

Microchip**Filter specification****TFS86A****1/5****Measurement condition**

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

Characteristics

Remark:

The nominal frequency f_N is fixed at 86.85 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 TFS86A is the insertion loss a_e . The centre frequency f_c is the arithmetic mean value of the upper and lower frequencies at the dB filter attenuation level relative to 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)		$a_e = a_{min}$	2.7	dB	max.	4 dB
Nominal frequency		f_N	-			86.85 MHz
Passband		PB	-		$f_N \pm$	13 kHz
Passband ripple		PBR	0.3		max.	1.5 dB
Relative attenuation		a_{rel}				
f_N	... $f_N \pm 15$ kHz		1.5	dB	max.	3 dB
$f_N \pm 60$ kHz	... $f_N \pm 120$ kHz		26	dB	min.	20 dB
$f_N + 120$ kHz	... $f_N + 150$ kHz		58	dB	min.	40 dB
$f_N + 150$ kHz	... $f_N + 400$ kHz		59	dB	min.	30 dB
$f_N + 400$ kHz	... $f_N + 1000$ kHz		60	dB	min.	40 dB
$f_N - 1000$ kHz	... $f_N - 940$ kHz		71	dB	min.	50 dB
$f_N - 940$ kHz	... $f_N - 880$ kHz		71	dB	min.	70 dB
$f_N - 880$ kHz	... $f_N - 400$ kHz		63	dB	min.	50 dB
$f_N - 400$ kHz	... $f_N - 120$ kHz		55	dB	min.	40 dB
Group delay ripple within $f_N \pm 11$ kHz		GDR	5	μ s	max.	10 μ s
Intermodulation in the composite signal by $f_N \pm 60$ kHz and $f_N - 120$ kHz		each of -20 dB			max.	-90 dBm
Operating temperature range		OTR	-			-20 °C ... +70 °C
Storage temperature range			-			-55 °C ... +125 °C
Frequency inversion temperature		T_0	25	°C		
Temperature coefficient of frequency		TC_f **)	-0.036	ppm/K ²		
No DC voltage permitted						

*) 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.

**) $\Delta f = TC_f (T - T_0)^2 f_N$

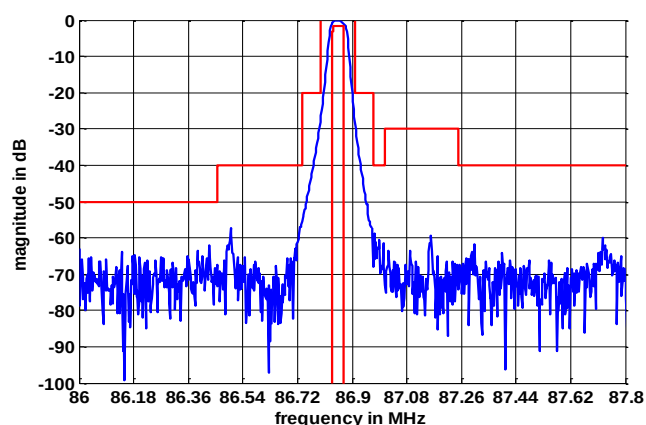
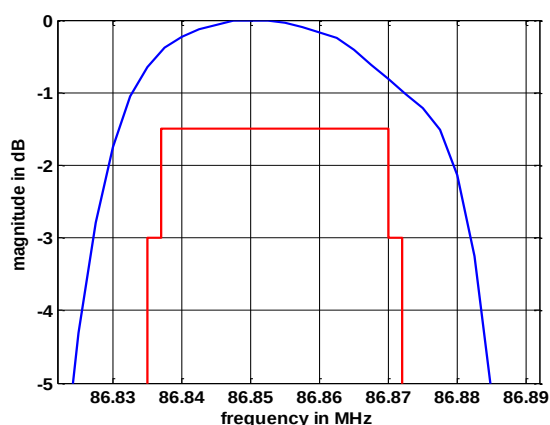
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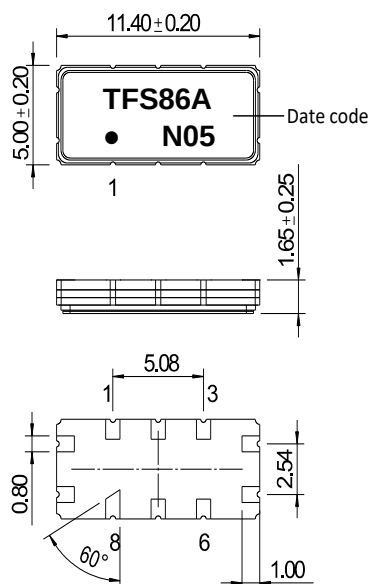
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Filter characteristic



Construction and pin connection

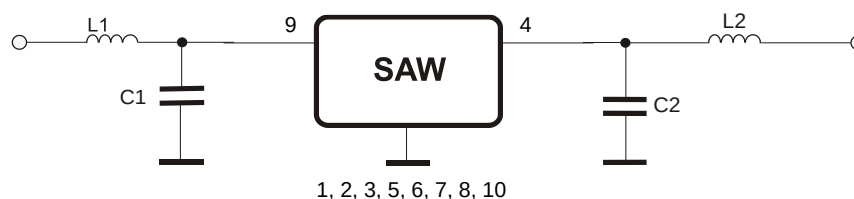
(All dimensions in mm)



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

Date code: Year + week
 N 2021
 P 2022
 R 2023
 ...

50 Ω Test circuit



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Stability characteristics, reliability

After the following tests the filter shall meet the whole specification:

1. Shock: 500 g, 1 ms, half sine wave, 3 shocks each plane;
DIN IEC 60068 T2 - 27
2. Vibration: 10 Hz to 2000 Hz, 0.35 mm or 5 g respectively, 1 octave per min, 10 cycles per plane, 3 planes; DIN IEC 60068 T2 - 6
3. Change of temperature: -55 °C to 125 °C / 15 min. each / 100 cycles
DIN IEC 60068 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. SAW devices are Electrostatic Discharge (ESD) sensitive devices.

This filter is RoHS compliant (2011/65/EU+2015/863/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;

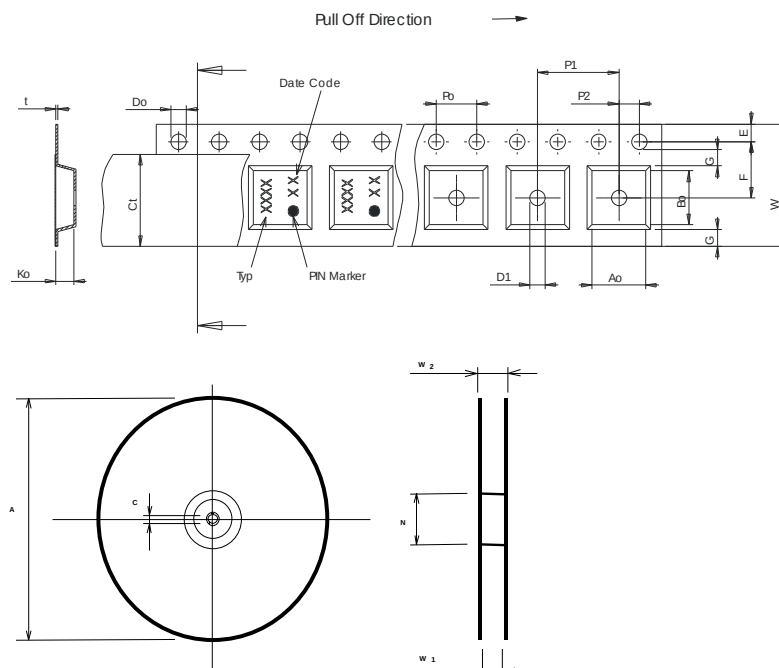
reel of empty components at start: min. 300 mm
reel of empty components at start including leader: min. 500 mm
trailer: min. 300 mm

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	: 8.00 ±0.1
D1(min)	: 1.50
Ao	: 5.60 ±0.1
Bo	: 11.80 ±0.1
Ct	: 21.00 ±0.1
Ko	: 2.50 ±0.1
t	: 0.30 ±0.05

Reel (all dimensions in mm)

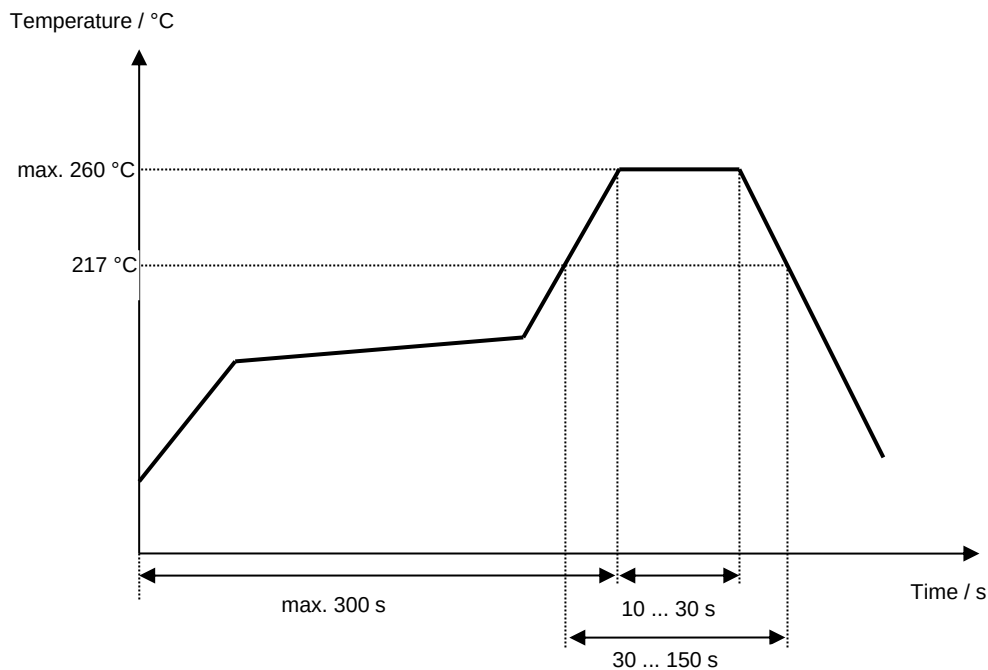
A	: 330 or 180
W1	: 24.4 +2/-0
W2(max)	: 30.40
N(min)	: 60.00
C	: 13.0 +0.5/-0.2



The minimum bending radius is 45 mm.

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**Filter specification****TFS86A****5/5****History**

Version	Reason of Changes	Name	Date
1.2	changing DC voltage changing label	Pfeiffer	13.02.2002
1.3	changing of construction	M.Springfeldt	13.05.2004
1.4	reworked construction reworked matching circuit reworked air reflow temperature conditions added plating information added filter characteristic added typical values added RoHS information	Martens	22.03.2007
1.5	updated storage temperature updated construction and pin connection updated RoHS information	P. Jaster	04.02.2021