

VI TELEFILTER**Filter specification****TFS 346B****1/5****Measurement condition**

Ambient temperature: 23 °C
 Input power level: 0 dBm
 Terminating impedance: *
 Input: 460 Ω || -7,0 pF
 Output: 290 Ω || -5,0 pF

Characteristics**Remark:**

The reference level for the relative attenuation a_{rel} of the TFS346B is the minimum of the pass band attenuation a_{min} . The minimum of the pass band attenuation a_{min} is defined as the insertion loss a_e . The centre frequency f_c is the arithmetic mean value of the upper and lower frequencies at the 3 dB filter attenuation level relative to the insertion loss a_e . The nominal frequency f_N is fixed at 346 MHz without any tolerance. The given values for both the relative attenuation a_{rel} and the group delay ripple have to be achieved at the frequencies given below even if the centre frequency f_c is shifted due to the temperature coefficient of frequency TC_f in the operating temperature range and due to a production tolerance for the centre frequency f_c .

D a t a		typ. value	tolerance / limit
Insertion loss (reference level)	a_e	9,0 dB	max. 12,5 dB
Nominal frequency	f_N	-	346 MHz
Centre frequency at ambient temperature	f_c	346,03 MHz	-
Pass band	PB	-	$f_N \pm 0,75$ MHz
Amplitude ripple within $f_N \pm 0,7$ MHz		0,7 dB	max. 1,0 dB
In band ripple (in any 112,5 kHz increment within the PB)		0,2 dB	max. 0,5 dB p-p
Relative attenuation	a_{rel}		
f_N	$f_N \pm 0,7$ MHz	0,7 dB	max. 1,0 dB
$f_N \pm 0,7$ MHz	$f_N \pm 0,75$ MHz	0,5 dB	max. 1,2 dB
$f_N \pm 1,6$ MHz	$f_N \pm 1,75$ MHz	49 dB	min. 39 dB
$f_N \pm 1,75$ MHz	$f_N \pm 3,25$ MHz	44 dB	min. 40 dB
$f_N \pm 3,25$ MHz	$f_N \pm 5$ MHz	45 dB	min. 42 dB
$f_N \pm 5$ MHz	$f_N \pm 6$ MHz	53 dB	min. 50 dB
$f_N \pm 6$ MHz	$f_N \pm 7$ MHz	50 dB	min. 45 dB
DC	$f_N - 7$ MHz	55 dB	min. 50 dB
$f_N + 7$ MHz	$f_N + 1,5$ GHz	55 dB	min. 50 dB
Group delay at f_N		0,9 µs	max. 2 µs
Group delay ripple within 80% of PB (in any 112,5 kHz increment within the PB)		120 ns	max. 160 ns
Phase linearity within 80% of PB (in any 112,5 kHz increment within the PB)		2 deg	max. 6 deg p-p
Input power level		-	max. 23 dBm**)
Operating temperature range		-	- 40 °C ... + 70 °C
Storage temperature range		-	- 40 °C ... + 100 °C
Turnover temperature T_o		20 °C	-
Temperature coefficient of frequency TC_f^{***}		- 0,04 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.

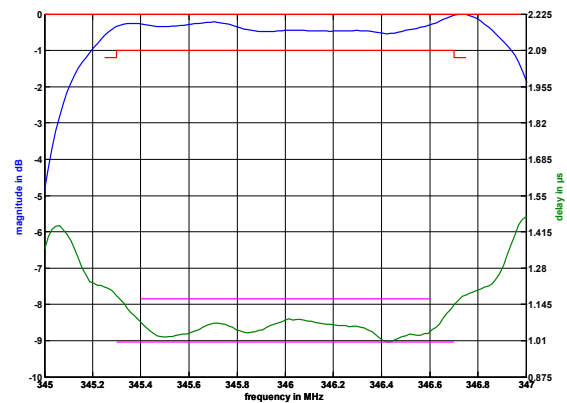
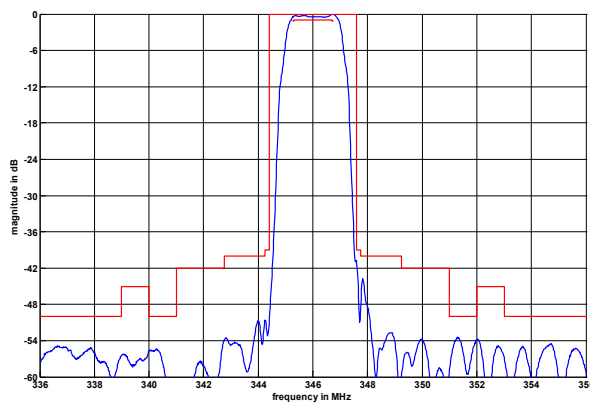
**) This power level is only allowed for short term operation (10% of the life time), the max. input power for continuous operation is max.15dBm only

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

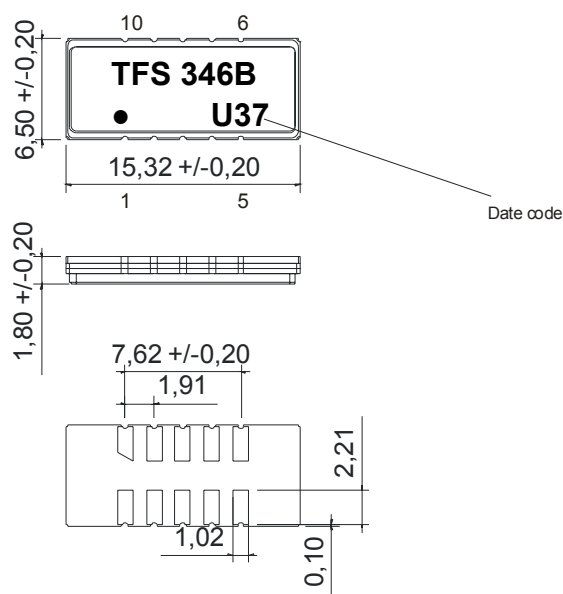
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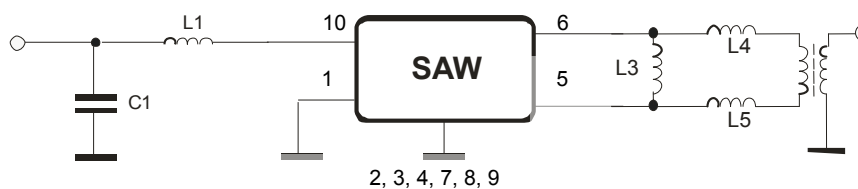
VI TELEFILTER**Filter specification****TFS 346B****2/5****Filter characteristic****Construction and pin connection**

(All dimensions in mm)



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

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

50 Ω Test circuit

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VI TELEFILTER**Filter specification****TFS 346B****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)

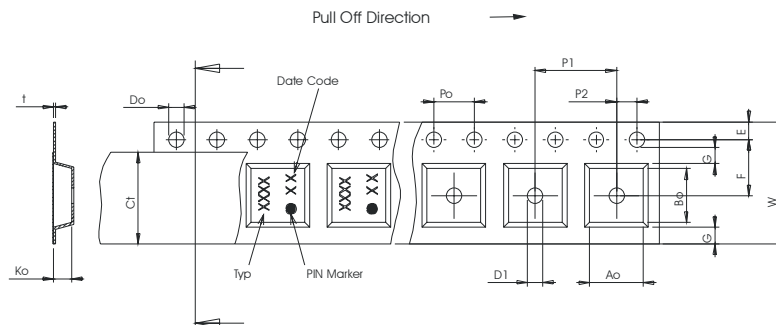
Packing

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;

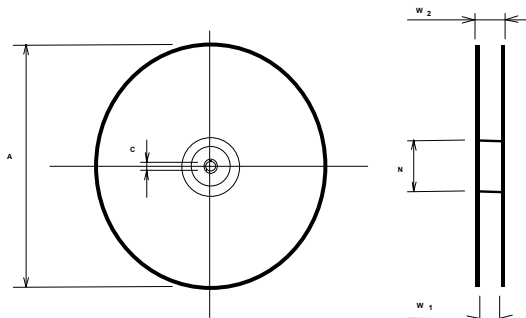
max. pieces of filters per reel:	2000
reel of empty components at start:	min. 300 mm
reel of empty components at start including leader:	min. 500 mm
trailer:	min. 300 mm

Tape (all dimensions in mm)

W	: 24,00 ± 0,3
Po	: 4,00 ± 0,1
Do	: 1,50 +0,1/-0
E	: 1,75 ± 0,1
F	: 11,50 ± 0,1
G(min)	: 0,60
P2	: 2,00 ± 0,1
P1	: 12,00 ± 0,1
D1(min)	: 1,50
Ao	: 7,10 ± 0,1
Bo	: 15,90 ± 0,1
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



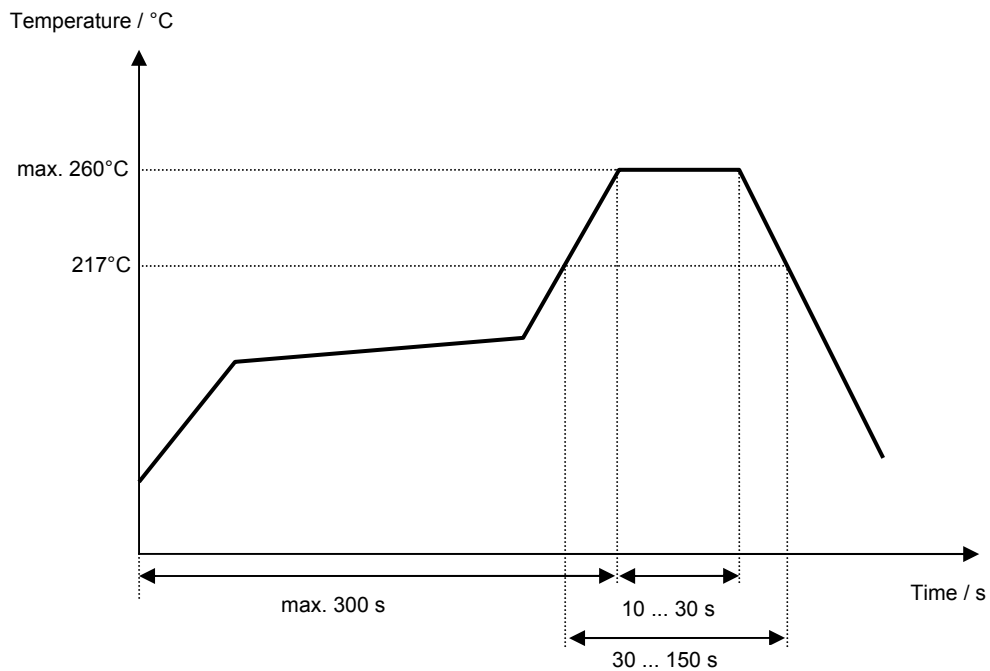
The minimum bending radius is 45 mm.

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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

VI TELEFILTER**Filter specification****TFS 346B****5/5****History**

Version	Reason of Changes	Name	Date
1.0	- generate specification according to customer requirements	Strehl	16.12.2005
1.1	- terminating impedance and typical values (preliminary values) added	Pfeiffer	31.03.2006
	- limits for relative attenuation and group delay / phase ripple temporary modified		
1.2	- filter characteristic added	Pfeiffer	15.05.2006
1.3	- limits for insertion loss, pass band ripple, group delay and phase ripple changed	Pfeiffer	13.09.2006