

Microchip**Filter specification****TFS 281A****1/5****Measurement condition**

Ambient temperature:	23	°C
Input power level:	0	dBm
Terminating impedance: *		
Input:	510 Ω	-7,86 pF
Output:	530 Ω	-7,38 pF

Characteristics

Remark:

The nominal frequency f_N is fixed at 281,6 MHz. The insertion loss a_e is defined as loss value determined at f_N . Reference level for the relative attenuation a_{rel} of the TFS 281A is 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 . All specified data are met within the operating temperature range.

D a t a		typ. value		tolerance / limit		
Insertion loss*** (reference level)		a_e	8,3	dB	max.	11 dB
Nominal frequency		f_N	-		281,6	MHz
Centre frequency		f_c	281,6	MHz	-	
Passband		PB	-		$f_N \pm$	1,0 MHz
Amplitude ripple within PB			0,5	dB	max.	1 dB
Relative attenuation		a_{rel}				
f_N	$\dots f_N \pm$	1,0 MHz	0,5	dB	max.	1 dB
$f_N \pm$	3,0 MHz	$\dots f_N \pm$	5,0 MHz	37	dB	min. 30 dB
$f_N -$	261,6 MHz	$\dots f_N -$	7,5 MHz	47	dB	min. 40 dB
$f_N -$	7,5 MHz	$\dots f_N -$	5,0 MHz	44	dB	min. 38 dB
$f_N +$	5,0 MHz	$\dots f_N +$	20,0 MHz	45	dB	min. 40 dB
Group delay ripple within PB		p-p	20	ns	max.	75 ns
Return loss within PB			14	dB	min.	10 dB
Input power level			-		max.	15 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 **	-0,04	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.

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

***) Design target is to improve insertion loss to as near to 8dB as possible.

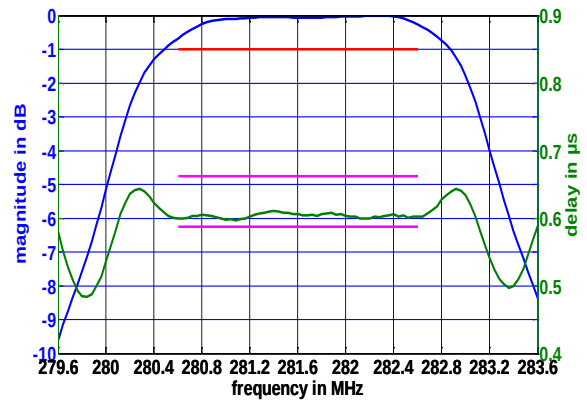
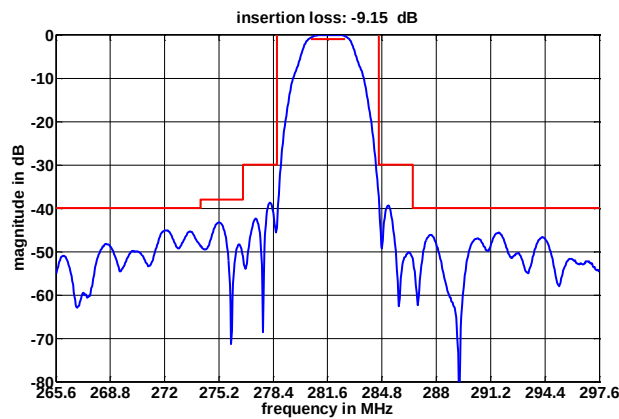
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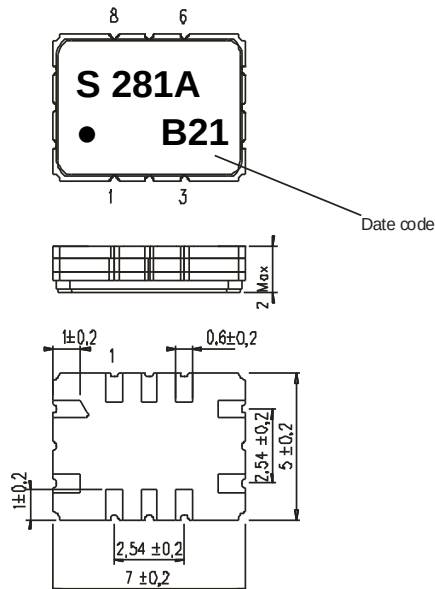
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Filter characteristic



Construction and pin connection

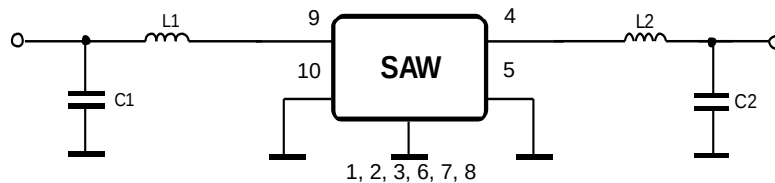
(All dimensions in mm)



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

Date code: Year + week
A 2010
B 2011
C 2012
...

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)

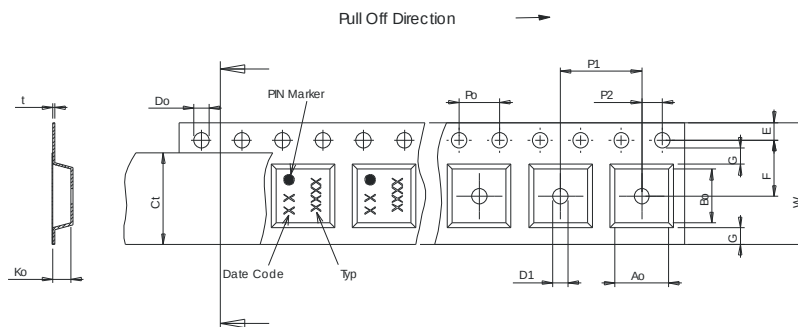
Packing

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;

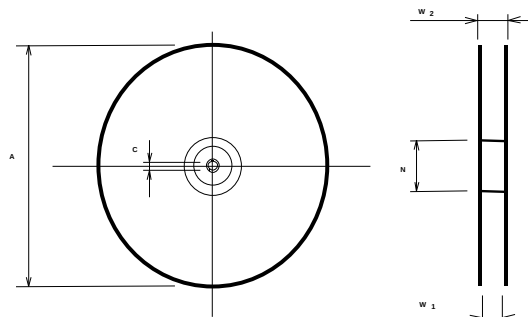
max. pieces of filters per reel:	3000
reel of empty components at start:	min. 300 mm
reel of empty components at start including leader:	min. 500 mm
trailer:	min. 300 mm

Tape (all dimensions in mm)

W	: 16,00 +0,3/-0,1
Po	: 4,00 ± 0,1
Do	: 1,50 +0,1/-0
E	: 1,75 ± 0,1
F	: 7,50 ± 0,1
G(min)	: 0,75
P2	: 2,00 ± 0,1
P1	: 8,00 ± 0,1
D1(min)	: 1,50
Ao	: 5,40 ± 0,1
Bo	: 7,60 ± 0,1
Ct	: 13,3 ± 0,1

**Reel (all dimensions in mm)**

A	: 330
W1	: 16,4 +2/-0
W2(max)	: 22,4
N(min)	: 50
C	: 13,0 +0,5/-0,2



The minimum bending radius is 45 mm.

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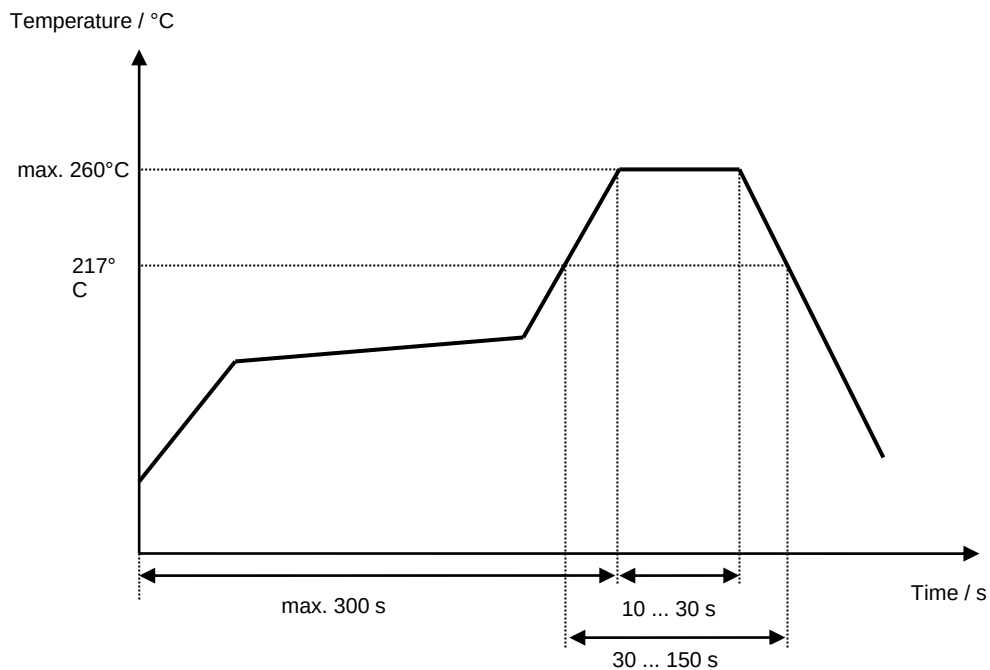
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Air reflow temperature conditions

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**Filter specification****TFS 281A****5/5****History**

Version	Reason of Changes	Name	Date
1.0	- development specification	A . Hodkin	12.03.2010
1.1	- customer requested GDR max to be revised, was 200ns max	A . Jaffer	30.03.2010
1.2	- add matching schematic	A . Jaffer	12.04.2010
1.3	- insertion loss 11dB max (was 12dB), rejection $f_N - 7,5\text{MHz} \dots f_N - 5\text{MHz}$: 38dB min (was 40dB), as confirmed by customer 27/07/10.	A . Jaffer	26.08.2010
1.4	- change from development spec to filter spec - added terminating impedances, typical values, and filter characteristic	Molke	03.03.2011
2.0	- change relative attenuation: $(f_n - 20\text{MHz} \dots f_n - 7,5\text{MHz})$ to $(f_n - 261,6\text{MHz} \dots f_n - 7,5\text{MHz})$ - added max. input power level - orientation of tape and reel updated	Molke	16.05.2011

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