

Measurement condition

Ambient temperature: 23 °C
 Input power level: 0 dBm
 Terminating impedance: *
 Input: 850 Ω || -2 pF
 Output: 850 Ω || -2 pF

Characteristics

Remark:

The reference level for the relative attenuation a_{rel} of TFS 86 is the minimum of the pass band attenuation a_{min} . This minimum is defined as the insertion loss a_e . The nominal frequency f_N is fixed at 86,85 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)	$a_e = a_{min}$	2,7 dB	max. 4 dB
Nominal frequency	f_N	-	86,85 MHz
Passband	PB	-	$f_N \pm 13$ kHz
Pass band ripple		1,0 dB	max. 1,5 dB
Relative attenuation	a_{rel}		
$f_N \pm 15$ kHz			min. 3 dB
$f_N - 1000$ kHz ... $f_N - 940$ kHz			max. 50 dB
$f_N - 940$ kHz ... $f_N - 880$ kHz			max. 70 dB
$f_N - 880$ kHz ... $f_N - 400$ kHz			max. 50 dB
$f_N - 400$ kHz ... $f_N - 120$ kHz			max. 40 dB
$f_N - 120$ kHz ... $f_N - 60$ kHz			max. 20 dB
$f_N + 60$ kHz ... $f_N + 120$ kHz			max. 20 dB
$f_N + 120$ kHz ... $f_N + 150$ kHz			max. 40 dB
$f_N + 150$ kHz ... $f_N + 400$ kHz			max. 30 dB
$f_N + 400$ kHz ... $f_N + 880$ kHz			max. 40 dB
$f_N + 880$ kHz ... $f_N + 940$ kHz			max. 60 dB
$f_N + 940$ kHz ... $f_N + 1000$ kHz			max. 40 dB
Group delay ripple	$f_N \pm 11$ kHz	-	max. 10 μs
Intermodulation			
Intermodulation in the composite signal by $f_N \pm 60$ kHz and $f_N \pm 120$ kHz each of -20 dBm		-	max. -90 dBm
Operating temperature range	OTR	-	-20 °C ... +70 °C
Storage temperature range		-	-40 °C ... +85 °C
Temperature coefficient of frequency	** TC	-0,036 ppm/ K ²	-
Frequency inversion temperature		25 °C	-
Permissible DC voltage	V_{DC}	-	max. 10 V

*) 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.

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

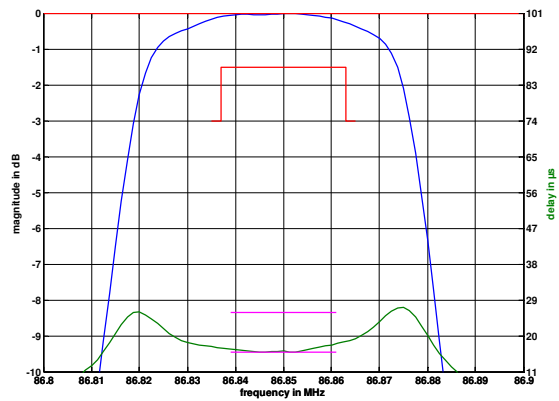
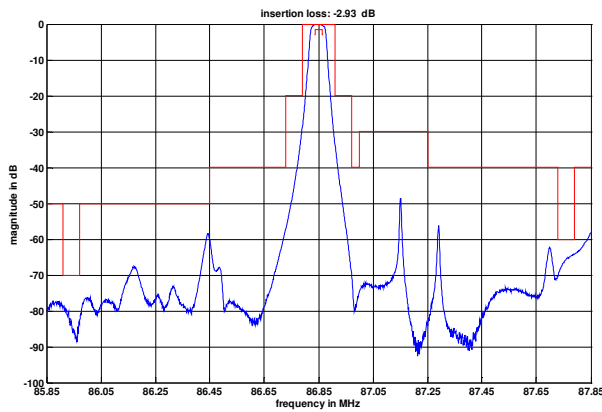
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Checked / Approved:

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

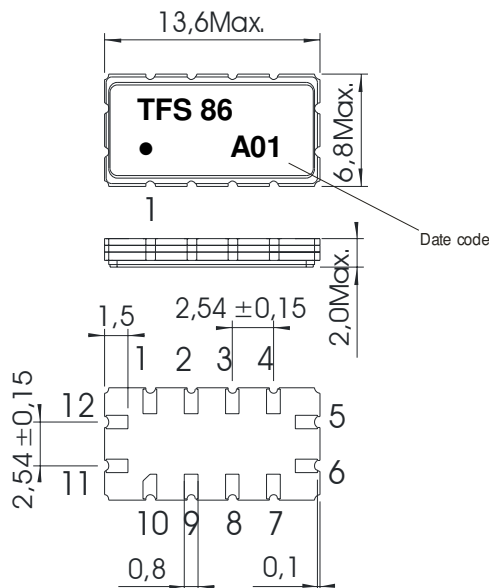
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Filter characteristic



Construction and pin connection

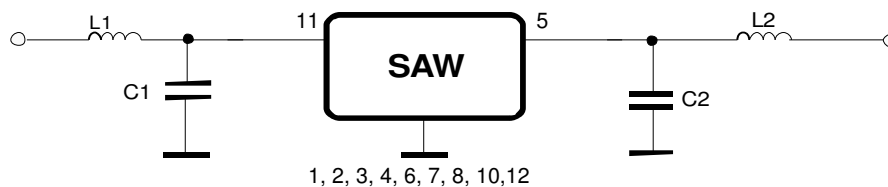
(All dimensions in mm)



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

Date code: Year + week
 X 2009
 A 2010
 B 2011
 ...

50 Ω Test circuit



Vectron International GmbH & Co. KG
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 E-Mail: tft@vectron.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;

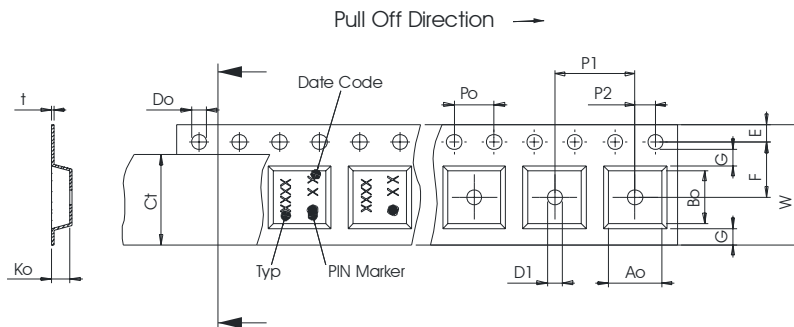
This filter is RoHS compliant (2002/95/EG, 2005/618/EG)

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: | 1700 |
| reel of empty components at start: | min. 300 mm |
| reel of empty components at start including leader: | min. 500 mm |
| trailer: | min. 300 mm |

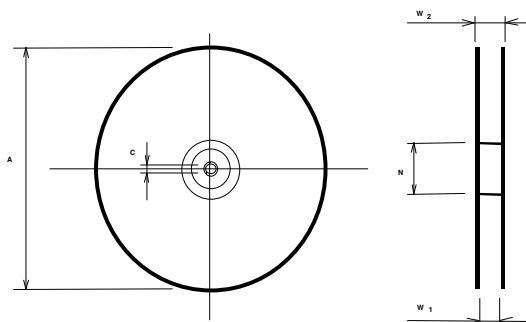
Tape (all dimensions in mm)

- W : 24,00 +0,30/-0,10
- Po : 4,00 ± 0,1
- Do : 1,50 +0,1/-0
- E : 1,75 ± 0,10
- F : 11,50 ± 0,10
- G(min) : 0,60
- P2 : 2,00 ± 0,1
- P1 : 12,00 ± 0,1
- D1(min) : 1,50
- Ao : 7,10 ± 0,10
- Bo : 13,90 ± 0,10
- Ct : 21,5 ± 0,1



Reel (all dimensions in mm)

- A : 330
- W1 : 24,4 +2/-0
- W2(max) : 30,4
- N(min) : 60
- C : 13,0 +0,5/-0,2



The minimum bending radius is 45 mm.

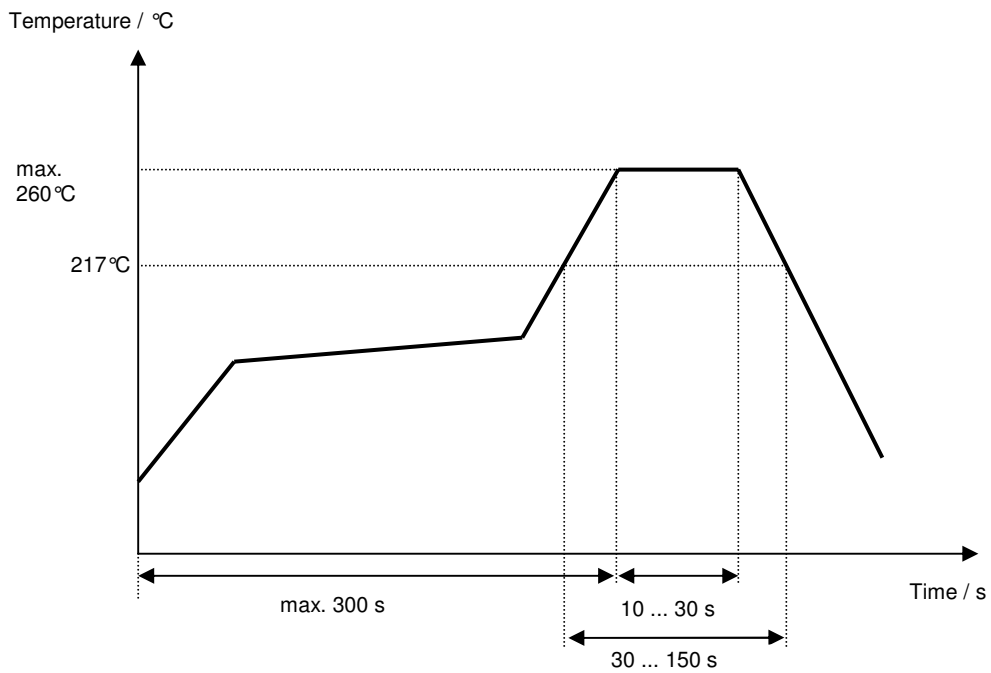
Vectron International GmbH & Co. KG
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D 14 513 TELTOW / Germany
Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30
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Air reflow temperature conditions

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
1.3	- Added filter characteristics graph - Changed package drawing in construction and pin connection	Raura	14.01.2010