

Microchip**Filter specification****TFS1650E****1/5****Measurement condition**

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

Characteristics

Remark:

The maximum attenuation in the pass band is defined as the insertion loss a_e . The nominal frequency f_N is fixed at 1650.0 MHz without any tolerance or limit. The values of absolute attenuation a_{abs} 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.

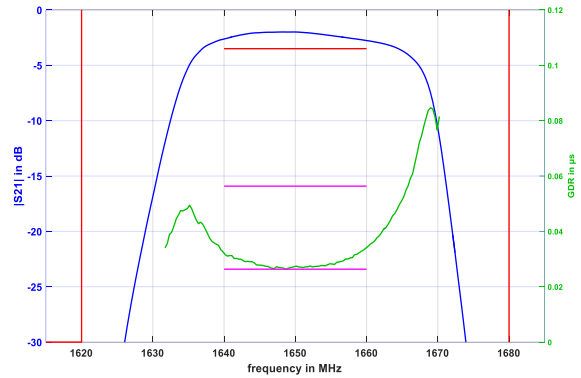
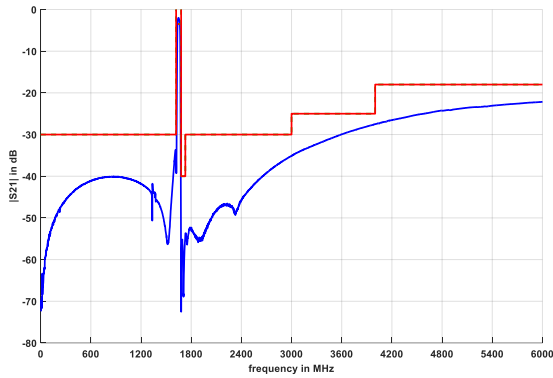
D a t a	typ. value		tolerance / limit		
Insertion loss	a_e	3.1 dB	max.	3.5	dB
Nominal frequency	f_N	-	f_N	1650.0	MHz
Passband	PB	-	$f_N \pm$	10.0	MHz
Passband variation	PBV	1.1 dB	max.	2.0	dB
Absolute attenuation	a_{abs}				
0.3 MHz ... 1500 MHz		40 dB	min.	30	dB
1500 MHz ... 1570 MHz		42 dB	min.	30	dB
1570 MHz ... 1620 MHz		34 dB	min.	30	dB
1680 MHz ... 1730 MHz		52 dB	min.	40	dB
1730 MHz ... 3000 MHz		35 dB	min.	30	dB
3000 MHz ... 4000 MHz		27 dB	min.	25	dB
4000 MHz ... 6000 MHz		22 dB	min.	18	dB
Group delay ripple within PB	GDR	21 ns	max.	30	ns
VSWR within PB		1.4 : 1	max.	2 : 1	
Input power level		-	max.	18	dBm
Operating temperature range	OTR	-		0 °C... +75 °C	
Storage temperature range		-		-55 °C... +125 °C	

Generated:**Checked / Approved:**

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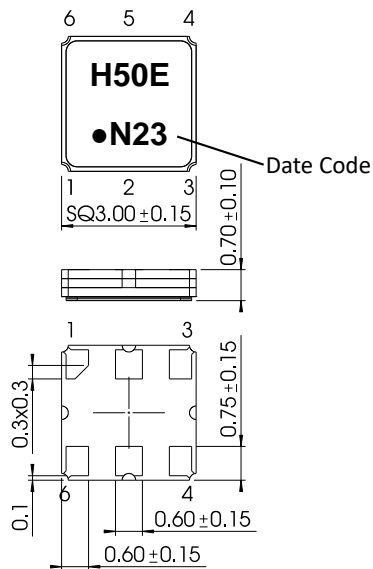
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Filter characteristic



Construction and pin connection

(All dimensions in mm)

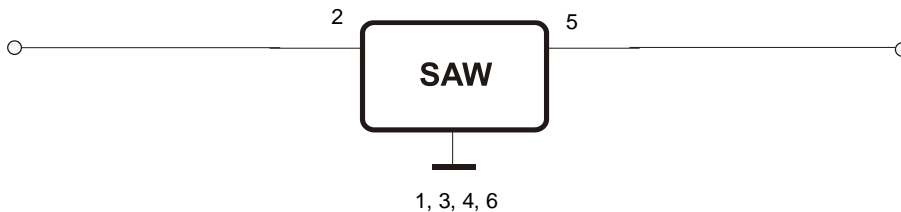


- 1 Ground
- 2 Input
- 3 Ground
- 4 Ground
- 5 Output
- 6 Ground

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

Pad finish: 0.3...0.7μm Au over min. 3.0μm Ni

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)

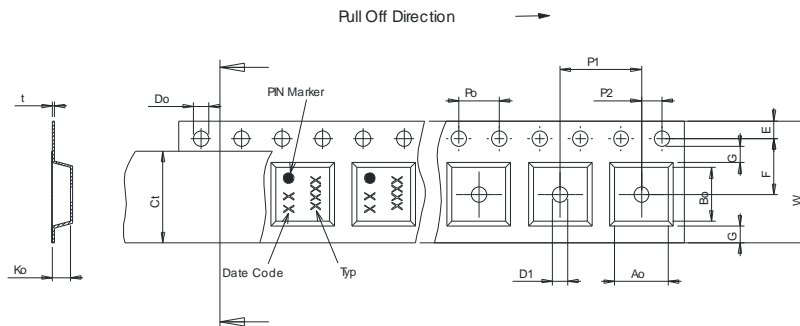
Packing

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

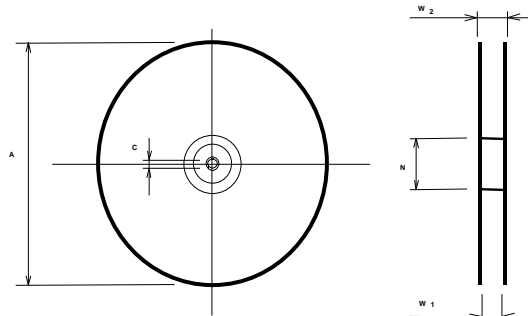
Tape (all dimensions in mm)

- W : 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.

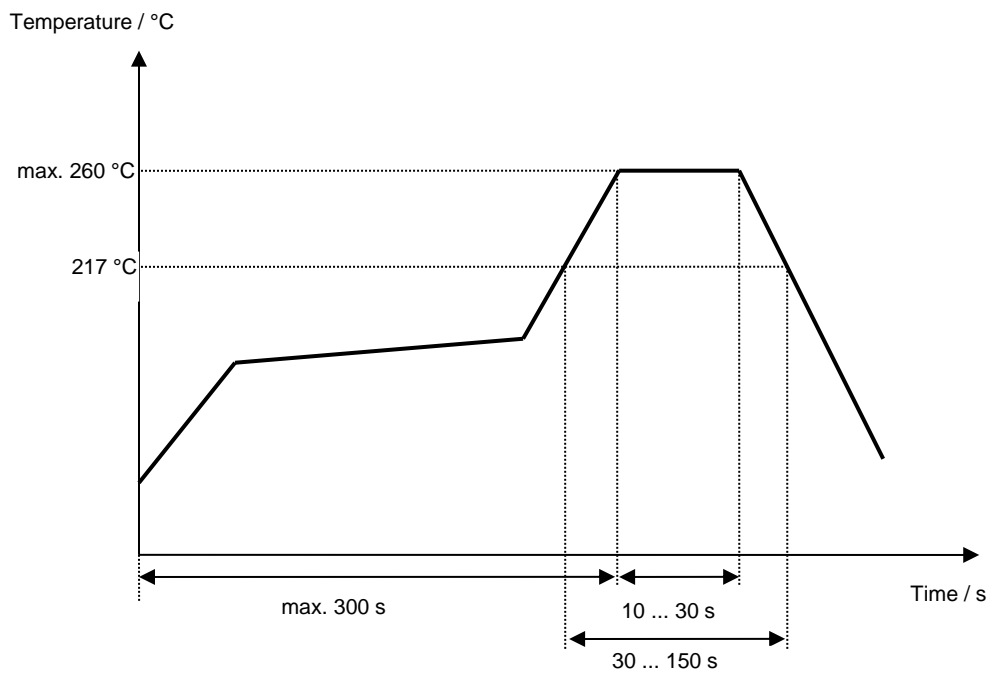
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Air reflow temperature conditions

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



Microchip**Filter specification****TFS1650E****5/5****History**

Version	Reason of Changes	Name	Date
1.0	- Generation of development specification	C. Noack	15.03.2019
2.0	- Generation of filter specification - Add typical values and filter characteristic - Change data table	C. Noack	23.09.2019
3.0	- Update package drawing	C. Noack	10.05.2021
3.1	- Added pad finish details	P. Jaster	10.06.2021

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