

# APPROVAL

DESCRIPTION : TUN-CAP 40-126P 20×20A

NCE PARTS NO. : DE443DB04-A04

PARTS NO. :

DRAWING :

**RECEIVED**

**VENDOR:UNITY SYSTEMS.CO.,LTD.**

**ADD:** 17 Floor,Block west qiushi building,zhuzilinlu,  
Shennandadao,Shenzhen,Guangdong,P.R.China

**TEL:**86-755-88316650

**FAX:**86-755-88316651

**[Http://www.nce-newcont.com](http://www.nce-newcont.com)**

**E-mail:**pvc@newcont.com

# NCE

## POLYVARICON

### MODEL: DE443DB04-A04

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**1. Application**

This specification is applicable for 4 gangs capacitor , model **DE443DB04-A04** with 2 gangs of equal capacitance on AM section and with 2 gangs of equal capacitance on FM section, for tuned 520-1650kHz and oscillation circuit 455kHz 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	126.00	100.00	40.00	*100
90	86.19	108.60	86.18	34.47	90
80	71.19	89.70	73.37	29.35	80
75	63.65	80.20	67.32	26.93	*75
70	56.43	71.10	61.48	24.59	70
60	42.06	53.00	50.42	20.17	60
*50	28.89	36.40	40.12	16.05	*50
40	17.62	22.20	30.50	12.20	40
30	10.24	12.90	21.52	8.61	30
*25	7.54	9.50	17.25	6.90	*25
20	5.40	6.80	13.11	5.24	20
*10	2.06	2.60	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: $4.2 \pm 1.0\text{pF}$ , C4: $4.4 \pm 1.0\text{pF}$
FM	C1: $4.0 \pm 1.0\text{pF}$ , C2: $3.8 \pm 1.0\text{pF}$

**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 $\pm ( 1.5\% + 1.5 \text{ pF} )$ , FM $\pm ( 1.0 \% + 1.0 \text{ pF} )$
	ANT	AM $\pm ( 1.5\% + 1.5 \text{ pF} )$ , FM $\pm ( 1.0 \% + 1.0 \text{ pF} )$

Clause	Item	Condition	Standard
2 - 4	Insulation Resistance	At D.C. 100V	More than 100 MΩ
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 $\pm$ 200Hz and 100mA are supplied(Rotation speed 30 times/minute)	Less than 20 mΩ

**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.
6 - 2	Load (at maximum capacitance)	Parallel load: 2kg weight is loaded to the shaft for 10 second and removing.	Satisfying clauses 2-4, 2-5, 2-6, 2-7 and 3-3.
		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.	Capacitance drift within $\pm 2\%$ or $\pm 0.5\text{pF}$ against initial value at maximum effective capacitance.
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 $70\pm 2^\circ\text{C}$ for 16 hours and left in the standard test condition for one or two hours.	Satisfying clauses 2-4 , 2-6 , 4-2 , 4-3 and 4-4
6 - 6	Cold Endurance	A specimen is kept in a chamber with constant temperature $-20\pm 2^\circ\text{C}$ 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 $270\pm 5^\circ\text{C}$ for $2\pm 0.5$ 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 $\pm 2^\circ\text{C}$	-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  $40\pm 2^\circ\text{C}$  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.

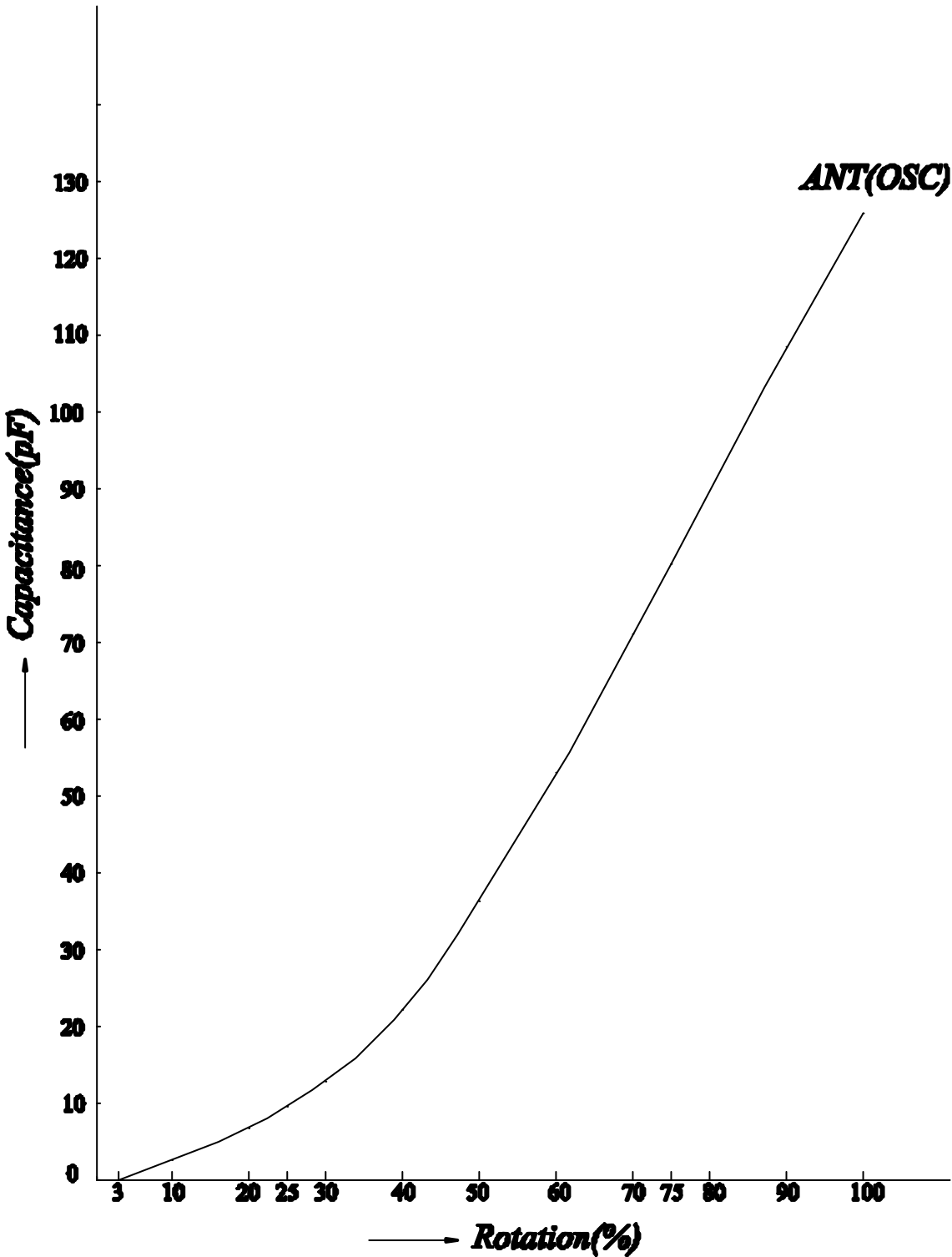
Table 5

		AM side	FM side
Insulation Resistance		More than $50\text{M}\Omega$ ( 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  $35^\circ\text{C}$  and relative humidity 45 to 85% , but that of  $20\pm 2^\circ\text{C}$  and  $65\pm 5\%$  if there is any doubt.

# AM curve-DD



# FM curve-EF

