

Microchip**Filter specification****TFS160W****1/5****Measurement condition**

Ambient temperature T_A :	23	°C
Input power level:	0	dBm
Terminating impedance: *		
Input:	387 Ω	- 17.5 pF
Output:	421 Ω	- 16.7 pF

Characteristics

Remark:

The nominal frequency f_N is fixed at 160 MHz. The insertion loss a_e is defined as the arithmetic mean insertion loss value within the passband. Reference level for the relative attenuation a_{rel} of the TFS160W is 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 . **All specified data are met within the operating temperature range.**

D a t a		typ. value		tolerance / limit					
Insertion loss (reference level)	a_e	8	dB	max.	12 dB				
Nominal frequency	f_N	-			160 MHz				
Centre frequency	f_C	-		max.	160 \pm 0.1 MHz				
Passband	PB			$f_N \pm$	0.565 MHz				
Pass band ripple	p-p	0.9	dB	max.	1.5 dB				
Bandwidth	BW								
1.5 dB		1.26	MHz	min.	1.13 MHz				
3 dB		1.38	MHz	max.	1.75 MHz				
40 dB		2.20	MHz	max.	2.78 MHz				
Relative attenuation	a_{rel}								
f_N	$\dots f_N \pm$	0.565	MHz	0.9	dB	max.	1.5	dB	
$f_N \pm$	0.875 MHz	$\dots f_N \pm$	1.39	MHz	10	dB	min.	3	dB
$f_N \pm$	1.39 MHz	$\dots f_N \pm$	2.0	MHz	45	dB	min.	40	dB
$f_N \pm$	2.0 MHz	$\dots f_N \pm$	20.0	MHz	44	dB	min.	41	dB
$f_N -$	155 MHz	$\dots f_N -$	20.0	MHz	55	dB	min.	45	dB
$f_N +$	20.0 MHz	$\dots f_N +$	2340.0	MHz	60	dB	min.	45	dB
Return loss within PB		18	dB	min.	10	dB			
Input power		-	dBm	max.	10	dBm			
Input power (up to 4000 hours without permanent damage)		-	dBm	max.	20	dBm			
Operable temperature range		-			- 40 °C ... + 100 °C	***			
Operating temperature range	OTR	-			- 40 °C ... + 90 °C				
Storage temperature range		-			- 55 °C ... + 125 °C				
Frequency inversion temperature	T_O	40	°C						
Temperature coefficient of frequency	TC_f **	-0.036	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.

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

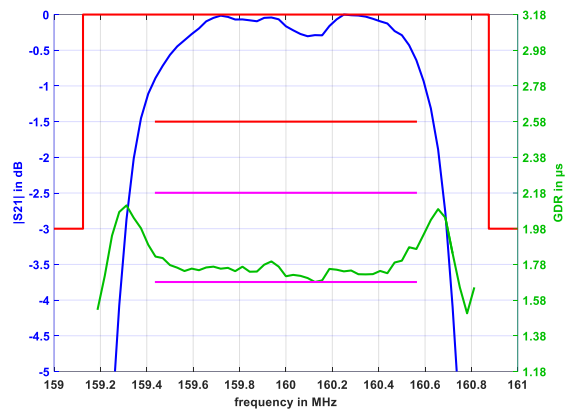
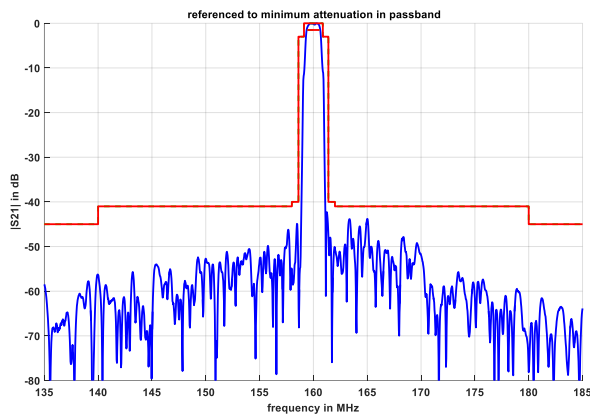
***) Between +90 °C to +100 °C degradation of performance is acceptable to the customer.

Generated:**Checked / Approved:**

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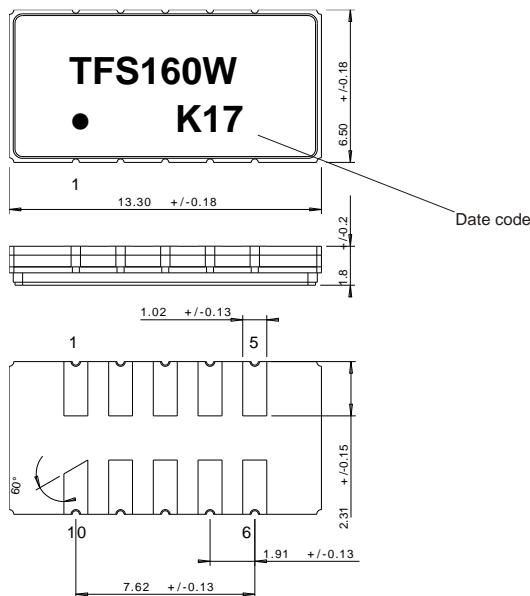
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Filter characteristic



Construction and pin connection

(All dimensions in mm)

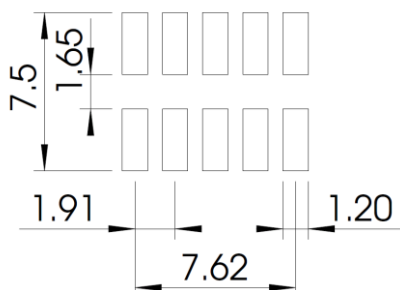


1	Ground
2	Ground
3	Ground
4	Ground
5	Output
6	Ground
7	Ground
8	Ground
9	Ground
10	Input

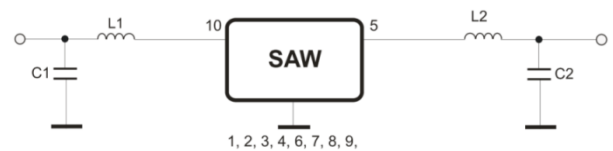
Date code: Year + week
 K 2018
 L 2019
 M 2020
 ...

Terminal finish: min. 0.5μm Au over min. 2μm Ni.

Package landing pattern:



50 Ω Test circuit:



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Stability characteristics, reliability

The device is designed to meet the following qualification requirements:

Mechanical Shock (MIL-STD-202, Method 213, Condition C): 100 g

Performance Random Vibration:

- 50 to 1000 Hz: 0.35 g²/Hz
- 1000 to 2000 Hz: 6 dB/octave roll off
- overall: 23 g RMS Min

Endurance Random Vibration:

- 50 to 1000 Hz: 1.10 g²/Hz
- 1000 to 2000 Hz: 6 dB/octave roll off
- overall: 40 g RMS Min

Moisture sensitivity:

- MSL1 (hermetic package)

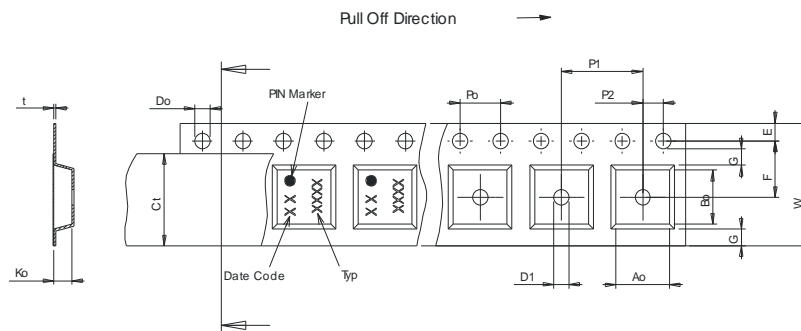
Packing

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

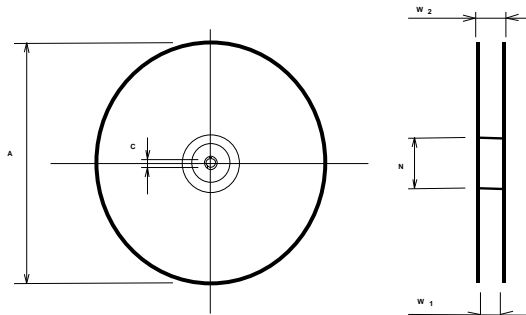
Tape (all dimensions in mm)

- W : 24.00 +0.30/-0.10
- Po : 4.00 ±0.1
- Do : 1.50 +0.1/0
- E : 1.75 ±0.10
- F : 11.50 ±0.10
- G(min) : 0.60
- P2 : 2.00 ±0.1
- P1 : 12.00 ±0.1
- D1(min) : 1.50
- Ao : 7.00 ±0.10
- Bo : 13.80 ±0.10
- Ct : 21.00 ±0.1
- Ko : 2.10 ±0.10
- 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.

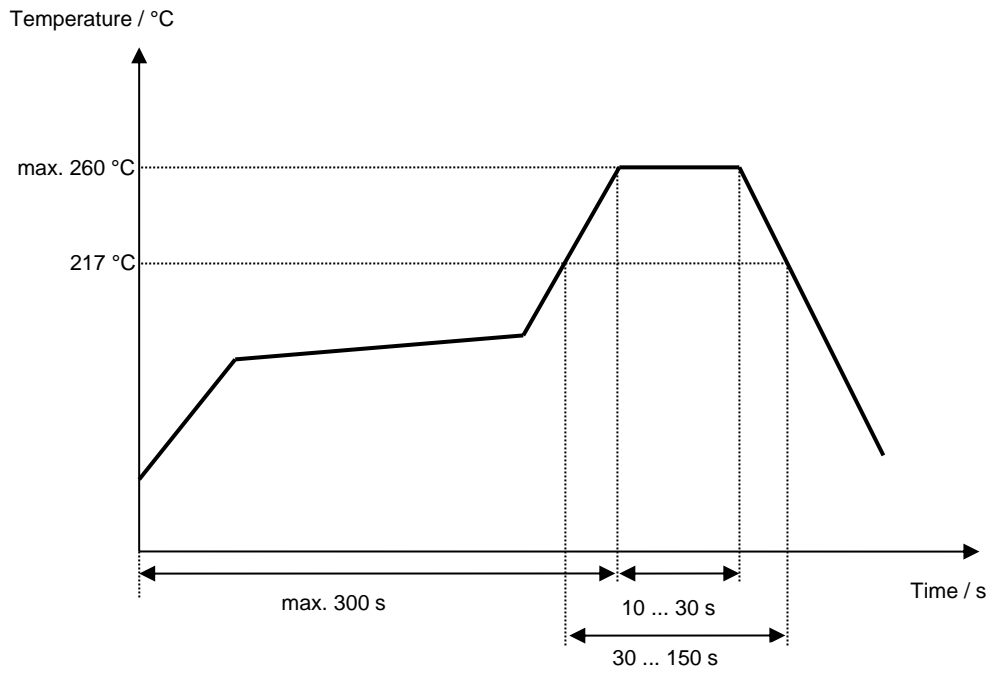
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Air reflow temperature conditions

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****TFS160W****5/5****History**

Version	Reason of Changes	Name	Date
1.0	- Generation of development specification	Jaffer	24.04.2018
1.1	- f_c over OTR, add customer requested screening	Jaffer	04.05.2018
1.2	- Move to filter spec., add typ. values, land pattern and terminal finish	Jaffer	23.07.2018
1.3	- Add BW parameters to the spec table (as requested by the customer).	Jaffer	31.07.2018

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