification	Strehl	17.05.2006
1.1	- changed insertion loss Chilla - changed pass band - changed relative attenuation - changed group delay ripple - introduced absolute group delay - changed phase linearity - changed input power level	26.06.2006	
1.2	- stopband attenuation updated	Chilla	29.06.2006
1.3	- passband extended	Chilla	06.07.2006
1.4	- changed relative attenuation temporary - changed group delay ripple - changed characteristics and passband	Strehl	18.10.2006
1.5	- Created filter specification - Added terminating impedances - Added typical values - Added filter characteristic - Changed construction - Added test circuit - Changed packing	Chilla	21.12.2006
1.6	- Test circuit corrected	Chilla	30.09.2009

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