

Microchip	Filter specification	TFS240M	1/5
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Measurement condition

Ambient temperature T_A :	23	°C
Input power level:	0	dBm
Terminating impedance: *)		
Input:	950 Ω -2.3 pF	
Output:	950 Ω -2.3 pF	
External Coil:	330 nH	

Characteristics

Remark:

The reference level for the relative attenuation a_{rel} of the TFS240M 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 240 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 within OTR				a_e	3.9	dB	max.	5.5 dB
Insertion loss within ROTR					3.9	dB	max.	5.0 dB
Nominal frequency				f_N	-		240.0	MHz
Centre frequency				f_C	240.02	MHz	-	
Relative attenuation				a_{rel}				
f_N	...	$f_N \pm 100.0$	kHz		0.8	dB	max.	1.5 dB **)
$f_N \pm 100.0$	kHz	...	$f_N \pm 120.0$	kHz	1.5	dB	max.	3 dB
	0.3	MHz	...	$f_N - 4.8$	50	dB	min.	45 dB
$f_N - 4.8$	MHz	...	$f_N - 700.0$	kHz	42	dB	min.	40 dB
$f_N - 700.0$	kHz	...	$f_N - 500.0$	kHz	29	dB	min.	25 dB
$f_N + 500.0$	kHz	...	$f_N + 800.0$	kHz	33	dB	min.	25 dB
$f_N + 800.0$	kHz	...	$f_N + 4.8$	MHz	46	dB	min.	40 dB
$f_N + 4.8$	MHz	...	450.0	MHz	51	dB	min.	45 dB
Group delay ripple				GDR				
$f_N \pm 120$	kHz				800	ns	max.	2 μ s
Input power level				***)	-		max.	10 dBm
Operating temperature range				OTR	-		-40°C ... +85 °C	
Reduced operating temperature range				ROTR	-		0°C ... +50 °C	
Storage temperature range					-		-55°C ... +125 °C	
Frequency inversion temperature				T_0 ****)	0	°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.

**) 1 dB in reduced operating temperature range

***) also guaranteed 15 dBm for 1 minute over lifetime of filter

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

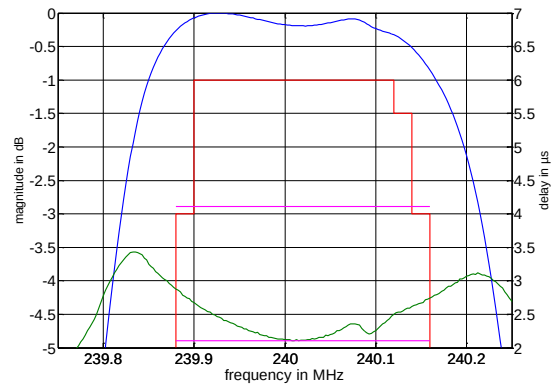
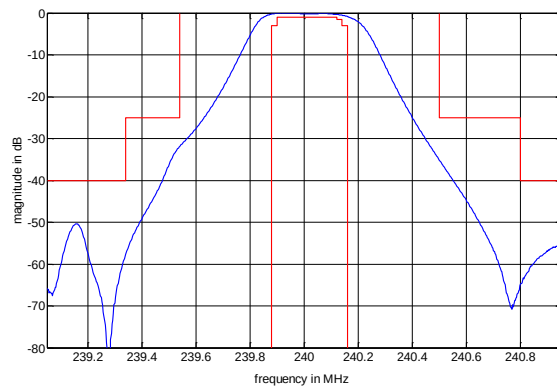
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Checked / Approved:

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

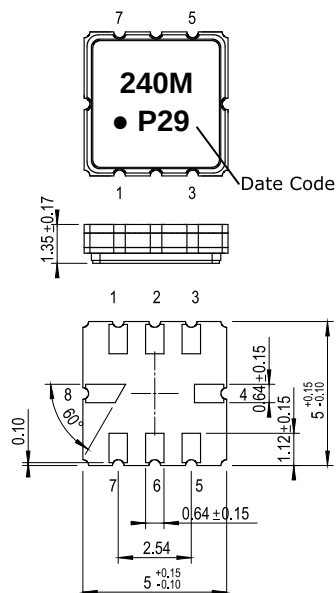
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Filter characteristic



Construction and pin connection

(All dimensions in mm)



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

Date code: Year + week

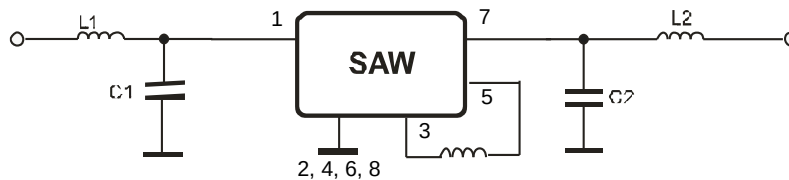
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50 Ω Test circuit



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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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;

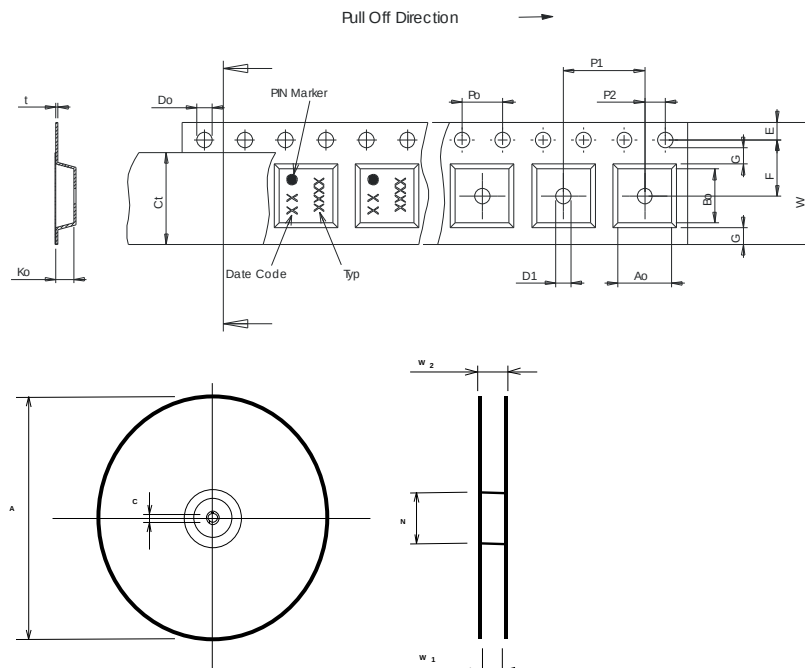
reel of empty components at start: min. 300 mm
reel of empty components at start including leader: min. 500 mm
trailer: min. 300 mm

Tape (all dimensions in mm)

W	: 12.00 +0.3/-0.1
Po	: 4.00 ±0.1
Do	: 1.50 ±0.10
E	: 1.75 ±0.1
F	: 5.50
G(min)	: 0.75
P2	: 2.00 ±0.1
P1	: 8.00
D1(min)	: 1.50
Ao	: 5.30 ±0.1
Bo	: 5.30 ±0.1
Ct	: 9.2 ±0.1
Ko	: 2.10 ±0.1
t	: 0.30 ±0.05

Reel (all dimensions in mm)

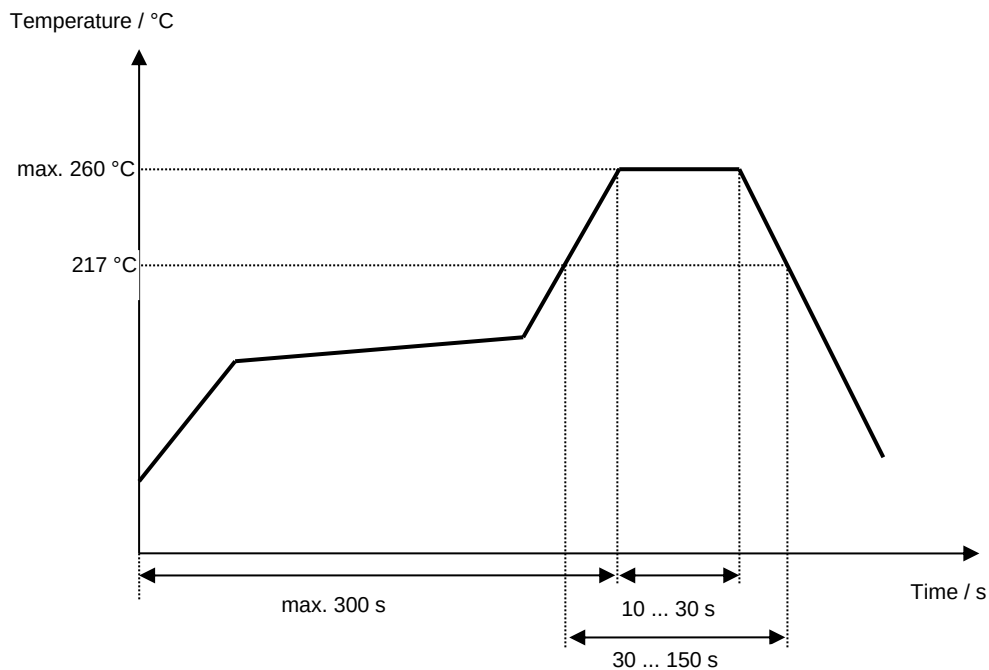
A	: 330 or 180
W1	: 12.4 +2/-0
W2(max)	: 18.40
N(min)	: 50.00
C	: 13.0



The minimum bending radius is 45 mm.

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****TFS240M****5/5****History**

Version	Reason of Changes	Name	Date
1.0	- Generation of development specification	Strehl	27.09.2004
1.1	- Increase of operating temperature range	Braun	12.10.2004
1.2	- Changed specification according to new design principle	Martens	16.11.2004
1.3	- Changed specification according to new customer requirement	Martens	02.12.2004
1.4	- Generated filter specification, added typical values	Martens	09.02.2005
1.5	- Changed filter characteristic	Martens	28.04.2005
2.0	- Changed construction and pin connection (package height) - Changed packing (pull off direction)	Bonnen	21.07.2022

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