Measurement condition

Ambient temperature:	23	°C
Input power level:	0	dBm
Terminating impedance: *		
Input:	675 Ω || -3,8 pF	
Output:	685 Ω || -3,8 pF	

Characteristics

Remark:
The reference level for the relative attenuation a_{rel} of the TFS 468M 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 468,0 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	9,2	dB	max.	14,0***	dB
Nominal frequency	f_N	-			468	MHz
Centre frequency	f_C	468	MHz		-	
Passband	PB	-		f_N ±	4,9	MHz
Pass band ripple		0,3	dB	max.	1,0	dB
Amplitude ripple within f_N ± 5,0 MHz		0,3	dB	max.	2,5	dB
Bandwidth	BW					
1 dB		11,2	dB	min.	9,8	MHz
Relative attenuation	a_{rel}					
f_N … f_N ± 4,9 MHz		0,6	dB	max.	1,0	dB
f_N ± 4,9 MHz … f_N ± 5 MHz		1	dB	max.	2,5	dB
f_N ± 8,5 MHz … f_N ± 12 MHz		20	dB	min.	15	dB
f_N ± 12 MHz … f_N ± 20 MHz		40	dB	min.	35	dB
f_N ± 20 MHz … f_N ± 30 MHz		47	dB	min.	40	dB
f_N - 438 MHz … f_N - 30 MHz		56	dB	min.	50	dB
f_N + 30 MHz … f_N + 532 MHz		56	dB	min.	50	dB
Group delay ripple within PB		60	ns	max.	250	ns
Group delay ripple within f_N ± 5,0 MHz		0,08	µs	max.	1,5	µs
Return loss within f_N ± 5,0 MHz		12	dB	min.	8	dB
Input power level		20	dBm	max.	15****	dBm
Operating temperature range	OTR	-		- 40 °C ... + 85 °C		
Storage temperature range		-		- 45 °C ... + 85 °C		
Temperature coefficient of frequency	TC_f **	-17	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.
**) $\Delta f(Hz) = TC_f(ppm/K) \times (T-T_0) \times f_{cat}(MHz)$.
***) insertion loss at 25°C max. 12,5 dB
****) RF Source Power (peak) is max. 15dBm, RF Source Power (average) is max. 5dBm

Generated: _____

Checked / Approved: _____

Tele Filter GmbH
Potsdamer Straße 18
D 14 513 TELTOW / Germany
Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30
E-Mail: tft@vectron.com

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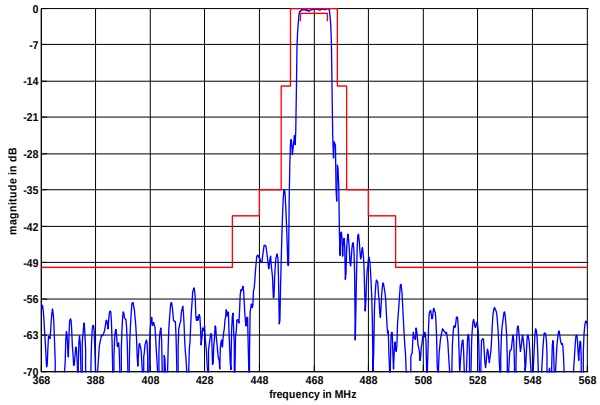
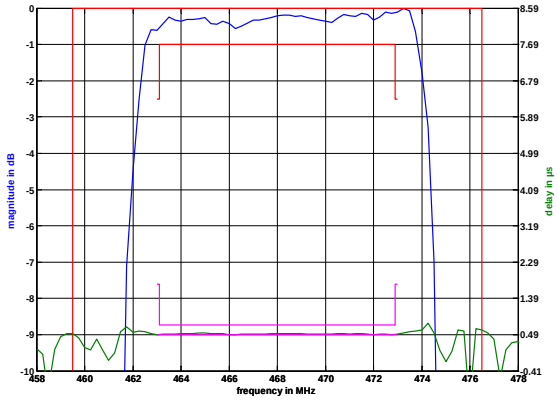
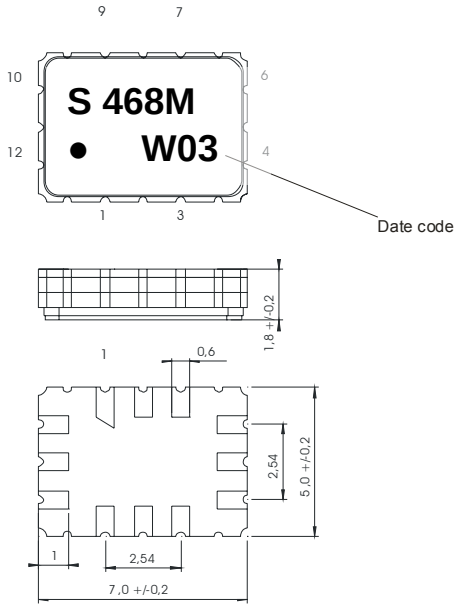
Filter characteristic





Construction and pin connection

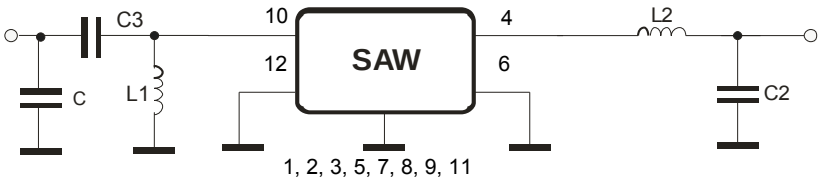
(All dimensions in mm)



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

Date code:	Year + week
W	2008
X	2009
A	2010
...	

50 Ohm Test circuit



Tele Filter GmbH
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Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30
E-Mail: tft@telefilter.com

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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 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;

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

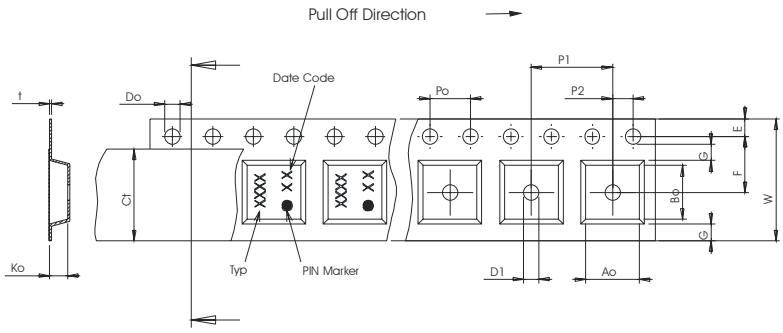
Packing

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

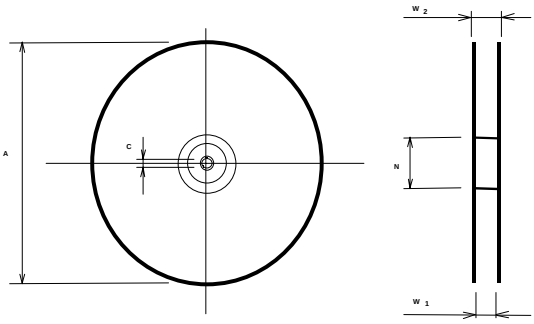
Tape (all dimensions in mm)

W	:	16,00	± 0,3
Po	:	4,00	± 0,1
Do	:	1,50	+0,1/-0
E	:	1,75	± 0,1
F	:	7,50	± 0,1
G(min)	:	0,60	
P2	:	2,00	± 0,1
P1	:	8,00	± 0,1
D1(min)	:	1,50	
Ao	:	5,50	± 0,1
Bo	:	7,50	± 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.

Tele Filter GmbH
Potsdamer Straße 18
D 14 513 TELTOW / Germany
Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30
E-Mail: tft@telefilter.com

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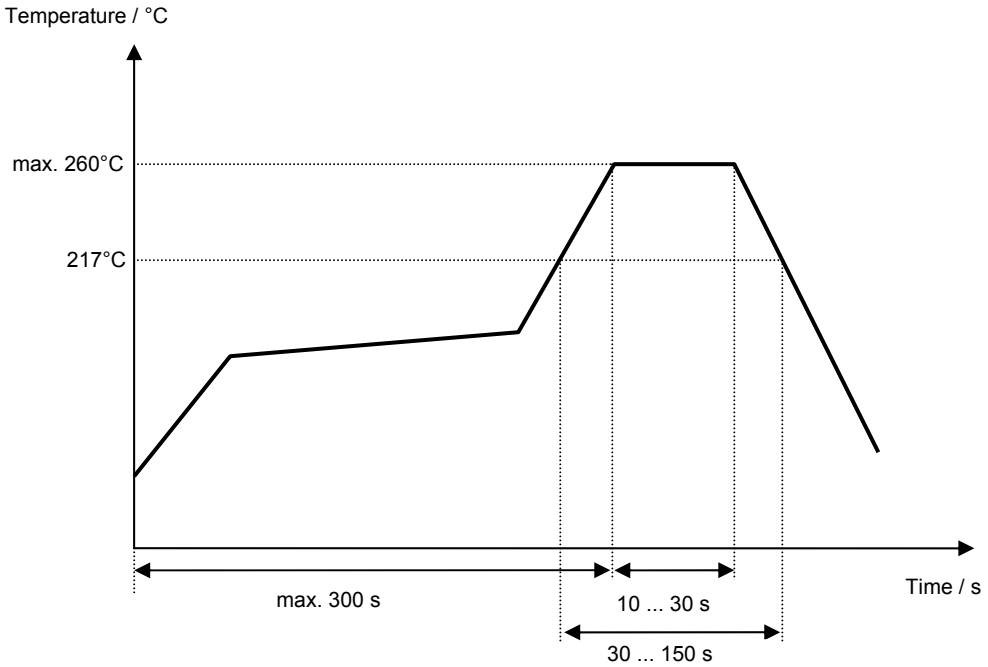
Air reflow temperature conditions

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	Strehl	07.05.2007
1.1	- Correct construction	Strehl	05.07.2007
1.2	- add of terminating impedances, typical values, filter characteristics and matching configuration	Pfeiffer	07.09.2007
	- change of limits: insertion loss: max. 12 dB relative attenuation: at f_N ± 7,5 MHz….f_N ± 12 MHz ➔ min. 15 dB lower stop band: at f_N - 180 MHz….f_N - 150 MHz ➔ min. 47 dB		
1.3	- correction of terminating impedances and matching configuration	Pfeiffer	14.09.2007
1.4	- change of relative attenuation : at f_N - 180 MHz….f_N - 150 MHz ➔ min. 50 dB - tape and reel direction adjusted to Motorola standard	Pfeiffer	15.10.2007
1.5	- tape and reel direction adjusted to Telefilter standard	Strehl	14.01.2008
1.6	- rel. attenuation changed to be conform with Motorola - loss updated - power limits updated	Strehl	16.6.08

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