

VI TELEFILTER

Filter specification

TFS 87

1/3

1. Measurement condition

Package, pin connection and 50 Ω matching network.
see page 2.

Ambient temperature T_A : 23 °C
 Input power level: 0 dBm (typ.) Max 10 dBm.
 Terminating impedances at f_C : for input: 256 Ω | - 22,5 pF.
 for output: 703 Ω | - 11,8 pF.

2. Characteristics

Remark:

Reference level for the relative attenuation a_{rel} of the TFS 87 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 .

Data	typ. value	tolerance / limit
Insertion loss (Reference level) a_e	22 dB	max 25 dB
Reference frequency f_C at ambient temperature (f_{CAT})	87.10 MHz	87.10 ± 0.2 MHz
Relative frequency distance of f_{CAT} within one set of 3 filters		
1st filter with $f_{CAT} = 65,9 \text{ MHz} \pm 200 \text{ kHz}$ *)	21200 kHz *)	max ± 20 kHz
2nd filter with $f_{COT} = 75,3 \text{ MHz} \pm 200 \text{ kHz}$	11800 kHz	max ± 20 kHz
1 dB - band width	2.35 MHz	
3 dB - band width	2.47 MHz	
20 dB - band width	2.77 MHz	
40 dB - band width	2.93 MHz	
Amplitude ripple (p-p): $f_C \dots f_C \pm 1.1 \text{ MHz}$	0.7 dB	max 1.0 dB
Relative attenuation a_{rel}		
f_C	$f_C \pm 1.1 \text{ MHz}$	- max 1 dB
$f_C \pm 1.1 \text{ MHz}$	$f_C \pm 1.2 \text{ MHz}$	- max 3 dB
$f_C \pm 1.5 \text{ MHz}$		42 dB min 40 dB
In the frequency range $f_C \pm 1,5 \text{ MHz} \dots f_C \pm 25 \text{ MHz}$ the limit line is of type SLOPING LINE.		
$f_C \pm 25 \text{ MHz}$		65 dB min 50 dB
$f_C \pm 25 \text{ MHz}$	$f_C \pm 50 \text{ MHz}$	70 dB -
Group delay	4.87 μs	max 5.0 μs
Group delay ripple (p-p): $f_C \dots f_C \pm 1.2 \text{ MHz}$	$\pm 80 \text{ ns}$	$\pm \text{max } 150 \text{ ns}$
Deviation from linear phase (p-p): $f_C \dots f_C \pm 1.0 (1.2) \text{ MHz}$	$2^\circ (6^\circ)$	
Triple transit attenuation compared to main signal	50 dB	
Input/Output return loss with matching network (S11/S22):	4/4 dB	
Crosstalk	60 dB	
Substrate material	Quartz	
Frequency inversion temperature (T_o)	5°	
Temperature coefficient of frequency (T_{Cf})	-0.0306 ppm/K ²	
Frequency deviation of f_C over temperature	$\Delta f_C(\text{Hz}) = T_{Cf}(\text{ppm/K}) \times (T - T_o)^2 \times f_{CAT} (\text{MHz})$	
Operating temperature range	- 25 °C ... + 80 °C	
Storage temperature range	- 40 °C ... + 85 °C	

*) For the 2nd filter f_{COT} is its reference frequency f_C at the operation temperature $OT = 70 \text{ }^\circ\text{C} \pm 1 \text{ }^\circ\text{C}$. The reference frequency at ambient temperature f_{CAT} for this 2nd filter and the from it resulting relative frequency distance have to be determined.

Generated:

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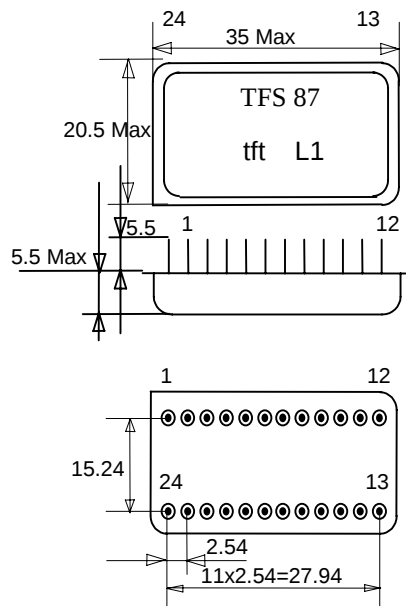
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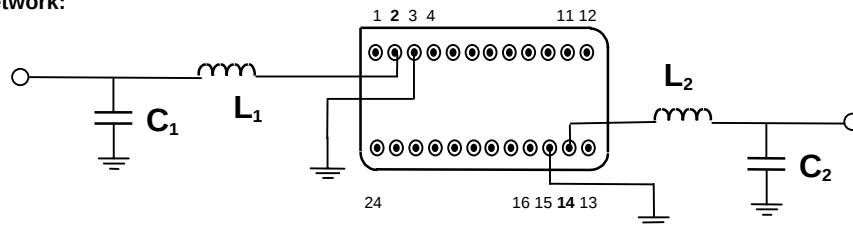
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VI TELEFILTER**Filter specification****TFS 87****2/3****3. Package**

Pin 2
Pin 3
Pin 14
Pin 15

Input
Input RF Return
Output
Output RF Return

4. 50 Ω matching network:

$C_1 = 47 \text{ pF.}$
 $L_1 = 170 \pm 5 \text{ nH.}$
 $C_2 = 39 \text{ pF.}$
 $L_2 = 275 \pm 5 \text{ nH.}$

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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.	

Chip-mount air reflow profile

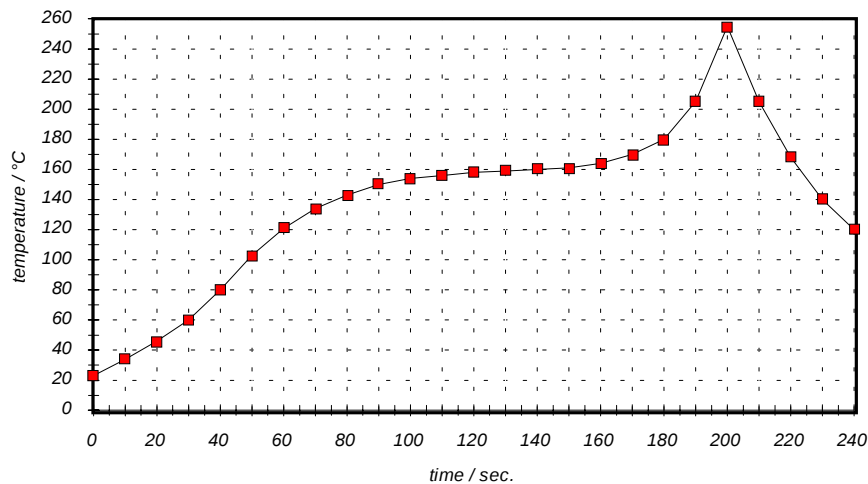


Table for temperature vs. time during the air reflow process

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