Measurement condition

Ambient temperature:	23	°C
Input power level:	0	dBm
Terminating impedance:		
Input:	50	Ω
Output:	50	Ω

Characteristics

Remark:
The reference level for the relative attenuation a_{rel} of the TFS1990B is the minimum attenuation in the passband. The maximum attenuation in the passband is defined as the insertion loss a_e. The nominal frequency f_N is fixed at 1990 MHz without any tolerance or limit. The values of relative attenuation a_{rel} are guaranteed for the whole operating temperature range. The frequency shift of the filter within the operating temperature range is included in the production tolerance scheme.

D a t a		**typ. value**		**tolerance / limit**		
Insertion loss within PB2	a_e	1.8	dB	max.	3.0	dB
Nominal frequency	f_N			1990.0	MHz	
Passband 1	PB1			f_N ±	3.5	MHz
Passband 2	PB2			(f_N – 5) MHz … (f_N + 9) MHz		
Passband ripple in any 1MHz segment within PB1		0.08	dB	max.	0.1	dB
Passband ripple in any 1MHz segment within PB2		0.1	dB	max.	0.3	dB
Passband variation within PB2		0.5	dB	max.	1.0	dB
Relative attenuation	a_{rel}					
300 MHz … 1842 MHz		31	dB	min.	17	dB
1842 MHz … 1858 MHz		41	dB	min.	33	dB
1858 MHz … 1928 MHz		40	dB	min.	20	dB
1928 MHz … 1955 MHz		22	dB	min.	10	dB
1955 MHz … 1962 MHz		12	dB	min.	5	dB
2055 MHz … 3500 MHz		28	dB	min.	20	dB
3500 MHz … 4000 MHz		32	dB	min.	17	dB
Return loss within PB2		14	dB	min.	12	dB
Group delay ripple within PB2	p-p	3	ns	max.	15	ns
Input power level		-		max.	0	dBm
Operating temperature range	OTR	-		- 20°C ... + 80°C		
Storage temperature range		-		- 40°C ... + 125°C		
Temperature coefficient of frequency	TC_f *	-42	ppm / K			

*) $\Delta f_C(Hz) = Tc_f(ppm/K) \times (T - T_o) \times f_{CAT}(MHz)$

Generated:

Checked / Approved:

Microchip Frequency Technology GmbH
Potsdamer Straße 18
D 14 513 TELTOW / Germany
Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30

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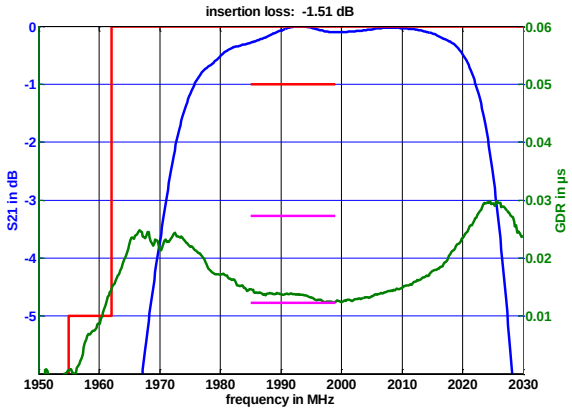
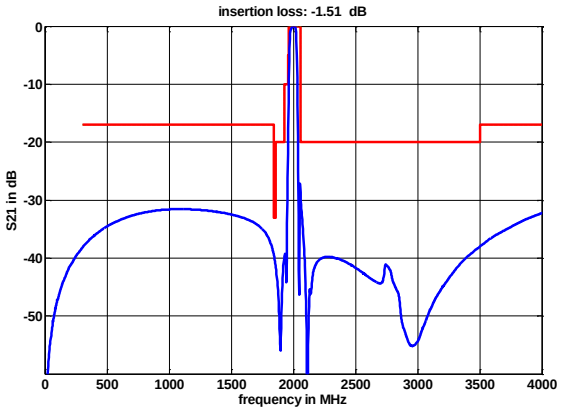
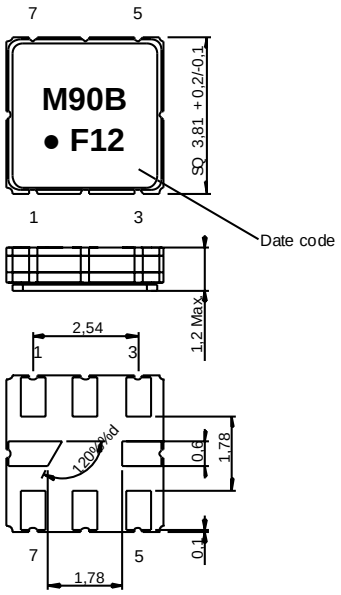
Filter characteristic





Construction and pin connection

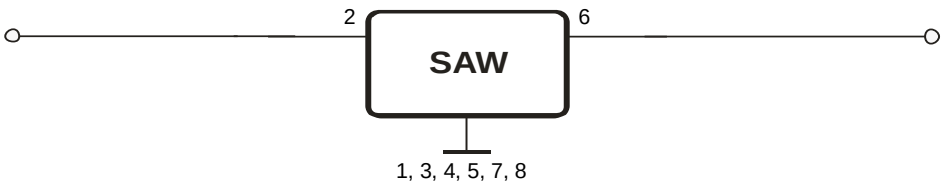
(All dimensions in mm)



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

Date code:	Year + week
F	2015
G	2016
H	2017
...	

50 Ohm 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, see page 4: "Air reflow temperature conditions"
5. ESD	ANSI/ESD S20.20-1999**,** class 1A for HBM

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

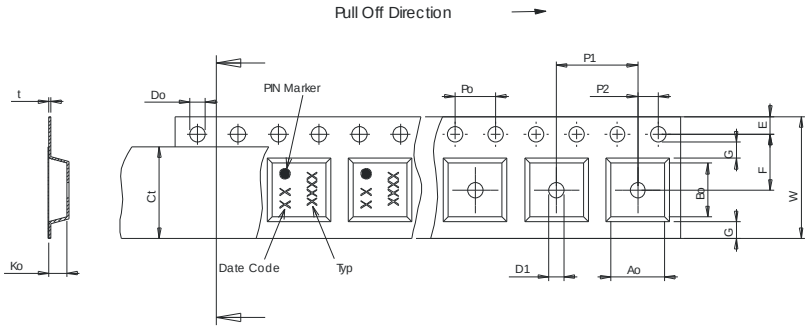
Packing

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:	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

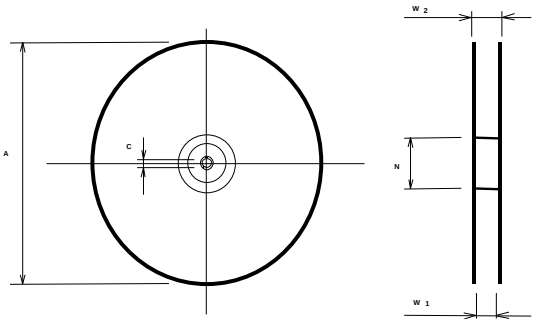
Tape (all dimensions in mm)

W	:	12,00 ± 0,3
Po	:	4,00 ± 0,1
Do	:	1,50 +0,1/-0
E	:	1,75 ± 0,1
F	:	5,50 ± 0,05
G(min)	:	0,75
P2	:	2,00 ± 0,05
P1	:	8,00 ± 0,1
D1(min)	:	1,50
Ao	:	4,30 ± 0,1
Bo	:	4,30 ± 0,1
Ct	:	9,2 ± 0,1



Reel (all dimensions in mm)

A	:	330 or 180
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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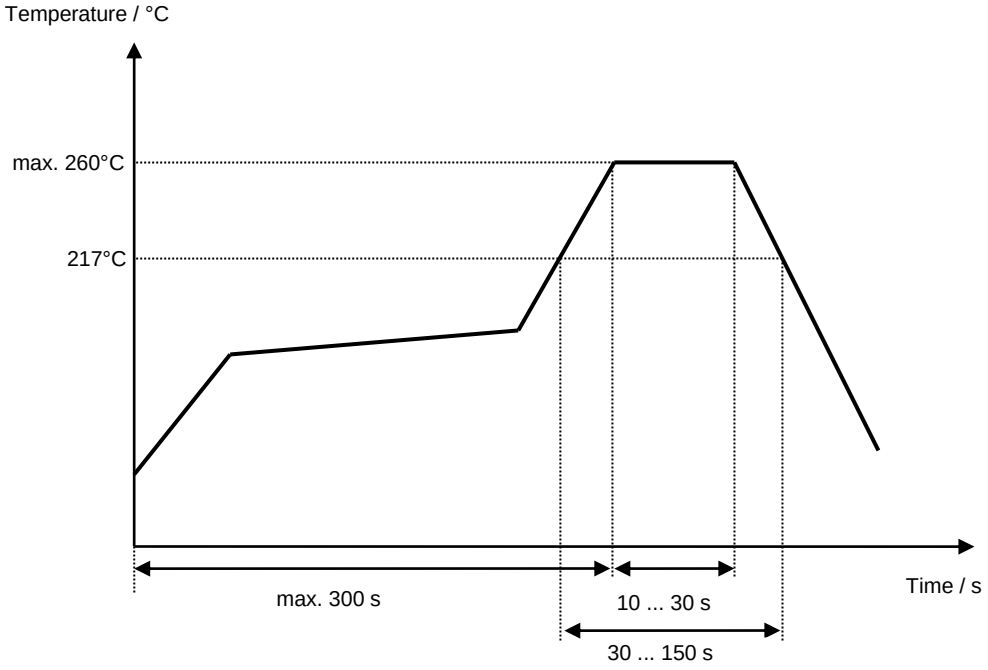
Air reflow temperature conditions

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	A. Molke	04.03.2013
1.1	- Change from development spec to filter spec - Typical values added - Filter characteristic added	A. Molke	12.09.2013
2.0	- Change of package - Change of passband limits for PB2 - Update of typical values and filter characteristic	A. Molke	20.03.2015

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