Measurement condition

Ambient temperature: 23 °C
Input power level: 0 dBm
Terminating impedance: *
Input: 570 Ω || - 7.1pF
Output: 566 Ω || - 7.4pF

Characteristics

Remark:
The reference level for the relative attenuation a_{rel} of the TFS 249C is the minimum of the pass band attenuation. This value is defined as the insertion loss a_e. The nominal frequency f_N is fixed at 249.6 MHz without any tolerance. The values of relative attenuation a_{rel} are guaranteed for the whole operating temperature range. The frequency shift of the filter in the operating temperature range is included in the production tolerance scheme.

D a t a		**typ. value**		**tolerance / limit**		
Insertion loss (reference level)	a_e	5.4	dB	max.	9	dB
Nominal frequency	f_N	-			249.6	MHz
Passband	PB	-		f_N ±	0.625	MHz
Pass band ripple within PB		0.6	dB	max.	1.0	dB
Relative attenuation	a_{rel}					
f_N … f_N ±	0.625 MHz	0.6	dB	max.	1.0	dB
f_N ± 1.6 MHz … f_N ±	3 MHz	16.5	dB	min.	15	dB
f_N ± 3 MHz … f_N ±	15 MHz	29.5	dB	min.	25	dB
f_N - 15 MHz … f_N -	30 MHz	48.5	dB	min.	45	dB
f_N - 30 MHz … f_N -	248.6 MHz	56	dB	min.	50	dB
f_N + 15 MHz … f_N +	30 MHz	45.5	dB	min.	42	dB
f_N + 30 MHz … f_N +	125 MHz	55	dB	min.	50	dB
f_N + 125 MHz … f_N +	225 MHz	43	dB	min.	40	dB
f_N + 225 MHz … f_N +	248.6 MHz	80	dB	min.	50	dB
Group delay ripple within $f_{N...}$ f_N± 0.425MHz		58	ns	max.	70	ns
Group delay ripple within f_N± 0.425MHz…f_N± 0.525MHz		68	ns	max.	100	ns
Group delay ripple within PB	GDR	96	ns	max.	140	ns
Return loss within PB		13		min.	10	dB
Input power		-		max.	+10	dBm
Operating temperature range	OTR	-		- 40 °C ... +	85 °C	
Storage temperature range		-		- 55 °C ... +	125 °C	
Temperature coefficient of frequency	TC_f **	-0.036	ppm/K²		-	

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

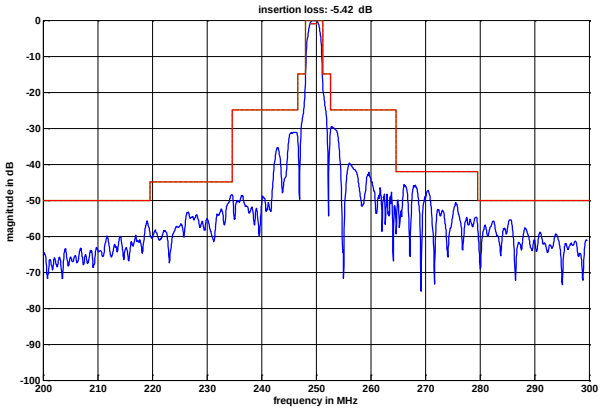
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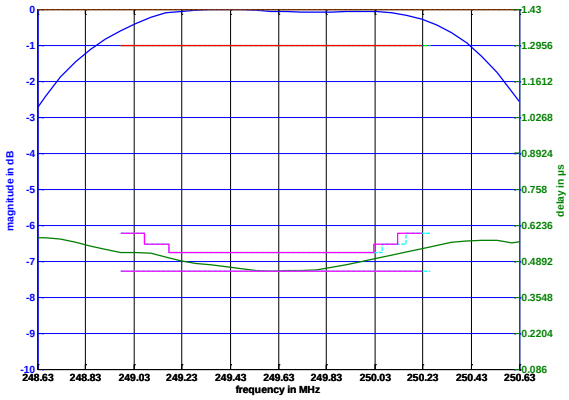
Checked / Approved:

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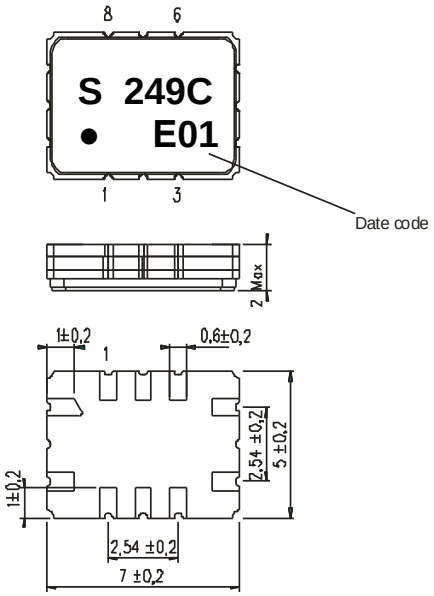
Filter characteristic





Construction and pin connection

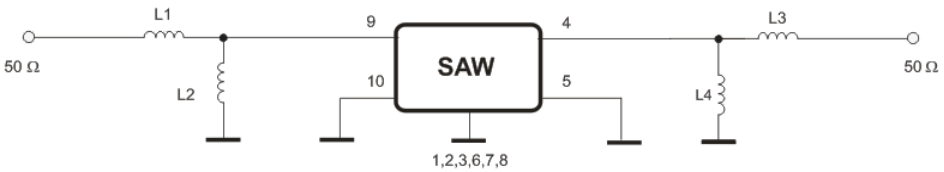
(All dimensions in mm)



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

Date code:	Year + week
E	2014
F	2015
G	2016
...	

50 Ohm Test circuit



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Stability characteristics, reliability

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

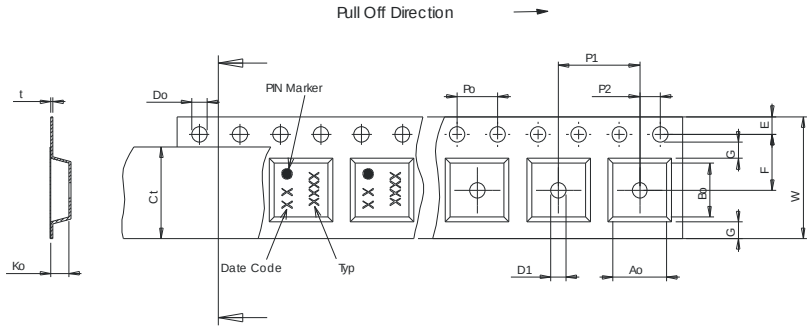
1. Shock:	500g, 1 ms, half sine wave, 3 shocks each plane; DIN IEC 68 T2 - 27
2. Vibration:	10 Hz to 500 Hz, 0,35 mm or 5 g respectively, 1 octave per min, 10 cycles per plane, 3 planes; DIN IEC 68 T2 - 6
3. Change of temperature:	-55 °C to 125°C / 15 min. each / 100 cycles DIN IEC 68 part 2 – 14 Test 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. ESD	ANSI/ESD S20.20-1999**,** class 1A for HBM

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

Packing

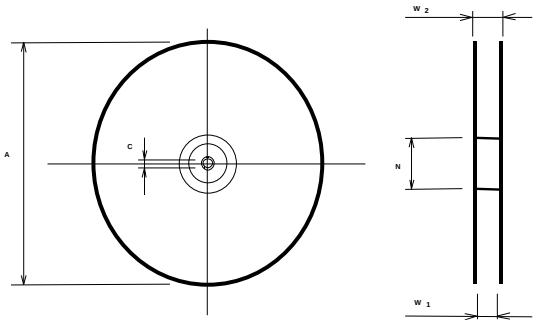
Tape & Reel: IEC 286 – 3, with exception of value for N and minimum bending radius;
tape type II, embossed carrier tape with top cover tape on the upper side;

max. pieces of filters per reel:	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	:	16.00	± 0.3
Po	:	4.00	± 0.1
Do	:	1.50	+0.1/-0
E	:	1.75	± 0.1
F	:	7.50	± 0.1
G(min)	:	0.60	
P2	:	2.00	± 0.1
P1	:	8.00	± 0.1
D1(min)	:	1.50	
Ao	:	5.50	± 0.1
Bo	:	7.50	± 0.1
Ct	:	13.5	± 0.1



Reel (all dimensions in mm)

A	:	330	
W1	:	12.4	+2/-0
W2(max)	:	18.4	
N(min)	:	50	
C	:	13.0	+0.5/-0.2

The minimum bending radius is 45 mm.

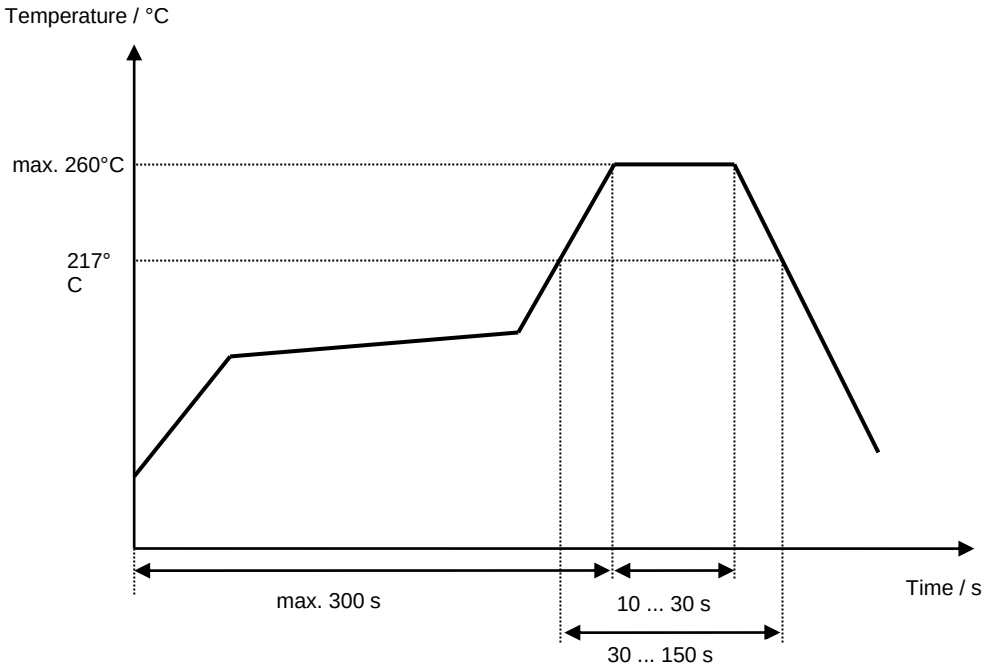
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Air reflow temperature conditions

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	- Development specification	TCUK	29.07.2014
1.1	- Changed 50Ω test circuit from Cp-Lr to Lr-Lp as per the customer simulation.	TCUK	21.08.2014
1.2	- Customer request to upgrade input power to +10dBm, (from 0dBm).	TCUK	02.09.2014
2.0	- Customer approved rejection relaxations.	TCUK	17.10.2014
3.0	- Rej (264.6 … 279.6MHz) now 42dB min, add typ values & move to filter spec.	TCUK	11.12.2014

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