Measurement condition

Ambient temperature:	23	°C
Input power level:	0	dBm
Terminating impedance: *		
Input:	130 Ω || -25 pF	
Output:	53 Ω || -43 pF	

Characteristics

Remark:

The reference level for the relative attenuation a_{rel} of the TFS192F 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 192,0 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	12,7	dB	max.	13,5	dB
Nominal frequency	f_N				192,0	MHz
Passband	PB			f_N ±	15,25	MHz
Pass band ripple p-p		0,4	dB	max.	1,0	dB
Amplitude ripple over any 200kHz of the PB p-p		0,15	dB	max.	0,4	dB
Bandwidth	BW					
1 dB		36	MHz	min.	30,5	MHz
3 dB		37,9	MHz	max.	44,0	MHz
40 dB		48,8	MHz	max.	66,0	MHz
Relative attenuation	a_{rel}					
f_N … f_N ± 15,25 MHz		0,4	dB	max.	1	dB
f_N ± 22,0 MHz … f_N ± 33,0 MHz		16	dB	min.	3	dB
f_N ± 33,0 MHz … f_N ± 62,0 MHz		42	dB	min.	40	dB
f_N ± 62,0 MHz … f_N ± 98,0 MHz		51	dB	min.	45	dB
Absolute group delay within PB		0,49	µs	max.	1	µs
Group delay ripple within PB p-p		35	ns	max.	100	ns
Group delay ripple over any 200kHz of the PB p-p		20	ns	max.	30	ns
Return loss (50Ω test circuit) in PB		12	dB	min.	9	dB
Input power level				max.	18	dBm
Operating temperature range	OTR			- 40 °C ... + 85 °C		
Storage temperature range				- 40 °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.

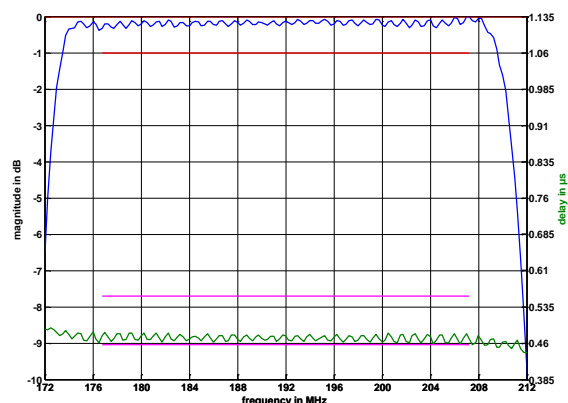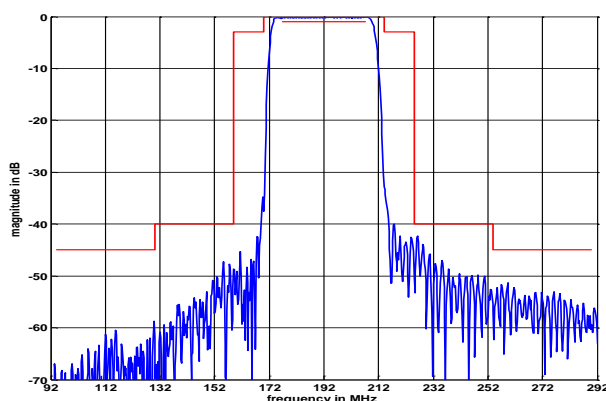**) $\Delta f(Hz) = TC_f(ppm/K) \times (T-T_0) \times f_{cat}(MHz)$.

Generated:

Checked / Approved:

Filter characteristic

Construction and pin connection

(All dimensions in mm)

Date code
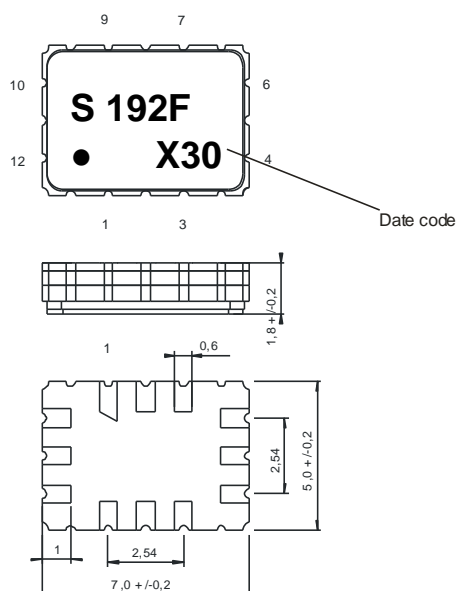
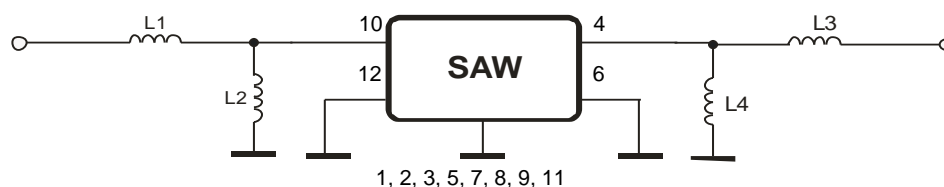| Pin	Function
1	Ground
2	Ground
3	Ground
4	Output
5	Ground
6	Output RF Return
7	Ground
8	Ground
9	Ground
10	Input
11	Ground
12	Input RF Return / Ground

Date code:	Year + week
X	2009
A	2010
B	2011
...	

50 Ohm Test circuit

1, 2, 3, 5, 7, 8, 9, 11

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 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: three times max.; for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4;
5. ESD	MIL-STD-883E using coupling network of ISO 10605 and EN 6100-4-2 HBM:250V;

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

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/-0,1
Po :   4,00 ± 0,1
Do :   1,50 +0,1/-0
E   :   1,75 ± 0,1
F   :   7,50 ± 0,1
G(min) : 0,75
P2 :   2,00 ± 0,1
P1 :   8,00 ± 0,1
D1(min) : 1,50
Ao :   5,40 ± 0,1
Bo :   7,60 ± 0,1
Ct : 13,5   ± 0,1
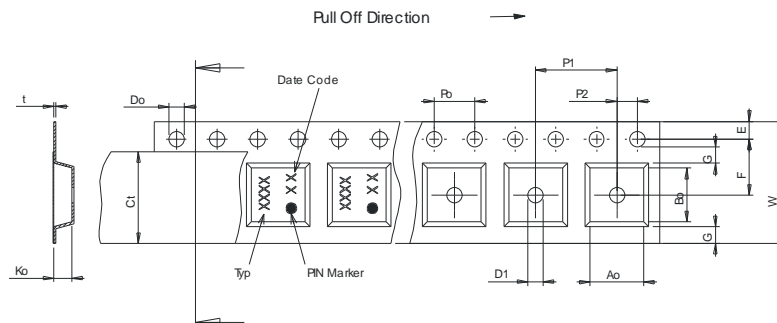
Reel (all dimensions in mm)
A   :330
W1   : 16,4   +2/-0
W2(max) : 22,4
N(min) : 50
C   : 13,0   +0,5/-0,2
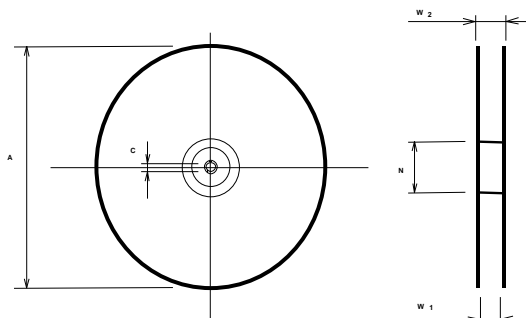
The minimum bending radius is 45 mm.

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
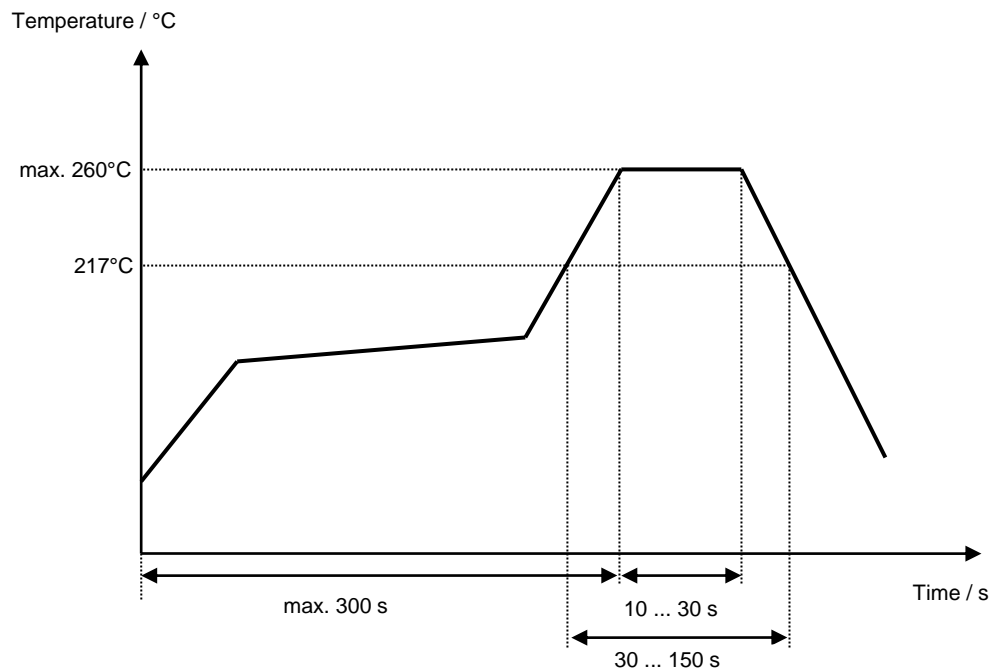
History

Version	Reason of Changes	Name	Date
1.0	- Generation of development specification	Strehl	02.02.2009
1.1	- Changed return losss	Chilla	16.02.2009
1.2	- Created filter specification - Added terminating impedance - Added typical values - Added filter characteristic - Added filter test circuit	Chilla	20.07.2009