Measurement condition

Ambient temperature: 25 °C
Input power level: 0 dBm
Terminating impedance: *
Input: 75 Ω ll -41pF
Output: 58 Ω ll -45pF

Characteristics

Remark:
The reference level for the relative attenuation a_{rel} of the TFS115L 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 115 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.	9.5	dB
Insertion loss within 2.5dB BW	ae + 2.5dB	7.9		max.	12	dB
Nominal frequency	f_N				115	MHz
Passband	PB			f_N ±	3	MHz
Pass band ripple		0.56	dB	max.	0,8	dB
Relative attenuation	a_{rel}					
f_N - 3 MHz … f_N + 3 MHz		0.56		max.	2.5	dB
f_N - 27 MHz … f_N - 15 MHz		-57	dB	min.	40	dB
f_N - 15 MHz … f_N - 11 MHz		-52	dB	min.	30	dB
f_N - 11 MHz … f_N - 7 MHz		-25	dB	min.	20	dB
f_N + 7 MHz … f_N + 11 MHz		-25	dB	min.	20	dB
f_N + 11 MHz … f_N + 15 MHz		-41	dB	min.	30	dB
f_N + 15 MHz … f_N + 29 MHz		-51	dB	min.	40	dB
f_N + 29 MHz … f_N + 39 MHz		-60	dB	min.	50	dB
f_N + 137 MHz … f_N + 147 MHz		-75	dB	min.	50	dB
Group delay ripple in PB	GDR	71	ns	max.	150	ns
IIP3		-		min.	30	dBm
Triple transit attenuation		39	dB	min.	35	dB
Return loss in PB		14	dB	min.	10	dB
Input power		-		max	10	dBm
Operating temperature range	OTR			- 40 °C ... + 85°C		
Operable temperature range				- 55 °C ... + 85°C		
Storage temperature range				- 45 °C ... + 85°C		
Temperature coefficient of frequency	TC_f **	-94	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.
**) $\Delta f(Hz) = TC_f(ppm/K) \times (T-T_0) \times f_{cat}(MHz)$.

Generated:

Checked / Approved:

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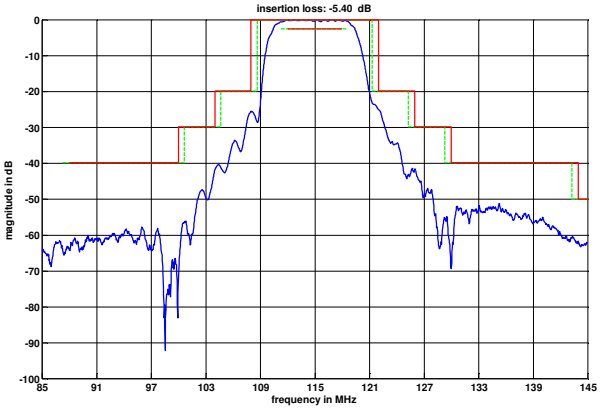
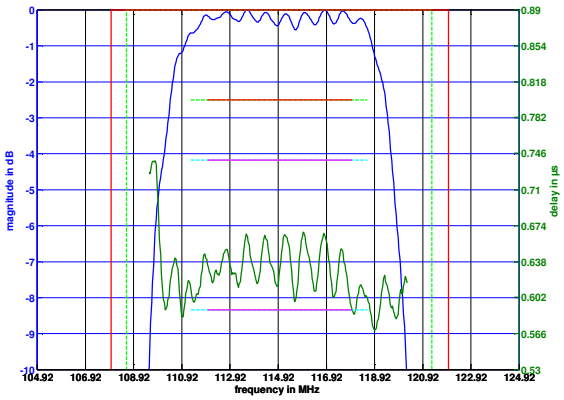
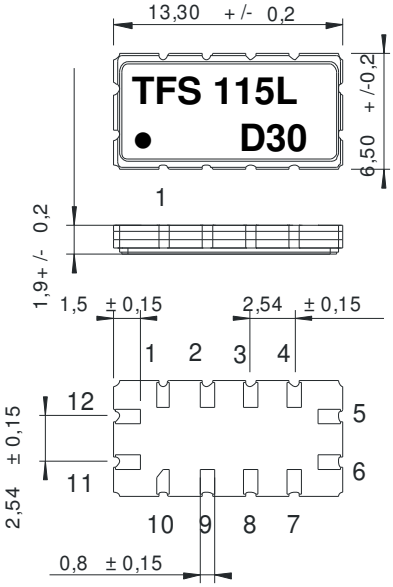
Filter characteristic





Construction and pin connection

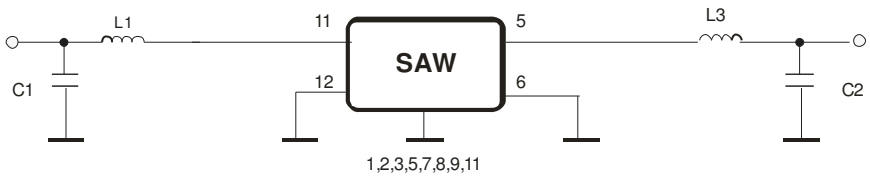
(All dimensions in mm)



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 / Ground

Date code:	Year + week
D	2013
E	2014
F	2015
...	

50 Ω 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)

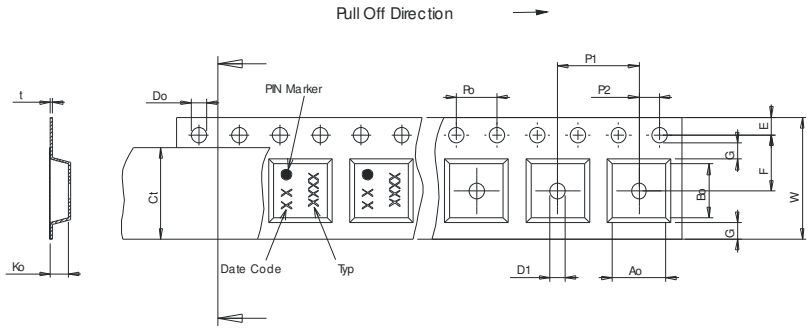
Packing

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:	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

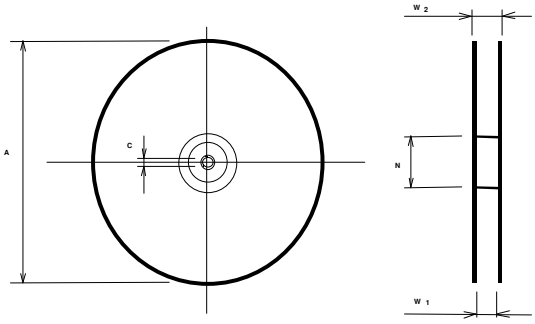
Tape (all dimensions in mm)

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	:7,10	± 0,10
Bo	:13,90	± 0,10
Ct	:21,5	± 0,1



Reel (all dimensions in mm)

A	:330	
W1	:24,4	+2/-0
W2(max)	:30,4	
N(min)	: 60	
C	:13,0	+0,5/-0,2



The minimum bending radius is 45 mm.

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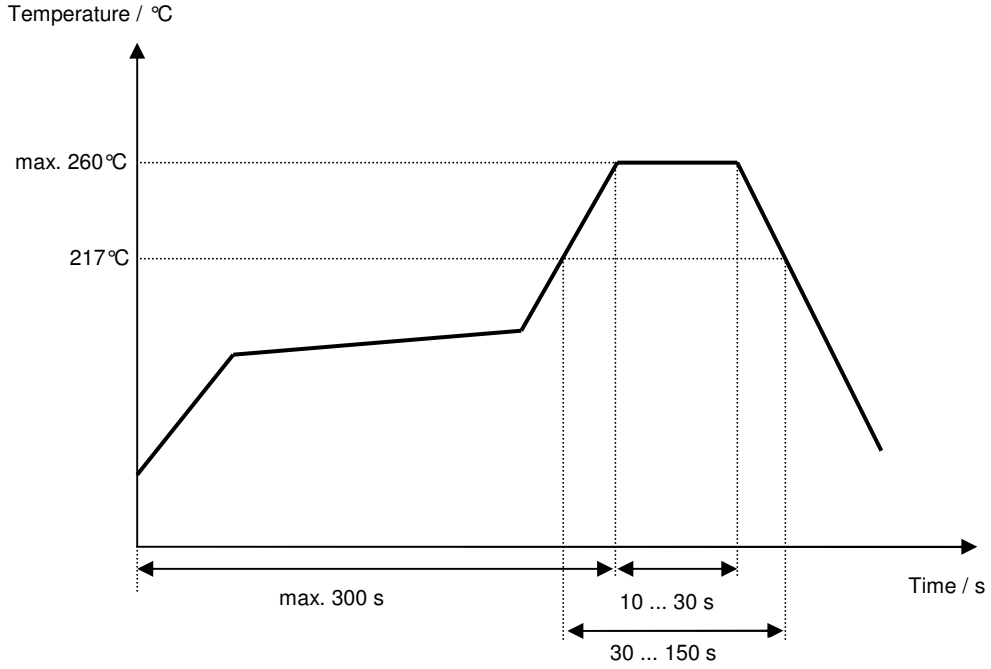
Air reflow temperature conditions

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	Chilla	25.07.2013
1.1	Added characteristic plots, typical values and 50Ω test circuit	TCUK	26.11.2013
1.2	Added temperature coefficient	TCUK	28.05.2014

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