

**Microchip****Filter specification****TFS 261B****1/5****Measurement condition**

Ambient temperature $T_A$ :	23	°C
Input power level:	0	dBm
Terminating impedance: *		
Input:	655 $\Omega$	-6.1 pF
Output:	521 $\Omega$	-6.9 pF

**Characteristics**

## Remark:

The reference level for the relative attenuation  $a_{rel}$  of the TFS 261B 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 1.5 dB filter attenuation level relative to the insertion loss  $a_e$ . The nominal frequency  $f_N$  is fixed at 261.0 MHz without any tolerance. The given values for both the relative attenuation  $a_{rel}$  and the group delay ripple have to be achieved 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  $f_C$ .

D a t a		typ. value		tolerance / limit		
<b>Insertion loss</b> (reference level)		$a_e$	7.5	max.	11.0	dB
<b>Nominal frequency</b>		$f_N$	-		261.0	MHz
<b>Centre frequency</b>		$f_C$	261.0	MHz	-	
<b>Pass band</b>		PB	-	$f_N \pm$	150.0	kHz
<b>Pass band ripple</b>			0.14	dB	max.	1.0 dB
<b>Pass band variation</b>			1	dB	max.	1.5 dB
<b>Relative attenuation</b>		$a_{rel}$				
$f_N$	$\dots f_N \pm$	150.0	kHz	1	dB	max. 1.5 dB
$f_N -$	260.0	MHz	$\dots f_N -$	0.8	MHz	46 dB
$f_N +$	0.8	MHz	$\dots f_N +$	1.8	MHz	38 dB
$f_N +$	1.8	MHz	$\dots f_N +$	239.0	MHz	46 dB
<b>Group delay</b>		at $f_N$ @ 25 °C	1.56	$\mu$ s	max.	$\pm 100$ ns
<b>Group delay ripple within PB</b>			144	ns	max.	200 ns
<b>Return loss within <math>f_N \pm 100</math> kHz</b>			22	dB	min.	15 dB
<b>Input power level</b>		**	-		max.	20 dBm
<b>Operable temperature range</b>			-		- 40 °C ... + 105 °C	
<b>Operating temperature range</b>		OTR	-		- 40 °C ... + 85 °C	
<b>Storage temperature range</b>			-		- 62 °C ... + 125 °C	
<b>Frequency inversion temperature</b>			49	°C	-	
<b>Temperature coefficient of frequency</b>		$TC_f$ ***	-0.03	ppm/K <sup>2</sup>	-	

\*) 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.

\*\*) for short term operation only, cycle time 1:1000; 15 dBm max for continuous operation

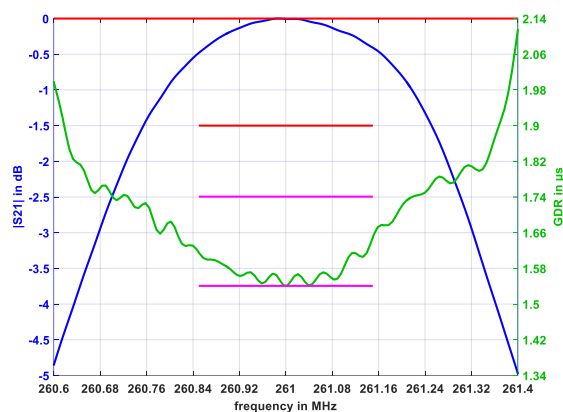
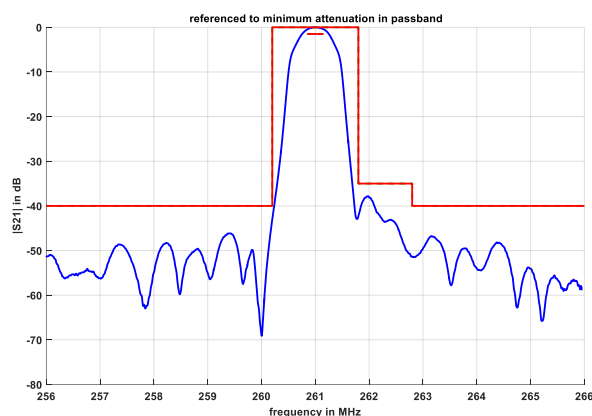
\*\*\*)  $\Delta f = TC_f(T - T_0)^2 f_N$

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

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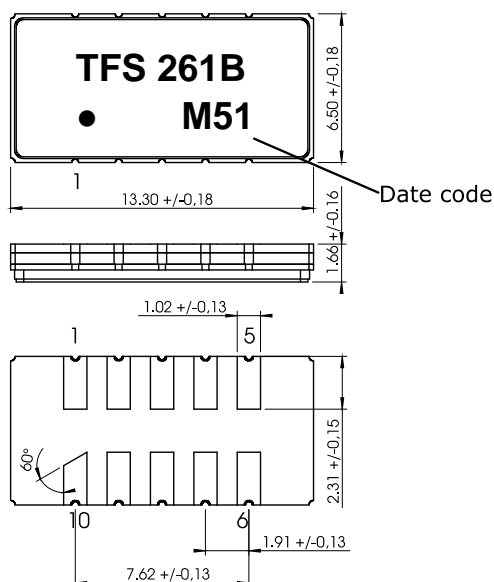
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## Filter characteristic



## Construction and pin connection

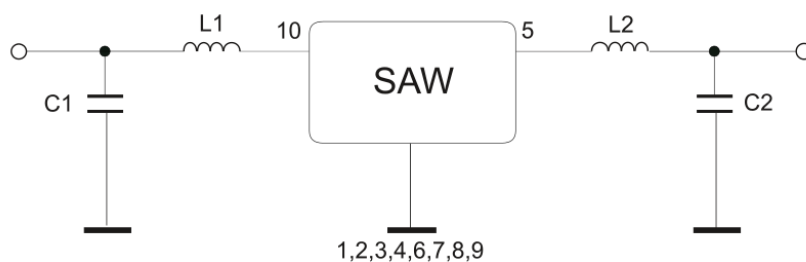
(All dimensions in mm)



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

Date code: Year + week  
M 2020  
N 2021  
P 2022  
...

## 50 Ω Test circuit



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**Stability characteristics, reliability**

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

1. Shock: 500 g, 1 ms, half sine wave, 3 shocks each plane;  
DIN IEC 60068 T2 - 27
2. Vibration: 10 Hz to 2000 Hz, 0.35 mm or 5 g respectively, 1 octave per min, 10 cycles per plane, 3 planes; DIN IEC 60068 T2 - 6
3. Change of temperature: -55 °C to 125 °C / 15 min. each / 100 cycles  
DIN IEC 60068 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. SAW devices are Electrostatic Discharge (ESD) sensitive devices.

This filter is RoHS compliant (2011/65/EU+2015/863/EU)

**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;

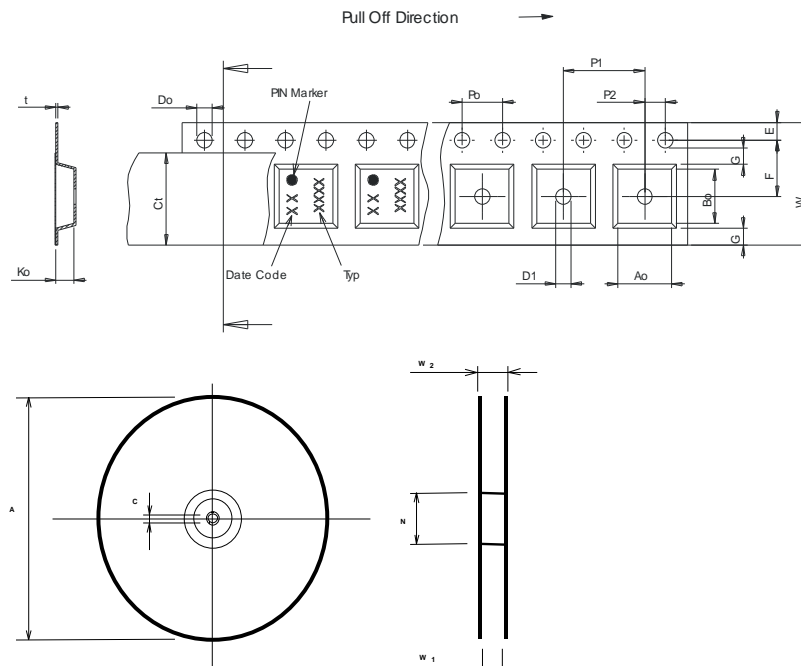
reel of empty components at start: min. 300 mm  
reel of empty components at start including leader: min. 500 mm  
trailer: min. 300 mm

**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	: 7.00 ±0.10
Bo	: 13.80 ±0.10
Ct	: 21.00 ±0.1
Ko	: 2.10 ±0.10
t	: 0.30 ±0.05

**Reel (all dimensions in mm)**

A	: 330 or 180
W1	: 24.4 +2/-0
W2(max)	: 30.40
N(min)	: 60.00
C	: 13.0 +0.5/-0.2



The minimum bending radius is 45 mm.

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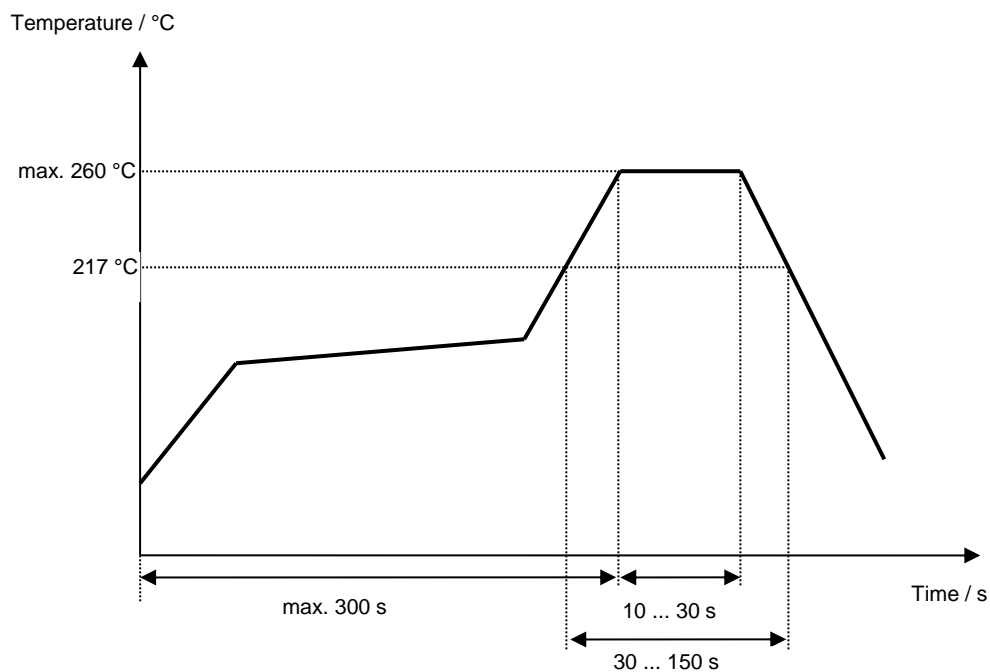
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**Air reflow temperature conditions**

<b>Conditions</b>	<b>Exposure</b>
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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**Microchip****Filter specification****TFS 261B****5/5****History**

<b>Version</b>	<b>Reason of Changes</b>	<b>Name</b>	<b>Date</b>
1.0	- Generation of development specification	Strehl	20.01.2009
1.1	- add of terminating impedances, typical values, filter characteristics and matching configuration - change of time domain parameters	Pfeiffer	19.05.2009
2.0	- back to development status, change of package, change terminating impedance to t.b.d. - remove pulse response requirements	Bonnen	31.08.2020
3.0	- Generation of filter specification with agreed relaxations	Bonnen	16.12.2020

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