VI TELEFILTER **Filter specification** **TFS 228** **1/5**

Measurement condition

Ambient temperature: 25 ± 5 °C
Input power level: 5 ± 2 dBm
terminating impedances
Source: 220 Ω || -14.3 pF
Load: 225 Ω || -13.5 pF

Characteristics

Remark:
Reference level for the relative attenuation a_{rel} of the TFS 228 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 dB filter attenuation level relative to the insertion loss a_e. 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		limit	
Insertion loss	$a_e = a_{min}$	5	dB	max. 8,0	dB
Nominal frequency	f_N	-		228,6	MHz
Relative attenuation	a_{rel}				
f_N	f_N ± 665 kHz	0,4	dB	max. 1,0	dB
f_N - 5,73 MHz ...	f_N - 188 MHz	45	dB	min. 40	dB
f_N + 5,73 MHz ...	f_N + 72 MHz	45	dB	min. 40	dB
VSWR ratio					
f_N - 665 kHz ...	f_N + 665 kHz	1,6 : 1		max. 2 : 1	
Group delay mean value					
f_N - 665 kHz ...	f_N + 665 kHz	710	ns	max. ±20	ns
Group delay ripple	GD				
f_N - 665 kHz ...	f_N + 665 kHz	100	ns	max. 200	ns
Phase linearity	φ				
f_N ± 0,665 MHz		1,0	°rms	max. 2,5	°rms
Input power level		-		max. + 10	dBm
Operating temperature range				- 30 °C ... + 80 °C	
Storage temperature range				- 40 °C ... + 85 °C	
Temperature coefficient	TC	- 18	ppm/K 1)		

Note 1) - Δf (Hz) = TC (ppm/K) x (T - To) x F_{To} (MHz)

Generated:

Checked / approved:

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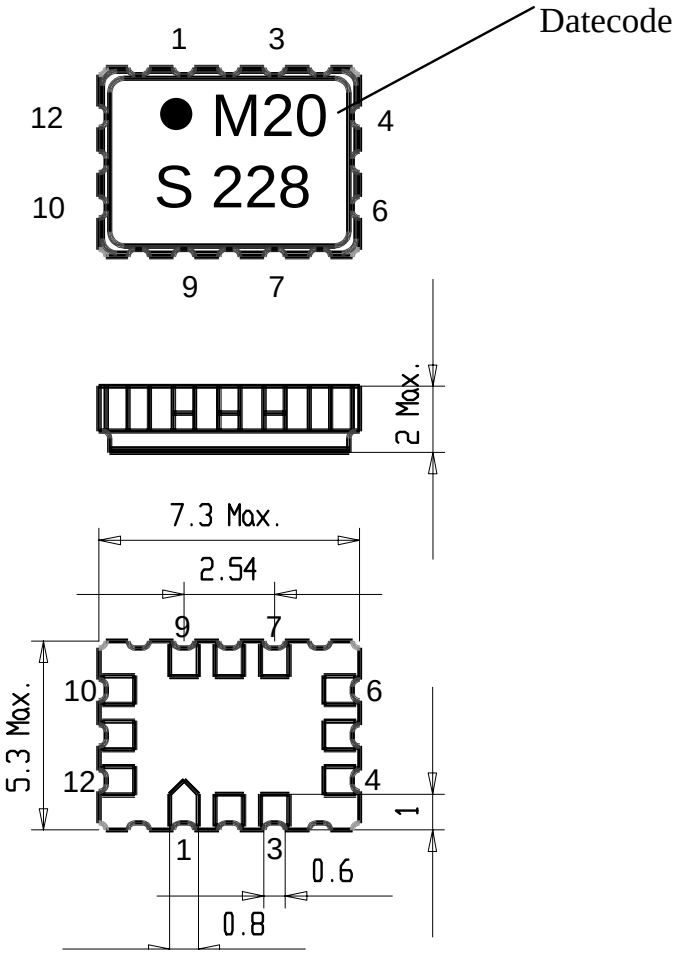
Construction and pin connection

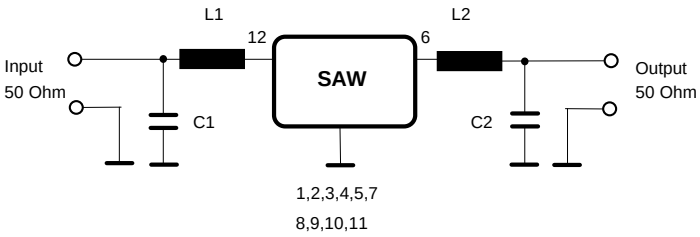
(All dimensions in mm)



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

Datecode:	Year+week
K	1998
L	1999
M	2000
...	

50 Ω test circuit



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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. Damp heat: (cycle)	25 ° C to 55° C / 95% r.H. / 10 cycles DIN IEC 68 - 2 – 30 Db
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;

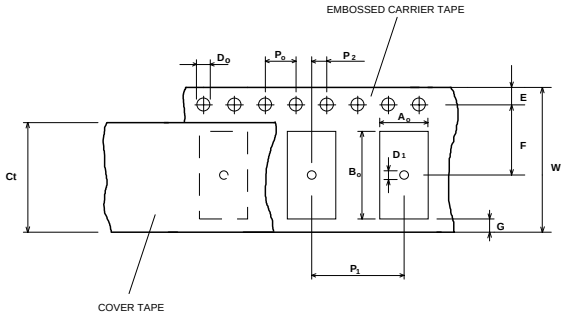
Packing:

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
Real of empty components at start:	min 300 mm
Real of empty components at start including leader:	min 500 mm
Trailer	min 300 mm

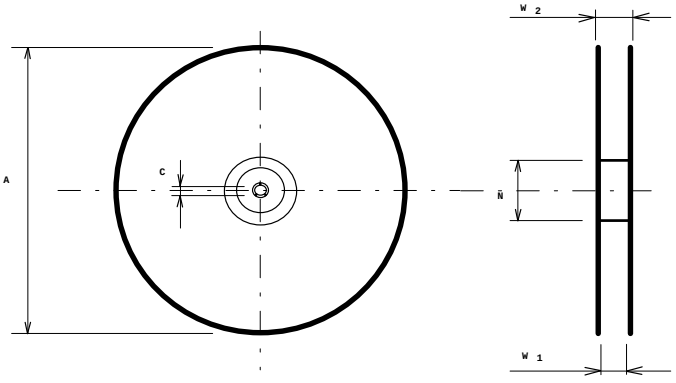
Tape (all dimensions in mm)

W	:	16	± 0,3
Po	:	4	± 0,1
Do	:	1,5	+ 0,5
E	:	1,75	± 0,1
F	:	7,5	± 0,1
G (min)	:	0,6	
P2	:	2	± 0,1
P1	:	8	± 0,1
D1(min)	:	1,5	
Ao	:	5,5	± 0,1
Bo	:	7,5	± 0,1
Ct	:	13,5	+/-0,1



Reel (all dimensions in mm):

A	:	330
W1	:	16,4 +2
W2 (max)	:	22,4
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 readable if the sprocket holes are on the left side of the tape, i.e. pin 1 identifier is close to the sprocket holes.

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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.	

Air reflow profile

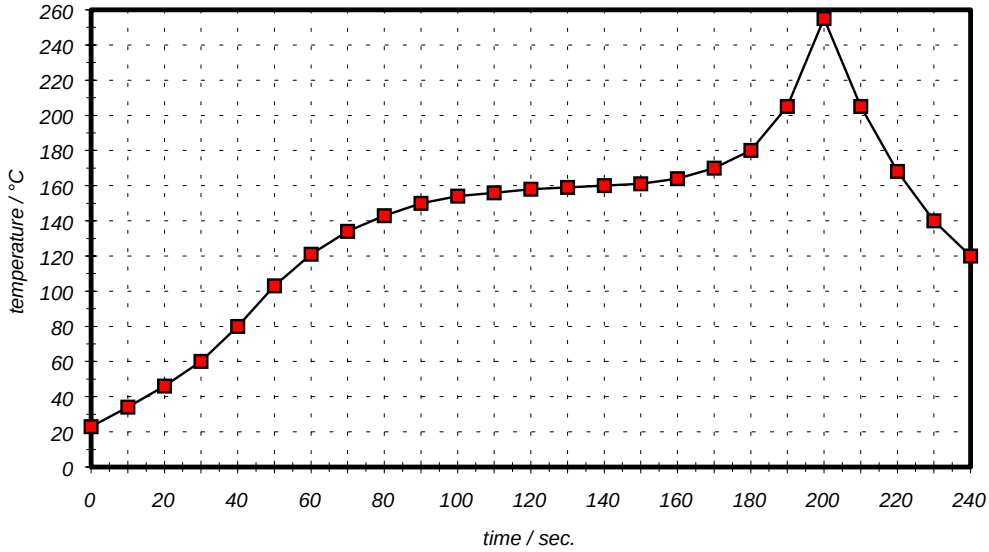

Table for temperature vs. time during the air reflow process

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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Version	Reason of Changes	Name	Date
1.2	- pinning rotated	Steiner	15.05.2000
1.3	- TTS suppression removed - group delay mean value limits added - stopband attenuation decrease removed - new terminating impedances added	Steiner	02.10.2000

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