

**VI TELEFILTER****Filter specification****TDX 1176****1/5****Measurement condition**

Ambient temperature:	23	°C
Input power level:	0	dBm
Terminating impedance: *		
source:	50 Ohm	
load:	50 Ohm	

**Characteristics**

## Remark:

The maximum attenuation in the pass bands is defined as the insertion loss  $a_e$ . The nominal frequency  $f_{NRX1}$  is fixed at 1176,45 MHz and the nominal frequency  $f_{NRX2}$  is fixed at 1204,53 MHz without any tolerance or limit. The values of absolute attenuation  $a_{abs}$  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	
<b>Insertion loss RX1</b>		$a_{eRX1}$	3,7 dB	max.	4,2 dB
<b>Insertion loss RX2</b>		$a_{eRX2}$	4,2 dB	max.	4,5 dB
<b>Nominal frequency RX1</b>		$f_{NRX1}$	-		1176,45 MHz
<b>Nominal frequency RX2</b>		$f_{NRX2}$	-		1204,53 MHz
<b>Passband RX1</b>		$PB_{RX1}$	-	$f_{NRX1} \pm$	8,0 MHz
<b>Pass band variation RX1</b>			1,2 dB	max.	2,0 dB
<b>Passband RX2</b>		$PB_{RX2}$	-	$f_{NRX2} \pm$	6,5 MHz
<b>Pass band variation RX2</b>			1,5 dB	max.	2,0 dB
<b>Absolute attenuation RX1</b>		$A_{abs} RX1$			
1	MHz ...	1100	MHz	43	dB
1100	MHz ...	1147	MHz	35	dB
1196,91	MHz ...	1260	MHz	48	dB
1260	MHz ...	1500	MHz	42	dB
					min. 40 dB
<b>Absolute attenuation RX2</b>		$A_{abs} RX2$			
1	MHz ...	1100,00	MHz	50	dB
1100	MHz ...	1186,5	MHz	39	dB
1220	MHz ...	1260	MHz	38	dB
1260	MHz ...	1500	MHz	46	dB
					min. 40 dB
<b>Group delay at <math>f_{NRX1}</math></b>			40 ns	max.	60 ns
<b>Group delay at <math>f_{NRX2}</math></b>			50 ns	max.	60 ns
<b>Group delay ripple within <math>PB_{RX1}</math></b>			37 ns	max.	50 ns
<b>Group delay ripple within <math>PB_{RX2}</math></b>			34 ns	max.	50 ns
<b>VSWR within <math>PB_{RX1}</math></b>			1,9 : 1	max.	2,3 : 1
<b>VSWR within <math>PB_{RX2}</math></b>			2,0 : 1	max.	2,3 : 1
<b>Input power level</b>			-	max.	15 dBm
<b>Operating temperature range</b>		OTR	-		10 °C ... + 35 °C
<b>Storage temperature range</b>			-		- 40 °C ... + 85 °C
<b>Temperature coefficient of frequency</b>		$TC_f$ **	-36 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.

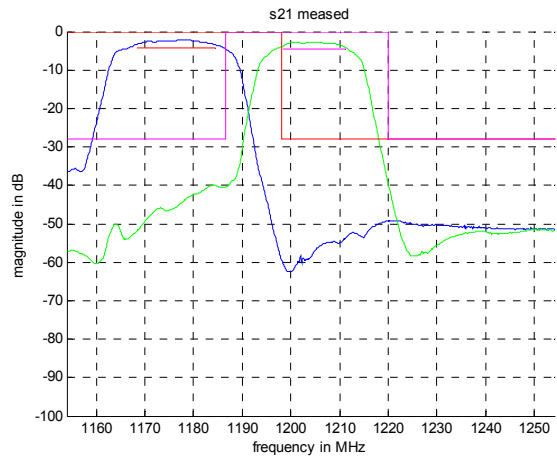
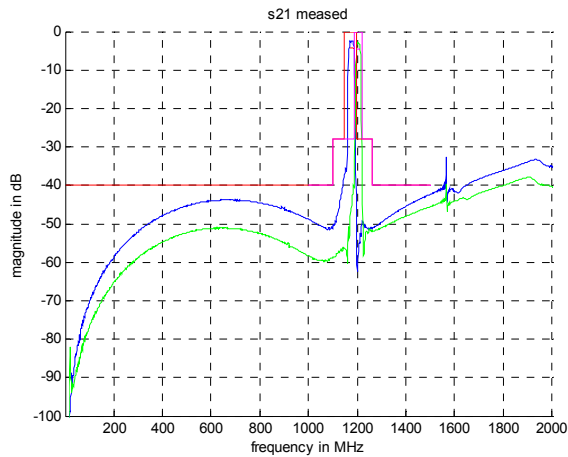
\*\*)  $\Delta f(\text{Hz}) = TC_f(\text{ppm/K}) \times (T - T_0) \times f_{T0}(\text{MHz})$

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

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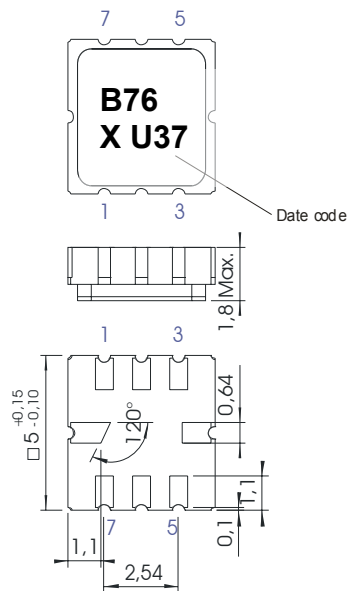
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**Duplexer characteristic**



**Construction and pin connection**

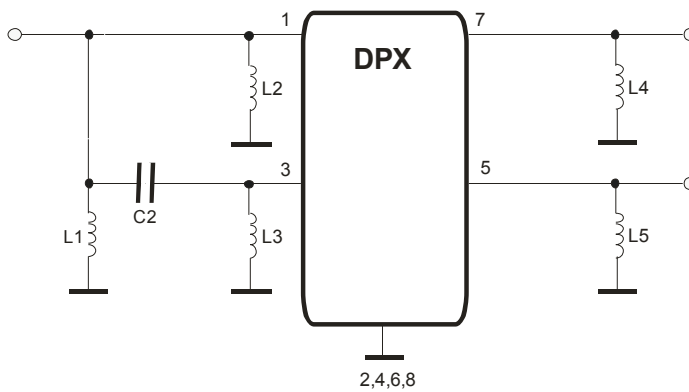
(All dimensions in mm)



- 1 Input RX1
- 2 Ground
- 3 Input RX2
- 4 Ground
- 5 Output RX2
- 6 Ground
- 7 Output RX1
- 8 Ground

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

**50 Ω 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)

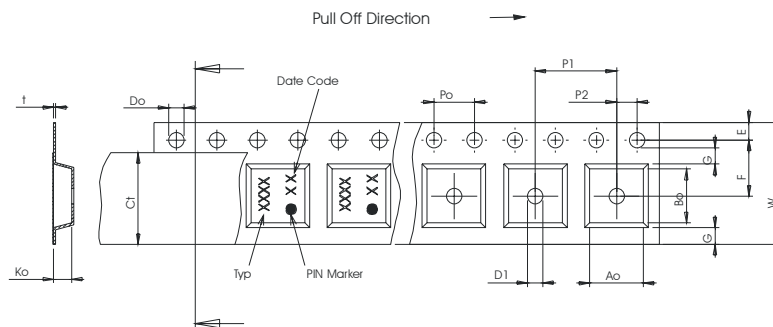
**Packing**

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: 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

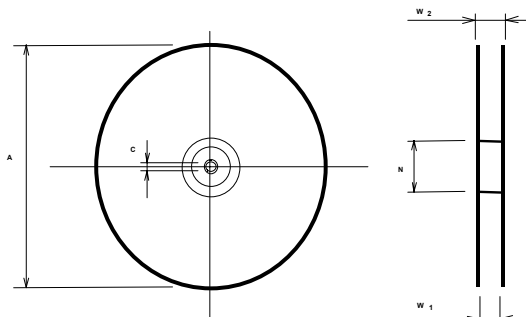
**Tape (all dimensions in mm)**

- W : 12,00 ± 0,3
- Po : 4,00 ± 0,1
- Do : 1,50 +0,1/-0
- E : 1,75 ± 0,1
- F : 5,50 ± 0,05
- G(min) : 0,75
- P2 : 2,00 ± 0,05
- P1 : 8,00 ± 0,1
- D1(min) : 1,50
- Ao : 5,30 ± 0,1
- Bo : 5,30 ± 0,1
- Ct : 9,5 ± 0,1



**Reel (all dimensions in mm)**

- A : 330
- W1 : 12,4 +2/-0
- W2(max) : 18,4
- N(min) : 50
- 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****TDX 1176****5/5****History**

<b>Version</b>	<b>Reason of Changes</b>	<b>Name</b>	<b>Date</b>
1.0	- Generation of development specification	Strehl	01.09.2006
1.1	- Change absolute attenuation	Strehl	15.09.2006
2.0	- Change data table - Added typical values - Generation of filter specification	Noack	26.07.2009

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