

Microchip**Filter specification****TFS 243E****1/5****Measurement condition**

Ambient temperature T_A :	23	°C
Input power level:	0	dBm
Terminating impedance: *)		
Input:	384 Ω	-3.8 pF
Output:	384 Ω	-3.8 pF

Characteristics

Remark:

The reference level for the relative attenuation a_{rel} of the TFS 243E 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 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 . The nominal frequency f_N is fixed at 243.0 MHz without any tolerance. The given values for both the relative attenuation a_{rel} and the group delay ripple have to be achieved at the frequencies given below even if the centre frequency f_c is shifted due to the temperature coefficient of frequency TC_f within the operating temperature range and due to a production tolerance for the centre frequency f_c .

D a t a		typ. value		tolerance / limit	
Insertion loss		a_e	1.4 dB	max.	2.5 dB
(reference level)					
Nominal frequency		f_N	-		243.0 MHz
Centre frequency at ambient temperature		f_c	243.0 MHz		242.9 ... 243.1 MHz
Passband		PB			$f_N \pm 25$ kHz
Passband ripple		PBR	0.15 dB	max.	± 0.5 dB
Bandwidth		BW			
0.5 dB			-	min.	± 25 kHz
3 dB			440 kHz		-
Relative attenuation		a_{rel}			
$f_N \pm 0.5$ MHz ... $f_N \pm 1.0$ MHz			15 dB	min.	7 dB
$f_N \pm 1.0$ MHz ... $f_N \pm 3.0$ MHz			30 dB	min.	25 dB
$f_N \pm 3.0$ MHz ... $f_N \pm 5.0$ MHz			37 dB	min.	25 dB
$f_N \pm 5.0$ MHz ... $f_N \pm 8.0$ MHz			43 dB	min.	25 dB
$f_N \pm 8.0$ MHz ... $f_N \pm 20.0$ MHz			48 dB	min.	40 dB
Input power level			-	max.	15 dBm
Operating temperature range		OTR	-		-40 ... +85 °C
Storage temperature range			-		-55 ... +125 °C
Frequency inversion temperature		T_o	+28 °C		-
Temperature coefficient of frequency		$TC_f^{**})$	-0.032 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.

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

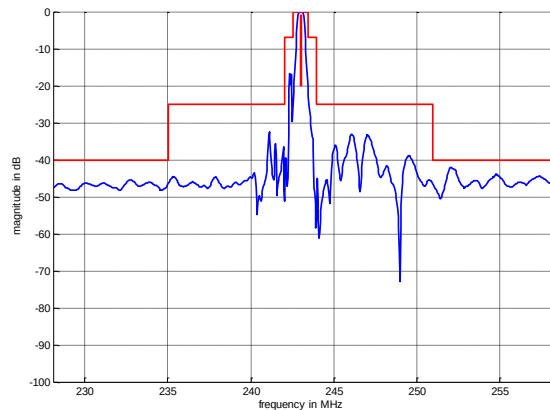
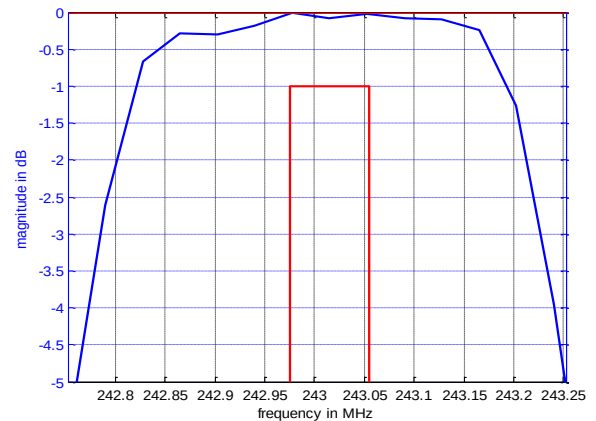
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Checked / Approved:

Microchip Frequency Technology GmbH
Potsdamer Straße 18
D 14 513 TELTOW / Germany
Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30

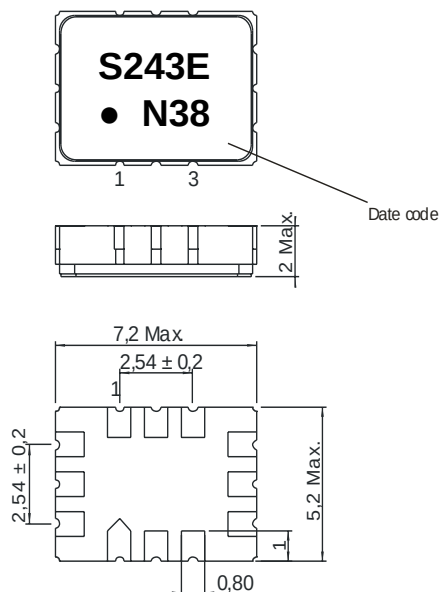
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Filter characteristic



Construction and pin connection

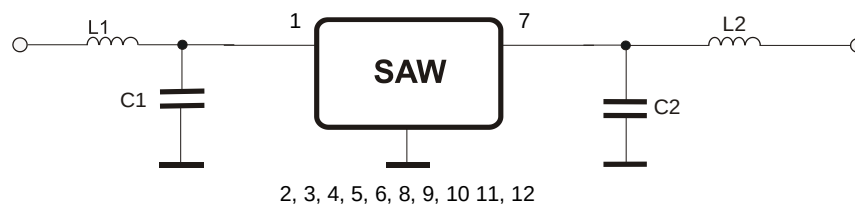
(All dimensions in mm)



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

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

50 Ohm Test circuit



Stability characteristics, reliability

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

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;

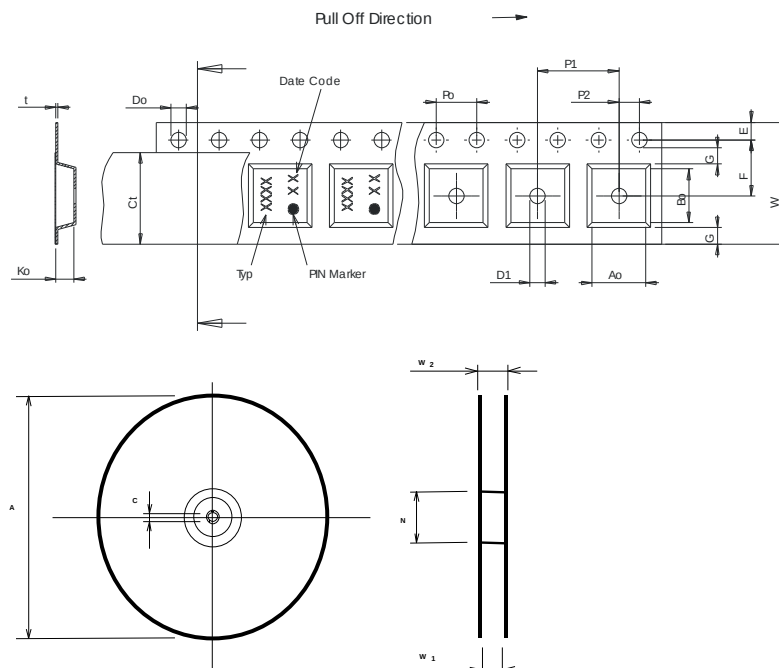
reel of empty components at start:	min. 300 mm
reel of empty components at start including leader:	min. 500 mm
trailer:	min. 300 mm

Tape (all dimensions in mm)

W	: 16.00 +0.3/-0.1
Po	: 4.00 ±0.1
Do	: 1.50 +0.1/-0
E	: 1.75 ±0.1
F	: 7.50 ±0.1
G(min)	: 0.75
P2	: 2.00 ±0.1
P1	: 8.00 ±0.1
D1(min)	: 1.50
Ao	: 5.40 ±0.1
Bo	: 7.60 ±0.1
Ct	: 13.30 ±0.1
Ko	: 2.00 ±0.1
t	: 0.30 ±0.05

Reel (all dimensions in mm)

A	: 330 or 180
W1	: 16.4 +2/-0
W2(max)	: 22.40
N(min)	: 50.00
C	: 13.0 +0.5/-0.2



The minimum bending radius is 45 mm.

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Potsdamer Straße 18

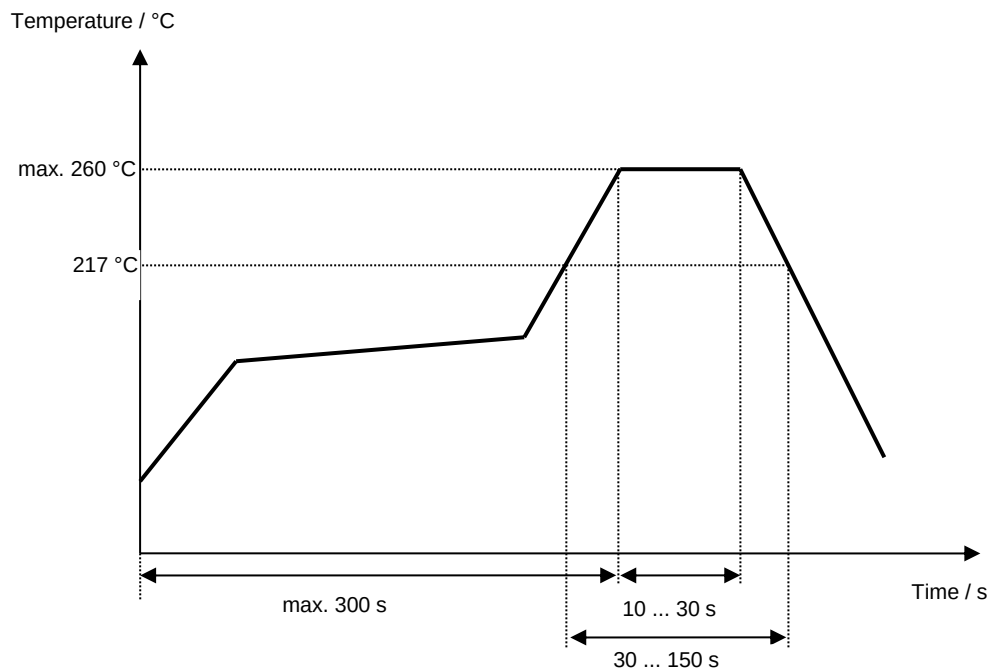
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Air reflow temperature conditions

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****TFS 243E****5/5****History**

Version	Reason of Changes	Name	Date
1.0	Generation of development specification.	Strehl	27.07.2005
1.1	Bandwidth @ 1 dB added.	Strehl	30.08.2005
1.2	Generation of filter specification and typical values added.	Sabah	27.10.2005
1.3	Insertion loss, bandwidth and relative attenuation updated. Stability characteristics updated.	Strehl	08.02.2006
1.4	Relative attenuation corrected.	Strehl	16.02.2006
1.5	Filter characteristic corrected.	Strehl	21.02.2006
2.0	Centre frequency at ambient temperature including tolerances added. Frequency inversion temperature added to data table.	Schönbein	03.02.2015
2.1	Storage temperature range updated.	Schönbein	11.05.2017
3.0	Updated terminating impedance Updated test circuit to LrCp	P. Jaster	15.09.2021
3.1	Updated stability characteristics and reliability	P. Jaster	23.09.2021