

# Temperature test report

## (1) Temperature Test



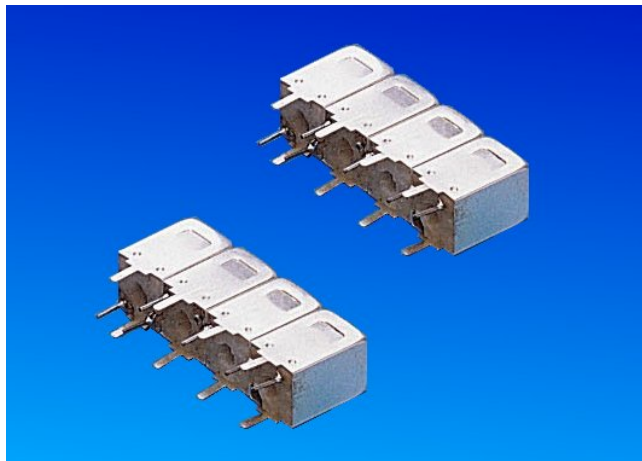
Testing Organization:  
**Temwell Corporation**



Testing Machine:  
**Temperature & Humidity Tester Chamber  
THS-A4C-100 STD**

Testing Specification:  
**Operation Temperature: - 30°C ~ + 70°C  
Storage Temperature: - 30°C ~ + 80°C**

## (2) Test subject:



Item:  
**Helical Band Pass Filter 7H4 Series**  
**1. TF641211D-140M**  
**2. TF641212D-468M**  
**3. TF641213A-880M**

Require:  
**Operation Temperature: - 30°C ~ + 70°C**  
**Storage Temperature: - 30°C ~ + 80°C**

### (3) Testing and test result:

Part number 1

TF641211D-140M

## Electrical Characteristics Spec. Approval Sheet

Parts Name: TF641211D-140M (Triple Tuning)

Date: 2023.09.20

(1) For -20°C~+70°C Temperature Δ F Draft vs. Spec's Approval.

Items	Temp °C	Time Age Hour	Fo MHz	BW(MHz) Fo to~ (-3db)	BW(MHz) Fo to~ +(-3db)	Total -3BW (MHz)	IL (dB)	RL S11 (db)	Atten Fo-30M (dB)	Atten Fo+30M (dB)	Pass
SPEC	-20°C~+70°C	--	140	> 2.5	> 2.5	> 5	< 5.5	> 12	> 60	> 60	Pass

	Temp °C	Time Age Hour	Fo MHz	BW(MHz) Fo to~ (-3db)	BW(MHz) Fo to~ +(-3db)	Total -3BW (MHz)	IL (dB)	RL S11 (db)	Atten Fo-30M (dB)	Atten Fo+30M (dB)	Pass
f1	-30°C	1.5H	140.51	2.34	3.35	5.69	4.12	16.33	83.66	79.24	Pass
f2	-20°C	0.5H	140.46	2.38	3.30	5.68	4.19	16.39	82.16	74.53	Pass
f3	-10°C	0.5H	140.43	2.40	3.26	5.66	4.23	16.34	79.91	73.50	Pass
f4	0°C	0.5H	140.27	2.54	3.08	5.62	4.25	16.03	86.49	73.62	Pass
f5	+10°C	0.5H	140.17	2.62	2.96	5.58	4.42	16.83	76.64	73.45	Pass
f6	+25°C	0.5H	140.14	2.65	2.92	5.56	4.60	18.24	80.26	75.88	Pass
f7	+40°C	0.5H	140.05	2.72	2.83	5.54	4.60	17.81	78.18	73.80	Pass
f8	+50°C	0.5H	139.96	2.80	2.73	5.53	4.68	17.76	76.86	75.15	Pass
f9	+60°C	0.5H	139.96	2.80	2.73	5.53	4.68	17.73	80.50	72.20	Pass
f10	+70°C	0.5H	139.77	2.99	2.52	5.51	4.99	17.63	73.81	73.99	Pass
f11	+80°C	0.5H	139.77	2.99	2.52	5.51	5.10	17.92	76.86	73.09	Pass

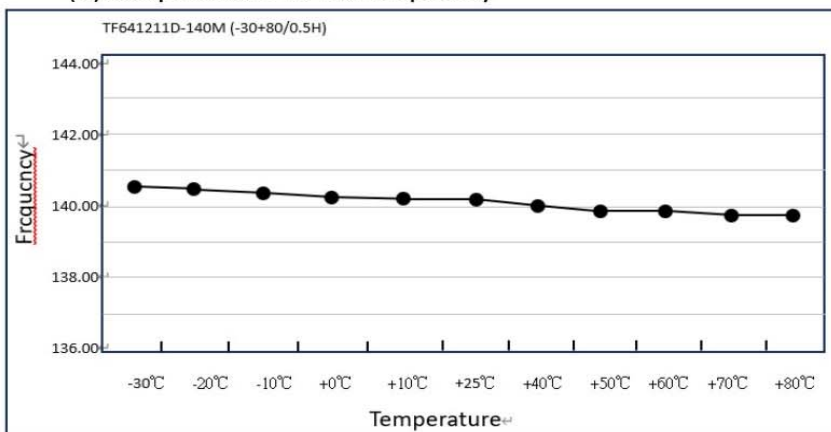
Note: The aging test data at +80°C is just only for your kind reference

### Temperatuer Aging Test Report

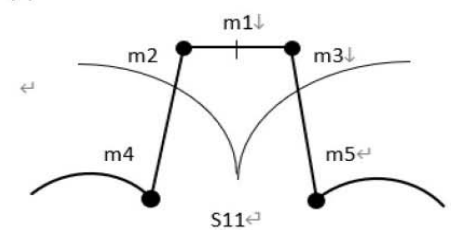
(2) Temperature & Time Process & Fo Frecurcy

	Temp °C	Time Age Hour	Δ f(%) (MHz) Temp. Draft(-20~+70°C) < Fo×0.5%(Tolerance)	Fo MHz	At-3dB MHz	At+3dB MHz	-3BW (MHz)	IL (dB)	RL S11 (dB)	Atten Fo-30M (dB)	Atten Fo+30M (dB)
f1	-30°C	1.5H	0.364% (0.51M)	140.51	137.66	143.35	5.69	4.12	16.33	83.66	79.24
f2	-20°C	0.5H	0.328% (0.46M)	140.46	137.62	143.30	5.67	4.19	16.39	82.16	74.53
f3	-10°C	0.5H	0.307% (0.43M)	140.43	137.60	143.26	5.66	4.23	16.34	79.91	73.50
f4	0°C	0.5H	0.192% (0.27M)	140.27	137.46	143.08	5.61	4.25	16.03	86.49	73.62
f5	+10°C	0.5H	0.121% (0.17M)	140.17	137.38	142.96	5.58	4.42	16.83	76.64	73.45
f6	+25°C	0.5H	0.001% (0.14M)	140.14	137.35	142.92	5.56	4.60	18.24	80.26	75.88
f7	+40°C	0.5H	0.003% (0.05M)	140.05	137.28	142.83	5.54	4.60	17.81	78.18	73.80
f8	+50°C	0.5H	0.028% (0.04M)	139.96	137.20	142.73	5.53	4.68	17.76	76.86	75.15
f9	+60°C	0.5H	0.028% (0.04M)	139.96	137.20	142.73	5.53	4.68	17.73	80.50	72.20
f10	+70°C	0.5H	0.164% (0.23M)	139.77	137.01	142.52	5.51	4.99	17.63	73.81	73.99
f11	+80°C	0.5H	0.164% (0.23M)	139.77	137.01	142.52	5.51	5.10	17.92	76.86	73.09

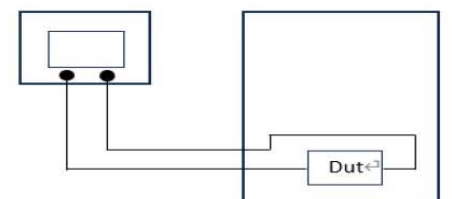
### (3) Temperature VS Fo Frequency



### (4) Makers↓



### (5) E5071C Temperature Chamber↔



Result

PASS



## Electrical Characteristics Spec. Approval Sheet

Parts Name: TF641212D-468M (Triple Tuning)

Date: 2023.09.20

(1) For -20°C~+70°C Temperature Δ F Draft vs. Spec's Approval.

Items	Temp °C	Time Age Hour	Fo MHz	BW(MHz) Fo to~ (-3db)	BW(MHz) Fo to~ (+(-3db)	Total -3BW (MHz)	IL (dB)	RL S11 (db)	Atten Fo-50M (dB)	Atten Fo+50M (dB)	Pass
SPEC	-20°C~+70°C	--	468	> 4	> 4	> 8	< 5.5	> 12	> 60	> 50	Pass

	Temp °C	Time Age Hour	Fo MHz	BW(MHz) Fo to~ (-3db)	BW(MHz) Fo to~ (+(-3db)	Total -3BW (MHz)	IL (dB)	RL S11 (db)	Atten Fo-50M (dB)	Atten Fo+50M (dB)	Pass
f1	-30°C	1.5H	468	4.34	6.77	11.11	3.59	20.60	77.83	63.98	Pass
f2	-20°C	0.5H	468	4.34	6.77	11.11	3.59	20.61	73.57	63.61	Pass
f3	-10°C	0.5H	468	4.54	6.50	11.04	3.63	19.99	78.10	63.02	Pass
f4	0°C	0.5H	468	4.96	5.96	10.92	3.81	20.77	76.02	64.09	Pass
f5	+10°C	0.5H	468	4.97	5.96	10.93	3.82	20.91	76.04	64.84	Pass
f6	+25°C	0.5H	468	5.46	5.47	10.93	3.82	22.54	74.57	63.63	Pass
f7	+40°C	0.5H	468	5.40	5.37	10.77	4.25	27.12	82.84	63.72	Pass
f8	+50°C	0.5H	468	5.41	5.37	10.78	4.26	27.24	74.76	64.07	Pass
f9	+60°C	0.5H	468	5.58	5.16	10.74	4.35	27.32	76.63	64.86	Pass
f10	+70°C	0.5H	468	6.16	4.50	10.66	4.60	26.22	80.27	63.64	Pass
f11	+80°C	0.5H	468	6.17	4.48	10.64	4.76	24.87	81.94	64.63	Pass

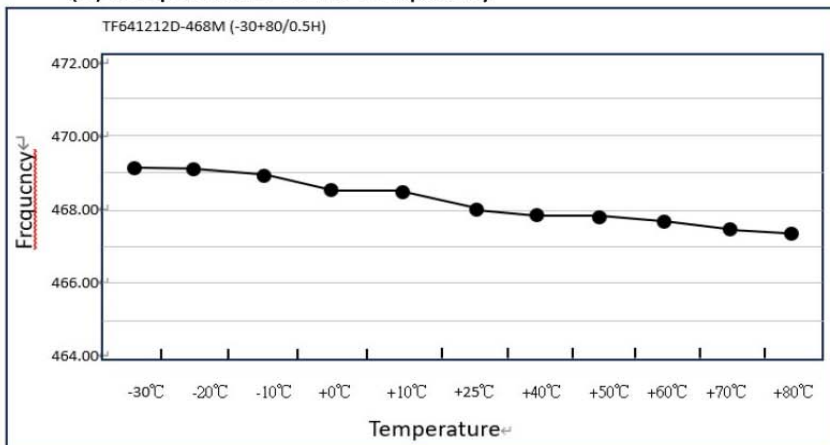
Note: The aging test data at +80°C is just only for your kind reference

### Temperatuer Aging Test Report

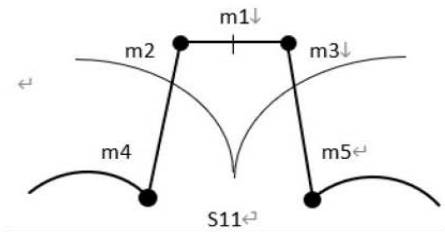
(2) Temperature & Time Process & Fo Frecurcy

	Temp °C	Time Age Hour	Δ f(%) (MHz) Temp. Draft (-20~+70°C) < Fo x 0.5% (Tolerance)	Fo MHz	At-3dB MHz	At+3dB MHz	-3BW (MHz)	IL (dB)	RL S11 (dB)	Atten Fo-50M (dB)	Atten Fo+50M (dB)
f1	-30°C	1.5H	0.258% (1.21M)	469.21	463.66	474.77	11.11	3.59	20.60	77.83	63.98
f2	-20°C	0.5H	0.258% (1.21M)	469.21	463.66	474.77	11.11	3.59	20.61	73.57	63.61
f3	-10°C	0.5H	0.209% (0.98M)	468.98	463.46	474.50	11.04	3.63	19.99	78.10	63.02
f4	0°C	0.5H	0.106% (0.50M)	468.50	463.04	473.96	10.92	3.81	20.77	76.02	64.09
f5	+10°C	0.5H	0.106% (0.50M)	468.50	463.03	473.96	10.93	3.82	20.91	76.04	64.84
f6	+25°C	0.5H	0.002% (0.05M)	468.01	462.54	473.47	10.93	3.82	22.54	74.57	63.63
f7	+40°C	0.5H	0.004% (0.02M)	467.98	462.60	473.37	10.77	4.25	27.12	82.84	63.72
f8	+50°C	0.5H	0.004% (0.02M)	467.98	462.59	473.37	10.78	4.26	27.24	74.76	64.07
f9	+60°C	0.5H	0.044% (0.21M)	467.79	462.42	473.16	10.74	4.35	27.32	76.63	64.86
f10	+70°C	0.5H	0.177% (0.83M)	467.17	461.84	472.50	10.66	4.60	26.22	80.27	63.64
f11	+80°C	0.5H	0.181% (0.85M)	467.15	461.83	472.48	10.64	4.76	24.87	81.94	64.63

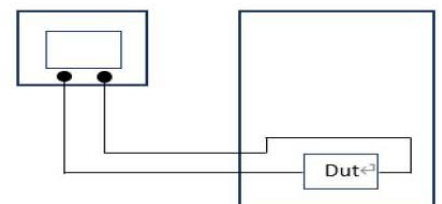
### (3) Temperature VS Fo Frequency



### (4) Makers↓



### (5) E5071C Temperature Chamber↔



**Result**

**PASS**

**Electrical Characteristics Spec. Approval Sheet**

Parts Name: TF641213A-880M (Triple Tuning)

Date: 2023.09.20

(1) For -20°C~+70°C Temperature Δ F Draft vs. Spec's Approval.

Items	Temp °C	Time Age Hour	Fo MHz	BW(MHz) Fo to~ (-3db)	BW(MHz) Fo to~ +(-3db)	Total -3BW (MHz)	IL (dB)	RL S11 (db)	Atten Fo-50M (dB)	Atten Fo+50M (dB)	Pass
SPEC	-20°C~+70°C	--	880	> 5	> 5	> 10	< 5.5	> 12	> 60	> 50	Pass

	Temp °C	Time Age Hour	Fo MHz	BW(MHz) Fo to~ (-3db)	BW(MHz) Fo to~ +(-3db)	Total -3BW (MHz)	IL (dB)	RL S11 (db)	Atten Fo-50M (dB)	Atten Fo+50M (dB)	Pass
f1	-30°C	1.5H	882.57	6.50	11.64	18.14	3.76	21.48	78.12	64.58	Pass
f2	-20°C	0.5H	882.25	6.79	11.29	18.08	3.85	20.27	80.73	64.82	Pass
f3	-10°C	0.5H	881.94	7.07	10.95	18.02	3.93	19.21	78.18	65.74	Pass
f4	0°C	0.5H	881.54	7.41	10.48	17.89	4.00	18.50	79.65	65.54	Pass
f5	+10°C	0.5H	881.07	7.86	9.97	17.83	3.98	17.44	83.71	65.69	Pass
f6	+25°C	0.5H	880.41	8.42	9.24	17.66	4.23	16.97	84.88	68.33	Pass
f7	+40°C	0.5H	879.52	9.14	8.17	17.31	4.64	16.77	79.08	70.70	Pass
f8	+50°C	0.5H	879.02	9.61	7.64	17.25	4.77	17.25	80.98	72.05	Pass
f9	+60°C	0.5H	878.98	9.64	7.61	17.25	4.77	17.16	80.04	71.17	Pass
f10	+70°C	0.5H	877.86	10.67	6.40	17.07	5.13	19.21	78.02	70.69	Pass
f11	+80°C	0.5H	877.68	10.82	6.17	16.99	5.25	21.31	84.05	66.20	Pass

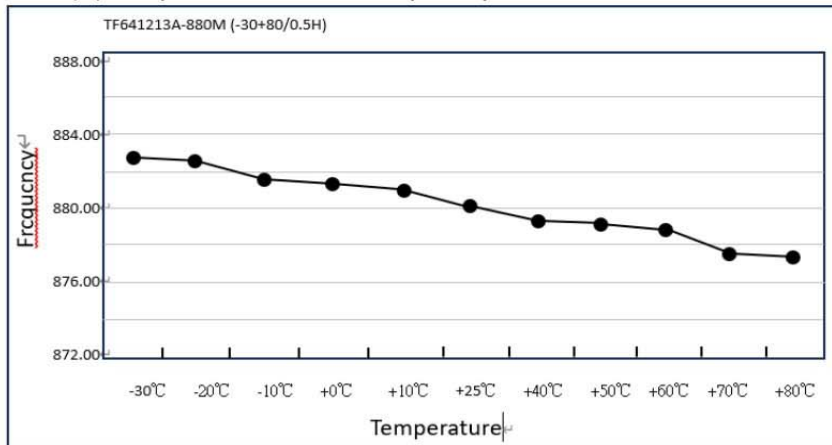
Note: The aging test data at +80°C is just only for your kind reference

Temperatuer Aging Test Report

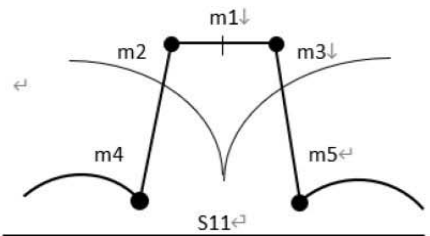
(2) Temperature & Time Process & Fo Frecurcy

	Temp °C	Time Age Hour	$\frac{\Delta f(\%)(MHz)}{Temp.Draft(-20\sim+70^\circ C) < Fo \times 0.5\% (Tolerance)}$	Fo MHz	At-3dB MHz	At+3dB MHz	-3BW (MHz)	IL (dB)	S11 (dB)	Atten Fo-50M (dB)	Atten Fo+50M (dB)
f1	-30°C	1.5H	0.292% (2.57M)	882.57	873.50	891.64	18.14	3.76	21.48	78.12	64.58
f2	-20°C	0.5H	0.255% (2.25M)	882.25	873.21	891.29	18.08	3.85	20.27	80.73	64.82
f3	-10°C	0.5H	0.220% (1.94M)	881.94	872.93	890.95	18.02	3.93	19.21	78.18	65.74
f4	0°C	0.5H	0.175% (1.54M)	890.48	872.59	890.48	17.89	4.00	18.50	79.65	65.54
f5	+10°C	0.5H	0.121% (1.07M)	881.07	872.17	889.97	17.83	3.98	17.44	83.71	65.69
f6	+25°C	0.5H	0.046% (0.41M)	880.41	871.58	889.24	17.66	4.23	16.97	84.88	68.33
f7	+40°C	0.5H	0.054% (0.48M)	879.52	870.86	888.17	17.31	4.64	16.77	79.08	70.70
f8	+50°C	0.5H	0.111% (0.98M)	879.02	870.39	887.64	17.25	4.77	17.25	80.98	72.05
f9	+60°C	0.5H	0.116% (1.02M)	878.98	870.36	887.61	17.25	4.77	17.16	80.04	71.17
f10	+70°C	0.5H	0.243% (2.14M)	877.86	869.33	886.40	17.07	5.13	19.21	78.02	70.69
f11	+80°C	0.5H	0.264% (2.32M)	877.68	869.18	886.17	16.99	5.25	21.31	84.05	66.20

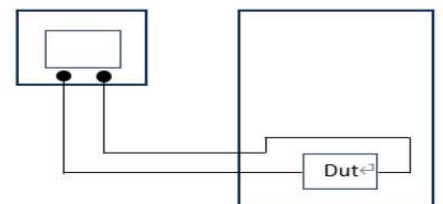
(3) Temperature VS Fo Frequency



(4) Makers↓



(5) E5071C Temperature Chamber↔



**Result**

**PASS**