

**VI TELEFILTER****SAW filter specification****TFS 460 B 1/4****Measurement condition**

Ambient temperature: 23 °C  
 Input power level: 0 dBm  
 Source impedance: 263  $\Omega$  || -0,45 pF  
 Load impedance: 263  $\Omega$  || -0,45 pF

**Construction, pin connection and 50  $\Omega$  test circuit**

see page 2

**Stability characteristics and packing**

see page 3

**Air reflow temperature conditions**

see page 4

**Characteristics**

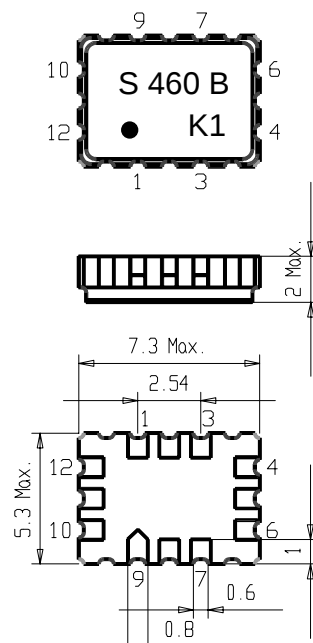
Remark:

Reference level for the relative attenuation  $a_{rel}$  of the TFS 460 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  $f_0$  is the arithmetic mean value of the upper and lower frequencies at the 2 dB filter attenuation level relative to the insertion loss  $a_e$ . The nominal frequency  $f_N$  is fixed on 460 MHz without tolerance.

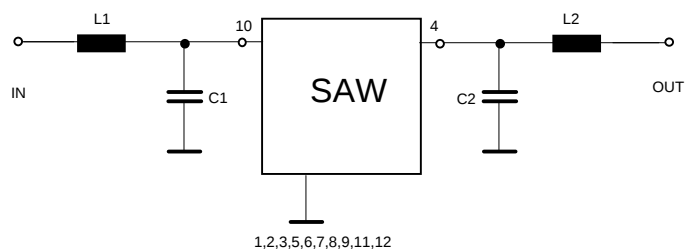
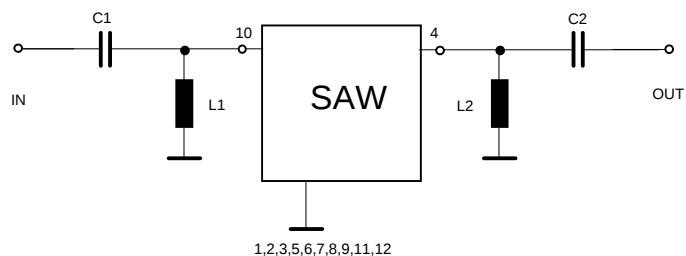
| <b>D a t a</b>                              |                                                                        | <b>typ. value</b> |                     | <b>tolerance / limit</b> |     |
|---------------------------------------------|------------------------------------------------------------------------|-------------------|---------------------|--------------------------|-----|
| <b>Insertion loss</b><br>(Reference level)  | $a_e = a_{min}$                                                        | 3                 | dB                  | max. 5                   | dB  |
| <b>Nominal frequency</b>                    | $f_N$                                                                  | -                 |                     | 460                      | MHz |
| <b>Centre frequency</b>                     | $f_0$                                                                  | 460               | MHz                 | -                        |     |
| <b>Pass band ripple</b>                     |                                                                        |                   |                     |                          |     |
| $f_N \pm 10$ MHz                            |                                                                        | 1                 | dB                  | max. 2                   | dB  |
| <b>Relative attenuation</b>                 | $a_{rel}$                                                              |                   |                     |                          |     |
| 360 MHz ... 380 MHz                         |                                                                        | > 60              | dB                  | min. 50                  | dB  |
| 405 MHz ... 425 MHz                         |                                                                        | > 40              | dB                  | min. 40                  | dB  |
| <b>Intermodulation</b>                      |                                                                        |                   |                     |                          |     |
| $IP_3$                                      | modulation signals:<br>$f_N + 1$ MHz and $f_N + 2$ MHz, each of 10 dBm | 40                | dB                  | min. 20                  | dB  |
| <b>Permissible DC voltage</b>               | $V_{DC}$                                                               |                   |                     | max. 12                  | V   |
| <b>Input power level</b>                    |                                                                        |                   |                     | max. 10                  | dBm |
| <b>Operating temperature range</b>          |                                                                        |                   | - 25 °C ... + 75 °C |                          |     |
| <b>Storage temperature range</b>            |                                                                        |                   | - 40 °C ... + 85 °C |                          |     |
| <b>Temperature coefficient of frequency</b> | $TC_f$                                                                 | - 72              | ppm/K               | -                        |     |

Generated: \_\_\_\_\_

Checked / approved: \_\_\_\_\_

**VI TELEFILTER****SAW filter specification****TFS 460 B 2/4****Construction and pin connection**

- |    |                  |
|----|------------------|
| 1  | Ground           |
| 2  | Ground           |
| 3  | Output RF Return |
| 4  | Output           |
| 5  | Package Ground   |
| 6  | Ground           |
| 7  | Ground           |
| 8  | Ground           |
| 9  | Input RF Return  |
| 10 | Input            |
| 11 | Package Ground   |
| 12 | Ground           |

**50  $\Omega$  test circuit 1 \*)****50  $\Omega$  test circuit 2 \*)**

\*) Both circuits are possible, but the behavior of the first circuit differs slightly from the second one. The final test at Telefilter is carried out with the first circuit.

**VI TELEFILTER****SAW filter specification****TFS 460 B 3/4****Stability characteristics**

After the following tests the filter shall meet the whole specification:

1. Shock: 100g, 18 ms, half sine wave, 3 shocks each plane;  
DIN IEC 68 T2 - 27
2. Vibration: 10 Hz to 500 Hz, 0.35 mm amplitude, 5g; 2 hours for 3 planes;  
DIN IEC 68 T2 - 6
3. Damp heat: 90 % to 95 % rel. humidity, 40 °C, 10 days;  
IEC Pub. 68 - 2 - 3
4. Resistance to solder heat (Reflow): 260 °C for 10 sec;

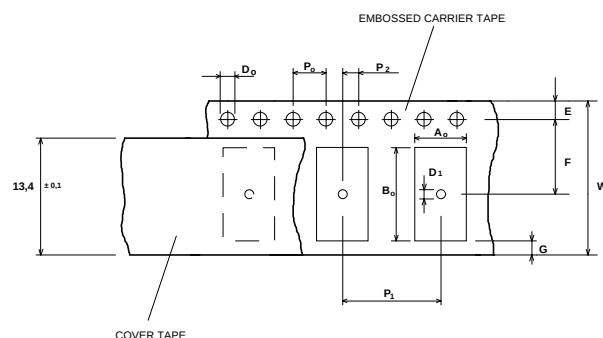
**Packing**

Tape & Reel: 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;

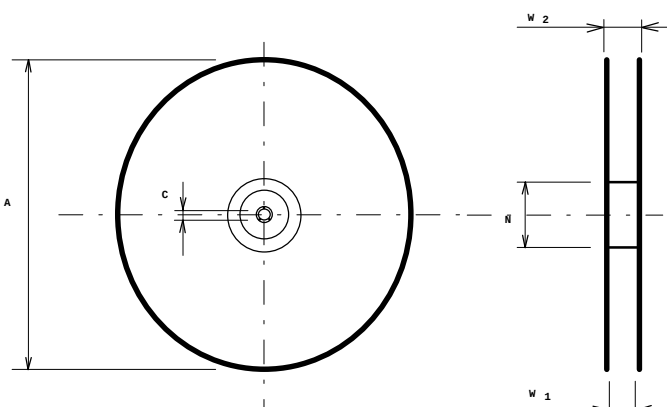
max. pieces of filters per reel: 3400

**Tape (all dimensions in mm)**

|         |              |
|---------|--------------|
| W       | : 16 ± 0,3   |
| Po      | : 4 ± 0,1    |
| Do      | : 1,5 + 0,5  |
| D1      | : 1,5 + 0,5  |
| E       | : 1,75 ± 0,1 |
| F       | : 7,5 ± 0,1  |
| G (min) | : 0,75       |
| P2      | : 2 ± 0,05   |
| P1      | : 8 ± 0,1    |
| D1(min) | : 1,5        |
| Ao      | : 5,4 ± 0,1  |
| Bo      | : 7,4 ± 0,1  |

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

|          |   |           |
|----------|---|-----------|
| A        | : | 330       |
| W1       | : | 16,4 +2   |
| W2 (max) | : | 22,4      |
| N (min)  | : | >= 90     |
| C        | : | 13 ± 0,25 |



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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## Air reflow temperature conditions

## 1st and 2nd air reflow profile

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

## Chip-mount air reflow profile

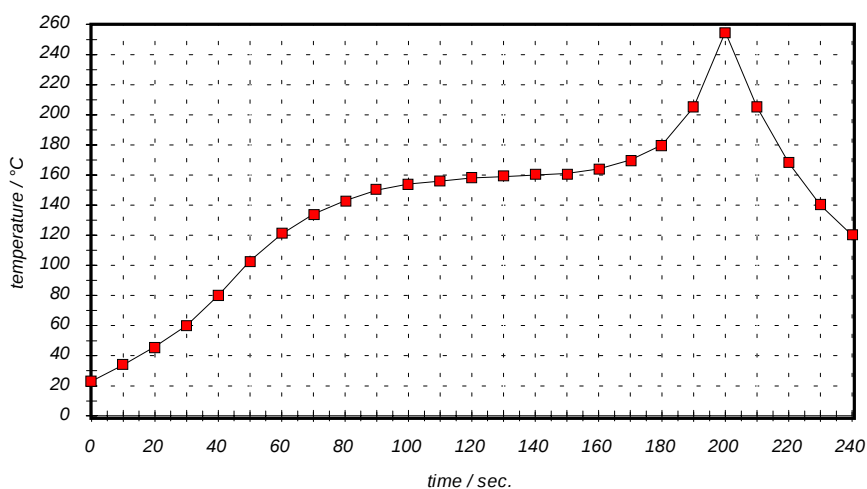


Table for temperature vs. time during the air reflow process

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              |