

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

Ambient temperature:	23	°C
Input power level:	0	dBm
Terminating impedance: *		
Input:	560 Ω	-0.6 pF
Output:	560 Ω	-0.6 pF

Characteristics

Remark:

The nominal frequency f_N is fixed at 135,0 MHz. The insertion loss a_e is defined as loss value determined at f_N . Reference level for the relative attenuation a_{rel} of the TFS 135D is the insertion loss a_e . All specified data are met within the operating temperature range.

D a t a		typ. value		tolerance / limit	
Insertion loss (reference level)	a_e	4,7	dB	max.	7,0 dB
Nominal frequency	f_N	135,008	MHz		135,0 MHz
Passband	PB	-		$f_N \pm$	8 kHz
Pass band ripple	p-p	0,7	dB	max.	1,0 dB
Relative attenuation	a_{rel}				
$f_N - 134,7$ MHz ... $f_N - 185$ kHz		62	dB	min.	50 dB
$f_N - 185$ kHz ... $f_N - 72$ kHz		27	dB	min.	25 dB
$f_N - 72$ kHz ... $f_N - 43$ kHz		11	dB	min.	3 dB
$f_N + 43$ kHz ... $f_N + 72$ kHz		8	dB	min.	3 dB
$f_N + 72$ kHz ... $f_N + 185$ kHz		27	dB	min.	25 dB
$f_N + 185$ kHz ... $f_N + 115$ MHz		66	dB	min.	50 dB
Group delay ripple within PB	p-p	3	µs	max.	10 µs
IIP3	**	34	dB	min.	30 dB
Operating temperature range	OTR	-			- 30 °C ... + 85°C
Storage temperature range		-			- 40 °C ... + 85°C
Frequency inversion temperature		22	°C		-
Temperature coefficient of frequency	TC_f ***	-0,035	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.

**) $f_{in1} = 134,8$ MHz; $f_{in2} = 134,9$ MHz; $P_{in} = 0$ dBm $f_{measurement} = 135$ MHz.

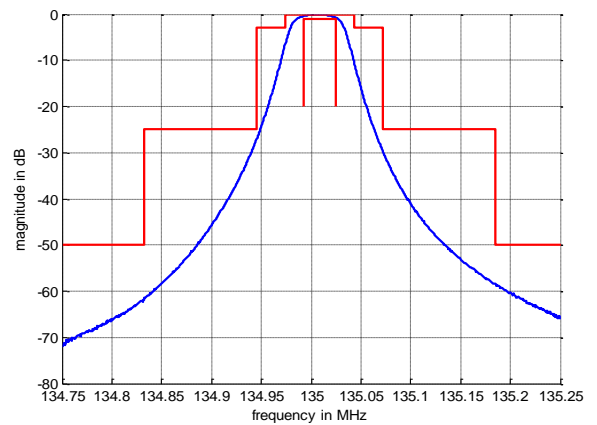
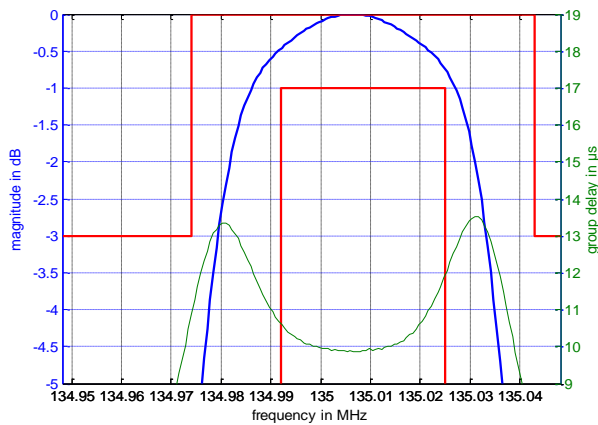
***) $\Delta f(\text{Hz}) = TC_f(\text{ppm/K}) \times (T - T_0)^2 \times f_{T0}(\text{MHz})$.

Generated:**Checked / Approved:**

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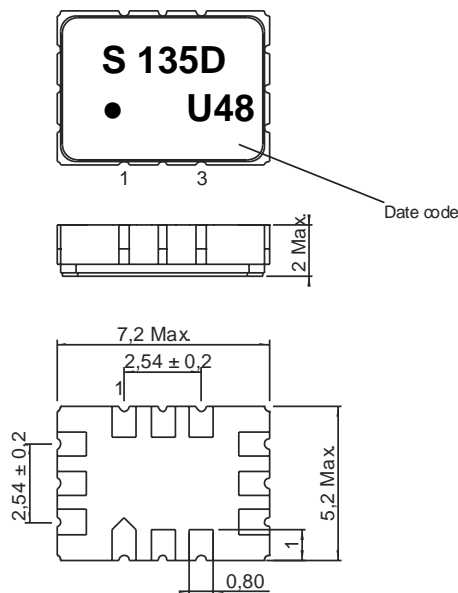
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Filter characteristic



Construction and pin connection

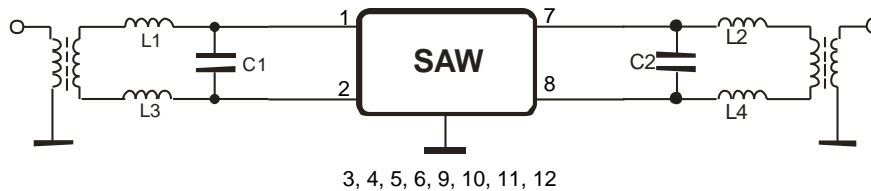
(All dimensions in mm)



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

Date code: Year + week
 U 2006
 V 2007
 W 2008
 ...

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 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;

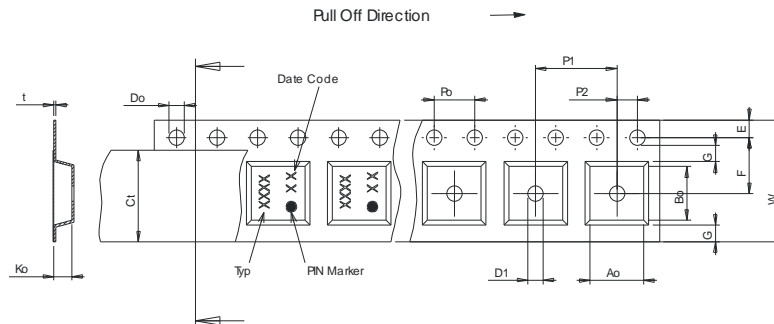
This filter is RoHS compliant (2002/95/EG, 2005/618/EG)

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 |

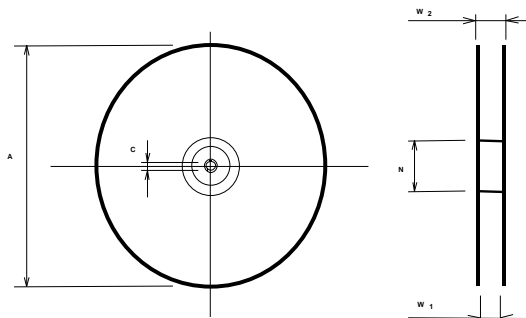
Tape (all dimensions in mm)

- 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.

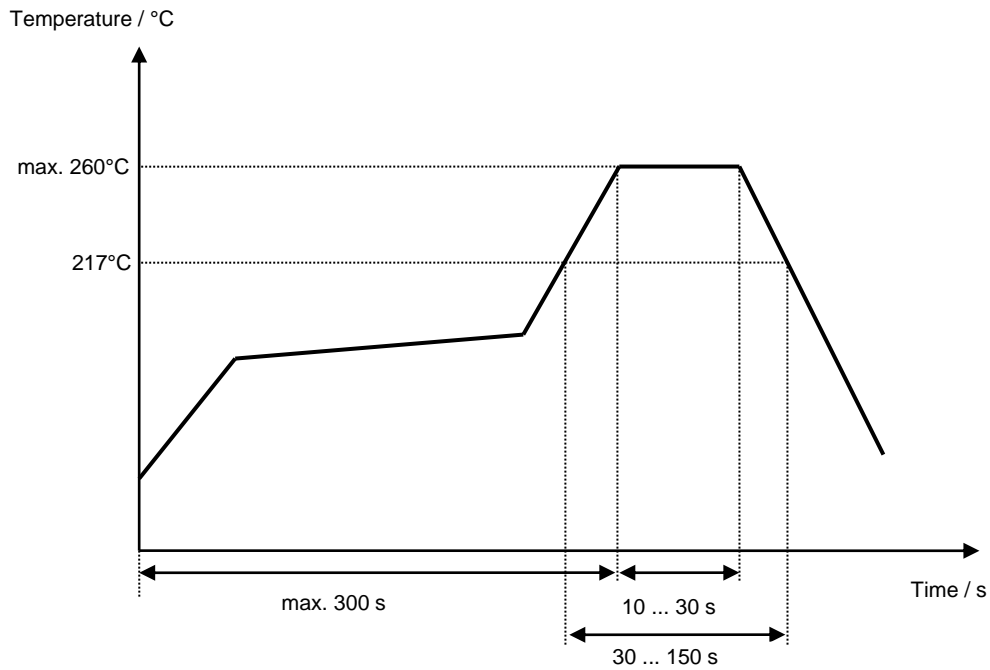
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Air reflow temperature conditions

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 135D****5/5****History**

Version	Reason of Changes	Name	Date
1.0	- Generation of development specification	Strehl	30.06.2006
1.1	- Change insertion loss	Strehl	26.07.2006
1.2	- Add terminating impedances - Add typical values - Add filter characteristic - Change limit for IIP3 from 40 dB to 30 dB - Remove comment for IIP3	Dr. Wall	27.11.2006

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