Measurement condition

Ambient temperature: 23 °C
Input power level: 0 dBm
Terminating impedance: *
Input: 75 Ω || -21 pF
Output: 77 Ω || -20 pF

Characteristics

Remark:
Reference level for the relative attenuation a_{rel} of the TFS 168A is the minimum of the pass band attenuation a_{min}. The minimum of the pass band attenuation a_{min} 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 168,50 MHz without tolerance. The given values for the relative attenuation a_{rel} and for 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**		**tolerance / limit**		
Insertion loss (reference level)	a_e	8,7	dB	max.	10	dB
Nominal frequency	f_N	-			168.5	MHz
Centre frequency	f_C	168.5	MHz		-	
Passband		22,5	MHz	f_N ±	10	MHz
Pass band ripple		0,4	dB	max.	1	dB
Relative attenuation	a_{rel}					
f_N ... f_N ± 10 MHz		0,4	dB	max.	1	dB
f_N - 167 MHz ... f_N - 19,5 MHz		38	dB	min.	33	dB
f_N + 21,5 MHz ... f_N + 81,5 MHz		35	dB	min.	33	dB
f_N + 81,5 MHz ... f_N + 141,5 MHz		60	dB	min.	50	dB
f_N + 141,5 MHz ... f_N + 241,5 MHz		60	dB	min.	50	dB
f_N + 241,5 MHz ... f_N + 831,5 MHz		65	dB	min.	50	dB
Group delay ripple within PB		50	ns	max.	80	ns
Mean group delay variation ***		5	ns	max.	35	ns
Input power level ****				max.	20	dBm
Operating temperature range	OTR	-		-40 °C .. + 85 °C		
Storage temperature range		-		-40 °C .. + 125 °C		
Temperature coefficient of frequency	TC_f **	-87	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.
**) $\Delta f_C(Hz) = Tc_f(ppm/K) \times (T - T_o) \times f_{CAT}$ (MHz).
***) Variation over fabrication tolerances and temperature
****) This power level is allowed for short term operation (<100 hours) only, the max. input power for continuous operation is 5 dBm.

Generated:

Checked / Approved:

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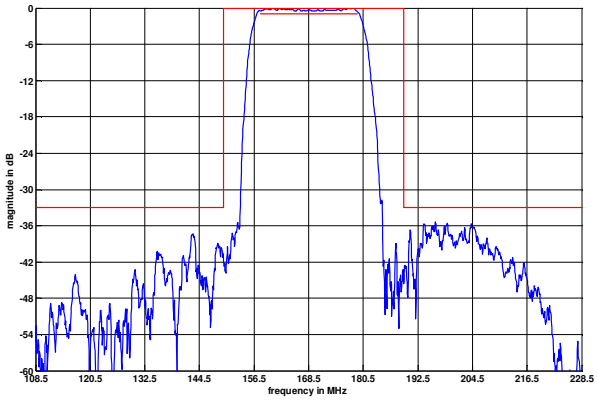
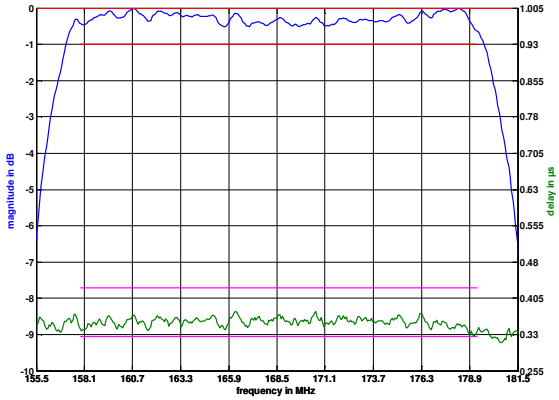
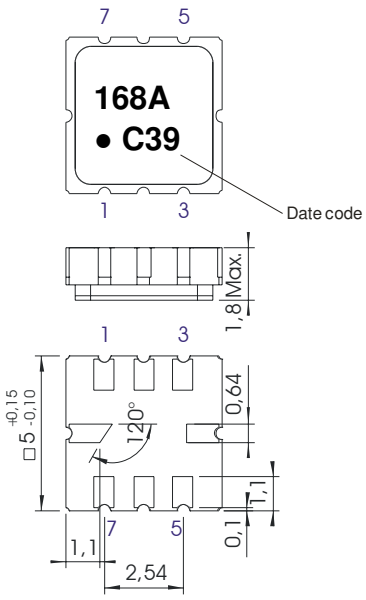
Filter characteristic





Construction and pin connection

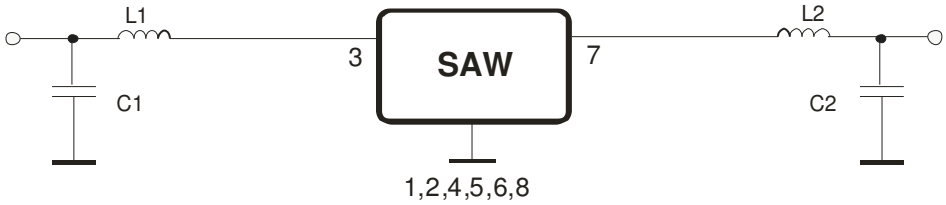
(All dimensions in mm)



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

Date code:	Year + week
C	2012
D	2013
E	2014

50 Ohm Test circuit



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Stability characteristics

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

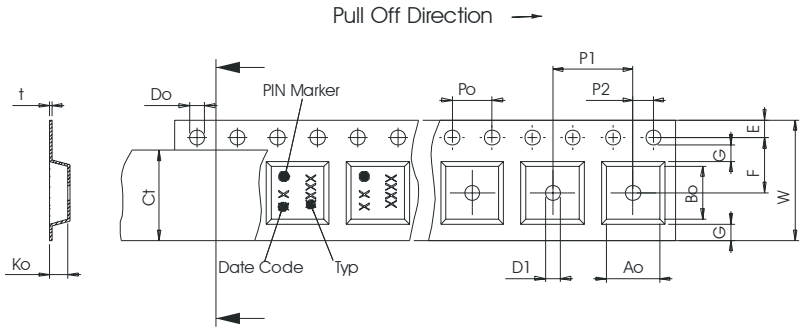
1. Shock:	500g, 18 ms, half sine wave, 3 shocks each plane; DIN IEC 68 T2 - 27
2. Vibration:	10 Hz to 500 Hz, 0,35 mm or 5 g respectively, 1 octave per min, 10 cycles per plan, 3 plans; DIN IEC 68 T2 - 6
3. Change of temperature:	-55 °C to 125°C / 30 min. each / 10 cycles DIN IEC 68 part 2 – 14 Test N
4. Resistance to solder heat (reflow):	reflow possible: twice max.; for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4;

This filter is RoHS compliant (2002/95/EG, 2005/618/EG)

Packing

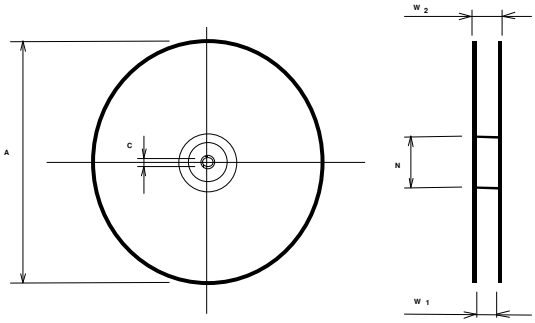
Tape & Reel: IEC 286 – 3, with exeption of value for N and minimum bending radius;
tape type II, embossed carrier tape with top cover tape on the upper side;

max. pieces of filters peer 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



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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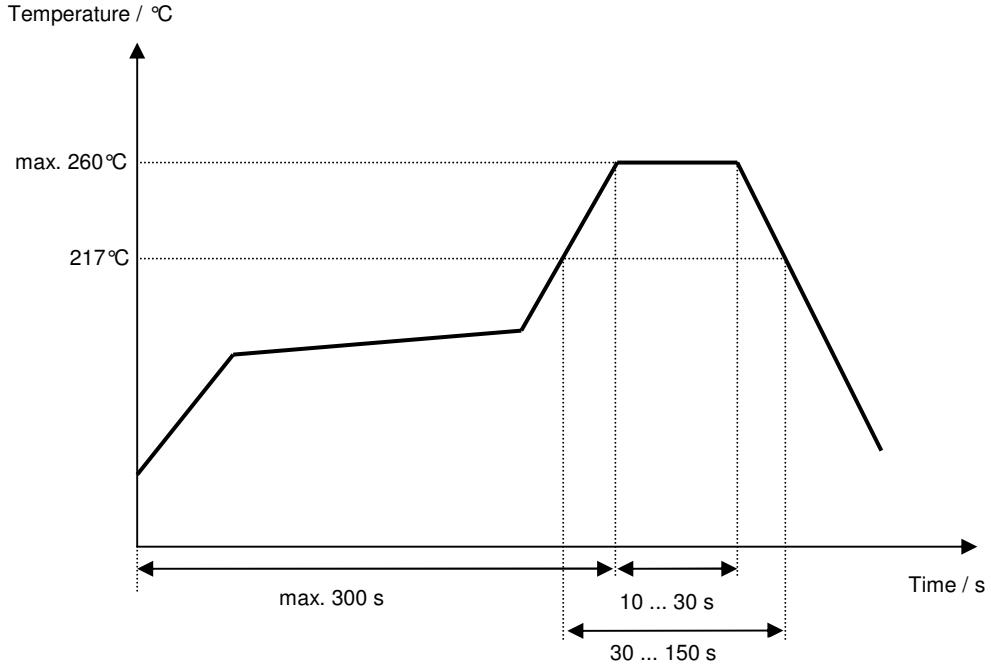
Air reflow temperature conditions

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	Generation of "Development specification" according to customer requirements	Chilla	11.02.2004
1.1	created Filter specification added termination impedance added typical values added filter characteristics changed construction added test circuit changed packing	Chilla	11.06.2004
1.2	changed pin connection	Chilla	29.07.2004
1.3	added / changed limit line for 50dB and 60 dB attenuation added typical values, reflow profile updated	Chilla	03.02.2005
1.4	changed filter specification changed terminating impedance changed typical values changed limit line for 60 dB attenuation	Chilla	02.05.2005
1.5	changed filter specification changed terminating impedance changed typical values changed group delay ripple within PB added group delay ripple within PB changed filter characteristics changed test circuit	Chilla	29.09.2005
1.6	RoHS conformity added	Chilla	03.06.2008
2.0	changed operating temperature range	Chilla	25.09.2012

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