

**1. Measurement condition :**

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

**2. Characteristics**

Remark:

Reference level for the relative attenuation  $a_{rel}$  of the **TFS 36A** 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 **40 dB** filter attenuation level relative to the insertion loss  $a_e$ . The nominal frequency  $f_N$  is fixed on **36 MHz** without tolerance. 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 included in the production tolerance scheme.

Data	typ. value	tolerance / limit
<b>Insertion loss</b> (Reference level) $a_e$	30,8 dB	max. 36 dB
<b>Nominal frequency</b> : $f_N$ at temperature $T_{OT} = 45^\circ\text{C}$		36 MHz
<b>Centre frequency</b> $f_C$ at ambient temperature $T_A$ ( $f_{CAT}$ )	36,065 MHz	
<b>Centre frequency</b> $f_C$ at temperature $T_{OT} = 45^\circ\text{C}$	36,00 MHz	
<b>Pass band ( PB ) :</b>	$f_N - 3,805 \text{ MHz} \dots f_N + 3,805 \text{ MHz}$	
<b>Amplitude ripple in PB (p-p) :</b>	0,7...0,9 dB	max. 1 dB
<b>Bandwidth</b>	at operating temperature:	
1 dB - band width	7,70 MHz	min. 7,61 MHz
2 dB - band width	7,81 MHz	
3 dB - band width	7,87 MHz	
4 dB - band width	7,92 MHz	
40 dB - band width	8,43 MHz	max. 8,46 MHz
45 dB - band width	8,51 MHz	
50 dB - band width	8,54 MHz	max. 8,76 MHz
<b>Relative attenuation</b>	$a_{rel}$	
$f_N \pm 4,23$ MHz ... $f_N \pm 4,38$ MHz	45...48 dB	max. 1 dB min. 40 dB
$f_N - 35$ MHz ... $f_N - 34$ MHz	33...36 dB	min. 30 dB
$f_N - 34$ MHz ... $f_N - 30$ MHz	37 dB	min. 35 dB
$f_N - 30$ MHz ... $f_N - 21$ MHz	44...46 dB	min. 40 dB
$f_N - 21$ MHz ... $f_N - 4,38$ MHz	52...55 dB	min. 50 dB
$f_N + 4,38$ MHz ... $f_N + 33$ MHz	55 dB	min. 50 dB
$f_N + 33$ MHz ... $f_N + 60$ MHz	48...55 dB	min. 45 dB
<b>Group delay ( mean value in PB ) :</b>	4,64 $\mu\text{s}$	max. 5 $\mu\text{s}$
<b>Group delay ripple in PB (p-p):</b>	90...130 ns	
<b>Deviation from linear phase in PB (p-p):</b>	4,4°..5,1° (r.m.s. 1,3...1,7°)	max. 5,5° p-p
<b>Triple transit attenuation compared to main signal Crosstalk</b>	70 dB	min. 55 dB
	64..67 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</b>	+ 45 °C	
<b>Storage temperature range</b>	- 25 °C ... + 85 °C	

Generated:

Dunzow W.P.

Checked/Approved:

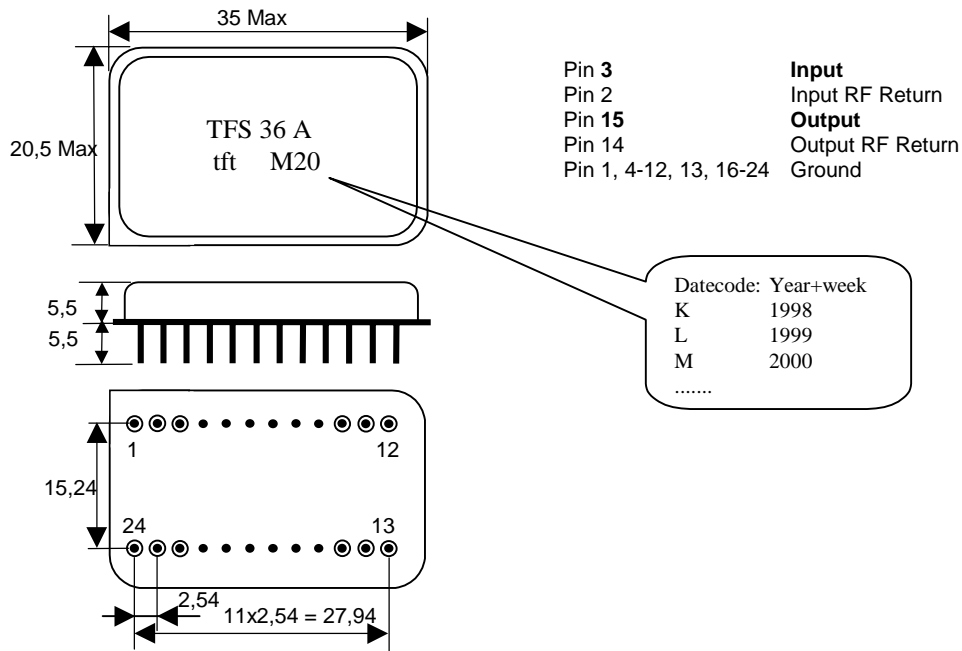
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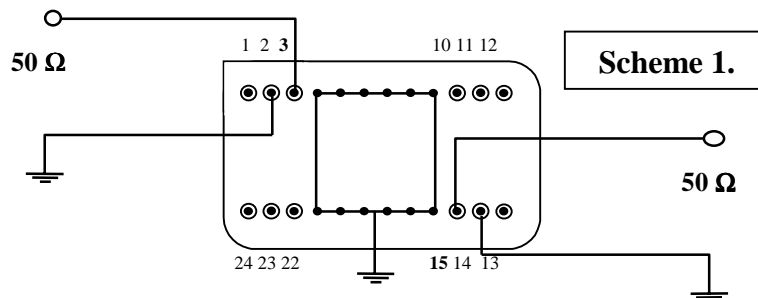
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### 3. Package :



### 4. 50 Ω matching networks ( about other matching networks see Application Note ):



## 5. Soldering temperature conditions :

Soldering temperature 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.	

### Soldering temperature profile

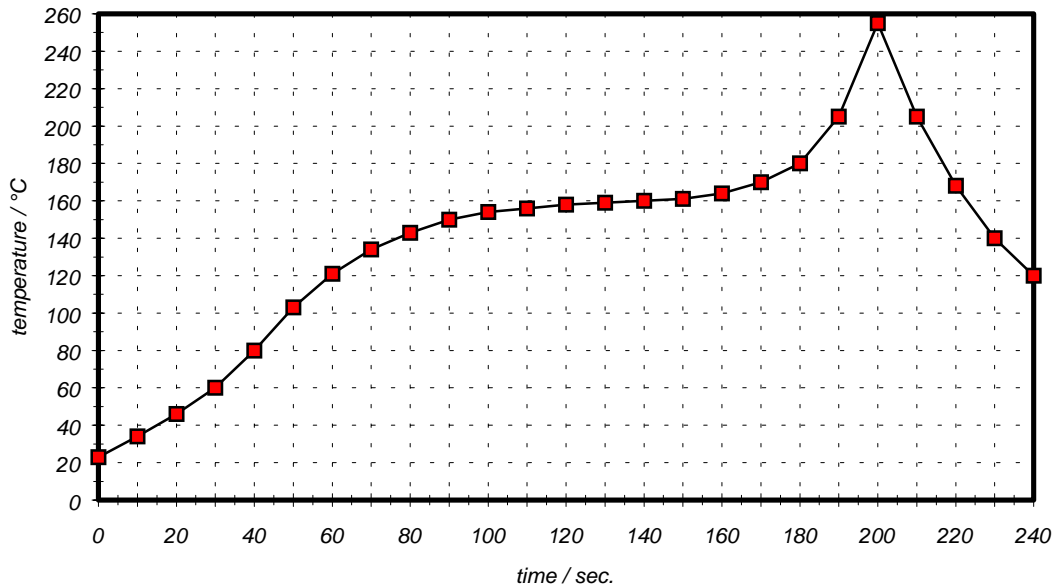


Table for temperature vs. time during the soldering process

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

**History**

<b>Version</b>	<b>Reason of Changes</b>	<b>Name</b>	<b>Date</b>
1.0	Generate specification according to customer requirements.	Wall B.	10.12.1999
1.1	Generate specification according to customer requirements.	Wall B.	21.12.1999
1.2	Generate specification according to customer requirements.	Wall B.	21.12.1999
1.3	Generate specification according to customer requirements.	Wall B.	10.12.1999
1.4	Edit Preliminary Specification. Edit typical values of the filter parameters after measured. Change stop band limit line in $f_N - 35 \text{ MHz} \dots f_N - 30 \text{ MHz}$ from min. 50 dB to min. 35 dB. Change stop band limit line in $f_N - 30 \text{ MHz} \dots f_N - 21 \text{ MHz}$ from min. 50 dB to min. 40 dB. Change limit of phase ripple in any 1 MHz in pass band from max. $4^\circ$ to max. $5,5^\circ$ in pass band.	Dunzow W.	26.07.1999
2.0	Edit Filter Specification. Change stop band limit line in $f_N - 35 \text{ MHz} \dots f_N - 34 \text{ MHz}$ from min. 35 dB to min. 30 dB. Change stop band limit line in $f_N + 33 \text{ MHz} \dots f_N - 35 \text{ MHz}$ from min. 50 dB to min. 45 dB.	Dunzow W.	10.11.2000
2.1	Change 40 dB bandwidth from min. 8.46 dB to max. 8.46 dB Change 50 dB bandwidth from min. 8.76 dB to max. 8.76 dB	Dr. Wall	15.11.2000