

VI TELEFILTER**Filter Specification****TFS 144****1/5****Measurement condition**

Ambient temperature T_A : 23 °C
 Input power level: 0 dBm
 Terminating impedances at f_C :*)

input: 1,30 kΩ || -12,9 pF
 output: 1,21 kΩ || -12,1 pF

Characteristics

Remark:

Reference level for the relative attenuation a_{rel} of the **TFS 144** is the minimum of the pass band attenuation a_{min} . It 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 **1,5 dB** filter attenuation level relative to the insertion loss a_e . The nominal frequency f_N is fixed on **144 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 also if the centre frequency f_C is shifted due to the temperature coefficient of frequency T_{Cf} in the operating temperature range and due to a production tolerance for the centre frequency f_C .

Data		typ. value		tolerance / limit		
Insertion loss (Reference level)	a_e	12,5	dB	max.	15,0	dB
Nominal frequency	f_N	-			144,15	MHz
Centre frequency	f_C	144,15	MHz			
1,5 dB Passband		2,6	MHz	min.	2,2	MHz
Relative attenuation	a_{rel}					
f_N	$f_N \pm 1,1$ MHz	1,0	dB	max.	1,5	dB
$f_N \pm 2,0$ MHz	$f_N \pm 10,0$ MHz	43	dB	min.	40,0	dB
$f_N \pm 10,0$ MHz	$f_N \pm 100$ MHz	60	dB	min.	35,0	dB
VSWR:		13	dB			
Operating temperature range					0 °C ... + 70 °C	
Temperature coefficient of frequency (T_{Cf}) **)		-0,036	ppm/ K ²			
Frequency inversion temperature T_o		25	°C			
Input power level:				max.	10,0	dBm

*) 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.

**) $\Delta f_C(\text{Hz}) = T_{Cf}(\text{ppm/K}^2) \times (T_o - T_A)^2 \times f_{T_o}(\text{MHz})$

f_{T_o} is reference frequency f_c at frequency inversion temperature (T_o)

Generated:**Checked/Approved:**

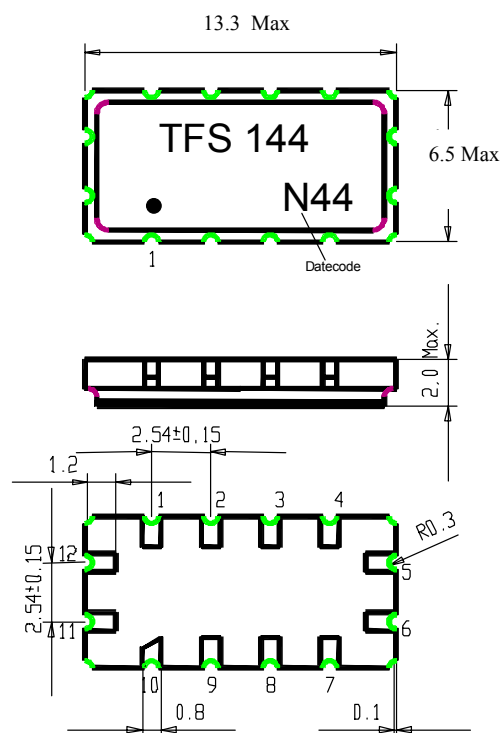
VI TELEFILTER
 Potsdamer Straße 18
 D 14 513 TELTOW / Germany
 Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30
 E-Mail: tft@telefilter.com

Vectron International, Inc.
 267 Lowell Road
 Hudson, NH 03051 / USA
 Tel: (603) 598-0070 Fax: (603) 598-0075
 E-Mail: vti@vtinh.com

VI TELEFILTER reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information

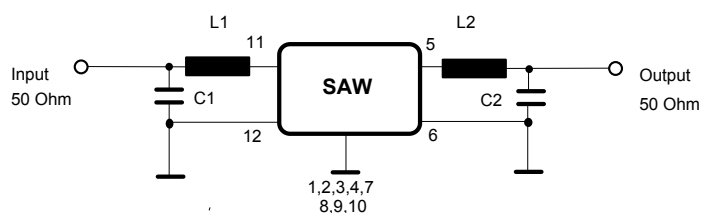
VI TELEFILTER**Filter Specification****TFS 144****2/5****Construction and pin connection**

(All dimensions in mm)



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

Date code: Year+week
 L 1999
 M 2000
 N 2001

**VI TELEFILTER**

Potsdamer Straße 18

D 14 513 TELTOW / Germany

Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30

E-Mail: tft@telefilter.com**Vectron International, Inc.**

267 Lowell Road

Hudson, NH 03051 / USA

Tel: (603) 598-0070 Fax: (603) 598-0075

E-Mail: vti@vtinh.com

VI TELEFILTER reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information

VI TELEFILTER**Filter Specification****TFS 144****3/5****Stability characteristics**

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

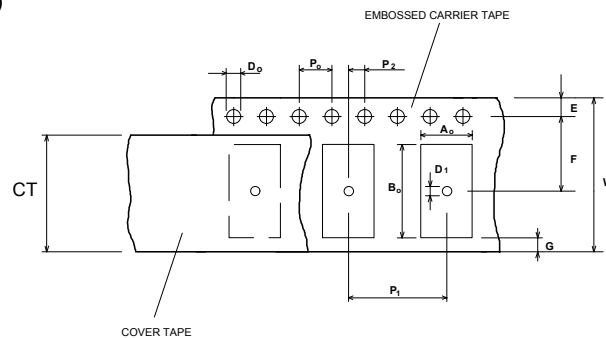
1. Shock: 500g, 18 ms, half sine wave, 3 shocks each plane;
DIN IEC 68 T2 - 27
2. Vibration: 10 Hz to 500 Hz, 0,35 mm or 5g respectively, 1 octave per min, 10 cycles per plan, 3 plans;
DIN IEC 68 T2 - 6
3. Change of temperature: -55 °C to 125°C / 30 min each. / 10 cycles
DIN IEC 68 part 2 – 14 Test N
4. Resistance to solder heat (reflow): max. 2 times reflow process;
for temperature conditions refer to the attached "Air reflow temperature conditions" on page 4;

Packing

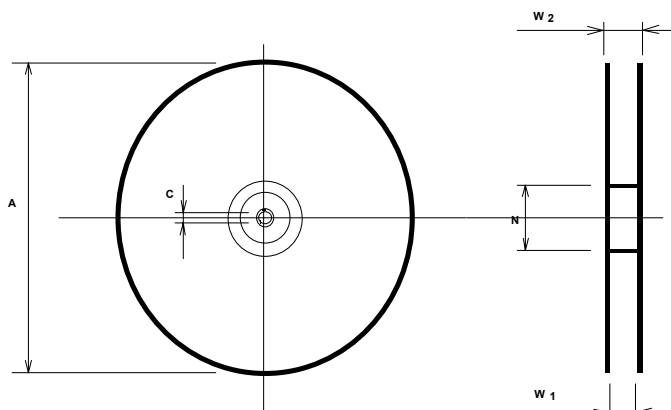
Tape & Reel:	IEC 286 - 3, with exception of value for N and minimum bending radius; tape type II, embossed carrier tape with top cover tape on the upper side;	
	max. pieces of filters per reel:	1700
	Reel of empty components at start:	min 300 mm
	Reel of empty components at start including leader:	min 500 mm
	Trailer	min 300 mm

Tape (all dimensions in mm)

W	: 24 ± 0,3
Po	: 4 ± 0,1
Do	: 1,5 ± 0,1
E	: 1,75 ± 0,1
F	: 11,5 ± 0,1
G (min)	: 0,60
P2	: 2 ± 0,1
P1	: 12 ± 0,1
D1(min)	: 1,5
Ao	: 7,1 ± 0,2
Bo	: 13,9 ± 0,2
CT	: 21,5 ± 0,1

**Reel (all dimensions in mm):**

A	: 330
W1	: 24,40 +2,0
V2 (max)	: 30,4
N (min)	: 60
C	: 13 + 0,5/-0,2



The minimum bending radius is 45 mm. The mounting surface of the filters faces the bottom side of the embossed carrier tape. The marking of the filters is able to read if the view is directed on the upper side of the carrier tape with the sprocket holes on the left side of the tape.

VI TELEFILTER

Potsdamer Straße 18
D 14 513 TELTOW / Germany
Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30
E-Mail: tft@telefilter.com

Vectron International, Inc.

267 Lowell Road
Hudson, NH 03051 / USA
Tel: (603) 598-0070 Fax: (603) 598-0075
E-Mail: vti@vtinh.com

VI TELEFILTER reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information

VI TELEFILTER**Filter Specification****TFS 144****4/5****Air reflow temperature conditions**

1st and 2nd air reflow profile

Name:	pre-heating periods	main-heating periods	peak temperature
Temperature:	150 °C - 170 °C	over 200 °C	255 °C ± 5 °C
Time:	60 sec. - 90 sec.	20 sec. - 25 sec.	

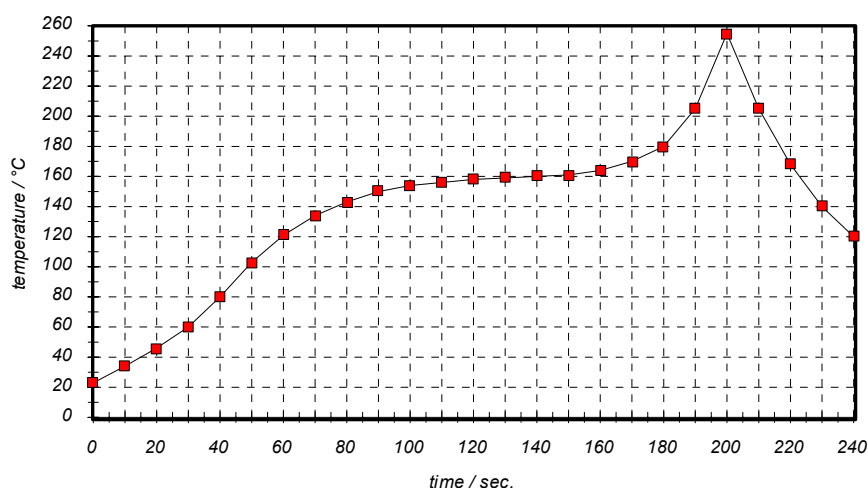
Chip-mount air reflow profile

Table for temperature vs. time during the air reflow process

Tolerance of temperatures: ± 5 °C

time / sec.	temperature / °C	time / sec.	temperature / °C
0	23	140	160
10	34	150	161
20	46	160	164
30	60	170	170
40	80	180	180
50	103	190	205
60	121	195	230
70	134	200	255
80	143	205	230
90	150	210	205
100	154	215	180
110	156	220	165
120	158	230	140
130	159	240	120

VI TELEFILTER

Potsdamer Straße 18

D 14 513 TELTOW / Germany

Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30

E-Mail: tft@telefilter.com**Vectron International, Inc.**

267 Lowell Road

Hudson, NH 03051 / USA

Tel: (603) 598-0070 Fax: (603) 598-0075

E-Mail: vti@vtinh.com

VI TELEFILTER reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information

VI TELEFILTER**Filter Specification****TFS 144****5/5****History**

Version	Reason of Changes	Name	Date
Development specification			
1.0	- generation of specification	Steiner	13.07.2000
preliminary filter specification			
2.0	- passband ripple relaxed to 1,5dB - VSWR limit exchanged with a typical value	Steiner	27.04.2001
filter specification			
3.0	- terminating impedance and typical values for final samples added	Steiner	07.11.2001
3.1	- terminating impedance slightly corrected on final samples	Steiner	16.11.2001

VI TELEFILTER
Potsdamer Straße 18
D 14 513 TELTOW / Germany
Tel: (+49) 3328 4784-0 / Fax: (+49) 3328 4784-30
E-Mail: tft@telefilter.com

Vectron International, Inc.
267 Lowell Road
Hudson, NH 03051 / USA
Tel: (603) 598-0070 Fax: (603) 598-0075
E-Mail: vti@vtinh.com

VI TELEFILTER reserves the right to make changes to the product(s) and/or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information