

**VI TELEFILTER**

**Filter specification**

**TFS 140AL**

**Measurement condition**

Ambient temperature: 23 °C  
 Input power level: 0 dBm  
 Terminating impedance: \*  
     Input: 212 Ω || -11,9 pF  
     Output: 1620 Ω || - 4,0 pF

**Characteristics**

Remark:

Reference level for the relative attenuation  $a_{rel}$  of the **TFS 140AL** 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 center frequency  $f_c$  is the arithmetic mean value of the upper and lower frequencies at the **32 dB** filter attenuation level relative to the insertion loss  $a_e$ . The temperature coefficient of frequency  $TC_f$  is valid both for the centre frequency  $f_c$  and the frequency response of the filter in the operating temperature range.

<b>D a t a</b>		<b>typ. value</b>	<b>tolerance / limit</b>
<b>Insertion loss</b> (Reference level)	$a_e$	30 dB	max. 35 dB
<b>Centre frequency</b> at ambient temperature :	$f_c$	140,01 MHz	140,0 ± 0,05 MHz
<b>Pass band</b> at ambient temperature	PB		$f_c \dots f_c \pm 4,48$ MHz
<b>Amplitude ripple</b> in PB (p-p):		0,4 dB	max. 0,8 dB
<b>Bandwidth</b> at ambient temperature:			
0,8 dB		9,27 MHz	min. 8,96 MHz
2 dB		9,40 MHz	min. 9,29 MHz
3 dB		9,47 MHz	min. 9,33 MHz
32 dB		10,01 MHz	max. 10,08 MHz
<b>Relative attenuation</b>	$a_{rel}$		
$f_c \dots f_c \pm 4,48$ MHz		0,4 dB	max. 0,8 dB
$f_c \pm 4,48$ MHz ... $f_c \pm 4,64$ MHz		1 dB	max. 2 dB
$f_c \pm 4,64$ MHz ... $f_c \pm 4,66$ MHz		1,5 dB	max. 3 dB
$f_c \pm 5,04$ MHz ... $f_c \pm 6,00$ MHz		34 dB	min. 32 dB
$f_c \pm 6,00$ MHz ... $f_c \pm 8,17$ MHz		42 dB	min. 39 dB
In the frequency range $f_c \pm 6,00$ MHz ... $f_c \pm 8,17$ MHz the type of the LIMIT LINE is a SLOPING LINE (SL).			
$f_c \pm 8,17$ MHz ... $f_c \pm 14,5$ MHz		48 dB	min. 45 dB
$f_c \pm 14,5$ MHz ... $f_c \pm 100$ MHz		55 dB	min. 50 dB
<b>Group delay</b> ( mean value in pass band ):		3,03 μs	max. 5,36 μs
<b>Group delay</b> ripple in pass band (p-p):		45 ns	max. 120 ns
<b>Operating temperature range</b>		-	- 25 °C ... + 75 °C
<b>Storage temperature range</b>		-	- 40 °C ... + 85 °C
<b>Temperature coefficient of frequency</b>	$TC_f$ **)	- 0,04 ppm/K <sup>2</sup>	-
<b>Frequency inversion temperature</b>	$T_0$	10 °C	-
<b>Input power level</b>		-	max. +10 dBm

\* ) The terminating impedances depends 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.

\*\* )  $\Delta f(\text{Hz}) = TC_f(\text{ppm/K}^2) \times (T - T_0)^2 \times f_{T0}(\text{MHz})$

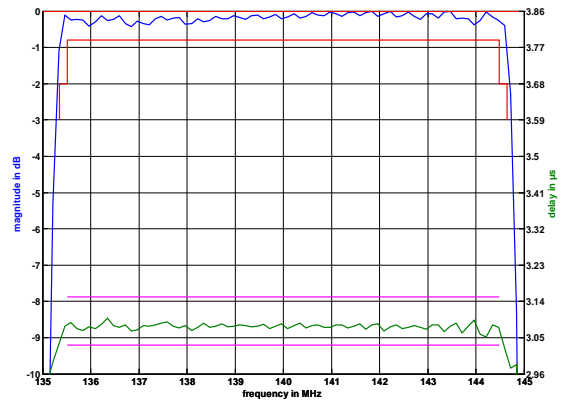
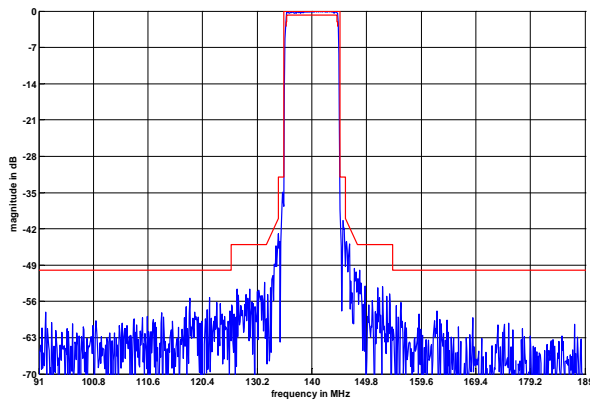
**generated:** \_\_\_\_\_

**checked / approved:** \_\_\_\_\_

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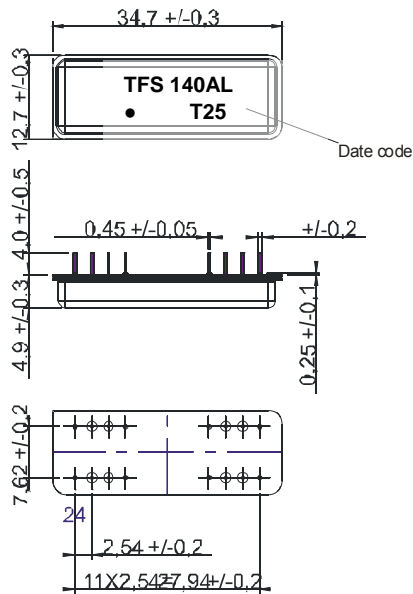
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**Filter characteristic**



**Construction and pin connection**

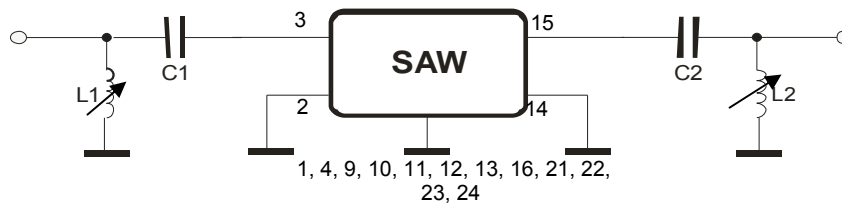
(All dimensions in mm)



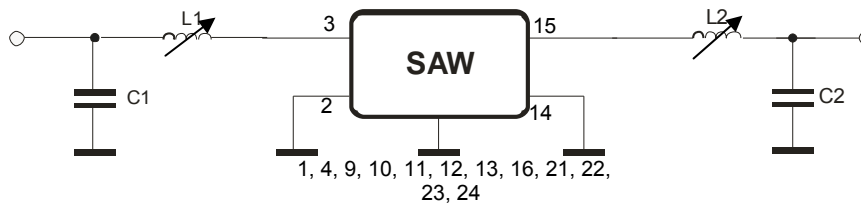
- 1 Ground
- 2 Input RF Return
- 3 Input
- 4 Ground
- 9,10,11,12 Ground
- 13 Ground
- 14 Output RF Return
- 15 Output
- 16 Ground
- 21,22,23,24 Ground

Date code: Year + week  
 T 2005  
 U 2006  
 V 2007  
 ...

**50 Ohm Test circuit**



alternative:



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**Stability characteristics :**

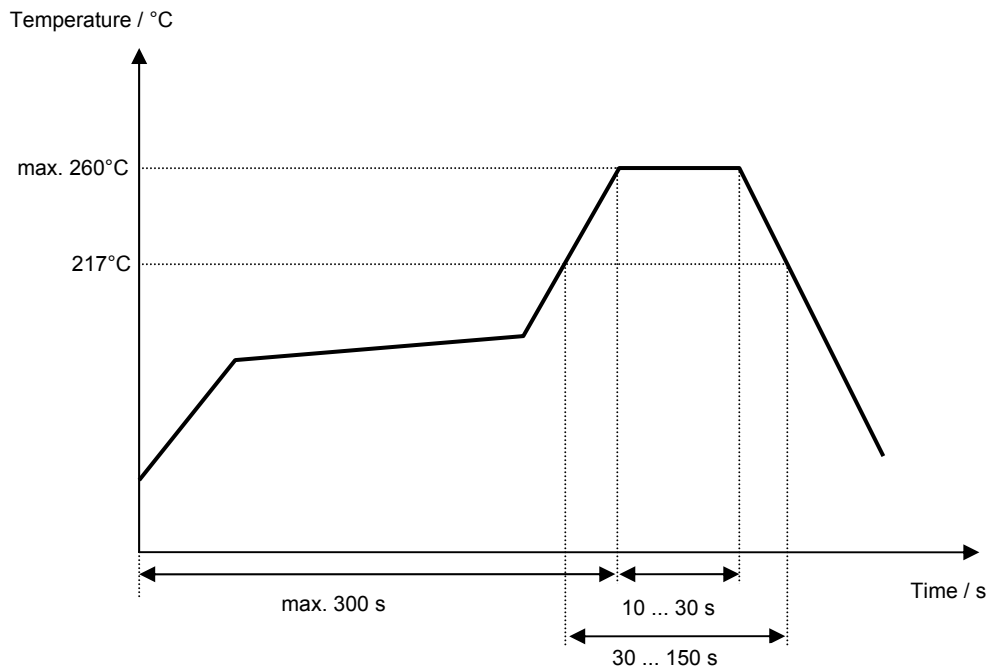
After the following tests the filter shall meet the whole specification:

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 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 refer to the attached "Air reflow temperature conditions" on page 4;

**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**



**VI TELEFILTER****Filter specification****TFS 140AL****5/5****History :**

<b>Version</b>	<b>Reason of changes</b>	<b>Name</b>	<b>Date</b>
1.0	- generate development specifications.	Steiner	02.05.2005
1.1	- limit for relative attenuation modified	Pfeiffer	11.05.2005
1.2	- pinning changed	Pfeiffer	13.05.2005
1.3	- terminating impedance, typical values and filter characteristic added	Pfeiffer	15.06.2005
1.4	- relative attenuation at $f_c \pm 6$ MHz changed to 39 dB	Pfeiffer	15.07.2005

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