

Microchip**Filter specification****TFS140G****1/5****Measurement condition**

Ambient temperature T_A :	23	°C
Input power level:	0	dBm
Source impedance:	50	Ω
Load impedance:	50	Ω
Terminating impedance:		
Input:	180 Ω	-16.5 pF
Output:	200 Ω	-12 pF

Characteristics

Remark:

Reference level for the relative attenuation a_{rel} of the TFS140G 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 reference 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 temperature coefficient of frequency TC_f is valid both for the reference frequency f_c and the frequency response of the filter in the operating temperature range. The frequency shift of the filter in the operating temperature range is not included in the production tolerance scheme

D a t a		typ. value		tolerance / limit		
Insertion loss		a_e	18.0	dB	max.	20 dB
Centre frequency		f_c	140.01	MHz		140 ± 0.06 MHz
Passband		PB			$f_c \pm$	850 kHz
Amplitude ripple		p-p ***)	0.5	dB	max.	1 dB
Bandwidth		BW				
1	dB		1.5	MHz	min.	1.4 MHz
3	dB		1.74	MHz	min.	1.7 MHz
20	dB		2.29	MHz		
40	dB		2.55	MHz	max.	2.6 MHz
45	dB		2.90	MHz	max.	4.6 MHz
Relative attenuation		a_{rel}				
f_c	...	$f_c \pm 0.7$ MHz	0.6	dB	max.	1 dB
$f_c \pm 0.7$ MHz	...	$f_c \pm 0.85$ MHz	2.5	dB	max.	3 dB
$f_c \pm 1.3$ MHz	...	$f_c \pm 2.3$ MHz	50	dB	min.	40 dB
$f_c \pm 2.3$ MHz	...	$f_c \pm 40$ MHz	55	dB	min.	45 dB
Group delay (mean value in PW)			2.54	μ s	max.	3 μ s
Group delay ripple in PB		p-p	150	ns	max.	200 ns
Deviation from linear phase in PB		p-p	3.0	°	max.	5 °
VSWR in PB			1.6 : 1		max.	2 : 1
Triple transit attenuation compared to main signal			42	dB	min.	40 dB
Crosstalk			60	dB		
Power durability			-		max.	20 dBm
Operating temperature range		OTR	-			0 °C ... +70 °C
Storage temperature range			-			-55 °C ... +125 °C
Temperature coefficient of frequency		TC_f **)	-0.040	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.

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

***) at ambient temperature T_A

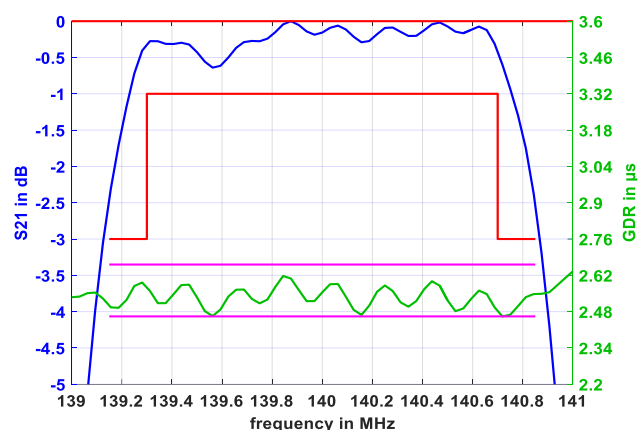
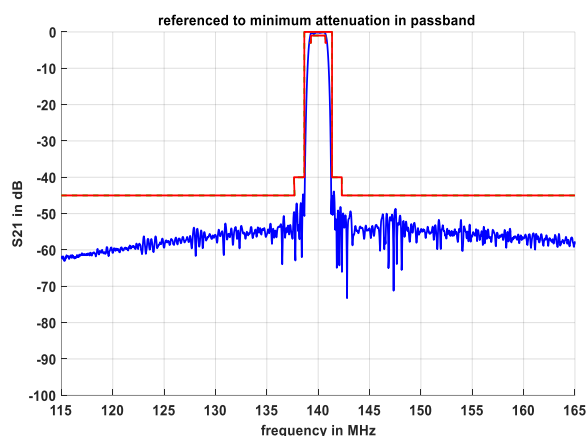
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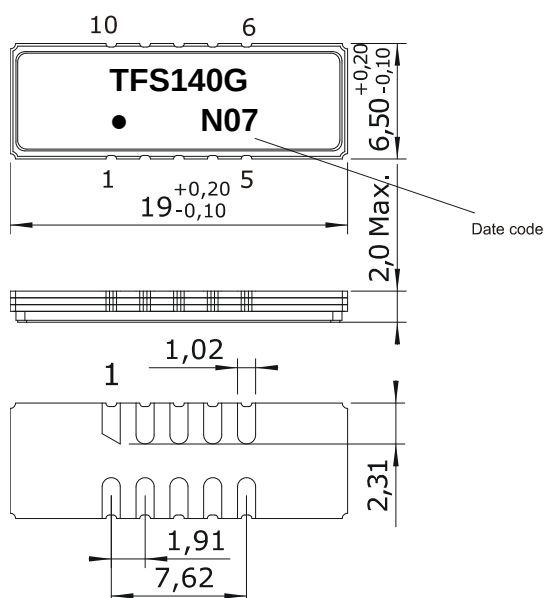
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Filter characteristic



Construction and pin connection

(All dimensions in mm)



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

Date code: Year + week

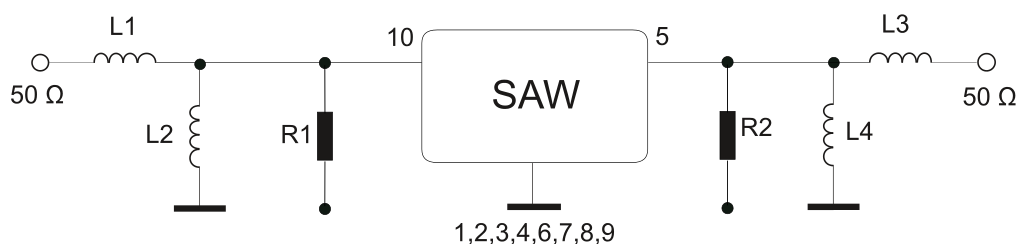
N 2021

P 2022

R 2023

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50 Ω Test circuit



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 (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;

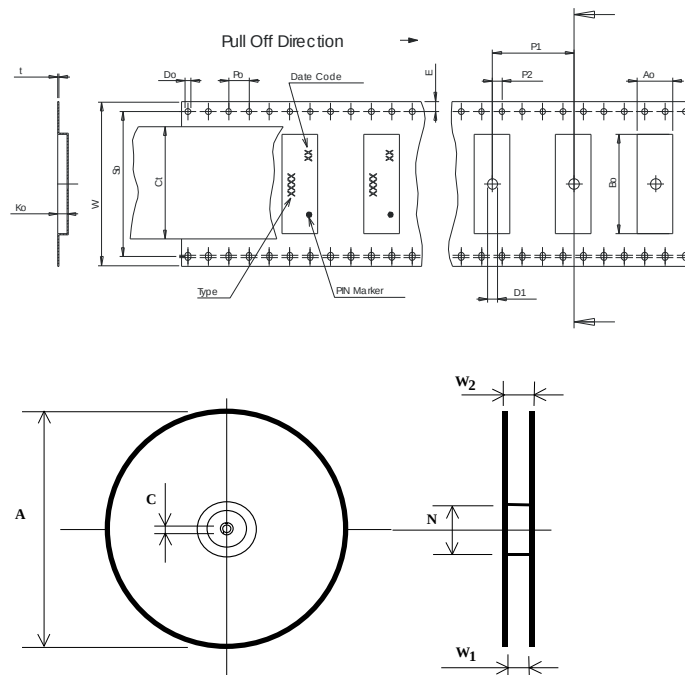
reel of empty components at start: min. 300 mm
reel of empty components at start including leader: min. 500 mm
trailer: min. 300 mm

Tape (all dimensions in mm)

W	: 32.00 ±0.3
Po	: 4.00 ±0.1
Do	: 1.50 +0.1/-0
E	: 1.75 ±0.1
F	: 14.20 ±0.1
G(min)	:
P2	: 2.00 ±0.1
P1	: 12.00 ±0.1
D1(min)	: 2.00
Ao	: 7.10 ±0.1
Bo	: 19.60 ±0.1
Ct	: 25.50 ±0.1
Ko	: 2.00 ±0.1
t	: 0.30 ±0.05

Reel (all dimensions in mm)

A	: 330 or 180
W1	: 32.4 +2/-0
W2(max)	: 38.40
N(min)	: 100.00
C	: 13.0 +0.5/-0.2



The minimum bending radius is 45 mm.

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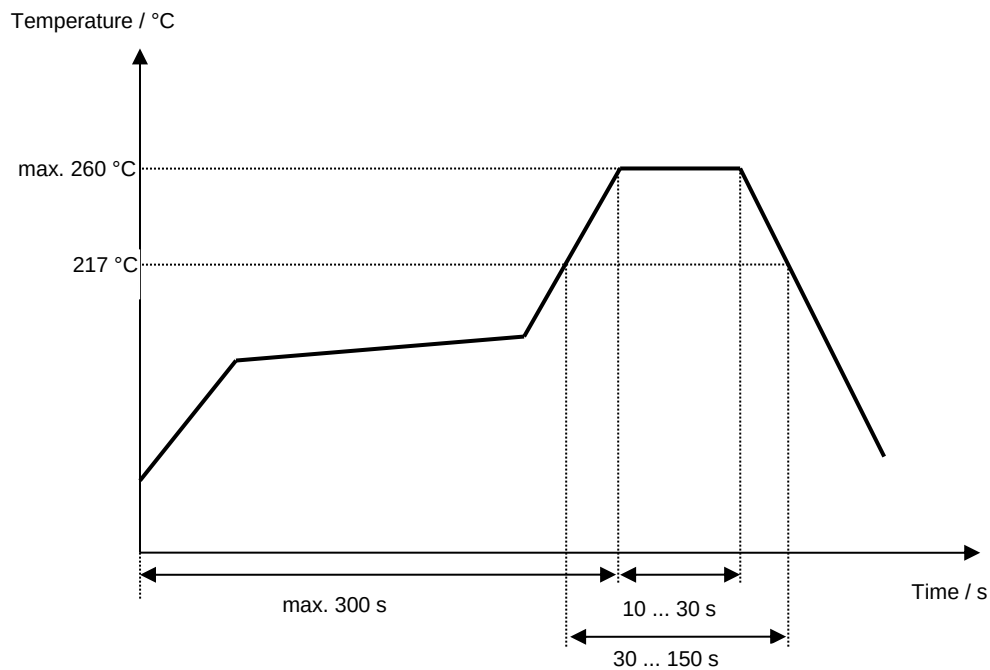
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Air reflow temperature conditions

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

Microchip	Filter specification	TFS140G	5/5
History			
Version	Reason of Changes	Name	Date
1.0	Generate specification according to customer requirements Modify insertion loss and triple transit attenuation according to our simulations	Dunzow W.	03.05.2000
1.1	Change next parameters according to customer requirements : - filter name from TFS 140G1 to TFS 140G , - limit value of I_{Lo} from $I_{Lo} = \max. 19 \text{ dB}$ to $I_{Lo} = \max. 20 \text{ dB}$, - limit value of Centre frequency from $140 \pm 0,03 \text{ MHz}$ to $140 \pm 0,06 \text{ MHz}$, - limit value of Pass band from $f_c \pm 0,77 \text{ MHz}$ to $f_c \pm 0,80 \text{ MHz}$, - limit value of Stop band from $f_c \pm 1,20 \text{ MHz}$ to $f_c \pm 1,25 \text{ MHz}$, - limit value of TTS from $\min. 37 \text{ dB}$ to $\min. 40 \text{ dB}$, - input and output pin positions. Add next parameters according to customer requirements: - limit value of VSWR : $\max. 2 : 1$, - theoretical matching network scheme.	Dunzow W.	22.06.2000
1.2	Change the following parameters according to customer requirements : - limit value of Pass band from $f_c \pm 0,8 \text{ MHz}$ to $f_c \pm 0,85 \text{ MHz}$, - Relative attenuation (3 dB) from $f_c \pm 0,8 \text{ MHz}$ to $f_c \pm 0,85 \text{ MHz}$, - Relative attenuation (40 dB) from $f_c \pm 1,25 \text{ MHz}$ to $f_c \pm 1,3 \text{ MHz}$,	A Jaffer	13.09.2000
1.3	Generate Filter specification. Add limit value of ripple in $f_c - 0,7 \text{ MHz} \dots f_c + 0,7 \text{ MHz}$. $\max. 1 \text{ dB}$.	Dunzow W.	28.11.2000
2.0	- changed data table - added filter characteristics - updated package and pin connection - updated 50 Ω Test circuit - updated stability characteristics and reliability - updated Tape & Reel - updated air reflow temperature conditions	P. Jaster	02.11.2017
3.0	- changed pull off direction	P. Jaster	07.11.2017
4.0	- corrected pin configuration	Bonnen	15.02.2021