

## 1. Measurement condition

Ambient temperature $T_A$ :	23 °C
Input power level:	0 dBm.
Terminating impedances in $f_C$ :	for input: 50 $\Omega$   - 39,16 pF.
	for output: 50 $\Omega$   - 39,16 pF.

## 2. Characteristics

### Remark:

Reference level for the relative attenuation  $a_{rel}$  of the **TFS 70S** 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 **40 dB** filter attenuation level relative to the insertion loss  $a_e$ . The temperature coefficient of frequency  $T_{Cf}$  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
<b>Insertion loss</b> (Reference level) $a_e$	21 dB	max 24 dB
<b>Reference frequency</b> $f_C$ at ambient temperature ( $f_{CAT}$ )	70 MHz	$70 \pm 0,1$ MHz
<b>Pass band ( PB ) :</b>	$f_C - 5,2$ MHz ... $f_C + 5,2$ MHz	
<b>Bandwidth</b> at ambient temperature:		
1,0 dB - band width	10,75 MHz	min. 10,4 MHz
3,0 dB - band width	10,90 MHz	min. 10,8 MHz
20 dB - band width	11,37 MHz	
40 dB - band width	11,57 MHz	max. 11,6 MHz
45 dB - band width	11,60 MHz	
50 dB - band width	11,62 MHz	
<b>Amplitude ripple in pass band (p-p) :</b>	0,7 dB	max. 1 dB
<b>Relative attenuation</b> $a_{rel}$		
$f_C$	0,7 dB	max 1 dB
$f_C \pm 5,2$ MHz ... $f_C \pm 5,2$ MHz	2 dB	max 3 dB
$f_C \pm 5,8$ MHz ... $f_C \pm 5,4$ MHz	45 dB	min 40 dB
$f_C \pm 6,4$ MHz ... $f_C \pm 6,4$ MHz	55 dB	min 45 dB
$f_C \pm 6,4$ MHz ... $f_C \pm 35$ MHz	75...60 dB	min 55 dB
$f_C - 65$ MHz ... $f_C - 35$ MHz	60...65 dB	min 55 dB
$f_C + 35$ MHz ... $f_C + 65$ MHz		
<b>Average group delay in PB :</b>	3,71 $\mu$ s	max 4,2 $\mu$ s
<b>Group delay ripple in PB (p-p) :</b>	110 ns	max 200 ns
<b>Deviation from linear phase in PB :</b>	5,5° p-p... ( 0,86° r.m.s.)	
<b>Triple transit attenuation compared to main signal Crosstalk</b>	50 dB	
	55...70 dB	
<b>Temperature coefficient of frequency ( <math>T_{Cf}</math> )</b>	-87 ppm/K	-94 ppm/K
<b>Frequency deviation of <math>f_C</math> over temperature</b>	$\Delta f_C(\text{Hz}) = T_{Cf}(\text{ppm/K}) \times (T - T_A) \times f_{CAT} (\text{MHz})$	
<b>Operating temperature range</b>	- 25 °C ... + 85 °C	
<b>Storage temperature range</b>	- 25 °C ... + 85 °C	

Generated: Wadim P. Dunzow

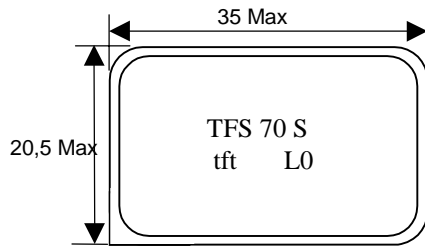
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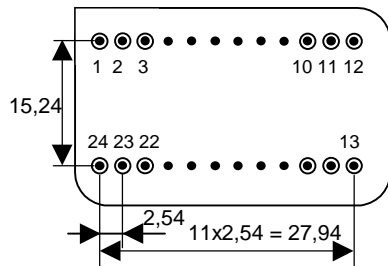
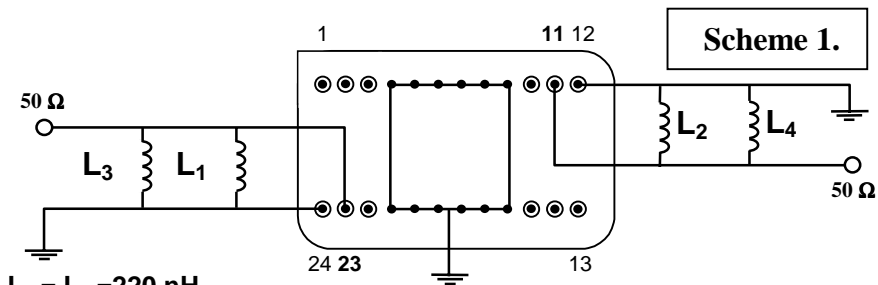
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## 3. Package

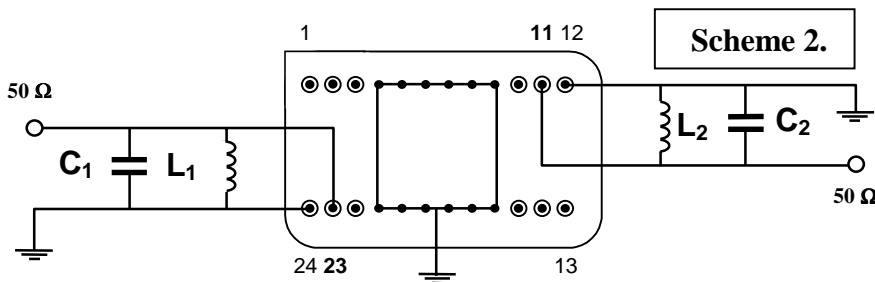


Pin 23	<b>Input</b>
Pin 24	Input RF Return
Pin 11	<b>Output</b>
Pin 12	Output RF Return
Pin 4-9, 16-21	Ground
Pin 1-3, 10, 13-15, 22	not connected

4. 50  $\Omega$  matching network:

$$L_1 = L_2 = 220 \text{ nH.}$$

$L_3 = L_4 = 330 \text{ nH}$  - have to be adjusted (for example: 270, 330, 390 nH ).



$$L_1 = L_2 = 100 \text{ nH.}$$

$C_1 = C_2 = 12,54 \text{ pF}$  - have to be adjusted (for example: 10, 12, 15 pF ).

For final test in production we use matching network 1.

## 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

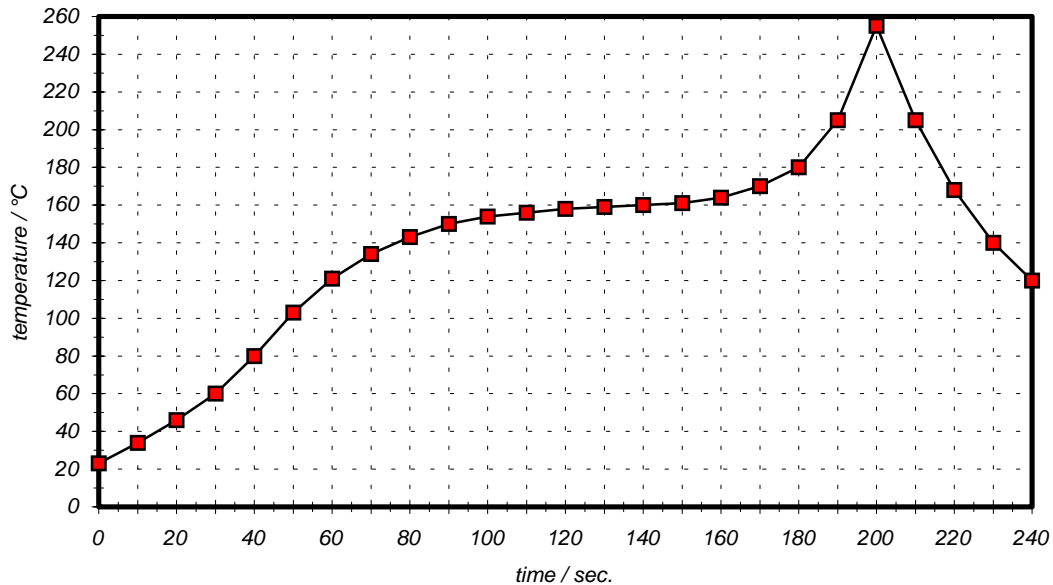


Table for temperature vs. time during the air reflow process

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