

# VI TELEFILTER

## Filter specification

## TFS 156C

1/5

### Measurement condition

Ambient temperature:	23	°C
Input power level:	0	dBm
Terminating impedance: *		
Input:	615 $\Omega$	-1,25 pF
Output:	615 $\Omega$	-1,25 pF

### Characteristics

#### Remark:

The reference level for the relative attenuation  $a_{rel}$  of the TFS 156C 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 3 dB filter attenuation level relative to the insertion loss  $a_e$ . The nominal frequency  $f_N$  is fixed at 156,8 MHz without any tolerance. The given values for the relative attenuation  $a_{rel}$  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)	$a_e$	2,5 dB	max. 5,0 dB
<b>Nominal frequency</b>	$f_N$	-	156,8 MHz
<b>Centre frequency</b>	$f_C$	156,8 MHz	-
<b>Passband</b>	PB	-	$f_N \pm 25$ kHz
<b>Relative attenuation</b>	$a_{rel}$		
$f_N \pm 25$ kHz		1,0 dB	max. 3 dB
$f_N \pm 125$ kHz ... $f_N \pm 450$ kHz		26 dB	min. 20 dB
@ $f_N \pm 450$ kHz		70 dB	min. 60 dB
<b>Operating temperature range</b>	OTR	-	- 40 °C ... + 85 °C
<b>Storage temperature range</b>		-	- 54 °C ... + 100 °C
<b>Frequency inversion temperature</b>	$T_0$ **	22 °C	-
<b>Temperature coefficient of frequency</b>	$TC_f$ **	-0,036 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.

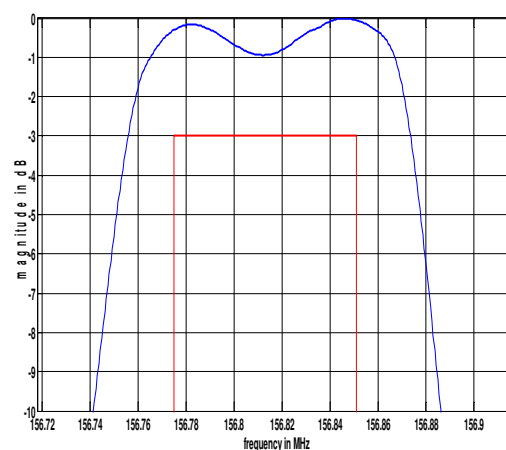
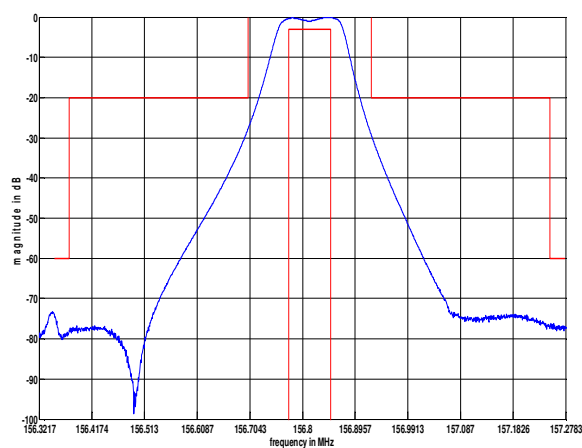
\*\*)  $\Delta f(\text{Hz}) = TC_f(\text{ppm/K}^2) \times (T - T_0)^2 \times f_{T0}(\text{MHz})$ .

### Generated:

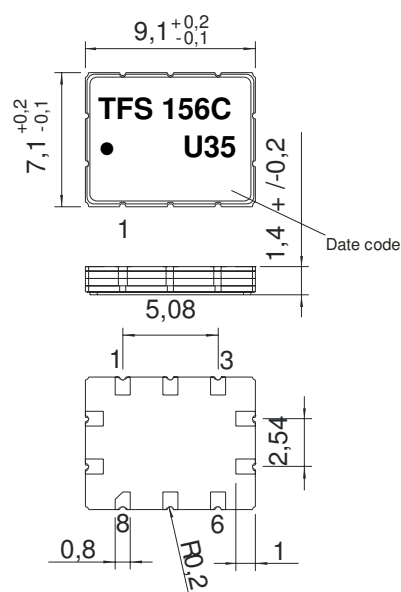
### Checked / Approved:

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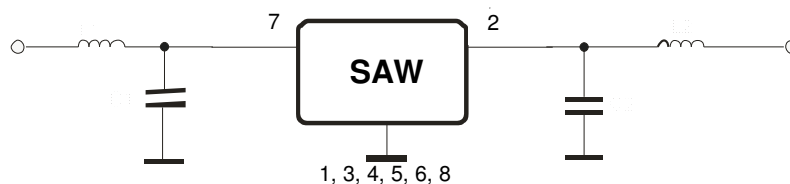
**VI TELEFILTER****Filter specification****TFS 156C****2/5****Filter characteristic****Construction and pin connection**

(All dimensions in mm)



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

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

**50 Ω Test circuit**

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**VI TELEFILTER****Filter specification****TFS 156C****3/5****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: twice 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)

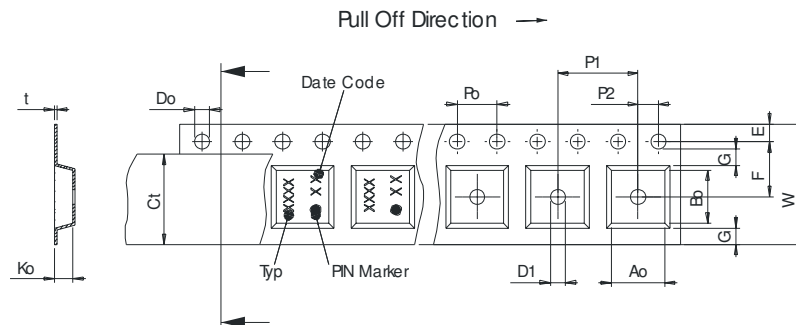
**Packing**

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;

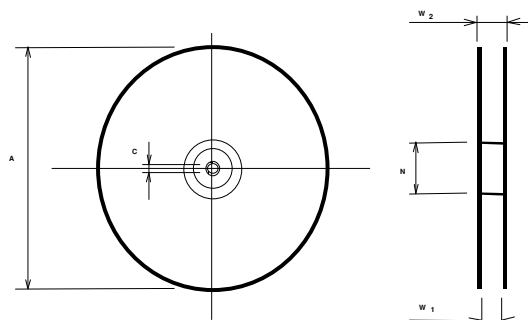
max. pieces of filters per reel:	2000
reel of empty components at start:	min. 300 mm
reel of empty components at start including leader:	min. 500 mm
trailer:	min. 300 mm

**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



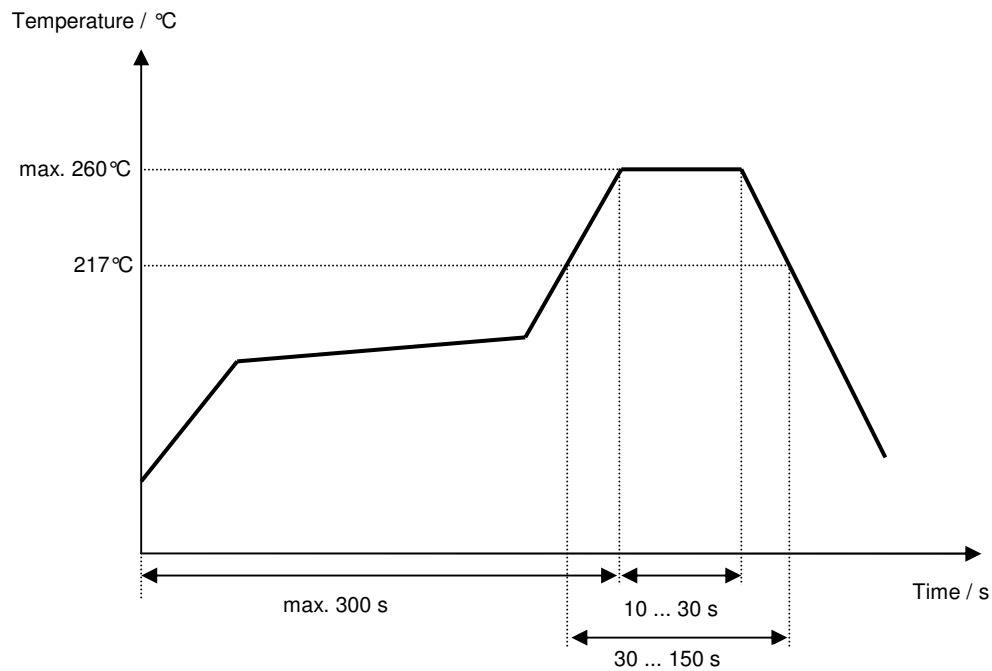
The minimum bending radius is 45 mm.

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**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**

**VI TELEFILTER****Filter specification****TFS 156C****5/5****History**

<b>Version</b>	<b>Reason of Changes</b>	<b>Name</b>	<b>Date</b>
1.0	- generation of development specification	Channaa	23.11.2005
1.1	- generation of filter specification - added filter characteristic - added terminating impedances - added typical values - changed test circuit	Martens	29.08.2006