

APPROVAL

DESCRIPTION : TUN-CAP 20-335P 20 × 20A

NCE PARTS NO. : BE443AB92-A04

PARTS NO. :

DRAWING :

RECEIVED

VENDOR:UNITY SYSTEMS.CO.,LTD.

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NCE

POLYVARICON

MODEL: BE443AB92-A04

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1. Application

This specification is applicable for 4 gangs capacitor , model **AE443AB92-A04** with 2 gangs of equal capacitance on AM section and with 2 gangs of equal capacitance on FM section, for tuned and oscillation circuit of transistor radio.

2. Electrical Characteristics

2-1. Capacitance

Effective capacitance at each position is shown on Table 1 , defining the rotation angle 180 ° is expressed 100%.

Table 1 Capacitance & Coefficient

| A M | | | F M | | |
|----------|-----------|-----------|-----------|-----------|----------|
| Rotation | OSC / ANT | | OSC / ANT | | Rotation |
| (%) | Coef. | Capa.(pF) | Coef. | Capa.(pF) | (%) |
| *100 | 100.00 | 335.00 | 100.00 | 40.00 | *100 |
| 90 | 84.40 | 282.74 | 86.18 | 34.47 | 90 |
| *80 | 67.90 | 227.47 | 73.37 | 29.35 | 80 |
| 75 | 60.00 | 201.00 | 67.32 | 26.93 | *75 |
| 70 | 52.30 | 175.21 | 61.48 | 24.59 | 70 |
| *60 | 38.00 | 127.30 | 50.42 | 20.17 | 60 |
| 50 | 26.20 | 87.77 | 40.12 | 16.05 | *50 |
| *40 | 17.00 | 56.95 | 30.50 | 12.20 | 40 |
| 30 | 10.20 | 34.17 | 21.52 | 8.61 | 30 |
| *25 | 7.57 | 25.36 | 17.25 | 6.90 | *25 |
| 20 | 5.31 | 17.79 | 13.11 | 5.24 | 20 |
| *10 | 1.74 | 5.83 | 5.23 | 2.09 | *10 |
| 3 | 0.00 | 0.00 | 0.00 | 0.00 | 3 |

2-2. Minimum Capacitance

Minimum Capacitance shown on Table 2 is defined at the end stop, where shaft is rotated full clockwise. But trimmer capacitance is minimum.

Table 2

| Section | Minimum Capacitance |
|---------|-------------------------------------|
| AM | C3 : 4.4 ± 1.0pF , C4 : 4.2 ± 1.0pF |
| FM | C1 : 3.0 ± 1.0pF , C2 : 3.6 ± 1.0pF |

2-3. Tolerance of Capacitance

The tolerance of the effective capacitance is shown Table 3

Table 3

| Condition | Section | Standard |
|--------------------------------------|---------|--|
| At the angle of * marking of Table 1 | OSC | AM ± (1.5% + 1.5 pF) , FM ± (1.0 % + 1.0 pF) |
| | ANT | AM ± (1.5% + 1.5 pF) , FM ± (1.0 % + 1.0 pF) |

| Clause | Item | Condition | Standard |
|--------|-----------------------|--|---------------------------|
| 2 - 4 | Insulation Resistance | At D.C. 100V | More than 100 M |
| 2 - 5 | Voltage Proof | Running D.C. 100V for 1 minute | Not to be found unusually |
| 2 - 6 | Q Characteristics | AM | Valued at 10MHz 50pF |
| | | FM | Valued at 100MHz 10pF |
| 2 - 7 | Contact Resistance | Valued at the tops of shaft and earth terminals when 1kHz ± 200Hz and 100mA are supplied(Rotation speed 30 times/minute) | Less than 20 m |

3. Mechanical Characteristics

| Clause | Item | Condition | Standard |
|--------|-------------------------------|---|---|
| 3 - 1 | Direction of the rotation | Capacitance change when shaft is rotated clockwise | Decreasing |
| 3 - 2 | Shaft Rotation | Rotation range is defined 100% for 180 ° | 97% (+2 to -1%) |
| 3 - 3 | Rotation Torque | Torque application when shaft is rotated full at normal temperature condition | 50 - 400 gf.cm |
| 3 - 4 | Strength of end stop | A specimen is left in the standard test condition for 1 minute after 5 kgf.cm rotations | Not to be found insulate both electrically and mechanically |
| 3 - 5 | Ratio of Max. and Min. torque | Max.: Min. | Within 3: 1 |

4. Trimmer ability

| Clause | Item | Condition | Standard |
|--------|-----------------------|--|---|
| 4 - 1 | Shaft Rotation | Rotation range | 360 ° |
| 4 - 2 | Rotation Torque | On the whole rotation range. Ratio of Max. and Min. torque | 50 – 400 gf-cm Max.: Min. within 3 : 1 |
| 4 - 3 | Effective Capacitance | | More than 5 pF |
| 4 - 4 | Q Characteristics | At maximum capacitance and 10 MHz(main capacitance is minimum) | More than 200 |

5. Materials

5-1. Body Parts

| Component | Materials |
|--------------|--|
| Base | Degeneration PPO or PPE included glass |
| Case | Degeneration PP or AS |
| Rotor Shaft | Brass |
| Rotor Plate | Aluminum or Brass |
| Stator Plate | Aluminum - Polyethylene film |
| Terminal | Iron or Brass - Tin plating |

5-2. Trimmer Parts

| Component | Materials |
|----------------------|--|
| Trimmer Base | Degeneration PPO or PPE included glass |
| Trimmer Shaft | Brass or Copper Alloys |
| Trimmer Rotor Plate | Brass - Nickel plating |
| Trimmer Stator Plate | Brass - Polyethylene film |

6. Specific Examinations

| Clause | Item | Condition | Standard |
|--------|-------------------------------|--|--|
| 6 - 1 | Vibration | By the vibration with frequency 10-55-10HZ/minute. 2.0mm to three directions of maximum capacitance for 2 hours. | Clattering or loosening shall not be occurred. Satisfying clauses 2-4, 2-5, 2-6, 2-7 and 3-3. Capacitance drift within $\pm 2\%$ or $\pm 0.5\text{pF}$ against initial value at maximum effective capacitance. |
| 6 - 2 | Load (at maximum capacitance) | Parallel load: 2kg weight is loaded to the shaft for 10 second and removing. | |
| | | Perpendicular load: 1kg weight is loaded to the shaft for 10 second | |
| 6 - 3 | Impact | By letting a specimen fall down from the height of 50 cm three times to a wooden board, or by giving impact of 80 grams to 6 faces of the specimen on time each. | |
| 6 - 4 | Rotation Life | By 10000 rotations with 10-15 rotations per minute $80\pm 5\%$ rotation range. | |
| 6 - 5 | Heat Endurance | A specimen is kept in a chamber with constant temperature 70 ± 2 for 16 hours and left in the standard test condition for one or two hours. | |
| 6 - 6 | Cold Endurance | A specimen is kept in a chamber with constant temperature -20 ± 2 for 16 hours and left in the standard test condition for one or two hours. | |
| 6 - 7 | Soldering (Terminals) | The end part 2mm of the terminal are given temperature 270 ± 5 for 2 ± 0.5 seconds. | Satisfying clauses 2-4, 2-5, 2-6, 2-7, 3 and 4. |

6-8. Temperature Cycles

A specimen at maximum capacitance is kept in the chamber (one is cold, another is hot) with constant temperature and humidity in every stage on table 4 and left in the standard test condition for 1 hour, clattering or loosening shall not be occurred. Satisfying clauses 2-4, 2-6, and 3-3.

Maximum capacitance variation rate : within 2.0%

Table 4

| Stage | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---------------------|-----|----|-----|----|-----|----|-----|----|
| Temperature ± 2 | -20 | 70 | -20 | 70 | -20 | 70 | -20 | 70 |
| Time (Hour) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

6-9. Humidity Endurance

A specimen is kept in a chamber with temperature 40 ± 2 and relative humidity 90% to 95% for 96 hours. And after leaving in the standard test condition for one or two hours. The specimen is valued, and the results shall satisfy table 5.

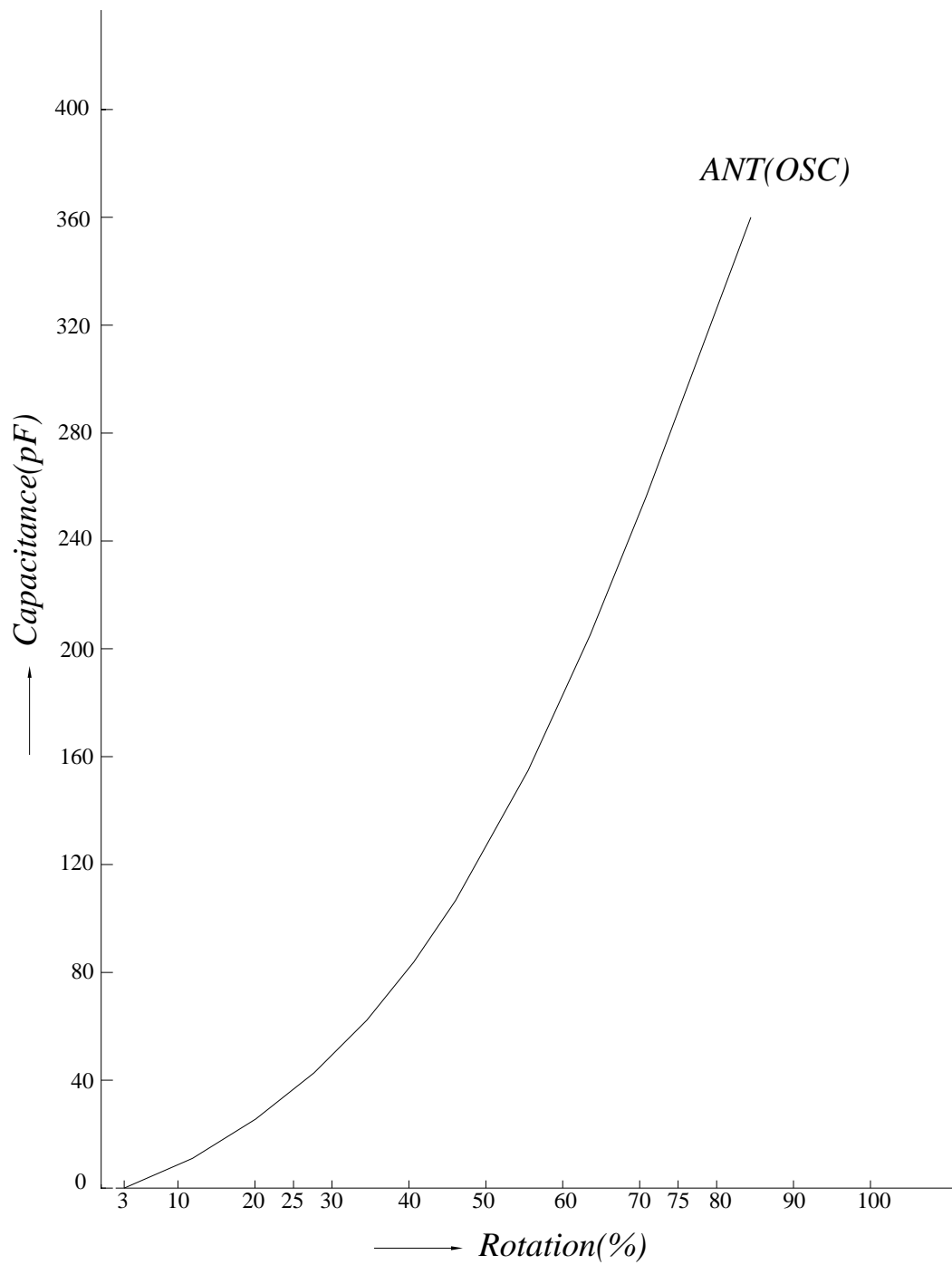
Table 5

| | | AM side | FM side |
|---------------------------|---------|-------------------------------|-----------------------------|
| Insulation Resistance | | More than 50 M (D.C. 100V) | |
| Q | Body | More than 500 (10MHz 50pF) | More than 150 (100MHz 10pF) |
| Characteristics | Trimmer | More than 150 (10 MHz Cmax) | |
| Maximum Capacitance Drift | | Within $\pm 2\%$ | |

The standard test condition

This means the condition of temperature 5 to 35 and relative humidity 45 to 85% , but that of 20 ± 2 and $65\pm 5\%$ if there is any doubt.

AM curve-AA



FM curve-EB

