Measurement condition

Ambient temperature T_A: 23 °C
Input power level: 0 dBm
Terminating impedance: *
Input: 336 Ω || -12.2 pF
Output: 313 Ω || -11.0 pF

Characteristics

Remark:
The reference level for the relative attenuation a_{rel} of the TFS186C 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 186.0 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	5.0	dB	max.	6.5	dB
Nominal frequency	f_N			186		MHz
Passband	PB			f_N	± 0.15	MHz
Pass band ripple (p-p)	OTR 1	0.13	dB	max.	1.5	dB
	OTR 2	0.13	dB	max.	1.8	dB
Relative attenuation (***)	a_{rel}					
f_N … f_N ± 0.15 MHz		0.13	dB	max.	1.5	dB
f_N ± 0.4 … f_N ± 4.0 MHz		32	dB	min.	25	dB
f_N - 172 MHz … f_N - 15 MHz		64	dB	min.	50	dB
f_N - 15 MHz … f_N - 4 MHz		40	dB	min.	30	dB
f_N + 4.0 MHz … f_N + 14 MHz		40	dB	min.	30	dB
f_N + 14 MHz … f_N + 94 MHz		64	dB	min.	50	dB
f_N + 94 MHz … f_N + 194 MHz		51	dB	min.	45	dB
f_N + 194 MHz … f_N + 328 MHz		90	dB	min.	50	dB
f_N + 328 MHz … f_N + 514 MHz		92	dB	min.	45	dB
Group delay ripple within f_N…f_N ± 0.1MHz (p-p)		460	ns	max.	1200	ns
Return loss within f_N…f_N ± 0.1MHz		15	dB	min.	10	dB
Input Power		-	dB	max.	15	dBm
Permissible DC voltage	V_{DC}			max.	10.0	V
IIP3		-	dBm	min.	30	dBm
Operating temperature range	OTR 1			+ 10 °C ... + 85 °C		
	OTR 2			+ 10 °C ... + 105 °C		
Operable temperature range				- 10 °C ... + 105 °C		
Storage temperature range				- 55 °C ... + 125 °C		
Turnover temperature	T_0	47.8	°C			
Temperature coefficient of frequency	TC_f **	-0.036	ppm/K^2		-	

*) The terminating impedances depend on parasites 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.
**) $\Delta f = TC_f(T - T_0)^2 f_N$
***) within OTR 1

Generated:

Checked / Approved:

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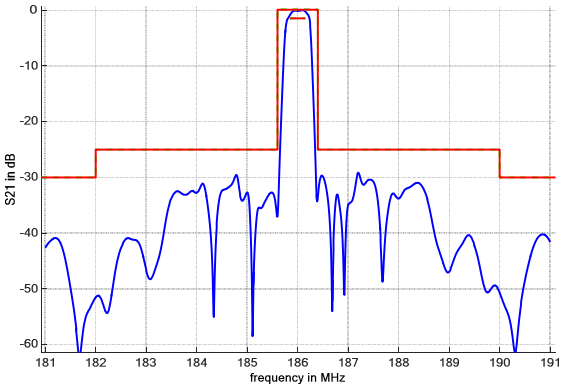
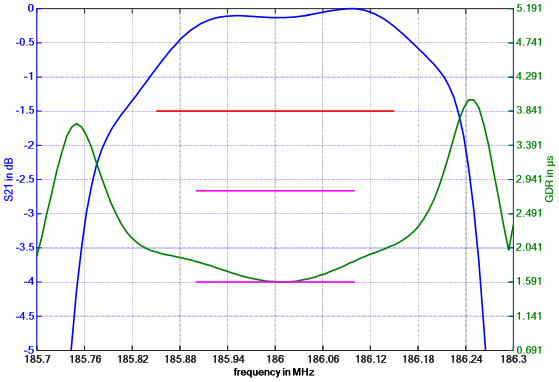
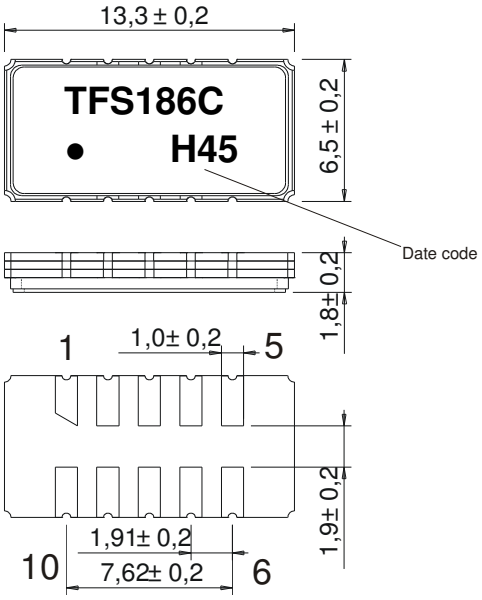
Filter characteristic





Construction and pin connection

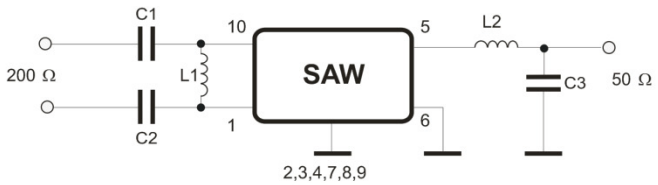
(All dimensions in mm)



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

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

200Ω BAL & 50Ω SE - 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;

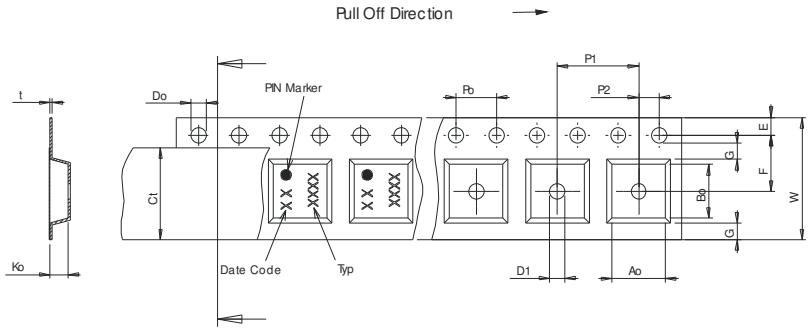
5. SAW devices are Electrostatic Discharge (ESD) sensitive devices.

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

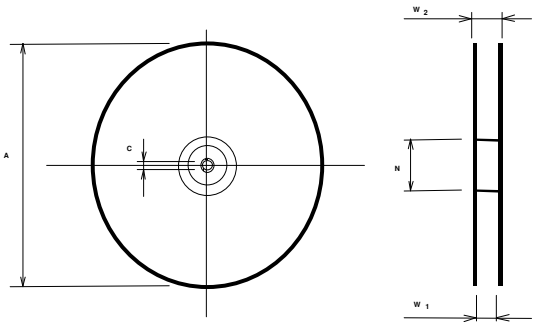


Tape (all dimensions in mm)

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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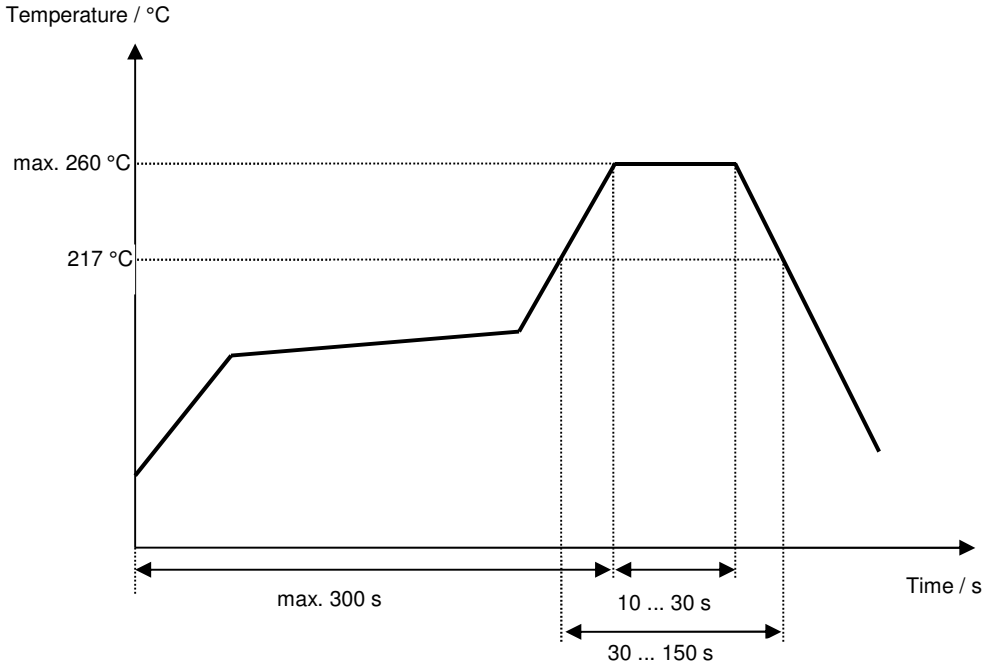
Air reflow temperature conditions

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	- Generation of development specification	TCUK	07.01.2016
1.1	- Customer request to add additional rejection level, fN+30MHz…fN+514MHz 45dB min.	TCUK	15.01.2016
1.2	- To further add customer request rejection levels, operable temp. range and other amendments.	TCUK	26.01.2016
1.3	- Changed to filter spec, added terminating impedance. Added turn over temperature, added filter characteristic plots.	TCUK	18.04.2016
1.4	- Corrected package schematic, (pin 1 marker).	TCUK	27.04.2016
2.0	- Add additional operating temperature range - Add comment about DC voltage - Change advanced storage temperature range - Update tape and reel dimensions - Add typical values	Bonnen	02.11.2016
2.1	- Change permissible DC voltage as per customer request - Increase operable temperature range	Bonnen	07.11.2016

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