Measurement condition

Ambient temperature T_A: 23 °C
Input power level: 0 dBm
Terminating impedance: *
Input: 156 Ω || -13 pF
Output: 108 Ω || -19 pF

Characteristics

Remark:
The nominal frequency f_N is fixed at 140.0 MHz. The insertion loss a_e is defined as loss value determined at f_N. Reference level for the relative attenuation a_{rel} of the TFS 140AT is the insertion loss a_e. The centre frequency f_c is the arithmetic mean value of the upper and lower frequencies at the 20 dB filter attenuation level relative to the insertion loss a_e. All specified data are met within the operating temperature range.

D a t a		**typ. value**		**tolerance / limit**		
Insertion loss (reference level)	a_e	12.8	dB	max.	15.0	dB
Nominal frequency	f_N	-			140.0	MHz
Centre frequency	f_C	140	MHz		-	
Passband	PB	26.6	MHz	f_N ±	12.0	MHz
Pass band ripple		0.4	dB	max.	1.0	dB
Bandwidth	BW					
3 dB		28.6	MHz	max.	32.0	MHz
33 dB		35	MHz	max.	42.0	MHz
Relative attenuation	a_{rel}					
f_N … f_N ± 12.0 MHz		0.6	dB	max.	1	dB
f_N - 50.0 MHz ... f_N - 21.0 MHz		43	dB	min.	33	dB
f_N + 21.0 MHz ... f_N + 70.0 MHz		41	dB	min.	33	dB
Group delay ripple within PB p-p		13	ns	max.	25	ns
Input power level		-		max.	0	dBm
Operating temperature range	OTR	-		- 5 °C ... + 80°C		
Storage temperature range		-		- 55 °C ... + 125°C		
Temperature coefficient of frequency	TC_f **	-91	ppm/K			

*) 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.
**) $\Delta f = TC_f(T - T_A)f_N$

Generated:

Checked / Approved:

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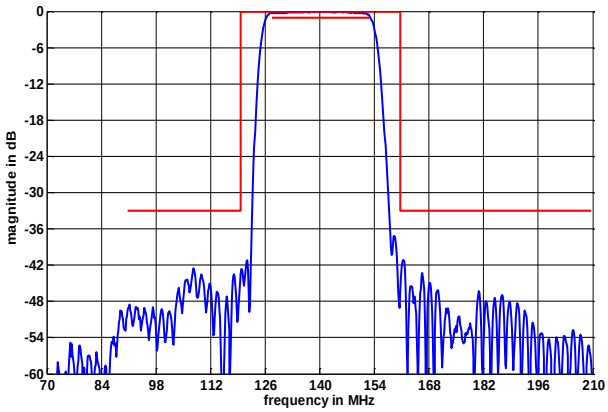
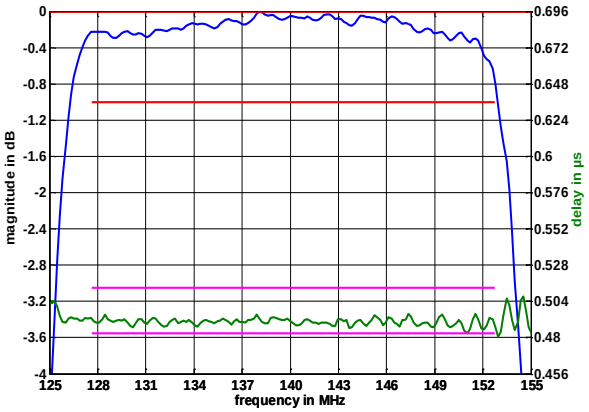
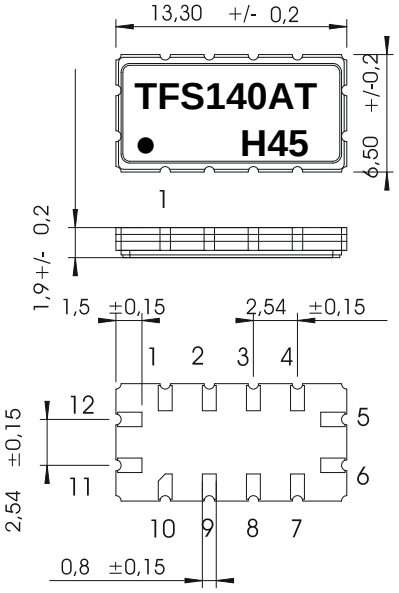
Filter characteristic





Construction and pin connection

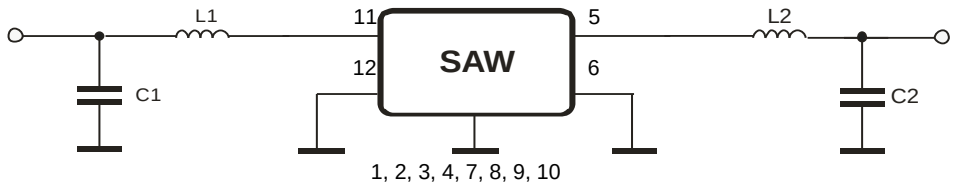
(All dimensions in mm)



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

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

50 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;

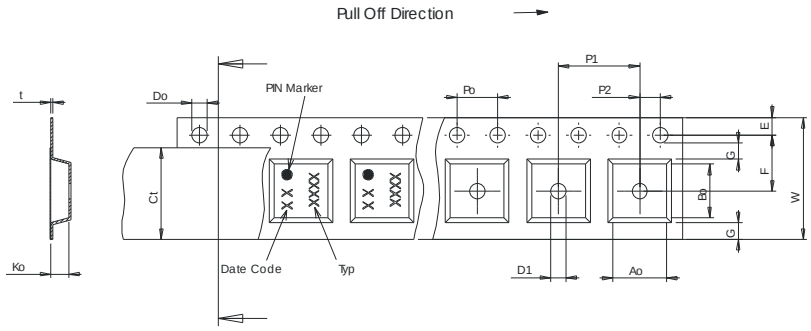
5. SAW devices are Electrostatic Discharge (ESD) sensitive devices.

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

Packing

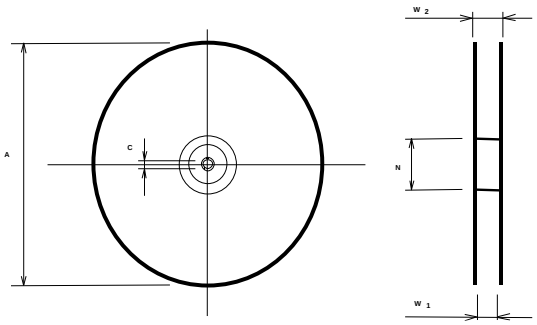
Tape & Reel: IEC 286 – 3, with exception of value for N and minimum bending radius;
tape type II, embossed carrier tape with top cover tape on the upper side;

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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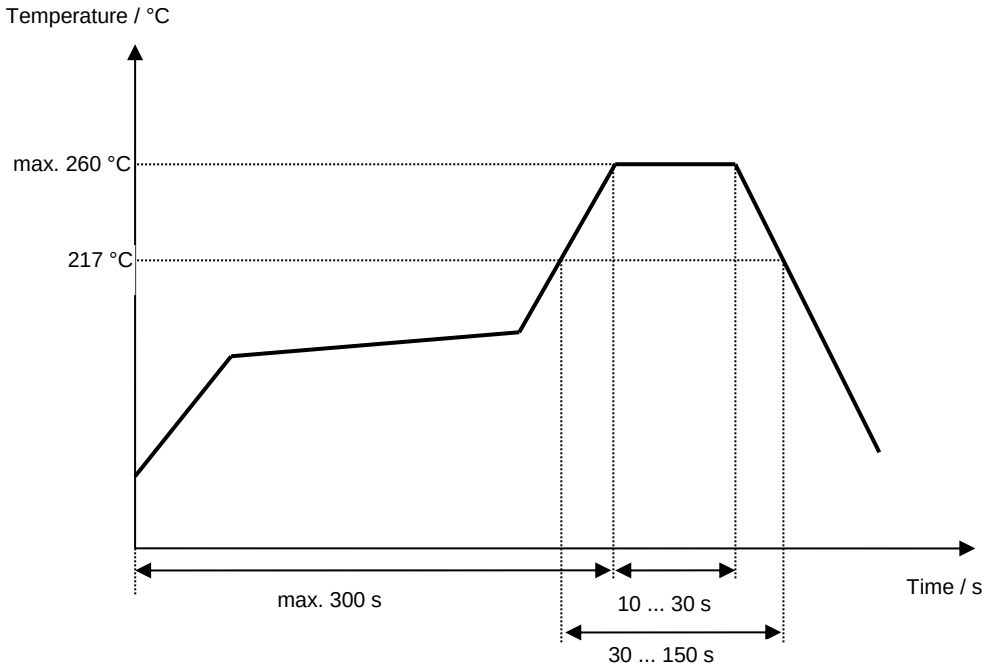
Air reflow temperature conditions

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	- Generation of development specification	Strehl	31.05.2006
1.1	- Add commentary to group delay ripple	Strehl	15.06.2006
1.2	- Created filter specification - Added terminating impedances - Changed max. group delay ripple - Added typical values - Added temperature coefficient of frequency - Added filter characteristic - Added test circuit	Chilla	16.11.2006
2.0	- Change tape & reel dimensions - Update header and footer sections - Update data section - Update storage temperature range - Update stability characteristics, reliability	Bonnen	04.11.2016

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