

Microchip	Filter specification	TFS978D	1/5
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Measurement condition

Ambient temperature T_A :	23	°C
Input power level:	0	dBm
Terminating impedance:		
Input:	50	Ω
Output:	50	Ω

Characteristics

Remark:

The nominal frequency f_N is fixed at 978 MHz without any tolerance or limit. The reference level for the relative attenuation a_{rel} is the attenuation at f_N . 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 at f_N	a_e	2.2	dB	max.	3.0	dB
Insertion loss at f_N at ambient temperature		2.2	dB	max.	2.5	dB
Nominal frequency	f_N	-			978.0	MHz
Passband	PB	-			$f_N \pm 1.5$	MHz
Passband variation		0.5	dB	max.	0.75	dB
Relative attenuation	a_{rel}	-				
10 MHz ... 958 MHz		42	dB	min.	40	dB
998 MHz ... 1500 MHz		44	dB	min.	40	dB
1500 MHz ... 2000 MHz		37	dB	min.	35	dB
Return loss within $f_N \pm 3.0$ MHz		18	dB	min.	12	dB
Input power level		-				
15 years, duty cycle = 100.0 %		-		max.	20.0	dBm
15 years, duty cycle = 2.0 %		-		max.	25.5	dBm
15 years, duty cycle = 0.1 %		-		max.	30.0	dBm
Operating temperature range	OTR	-			- 40 °C ... + 85 °C	
Storage temperature range		-			- 65 °C ... + 125 °C	
Temperature coefficient of frequency	TC_f *)	-42	ppm/K			

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

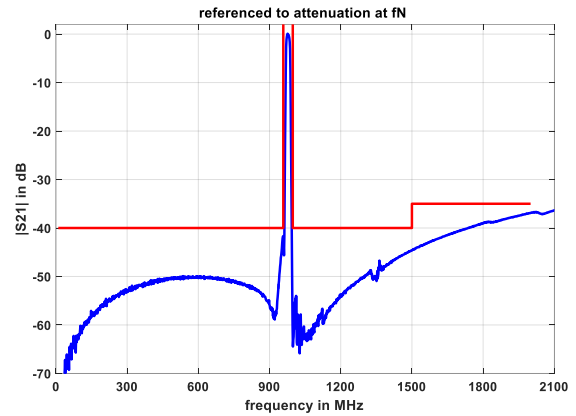
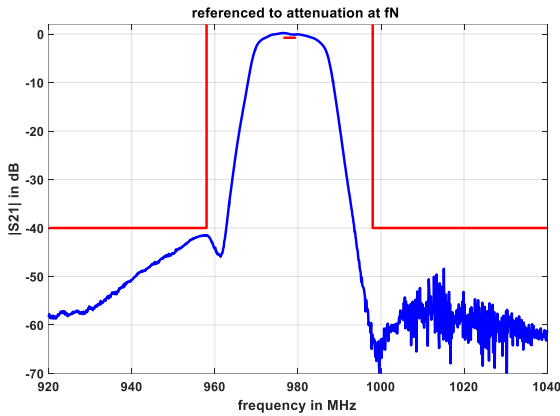
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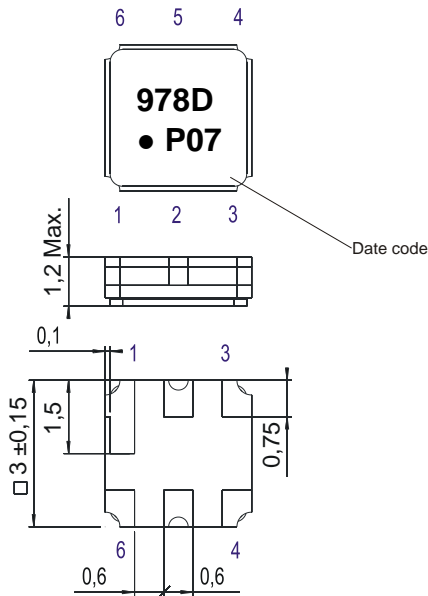
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Filter characteristic



Construction and pin connection

(All dimensions in mm)

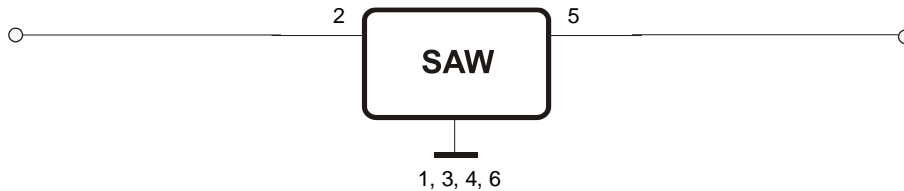


1	Ground
2	Input
3	Ground
4	Ground
5	Output
6	Ground

Date code: Year + week

P	2022
R	2023
S	2024
...	

50 Ohm Test circuit



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Stability characteristics, reliability

1. Shock: 1500 g, 0.5 ms, half sine wave, 5 Shocks each of the orientations acc. to MIL-STD-883, Method 2002, Cond. B
2. Vibration: 10 Hz to 2000 Hz, 20 g acc. to MIL-STD-883, Method 2007, Cond. A
3. Temperature cycling: 100 cycles, -55 °C to 125 °C / 15 min. dwell time acc. to MIL-STD-883, Method 1010, Cond. B
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)

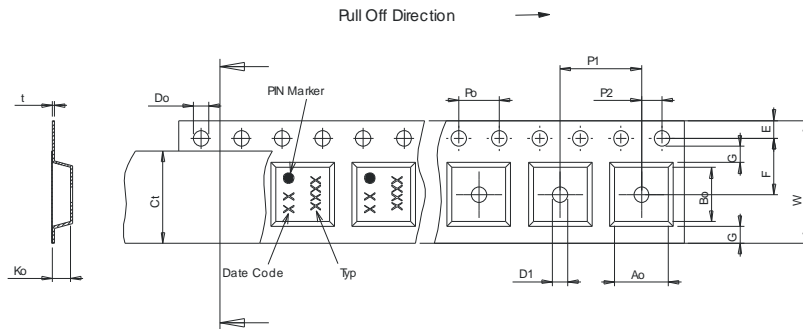
Packing

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

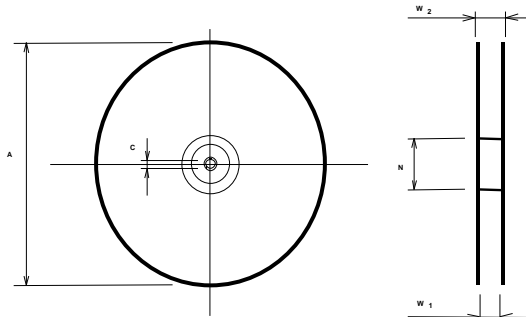
Tape (all dimensions in mm)

- W : 8.00 ±0.3
- Po : 4.00 ±0.1
- Do : 1.50 +0.1/-0
- E : 1.75 ±0.1
- F : 3.50 ±0.05
- G(min) : 0.75
- P2 : 2.00 ±0.05
- P1 : 4.00 ±0.1
- D1(min) : 1.50
- Ao : 3.25 ±0.1
- Bo : 3.25 ±0.1
- Ct : 5.30 ±0.1
- Ko : 1.50 ±0.1
- t : 0.25 ±0.05



Reel (all dimensions in mm)

- A : 330 or 180
- W1 : 8.40 +1.5/-0
- W2(max) : 14.40
- N(min) : 60.00
- C : 13.0 ±0.2



The minimum bending radius is 45 mm.

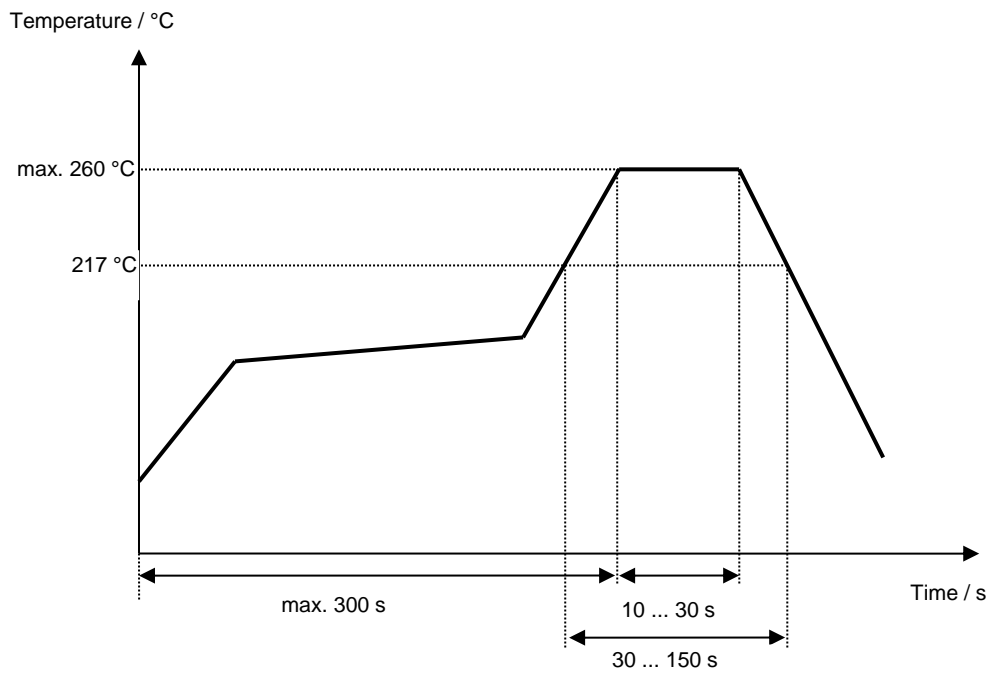
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Air reflow temperature conditions

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****TFS978D****5/5****History**

Version	Reason of Changes	Name	Date
1.0	- Generation of development specification	A. Molke	01.09.2020
2.0	- Update of data table (relative attenuation)	A. Molke	06.10.2020
2.1	- Update of data table (storage temperature range)	A. Molke	19.08.2021
3.0	- Update of data table (insertion loss) - Change from development spec to filter spec - Typical values added - Filter characteristic added	A. Molke	16.02.2022

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