

VI TELEFILTER**Filter Specification****TFS 440A****1/5****Measurement condition**

Ambient temperature: 23 °C
 Input power level: 0 dBm
 Terminating impedances *)
 for input: 300 Ω // -0,8 pF
 for output: 300 Ω // -0,8 pF
 Coupling coil: 56 nH

Characteristics**Remark:**

Reference level for the relative attenuation a_{rel} of the TFS440A 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 1,5 dB filter attenuation level relative to the insertion loss a_e . The nominal frequency f_N is fixed on 440 MHz without tolerance. The given values for the relative attenuation a_{rel} and for the group delay ripple have to be reached at the frequencies given below also if the centre frequency f_c is shifted due to the temperature coefficient of frequency TC_f in the operating temperature range and due to a production tolerance for the centre frequency f_c .

| D a t a | | typ. value | tolerance/limit |
|---|--------------------------|----------------------------|------------------------|
| Insertion loss (Reference level) | $a_e = a_{min}$ | - | max. 6,5 dB |
| Nominal frequency | f_N | - | 440,00 MHz |
| Centre frequency | f_c | 440,015 MHz | |
| Pass band ripple | $f_N \pm 70$ kHz BW | 0,5 dB | max. 1,5 dB |
| Relative attenuation | a_{rel} | | |
| f_N ... $f_N \pm 70$ kHz | | 0,5 dB | max. 1,5 dB |
| $f_N \pm 70$ kHz ... $f_N \pm 100$ kHz | | 1,2 dB | max. 3,0 dB |
| $f_N \pm 0,4$ MHz ... $f_N \pm 0,6$ MHz | | 32 dB | min. 25 dB |
| $f_N \pm 0,6$ MHz ... $f_N \pm 0,8$ MHz | | 48 dB | min. 40 dB |
| $f_N \pm 0,8$ MHz ... $f_N \pm 3$ MHz | | 63 dB | min. 50 dB |
| $f_N \pm 3$ MHz ... $f_N \pm 78$ MHz | | 64 dB | min. 50 dB |
| Group delay ripple | GD | | |
| $f_N \pm 100$ kHz | | 0,9 μs | max. 2,0 μs |
| Input power level | | - | max. 5 dBm |
| Operating temperature range | | | - 20 °C ... + 70 °C |
| Storage temperature range | | | - 35 °C ... + 85 °C |
| Temperature coefficient of frequency | TC | - 0.036 ppm/K ² | |
| Frequency inversion temperature | | + 25 °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: _____**Checked / approved:** _____

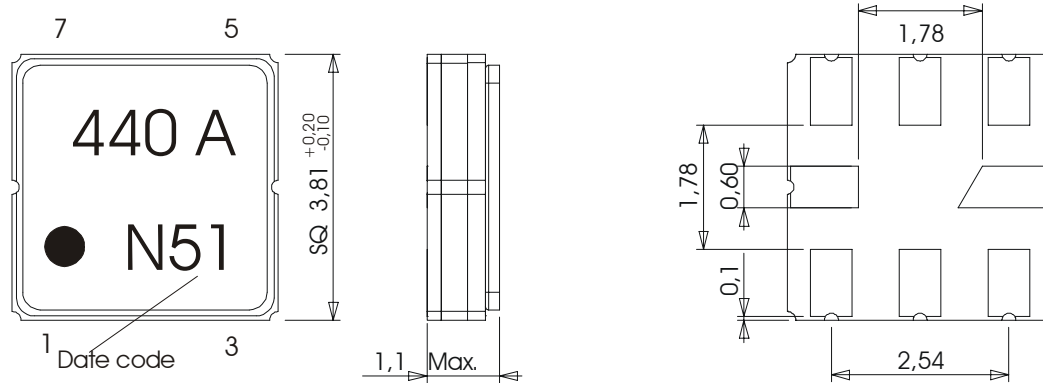
VI TELEFILTER
 Potsdamer Straße 18
 D 14 513 TELTOW / Germany
 Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30
 E-Mail: tft@telefilter.com

Vectron International Inc.
 267 Lowell Road
 Hudson, NH 03051 / USA
 Tel: (603) 598-0070 Fax: (603) 598-0075
 E-Mail: vti@vtinh.com

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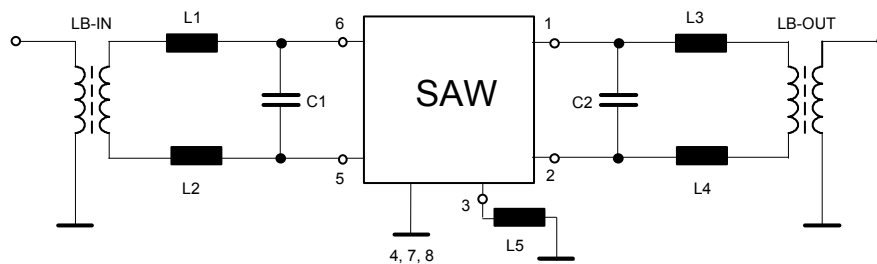
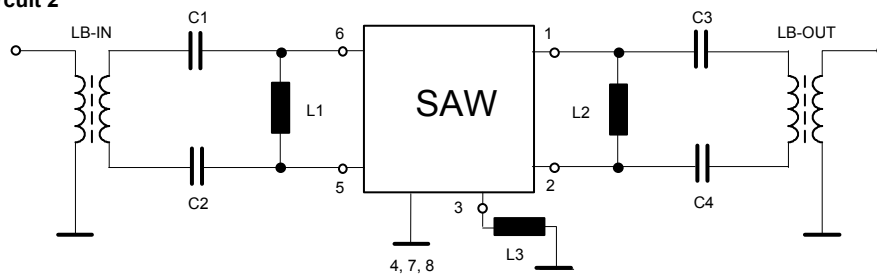
Construction, pin configuration and 50 Ω - matching network

(All dimensions in mm)



| | | | |
|-------|----------------|-------|----------------|
| Pin 1 | Sym. Output | Pin 5 | Sym. Input |
| Pin 2 | Sym. Output | Pin 6 | Sym. Input |
| Pin 3 | External Coil | Pin 7 | Ground |
| Pin 4 | Package Ground | Pin 8 | Package ground |

| | |
|------------|-------------|
| Date code: | Year + week |
| M | 2000 |
| N | 2001 |
| P | 2002 |
| ... | |

50 Ohm Test circuit 1**50 Ohm Test circuit 2**

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, 1,5 mm or 20g 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;

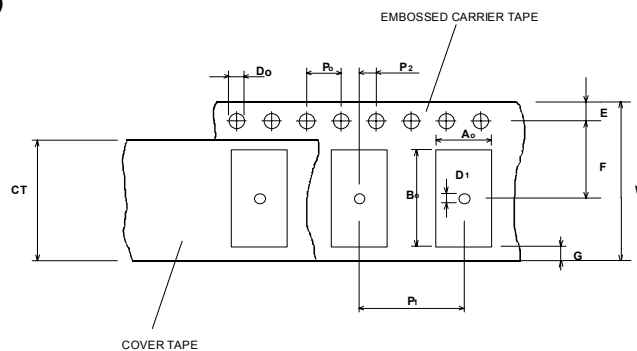
Packing

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;

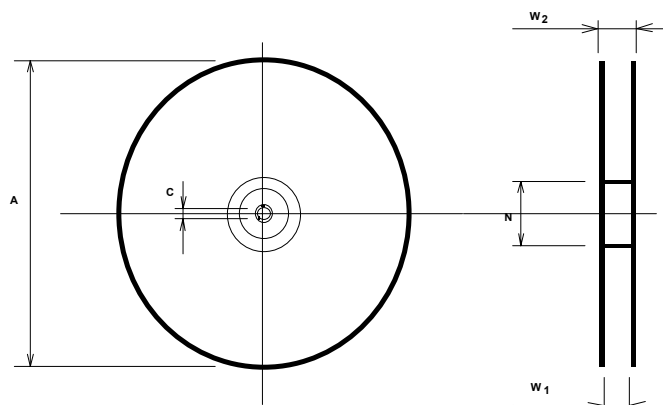
max. pieces of filters per reel: 3000
reel of empty components at start: min 300 mm
reel of empty components at start including leader: min 500 mm
trailer: min 300 mm

Tape (all dimensions in mm)

| | |
|---------|--------------|
| W | : 12 ± 0,3 |
| Po | : 4 ± 0,1 |
| Do | : 1,5 + 0,1 |
| E | : 1,75 ± 0,1 |
| F | : 5,5 ± 0,05 |
| G (min) | : 0,75 |
| P2 | : 2 ± 0,05 |
| P1 | : 8 ± 0,1 |
| D1(min) | : 1,5 |
| Ao | : 4,3 ± 0,1 |
| Bo | : 4,3 ± 0,1 |
| CT | : 9,5 ± 0,1 |

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

| | |
|----------|-------------------|
| A | : 330 |
| W1 | : 12,4 + 0,2 |
| W2 (max) | : 18,4 |
| N (min) | : 50 |
| 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.

VI TELEFILTER
Potsdamer Straße 18
D 14 513 TELTOW / Germany
Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30
E-Mail: tft@telefilter.com

Vectron International Inc.
267 Lowell Road
Hudson, NH 03051 / USA
Tel: (603) 598-0070 Fax: (603) 598-0075
E-Mail: vti@vtinh.com

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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. | |

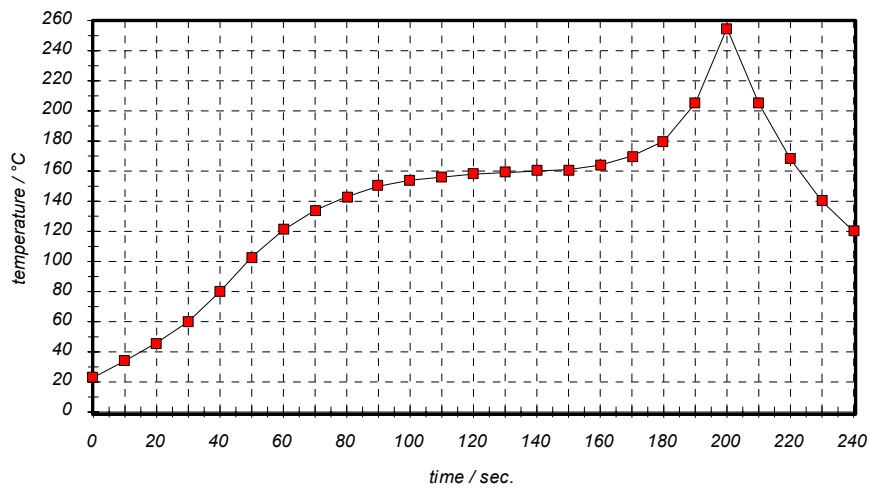
Chip-mount air reflow profile

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 |

VI TELEFILTER**Filter Specification****TFS 440A****5/5****History**

| Version | Reason of Changes | Name | Date |
|----------------|---|-------------|-------------|
| 1.0 | - Generation of specification | Dr. Wall | 25.01.2001 |
| 1.1 | - Add typical values and termination impedances. - Change stability characteristic. | Dr. Wall | 09.11.2001 |
| 1.2 | - Add comment for terminating impedances. - Correct date code and tape and reel information. | Dr. Wall | 19.12.2001 |

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