Measurement condition

Ambient temperature T_A: 23 °C
Input power level: 0 dBm
Terminating impedance: *
Input: 346 Ω || -7.7 pF
Output: 406 Ω || -7.4 pF

Characteristics

Remark:
The reference level for the relative attenuation a_{rel} of TFS 248H is the minimum of the pass band attenuation a_{min}. This value 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 nominal frequency f_N is fixed at 248.6 MHz without any tolerance. The given values for the relative attenuation a_{rel} and 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 (at ambient temperature)	$a_e = a_{min}$	5	dB	max.	6	dB
Nominal Frequency	f_N	-			248.6	MHz
Centre Frequency	f_c	248.6	MHz		-	
Passband Ripple (p-p)	$f_N \pm$ 100 kHz	0.4	dB	max.	1	dB
	$f_N \pm$ 100 kHz ****)	0.4	dB	max.	1.2	dB
Relative Attenuation *)**	a_{rel}					
f_N	... $f_N \pm$ 0.1 MHz			max.	1	dB
$f_N \pm$ 0.33 MHz	... $f_N \pm$0.6 MHz	17	dB	min.	12	dB
$f_N \pm$ 0.33 MHz	… $f_N \pm$ 0.6 MHz ****)	17	dB	min.	10	dB
$f_N \pm$ 0.6 MHz	... $f_N \pm$0.8 MHz	35	dB	min.	25	dB
$f_N \pm$ 0.8 MHz	... $f_N \pm$1.6 MHz	50	dB	min.	45	dB
$f_N \pm$ 1.6 MHz	... $f_N \pm$100.0 MHz	53	dB	min.	48	dB
f_N - 236.6 MHz	... f_N - 100.0 MHz	65	dB	min.	55	dB
f_N + 22.8 MHz		65	dB	min.	55	dB
f_N + 52.0 MHz		70	dB	min.	55	dB
f_N + 74.8MHz		70	dB	min.	55	dB
f_N +104.0MHz		75	dB	min.	55	dB
f_N +126.8MHz		75	dB	min.	55	dB
Group Delay Ripple (p-p)	$f_N \pm$ 100 kHz	0.3	µs	max.	0.5	µs
Group Delay Ripple (p-p)	$f_N \pm$ 100 kHz ****)	0.3	µs	max.	0.75	µs
Input power level						
<=100 hours		-		max.	20	dBm
<=15 years		-		max.	5	dBm
Operating Temperature Range	OTR 1	-	-	- 20 °C ... + 80 °C		
	OTR 2 ****)	-	-	- 40 °C ... + 85 °C		
Storage temperature range		-		- 55 °C ... + 125 °C		
Temperature Coefficient **)	TC_f	-0.032	ppm/K²		-	
Frequency inversion temperature (T_o)		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.
**) $\Delta f = TC_f(T - T_0)^2 f_N$
***) if a frequency range / point is defined twice the larger attenuation value is valid
****) valid for extended temperature range OTR 2

generated:

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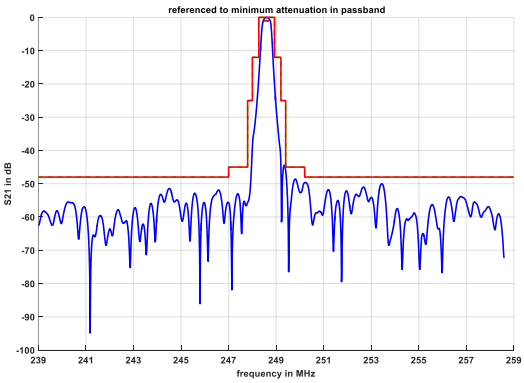
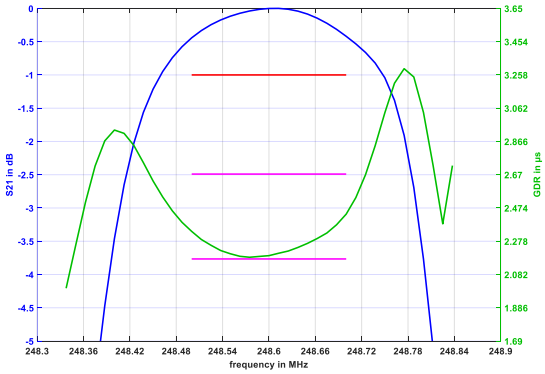
checked / approved:

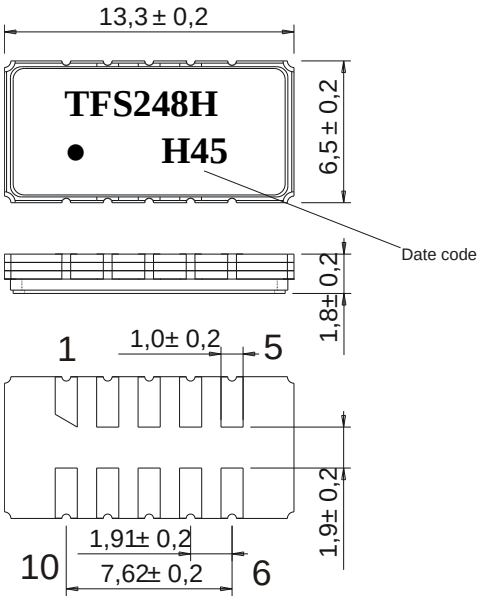
Filter characteristic





Construction and pin connection

(All dimensions in mm)

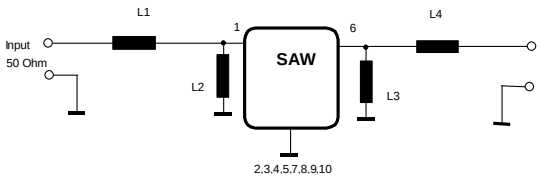


1	Input
2	Ground
3	Ground
4	Ground
5	Output RF return
6	Output
7	Ground
8	Ground
9	Ground
10	Input RF return

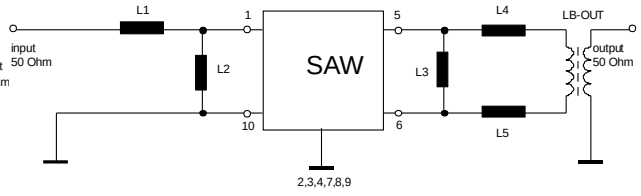
Date code:	Year + week
H	2016
J	2017
K	2018

50 Ω matching circuits

test circuit 1, single ended driven



test circuit 2, input single ended driven / output balanced driven



please note : for final test we use test circuit 1

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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;

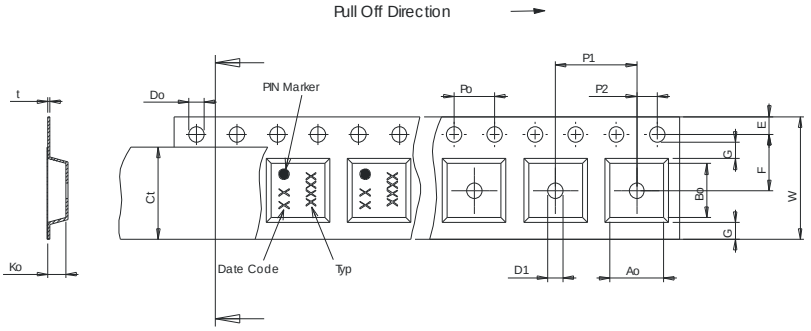
5. SAW devices are Electrostatic Discharge (ESD) sensitive devices.

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

Packing

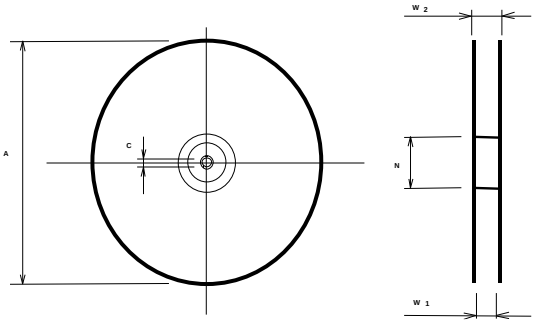
Tape & Reel: IEC 286 – 3, with exception of value for N and minimum bending radius;
tape type II, embossed carrier tape with top cover tape on the upper side;

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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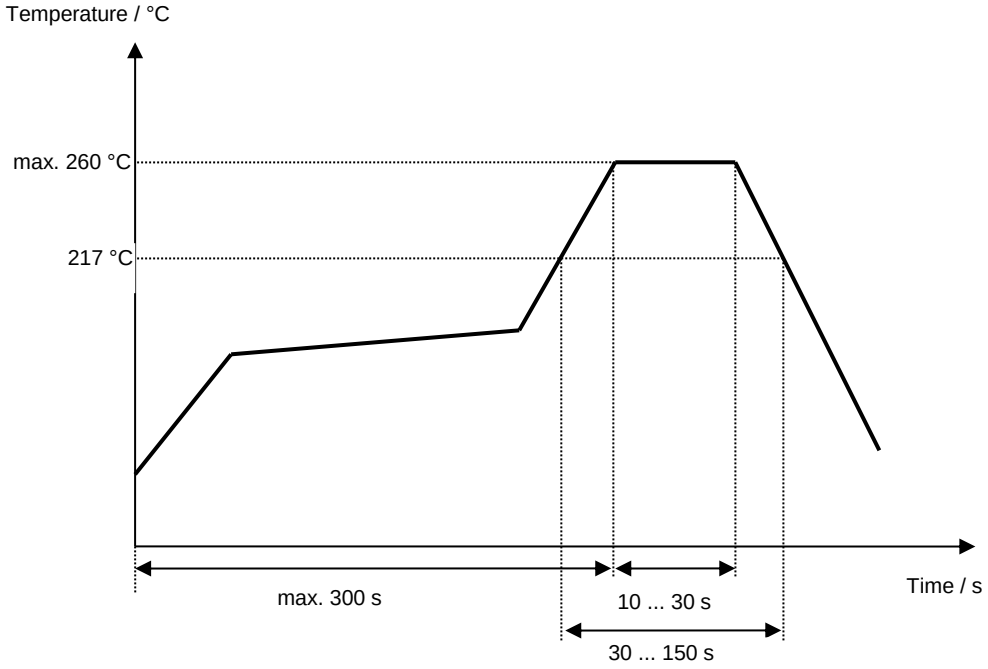
Air reflow temperature conditions

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	Pfeiffer	13.09.2002
1.1	add typical values and terminating impedance	Pfeiffer	18.11.2002
1.2	dimensions in relative attenuation corrected	Pfeiffer	22.09.2003
1.3	template of relative attenuation corrected	Pfeiffer	10.02.2004
1.4	sign of temperature coefficient corrected	Molke	03.02.2011
2.0	Change tape & reel dimensions Update header and footer sections Update data section Update storage temperature Update stability characteristics, reliability Add Filter characteristic Add extended temperature range	Bonnen	14.11.2016

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