

Microchip**Filter specification****TFS156D****1/5****Measurement condition**

Ambient temperature:	23	°C
Input power level:	0	dBm
Terminating impedance:		
Input:	630 Ω -2 pF	
Output:	630 Ω -2 pF	

Characteristics

Remark:

The reference level for the relative attenuation a_{rel} of the TFS156D is the minimum attenuation in the pass band. The minimum attenuation in the pass band is defined as the insertion loss a_e . The nominal frequency f_N is fixed at 156.25 MHz without any tolerance or limit. The values of relative attenuation a_{rel} are guaranteed over the whole operating temperature range. The frequency shift of the filter within the operating temperature range is included in the production tolerance scheme.

D a t a	typ. value		tolerance / limit		
Insertion loss	a_e	2.3	dB	max. 5	dB
Nominal frequency	f_N	156.26	MHz	156.25	MHz
Passband	PB	170	kHz	$f_N \pm 50.0$	kHz
Pass band variation		1.0	dB	max. 2.0	dB
Relative attenuation	a_{rel}				
$f_N \pm 250$	kHz ...	$f_N \pm 600$	kHz	40	dB
$f_N + 600$	kHz ...	$f_N + 800$	kHz *	37	dB**
$f_N + 800$	kHz ...	$f_N + 1.2$	MHz	55	dB
$f_N + 1.2$	MHz ...	$f_N + 2$	MHz	65	dB
$f_N + 2$	MHz ...	$f_N + 4$	MHz	51	dB
$f_N + 4$	MHz ...	$f_N + 60$	MHz	58	dB
$f_N - 600$	kHz ...	$f_N - 800$	kHz	60	dB
$f_N - 800$	kHz ...	$f_N - 30$	MHz	58	dB
$f_N - 30$	MHz ...	$f_N - 42$	MHz	47	dB
$f_N - 42$	MHz ...	$f_N - 60$	MHz	65	dB
Input power level				max. 0	dBm
Temperature coefficient of frequency	TC_f ***	-0.032	ppm/K ²	-	
Turn over temperature		21	°C		
Operating temperature range	OTR	-		- 33 °C ... + 85 °C	
Storage temperature range		-		- 40 °C ... + 85 °C	

*) One narrow band distortion of minimum attenuation of 30dB is allowed within this frequency range.

**) For narrow band distortion

***) $\Delta f(\text{Hz}) = TC_f(\text{ppm/K}) \times (T - T_0)^2 \times f_{T0}(\text{MHz})$.

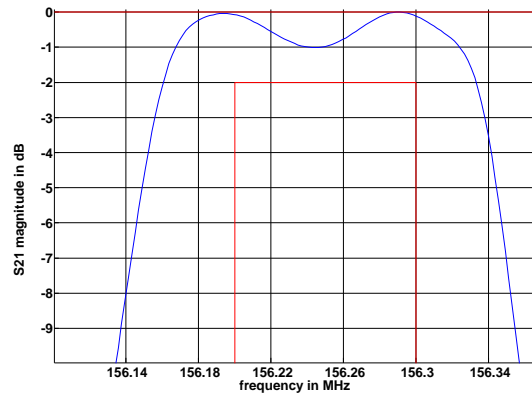
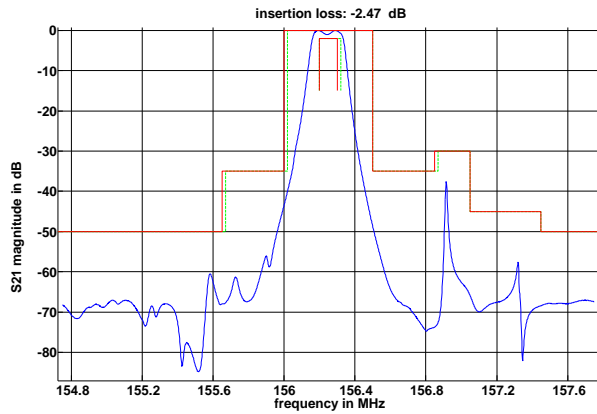
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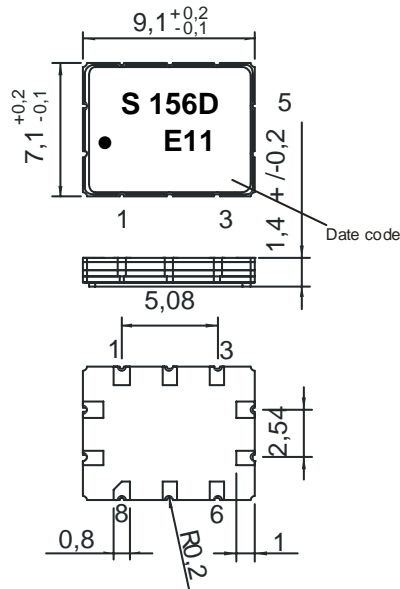
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Filter characteristic



Construction and pin connection

(All dimensions in mm)

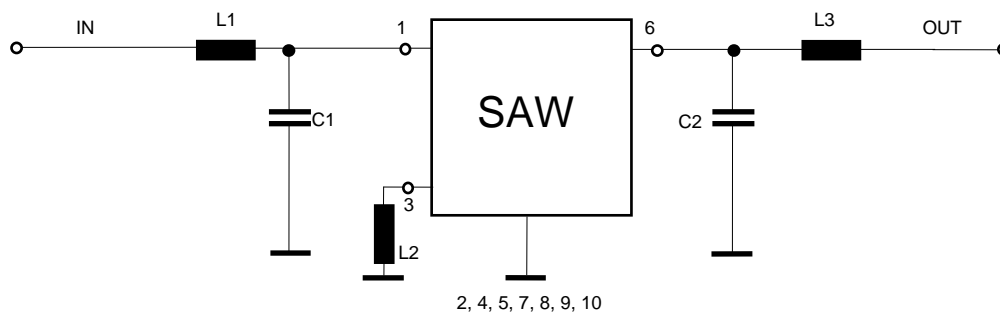


1	Input
2	Ground
3	External Coil
4	Ground
5	Ground
6	Output
7	Ground
8	Ground
9	Ground
10	Ground

Date code: Year + week

E	2014
F	2015
G	2016
...	

50 Ω Test circuit 1



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Stability characteristics, reliability

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

- 1. Shock: 500g, 1 ms, half sine wave, 3 shocks each plane;
DIN IEC 68 T2 - 27
- 2. Vibration: 10 Hz to 500 Hz, 0.35 mm or 5 g respectively, 1 octave per min, 10 cycles per plane, 3 planes; DIN IEC 68 T2 - 6
- 3. Change of temperature: -55 °C to 125°C / 15 min. each / 100 cycles
DIN IEC 68 part 2 – 14 Test N
- 4. Resistance to solder heat (reflow): reflow possible: three times max.;
for temperature conditions, see page 4: "Air reflow temperature conditions"
- 5. ESD ANSI/ESD S20.20-1999, class 1A for HBM

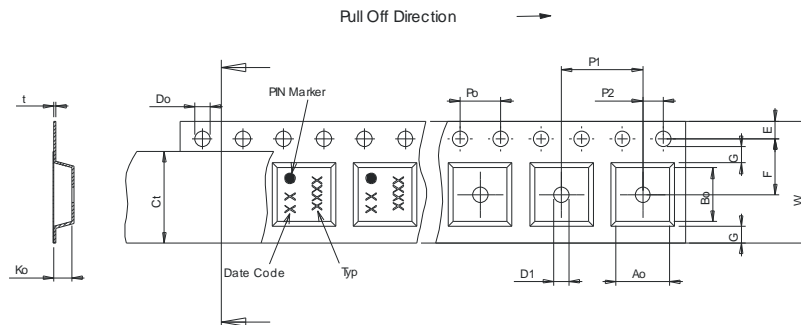
This filter is RoHS compliant (2011/65/EU)

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;
- max. pieces of filters per reel: 2000
 reel of empty components at start: min. 300 mm
 reel of empty components at start including leader: min. 500 mm
 trailer: min. 300 mm

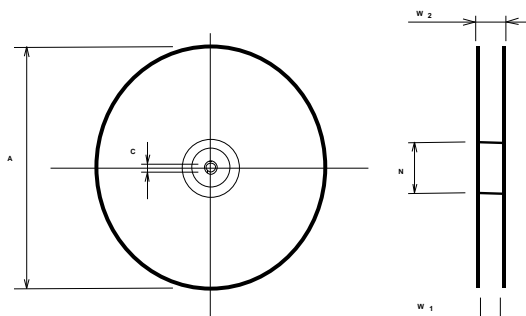
Tape (all dimensions in mm)

- W : 16.00 ± 0.3
- Po : 4.00 ± 0.1
- Do : 1.50 +0.1/-0
- E : 1.75 ± 0.10
- F : 7.50 ± 0.10
- G(min) : 0.60
- P2 : 2.00 ± 0.1
- P1 : 12.00 ± 0.1
- D1(min) : 1.50
- Ao : 7.60 ± 0.10
- Bo : 9.60 ± 0.10
- Ct : 13.3



Reel (all dimensions in mm)

- A : 330
- W1 : 16.4
- W2(max) : 22.4
- N(min) : 50
- C : 13.0



The minimum bending radius is 45 mm.

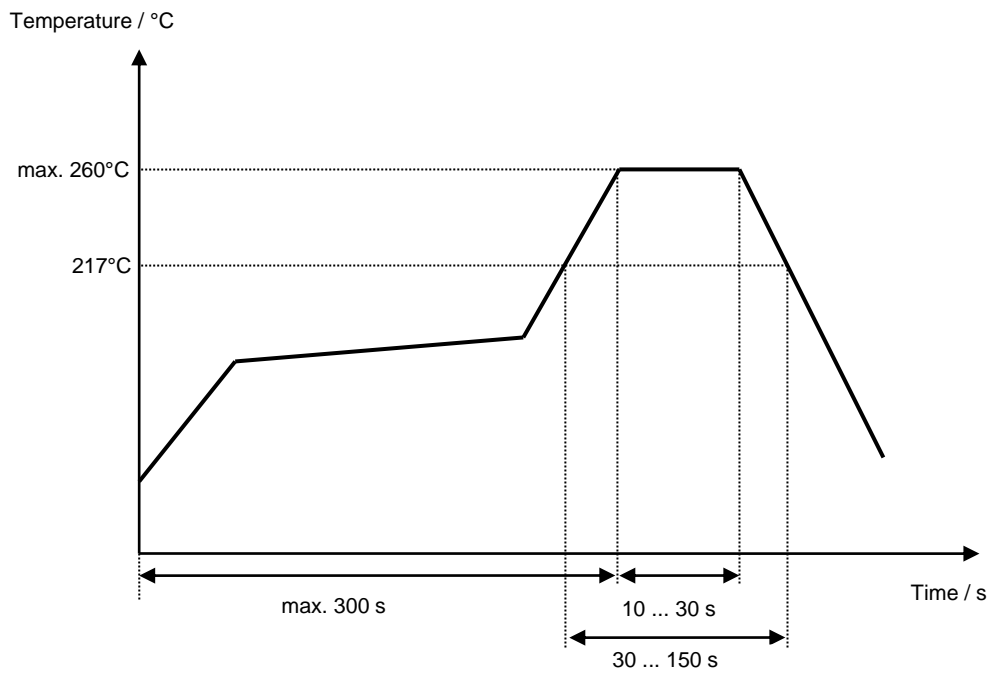
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Air reflow temperature conditions

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****TFS156D****5/5****History**

Version	Reason of Changes	Name	Date
1.0	- Generation of development specification.	C. Schönbein	07.05.2012
2.0	- Generation of filter specification - Added terminating impedance - Added typical values - Changed relative attenuation - Added filter characteristic - Added test circuit - Added turn over temperature	Raura	22.08.2012
2.1	- Updated comma/period punctuation marks - Changed filter marking in construction and pin connection - Updated stability characteristics, reliability	Raura	12.03.2014

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