

Microchip**Filter specification****TFS 460G****1/5****Measurement condition**

Ambient temperature:	23	°C
Input power level:	0	dBm
Terminating impedance:		
Input:	730 Ω -1.25 pF	
Output:	730 Ω -1.05 pF	

Characteristics

Remark:

The minimum attenuation in the pass band is defined as the insertion loss a_{e} . The nominal frequency f_N is fixed at 460 MHz without any tolerance or limit. The values of absolute attenuation a_{abs} 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	a_{e}	4.5	dB	max.	5.3	dB
Nominal frequency	f_N	-			460	MHz
Passband	PB	-		f_N	± 50	kHz
Pass band variation		0.3	dB	max.	1.0	dB
Absolute attenuation		A_{abs}				
0	MHz ... 458	60	dB	min.	50	dB
458	MHz ... 459	55	dB	min.	30	dB
459	MHz ... 459.6	23	dB	min.	15	dB
460.4	MHz ... 461	23	dB	min.	15	dB
461	MHz ... 462	60	dB	min.	30	dB
462	MHz ... 1000	49	dB	min.	45	dB
Input power level		-		max.	0	dBm
Return loss		7	dB	min.	6	dB
Group delay ripple in passband		500	ns	max.	700	ns
Group delay		2	µs	max.	3	µs
Operating temperature range	OTR	-		- 40 °C ... + 85 °C		
Storage temperature range		-		- 55 °C ... + 85 °C		
Temperature coefficient of frequency	TC_f **	-0.035	ppm/K ²	-		
Frequency inversion temperature	T_0 **	16	°C	-		

*) 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.

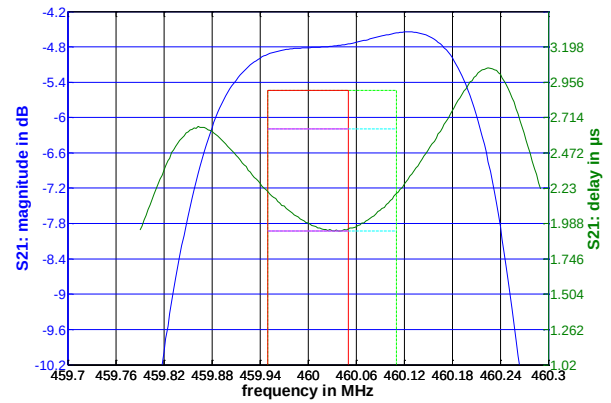
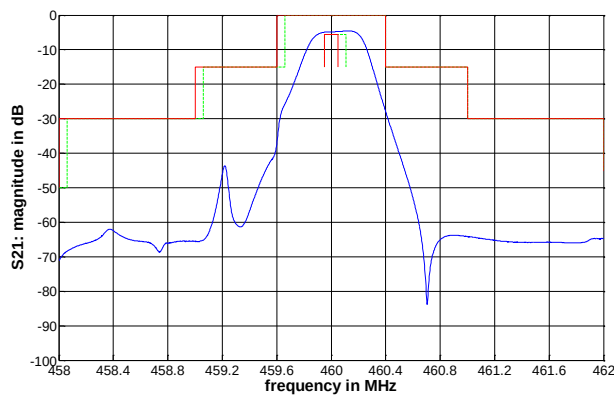
**) $\Delta f_c(\text{Hz}) = TC_f(\text{ppm/K}^2) \times (T - T_0)^2 \times f_{T0}(\text{MHz})$.

Generated:**Checked / Approved:**

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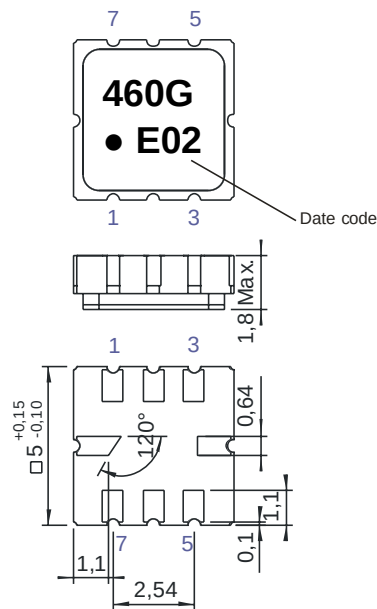
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Filter characteristic



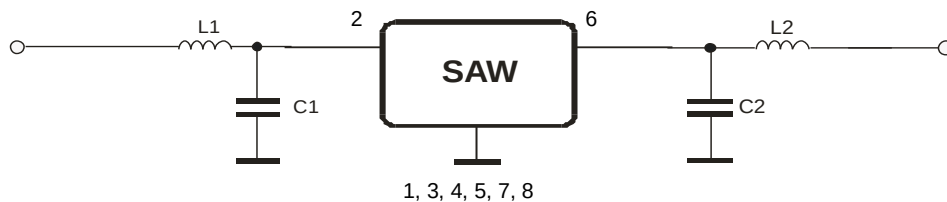
Construction and pin connection

(All dimensions in mm)



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

Date code: Year + week
 E 2014
 F 2015
 G 2016
 ...

50 Ω 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 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"

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

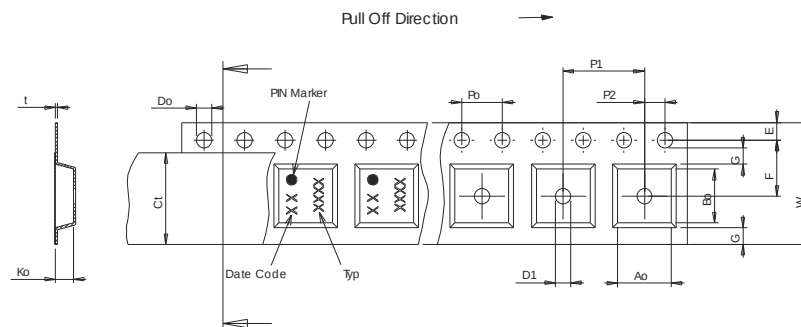
Packing

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;

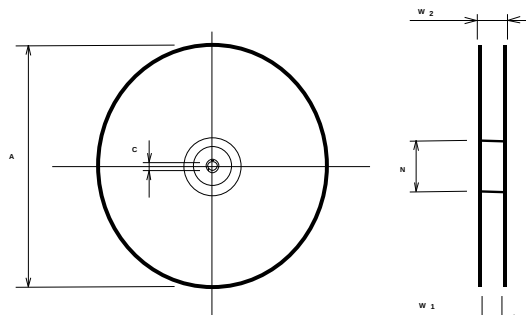
max. pieces of filters per reel:	3000
reel of empty components at start:	min. 300 mm
reel of empty components at start including leader:	min. 500 mm
trailer:	min. 300 mm

Tape (all dimensions in mm)

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

**Reel (all dimensions in mm)**

A	: 330
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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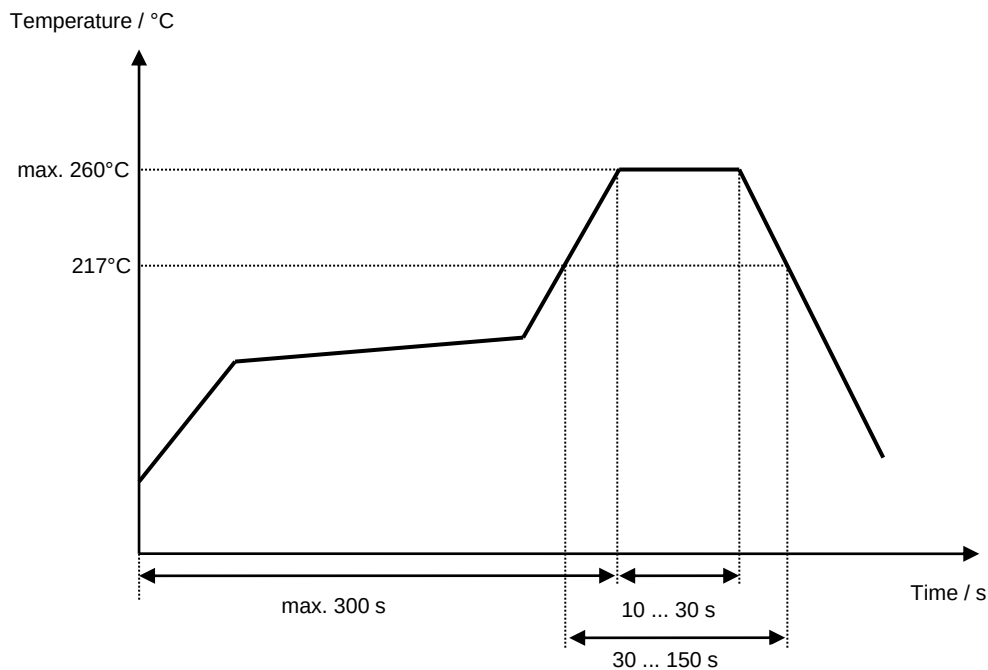
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Air reflow temperature conditions

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 460G****5/5****History**

Version	Reason of Changes	Name	Date
1.0	Generation of development specification	Noack	02.05.2012
1.1	Changed data table	Schönbein	04.05.2012
1.2	Changed lower storage temperature to -55 °C	Schönbein	10.05.2012
2.0	Change from development specification to SAW filter specification Change limit for return loss from 8 dB to 6 dB Change limit for insertion loss from 5 dB to 5.3 dB Change frequency over temperature characteristic from linear to parabolic Add frequency inversion temperature Add typical values Add filter characteristic Add values for termination impedances Remove term relative attenuation in remark	Dr. Wall	07.11.2012
2.1	maximum input power updated	Kortenbeutel	07.01.2014

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