Measurement condition

Ambient temperature:	23	°C
Input power level:	0	dBm
Terminating impedance:		
Input:	50	Ω
Output:	50	Ω

Characteristics

Remark:
The reference level for the relative attenuation a_{rel} of the TFS 140AE 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 6 dB filter attenuation level relative to the insertion loss a_e. The temperature coefficient of frequency Tc_f is valid for both the reference frequency f_c and the frequency response of the filter in the operating temperature range.

D a t a		typ. value		tolerance / limit		
Insertion loss (reference level)	a_e	30,7	dB	max.	32	dB
Centre frequency at operating temperature	f_C	-			140 ± 0,25	MHz
Passband $f_C \pm f_Y * (1-a)$	PB				32	MHz
Pass band tilt within PB		0,004	dB/MHz	max.	0,012	dB/MHz
Relative attenuation	a_{rel}					
20 MHz … 115 MHz		50	dB	min.	40	dB
165 MHz … 280 MHz		47	dB	min.	40	dB
Reflected attenuation compared to main signal		70	dB	min.	50	dB
Crosstalk attenuation compared to main signal		58	dB	min.	50	dB
Deviation from theoretical phase response	$\Delta\varphi$	1,2	deg	max.	4,5	deg
Deviation from theoretical frequency response	$\Delta\alpha$					
f_C … $f_C \pm f_Y * (1-a)$		± 0,1	dB	max.	± 0,25	dB
$f_C \pm f_Y * (1-a)$ … $f_C \pm f_Y * (1)$		± 0,25	dB	max.	± 0,5	dB
Nyquist frequency	f_y	-			20	MHz
Roll-off factor	a	-			0,2	
Partitioning factor	p	-			1,0	
Group delay	at f_c	1,1	µs			
Group delay ripple within PB		9	ns	max.	25	ns
Input power level		-		max.	15	dBm
Operating temperature range	OTR	-		+ 45 °C		
Operable temperature range		-		- 45 °C ... + 85°C		
Storage temperature range		-		- 45 °C ... + 85°C		
Temperature coefficient of frequency	TC_f **	-72	ppm/K			

**) $\Delta f_C(Hz) = Tc_f(ppm/K) \times (T - T_o) \times f_{CAT}(MHz)$.

Theoretical frequency response :

$$\begin{cases} H(x) = (S(x))^P; & \text{where} \quad x = \dfrac{f - f_C}{f_Y} \\ S(x) = \begin{cases} 1, & \text{for} \quad |x| \le (1-a) \\ \dfrac{1}{2} \cdot \left(1 + \cos\left(\dfrac{\pi\ (|x| - 1 + a)}{2a}\right)\right), & \text{for} \quad (1-a) \le |x| \le (1+a), \\ 0 & \text{for} \quad (1+a) \le |x| \end{cases} \end{cases}$$

Generated:

Checked / Approved:

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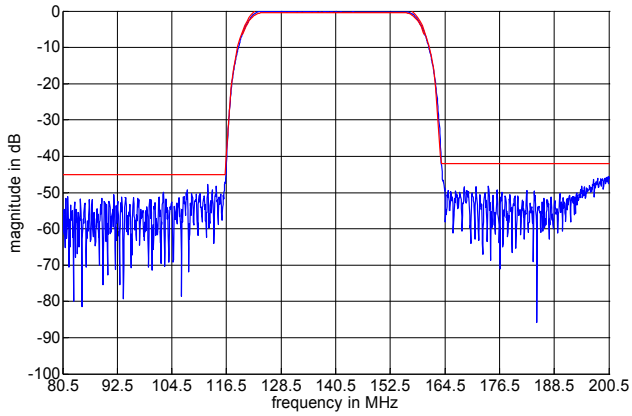
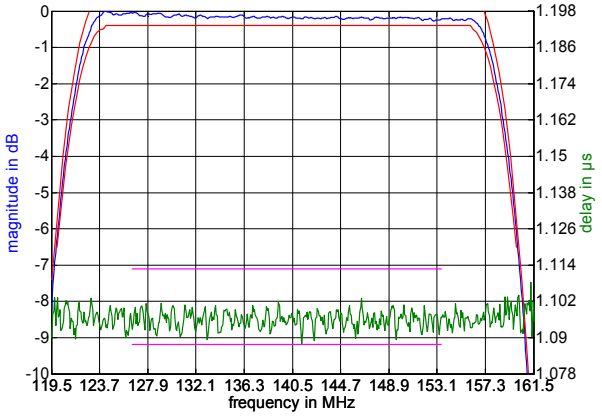
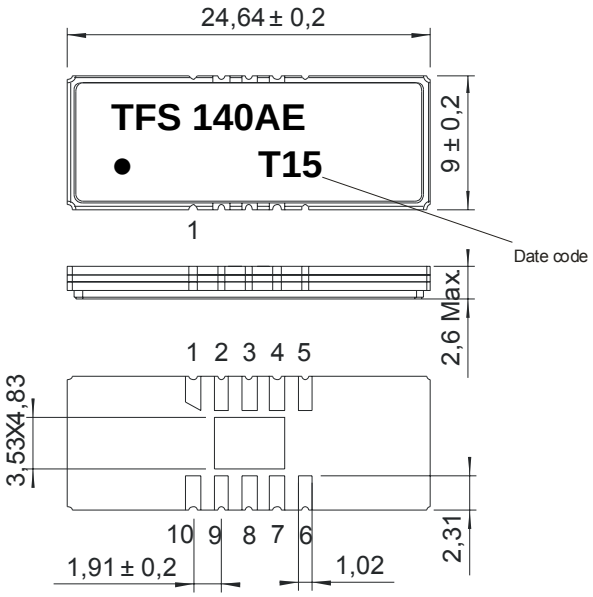
Filter characteristic





Construction and pin connection

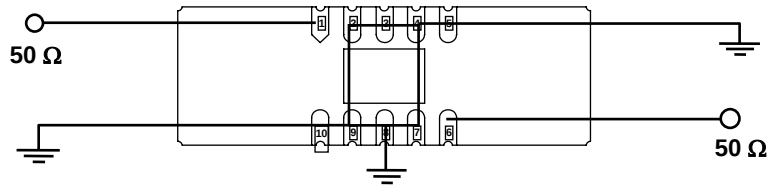
(All dimensions in mm)



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

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

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;

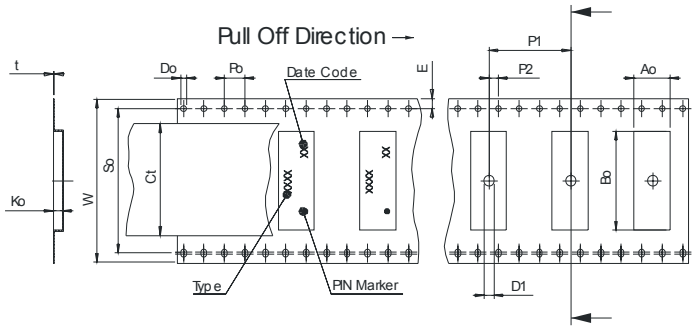
Packing

Tape & Reel: IEC 286 – 3, with exeption 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:	1000
reel of empty components at start:	min. 300 mm
reel of empty components at start including leader:	min. 300 mm
trailer:	min. 300 mm

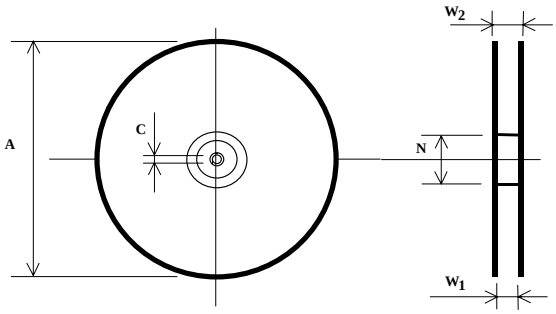
Tape (all dimensions in mm)

W	: 44,00	± 0,3
Po	: 4,00	± 0,1
Do	: 1,50	+0,1/-0
E	: 1,75	± 0,1
F	: 20,20	± 0,15
P2	: 2,00	± 0,15
P1	: 16,00	± 0,1
D1(min)	: 2,00	
Ao	: 9,30	± 0,1
Bo	: 24,90	± 0,1
So	: 40,40	± 0,1
Ct	: 38,0	± 0,1



Reel (all dimensions in mm)

A	:330	
W1	: 44,4	+2/-0
W2(max)	: 50,4	
N(min)	:100	
C	: 13,0	+0,5/-0,2



The minimum bending radius is 45 mm.

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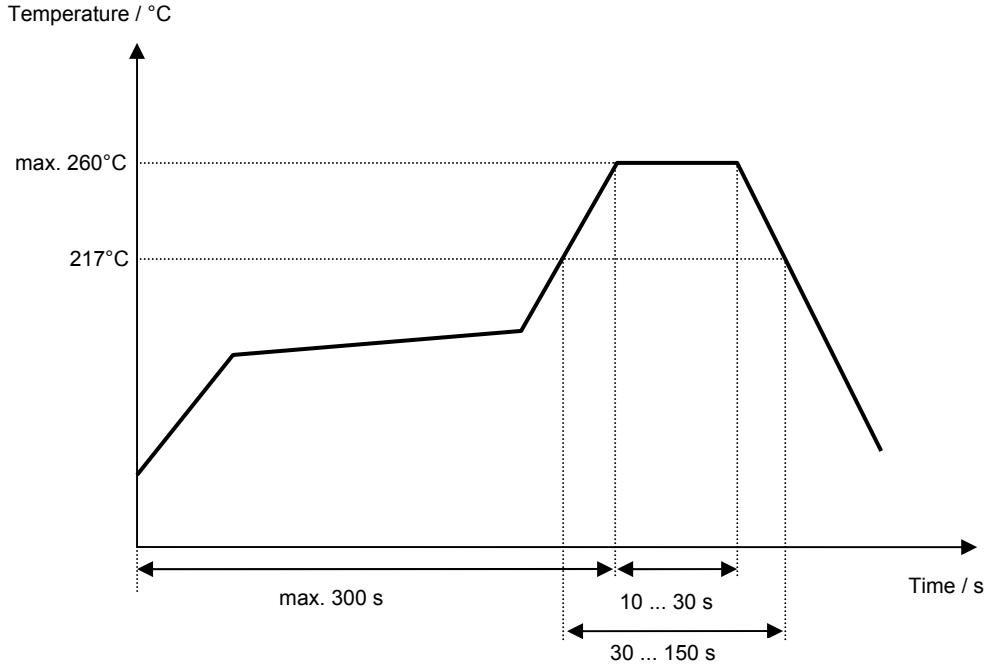
Air reflow temperature conditions

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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History :

Version	Reason of Changes	Name	Date
1.0	Generate development specification	Noack	25.05.2004
1.1	typical values and filter characteristic added frequency range of passband-stopband transition modified	Pfeiffer	05.10.2004
1.2	- air reflow temperature profile modified - set limits of centre frequency at operating temperature	Pfeiffer	08.04.2005

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