

**VI TELEFILTER****SAW Resonator Specification****TFR 433M 1/5****Measurement condition**

Ambient temperature: 23 °C  
 Input power level: 10 dBm  
 Terminating Impedance at  $f_c$ :  
     for input: 50  $\Omega$  || 0 pF  
     for output: 50  $\Omega$  || 0 pF

**Characteristics****Remark:**

The minimum of the pass band attenuation  $a_{\min}$  is defined as the insertion loss  $a_e$ . The centre frequency  $f_c$  is the frequency of the minimum of the passband attenuation  $a_{\min}$ . The tolerance for the resonant frequency also includes a centre frequency shift due to the temperature coefficient of frequency  $TC_f$  in the operating temperature range and a production tolerance for the resonant frequency  $f_R$ .

<b>D a t a</b>		<b>typ. value</b>	<b>tolerance/limit</b>
<b>Insertion loss</b> (Reference level)	$a_e = a_{\min}$	1,3 dB	max. 1,8 dB
<b>Resonant frequency</b>	$f_R$	433,820 MHz	$\pm 75$ kHz
<b>Parallel capacitance</b>	$C_0$	3,0 pF	-
<b>Motional resistance</b>	$R_1$	13,96 $\Omega$	-
<b>Motional inductance</b>	$L_1$	61,4 $\mu$ H	-
<b>Motional capacitance</b>	$C_1$	2,2 fF	-
<b>Unloaded quality factor</b>	$Q_u$	1199	-
<b>Operating temperature range</b>		-	- 10°C... + 70 °C
<b>Storage temperature range</b>		-	- 30°C... + 85 °C
<b>Temperature coefficient ***</b>	TC	- 0,036 ppm/K <sup>2</sup>	
<b>Frequency aging **</b>	$ f_A $	10 ppm/yr	
<b>Phase</b>	$\varphi$		-20 ..... + 20 °

\*) 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.

\*\*) Frequency aging is the change in  $f_R$  with time. Typically aging is greatest first year after manufacture, decreasing in subsequent years.

\*\*\*)  $\Delta f(\text{Hz}) = TC_f(\text{ppm/K}^2) \times (T - T_0)^2 \times f_{T0}(\text{MHz})$

**generated:** \_\_\_\_\_

**checked / approved:** \_\_\_\_\_

**VI TELEFILTER**

**Potsdamer Straße 18**

**D 14 513 TELTOW / Germany**

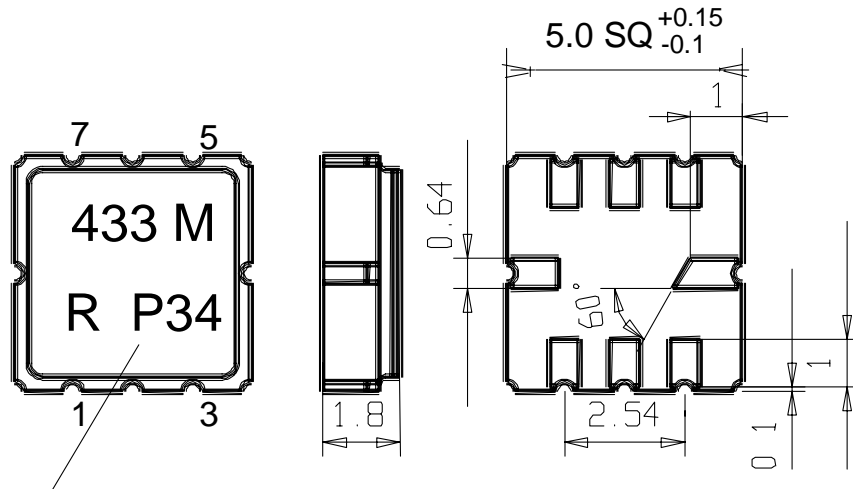
**Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30**

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**Construction, pin configuration and 50 Ω - matching network**

(All dimensions in mm)



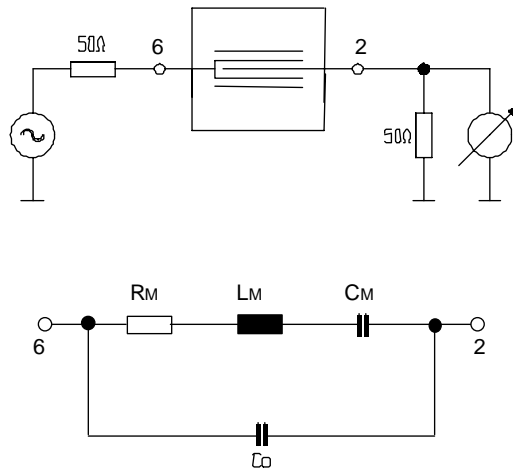
Date code

pin 1 ground  
 pin 2 output  
 pin 3 ground  
 pin 4 package ground

pin 5 ground  
 pin 6 input  
 pin 7 ground  
 pin 8 package ground

date code: year + week  
 M 2000  
 N 2001  
 P 2002  
 ....

**50 Ohm test circuit 1**



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**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): reflow possible: twice max.;  
for temperature conditions, please refer to the attached "Air reflow temperature conditions" on page 4;

**Packing**

tape & reel:

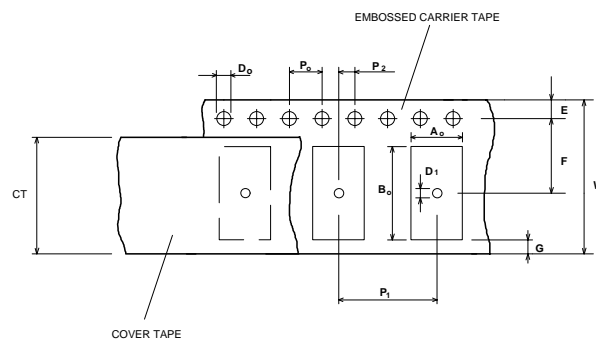
IEC 286 - 3, with exception of value for N and minimum bending radius;  
tape type II, embossed carrier tape with top cover tape on the upper side;

max. pieces of filters per reel:  
reel of empty components at start:  
reel of empty components at start including leader:  
trailer

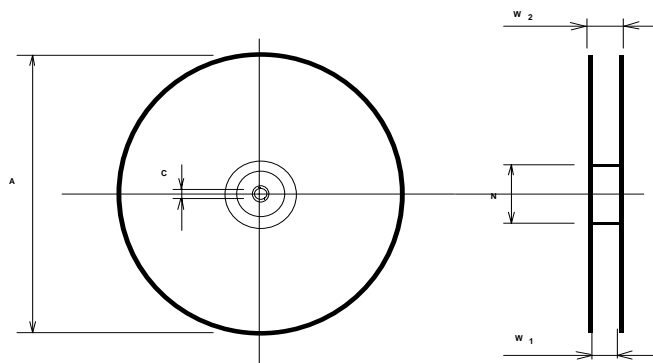
3000  
min 300 mm  
min 500 mm  
min 300 mm

**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 ± 0,10
D1(min)	: 1,5
Ao	: 5,30 ± 0,1
Bo	: 5,30 ± 0,1
CT	: 13,0 ± 0,2

**Reel (all dimensions in mm)**

A	: 330
W1	: 12,4 + 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. Markings on the filters can be read if the upper side of the carrier tape is regarded with the sprocket holes on its right.

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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

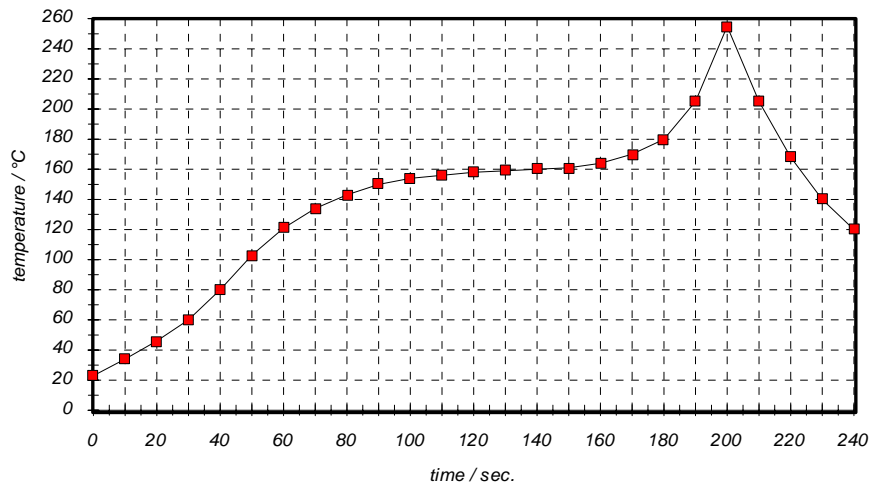


Table for temperature vs. time during the air reflow process

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

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**History**

<b>version</b>	<b>reason of changes</b>	<b>name</b>	<b>date</b>
1.0	generate specification	Pfeiffer	16.08.2002

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