Measurement condition

Ambient temperature T_A: 23 °C
Input power level: 0 dBm
Terminating impedance: *
Input: 715 Ω || -5.9 pF
Output: 670 Ω || -5.9 pF

Characteristics

Remark:
Reference level for the relative attenuation a_{rel} of the TFS 199E 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 3 dB filter attenuation level relative to the insertion loss a_e. The nominal frequency f_N is fixed at 199 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 even 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 (Reference level)	a_e	6.5	dB	max.	7	dB
Nominal frequency	f_N	-			199	MHz
Centre frequency	f_C	199	MHz		-	
0.7 dB passband	PB	-		f_N ±	100	kHz
Relative attenuation	a_{rel}					
f_N ..... f_N ± 0.1 MHz		0.4	dB	max.	0.7	dB
f_N ± 0.3 MHz ..... f_N ± 0.5 MHz		18	dB	min.	10	dB
f_N ± 0.5 MHz ..... f_N ± 0.6 MHz		37	dB	min.	27	dB
f_N ± 0.6 MHz ..... f_N ± 0.7 MHz		39	dB	min.	36	dB
f_N ± 0.7 MHz ..... f_N ± 80 MHz		55	dB	min.	45	dB
Group delay variation in PB p-p		465	ns	max.	700	ns
Input power level		-		max.	18	dBm**)
Voltage between any two terminals		-		max	10	V
Frequency inversion temperature (T_o)		25	°C		-	
Temperature coefficient of frequency Tc_f	***)	-0.036	ppm/K^2		-	
Operating temperature range		-		- 35 °C ... + 85 °C		
Storage temperature range		-		- 55 °C …+ 125 °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
**) This power level is only allowed for short term operation (10% of the life time), the max. input power for continuous operation is max.10dBm only
***) $\Delta f = TC_f(T - T_0)^2 f_N$

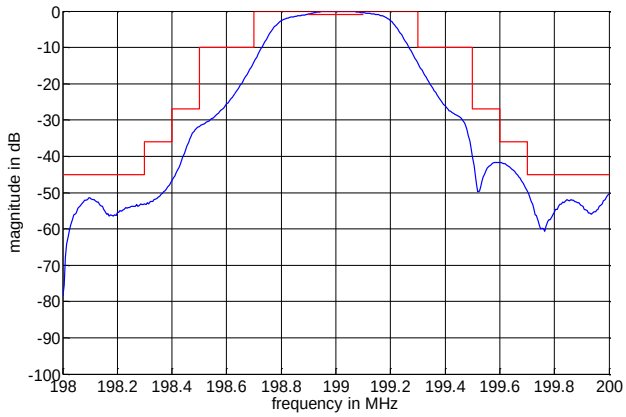
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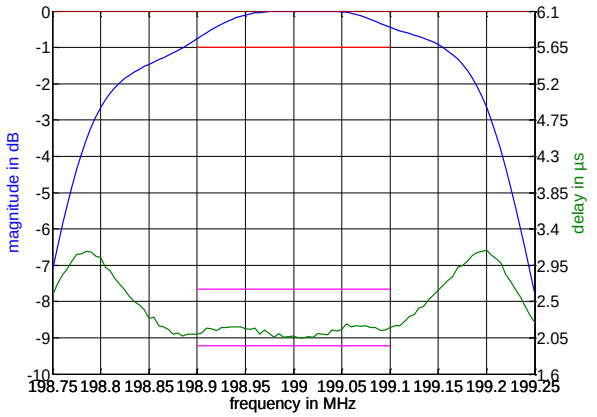
Checked / Approved:

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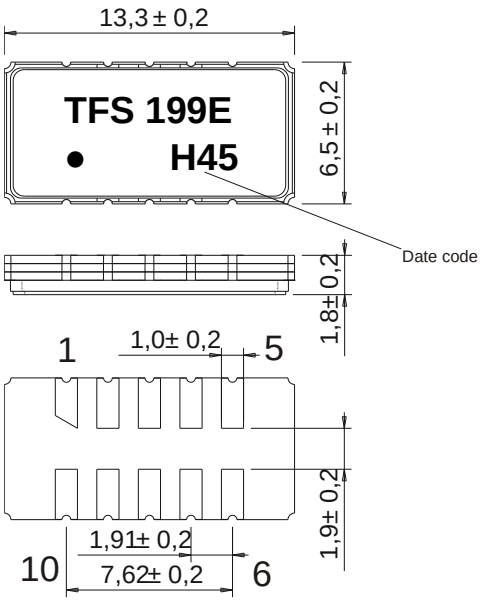
Filter characteristic





Construction and pin connection

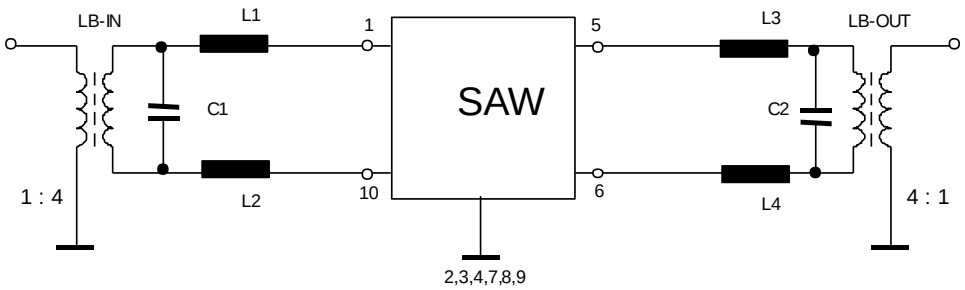
(All dimensions in mm)



1	Input
2	Ground
3	Ground
4	Ground
5	Output
6	Output
7	Ground
8	Ground
9	Ground
10	Input

Date code:	Year + week
H	2016
J	2017
K	2018
...	

200 Ω Test circuit



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Stability characteristics, reliability

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

1. Shock: 500 g, 1 ms, half sine wave, 3 shocks each plane;
   DIN IEC 60068 T2 - 27

2. Vibration: 10 Hz to 2000 Hz, 0.35 mm or 5 g respectively, 1 octave per min, 10 cycles per plane, 3 planes; DIN IEC 60068 T2 - 6

3. Change of temperature: -55 °C to 125 °C / 15 min. each / 100 cycles
   DIN IEC 60068 part 2 – 14 Test N

4. Resistance to solder heat (reflow): reflow possible: three times max.;
   for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4;

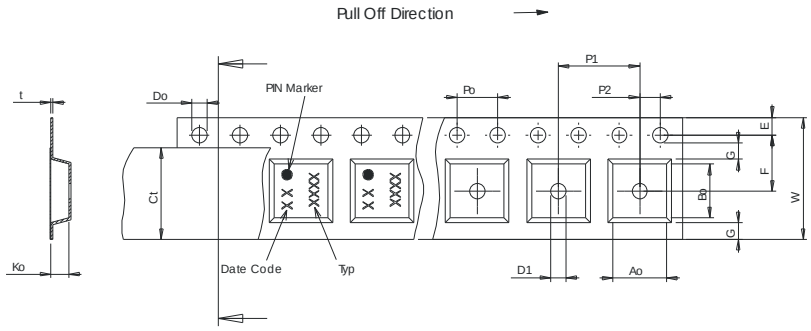
5. SAW devices are Electrostatic Discharge (ESD) sensitive devices.

This filter is RoHS compliant (2011/65/EU)

Packing

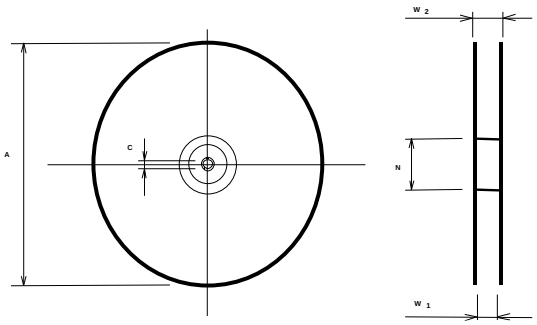
Tape & Reel: IEC 286 – 3, with exception of value for N and minimum bending radius;
tape type II, embossed carrier tape with top cover tape on the upper side;

max. pieces of filters per reel:	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	:	24.00	+0.30/-0.10
Po	:	4.00	±0.1
Do	:	1.50	+0.1/0
E	:	1.75	±0.10
F	:	11.50	±0.10
G(min)	:	0.60	
P2	:	2.00	±0.1
P1	:	12.00	±0.1
D1(min)	:	1.50	
Ao	:	7.00	±0.10
Bo	:	13.80	±0.10
Ct	:	21.00	±0.1
Ko	:	2.10	±0.10
t	:	0.30	±0.05



Reel (all dimensions in mm)

A	:	330	or 180
W1	:	24.4	+2/-0
W2(max)	:	30.40	
N(min)	:	60.00	
C	:	13.0	+0.5/-0.2

The minimum bending radius is 45 mm.

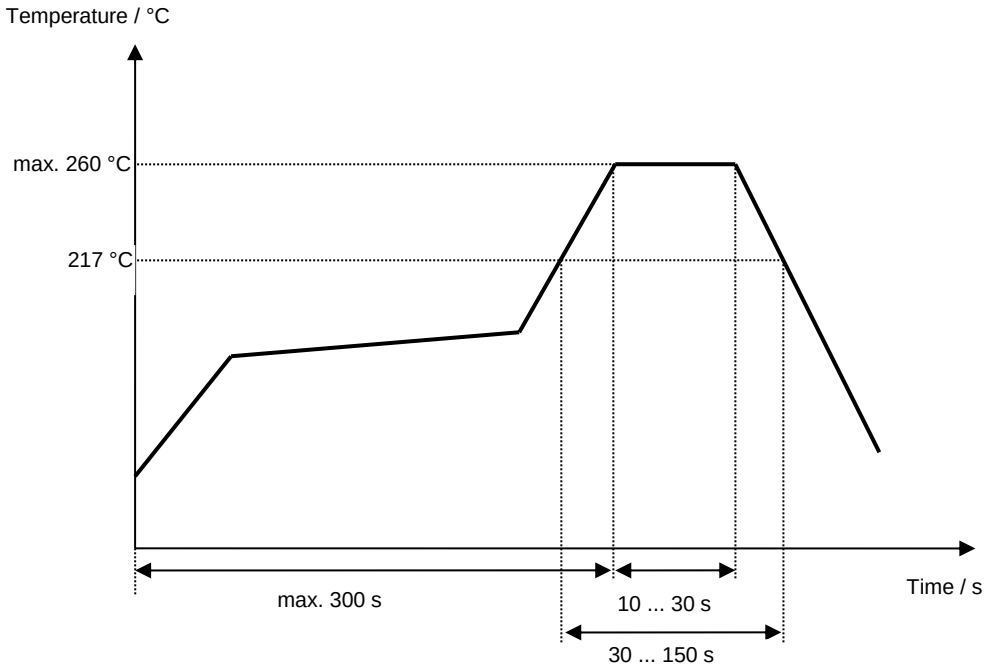
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Air reflow temperature conditions

Conditions	**Exposure**
Average ramp-up rate (30 °C to 217 °C)	less than 3 °C / second
> 100 °C	between 300 and 600 seconds
> 150 °C	between 240 and 500 seconds
> 217 °C	between 30 and 150 seconds
Peak temperature	max. 260 °C
Time within 5 °C of actual peak temperature	between 10 and 30 seconds
Cool-down rate (Peak to 50 °C)	less than 6 °C / second
Time from 30 °C to Peak temperature	no greater than 300 seconds

Chip-mount air reflow profile



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History

Version	Reason of Changes	Name	Date
1.0	generate specification according to customer requirements	Pfeiffer	06.01.2003
1.1	typical values and terminating impedances added	Pfeiffer	06.05.2003
1.2	matching configuration changed filter characteristic added	Pfeiffer	24.08.2004
1.3	tape and reel direction reversed	Steiner	26.09.2005
1.4	change stability characteristics	Strehl	14.03.2007
1.5	correct packing	Strehl	07.05.2007
2.0	Change tape & reel dimensions Update header and footer sections Update data section Update storage temperature Update stability characteristics, reliability	Bonnen	04.11.2016

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