

# TF0103 Digitally Tunable LC Filters

## 30MHz – 90MHz – typical performance



### I. General & Electrical Requirements

- Tuned Center Frequency Range ( $F_{COM}$ ) <sup>Note 1</sup>:  
 $F_{MIN} = 30 \text{ MHz}$  to  $F_{MAX} = 90 \text{ MHz}$  in 250-steps,  $F_{STEP} = 240 \text{ kHz}$
- Passband @ 3 dB:  $F_{SIG} \pm 200 \text{ kHz}$
- Passband Insertion Loss:  $\leq 3.6 \text{ dB}$
- Passband Variation (peak-valley):  $\leq 0.3 \text{ dB}$
- Input/Output VSWR (within the  $F_{SIG}$  Bandwidth into  $50 \Omega$ ):  $< 2.0:1$
- Absolute Stop Band Attenuation:  
 $F_{SIG} \pm 10\%$ : 16 dB minimum  
 $F_{SIG} \pm 15\%$ : 22 dB minimum  
 $F_{SIG} \pm 20\%$ : 27 dB minimum  
  
1.6 MHz to  $\frac{1}{2} F_{SIG}$ : 40 dB minimum  
 $2x F_{SIG}$  to  $< 750 \text{ MHz}$ : 35 dB minimum  
750 MHz to 1.2 GHz: 25 dB minimum  
1.2 GHz to 2.0 GHz: 15 dB minimum
- In-Band IIP3: +45 dBm minimum
- In Band RF Power Handling:  $\leq 1.25 \text{ Watts (+31 dBm) CW}$
- Out of Band RF Power Handling: 5 Watts (+37 dBm) CW,  $\geq \pm 10\%$  from  $F_{SIG}$
- $Z_{IN}/Z_{OUT}$ :  $50 \Omega$  nominal
- Tuning Method:  
Digital Control: 250 steps, 8-bit parallel  
Tuning Speed:  $< 25 \mu\text{sec}$
- DC Power:  
 $V_1$ :  $+5 V_{DC} \pm 5\%$   
 $I_1$ :  $< 275 \text{ mA}$   
 $V_2$ :  $100 V_{DC} \pm 5\%$  <sup>Note 2</sup>  
 $I_2$ : 1.5 mA typical

Note 1:

$F_{SIG}$  = Frequency of the signal,

Where;  $F_{COM}$  is the target command frequency that the filter will be directed to.

$$F_{COM} = \text{Integer}((F_{SIG} - F_{MIN}) / F_{STEP}) * F_{STEP} + F_{MIN}$$

Note 2:

$V_2 = 100V$ , the filter command and tune frequencies are set up with 100 V applied and the filter is fully compliant to these specification. For  $V_2 = 50 V$  ( $I_2 = 1.5 \text{ mA}$ ), the filter will be functional but the filter command frequency may have greater error. Power handling and linearity will be degraded.

### II. Environmental & Physical Requirements

- Temperature Range:

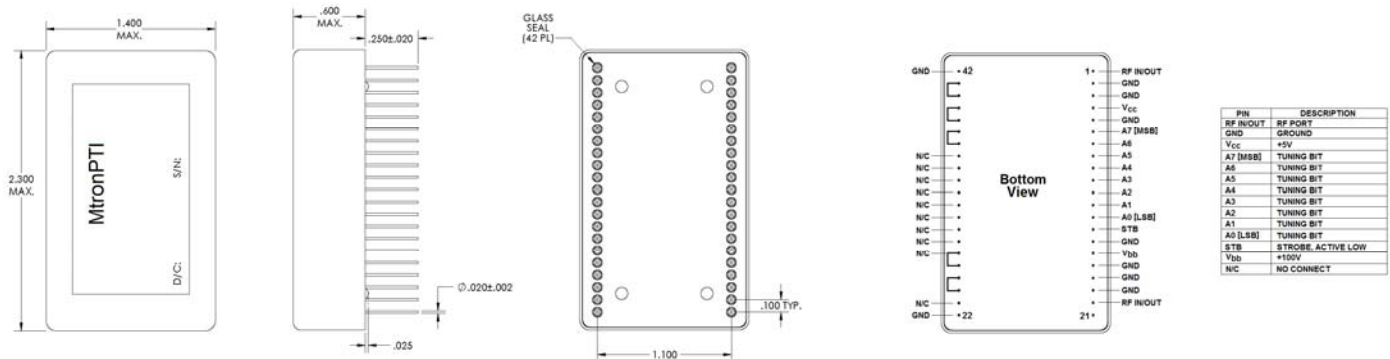
Operating:  $-40 \text{ }^\circ\text{C}$  to  $+85 \text{ }^\circ\text{C}$

Storage:  $-45 \text{ }^\circ\text{C}$  to  $+90 \text{ }^\circ\text{C}$

- Package

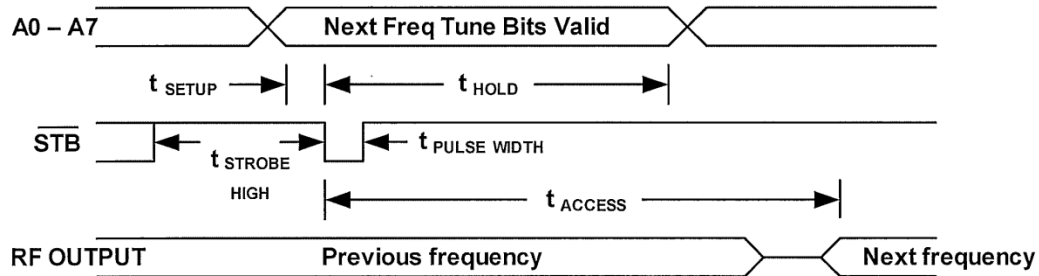
Size: 2.300" (L) x 1.400" (W) x 0.600" (H)

Style: 42-pin thru-hole



**III. Interface Timing:**

**Input Control Timing**



$t_{SETUP} = 200 \text{ ns (min)}$

$t_{HOLD} = 6 \mu\text{S (min)}$

$t_{STROBE HIGH} = 25 \mu\text{S (min)}$

$t_{PULSE WIDTH} = 20 \text{ ns (min)}$

$t_{ACCESS} = 25 \mu\text{S (max)}$

**DC Control Interface Characteristics**

Symbol	Parameter	Condition	Min	Max	Units
$V_{IL}$	Input Low Voltage	Control signals except A0 - A7	0.0	0.2 Vcc	V
$V_{IH}$	Input High Voltage	Control signals except A0 - A7	0.7 Vcc	Vcc	V
$V_{IL}$	Input Low Voltage	A0 - A7	0.0	0.15 Vcc	V
$V_{IH}$	Input High Voltage	A0 - A7	0.7 Vcc	Vcc	V

**IV. Data Sheet Revision:**

Date	Rev.	Author	Details of Revision
11/19/13	B	BRM	Removed the preliminary status designation.
08/27/13	A	BRM	Corrected a typographical error in the package width.
06/25/13	-	BRM	Original Draft.