

VI TELEFILTER Filter Specification TFS 70L9 1/5

1. Measurement condition :

| | | |
|-------------------------------------|--|--|
| Ambient temperature T_A : | 25 °C | |
| Input power level: | 0 dBm | |
| Terminating impedances in f_C *): | for input: 260 Ω - 14,33 pF. | |
| | for output: 180 Ω - 17,53 pF. | |

2. Characteristics

Remark:

Reference level for the relative attenuation a_{rel} of the TFS 70L9 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 3 dB filter attenuation level relative to the insertion loss a_e . The temperature coefficient of frequency T_{c_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 | 9,5 dB | max. 10,5 dB |
| Centre frequency f_C at ambient temperature (f_{CTA}) | 70,0 MHz | $70,0 \pm 0,10$ MHz |
| Pass band (PB) : | | $f_C - 4,2$ MHz ... $f_C + 4,2$ MHz |
| Amplitude ripple in PB (p-p) : | 0,4 dB | max. 1 dB |
| Bandwidth at ambient temperature T_A : | | |
| 1 dB - band width | 8,75 MHz | min. 8,4 MHz |
| 3 dB - band width | 9,46 MHz | min. 9,0 MHz |
| 40 dB - band width | 13,44 MHz | max. 14,5 MHz |
| Relative attenuation a_{rel} | | |
| f_C ... $f_C \pm 4,2$ MHz | - | max. 1 dB |
| $f_C \pm 4,2$ MHz ... $f_C \pm 4,5$ MHz | - | max. 3 dB |
| $f_C - 20,0$ MHz ... $f_C - 7,25$ MHz | 47...43 dB | min. 40 dB |
| $f_C + 7,25$ MHz ... $f_C + 20,0$ MHz | 43...45 dB | min. 40 dB |
| Group delay (mean value in PB): | 1,1 μ s | max. 1,5 μ s |
| Group delay ripple in f_C ... $f_C \pm 4,1$ MHz (p-p) : | 70 ns | max. 100 ns |
| Deviation from linear phase in f_C ... $f_C \pm 4,1$ MHz (p-p) : | 5,5 degree | max. 10 degree |
| Triple transit attenuation compared to main signal | 44 dB | |
| Crosstalk attenuation compared to main signal | 50 dB | |
| Temperature coefficient of frequency (T_{c_f}) : | -87 ppm/K | -94 ppm/K |
| Frequency deviation of f_C over temperature : | $\Delta f_C(\text{Hz}) = T_{c_f}(\text{ppm/K}) \times (T - T_A) \times f_{CTA}(\text{MHz})$ | |
| Operating temperature range (OTR) : | - 20 °C ... + 70 °C | |
| Storage temperature range : | - 40 °C ... + 85 °C | |

*) The terminating impedances depend on parasitics and q-values of matching elements and the board used, and are to be understood as reference values only. Should there be additional questions do not hesitate to ask for an application note or contact our design team.

Generated: _____ Dunzow W.

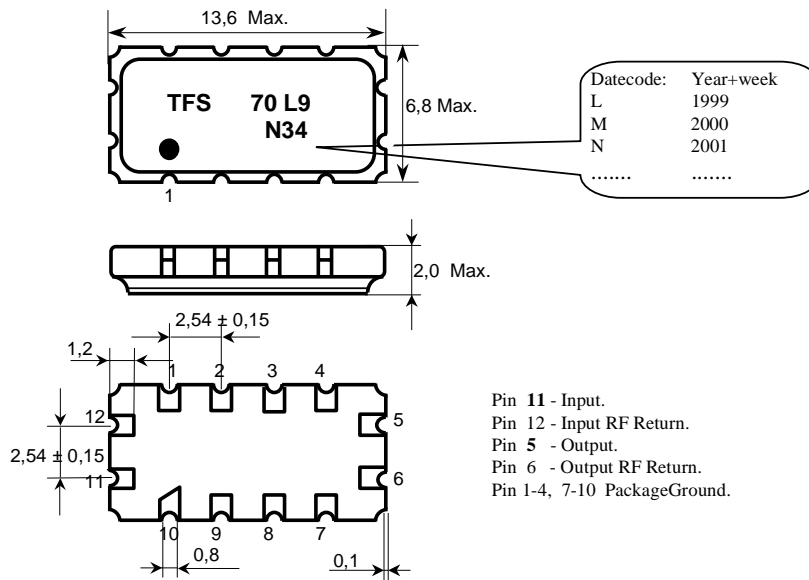
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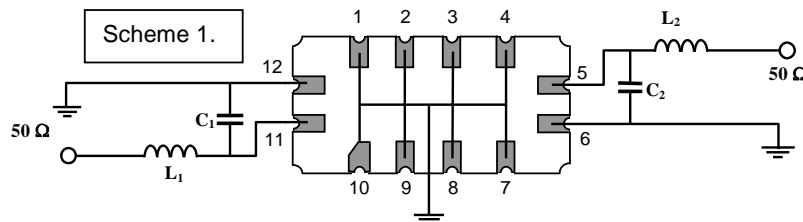
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3. Package, pin grid 2,54 mm :



4. 50 Ω - Matching network (about matching element values see Application Note):



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5. 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. Change of temperature: -55 °C to 125°C / 30 min. each / 10 cycles
DIN IEC 68 part 2 – 14 Test N
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;

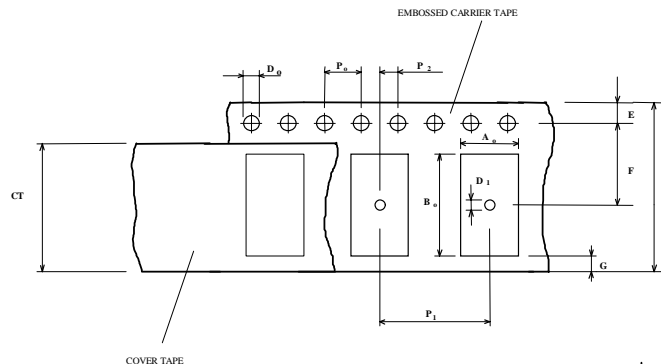
6. Packing :

Tape & Reel: DIN 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;

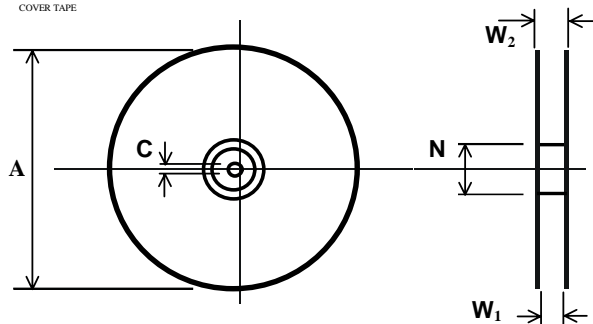
| | |
|---|------------|
| max. pieces of filters per reel: | 1700 |
| reel of empty components at start: | min 300 mm |
| reel of empty components at start including leader: | min 500 mm |
| Trailer | min 300 mm |

Tape (all dimensions in mm)

| | |
|---------|--------------|
| W | : 24 ± 0,3 |
| Po | : 4 ± 0,1 |
| Do | : 1,5 ± 0,1 |
| E | : 1,75 ± 0,1 |
| F | : 11,5 ± 0,1 |
| G (min) | : 0,6 |
| P2 | : 2 ± 0,1 |
| P1 | : 12 ± 0,1 |
| D1(min) | : 1,5 |
| Ao | : 7,1 ± 0,2 |
| Bo | : 13,9 ± 0,2 |
| CT | : 21,5 ± 0,1 |

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

| | |
|---------|----------------|
| A | : 330 |
| W1 | : 24,4 + 2 |
| W2(max) | : 30,4 |
| N(min) | : 60 |
| 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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7. 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. | |

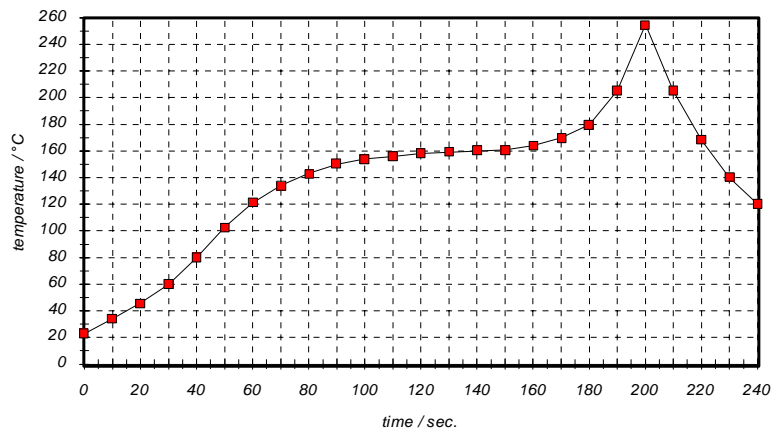
Chip-mount air reflow profile

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 |

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VI TELEFILTER**Filter Specification****TFS 70L9****5/5****History**

| Version | Reason of Changes | Name | Date |
|----------------|--------------------------------|-------------|-------------|
| 1.0 | Generate Filter specification. | Dunzow W. | 10.09.2001 |

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