

Measurement condition

Ambient temperature: 23 °C
 Input power level: 0 dBm
 Terminating impedance: *
 Input: 754.71 Ω || - 17.85 pF
 Output: 1245.42 Ω || - 10.03 pF

Characteristics

Remark:

The reference level for the relative attenuation a_{rel} of the TFS 70BR 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 70.0 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	22.5	dB	max.	24.3 dB
Nominal frequency	f_N	-			70 MHz
Passband	PB	-			$f_N \pm 0.92\text{MHz}$
Pass band ripple $f_N \dots f_N \pm 0.92\text{MHz}$ (p-p)		0.3	dB	max.	0.7 dB
Pass band ripple in any 1MHz segment $f_N \dots f_N \pm 0.92\text{MHz}$ (p-p)		0.3	dB	max.	0.5 dB
Relative attenuation ****	a_{rel}				
$f_N \pm 1.5$... $f_N \pm 4.0$ MHz		28 to 40	dB	min.	20 to 30 dB
$f_N \pm 4.0$ MHz ... $f_N \pm 10$ MHz		45 to 55	dB	min.	30 to 45 dB
$f_N - 10$ MHz ... $f_N - 50$ MHz		55	dB	min.	45 dB
$f_N + 10$ MHz ... $f_N + 110$ MHz		55	dB	min.	45 dB
Group delay ripple $f_N \dots f_N \pm 0.92\text{MHz}$ (p-p) ***		71	ns	max.	150 ns
Phase ripple in any 1MHz segment $f_N \dots f_N \pm 0.92\text{MHz}$ (p-p)		1.1	°	max.	2 °
Absolute group delay $f_N \dots f_N \pm 0.92\text{MHz}$		2.25	µs	max.	2.5 µs
Input & Output return loss $f_N \dots f_N \pm 0.92\text{MHz}$ MHz		18	dB	min.	10 dB
Operating temperature range	OTR	-			- 20 °C ... + 80 °C
Storage temperature range		-			- 40 °C ... + 125 °C
Temperature coefficient of frequency **		-0.034	ppm/K ²		-

*) 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.

**) $\Delta f(\text{Hz}) = \text{TC}_f(\text{ppm/K}^2) \times (T-T_0)^2 \times f_{cat}(\text{MHz})$.

***) Target to further improve group delay ripple, to be reviewed after evaluation of first sample.

****) Rejection increases linearly from frequency 1 to frequency 2 with dB1 to dB2 respectively.

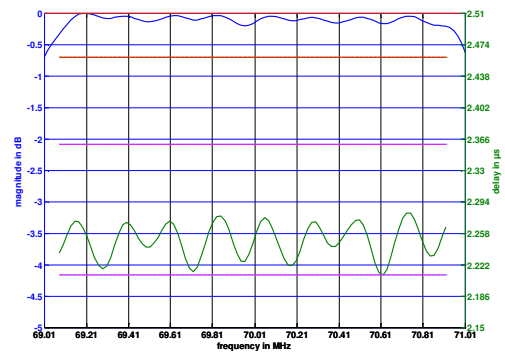
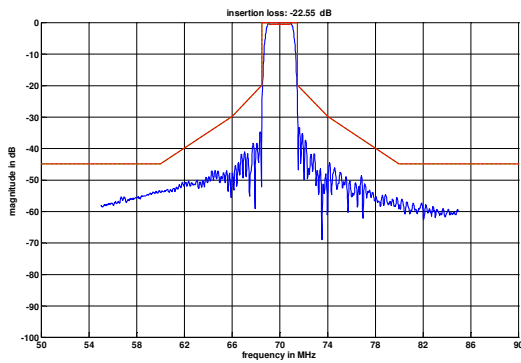
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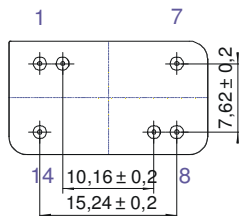
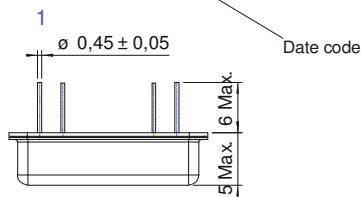
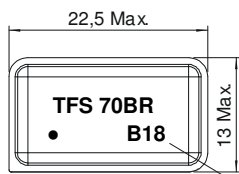
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Filter characteristic



Construction and pin connection

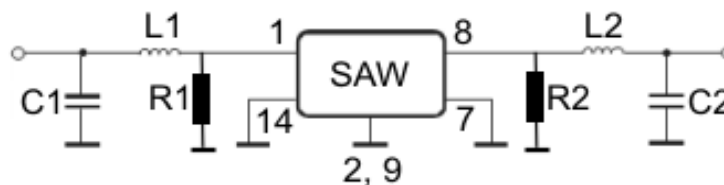
(All dimensions in mm)



- 1 Input
- 2 Ground
- 7 Output RF Return
- 8 Output
- 9 Ground
- 14 Input RF Return

Date code: Year + week
 B 2011
 C 2012
 D 2013

50 Ohm Test circuit



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Stability characteristics, reliability

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

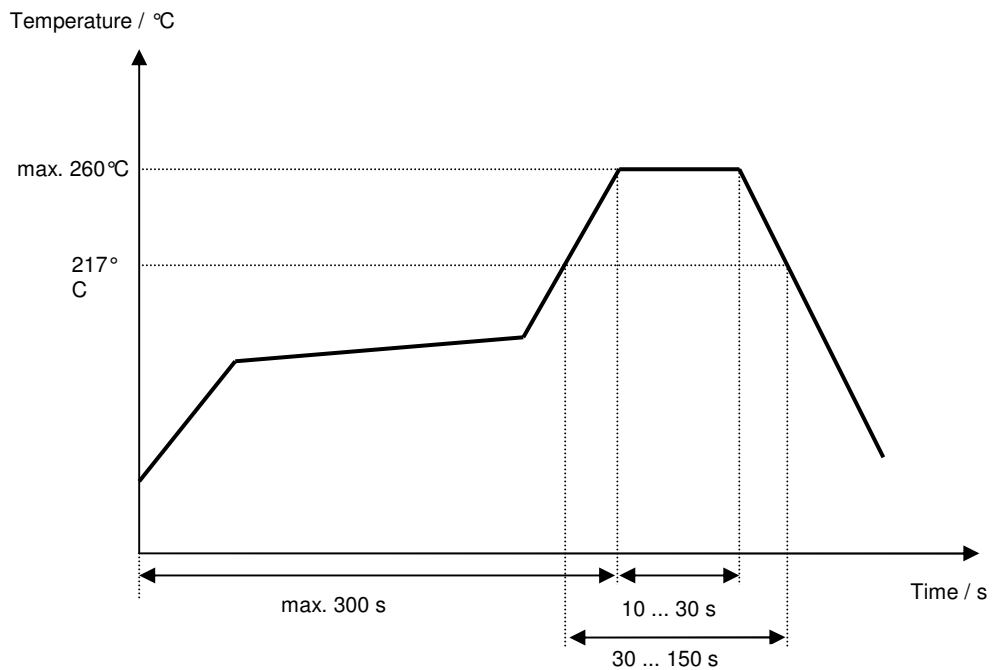
1. Shock: 500g, 1 ms, half sine wave, 3 shocks each plane;
DIN IEC 68 T2 - 27
2. Vibration: 10 Hz to 500 Hz, 0,35 mm or 5 g respectively, 1 octave per min, 10 cycles per plane, 3 planes;
DIN IEC 68 T2 - 6
3. Change of temperature: -55 °C to 125 °C / 30 min. each / 10 cycles
DIN IEC 68 part 2 – 14 Test 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;

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

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	- development specification	TCUK	06.07.2011
1.1	- extend storage temperature from -40°C...+85°C to -40°C...+125°C	TCUK	08.07.2011
1.2	- add typical values, change from development to filter specification.	TCUK	26.10.2011
1.3	- correct typo, now fN±1.5...fN±4.0MHz min. 20 to 30dB (was max.)	TCUK	08.05.2012

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