

Microchip**Filter specification****TFS 456AG****1/5****Measurement condition**

Ambient temperature:	23	°C
Input power level:	0	dBm
Terminating impedance: *		
Input:	800 Ω	-4,4 pF
Output:	900 Ω	-3,9 pF

Characteristics

Remark:

The reference level for the relative attenuation a_{rel} of the TFS 456AG 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 456,0 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	9,6 dB	max.	14,0	dB
Nominal frequency		f_N	-		456,0	MHz
Centre frequency		f_C	456,0 MHz		-	
Passband		PB	-	$f_N \pm$	2,5	MHz
Pass band ripple		p-p	0,3 dB	max.	1	dB
Bandwidth		BW				
1 dB			5,28 MHz	min.	5	MHz
37 dB			8,82 MHz	max.	9,2	MHz
Relative attenuation		a_{rel}				
f_N	$\pm$ 2,5 MHz		0,7 dB	max.	1	dB
$f_N \pm$ 4,6 MHz	$\pm$ 20 MHz		43 dB	min.	37	dB
$f_N \pm$ 20 MHz	$\pm$ 50 MHz		54 dB	min.	47	dB
Group delay ripple within PB			39 ns	max.	150	ns
Return loss within PB			17 dB	min.	10	dB
Input power level			-	max.	15	dBm
Operating temperature range		OTR	-	- 40 °C ... + 85 °C		
Storage temperature range			-	- 40 °C ... + 85 °C		
Frequency inversion temperature			25 °C	-		
Temperature coefficient of frequency		TC_f **	-0,046 ppm/K ²	-		

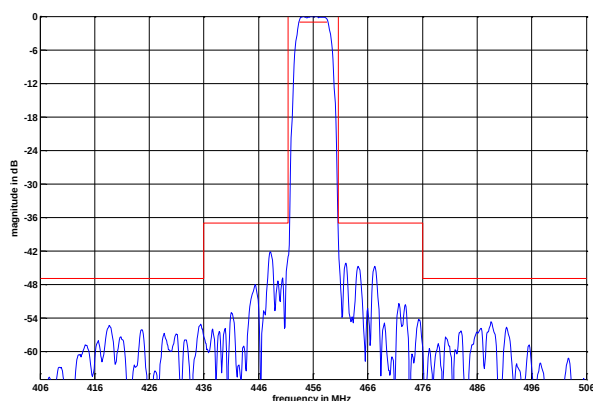
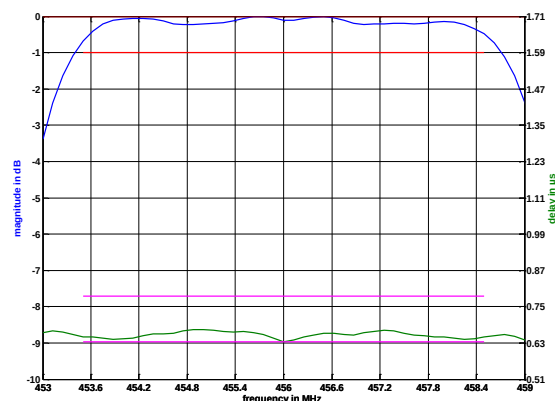
*) The terminating impedances depend on parasitics and q-values of matching elements and the board used, and are to be understood as reference values only. Should there be additional questions do not hesitate to ask for an application note or contact our design team.

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

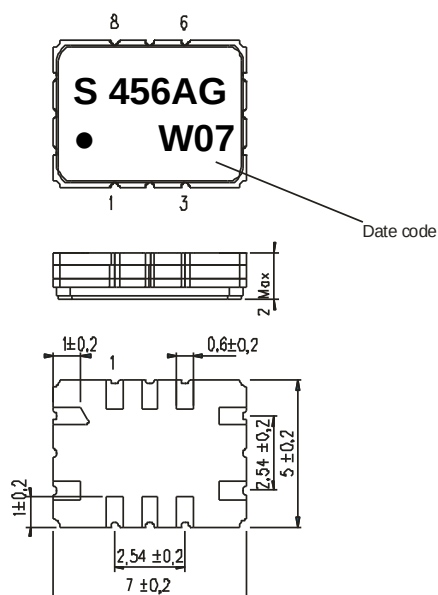
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Microchip Frequency Technology GmbH
Potsdamer Straße 18
D 14 513 TELTOW / Germany
Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30

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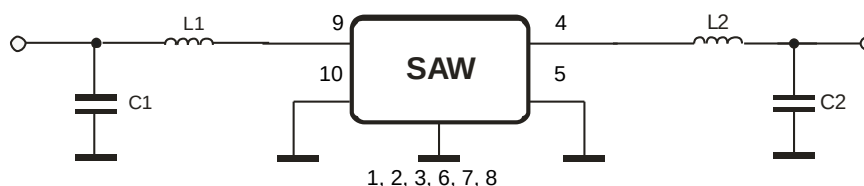
Filter characteristic**Construction and pin connection**

(All dimensions in mm)



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

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

50 Ohm Test circuit**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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Microchip**Filter specification****TFS 456AG****3/5****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)

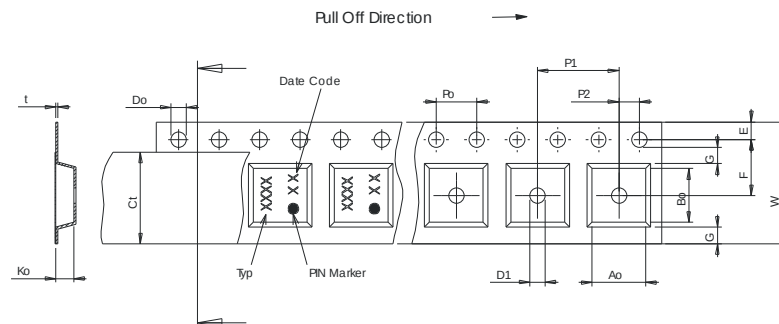
Packing

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;

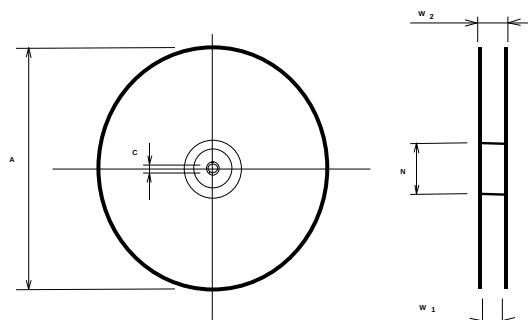
max. pieces of filters per reel:	3000
reel of empty components at start:	min. 300 mm
reel of empty components at start including leader:	min. 500 mm
trailer:	min. 300 mm

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.

Microchip Frequency Technology GmbH

Potsdamer Straße 18

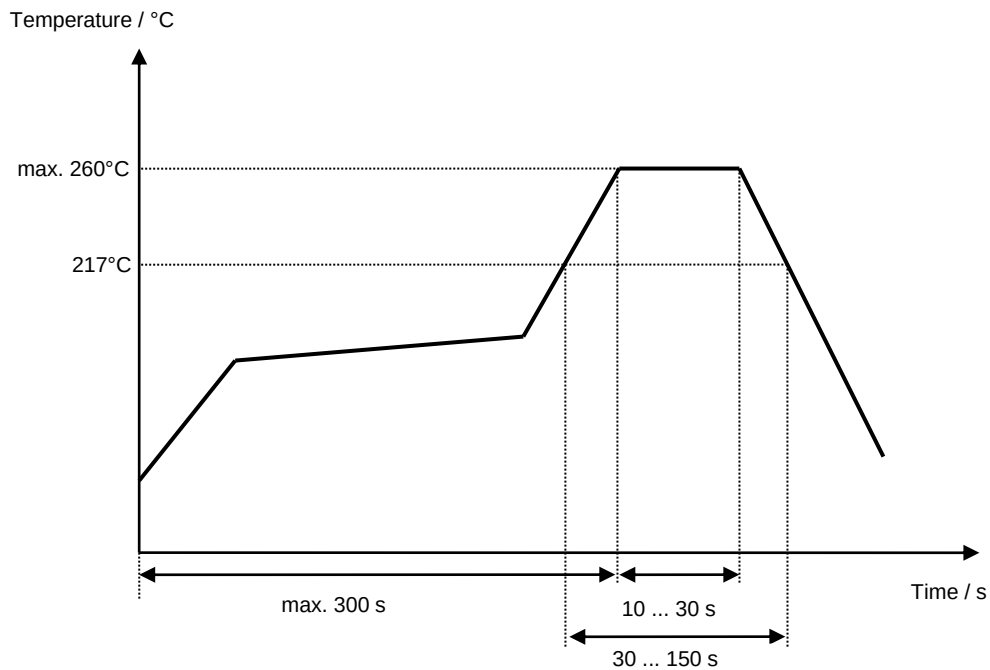
D 14 513 TELTOW / Germany

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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**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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Microchip**Filter specification****TFS 456AG****5/5****History**

Version	Reason of Changes	Name	Date
1.0	- Generation of development specification	Strehl	21.05.2007
1.1	- Change relative attenuation - Add terminating impedance - Add typical values - Add filter characteristics - Add matching circuit	Alawneh	18.10.2007
1.2	- terminating impedances changed and fixed - change of typical values, filter characteristics and matching configuration	Pfeiffer	14.02.2008