

Microchip**Filter specification****TFS 135G****1/5****Measurement condition**

Ambient temperature:	23	°C
Input power level:	0	dBm
Terminating impedance: *		
Input:	264.86 Ω	- 28.07 pF
Output:	178.06 Ω	- 37.54 pF

Characteristics

Remark:

The reference level for the relative attenuation a_{rel} of the TFS135G 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 135.0MHz 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	8.7 dB	max. 11.5 dB
Nominal frequency	f_N		135.0 MHz
Passband	PB	-	$f_N \pm 1.5$ MHz
Passband ripple within PB	p-p	0.3 dB	max. 1.0 dB
Bandwidth	BW		
1.0dB		4.2 MHz	min. 3 MHz
Relative attenuation	a_{rel}		
f_N ... $f_N \pm 1.5$ MHz		0.3 dB	max. 1.0 dB
$f_N \pm 5.25$ MHz ... $f_N \pm 50$ MHz		48 dB	min. 40 dB
Group delay ripple within PB	p-p	26 ns	max. 60 ns
Return loss within PB		20 dB	min. 10 dB
Operating temperature range	OTR	-	-40 °C ... + 85 °C
Storage temperature range		-	-40 °C ... + 85 °C
Temperature coefficient of frequency	TC_f **	-22 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.

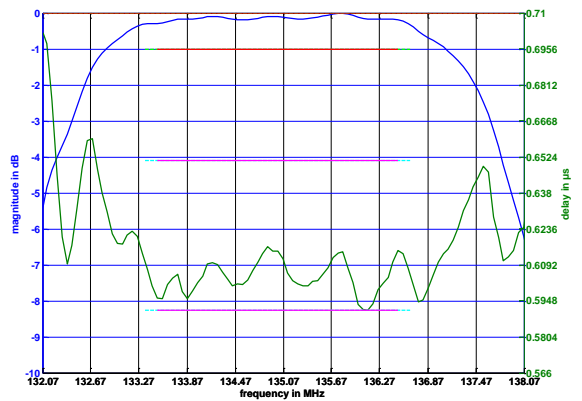
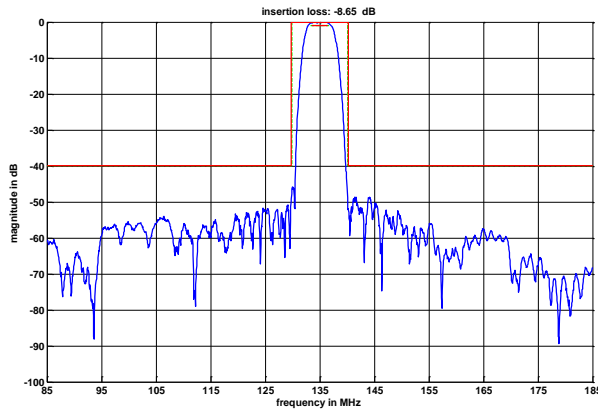
***) $\Delta f(\text{Hz}) = TC_f(\text{ppm/K}) \times (T - T_0) \times f_{cat}(\text{MHz})$.

Generated:**Checked / Approved:**

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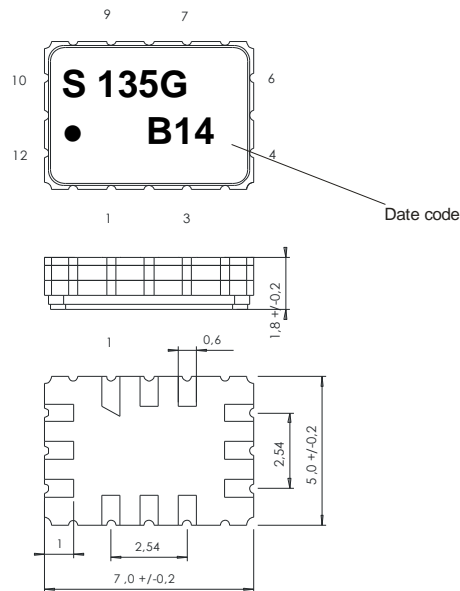
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Filter characteristic



Construction and pin connection

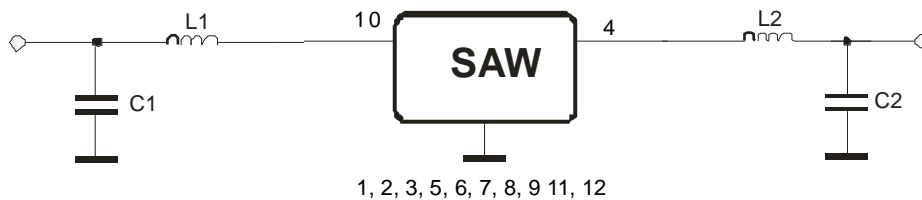
(All dimensions in mm)



- 1 Ground
- 2 Ground
- 3 Ground
- 4 Output
- 5 Ground
- 6 Ground
- 7 Ground
- 8 Ground
- 9 Ground
- 10 Input
- 11 Ground
- 12 Ground

Date code: Year + week
 C 2012
 D 2013
 E 2013
 ...

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 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;
5. ESD MIL-STD-883E using coupling network of ISO 10605 and EN 6100-4-2
HBM:250V;

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

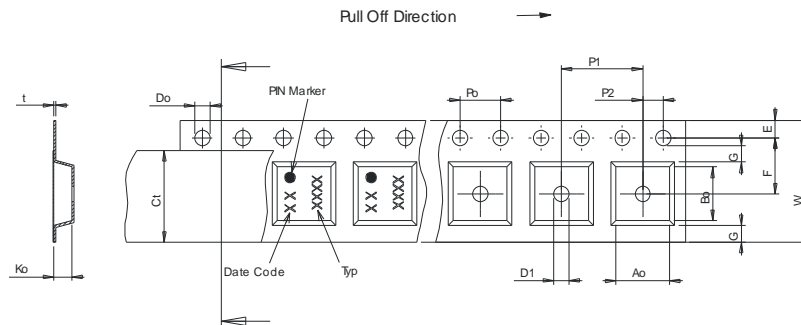
Packing

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

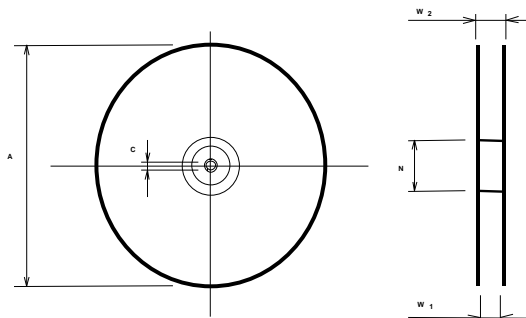
Tape (all dimensions in mm)

- 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 : 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.

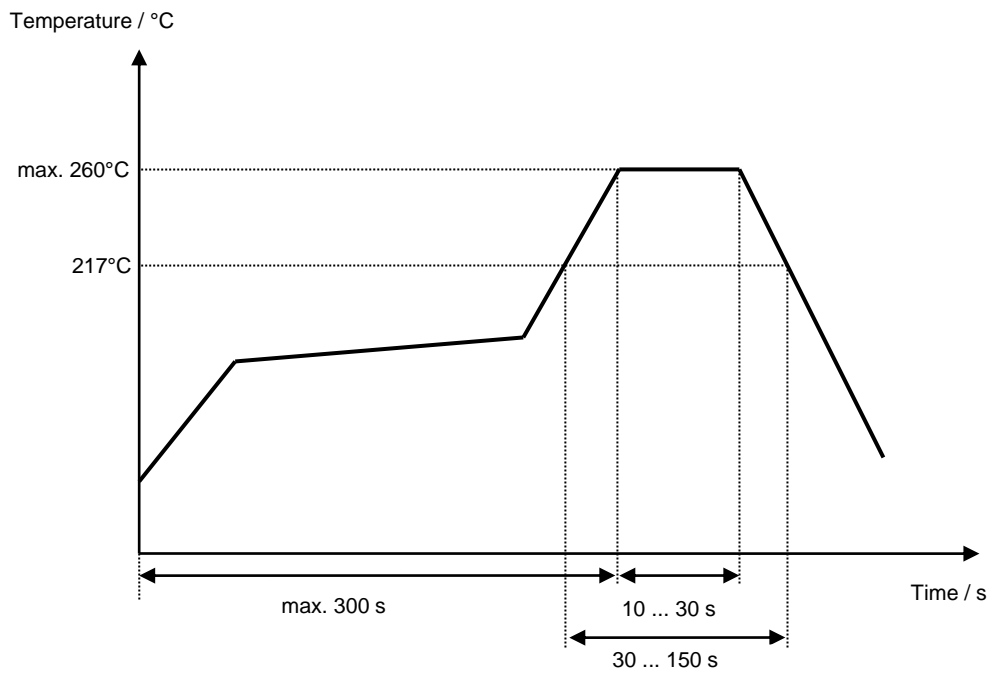
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Air reflow temperature conditions

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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Microchip**Filter specification****TFS 135G****5/5**

History

Version	Reason of Changes	Name	Date
1.0	- Generation of development specification	TCUK	15.06.2012
1.1	- Changed to filter spec.; corrected package drawing; added plots & typical values, (T11).	TCUK	26.10.2012

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