

Microchip**Filter specification****TFS 499B****1/5****Measurement condition**

Ambient temperature:	23	°C
Input power level:	0	dBm
Terminating impedance: *		
Input:	719.86 Ω	-2.98pF
Output:	645.42 Ω	-2.98pF

Characteristics**Remark:**

The reference level for the relative attenuation a_{rel} of the TFS499B is the minimum of the pass band attenuation. This value is defined as the insertion loss a_e . The nominal frequency f_N is fixed at 499.25 MHz without any tolerance. The values of relative attenuation a_{rel} are guaranteed for the whole operating temperature range. The frequency shift of the filter in the operating temperature range is included in the production tolerance scheme.

D a t a		typ. value		tolerance / limit		
Insertion loss (reference level)	a_e	7.1	dB	max.	9	dB
Nominal frequency	f_N	-	MHz		499.25	MHz
Passband	PB	-		$f_N \pm$	0.1	MHz
Amplitude ripple within $f_N \dots f_N \pm 0.1$ MHz	p-p	0.2	dB	max.	0.5	dB
Amplitude ripple within $f_N \pm 0.1 \dots f_N \pm 0.8$ MHz	p-p	0.8	dB	max.	3.0	dB
Relative attenuation	a_{rel}					
$f_N \dots f_N \pm 0.1$ MHz		0.2	dB	max.	0.5	dB
$f_N \pm 0.1 \dots f_N \pm 0.8$ MHz		0.8	dB	max.	3	dB
$f_N \pm 3.0$ MHz $\dots f_N \pm 10.0$ MHz		39	dB	min.	35	dB
$f_N \pm 10.0$ MHz $\dots f_N \pm 200$ MHz		45	dB	min.	40	dB
Group delay ripple within PB	p-p	99	ns	max.	400	ns
Return loss within PB (with external matching)		13	dB	min.	10	dB
Input power level		-		max.	10	dBm
Operating temperature range	OTR	-		- 40 °C ... + 85 °C		
Storage temperature range		-		- 40 °C ... + 85 °C		
Frequency inversion temperature		-		-		
Temperature coefficient of frequency	TC_f **	-0.036	ppm/K ²	-		

*) 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.

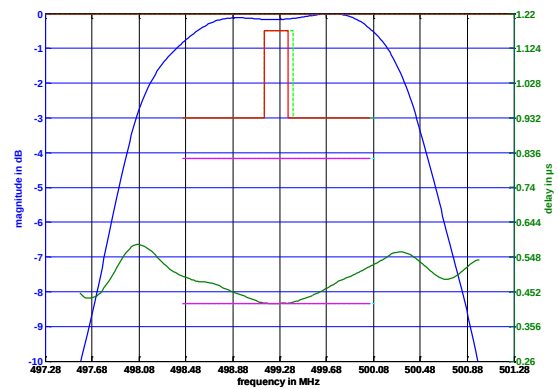
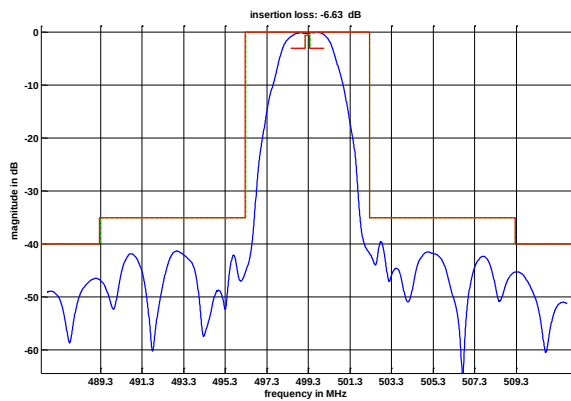
**) $\Delta f(\text{Hz}) = TC_f(\text{ppm/K}^2) \times (T - T_0)^2 \times f_{cat}(\text{MHz})$.

Generated:**Checked / Approved:**

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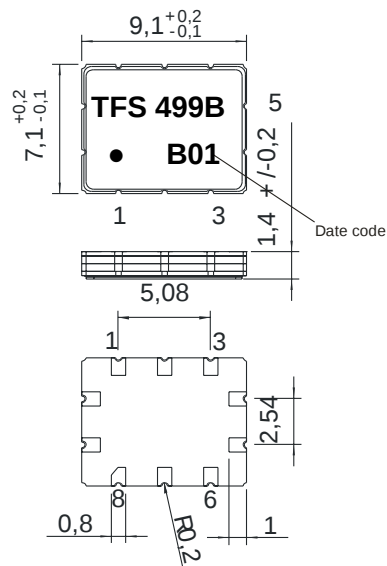
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Filter characteristic



Construction and pin connection

(All dimensions in mm)

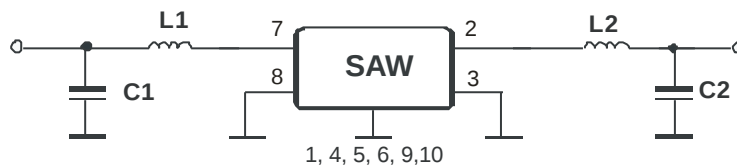


- | | |
|----|--------------------|
| 1 | Ground |
| 2 | Output |
| 3 | Output RF Return * |
| 4 | Ground |
| 5 | Ground |
| 6 | Ground |
| 7 | Input |
| 8 | Input RF Return * |
| 9 | Ground |
| 10 | Ground |

* Not bonded to ground internally.

Date code: Year + week
 B 2011
 C 2012
 D 2013
 ...

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 plane, 3 planes;
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;
5. ESD ANSI/ESD S20.20-1999, class 1A for HBM

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

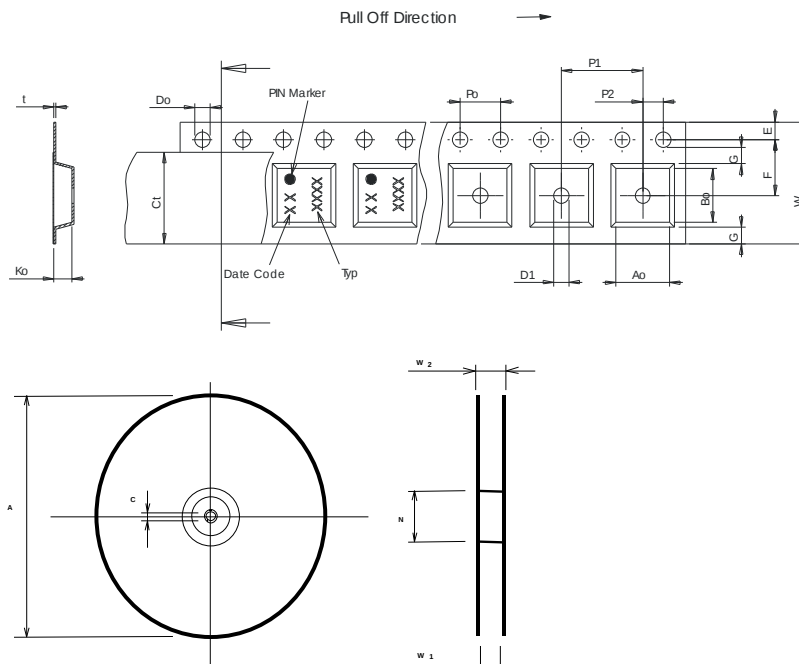
Packing

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:	2000
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	: 16,00 ± 0,3
Po	: 4,00 ± 0,1
Do	: 1,50 +0,1/-0
E	: 1,75 ± 0,10
F	: 7,50 ± 0,10
G(min)	: 0,60
P2	: 2,00 ± 0,1
P1	: 12,00 ± 0,1
D1(min)	: 1,50 +0,1/-0
Ao	: 7,60 ± 0,10
Bo	: 9,60 ± 0,10
Ct	: 13,5

**Reel (all dimensions in mm)**

A	: 330
W1	: 16,4
W2(max)	: 22,4
N(min)	: 50
C	: 13,0

The minimum bending radius is 45 mm.

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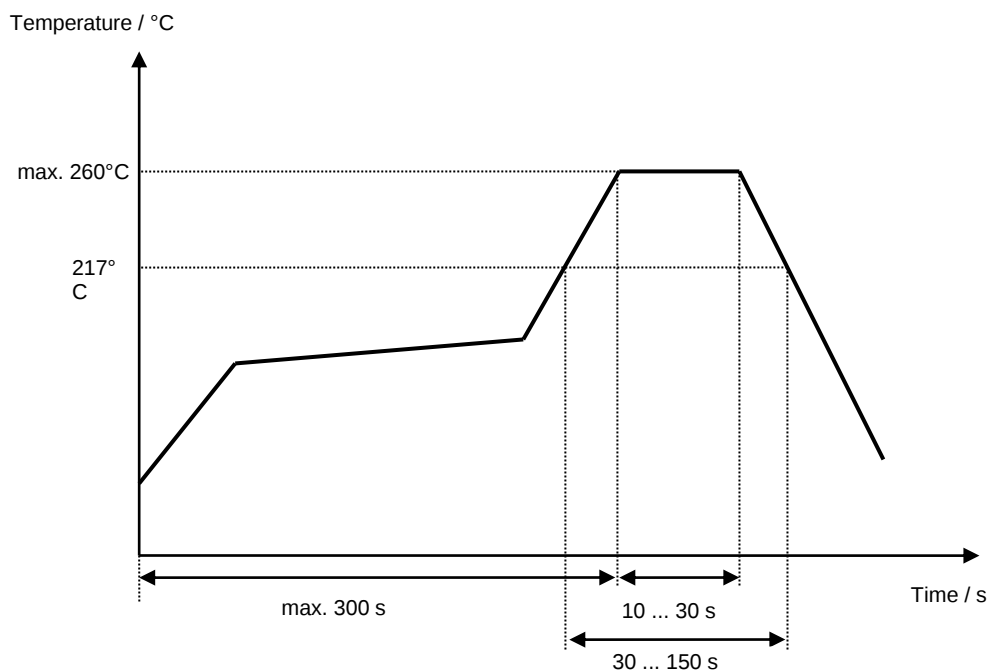
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Air reflow temperature conditions

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**Microchip Frequency Technology GmbH****Potsdamer Straße 18****D 14 513 TELTOW / Germany****Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30**

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Microchip**Filter specification****TFS 499B****5/5****History**

Version	Reason of Changes	Name	Date
1.0	- development specification	TCUK	13.09.2011
1.1	- updated package pinning	TCUK	12.01.2012
1.2	- add typical values & plots. Update from development to filter spec.	TCUK	26.03.2012
2.0	- customer request, extend OTR to -40°C...+85°C (was -25°C...+75°C)	TCUK	06.02.2013

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