1. Measurement condition

Ambient temperature T_A:	23 °C	
Input power level:	0 dBm.	
Terminating impedances at f_C:	for input:	290 Ω | - 13,62 pF.
	for output:	260 Ω | - 14,35 pF.
Q-value of matching elements:	70	

2. Characteristics

Remark: Reference level for the relative attenuation a_{rel} of the **TFS 140A** 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 reference frequency f_C is the arithmetic mean value of the upper and lower frequencies at the **20 dB** filter attenuation level relative to the insertion loss a_e. The temperature coefficient of frequency Tc_f is valid both for the reference frequency f_C and the frequency response of the filter in the operating temperature range. The frequency shift of the filter in the operating temperature range is not included in the production tolerance scheme.

Data	**typ. value**	**tolerance / limit**
Insertion loss (Reference level) a_e	22,5...22,8 dB	max. 25 dB
Centre frequency f_C at ambient temperature T_A (f_{CAT})	140,01 MHz	140,0 ± 0,1 MHz
Pass band at ambient temperature T_A:		f_C - 1,5 MHz.....f_C + 1,5 MHz
Amplitude ripple (p-p): f_C ... f_C ± 1,30 MHz	0,45 dB	max. 0,7 dB
f_C ± 1,30 MHz f_C ± 1,40 MHz	0,7 dB	max. 1 dB
Bandwidth at ambient temperature**:**		
1 dB - band width	2,88 MHz	min. 2,80 MHz
3 dB - band width	3,13 MHz	min. 3,00 MHz
20 dB - band width	3,83 MHz	
40 dB - band width	4,20 MHz	max. 4,25 MHz
45 dB - band width	4,24 MHz	max. 4,50 MHz
Relative attenuation a_{rel}		
f_C ..... f_C ± 1,4 MHz	-	max. 1 dB
f_C ± 1,4 MHz ..... f_C ± 1,5 MHz	-	max. 3 dB
f_C ± 2,125 MHz ..... f_C ± 2,25 MHz	45...50 dB	min. 40 dB
f_C ± 2,25 MHz ..... f_C ± 80 MHz	48...65 dB	min. 45 dB
f_C - 135 MHz ..... f_C - 100 MHz	55...70 dB	min. 50 dB
f_C - 100 MHz ..... f_C - 80 MHz	55...70 dB	min. 45 dB
f_C + 80 MHz ..... f_C + 125 MHz	35...40 dB	min. 32 dB
f_C + 80 MHz ..... f_C + 300 MHz	55....70 dB	min. 50 dB
Group delay (mean value in pass band):	2,68 µs	max. 2,8 µs
Group delay ripple in pass band (p-p):	80...90 ns	max. 150 ns
Deviation from linear phase in pass band (p-p):	5° (r.m.s. 1°)	
Input VSWR (S11) in PB :	1,25 : 1	
Output VSWR (S22) in PB :	1,30 : 1	
Triple transit attenuation compared to main signal	47...49 dB	
Crosstalk	56...60 dB	
Frequency inversion temperature (T_o)	25° C	
Temperature coefficient of frequency (Tc_f)	-0,045 ppm/K²	
Frequency deviation of f_C over temperature: *)	Δf_C(Hz) = Tc_f(ppm/K) x (T - T_o)² x f_{To} (MHz)	
Operating temperature range		-25 °C ... + 80 °C
Storage temperature range		- 40 °C ... + 85 °C

***)** f_{To} is reference frequency f_C at frequency inversion temperature (T_o)

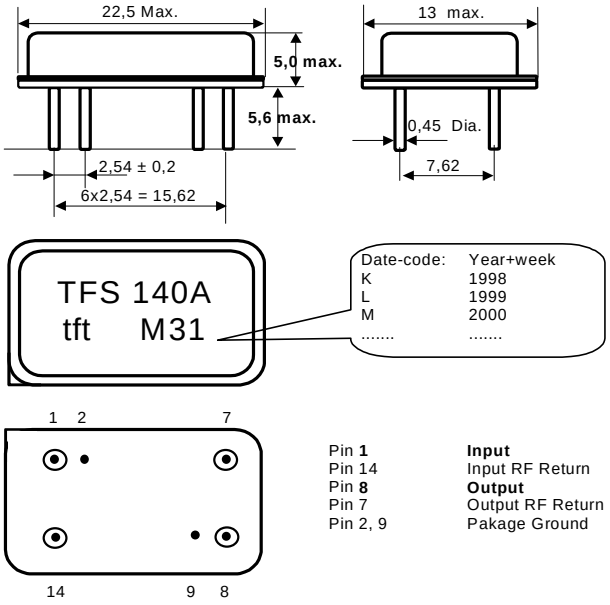
Generated: **Dunzow W.P.**

Checked/Approved: **Dr. Bert Wall**

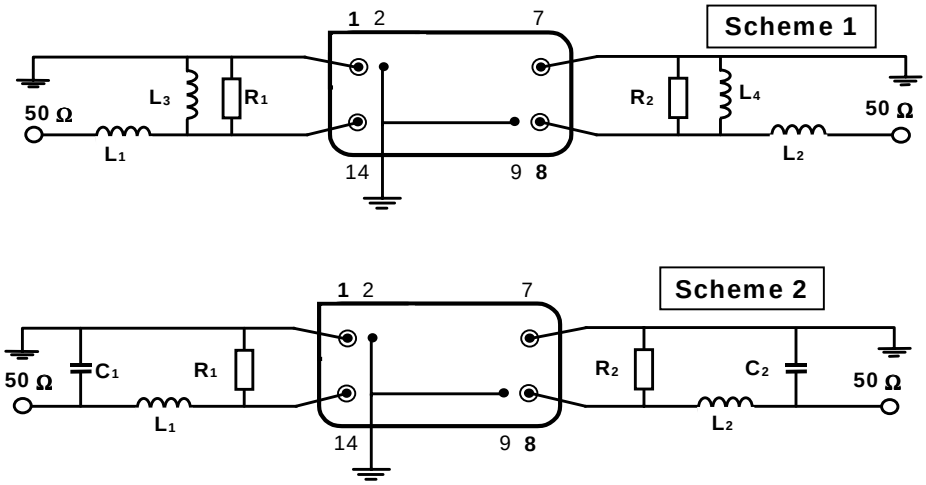
VI TELEFILTER
Potsdamer Straße 18
D 14 513 TELTOW / Germany
Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30
E-Mail: tft@telefilter.com

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

3. Package



4. 50 Ω matching network (see Application Note):



We use scheme 1 for final test.

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E-Mail: vti@vtinh.com

5. Air reflow temperature conditions :

1st and 2nd air reflow profile

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

Air reflow profile

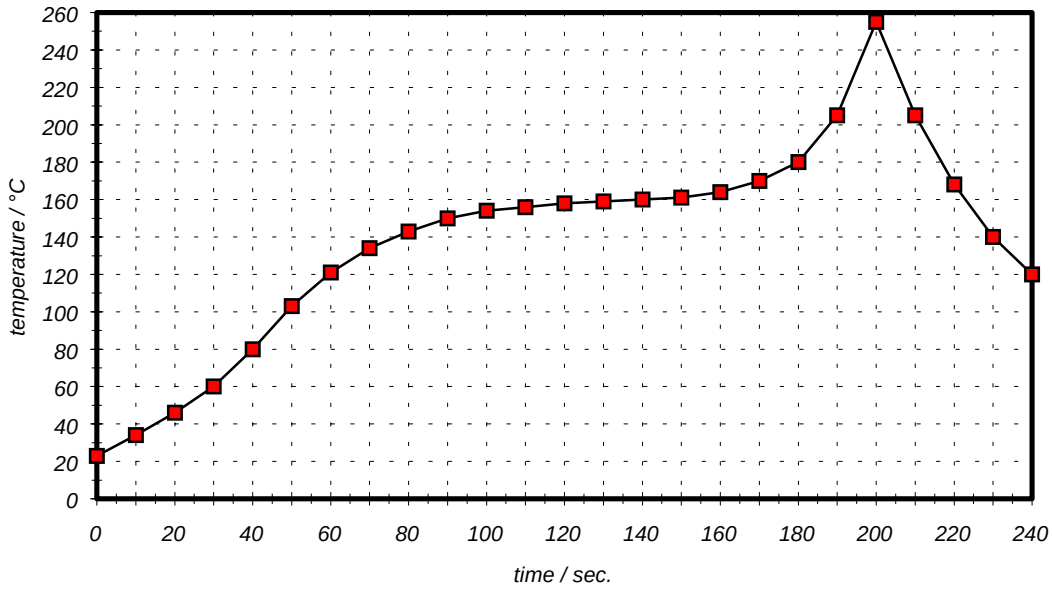

Table for temperature vs. time during the air reflow process

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

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History

Version	Reason of Changes	Name	Date
1.0	Generate Development Specification according to customer requirements.	Dunzow W.	15.11.1997
2.0	Generate Preliminary Specification after measured.	Dunzow W.	04.08.1998
2.1	Correct matching networks. Correct termination impedances. Change limit lines. Add VSWR.	Dunzow W.	06.11.2000

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