

**VI TELEFILTER****Filter Specification****TFS 235****1/5****Measurement condition**

Ambient temperature: 23 °C  
 Input power level: 0 dBm  
 Terminating impedances  
     for input: 770 Ohm // -1.9 pF  
     for output: 770 Ohm // -1.9 pF  
 Coupling coil: 145 nH

**Characteristics****Remark:**

Reference level for the relative attenuation  $a_{rel}$  of the TFS 235 is the insertion loss. The insertion loss  $a_e$  is defined as the insertion loss at the nominal frequency  $f_N$ . 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 on 235,6 MHz without tolerance. The specified values have to be reached in operating temperature range.

<b>D a t a</b>		<b>typ. value</b>	<b>tolerance/limit</b>
<b>Insertion loss</b> (Reference level)	$a_e$	2,7 dB*	2,1 ... 4,1 dB
<b>Nominal frequency</b>	$f_N$	-	235,600 MHz
<b>Centre frequency</b>	$f_C$	236,612	-
<b>1 dB bandwidth</b>	BW	255 kHz	-
<b>Relative attenuation</b>	$a_{rel}$		
$f_N \pm 1,8$ MHz ... $f_N \pm 6$ MHz		42	min. 30 dB
$f_N \pm 6$ MHz ... $f_N \pm 100$ MHz		27...80	min. 20 dB
<b>VSWR</b> @ $f_N$		1,3:1	min. 1.8 : 1
<b>Group delay</b> @ $f_N$	GD	2,85 $\mu$ s	max. 5 $\mu$ s
<b>Input power</b>		-	max. 10 dBm
<b>Operating temperature range</b>			- 5 °C ... + 80 °C
<b>Storage temperature range</b>			- 30 °C ... + 80 °C
<b>Temperature coefficient of frequency</b>	TC	- 0.036 ppm/K <sup>2</sup>	
<b>Frequency inversion temperature</b>		30 °C	

\* at ambient temperature

**Generated:** \_\_\_\_\_**Checked / approved:** \_\_\_\_\_

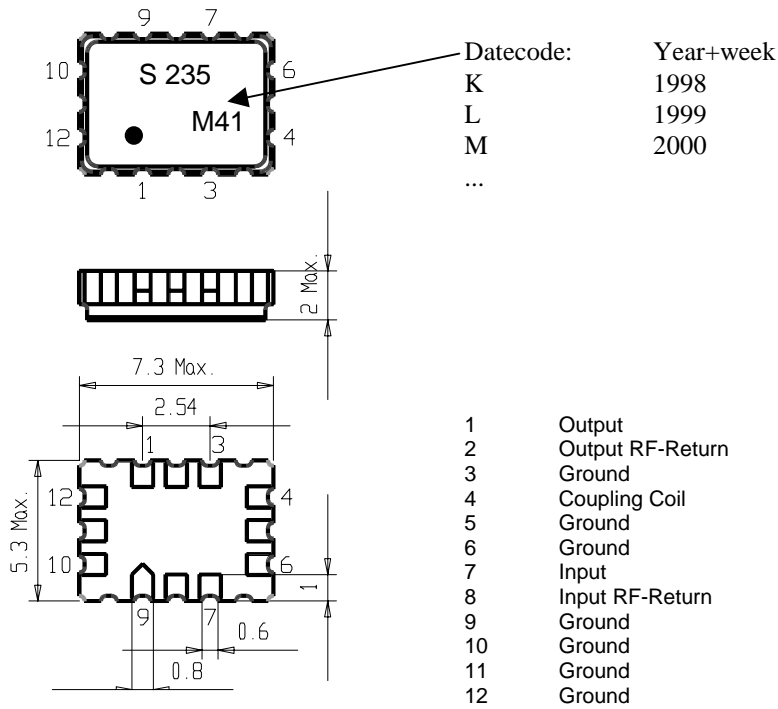
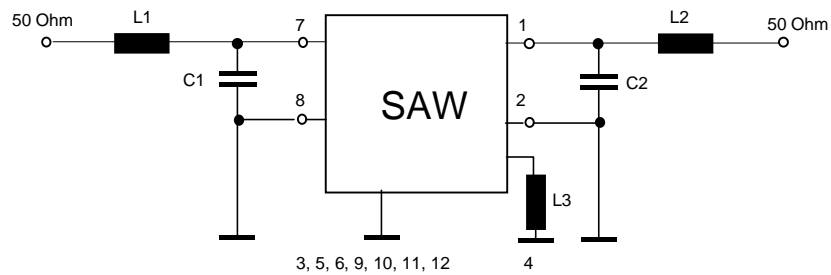
**VI TELEFILTER**  
 Potsdamer Straße 18  
 D 14 513 TELTOW / Germany  
 Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30  
 E-Mail: tft@telefilter.com

**Vectron International, Inc.**  
 267 Lowell Road  
 Hudson, NH 03051 / USA  
 Tel: (603) 598-0070 Fax: (603) 598-0075  
 E-Mail: vti@vtinh.com

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**Construction, pin configuration and 50  $\Omega$  - matching network**

(All dimensions in mm)

**50 Ohm Test circuit**

**Stability Characteristics**

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

1. Shock: 500g, 18 ms, half sine wave, 3 shocks each plane;  
DIN IEC 68 T2 - 27
2. Vibration: 10 Hz to 500 Hz, 0,35 mm or 5g respectively, 1 octave per min, 10 cycles per plan, 3 plans;  
DIN IEC 68 T2 - 6
3. Damp heat: 25 °C to 55°C / 95% r.H. / 10 cycles  
(cycle) DIN IEC 68 - 2 – 30 Db
4. Resistance to solder heat (reflow): max. 2 times reflow process;  
for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4;

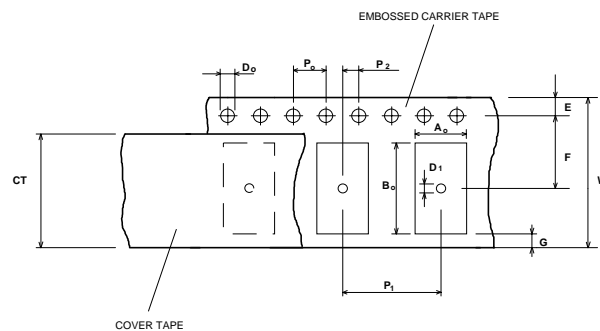
**Packing**

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;

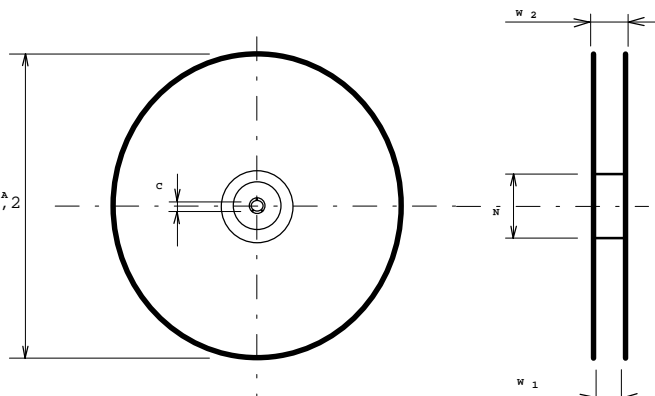
max. pieces of filters per reel: 2000  
Reel of empty components at start: min 300 mm  
Reel of empty components at start including leader: min 500 mm  
Trailer min 300 mm

**Tape (all dimensions in mm)**

W : 16 ±0,3  
Po : 4 ±0,1  
Do : 1,5 +0,1  
E : 1,75 ±0,1  
F : 7,5 ±0,1  
G (min) : 0,6  
P2 : 2 ±0,1  
P1 : 8 ±0,1  
D1(min) : 1,5  
Ao : 5,5 ±0,1  
Bo : 7,5 ±0,1  
CT : 13,5 +0,1

**Reel (all dimensions in mm):**

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



The minimum bending radius is 45 mm. The mounting surface of the filters faces the bottom side of the embossed carrier tape. The marking of the filters is able to read if the view is directed on the upper side of the carrier tape with the sprocket holes on the right side of the tape.

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E-Mail: tft@telefilter.com

**Vectron International, Inc.**  
267 Lowell Road  
Hudson, NH 03051 / USA  
Tel: (603) 598-0070 Fax: (603) 598-0075  
E-Mail: vti@vtinh.com

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**Air reflow temperature conditions**

## 1st and 2nd air reflow profile

<b>Name:</b>	pre-heating periods	main-heating periods	peak temperature
<b>Temperature:</b>	150 °C - 170 °C	over 200 °C	255 °C ± 5 °C
<b>Time:</b>	60 sec. - 90 sec.	20 sec. - 25 sec.	

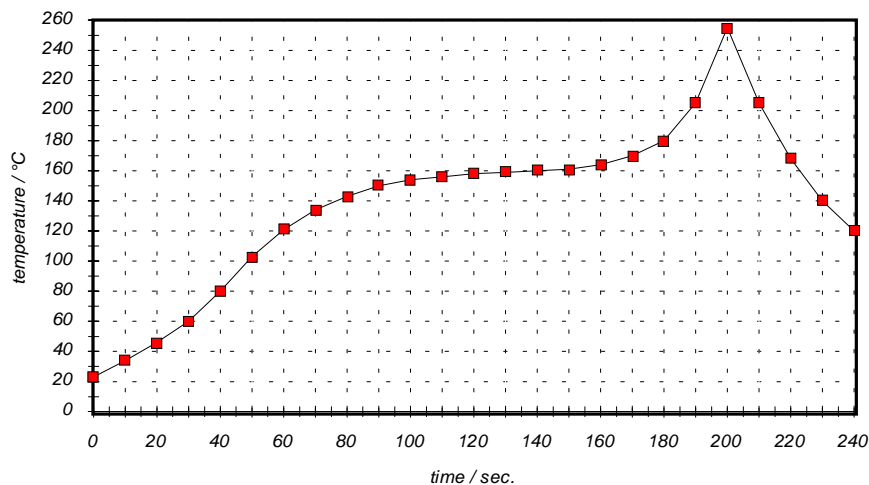
**Chip-mount air reflow profile**

Table for temperature vs. time during the air reflow process

Tolerance of temperatures: ± 5 °C

time / sec.	temperature / °C	time / sec.	temperature / °C
0	23	140	160
10	34	150	161
20	46	160	164
30	60	170	170
40	80	180	180
50	103	190	205
60	121	195	230
70	134	200	255
80	143	205	230
90	150	210	205
100	154	215	180
110	156	220	165
120	158	230	140
130	159	240	120

**VI TELEFILTER****Filter Specification****TFS 235****5/5****History**

<b>Version</b>	<b>Reason of Changes</b>	<b>Name</b>	<b>Date</b>
1.0	generated according to customer requirement	Dr. Sabah	27.06.00
1.1	remove pass band width related values change position of input and output pin add coupling coil	Dr. Wall	28.07.2000
1.2	add values for termination impedances and coupling coil correct tape and real information add matching network scheme add typical value for 1 dB bandwidth add group delay values change marking from TFS235 to S235	Dr. Wall	11.10.2000
1.3	add typical filter data define limits for insertion loss	Dr. Wall	12.10.2000

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