

VI TELEFILTER

Filter specification

TFS 240M

Measurement condition

Ambient temperature:	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:

Reference level for the relative attenuation a_{rel} of the TFS 240M 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 tolerance. The given values for the relative attenuation a_{rel} and for the group delay ripple have to be reached at the frequencies given below even if the centre frequency f_c is shifted due to the temperature coefficient of frequency TC_f in 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 in OTR		a_e	3,9 dB	max.	5,5 dB
Insertion loss in 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	kHz	$f_N \pm 100$ kHz	0,8 dB	max.	1,5 dB **
$f_N \pm 100$	kHz	$f_N \pm 120$ kHz	1,5 dB	max.	3 dB
$f_N - 0,3$	MHz	$f_N - 4,8$ MHz	50 dB	min.	45 dB
$f_N - 4,8$	MHz	$f_N - 700$ kHz	42 dB	min.	40 dB
$f_N - 700$	kHz	$f_N - 500$ kHz	29 dB	min.	25 dB
$f_N + 500$	kHz	$f_N + 800$ kHz	33 dB	min.	25 dB
$f_N + 800$	kHz	$f_N + 4,8$ MHz	46 dB	min.	40 dB
$f_N + 4,8$	MHz	$f_N + 450$ MHz	51 dB	min.	45 dB
Group delay ripple					
$f_N \pm 120$	kHz		800 ns	max.	2 µs
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

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

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

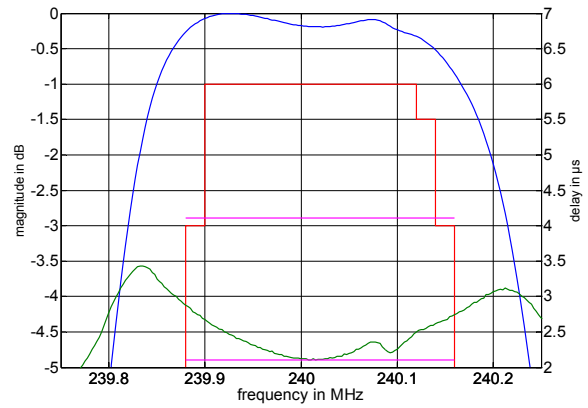
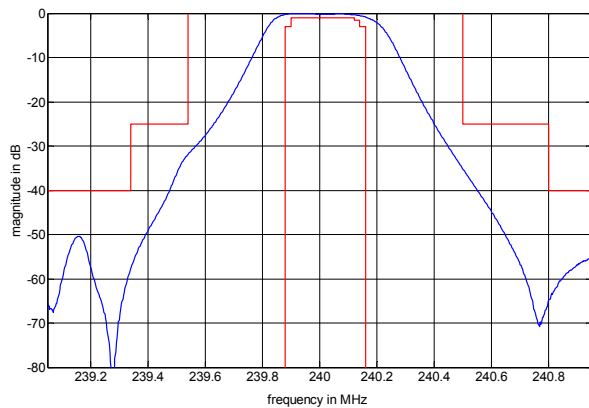
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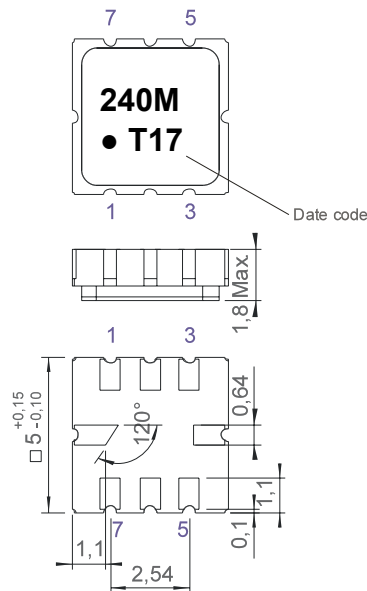
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Filter characteristic



Construction and pin connection

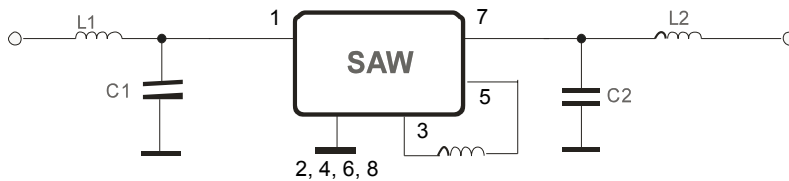
(All dimensions in mm)



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

Date code: Year + week
 T 2005
 U 2006
 V 2007
 ...

50 Ω Test circuit



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Stability characteristics

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 plan, 3 plans;
DIN IEC 68 T2 - 6
3. Change of temperature: -55 °C to 125°C / 30 min. each / 10 cycles
DIN IEC 68 part 2 – 14 Test N
4. Resistance to solder heat (reflow): reflow possible: twice max.;
for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4;

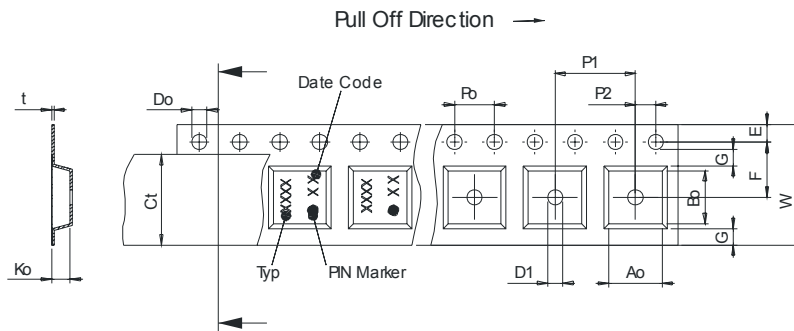
Packing

Tape & Reel: IEC 286 – 3, with expection 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 peer reel:	3000
reel of empty components at start:	min. 300 mm
reel of empty components at start including leader:	min. 500 mm
trailer:	min. 300 mm

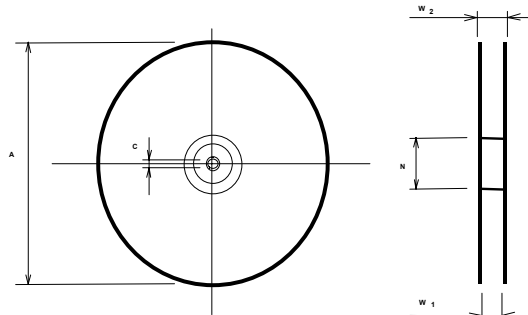
Tape (all dimensions in mm)

- W : 12,00 ± 0,3
- Po : 4,00 ± 0,1
- Do : 1,50 +0,1/-0
- E : 1,75 ± 0,1
- F : 5,50 ± 0,05
- G(min) : 0,75
- P2 : 2,00 ± 0,05
- P1 : 8,00 ± 0,1
- D1(min) : 1,50
- Ao : 5,30 ± 0,1
- Bo : 5,30 ± 0,1
- Ct : 9,5 ± 0,1



Reel (all dimensions in mm)

- A : 330
- W1 : 12,4 +2/-0
- W2(max) : 18,4
- N(min) : 50
- C : 13,0 +0,5/-0,2



The minimum bending radius is 45 mm.

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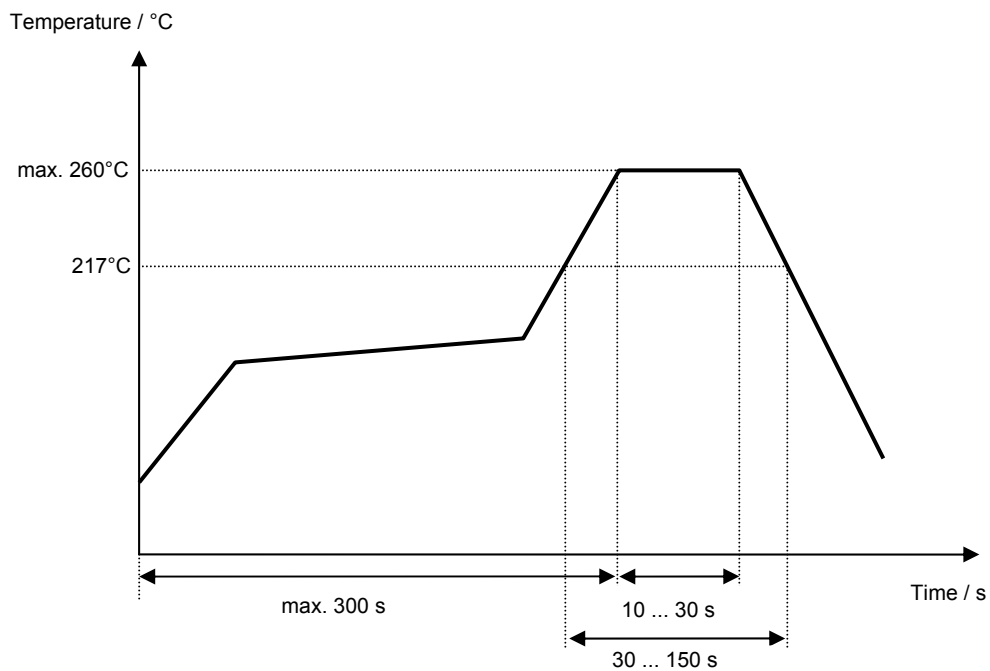
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Air reflow temperature conditions**Conditions**

Average ramp-up rate (30°C to 217°C)
 > 100°C
 > 150°C
 > 217°C
 Peak temperature
 Time within 5°C of actual peak temperature
 Cool-down rate (Peak to 50°C)
 Time from 30°C to Peak temperature

Exposure

less than 3°C/second
 between 300 and 600 seconds
 between 240 and 500 seconds
 between 30 and 150 seconds
 max. 260°C
 between 10 and 30 seconds
 less than 6°C/second
 no greater than 300 seconds

Chip-mount air reflow profile

VI TELEFILTER**Filter specification****TFS 240M****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

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