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**SURFACE MOUNT TRIMMER CAPACITORS**

Selection guide

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## SURFACE MOUNT TRIMMER CAPACITORS

SMD hermetic ceramic trimmers

### SMD HERMETIC CERAMIC TRIMMER CAPACITORS AT2320 SERIES

#### Description

**SMD hermetic ceramic trimmer** is a high performance surface mount trimmer capacitor. Designed specifically to withstand harsh environments, SMD hermetic ceramic trimmer delivers exceptional performance through microwave frequencies at operating temperatures of -55° C to +125° C.

- **SMD hermetic ceramic trimmer** rugged construction renders it resistant to penetration of solder fluxes and cleaning solvents.
- **SMD hermetic ceramic trimmer** square drive tuning mechanism provides and assures complete compatibility with automated tuning devices for positive non-slip tamper-proof adjustments.
- **SMD hermetic ceramic trimmer** design makes it possible to utilize tape and reel. The alumina housing provides mechanical strength with outstanding electrical and heat resistant properties.

Recommended handling instructions outlining soldering procedures are available upon request.

#### Features

- Working voltage 250 VDC, test 500 VDC
- Resistance to soldering heat and flux, 235° C for 30 s
- Can withstand up to 5 minutes total immersion in typical cleaning solvents at room temperature
- Solderability and moisture resistance meet MIL-STD-202
- Conform with specification MIL-C-81

#### Applications

- VCOs - Microprocessor
- Filter networks - Crystal trimming
- Avionics equipment - Disc drives
- Impedance matching - Telemetry

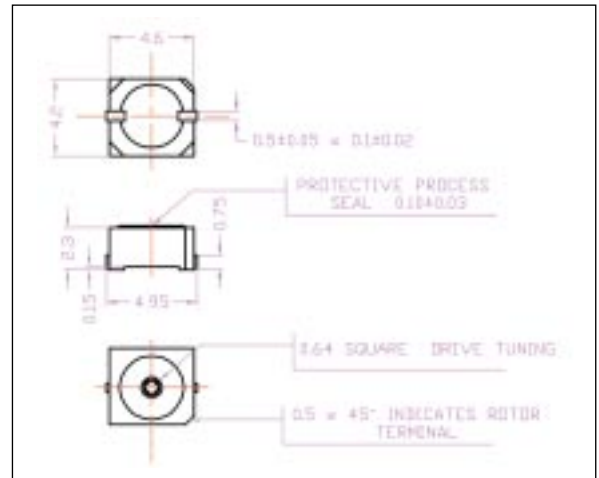


## SURFACE MOUNT TRIMMER CAPACITORS

SMD hermetic ceramic trimmers

### Characteristics

|                       |                                 |
|-----------------------|---------------------------------|
| Capacitance range     | See table                       |
| Voltage               | Rated 250 VDC<br>Test 500 VDC   |
| Q at 100 MHz          | See table                       |
| Operating temp.       | -55° C to +125° C               |
| Temp. coeff.          | See table                       |
| Torque                | See table                       |
| Insulation resistance | > 10 <sup>4</sup> MΩ at 500 VDC |
| Vibration             | 15 g 10-2000 Hz                 |
| Shock                 | 100 g 6 ms                      |
| Setting drift         | <1 %                            |



Solder finish terminals

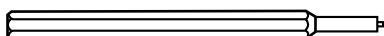
| Temex Part N° | Capacitance range (pF) | Temperature coefficient (ppm/°C) | Min Q at 100 MHz | Torque g.cm | Color Code |
|---------------|------------------------|----------------------------------|------------------|-------------|------------|
| AT2320-0      | 0.6 - 2.5              | 100 ± 200                        | 3000             | 4 - 70      | Red        |
| AT2320-1      | 1 - 5                  | 100 ± 200                        | 1000             | 4 - 70      | Black      |
| AT2320-2      | 2.5 - 10               | 100 ± 200                        | 1000             | 4 - 70      | Blue       |
| AT2320-3      | 5 - 18                 | - 450 ± 300                      | 500              | 4 - 70      | Green      |
| AT2320-4      | 6.5 - 25               | - 1100 ± 300                     | 300              | 4 - 70      | Amber      |

### Packaging

- **TAPE AND REEL:** TEMEX tape and reel packaging is in accordance with EIA-481 specification in 12 mm width carrier tape in quantities of 500 on 18 cm reel & 2500 on 33 cm reel
- **BULK:** TEMEX standard bulk packaging in a sealed antistatic plastic bag with dessicant

### How to order?

- Standard ex: AT2320-2
- For tape and reel, add code after P/ Nb: R1 for 18 cm diameter reel, and R2 for 33 cm diameter reel



TEMEX Tuning Tool : 4192

## **SMD THIN CERAMIC TRIMMER CAPACITORS**

### **AT9401, AT9402 & AT9410 SERIES**

#### *Description*

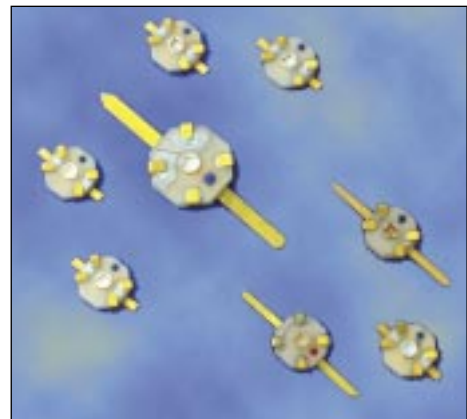
- SMD thin trimmer capacitors are an advanced development in miniaturized trimmer capacitors for applications in circuits where size and performance are critical.
- The SMD thin trimmer capacitors embodies a radical reduction in size and weight over standard ceramic capacitors, with a proportional improvement in electrical characteristics. The capacitor consists of a metallic rotor suspended under spring pressure between two metallized dielectric disks. In addition to physically securing the assembly, the springs serve as both the internal electrical connection and the external terminal, simplifying the construction and further reducing size. The incorporation of the square drive tuning mechanism insures captive, non-slip, tamper-proof adjustments which are not subject to backlash problems associated with screwdriver type adjustment slots.
- SMD thin trimmer capacitors (AT9401 series) feature high Q performance up to 2 GHz and beyond. AT9401 series construction incorporates a butterfly electrode pattern which provides a series parallel capacitor with extremely low ESR and ESL.

#### *Features*

- Working voltage 250 VDC, test 500 VDC
- Resistance to cleaning solvents and soldering heat, moisture resistance, solderability meet MIL-STD-202
- Conform with specification MIL-C-81

#### *Applications*

- Microprocessor clock - Interstage coupling
- Filter networks - Impedance matching
- Crystal trimming - Antenna tuning
- Electronic watches - Telemetry
- Avionics equipment
- WLAN

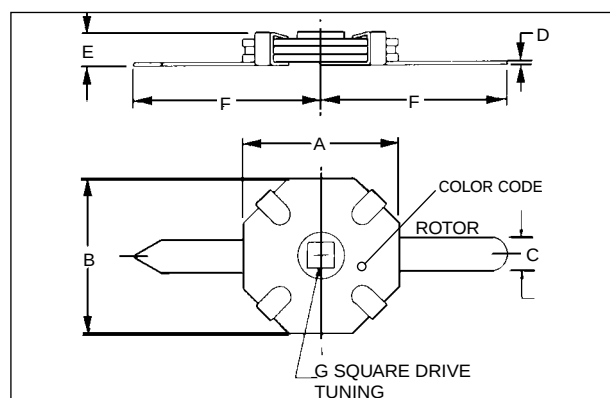


# SURFACE MOUNT TRIMMER CAPACITORS

SMD thin trimmers

## Characteristics (AT94XX series)

|                       |                                 |
|-----------------------|---------------------------------|
| Range                 | See table                       |
| Voltage               | Rated 250 VDC<br>Test 500 VDC   |
| Q at 100 MHz          | See table                       |
| Operating temp.       | -55° C to +125° C               |
| Temp. coeff.          | See table                       |
| Torque                | See table                       |
| Insulation resistance | > 10 <sup>4</sup> MΩ at 500 VDC |
| Vibration             | 15 g 10-2000 Hz                 |
| Shock                 | 100 g 6 ms                      |
| Capacitance drift     | < 1 %                           |



Gold finish terminals

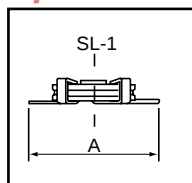
## Technical data

| Temex Part N° | Capacitance range (pF) | Temperature coefficient (ppm/°C) | Min Q at 100 MHz | Torque g.cm |
|---------------|------------------------|----------------------------------|------------------|-------------|
| AT9401-0      | 0.25 - 0.7             | 50 ± 50                          | 1000             | 4 - 70      |
| AT9401-1      | 0.5 - 1.3              | NPO ± 100                        | 1000             | 4 - 70      |
| AT9401-2      | 0.6 - 2                | - 400 ± 200                      | 1000             | 4 - 70      |
| AT9401-4      | 1.5 - 4                | - 1100 ± 300                     | 500              | 4 - 70      |
| AT9402-0      | 0.6 - 2.5              | 100 ± 100                        | 3000             | 4 - 70      |
| AT9402-1      | 1 - 5                  | 100 ± 200                        | 1000             | 4 - 70      |
| AT9402-2      | 2.5 - 10               | - 50 ± 100                       | 1000             | 4 - 70      |
| AT9402-4      | 3 - 12                 | - 1100 ± 300                     | 500              | 4 - 70      |
| AT9402-6      | 6 - 25                 | - 1100 ± 300                     | 300              | 4 - 70      |
| AT9402-8      | 5 - 15                 | - 300 ± 300                      | 750              | 4 - 70      |
| AT9402-9      | 5 - 18                 | - 450 ± 300                      | 500              | 4 - 70      |
| AT9410-0      | 1 - 4.5                | 50 ± 50                          | 1000             | 14 - 140    |
| AT9410-1      | 2.5 - 10               | - 100 ± 200                      | 1000             | 14 - 140    |
| AT9410-2      | 4 - 18                 | - 400 ± 200                      | 700              | 14 - 140    |
| AT9410-3      | 6 - 35                 | - 1100 ± 300                     | 200              | 14 - 140    |
| AT9410-4      | 7 - 40                 | - 1100 ± 300                     | 200              | 14 - 140    |
| AT9410-5      | 8 - 50                 | - 1500 ± 500                     | 200              | 14 - 140    |
| AT9410-25     | 5 - 25                 | NPO ± 150                        | 200              | 14 - 140    |

## Dimensions (mm)

| Color Code                                                 | A          | B   | C   | D   | E          | F   | G   |
|------------------------------------------------------------|------------|-----|-----|-----|------------|-----|-----|
| Red<br>Black<br>Blue<br>Brown                              | 3.6<br>max | 3.2 | 0.5 | 0.1 | 1.0<br>max | 5.0 | 0.6 |
| Red<br>Black<br>Blue<br>Brown<br>Yellow<br>None<br>Grey    | 3.2        | 3.2 | 0.5 | 0.1 | 1.0        | 5.0 | 0.6 |
| Red<br>Black<br>Blue<br>Orange<br>Brown<br>Green<br>Yellow | 5.1        | 5.1 | 1.0 | 0.1 | 1.5<br>max | 7.6 | 0.8 |

## Optional configuration



| Temex P/Nb    | SL      |
|---------------|---------|
| AT9401 Series | 5.1     |
| AT9402 Series | 5.1     |
| AT9410 Series | 6.4 Max |

## Packaging

- **BULK:**
- **TAPE AND REEL:**

TEMEX standard bulk packaging in a sealed antistatic plastic bag  
TEMEX standard tape and reel packaging is available in quantities of 1500 or 6000 pieces per reel on carrier tape 12 mm width for AT9401 SL and AT9402 SL products, and in quantities of 3000 pieces per reel on carrier tape 24 mm width for AT9410 products

## How to order?

- Standard .....ex: AT9402-2
- For optional configuration add code after TEMEX P/ Nb .....ex: AT9402-2 SL1



## TEMEX Tuning Tool:

AT4192: For 9401 and 9402 series  
AT4193: For 9410 series

## SURFACE MOUNT TRIMMER CAPACITORS

AT0300 & AT1300 Series

### SURFACE MOUNT TRIMMER CAPACITORS AT0300 & AT1300 SERIES

#### *Description*

AT0300 and AT1300 series are **surface mount ceramic dielectric chip size trimmer capacitors**. They are specially designed for reflow soldering process and commercial applications like handy radio communication equipment, wireless LAN or crystal oscillators. Dust proof and preserved from solvent and washable, they are available on tape and reel. Full ring around the rotor facilitates its use with automatic pick and place machine.

#### *Features*

- Very good Q and high resonant frequency
- Low capacitance drift
- Very stable over time
- Low temperature coefficient

#### *Applications*

- Crystal and resonator trimming
- Paging system
- WLAN
- CATV amplifiers
- All varieties of communication and test equipment



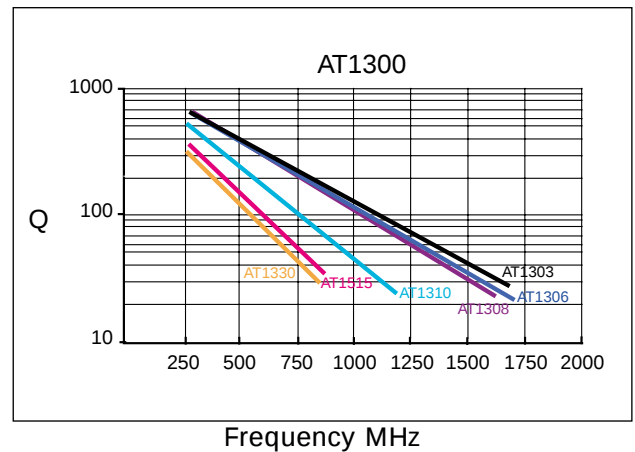
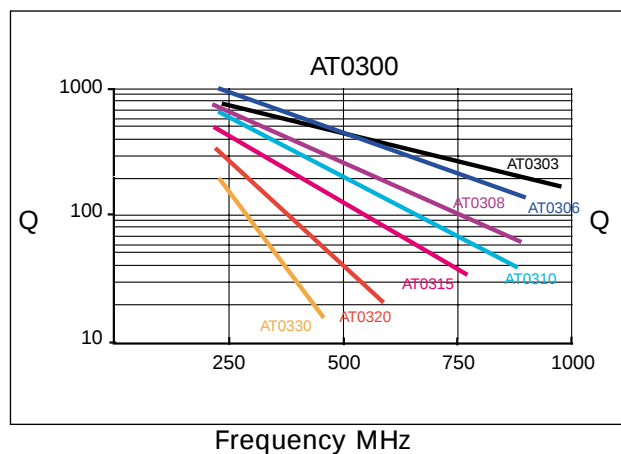
# SURFACE MOUNT TRIMMER CAPACITORS

## AT0300 & AT1300 Series

### Characteristics

|                                                                        | AT0303<br>AT1303                                                  | AT0306<br>AT1306       | AT0308<br>AT1308       | AT0310<br>AT1310         | AT0315<br>AT1315         | AT0320<br>AT1320         | AT0330<br>AT1330         | AT0340<br>AT1340         |
|------------------------------------------------------------------------|-------------------------------------------------------------------|------------------------|------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Maximum capacitance pF & tolerance                                     | + 50 %<br>3.0<br>- 0 %                                            | + 50 %<br>6.0<br>- 0 % | + 50 %<br>8.0<br>- 0 % | + 100 %<br>10.0<br>- 0 % | + 100 %<br>15.0<br>- 0 % | + 100 %<br>20.0<br>- 0 % | + 100 %<br>30.0<br>- 0 % | + 100 %<br>40.0<br>- 0 % |
| Minimum capacitance pF                                                 | 1.5 max                                                           | 2 max                  | 3 max                  | 2 max                    | 3 max                    | 4.5 max                  | 5.5 max                  | 8.0 max                  |
| Rated voltage VDC                                                      | 100                                                               |                        |                        |                          |                          |                          |                          |                          |
| Voltage proof                                                          | 220 VDC                                                           |                        |                        |                          |                          |                          |                          |                          |
| Working temperature range                                              | - 40° C to 85° C                                                  |                        |                        |                          |                          |                          |                          |                          |
| Temperature coefficient ppm/°C                                         | 0 ± 200                                                           | 0 ± 300                | -750 ± 500             | 0 ± 300                  | 0 ± 300                  | 0 ± 500                  | -750 ± 500               | -750 ± 500               |
| Capacitance drift pF                                                   | 0.1 max                                                           |                        | 0.2 max                | 0.3 max                  | 0.4 max                  | 0.5 max                  | 1.0 max                  | 1.2 max                  |
| Setting drift                                                          | < 1 %                                                             |                        |                        |                          |                          |                          |                          |                          |
| Typical self-resonant frequency at max. rated cap GHz (*AT1300 series) | 2<br>2.3*                                                         | 1.4<br>1.6*            | 1.2<br>1.4*            | 1.1<br>1.2*              | 0.9<br>1.0*              | 0.8<br>0.9*              | 0.6<br>0.7*              | 0.4<br>0.5*              |
| Insulation resistance MΩ                                               | 10 000 min                                                        |                        |                        |                          |                          |                          |                          |                          |
| Color code                                                             | Black                                                             | Blue                   | Violet                 | White                    | Pink                     | Red                      | Orange                   | Yellow                   |
| Tensile strength of terminal                                           | 250 g min                                                         |                        |                        |                          |                          |                          |                          |                          |
| Torque                                                                 | 10 to 70 g. cm                                                    |                        |                        |                          |                          |                          |                          |                          |
| Resistance to axial loading                                            | 500 g min                                                         |                        |                        |                          |                          |                          |                          |                          |
| Packaging                                                              | All parts delivered on 12 mm tape and reel (1000 pieces per reel) |                        |                        |                          |                          |                          |                          |                          |

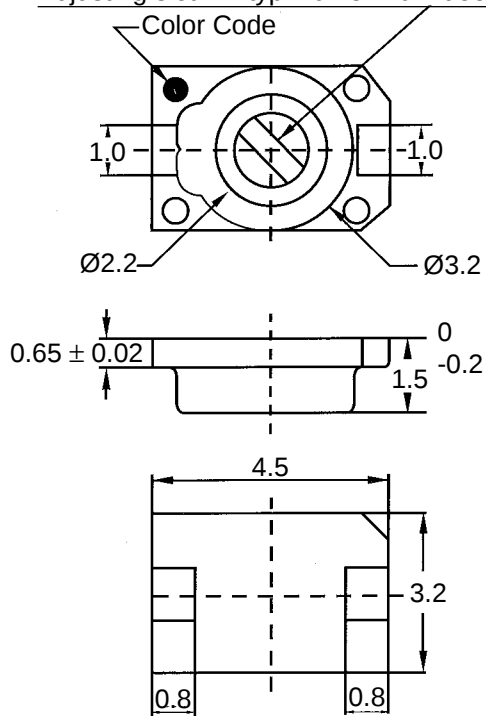
### Quality factor



## Outline drawings

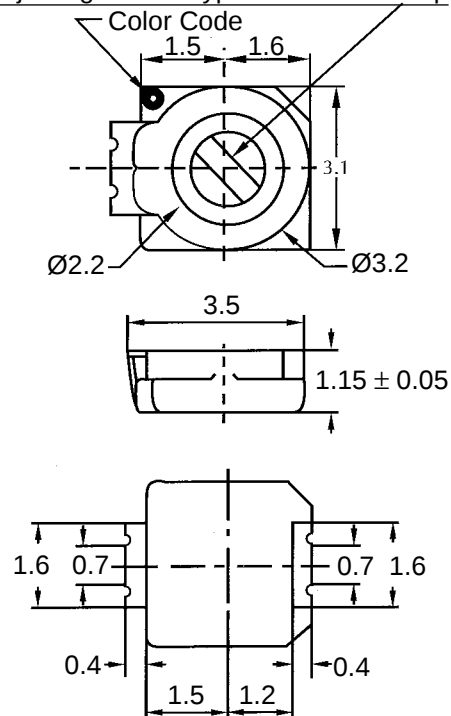
AT 0300

Adjusting slot 1.4 typ x 0.45 w 0.4 deep



AT 1300

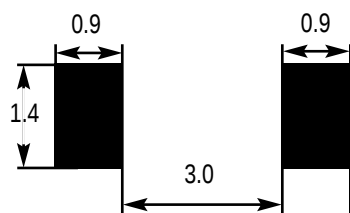
Adjusting slot 1.4 typ x 0.45 w 0.4 deep



### Typical solder Pad layout

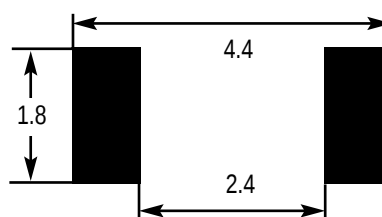
# AT0300

**Tolerance  $\pm 0.2$  mm**

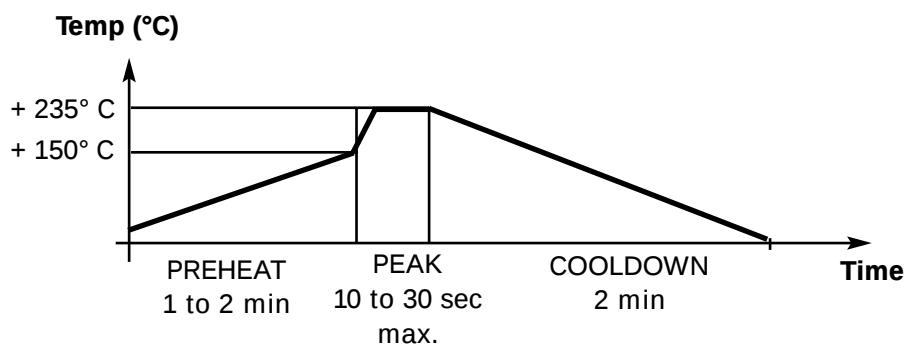


# AT1300

**Tolerance  $\pm 0.1$  mm**



*Recommended reflow solder temperature profile*



## Selection Guide

|                                                           |                       |
|-----------------------------------------------------------|-----------------------|
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## GIGAHERTZ TRIMMER CAPACITORS

### Description

- **Gigahertz trimmers** are tiny trimmer capacitors which provide a straight-forward technique for fine tuning RF and microwave circuits.
- **Gigahertz trimmers** withstand the rigors of soldering heat, excessive tuning and rough handling. As a result of the excellent dielectric and insulation properties of the sapphire or ceramic housing, high breakdown voltage is achieved. Incorporating the self-locking constant torque drive mechanism, they offer many improvements a fixed length, increased Q, essentially zero tuning noise and reduced susceptibility to solder flux intrusion during installation.
- **Vertical Surface Mount Gigahertz trimmers** versions are available, with models 3, 7 and 8, offering a good mechanical stability on the circuit board. Self resonant frequency of **Vertical surface mount Gigahertz trimmers** versions is improving when the width of the terminal is increasing. They are available on tape and reel with permanent sealing cap which resists intrusion of solder flux and cleaning agents and allows easy access to the tuning rotor.
- **Surface Mount SM series** offer a rectangular outline with horizontal tuning axis.
- **Non magnetic Gigahertz trimmer** version available.
- **NEW** : Extended range Gigahertz trimmers designed for applications such as RF power amplifiers feature a 25 to 35% size reduction

### Features

- High Q and high resonant frequency
- Excellent tuning stability and low dynamic noise
- 2 temperature coefficients available
- Very fine resolution
- Resistant to soldering heat
- Meet MIL-C-14409 and ESA/SCC 3010
- 500 VDC working voltage
- High ratio capacitance/volume
- Removable or permanent sealing caps

### Applications

- Base station amplifier
- Filter tuning
- Crystal trimming
- Impedance matching
- Interstage coupling



## TRIMMER CAPACITORS

Gigahertz trimmers - Standard & non magnetic trimmers

### Standard Gigahertz trimmers

#### Characteristics

|                              |                                |                         |                                |                               |                                 |
|------------------------------|--------------------------------|-------------------------|--------------------------------|-------------------------------|---------------------------------|
| <b>Range</b>                 | See table                      |                         | <b>Insulating resistance</b>   | >10 <sup>4</sup> MΩ @ 500 VDC | Measured at 25°C and 50% RH     |
| <b>Voltage</b>               | Rated 500 VDC<br>Test 1000 VDC | Typ. breakdown 1500 VDC | <b>Rotational life</b>         | >800 revolutions              | Meets MIL-C-14409               |
| <b>Operating temperature</b> | -55°C to +125°C                | Stable over full range  | <b>Torque size 6</b>           | 7 to 60 cN.cm                 | Average 30 cN.cm                |
| <b>Temp. Coeff.</b>          | See table                      | Measured at 75%Max cap. | <b>Sizes 7, 8 and 9</b>        | 10 to 100 cN.cm               | Average 60 cN.cm                |
| <b>Contact resistance</b>    | <0.01Ω                         | Low dynamic noise       | <b>Vibration</b>               | 60g, 10-2000 Hz               | Meets MIL-STD-202E, Method 204C |
| <b>Thermal shock</b>         | -55°C to +125°C                |                         | <b>Shock</b>                   | 100g, 6ms                     | Meets MIL-STD-202E Method 213B  |
|                              |                                |                         | <b>Self resonant frequency</b> | >12 GHz                       | Operates B to C band            |

#### Technical data

| Standard Series | Capacitance range (pF) | Turns | Q factor at Max capacitance | Temp. Coeff. ppm/°C X = 2 | Temp. Coeff. ppm/°C X = 3 |
|-----------------|------------------------|-------|-----------------------------|---------------------------|---------------------------|
| ATX726 series   | 0.3 - 1.2              | >4    | >5000 @ 250 MHz             | 0 ± 50                    | 350 ± 75                  |
| ATX727 series   | 0.6 - 4.5              | >8    | >3000 @ 250 MHz             | 0 ± 50                    | 350 ± 75                  |
| ATX728 series   | 0.4 - 2.5              | >4    | >4000 @ 250 MHz             | 0 ± 50                    | 350 ± 75                  |
| ATX729 series   | 0.8 - 8.0              | >16   | >3000 @ 100 MHz             | 0 ± 75                    | 350 ± 75                  |

For models 7 and 8 add 0.05 pF to minimum capacitance

| Standard SM Series | Capacitance range (pF) | Turns | Q factor at Max capacitance | Temp. Coeff. ppm/°C |
|--------------------|------------------------|-------|-----------------------------|---------------------|
| AT SM 260          | 0.3 - 1.2              | >4    | >5000 @ 250 MHz             | -50 ± 75            |
| AT SM 270          | 0.6 - 4.5              | >8    | >3000 @ 250 MHz             | -50 ± 75            |
| AT SM 280          | 0.4 - 2.5              | >4    | >4000 @ 250 MHz             | -50 ± 75            |
| AT SM 290          | 0.8 - 8.0              | >16   | >3000 @ 100 MHz             | -50 ± 75            |

#### Dimensions

| Size | A    | B   | C   | D   | E   | F   | G   | H   | L   | R1  | R2  |
|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 6    | 5.8  | 1.9 | 2.0 | 2.0 | 1.9 | 3.0 | 4.0 | 5.9 | 3.1 | 2.3 | 2.8 |
| 7    | 8.0  | 3.0 | 3.2 | 4.0 | 2.8 | 4.2 | 2.5 | 5.9 | 4.1 | 2.8 | 3.3 |
| 8    | 5.8  | 3.0 | 2.0 | 2.3 | 2.8 | 4.2 | 3.6 | 5.9 | 4.1 | 2.8 | 3.3 |
| 9    | 12.3 | 3.0 | 6.4 | 6.4 | 2.8 | 4.2 | 3.1 | 5.9 | 4.1 | 2.8 | 3.3 |

### Non-magnetic Gigahertz trimmer

#### Description

Non magnetic Gigahertz trimmer capacitors, made of non magnetic metal silver plated, are designed for MRI, NMR and spectroscopy applications

#### Characteristics

Low magnetic signature and same others characteristics as standard Gigahertz trimmer capacitors.

#### Technical data

| Reference | Capacitance range (pF) | Turns | Q factor at Max capacitance | Temp. Coeff. ppm/°C |
|-----------|------------------------|-------|-----------------------------|---------------------|
| AT57290   | 0.8 - 8.0              | >16   | >3000@100 MHz               | 350 ± 75            |

#### Dimensions

Same as size 9, model 0.



## TRIMMER CAPACITORS

Extended range Gigahertz trimmers

### Extended range Gigahertz trimmers

#### Description

Extended range GigaHertz trimmer capacitors incorporate high quality dielectric ceramic that have permitted a 25 to 35% size reduction, without sacrificing performances.

#### Characteristics

Same as standard Gigahertz trimmer capacitors

#### Technical data

| Standard Series | Capacitance range (pF) | Turns | Q factor at Max capacitance | Temp. Coeff. ppm/°C X = 2 | Temp. Coeff. ppm/°C X = 3 |
|-----------------|------------------------|-------|-----------------------------|---------------------------|---------------------------|
| ATX757 series   | 0.8 – 8.0              | >8    | >3000 @100 MHz              | -50 ± 75                  | +400 ± 100                |
| ATX758 series   | 0.6 – 4.5              | >4    | >3000 @250 MHz              | -50 ± 75                  | +400 ± 100                |

For models 7 and 8 add 0.05 pF to minimum capacitance

| Standard SM Series | Capacitance range (pF) | Turns | Q factor at Max capacitance | Temp. Coeff. ppm/°C |
|--------------------|------------------------|-------|-----------------------------|---------------------|
| AT SM 570          | 0.8 - 8.0              | >8    | >3000 @ 100 MHz             | -50 ± 75            |
| AT SM 580          | 0.5 - 4.5              | >4    | >3000 @ 250 MHz             | -50 ± 75            |

#### Dimensions

Same as sizes 7 and 8 and SM 270 and SM 280 of standard Gigahertz trimmer capacitors.

### Extended range Gigahertz trimmers with linear capacitance variation

#### Description

AT SM 571, extended range Gigahertz trimmer capacitor with linear variation of capacity from 0.8 to 6.0 pF, horizontal Surface Mount model.

#### Technical data

| Reference | Capacitance range (pF) | Turns | Q factor at Max capacitance | Temp. Coeff. ppm/°C |
|-----------|------------------------|-------|-----------------------------|---------------------|
| AT SM 571 | 0.8 - 6.0              | >8    | >3000 @ 250 MHz             | -50 ± 75            |

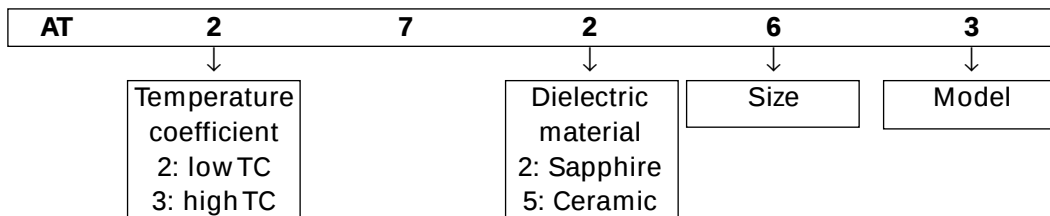
#### Dimensions

Similar to AT SM 270.

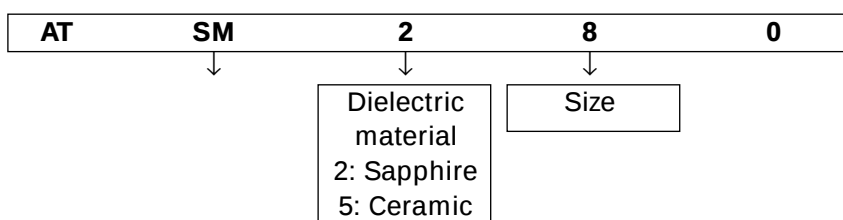
## Extended range Gigahertz trimmers

## How to order?

Ex : AT 27263



Ex : AT SM 280



## Packaging

Bulk  
Tape and reel

TEMEX standard bulk packaging  
In accordance with IEC 286.3 specification.  
Parts are delivered with permanent seal cap.  
Add suffix RF to TEMEX p/n.

| References<br>Size and model | Carrier tape | Units            |
|------------------------------|--------------|------------------|
| 63, 68                       | 16 mm        | 500 p / 13' reel |
| 73                           | 16 mm        | 500 p / 13' reel |
| 78                           | 24 mm        | 500 p / 13' reel |
| 83, 87, 88,                  | 16 mm        | 500 p / 13' reel |
| SM 260, SM 280               | 12 mm        | 500 p / 7' reel  |
| SM 270                       | 16 mm        | 500 p / 7' reel) |
| SM 290                       | 24 mm        | 500 p / 7' reel  |

Note 1 : Gigahertz capacitors size 6 can be delivered with permanent sealing cap AT69600  
Gigahertz capacitors size 7, 8 and 9 can be delivered with permanent sealing cap AT69700  
With permanent sealing cap, total length A is increased by 0.1 mm

Note 2 : For fixing hole layout dimensions and tolerances, consult [page 122](#).

Note 3 : Rotors of Gigahertz capacitors size 7, 8 and 9 can be delivered with hexagonal drive hole for automatic tuning.

Note 4 : Custom designs available upon request

## Recommended TEMEX tuning tools

AT8762 for size 6  
AT8777 for sizes 7, 8 and 9



## M SERIES TRIMMER CAPACITORS

### M SERIES TRIMMER CAPACITORS

#### Description

- M Series air trimmer capacitors are new generation trimmers specially designed and developed by TEMEX to answer commercial and high volume applications needs.
- M Series incorporate the self-locking constant torque drive mechanism which insures uniform torque, high Q and low dynamic tuning noise.
- The ATM120 and ATM130 series design results in the rotor and stator is of one part construction. With a resolution of 1 pF per turn, this series is designed for HF applications and offers a significant advantage for accurate adjustment in circuit tuning.
- Using the same assembly process, and completing ATM220, ATM230, ATM320, ATM330, ATM420 and ATM430 series with press fitted tubes were designed.

#### Features

- High Q factor
- Excellent tuning stability and low tuning noise
- Low temperature coefficient
- Working voltage 200 VDC, test 400 VDC
- Fine tuning resolution

#### Applications

- Commercial applications
- CATV
- Radiotelephone
- Crystal filters



## Air capacitors

## Characteristics

|                                |                               |                                         |
|--------------------------------|-------------------------------|-----------------------------------------|
| <b>Range</b>                   | See table                     | <a href="#">See curve</a>               |
| <b>Δ Cvs Rotation</b>          | <a href="#">See curve</a>     | Linear over wide range                  |
| <b>Voltage</b>                 | Rated 200 VDC<br>Test 400 VDC | Typical breakdown @ sea level > 800 VDC |
| <b>Min. Q @ 100 MHz</b>        | See table                     | Measured at max. capacitance            |
| <b>Operating temperature</b>   | -40° C to +85° C              | Stable over full range                  |
| <b>Thermal shock</b>           | -40° C to +85° C              |                                         |
| <b>Temperature coefficient</b> | See table                     | Measured at 75% max. capacitance        |

|                                |                                  |                                 |
|--------------------------------|----------------------------------|---------------------------------|
| <b>Torque</b>                  | 70 to 360 cN.cm                  |                                 |
| <b>Rotational life</b>         | > 600 revolutions                |                                 |
| <b>Insulation resistance</b>   | >10 <sup>4</sup> MΩ<br>@ 400 VDC | Measured at 25° C<br>and 50% RH |
| <b>Contact resistance</b>      | < 0.01 Ω                         | Low dynamic noise               |
| <b>Self-resonant frequency</b> | <a href="#">See curve</a>        | > 2 GHz                         |
| <b>Vibration</b>               | 60 g 10 - 2000 Hz                | MIL-STD-202 E<br>Method 204 C   |
| <b>Shock</b>                   | 1500 g 0.5 ms                    | MIL-STD-202 E<br>Method 213 B   |

## Technical data

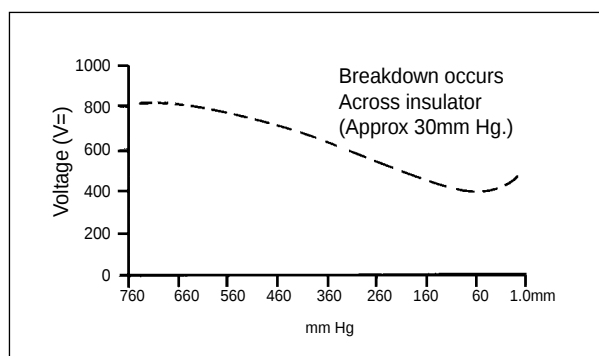
| Temex Part N° | Color Code | Q factor at 100 MHz | Capacitance range (pF) | Temperature coefficient (ppM/°C) |
|---------------|------------|---------------------|------------------------|----------------------------------|
| ATM120        | White      | > 2000              | 1.2 - 7.0              | 50±50                            |
| ATM121        |            |                     | 1.2 - 7.0              |                                  |
| ATM122        |            |                     | 1.2 - 7.0              |                                  |
| ATM123        |            |                     | 1.2 - 7.0              |                                  |
| ATM220        | Green      | > 2000              | 0.9 - 7.5              | 0±50                             |
| ATM221        |            |                     | 0.9 - 7.5              |                                  |
| ATM222        |            |                     | 0.9 - 7.5              |                                  |
| ATM223        |            |                     | 1.5 - 7.5              |                                  |
| ATM320        | Red        | > 2500              | 1.0 - 10.0             | 0±50                             |
| ATM321        |            |                     | 1.0 - 10.0             |                                  |
| ATM322        |            |                     | 1.0 - 10.0             |                                  |
| ATM323        |            |                     | 1.0 - 10.0             |                                  |
| ATM420        | Blue       | > 2500              | 1.4 - 14.0             | 0±50                             |
| ATM421        |            |                     | 1.4 - 14.0             |                                  |
| ATM422        |            |                     | 1.4 - 14.0             |                                  |
| ATM423        |            |                     | 1.4 - 14.0             |                                  |

*Dimensions (mm)*

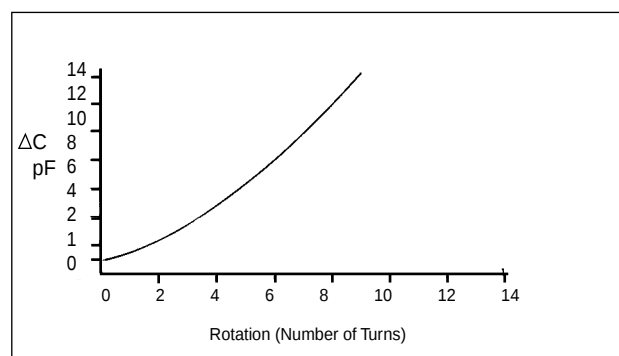
| Fig. | A   | B   | C   | D | E   | F       | G   |
|------|-----|-----|-----|---|-----|---------|-----|
| 1    | 7.8 | 4.6 |     | 7 |     | Ø 6x0.5 | 5.8 |
| 2    | 8.2 | 4.2 | 7.6 | 7 | 7.9 |         | 5.8 |
| 3    | 7.2 | 4.6 | 2.8 | 7 |     | Ø 6x0.5 | 5.8 |
| 4    | 7.6 | 4.2 | 5.2 | 7 | 2.8 |         | 5.8 |
| 1    | 8.1 | 4.6 |     | 7 |     | Ø 6x0.5 | 5.8 |
| 2    | 8.5 | 4.2 | 7.9 | 7 | 7.9 |         | 5.8 |
| 3    | 7.8 | 4.6 | 2.8 | 7 |     | Ø 6x0.5 | 5.8 |
| 4    | 8.2 | 4.2 | 5.2 | 7 | 2.8 |         | 5.8 |
| 1    | 8.1 | 4.6 |     | 7 |     | Ø 6x0.5 | 5.8 |
| 2    | 8.5 | 4.2 | 7.9 | 7 | 7.9 |         | 5.8 |
| 3    | 7.8 | 4.6 | 2.8 | 7 |     | Ø 6x0.5 | 5.8 |
| 4    | 8.2 | 4.2 | 5.2 | 7 | 2.8 |         | 5.8 |
| 1    | 8.1 | 4.6 |     | 7 |     | Ø 6x0.5 | 5.8 |
| 2    | 8.5 | 4.2 | 7.9 | 7 | 7.9 |         | 5.8 |
| 3    | 7.8 | 4.6 | 2.8 | 7 |     | Ø 6x0.5 | 5.8 |
| 4    | 8.2 | 4.2 | 5.2 | 7 | 2.8 |         | 5.8 |

M series trimmers, models ATMX20 and ATMX22 are available with 15/64 threaded bushing with 7 mm hex nut 1 mm thick. To order, add suffix THR to the reference.

### Breakdown voltage versus altitude



### $\Delta C$ versus rotation



## M SERIES TRIMMER

### Air capacitors

Figure 1

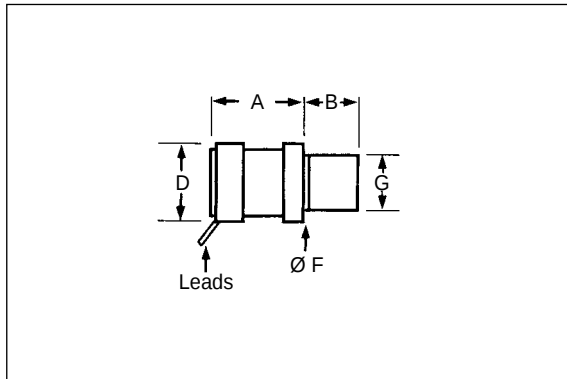


Figure 2

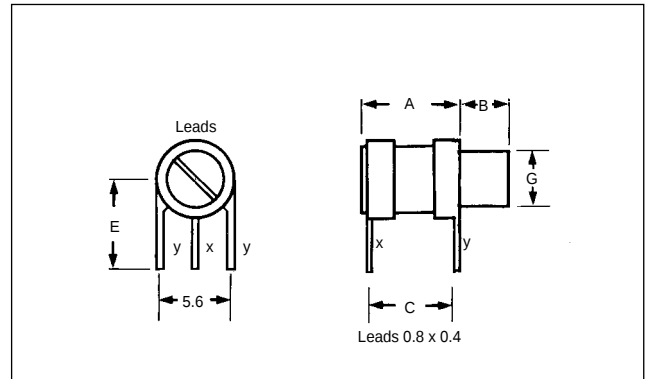


Figure 3

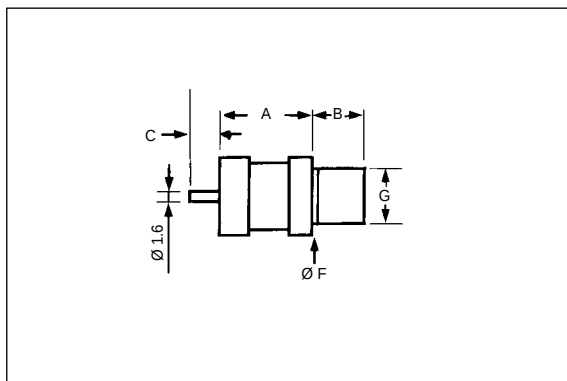
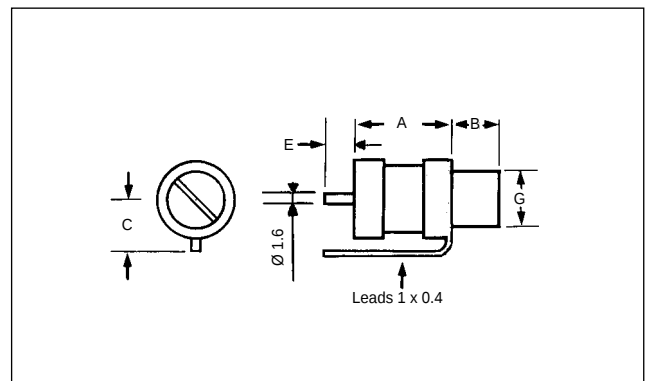


Figure 4

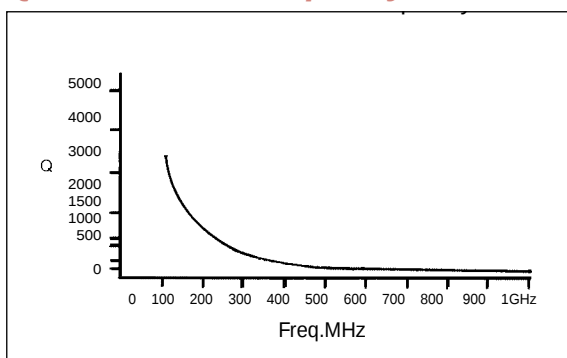


- Note 1 :** For fixing hole layout tolerances and dimensions, consult [page 122](#)  
**Note 2 :** For Tap sizes and ref. numbers, see [page 118](#)  
**Note 3 :** For special and custom design models, consult [page 117](#)  
**Note 4 :** For panel mounting version (with nut) minimum circuit thickness: 0.8 mm

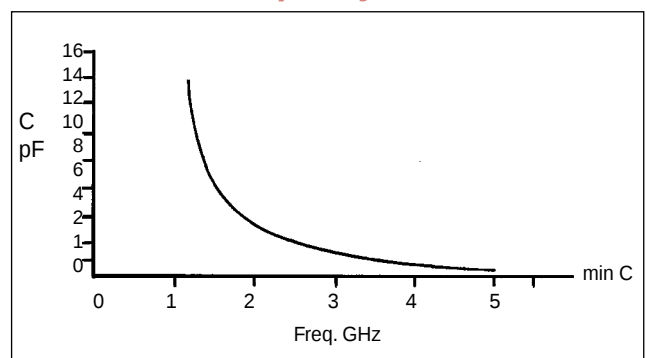
### How to order?

- Standard temperature coeff. M series trimmer ex.: ATM122
- Standard temperature coeff. M series trimmer with threaded busing and nut: ex.: ATM122 THR

### Q Factor versus frequency



### Self-resonant frequency



## AIR DIELECTRIC TRIMMER CAPACITORS

### Description

- **Standard** trimmer air capacitors are designed specifically for RF applications, VHF through microwave, and have become the industry standard of excellence. High Q and temperature stability are a result of proper attention to geometry and choice of optimum materials. The heart of this trimmer is the one piece self-locking constant torque drive mechanism. This mechanism utilizes transverse slots to create a spring effect between two threaded sections resulting in substantial contact areas which insure uniform torque, high Q and low dynamic tuning noise.
- **Miniature** trimmer air capacitors offer an even further size reduction of the standard air capacitors coupled with finer tuning resolution and ultra high Q, making them ideal for use in microwave circuits.
- Both standard and miniature capacitors are available in vertical mounting configurations which save board space and allow top tuning. **Vertical mount** capacitors are available in single dual and low inductance leads with upright or inverted tuning.
- Where **High voltage** is a requirement, the AT5300 series air capacitors are an excellent replacement for comparable range glass capacitors.

### Features

- Q's previously unavailable in trimmer capacitors
- Excellent tuning stability and very low dynamic noise
- Approximately zero temperature coefficient
- Working voltage 250 VDC, test 500 VDC
- 306° C solder used in assembly
- Removable hermetic seal
- Meets MIL-C-14 409D
- French military QPL
- ESA-SCC 3010 qualified and NFC 93.171 approved

### Applications

- RF amplifiers and oscillators
- Impedance matching
- Crystal trimming
- Interstage coupling
- Filter tuning



# AIR DIELECTRIC TRIMMER CAPACITORS

High voltage

## Characteristics

|                         |                                |                                             |
|-------------------------|--------------------------------|---------------------------------------------|
| Range                   | 1 to 10 pF                     |                                             |
| Δ Cvs Rotation          |                                | Linear over wide range                      |
| Voltage                 | Rated 500 VDC<br>Test 1000 VDC | Typical breakdown @ sea level<br>> 1200 VDC |
| Min. Q @ 100 MHz        | > 2000                         | Measured at max. capacitance                |
| Operating temperature   | -55° C to +125° C              | Stable over full range                      |
| Thermal shock           | -55° C to +125° C              | MIL-C-14409D                                |
| Temperature coefficient | 0 ± 20 ppM/° C                 | Measured at 75% max. capacitance            |

|                       |                               |                              |
|-----------------------|-------------------------------|------------------------------|
| Torque                | 70 to 420 cN.cm               |                              |
| Rotational life       | > 800 revolutions             | Equivalent to MIL-C-14409D   |
| Insulation resistance | >10 <sup>6</sup> MΩ @ 500 VDC | Measured at 25° C and 50% RH |
| Contact resistance    | < 0.01 Ω                      | Low noise while tuning       |
| Vibration             | 60 g 10 - 2000 Hz             | MIL-STD-202 E Method 204 C   |
| Shock                 | 1500 g 0.5 ms                 | MIL-STD-202 E Method 213 B   |

## Technical data

| Temex Part N° | Q factor at 100 MHz | Capacitance range (pF) | Temperature coefficient (ppM/°C) |
|---------------|---------------------|------------------------|----------------------------------|
| AT5300        | > 2000              | 1 - 10                 | 0 ± 20                           |
| AT5301        | > 2000              | 1 - 10                 | 0 ± 20                           |
| AT5302        | > 2000              | 1 - 10                 | 0 ± 20                           |

## Dimensions (mm)

| Fig. | A    | B   | C   | Thread  |
|------|------|-----|-----|---------|
| 1    | 10.7 | 7.8 | 9.8 | 5/16-64 |
| 2    | 11.1 | 8.3 | 9.8 | 5/16-64 |
| 3    | 10.7 | 7.8 | 9.8 | 5/16-64 |

Figure 1

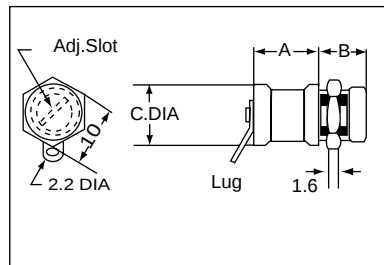


Figure 2

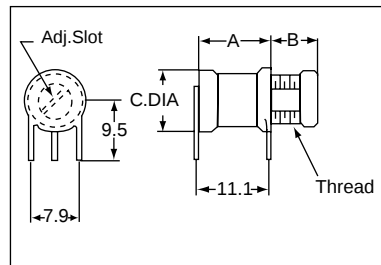
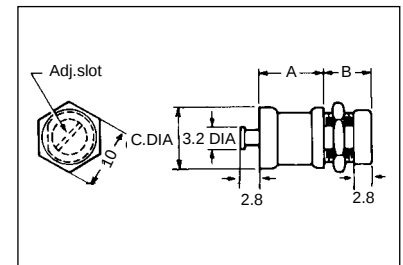
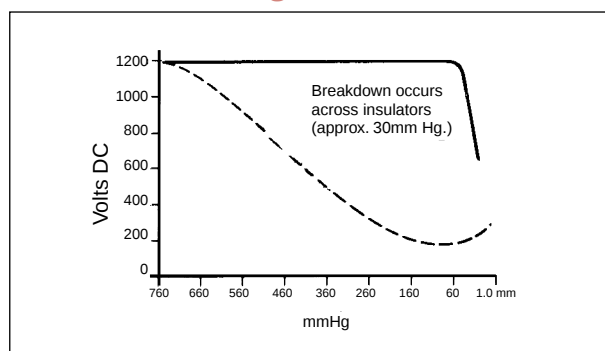


Figure 3

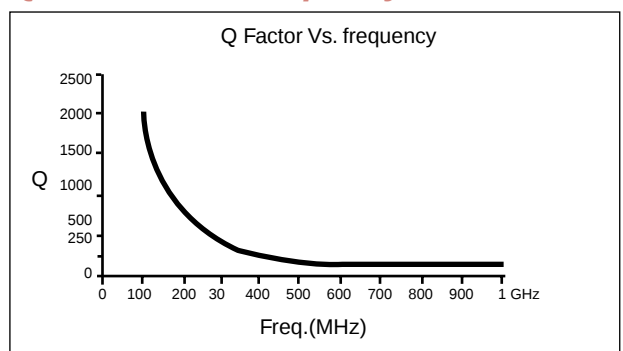


- Note 1 :** For fixing hole layout tolerances and dimensions, consult [page 122](#)  
**Note 2 :** For Tap sizes and ref. numbers, see [page 118](#)  
**Note 3 :** For special and custom design models, consult [page 117](#)  
**Note 4 :** For panel mounting version (with nut) minimum circuit thickness: 0.8 mm

## Breakdown voltage versus altitude



## Q factor versus frequency



## Standard

## Characteristics

|                                    |                                   |                                               |
|------------------------------------|-----------------------------------|-----------------------------------------------|
| <b>Range</b>                       | See table                         | <a href="#">See graph</a>                     |
| <b>Δ Cvs<br/>Rotation</b>          | <a href="#">See graph</a>         | Linear over<br>wide range                     |
| <b>Voltage</b>                     | Rated 250 VDC<br><br>Test 500 VDC | Typical breakdown<br>@ sea level<br>> 800 VDC |
| <b>Min. Q @<br/>100 MHz</b>        | To > 5000<br>See table            | Measured at<br>max. capacitance               |
| <b>Operating<br/>temperature</b>   | -55° C to +125° C                 | Stable over<br>full range                     |
| <b>Thermal shock</b>               | -55° C to +125° C                 | MIL-C-14409D                                  |
| <b>Temperature<br/>coefficient</b> | See table                         | Measured at 75%<br>max. capacitance           |

|                                |                                         |                                      |
|--------------------------------|-----------------------------------------|--------------------------------------|
| <b>Torque</b>                  | 70 to 360 cN.cm                         | Average<br>150 cN.cm                 |
| <b>Rotational life</b>         | > 800 revolutions                       | Equivalent to<br>MIL-C-14409D        |
| <b>Insulation resistance</b>   | >10 <sup>6</sup> MΩ<br>@ 500 VDC        | Measured at<br>25° C and 50% RH      |
| <b>Contact resistance</b>      | < 0.01 Ω                                | Low dynamic<br>noise                 |
| <b>Self resonant frequency</b> | to > 5 GHz<br><a href="#">See graph</a> | Suitable to «C»<br>band applications |
| <b>Vibration</b>               | 60 g 10 - 2000 Hz                       | MIL-STD-202 E<br>Method 204 C        |
| <b>Shock</b>                   | 1500 g 0.5 ms                           | MIL-STD-202 E<br>Method 213 B        |

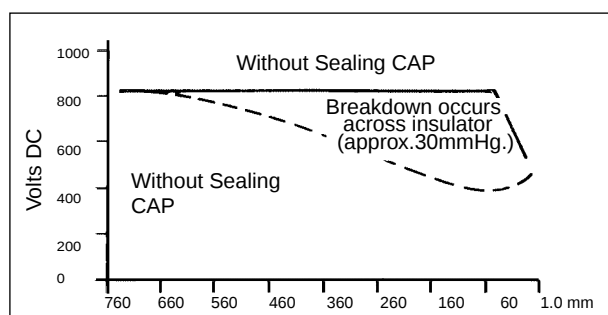
## Technical data

| Temex<br>Part N°                     | Q factor<br>at<br>100 MHz | Capacitance<br>range<br>(pF) | Temperature<br>coefficient<br>(ppM/°C) |
|--------------------------------------|---------------------------|------------------------------|----------------------------------------|
| AT5200<br>AT5201<br>AT5202<br>AT5205 | > 5000                    | 0.8 - 10                     | 0 ± 15                                 |
| AT5400<br>AT5401<br>AT5402<br>AT5405 | > 3000                    | 1 - 14                       | 0 ± 25                                 |
| AT5450<br>AT5451<br>AT5452<br>AT5455 | > 3000                    | 1 - 16                       | 0 ± 50                                 |
| AT5500<br>AT5501<br>AT5502           | > 1500                    | 1 - 20                       | 0 ± 30                                 |
| AT5550<br>AT5551<br>AT5552           | > 1000                    | 1.5 - 25                     | 0 ± 50                                 |
| AT5600<br>AT5601<br>AT5602           | > 800                     | 1 - 30                       | 0 ± 30                                 |

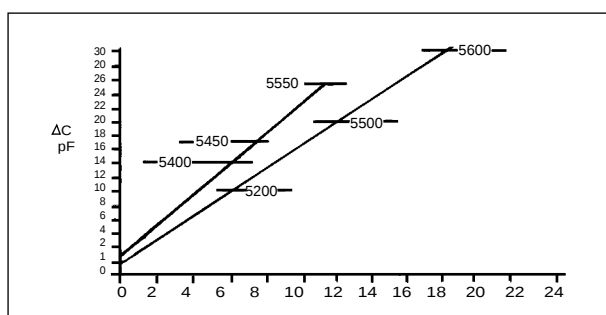
*Dimensions (mm)*

| Fig. | A    | B   | C    | D   | E    | Thread   |
|------|------|-----|------|-----|------|----------|
| 1    | 7.7  | 5.8 |      | 7.6 |      | 15/64-64 |
| 2b   | 8.0  | 5.4 | 7.2  | 7.6 | 7.9  | 15/64-64 |
| 3    | 7.2  | 5.8 |      | 7.6 |      | 15/64-64 |
| 4    | 8.0  | 5.4 | 7.2  | 7.6 | 3.9  | 15/64-64 |
| 1    | 7.7  | 5.8 |      | 7.6 |      | 15/64-64 |
| 2b   | 8.0  | 5.4 | 7.2  | 7.6 | 12.0 | 15/64-64 |
| 3    | 7.2  | 5.8 |      | 7.6 |      | 15/64-64 |
| 4    | 8.0  | 5.4 | 7.2  | 7.6 | 3.9  | 15/64-64 |
| 1    | 7.7  | 5.8 |      | 7.6 |      | 15/64-64 |
| 2b   | 8.0  | 5.4 | 7.2  | 7.6 | 12.0 | 15/64-64 |
| 3    | 7.2  | 5.8 |      | 7.6 |      | 15/64-64 |
| 4    | 8.0  | 5.4 | 7.2  | 7.6 | 3.9  | 15/64-64 |
| 1    | 12.5 | 6.7 |      | 8.0 |      | 15/64-64 |
| 2b   | 14.7 | 4.3 | 14.2 | 8.0 | 12.0 | 15/64-64 |
| 3    | 12.4 | 6.7 |      | 8.0 |      | 15/64-64 |
| 1    | 12.5 | 6.7 |      | 8.0 |      | 15/64-64 |
| 2b   | 14.7 | 4.3 | 14.2 | 8.0 | 12.0 | 15/64-64 |
| 3    | 12.4 | 6.7 |      | 8.0 |      | 15/64-64 |
| 1    | 17.3 | 6.6 |      | 8.0 |      | 15/64-64 |
| 2a   | 19.4 | 4.4 | 18.8 | 8.0 | 12.0 | 15/64-64 |
| 3    | 17.3 | 6.6 |      | 8.0 |      | 15/64-64 |

### Breakdown voltage versus altitude



### $\Delta$ VS rotation



# AIR DIELECTRIC TRIMMER CAPACITORS

## Standard

Figure 1

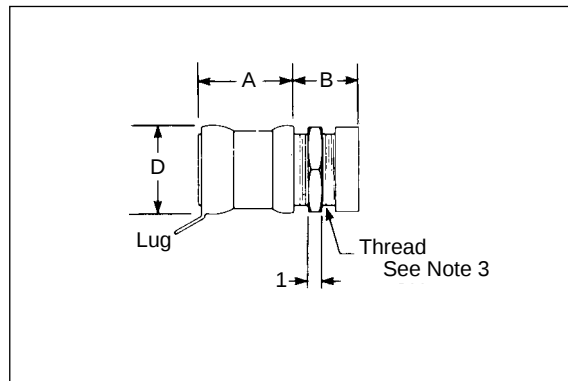


Figure 2

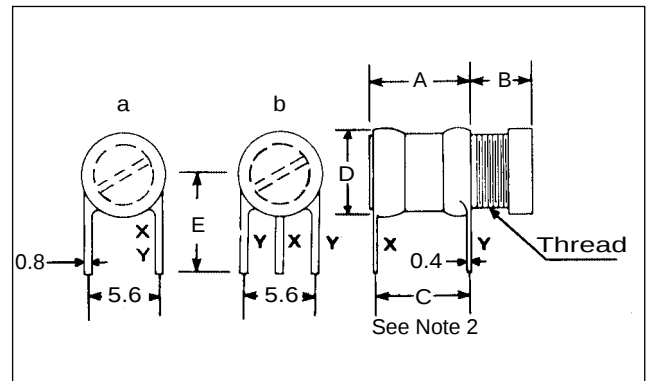


Figure 3

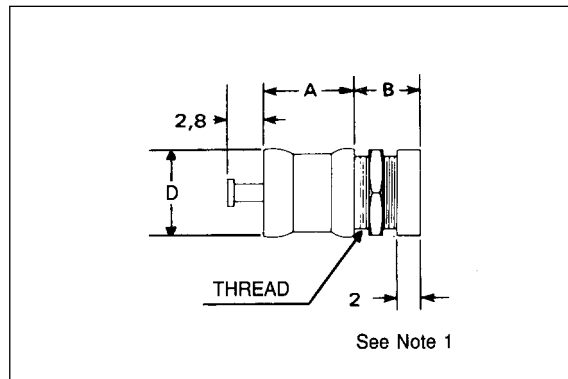
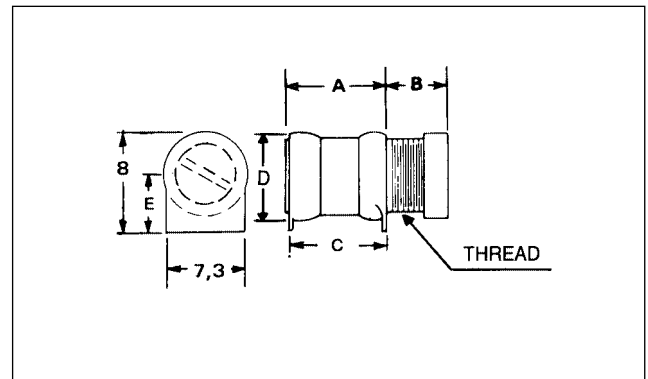


Figure 4

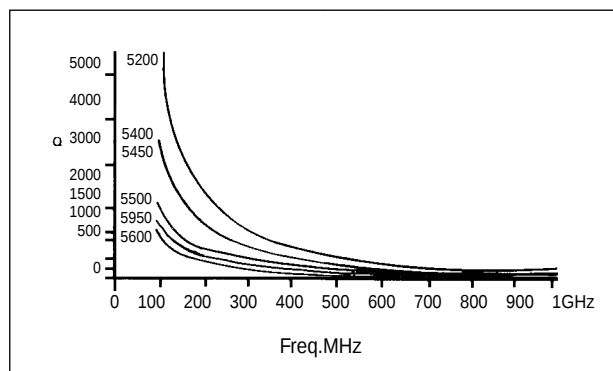


- Note 1:** B. Dimension is increased by 0.8 mm with slotted seal cap.  
**Note 2:** For fixing hole layout tolerances and dimensions consult [122](#)  
**Note 3:** For Tap sizes and reference numbers see [page 118](#)  
**Note 4:** For special and custom design models consult [page 117](#)  
**Note 5:** For panel mounting version (with nut) minimum circuit thickness: 0.8 mm

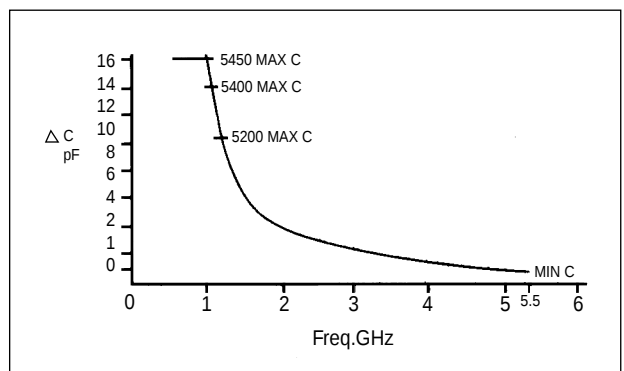
## How to order?

- With standard seal cap ex: AT5202
- With slotted seal cap add suffix S ex: AT5202 S

## Q versus frequency



## $\Delta C$ versus self-resonant frequency



## AIR DIELECTRIC TRIMMER CAPACITORS

Miniature

## Characteristics

|                         |                               |                                            |
|-------------------------|-------------------------------|--------------------------------------------|
| Range                   | See table                     | See graph                                  |
| $\Delta$ Cvs Rotation   | See graph                     | Linear over wide range                     |
| Voltage                 | Rated 250 VDC<br>Test 500 VDC | Typical breakdown @ sea level<br>> 800 VDC |
| Min. Q @ 100 MHz        | To > 10000<br>See table       | Measured at max. capacitance               |
| Operating temperature   | -55° C to +125° C             | Stable over full range                     |
| Thermal shock           | -55° C to +125° C             | MIL-C-14409D                               |
| Temperature coefficient | See table                     | Measured at 75% max. capacitance           |

|                                |                                    |                                   |
|--------------------------------|------------------------------------|-----------------------------------|
| Torque<br>AT5700's<br>AT5800's | 30 to 290 cN.cm<br>22 to 220 cN.cm |                                   |
| Rotational life                | > 800 revolutions                  | Equivalent to MIL-C-14409D        |
| Insulation resistance          | >10 <sup>6</sup> MΩ @ 500 VDC      | Measured at 25° C and 50% RH      |
| Contact resistance             | < 0.01 Ω                           | Low dynamic noise                 |
| Self resonant frequency        | to > 6 GHz<br>See graph            | Suitable to «C» band applications |
| Vibration                      | 60 g 10 - 2000 Hz                  | MIL-STD-202 E Method 204 C        |
| Shock                          | 1500 g 0.5 ms                      | MIL-STD-202 E Method 213 B        |

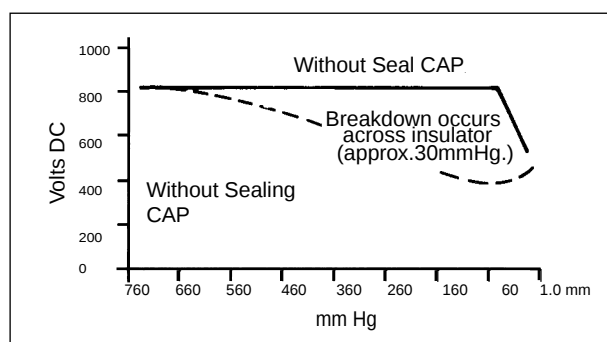
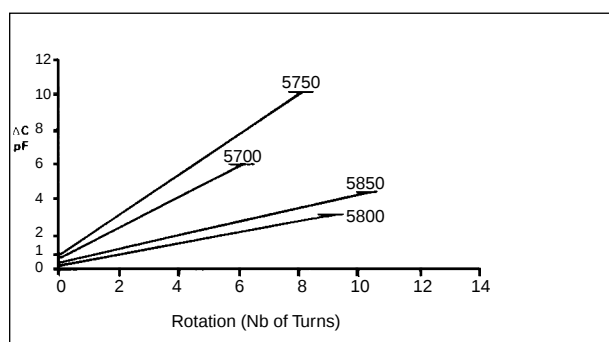
## Technical data

| Temex Part N°                        | Q factor at 100 MHz | Capacitance range (pF) | Temperature coefficient (ppM/°C) |
|--------------------------------------|---------------------|------------------------|----------------------------------|
| AT5700<br>AT5701<br>AT5702<br>AT5705 | > 10000             | 0.8 - 6                | 0 ± 15                           |
| AT5750<br>AT5751<br>AT5752<br>AT5755 | > 7500              | 0.8 - 10               | 0 ± 50                           |
| AT5800<br>AT5801<br>AT5802<br>AT5805 | > 10000             | 0.35 - 3.5             | 0 ± 50                           |
| AT5850<br>AT5851<br>AT5852<br>AT5855 | > 7500              | 0.5 - 5                | 0 ± 50                           |

## Dimensions (mm)

| Fig. | A   | B   | C   | D   | E   | F   | G    | Thread  |
|------|-----|-----|-----|-----|-----|-----|------|---------|
| 1    | 7.0 | 5.6 |     | 6.2 |     |     |      | 10-64   |
| 2b   | 7.3 | 5.1 | 6.7 | 6.2 | 6.3 |     | 0.4  | 10-64   |
| 3    | 6.9 | 5.6 |     | 6.2 |     |     |      | 10-64   |
| 5    | 7.3 | 5.1 | 6.7 | 6.2 | 6.4 | 5.6 | 0.4  | 10-64   |
| 1    | 7.0 | 6.3 |     | 6.2 |     |     |      | 10-64   |
| 2b   | 7.3 | 5.8 | 6.7 | 6.2 | 6.3 |     | 0.4  | 10-64   |
| 3    | 6.9 | 6.3 |     | 6.2 |     |     |      | 10-64   |
| 5    | 7.3 | 5.8 | 6.7 | 6.2 | 6.4 | 5.6 | 0.4  | 10-64   |
| 4    | 6.7 | 5.9 |     | 4.6 |     |     |      | .120-80 |
| 2a   | 7.0 | 5.7 | 6.5 | 4.6 | 5.4 |     | 0.25 | .120-80 |
| 3    | 6.7 | 5.9 |     | 4.6 |     |     |      | .120-80 |
| 5    | 7.2 | 5.5 | 6.7 | 4.6 | 4.6 | 3.8 | 0.4  | .120-80 |
| 4    | 6.7 | 6.8 |     | 4.6 |     |     |      | .120-80 |
| 2a   | 7.0 | 6.6 | 6.5 | 4.6 | 5.4 |     | 0.25 | .120-80 |
| 3    | 6.7 | 6.8 |     | 4.6 |     |     |      | .120-80 |
| 5    | 7.2 | 6.4 | 6.7 | 4.6 | 4.6 | 3.8 | 0.4  | .120-80 |

## Breakdown voltage versus altitude

 $\Delta$  VS rotation

# AIR DIELECTRIC TRIMMER CAPACITORS

## Miniature

Figure 1

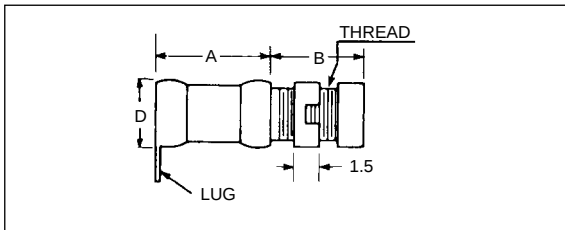


Figure 2

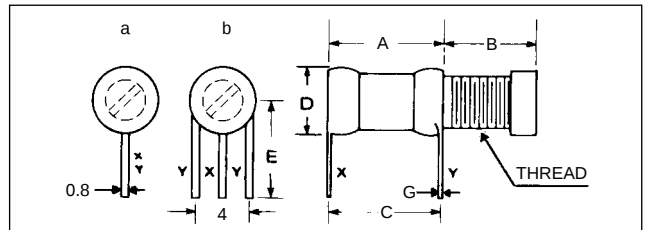


Figure 3

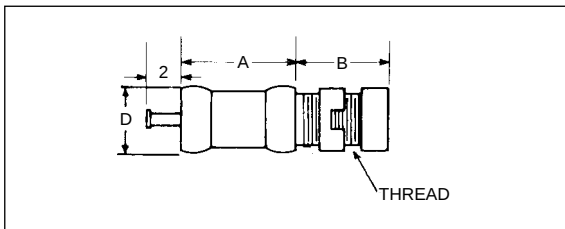


Figure 4

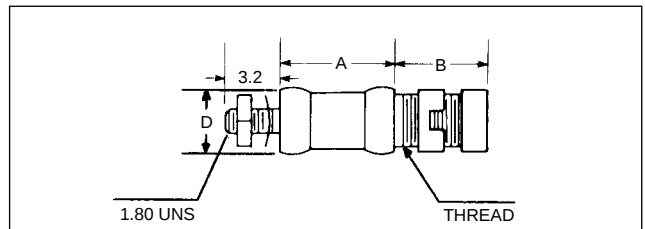
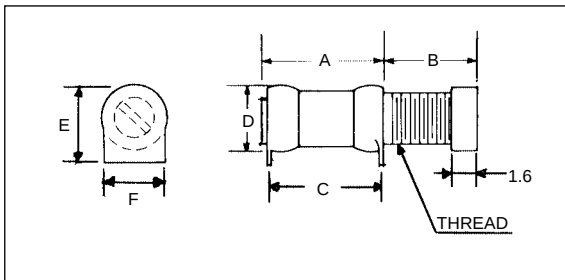


Figure 5



**Note 1:** B. Dimension is increased by 0.8 mm with slotted seal cap.

**Note 2:** For fixing hole layout tolerances and dimensions consult [page 122](#)

**Note 3:** For Tap sizes and reference numbers see [page 118](#)

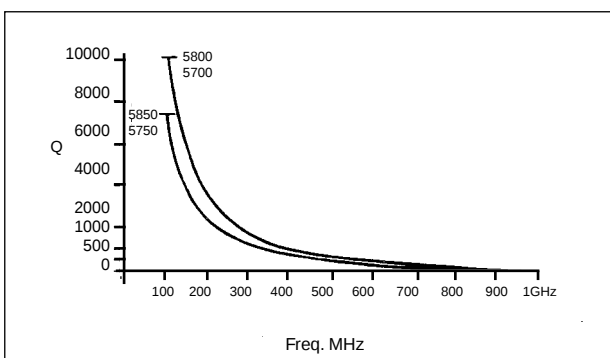
**Note 4:** For special and custom design models consult [page 117](#)

**Note 5:** For panel mounting version (with nut) minimum circuit thickness: 0.8 mm

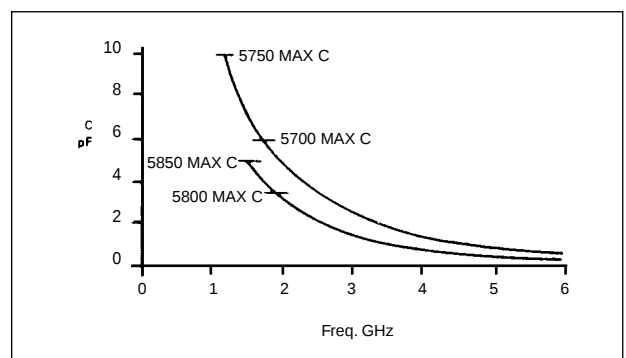
## How to order?

- With standard seal cap ex: AT5701
- With slotted seal cap add suffix S ex: AT5701 S

## Q factor versus frequency



## Self-resonant frequency



# AIR DIELECTRIC TRIMMER CAPACITORS

Vertical mount

## Characteristics

|                         |                                                                    |                                            |
|-------------------------|--------------------------------------------------------------------|--------------------------------------------|
| Range                   | See table of <a href="#">Standard</a> or <a href="#">miniature</a> |                                            |
| $\Delta$ Cvs Rotation   | <a href="#">See graph page 101</a>                                 |                                            |
| Voltage                 | Rated 250 VDC<br>Test 500 VDC                                      | Typical breakdown @ sea level<br>> 800 VDC |
| Min. Q @ 100 MHz        | To > 10000, see graph p. 10/21-23                                  | Measured at max. capacitance               |
| Operating temperature   | -55° C to +125° C                                                  | Stable over full range                     |
| Thermal shock           | -55° C to +125° C                                                  | MIL-C-14409D                               |
| Temperature coefficient | See table of <a href="#">Standard</a> or <a href="#">miniature</a> | Measured at 75% max. capacitance           |

|                         |                                                                                                    |                                   |
|-------------------------|----------------------------------------------------------------------------------------------------|-----------------------------------|
| Torque                  | T <sub>1</sub> 70 to 360 cN.cm<br>T <sub>2</sub> 22 to 220 cN.cm<br>T <sub>3</sub> 30 to 290 cN.cm |                                   |
| Rotational life         | > 800 revolutions                                                                                  | Equivalent to MIL-C-14409D        |
| Insulation resistance   | >10 <sup>6</sup> MΩ @ 500 VDC                                                                      | Measured at 25° C and 50% RH      |
| Contact resistance      | < 0.01 Ω                                                                                           | Low dynamic noise                 |
| Self-resonant frequency | To > 5 GHz<br>See graph <a href="#">p. 102</a>                                                     | Suitable to «S» band applications |
| Vibration               | 60 g 10 - 2000 Hz                                                                                  | MIL-STD-202 E Method 204 C        |
| Shock                   | 1500 g 0.5 ms                                                                                      | MIL-STD-202 E Method 213 B        |

Figure 1

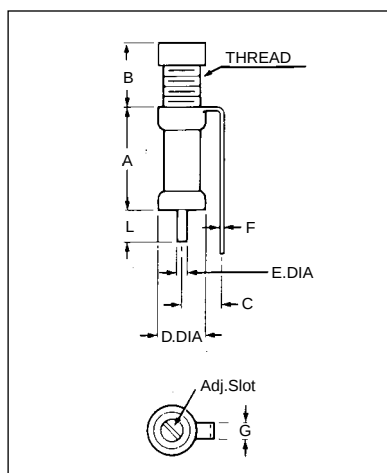


Figure 2

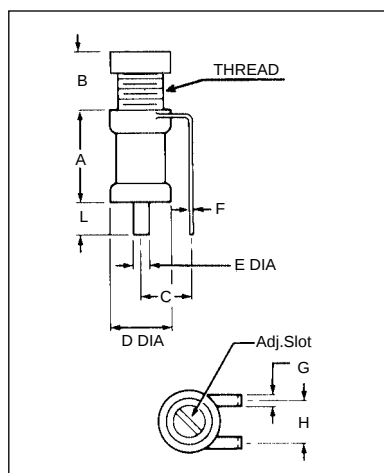


Figure 3

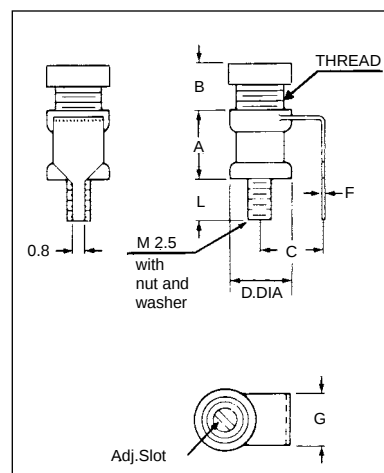


Figure 4

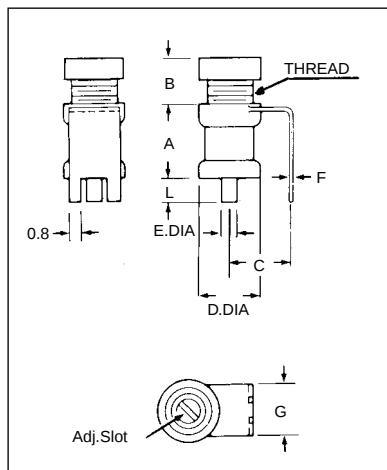


Figure 5

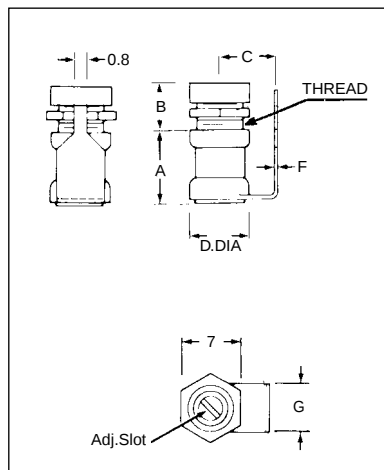
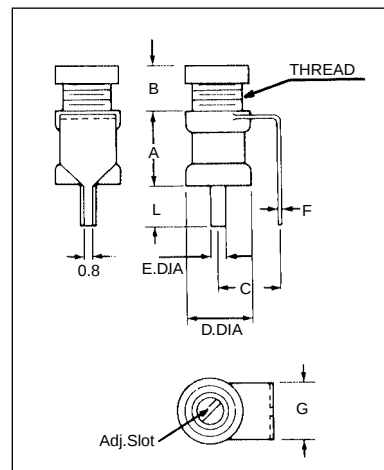


Figure 6



## AIR DIELECTRIC TRIMMER CAPACITORS

Vertical mount

### Vertical mount, Standard & Extended range Dimensions (mm)

| Temex Part N° | Q factor at 100 MHz | Capacitance range (pF) | Temperature coefficient (ppM/°C) | Torque         |
|---------------|---------------------|------------------------|----------------------------------|----------------|
| AT8052        | > 5000              | 1.5 - 10               | 0 ± 15                           | T <sub>1</sub> |
| AT5276        | > 5000              | 1.5 - 10               | 0 ± 15                           | T <sub>1</sub> |
| AT8053        | > 3000              | 1.5 - 14               | 0 ± 25                           | T <sub>1</sub> |
| AT5476        | > 3000              | 1.5 - 14               | 0 ± 30                           | T <sub>1</sub> |
| AT5453        | > 3000              | 1.5 - 16               | 0 ± 50                           | T <sub>1</sub> |
| AT8054        | > 1500              | 1.5 - 20               | 0 ± 30                           | T <sub>1</sub> |
| AT5553        | > 1000              | 1.5 - 25               | 0 ± 50                           | T <sub>1</sub> |

| Fig. | A    | B   | C   | D   | E   | F   | G | H   | L   | Thread  |
|------|------|-----|-----|-----|-----|-----|---|-----|-----|---------|
| 1    | 7.5  | 5.6 | 5.2 | 7.6 | 1.6 | 0.4 | 1 |     | 2.8 | 15/64-4 |
| 2    | 7.5  | 5.6 | 5.2 | 7.6 | 1.6 | 0.4 | 1 | 5.6 | 2.8 | 15/64-4 |
| 1    | 7.5  | 5.6 | 5.2 | 7.6 | 1.6 | 0.4 | 1 |     | 2.8 | 15/64-4 |
| 2    | 7.5  | 5.6 | 5.2 | 7.6 | 1.6 | 0.4 | 1 | 5.6 | 2.8 | 15/64-4 |
| 2    | 7.5  | 5.6 | 5.2 | 7.6 | 1.6 | 0.4 | 1 | 5.6 | 2.8 | 15/64-4 |
| 1    | 14.7 | 4.4 | 5.2 | 8.0 | 1.6 | 0.4 | 1 |     | 2.8 | 15/64-4 |
| 1    | 14.7 | 4.4 | 5.2 | 8.0 | 1.6 | 0.4 | 1 |     | 2.8 | 15/64-4 |

### Vertical mount, Miniature

| Temex Part N° | Q factor at 100 MHz | Capacitance range (pF) | Temperature coefficient (ppM/°C) | Torque         |
|---------------|---------------------|------------------------|----------------------------------|----------------|
| AT8051        | > 10000             | 0.6 - 3.5              | 0 ± 50                           | T <sub>2</sub> |
| AT5853        | > 7500              | 0.7 - 5                | 0 ± 50                           | T <sub>2</sub> |
| AT8050        | > 10000             | 0.8 - 6                | 0 ± 15                           | T <sub>3</sub> |
| AT5753        | > 7500              | 1.2 - 10               | 0 ± 50                           | T <sub>3</sub> |

### Dimensions (mm)

| Fig. | A   | B   | C   | D   | E   | F    | G   | H | L   | Thread    |
|------|-----|-----|-----|-----|-----|------|-----|---|-----|-----------|
| 1    | 7.0 | 5.6 | 3.2 | 4.6 | 0.8 | 0.25 | 0.5 |   | 2.8 | .120 - 80 |
| 1    | 7.0 | 6.6 | 3.2 | 4.6 | 0.8 | 0.25 | 0.5 |   | 2.8 | .120 - 80 |
| 1    | 7.3 | 5.1 | 4   | 6.2 | 1.1 | 0.4  | 0.8 |   | 3   | 10-64     |
| 2    | 7.3 | 5.8 | 4   | 6.2 | 1.1 | 0.4  | 0.8 | 4 | 3   | 10-64     |

### Vertical mount, Low inductance

| Temex Part N° | Q factor at 100 MHz | Capacitance range (pF) | Temperature coefficient (ppM/°C) | Torque         |
|---------------|---------------------|------------------------|----------------------------------|----------------|
| AT8090        | > 2000              | 1.5 - 10               | 0 ± 20                           | T <sub>1</sub> |
| AT8091        | > 2000              | 1.5 - 14               | 0 ± 25                           | T <sub>1</sub> |
| AT8092        | > 2000              | 1.5 - 14               | 0 ± 25                           | T <sub>1</sub> |
| AT8093        | > 2000              | 1.5 - 14               | 0 ± 30                           | T <sub>1</sub> |

### Dimensions (mm)

| Fig. | A   | B   | C   | D   | E   | F   | G   | H   | L   | Thread   |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|----------|
| 3    | 7.5 | 5.6 | 7.2 | 7.6 |     | 0.4 | 6.4 |     | 4.8 | 15/64-64 |
| 5    | 7.7 | 4.7 | 7.2 | 7.6 |     | 0.4 | 6.4 |     |     | 15/64-64 |
| 4    | 7.5 | 5.6 | 7.2 | 7.6 | 1.6 | 0.4 | 6.4 | 5.5 | 2.8 | 15/64-64 |
| 6    | 7.5 | 5.6 | 7.2 | 7.6 | 1.6 | 0.4 | 6.4 |     | 2.8 | 15/64-64 |

- Note 1** : All models supplied with sealing cap.  
**Note 2** : B. Dimension is increased by 0.8 mm with slotted seal cap.  
**Note 3** : For Tap sizes and ref. numbers, consult [page 118](#)  
**Note 4** : For special and custom design models, consult [page 117](#)  
**Note 5** : For fixing hole layout tolerances and dimensions, consult [page 122](#)

### How to order?

- With standard seal cap
- With slotted seal cap add suffix S

Ex.: AT5853

Ex.: AT5853 S

## MICROWAVE TUNING ELEMENTS

|                                                            | PAGE              |
|------------------------------------------------------------|-------------------|
| <b><u>GENERAL MATTERS</u></b> .....                        | <b><u>112</u></b> |
| <b><u>A - BUSHING WITH METALLIC ROTORS</u></b> .....       | <b><u>113</u></b> |
| <b><u>B - BUSHING WITH POWER ABSORBENT ROTOR</u></b> ..... | <b><u>114</u></b> |
| <b><u>C - BUSHING WITH DIELECTRIC ROTOR</u></b> .....      | <b><u>114</u></b> |
| <b><u>D - TUNING ROTOR</u></b> .....                       | <b><u>115</u></b> |

## MICROWAVE TUNING ELEMENTS

### General matters

## GENERAL MATTERS

### Description

Microwave tuning elements are an economical means of introducing variable reactance to waveguides, cavities and other microwave structures. They are excellent for applications requiring precision, low loss high resolution tuning. The self-locking, constant torque drive mechanism eliminates the need for locking nuts and assures stable, noise free adjustment in application from DC to W band.

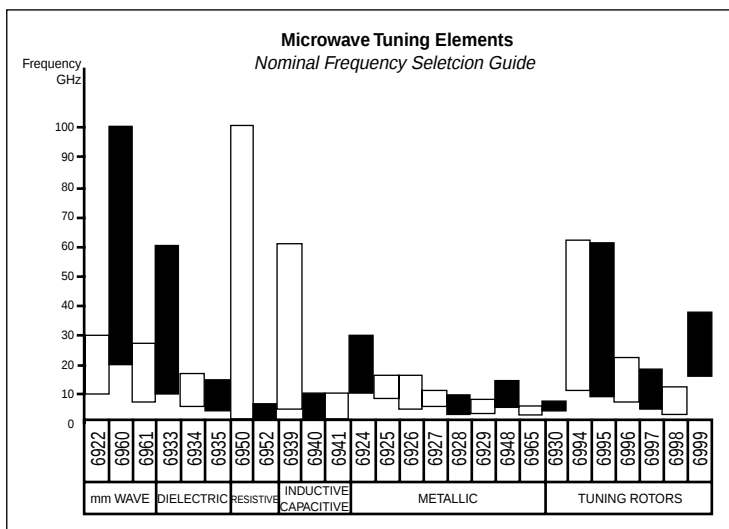
A microwave tuning element consists of a mounting bushing with an integral tuning rotor.

### Features

- High tuning resolution
- Excellent tuning stability and very low dynamic noise
- Frequency range from 0 to 100 GHz and more
- Easy to use, one hand tuning
- Gold and chromate finish (other plating upon request)
- Metallic, dielectric and resistive types available
- All tuning rotors available separately
- High reliability versions available upon request

### Applications

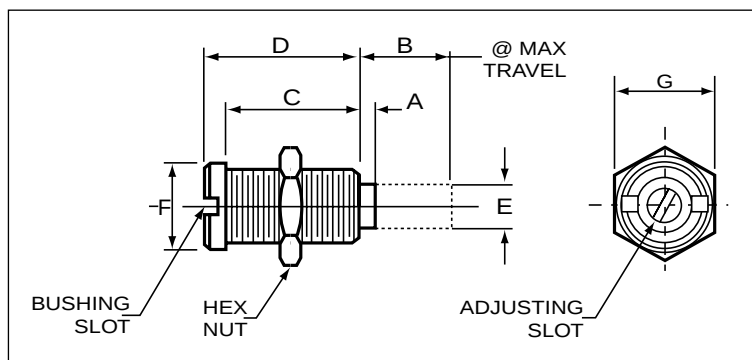
- Combine filters - Interdigital filters
- Impedance transformers - Attenuators
- Impatt and Gunn oscillators
- Microstrip and strip-line circuits
- Coaxial structures - Waveguide circuitry



## General matters

## A - BUSHING WITH METALLIC ROTOR

Tuning elements with metallic posts are simple and straight-forward in design. Each tuning unit consists of two parts, a threaded mounting bushing and a self-locking rotor screw that won't vibrate loose. Noise free, low resistance contacting is maintained between both parts by the "spring loaded" webbing which forces the threads together. High Q tuning is possible from the smooth, short, non threaded slug with less exposed surface area than with standard screws.



## Technical data

*Dimensions (mm)*

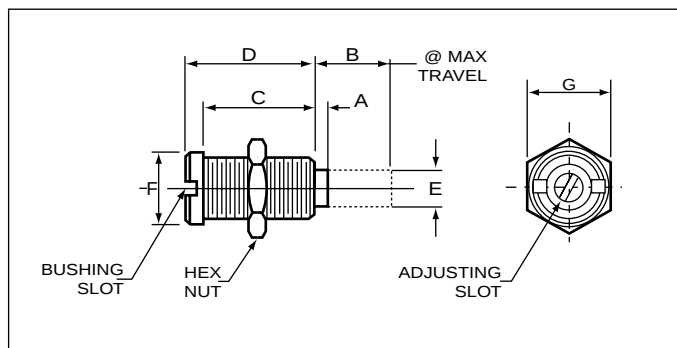
| Temex Part N° | Nominal frequency band | Bushing thread | Tap reference | Typ. tap drill | Mounting torque g. cm | A   | B    | C    | D    | E   | F    | G    |
|---------------|------------------------|----------------|---------------|----------------|-----------------------|-----|------|------|------|-----|------|------|
| AT6924-0 SL   | X and K                | .120 - 80      | 7060          | 2.75           | 700                   | 0   | 3.8  | 5.1  | 6.0  | 1.8 | 3.4  | 4.0  |
| AT6924-1 SL   | X and K                | .120 - 80      | 7060          | 2.75           | 700                   | 1.2 | 1.9  | 2.2  | 3.1  | 1.8 | 3.4  | 4.0  |
| AT6924-2 SL   | X and K                | .120 - 80      | 7060          | 2.75           | 700                   | 0   | 1.9  | 5.1  | 6.0  | 1.8 | 3.4  | 4.0  |
| AT6924-3 SL   | X and K                | .120 - 80      | 7060          | 2.75           | 700                   | 0   | 0.8  | 2.2  | 3.1  | 1.8 | 3.4  | 4.0  |
| AT6925-0 SL   | C and X                | 10 - 64        | 7061          | 4.45           | 2100                  | 0   | 3.8  | 5.4  | 6.4  | 3.2 | 5.3  | 5.6  |
| AT6925-1 SL   | C and X                | 10 - 64        | 7061          | 4.45           | 2100                  | 0   | 0.6  | 2.2  | 3.2  | 3.2 | 5.3  | 5.6  |
| AT6925-2 SL   | C and X                | 10 - 64        | 7061          | 4.45           | 2100                  | 0   | 3.2  | 5.4  | 6.4  | 1.6 | 5.3  | 5.6  |
| AT6925-3 SL   | C and X                | 10 - 64        | 7061          | 4.45           | 2100                  | 3.3 | 7.1  | 5.4  | 6.4  | 3.2 | 5.3  | 5.6  |
| AT6925-7 SL   | C and X                | 10 - 64        | 7061          | 4.45           | 2100                  | 1.1 | 4.9  | 5.4  | 6.4  | 3.2 | 5.3  | 5.6  |
| AT6925-8 SL   | C and X                | 10 - 64        | 7061          | 4.45           | 2100                  | 0.2 | 2.0  | 3.2  | 4.2  | 3.2 | 5.3  | 5.6  |
| AT6925-9 SL   | C and X                | 10 - 64        | 7061          | 4.45           | 2100                  | 0   | 2.3  | 6.6  | 7.6  | 3.2 | 5.3  | 5.6  |
| AT6926-0 SL   | C and X                | 15/64 - 64     | 7062          | 5.5            | 3500                  | 0   | 2.7  | 4.6  | 5.4  | 4.1 | 6.8  | 7.0  |
| AT6926-1 SL   | C and X                | 15/64 - 64     | 7062          | 5.5            | 3500                  | 0   | 0.7  | 2.4  | 3.2  | 4.1 | 6.8  | 7.0  |
| AT6926-4 SL   | C and X                | 15/64 - 64     | 7062          | 5.5            | 3500                  | 2.3 | 8.8  | 5.5  | 9.1  | 4.1 | 6.8  | 7.0  |
| AT6926-5 SL   | C and X                | 15/64 - 64     | 7062          | 5.5            | 3500                  | 0.6 | 2.7  | 4.0  | 4.8  | 4.1 | 6.8  | 7.0  |
| AT6926-6 SL   | C and X                | 15/64 - 64     | 7062          | 5.5            | 3500                  | 2.6 | 11.5 | 5.4  | 11.5 | 4.1 | 6.8  | 7.0  |
| AT6926-7 SL   | C and X                | 15/64 - 64     | 7062          | 5.5            | 3500                  | 1.9 | 4.6  | 4.6  | 5.4  | 4.1 | 6.8  | 7.0  |
| AT6926-9 SL   | C and X                | 15/64 - 64     | 7062          | 5.5            | 3500                  | 0   | 2.7  | 5.5  | 9.1  | 4.1 | 6.8  | 7.0  |
| AT6926-10 SL  | C and X                | 15/64 - 64     | 7062          | 5.5            | 3500                  | 0   | 4.6  | 5.5  | 9.1  | 4.1 | 6.8  | 7.0  |
| AT6927-0 SL   | C and X                | 15/64 - 64     | 7062          | 5.55           | 3500                  | 0   | 6.5  | 5.5  | 9.7  | 4.1 | 6.8  | 7.0  |
| AT6928-0 SL   | C                      | 15/64 - 64     | 7062          | 5.55           | 3500                  | 0   | 8.8  | 5.4  | 11.5 | 4.1 | 6.8  | 7.0  |
| AT6928-2 SL   | C                      | 15/64 - 64     | 7062          | 5.55           | 3500                  | 6.1 | 8.8  | 4.6  | 5.4  | 4.1 | 6.8  | 7.0  |
| AT6929-0 SL   | C                      | 10 - 64        | 7061          | 4.45           | 2100                  | 0   | 11.4 | 13.0 | 14.0 | 3.2 | 5.3  | 5.6  |
| AT6948-0 SL   | C and X                | .312 - 64      | 7065          | 7.55           | 8400                  | 0   | 5.9  | 8.2  | 9.2  | 5.3 | 9.5  | 10   |
| AT6965-0 SL   | L and S                | .469 - 32      |               | 11.10          | 16800                 | 0   | 12.7 | 17.3 | 18.3 | 8.8 | 13.5 | 14.2 |

## MICROWAVE TUNING ELEMENTS

### General matters

#### B - BUSHING WITH POWER ABSORBENT ROTOR

The AT6950 series tuning elements are unique in that they absorb varying amounts of microwave power. The amount of power absorbed depends on the insertion of the slug into the waveguide or cavity. When properly mounted in the input or the output ports of microwave amplifiers, oscillators, etc., they may provide the test engineer a convenient means to trim the microwave power. The slug material is a magnetically loaded epoxide rod, chosen for its broadband lossy properties.



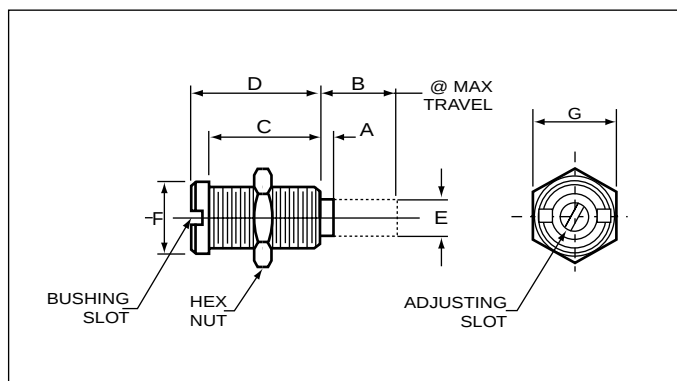
#### Technical data

| Temex Part N° | Nominal frequency band | Bushing thread | Tap reference | Typ. tap drill | Mounting torque g. cm | A   | B   | C   | D   | E   | F   | G   |
|---------------|------------------------|----------------|---------------|----------------|-----------------------|-----|-----|-----|-----|-----|-----|-----|
| AT6950-0 SL   | Broad Band             | .120 - 80      | 7060          | 2.75           | 700                   | 0.6 | 4.3 | 5.1 | 6.0 | 1.6 | 3.4 | 4.0 |
| AT6950-1 SL   |                        | .120 - 80      | 7060          | 2.75           | 700                   | 0   | 3.3 | 5.1 | 6.0 | 2.0 | 3.4 | 4.0 |
| AT6952-0 SL   |                        | 15/64 - 64     | 7062          | 5.55           | 3500                  | 0   | 6.4 | 5.5 | 9.1 | 3.9 | 6.8 | 7.0 |

#### Dimensions (mm)

#### C - BUSHING WITH DIELECTRIC ROTOR

Dielectric tuning elements are used whenever the ultimate is required in high frequency low loss tuning. When a dielectric rod is introduced into a microwave cavity, the cavity "appears" electrically larger and the resonant frequency is lowered. This change in resonant frequency is dependent on the depth of dielectric rod insertion, the dissipation factor (DF) which must be kept low to minimize circuit loss, the dielectric constant (K) of the material for tuning resolution, the diameter of the rod and its placement in the circuit. Ideal applications are Gunn diode and impatt oscillators.



#### Technical data

| Temex Part N° | Rod mat. | Nominal frequency band | Bushing thread | Tap reference | Typ. tap drill | Mounting torque g. cm | A   | B   | C   | D   | E   | F   | G   |
|---------------|----------|------------------------|----------------|---------------|----------------|-----------------------|-----|-----|-----|-----|-----|-----|-----|
| AT6933-0 SL   | S        | X and K                | .120 - 80      | 7060          | 2.75           | 700                   | 0.8 | 4.3 | 5.1 | 6.0 | 1.6 | 3.4 | 4.0 |
| AT6933-1 SL   | S        | X and K                | .120 - 80      | 7060          | 2.75           | 700                   | 0.8 | 3.3 | 5.1 | 6.0 | 0.9 | 3.4 | 4.0 |
| AT6933-2 SL   | Q        | K                      | .120 - 80      | 7060          | 2.75           | 700                   | 0.6 | 4.3 | 5.1 | 6.0 | 1.6 | 3.4 | 4.0 |
| AT6934-0 SL   | S        | C, X and K             | 15/64 - 64     | 7062          | 5.55           | 3500                  | 0.8 | 3.0 | 4.6 | 5.4 | 3.9 | 6.8 | 7.0 |
| AT6935-0 SL   | S        | X and K                | 15/64 - 64     | 7062          | 5.55           | 3500                  | 0.8 | 6.8 | 5.5 | 9.1 | 3.9 | 6.8 | 7.0 |

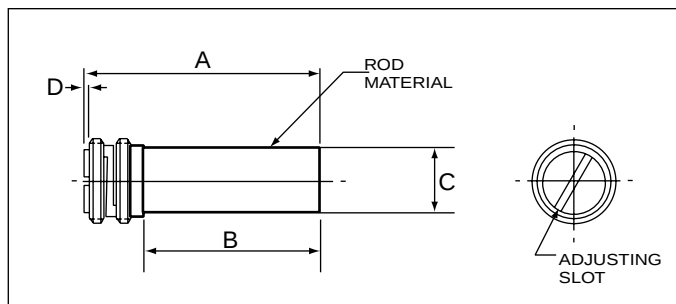
#### Dimensions (mm)

| Rod material | Approximate K @ 10 GHz | Approximate DF @ 10 GHz |
|--------------|------------------------|-------------------------|
| S SAPPHIRE   | 9.9                    | 0.0001                  |
| Q QUARTZ     | 3.8                    | 0.0001                  |
| A ALUMINA    | 9.7                    | 0.0002                  |

**D - TUNING ROTOR**

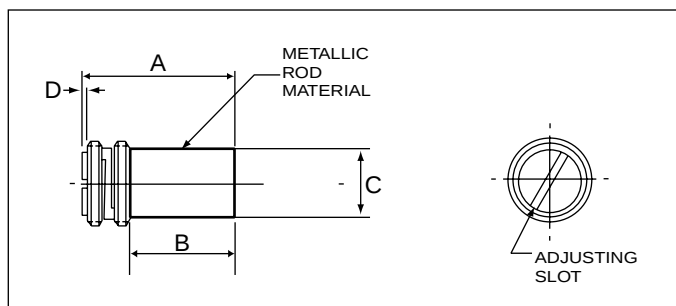
Extended range high Q dielectric and metallic rotors are used where direct insertion of the tuning element is desired.

Taps designed specifically to insure proper fit are available from the factory and are listed below.

**Dielectric rotors****Technical data****Dimensions (mm)**

| Temex Part N° | Rod material | Thread UNS-2A | Tap reference | Typ. tap drill | A   | B   | C   | D   | Slot W x L |
|---------------|--------------|---------------|---------------|----------------|-----|-----|-----|-----|------------|
| AT6930-4      | Sapphire     | 3/32 - 80     | 7064          | 2.05           | 5.8 | 2.5 | 0.9 | 0.5 | 0.4 x 1.5  |
| AT6930-8      | Sapphire     | 3/32 - 80     | 7064          | 2.05           | 6.6 | 3.5 | 1.6 | 0.5 | 0.4 x 1.5  |

Other dielectric materials available upon request

**Metallic rotors****Technical data****Dimensions (mm)**

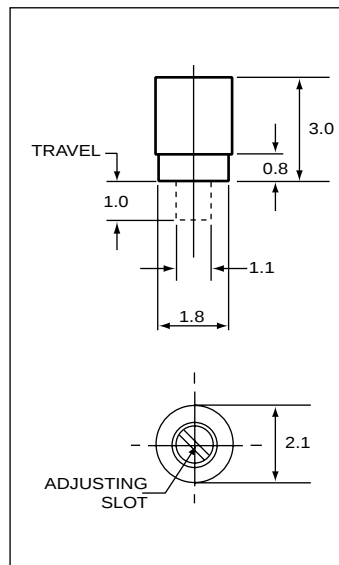
| Temex Part N° | Rod material | Thread       | Tap reference | Typ. tap drill | A    | B    | C   | D    | Slot W x L  |
|---------------|--------------|--------------|---------------|----------------|------|------|-----|------|-------------|
| AT6501-3      | Brass        | M 1.5 x 0.25 | AT7071        | 1.25           | 4.4  | 2.3  | 1.1 | 0.4  | 0.25 x 1.10 |
| AT6501-0      | Brass        | M 2.5 x 0.25 | AT7070        | 2.25           | 5.4  | 3.3  | 2.1 | 0.4  | 0.4 x 1.90  |
| AT6501-1      | Brass        | M 2.5 x 0.25 | AT7070        | 2.25           | 4.4  | 2.3  | 2.1 | 0.4  | 0.4 x 1.90  |
| AT6501-2      | Brass        | M 2.5 x 0.25 | AT7070        | 2.25           | 7.7  | 5.6  | 2.1 | 0.4  | 0.4 x 1.90  |
| AT6995-0      | Brass        | 3/32 - 80    | AT7064        | 2.05           | 3.1  | 0.8  | 1.8 | 0.5  | 0.4 x 1.50  |
| AT6995-1      | Brass        | 3/32 - 80    | AT7064        | 2.05           | 4.2  | 1.9  | 1.8 | 0.5  | 0.4 x 1.50  |
| AT6995-2      | Brass        | 3/32 - 80    | AT7064        | 2.05           | 6.1  | 3.8  | 1.8 | 0.5  | 0.4 x 1.50  |
| AT6996-0      | Brass        | 5/32 - 64    | AT7059        | 3.55           | 5.8  | 3.2  | 1.6 | 0.25 | 0.50 x 3.0  |
| AT6996-1      | Brass        | 5/32 - 64    | AT7059        | 3.55           | 6.4  | 3.8  | 3.2 | 0.25 | 0.50 x 3.0  |
| AT6996-2      | Brass        | 5/32 - 64    | AT7059        | 3.55           | 9.7  | 7.1  | 3.2 | 0.25 | 0.50 x 3.0  |
| AT6996-3      | Brass        | 5/32 - 64    | AT7059        | 3.55           | 14.0 | 11.4 | 3.2 | 0.25 | 0.50 x 3.0  |
| AT6996-4      | Brass        | 5/32 - 64    | AT7059        | 3.55           | 3.2  | 0.6  | 3.2 | 0.25 | 0.50 x 3.0  |
| AT6996-5      | Brass        | 5/32 - 64    | AT7059        | 3.55           | 7.5  | 4.9  | 3.2 | 0.25 | 0.50 x 3.0  |
| AT6996-6      | Brass        | 5/32 - 64    | AT7059        | 3.55           | 4.6  | 2.0  | 3.2 | 0.25 | 0.50 x 3.0  |
| AT6996-8      | Brass        | 5/32 - 64    | AT7059        | 3.55           | 4.9  | 2.3  | 3.2 | 0.25 | 0.50 x 3.0  |
| AT6997-0      | Brass        | 10 - 64      | AT7061        | 4.45           | 14.1 | 11.5 | 4.1 | 0.3  | 0.50 x 3.70 |
| AT6997-1      | Brass        | 10 - 64      | AT7061        | 4.45           | 5.3  | 2.7  | 4.1 | 0.3  | 0.50 x 3.70 |
| AT6997-2      | Brass        | 10 - 64      | AT7061        | 4.45           | 9.1  | 6.5  | 4.1 | 0.3  | 0.50 x 3.70 |
| AT6997-3      | Brass        | 10 - 64      | AT7061        | 4.45           | 11.4 | 8.8  | 4.1 | 0.3  | 0.50 x 3.70 |
| AT6997-4      | Brass        | 10 - 64      | AT7061        | 4.45           | 3.3  | 0.7  | 4.1 | 0.3  | 0.50 x 3.70 |
| AT6997-5      | Brass        | 10 - 64      | AT7061        | 4.45           | 7.2  | 4.6  | 4.1 | 0.3  | 0.50 x 3.70 |

Other materials available upon request

## MICROWAVE TUNING ELEMENTS

### E - MICROWAVE TUNING ELEMENTS

The millimeter wave tuning elements are higher frequency versions of both the metallic and dielectric tuning elements described in this catalog. Please contact TEMEX for further information.

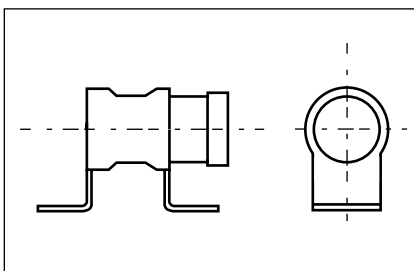


**AT6922**

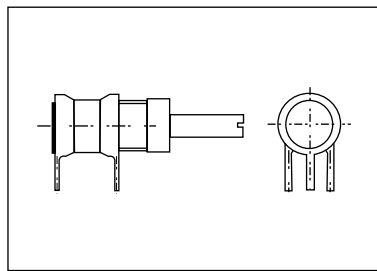
## CUSTOM DESIGNS

- TEMEX can manufacture custom design Frequency Tuning Components when standard types do not meet exact customer needs.
- Special models have been designed to make mounting or tuning easier, to increase capacitance range, etc. to answer customers individual requirements. Don't hesitate to consult us about the required specifications for your particular application. Some special models are shown hereunder.

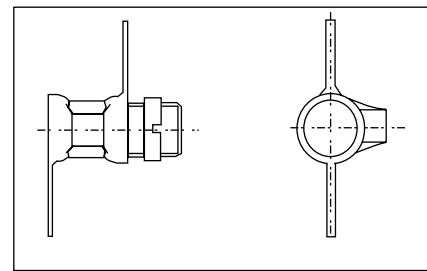
### Air trimmer capacitors



Strip-line

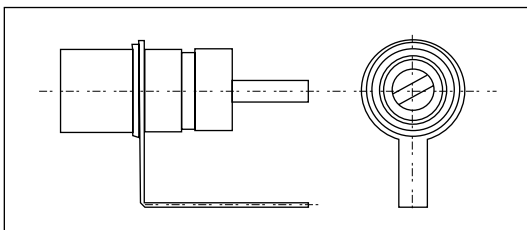


Insulating shaft

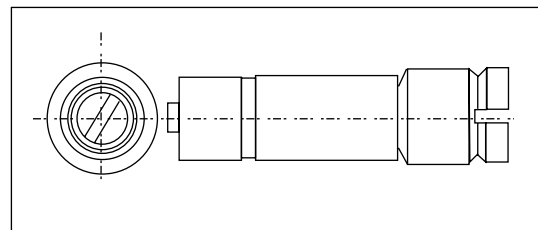


Extended range with HQ chips

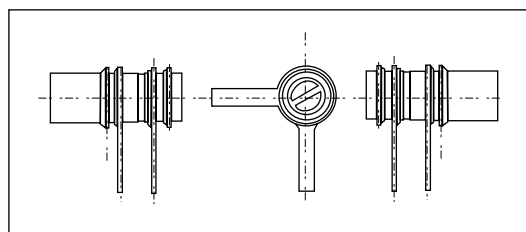
### Gigahertz trimmer capacitors



Vertical mounting

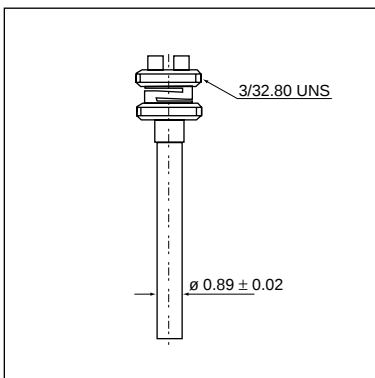


Special design with sealing cap

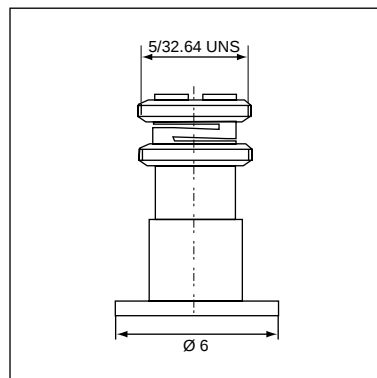


Special 4 leads

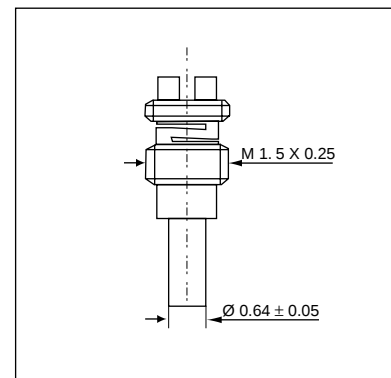
### Microwave tuning elements



Miniature sapphire rod



Metallic disk



Miniature metallic screw

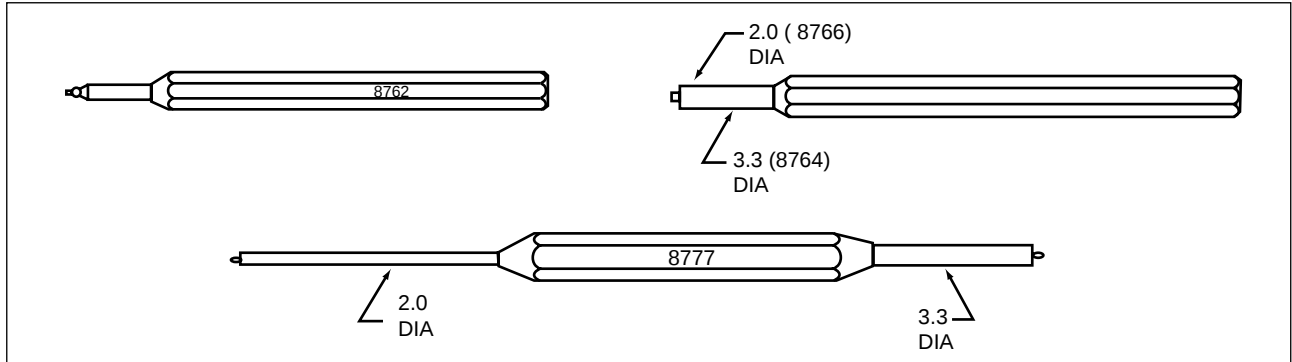
## FREQUENCY TUNING COMPONENTS

Tuning tools, taps

### TUNING TOOLS, TAPS

#### TUNING TOOLS

##### Slot tuning tools



| Temex Part N° | APPLICATION                                                                        |                                                                                       |
|---------------|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| AT8762        | AT(x) 7260 Gigahertz trimmers Series<br>AT6922 Tuning elements                     |                                                                                       |
| AT8764        | 3.3 DIA Standard Air Series<br>AT5700 Miniature Series                             |                                                                                       |
| AT8766        | 2.0 DIA AT(x) 7270, 80 90 Gigahertz trimmers Series<br>AT5800 Miniature Air Series |                                                                                       |
| AT8777        | 3.3 DIA<br>Standard Air Series<br>AT5700 Miniature Series                          | 2.0 DIA<br>AT(x) 7270, 80 90 Gigahertz trimmers Series<br>AT5800 Miniature Air Series |

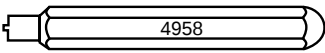
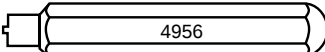
##### Square drive tuning tools

| Temex Part N° | APPLICATION                               |  |
|---------------|-------------------------------------------|--|
| AT4192        | AT9401 } Thin trimmers Series<br>AT9402 } |  |
|               | AT2320 Ceramic trimmers                   |  |
| AT4193        | AT9410 Thin trimmers Series               |  |

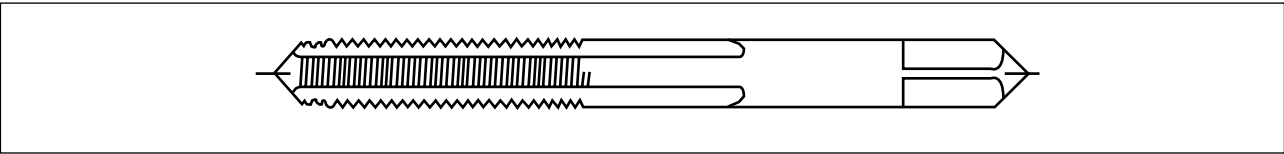
FREQUENCY TUNING COMPONENTS

Tuning tools, taps

Round nut wrenches

| Temex Part N° | APPLICATION                  |                                                                                    |
|---------------|------------------------------|------------------------------------------------------------------------------------|
| AT4958        | 5800<br>Miniature Air Series |  |
| AT4956        | 5700<br>Miniature Air Series |  |

Taps



| Temex Part N° | THREAD SIZE UNS-2 | RECOMMENDED TAP DRILL |
|---------------|-------------------|-----------------------|
| AT7057        | .200 - 80         | 4.75                  |
| AT7059        | 5/32 - 64         | 3.55                  |
| AT7060        | .120 - 80         | 2.75                  |
| AT7061        | 10 - 64           | 4.45                  |
| AT7062        | 15/64 - 64        | 5.55                  |
| AT7063        | 1/4 - 64          | 5.95                  |
| AT7064        | 3/32 - 80         | 2.05                  |
| AT7065        | .312 - 64         | 7.50                  |
| AT7070        | M 2.5 x 0.25      | 2.25                  |
| AT7071        | M 1.5 x 0.25      | 1.25                  |

# FREQUENCY TUNING COMPONENTS

## Hardware



## HARDWARE

|                                                                                     |                  | TEMEX PART NUMBER     |         |           |
|-------------------------------------------------------------------------------------|------------------|-----------------------|---------|-----------|
|                                                                                     |                  | MOUNTING THREAD UNS-2 |         |           |
|                                                                                     |                  | 15/64 - 64            | 10 - 64 | .120 - 80 |
|    | Slotted Seal Cap | AT4613                | AT6486  | AT6487    |
|    | Lock Washer      | AT1999                | AT1994  | AT1993    |
|   | Round Nut        | AT6546                | AT4825  | AT4680    |
|  | Hex Nut          | AT3469                | AT4537  | AT6389    |

|                                                                                     |                       |         |                                                               |
|-------------------------------------------------------------------------------------|-----------------------|---------|---------------------------------------------------------------|
|  | Removable sealing cap | AT69800 | For Gigahertz trimmers<br>ATX727, ATX728<br>and ATX729 series |
|                                                                                     | Permanent sealing cap | AT69600 | For Gigahertz trimmers<br>ATX726 series                       |
|                                                                                     | Permanent sealing cap | AT69700 | For Gigahertz trimmers<br>ATX727, ATX728<br>and ATX729 series |

## PRECAUTION OF USE

### General

TEMEX variable capacitors and microwave tuning elements are precision components and may require specific handling during installation and adjustments. If these simple procedures are followed, your TEMEX component can be expected to provide you with trouble free service.

### Mounting

- Use appropriate tuning tool
- Rotor should not be disassembled from stator
- Handle components with dry hands or finger stalls

### Recommended mounting torques

The torques indicated in the following chart should not be exceeded on:

- Rotor stops (max. capac. position): (Rot Stop)
- Mounting nuts (Mnt Nut)
- Sealing caps (Seal)
- Note: 1 cN.cm  $\neq$  1 g.cm

| AIR TRIMMERS Series | Rot Stop cN.cm | Mnt Nut cN.cm | Seal cN.cm |
|---------------------|----------------|---------------|------------|
| AT5200-5400-5450    | 500            | 5000          | 800        |
| AT5500-5550-5600    | 500            | 5000          | 800        |
| AT5300              | 600            | 7000          | 1000       |
| AT5700-5750         | 400            | 3000          | 600        |
| AT5800-5850         | 300            | 1000          | 300        |

| GIGAHERTZ TRIMMER Series | Rot Stop cN.cm | Tuning Elements                 | Mnt Nut cN.cm |
|--------------------------|----------------|---------------------------------|---------------|
| AT7260                   | 80             | AT6924-6933-6950<br>AT6925-6929 | 1000<br>3000  |
| AT7280                   | 120            | AT6926-6927-6928                | 5000          |
| AT7270/90                | 150            | AT6934-6935-6940-6952<br>AT6948 | 5000<br>7000  |

### Soldering

Use of 60-40 solder is recommended. The use of higher temperature solder is not recommended.

**Hand Soldering:** use a temperature controlled 40 watts iron set at 260° C maximum. The solder joint should be made in 3 seconds or less.

**Wave Soldering:** recommended preheat is 1 to 2 minutes. Soldering temperature, 220° C to 5 seconds maximum.

**Reflow Soldering:** recommended preheat is 1 to 2 minutes. Soldering temperature, 250° C to 20 seconds maximum.

### Cleaning

Air, Gigahertz and SMD Ceramic (Thin and Hermetic) trimmers are compatible with a wide variety of cleaning processes including those that utilize aqueous or semi-aqueous cleaning solutions, alcohol solutions, de-ionized water and other cleaners. Due to the large variety of such processes, the Customer must determine compatibility, through cleaning process evaluation in conjunction with purchased Temex component. Capacitors without seal caps should be protected from intrusion of cleaning solvents on the internal bushing thread. It is recommended to install these units after circuit boards have been cleaned. Units with seal caps may be immersed in liquid, vapor, and ultrasonic cleaning systems.

SMD Thin Ceramic Trimmer Capacitors should be cleaned in contamination free solvent. If rough torque occurs after cleaning, reclean in fresh solvent.

SMD Hermetic Ceramic trimmer Capacitors with process seal can be cleaned in aggressive systems. It is possible to clean these sealed trimmers by suspension in vapor or total immersion in liquid ultrasonic systems containing the cleaning solutions.

### Adjusting

Always use the recommended tuning tool. TEMEX tuning tools are designed specifically for tuning TEMEX products ; Use of other tools may damage the internal bushing thread causing the rotor to bind.

# FREQUENCY TUNING COMPONENTS

## Mounting holes layout

### ► MOUNTING HOLES LAYOUT

#### Trimmer air capacitors

|                  | Fig. | Ø1   | Ø2  | L   | M    |
|------------------|------|------|-----|-----|------|
| AT5200-5400-5450 | A    | 6.2  | -   | -   | -    |
| AT5201-5401-5451 | B    | 1.3  | -   | 5.6 | 7.2  |
| AT5202-5402-5452 | A    | 6.2  | -   | -   | -    |
| AT5276-5476-5453 | C    | 1.3  | 1.7 | 5.6 | 5.2  |
| AT5300-5302      | A    | 8.1  | -   | -   | -    |
| AT5301           | B    | 1.3  | -   | 7.9 | 11.1 |
| AT5500-5550      | A    | 6.2  | -   | -   | -    |
| AT5501-5551      | B    | 1.3  | -   | 5.6 | 14.2 |
| AT5502-5552      | A    | 6.2  | -   | -   | -    |
| AT5600-5602      | A    | 6.2  | -   | -   | -    |
| AT5601           | D    | 1.3  | -   | 5.6 | 18.8 |
| AT5700-5750      | A    | 4.9  | -   | -   | -    |
| AT5701-5751      | B    | 1.3  | -   | 4.0 | 6.7  |
| AT5702-5752      | A    | 4.9  | -   | -   | -    |
| AT5753           | B    | 1.3  | -   | 4.0 | 4.0  |
| AT5800-5850      | A    | 3.2  | -   | -   | -    |
| AT5801-5851      | E    | 1.3  | 1.3 | -   | 6.5  |
| AT5802-5852      | A    | 3.2  | -   | -   | -    |
| AT5853           | E    | 0.7* | 1.0 | -   | 3.2  |
| AT8050           | E    | 1.3  | 1.3 | -   | 4.0  |
| AT8051           | E    | 0.7* | 1.0 | -   | 3.2  |
| AT8052-8053-8054 | E    | 1.3  | 1.7 | -   | 5.2  |
| AT8090           | E    | 1.3  | 2.9 | -   | 7.2  |
| AT8091           | C    | 1.3  | 6.2 | -   | 7.2  |
| AT8092           | E    | 1.3  | 1.7 | 5.6 | 7.2  |
| AT8093           | A    | 1.3  | 1.7 | -   | 7.2  |

#### M Series capacitors

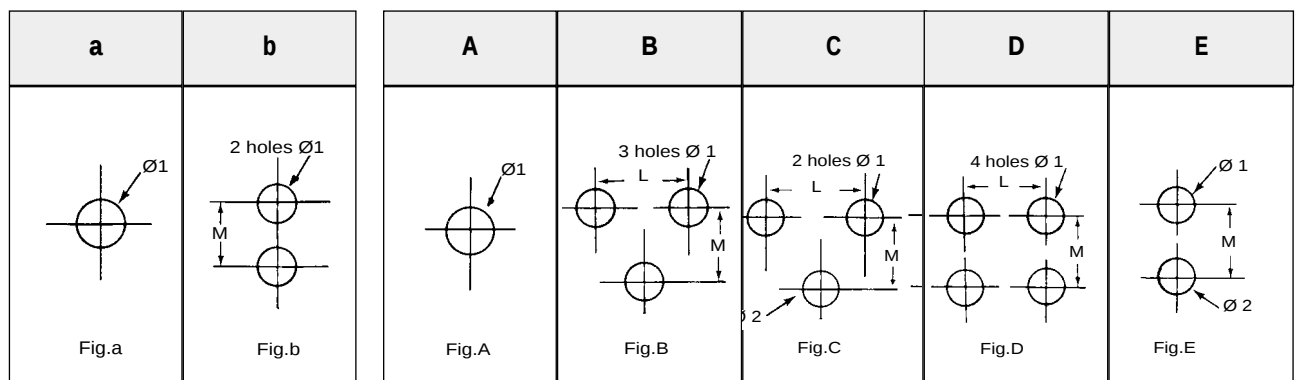
|                       | Fig. | Ø1  | Ø2  | L   | M   |
|-----------------------|------|-----|-----|-----|-----|
| ATM120-M220-M320-M420 | A    | 6.2 | -   | -   | -   |
| ATM121                | B    | 1.3 | -   | 5.6 | 7.6 |
| ATM122-M222-M322-M422 | A    | 6.2 | -   | -   | -   |
| ATM123-M223-M323-M423 | E    | 1.3 | 1.7 | 5.2 | -   |
| ATM221-M321-M421      | B    | 1.3 | -   | 5.6 | 7.9 |

#### Gigahertz trimmers

|                  | Fig. | Ø   | M   |
|------------------|------|-----|-----|
| AT(x) 7261       | b    | 1.2 | 2.0 |
| AT(x) 7265       | a    | 2.1 | -   |
| AT(x) 7269       | b    | 1.2 | 3.0 |
| AT(x) 7271       | b    | 1.2 | 3.2 |
| AT(x) 7275-85-95 | a    | 3.2 | -   |
| AT(x) 7279-89-99 | b    | 1.2 | 4.2 |
| AT(x) 7281       | b    | 1.2 | 2.0 |
| AT(x) 7291       | b    | 1.2 | 6.4 |

Dimensions are given in mm.

Tolerance  $\pm 0.1$  mm except if (\*)  $\pm 0.05$  mm.



## ▶ PROTOTYPING KITS

### • SMD hermetic ceramic trimmer capacitor Kit KTT-023

| Quantity | Part Number | Capacity pF |
|----------|-------------|-------------|
| 4        | AT2320-0    | 0.6 - 2.5   |
| 4        | AT2320-1    | 1 - 5       |
| 4        | AT2320-2    | 2.5 - 10    |
| 4        | AT2320-3    | 5 - 18      |
| 4        | AT2320-4    | 6.5 - 25    |
| 1        | AT4192      | Tuning tool |

### • SMD thin trimmer capacitor Kit KTT-941 (3 mm)

| Quantity | Part Number | Capacity pF |
|----------|-------------|-------------|
| 5        | AT9401-0    | 0.25 - 0.7  |
| 5        | AT9401-1    | 0.5 - 1.3   |
| 5        | AT9401-2    | 0.6 - 2     |
| 5        | AT9401-4    | 1.5 - 4     |
| 1        | AT4192      | Tuning tool |

### • SMD thin trimmer capacitor Kit KTT-942 (3 mm)

| Quantity | Part Number | Capacity pF |
|----------|-------------|-------------|
| 4        | AT9402-0    | 0.6 - 2.5   |
| 4        | AT9402-1    | 1 - 5       |
| 4        | AT9402-2    | 2.5 - 10    |
| 4        | AT9402-8    | 3 - 12      |
| 4        | AT9402-6    | 6 - 25      |
| 4        | AT9402-9    | 5 - 18      |
| 1        | AT4192      | Tuning tool |

### • SMD thin trimmer capacitor Kit KTT-940 (5 mm)

| Quantity | Part Number | Capacity pF |
|----------|-------------|-------------|
| 5        | AT9410-0    | 1 - 4.5     |
| 5        | AT9410-1    | 2.5 - 10    |
| 5        | AT9410-2    | 4 - 18      |
| 5        | AT9410-3    | 6 - 35      |
| 1        | AT4193      | Tuning tool |

### • Chip trimmer capacitor Kit KTT-0300

| Quantity | Part Number | Capacity pF |
|----------|-------------|-------------|
| 5        | AT0303      | 1.5 - 3     |
| 5        | AT0306      | 2 - 6       |
| 5        | AT0308      | 3 - 8       |
| 5        | AT0310      | 2 - 10      |
| 5        | AT0315      | 3 - 15      |
| 5        | AT0320      | 4.5 - 20    |
| 5        | AT0330      | 5.5 - 30    |
| 5        | AT0340      | 8 - 40      |

### • Chip trimmer capacitor Kit KTT-1300

| Quantity | Part Number | Capacity pF |
|----------|-------------|-------------|
| 5        | AT1303      | 1.5 - 3     |
| 5        | AT1306      | 2 - 6       |
| 5        | AT1308      | 3 - 8       |
| 5        | AT1310      | 2 - 10      |
| 5        | AT1315      | 3 - 15      |
| 5        | AT1320      | 4.5 - 20    |
| 5        | AT1330      | 5.5 - 30    |
| 5        | AT1340      | 8 - 40      |

### • Gigahertz trimmer capacitor Kit KTT-272

| Quantity | Part Number | Capacity pF |
|----------|-------------|-------------|
| 3        | AT27261     | 0.3 - 1.2   |
| 3        | AT27263     | 0.3 - 1.2   |
| 3        | AT27271     | 0.6 - 4.5   |
| 3        | AT27284     | 0.4 - 2.5   |
| 3        | AT27285     | 0.4 - 2.5   |
| 3        | AT27291     | 0.8 - 8.0   |
| 1        | AT8762      | Tuning tool |
| 1        | AT8777      | Tuning tool |

### • Microwave tuning elements Kit KTT-690

| Quantity | Part Number | Max. Travel    | Rod Diameter |
|----------|-------------|----------------|--------------|
| 5        | AT6924-0    | 3.8            | 1.8          |
| 5        | AT6925-0    | 3.8            | 3.2          |
| 5        | AT6926-0    | 2.7            | 4.1          |
| 5        | AT6927-0    | 6.5            | 4.1          |
| 3        | AT6928-0    | 8.8            | 4.1          |
| 3        | AT6933-0    | 4.3            | 1.6          |
| 1        | AT7060      | .120-80 Tap    |              |
| 1        | AT7061      | 10-64 Tap      |              |
| 1        | AT7062      | 15/64 - 64 Tap |              |