

# Miniature Aluminum Electrolytic Capacitors

NRSK Series

ULTRA LOW IMPEDANCE AT HIGH FREQUENCY, RADIAL LEADS,  
POLARIZED ALUMINUM ELECTROLYTIC CAPACITORS

## FEATURES

- VERY LOW IMPEDANCE
- LONG LIFE AT 105°C (Up to 4000 hrs)
- HIGH STABILITY AT LOW TEMPERATURE
- IDEALLY SUITED FOR USE IN SWITCHING POWER SUPPLIES & CONVERTERS

**RoHS**  
**Compliant**  
includes all homogeneous materials

\*See Part Number System for Details



## CHARACTERISTICS

|                                                                                                                                                   |                    |                                               |      |      |      |
|---------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------------------------|------|------|------|
| Rated Voltage Range                                                                                                                               | 6.3 ~ 25           |                                               |      |      |      |
| Rated Capacitance Range                                                                                                                           | 470 ~ 3,300μF      |                                               |      |      |      |
| Operating Temp. Range                                                                                                                             | -40°C ~ +105°C     |                                               |      |      |      |
| Capacitance Tolerance                                                                                                                             | ± 20% (M)          |                                               |      |      |      |
| Max. Leakage Current After 2 Minutes @ 20°C                                                                                                       | 0.03CV             |                                               |      |      |      |
| Surge Voltage Ratings                                                                                                                             | W.V.               | 6.3                                           | 10   | 16   | 25   |
|                                                                                                                                                   | S.V.               | 8                                             | 13   | 20   | 32   |
| Maximum Tan δ (see specifications table for values above 1,800μF)                                                                                 | Tan δ @ 20°C/120Hz | 0.22                                          | 0.19 | 0.16 | 0.14 |
| Low Temperature Stability (Impedance Ratio @ 120Hz)                                                                                               | Z -25°C/Z +20°C    | 2                                             | 2    | 2    | 2    |
|                                                                                                                                                   | Z -40°C/Z +20°C    | 3                                             | 3    | 3    | 3    |
| Load Life Test @ Rated W.V. & 105°C<br>2,000 hours for 8x11.5, 8x16,<br>10x12.5 and 10x16<br>3,000 hours for 8x20<br>4,000 hours for 10x20, 10x23 | Capacitance Change | Within ± 25% of initial measured value        |      |      |      |
|                                                                                                                                                   | Tan δ              | Less than 200% of the specified maximum value |      |      |      |
|                                                                                                                                                   | Leakage Current    | Less than specified maximum value             |      |      |      |

## STANDARD PRODUCT AND CASE SIZE TABLE Dφ x L (mm)

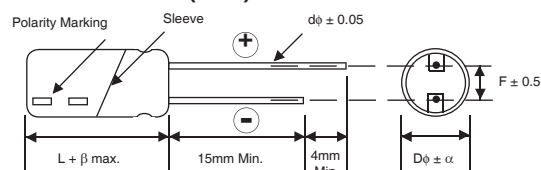
| Cap (μF) | Code | Working Voltage (Vdc) |         |         |         |
|----------|------|-----------------------|---------|---------|---------|
|          |      | 6.3                   | 10      | 16      | 25      |
| 220      | 221  | -                     | -       | -       | 8x11.5  |
| 330      | 331  | -                     | -       | -       | 8x11.5  |
|          |      | -                     | -       | -       | 10x12.5 |
| 470      | 471  | -                     | -       | -       | 8x20    |
|          |      | -                     | -       | -       | 10x12.5 |
|          |      | -                     | -       | 8x11.5  | 10x16   |
| 680      | 681  | -                     | 8x11.5  | 8x16    | 10x16   |
|          |      | -                     | -       | 10x12.5 | 10x20   |
| 820      | 821  | 8x11.5                | -       | -       | -       |
| 1000     | 102  | 8x11.5                | 8x16    | 8x20    | 10x23   |
|          |      | -                     | 10x12.5 | 10x16   |         |
| 1200     | 122  | 8x16                  | -       | -       | -       |
| 1500     | 152  | 8x20                  | 8x20    | 10x20   | -       |
|          |      | 10x12.5               | 10x16   |         |         |
| 1800     | 182  | 10x16                 | 10x20   | 10x23   | -       |
| 2200     | 222  | 10x20                 | 10x23   | -       | -       |
| 3300     | 332  | 10x23                 | -       | -       | -       |

## DIAMETER AND LEADSPACE (mm)

|                  |     |     |
|------------------|-----|-----|
| Case Dia. (Dφ)   | 8   | 10  |
| Lead Dia. (dφ)   | 0.6 | 0.6 |
| Lead Spacing (F) | 3.5 | 5.0 |
| Dim. α           | 0.5 | 0.5 |

β = L ≤ 16mm = 1.5mm, L ≥ 20mm = 2.0mm

## DIMENSIONS (mm)



Drawing is representative of parts as supplied in bulk or straight lead format, please see taping specification for details on taped format packaging.



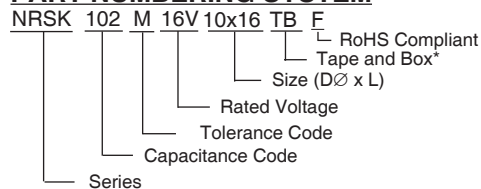
# Miniature Aluminum Electrolytic Capacitors

NRSK Series

## STANDARD PRODUCT, SPECIFICATIONS AND CASE SIZES D $\phi$ x L (mm)

| Part Number          | Cap.<br>( $\mu$ F) | W.V.<br>(Vdc) | Dissipation Factor<br>+20°C/120Hz | Ripple Current Rating (mA)<br>+105°C/100KHz | Max. ESR ( $\Omega$ )<br>+20°C/100KHz | Load Life Hours<br>@+105°C |
|----------------------|--------------------|---------------|-----------------------------------|---------------------------------------------|---------------------------------------|----------------------------|
| NRSK821M6.3V8X11.5F  | 820                | 6.3           | 0.22                              | 1140                                        | 0.036                                 | 2,000                      |
| NRSK102M6.3V8X11.5F  | 1000               |               | 0.22                              | 1140                                        | 0.030                                 | 2,000                      |
| NRSK122M6.3V8X16F    | 1200               |               | 0.22                              | 1490                                        | 0.028                                 | 2,000                      |
| NRSK152M6.3V8X20F    | 1500               |               | 0.22                              | 1870                                        | 0.019                                 | 3,000                      |
| NRSK152M6.3V10X12.5F | 1500               |               | 0.22                              | 1540                                        | 0.026                                 | 2,000                      |
| NRSK152M6.3V10X16F   | 1500               |               | 0.22                              | 2000                                        | 0.018                                 | 2,000                      |
| NRSK182M6.3V8X20F    | 1800               |               | 0.22                              | 1950                                        | 0.016                                 | 3,000                      |
| NRSK182M6.3V10X16F   | 1800               |               | 0.22                              | 2000                                        | 0.019                                 | 2,000                      |
| NRSK222M6.3V10X20F   | 2200               |               | 0.24                              | 2550                                        | 0.013                                 | 4,000                      |
| NRSK332M6.3V10X23F   | 3300               |               | 0.26                              | 2800                                        | 0.012                                 | 4,000                      |
| NRSK471M10V8X11.5F   | 470                | 10            | 0.19                              | 1140                                        | 0.030                                 | 2,000                      |
| NRSK681M10V8X11.5F   | 680                |               | 0.19                              | 1140                                        | 0.036                                 | 2,000                      |
| NRSK102M10V8X16F     | 1000               |               | 0.19                              | 1490                                        | 0.028                                 | 2,000                      |
| NRSK102M10V10X12.5F  | 1000               |               | 0.19                              | 1540                                        | 0.026                                 | 2,000                      |
| NRSK122M10V8X20F     | 1200               |               | 0.19                              | 1870                                        | 0.019                                 | 3,000                      |
| NRSK152M10V8X20F     | 1500               |               | 0.19                              | 1870                                        | 0.019                                 | 3,000                      |
| NRSK152M10V10X16F    | 1500               |               | 0.19                              | 2000                                        | 0.019                                 | 2,000                      |
| NRSK182M10V10X20V    | 1800               |               | 0.19                              | 2550                                        | 0.013                                 | 4,000                      |
| NRSK222M10V10X23     | 2200               |               | 0.21                              | 2800                                        | 0.012                                 | 4,000                      |
| NRSK331M16V8X11.5F   | 330                | 16            | 0.16                              | 1140                                        | 0.030                                 | 2,000                      |
| NRSK471M16V8X11.5F   | 470                |               | 0.16                              | 1140                                        | 0.036                                 | 2,000                      |
| NRSK681M16V8X16F     | 680                |               | 0.16                              | 1490                                        | 0.028                                 | 2,000                      |
| NRSK681M16V10X12.5F  | 680                |               | 0.16                              | 1540                                        | 0.026                                 | 2,000                      |
| NRSK102M16V8X20F     | 1000               |               | 0.16                              | 1870                                        | 0.019                                 | 3,000                      |
| NRSK102M16V10X16F    | 1000               |               | 0.16                              | 2000                                        | 0.019                                 | 2,000                      |
| NRSK152M16V10X20F    | 1500               |               | 0.16                              | 2550                                        | 0.013                                 | 4,000                      |
| NRSK182M16V10X23F    | 1800               |               | 0.16                              | 2800                                        | 0.012                                 | 4,000                      |
| NRSK221M25V8X11.5F   | 220                | 25            | 0.14                              | 1110                                        | 0.030                                 | 2,000                      |
| NRSK331M25V8X11.5F   | 330                |               | 0.14                              | 1080                                        | 0.032                                 | 2,000                      |
| NRSK331M25V10X12.5F  | 330                |               | 0.14                              | 1440                                        | 0.025                                 | 2,000                      |
| NRSK471M25V8X20F     | 470                |               | 0.14                              | 1820                                        | 0.018                                 | 3,000                      |
| NRSK471M25V10X12.5F  | 470                |               | 0.14                              | 1390                                        | 0.027                                 | 2,000                      |
| NRSK471M25V10X16F    | 470                |               | 0.14                              | 1920                                        | 0.020                                 | 2,000                      |
| NRSK681M25V10X16F    | 680                |               | 0.14                              | 1830                                        | 0.022                                 | 2,000                      |
| NRSK681M25V10X20F    | 680                |               | 0.14                              | 2180                                        | 0.016                                 | 4,000                      |
| NRSK102M25V10X23F    | 1000               |               | 0.14                              | 2180                                        | 0.016                                 | 4,000                      |

### PART NUMBERING SYSTEM



\*see tape specification for details

### PRECAUTIONS

Please review the notes on correct use, safety and precautions found on pages T10 & T11 of NIC's Electrolytic Capacitor catalog.  
Also found at [www.niccomp.com/precautions](http://www.niccomp.com/precautions)  
If in doubt or uncertainty, please review your specific application - process details with NIC's technical support personnel: [tpmg@niccomp.com](mailto:tpmg@niccomp.com)

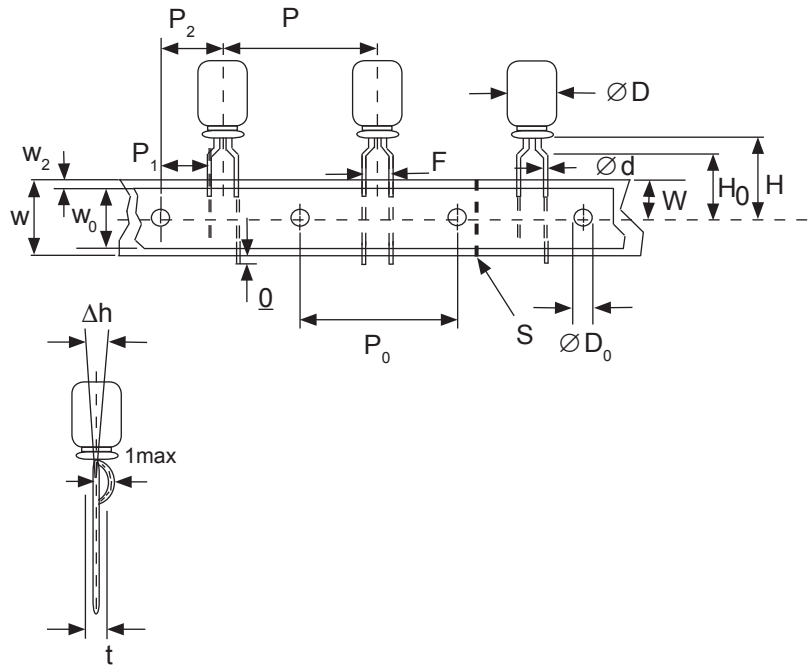


# Miniature Aluminum Electrolytic Capacitors Taping Specifications

## STANDARD RADIAL TAPING (5mm LEAD SPACING, FORMED LEADS) TB

Taping Dimensions (mm)

| Case Dia.<br>(D $\phi$ ) | 4                                  | 5    | 6.3   | 8      |
|--------------------------|------------------------------------|------|-------|--------|
| Case Size                | 4x5                                | 5x5  | 6.3x5 | 8x5    |
| Dim.                     | 4x7                                | 5x7  | 6.3x7 | 8x11.5 |
| d $\phi$ $\pm 0.05$      | 0.45                               | 0.45 | 0.45  | 0.6    |
| H $\pm 0.75$             | 17.5                               | 17.5 | 17.5  | 20.0   |
| F $+0.8 \sim -0.2$       | 5.0 $-0.2 \sim +0.8$               |      |       |        |
| P                        | 12.7 $\pm 1.0$                     |      |       |        |
| P <sub>0</sub>           | 12.7 $\pm 0.2$                     |      |       |        |
| P <sub>1</sub>           | 3.85 $\pm 0.5$ (at end of tape)    |      |       |        |
| P <sub>2</sub>           | 6.35 $\pm 1.0$                     |      |       |        |
| W                        | 18.0 $\pm 0.5$                     |      |       |        |
| W <sub>0</sub>           | 11.5 min.                          |      |       |        |
| W <sub>1</sub>           | 9.0 $\pm 0.5$                      |      |       |        |
| W <sub>2</sub>           | 0 $\sim 2.5$                       |      |       |        |
| H <sub>0</sub>           | 16.0 $\pm 0.5$                     |      |       |        |
| l                        | 1.0 max.                           |      |       |        |
| D <sub>0</sub> $\phi$    | 4.0 $\pm 0.2$                      |      |       |        |
| $\Delta h$               | 0 $\pm 1.0$ (at top of can)        |      |       |        |
| t                        | 0.7 $\pm 0.2$ (not including lead) |      |       |        |



## STANDARD RADIAL TAPING (5mm LEAD SPACING, STRAIGHT LEADS) TB

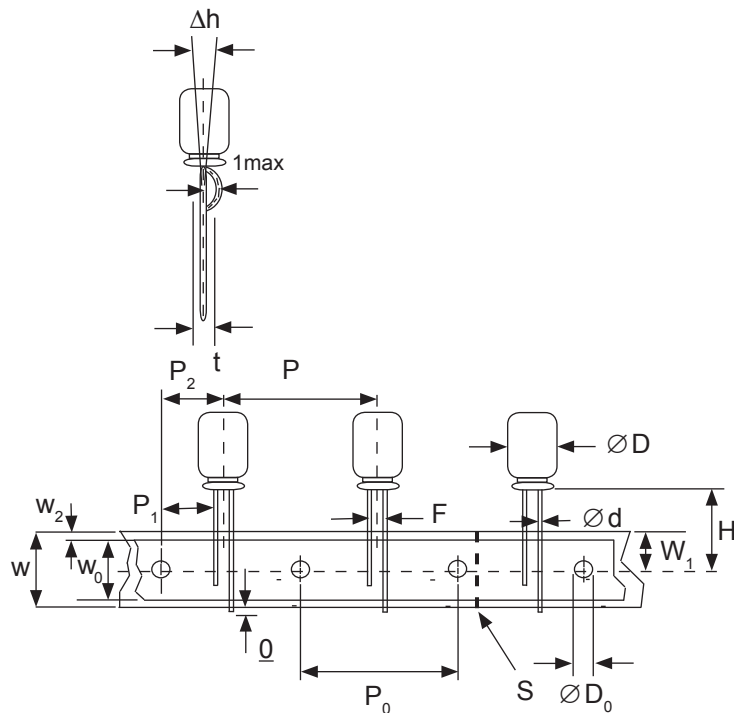
Taping Dimensions (mm)

| Case Dia.<br>(D $\phi$ ) | 10                                 | 12.5 |
|--------------------------|------------------------------------|------|
| Case Size                | All                                | All  |
| Dim.                     | All                                | All  |
| d $\phi$ $\pm 0.05$      | 0.6                                | 0.6  |
| H $\pm 0.75$             | 19.0                               | 19.0 |
| F $+0.8 \sim -0.2$       | 5.0                                | 5.0  |
| P $\pm 1.0$              | 25.4*                              |      |
| P <sub>0</sub>           | 12.7 $\pm 0.2$                     |      |
| P <sub>1</sub>           | 3.85                               |      |
| P <sub>2</sub>           | 6.35 $\pm 1.0$                     |      |
| W                        | 18.0 $\pm 0.5$                     |      |
| W <sub>0</sub>           | 11.5 min                           |      |
| W <sub>1</sub>           | 9.0 $\pm 0.5$                      |      |
| W <sub>2</sub>           | 0 $\sim 2.5$                       |      |
| H <sub>0</sub>           | 16.0 $\pm 0.5$                     |      |
| l                        | 1.0 max.                           |      |
| D <sub>0</sub> $\phi$    | 4.0 $\pm 0.2$                      |      |
| $\Delta h$               | 0 $\pm 1.0$ (at top of can)        |      |
| t                        | 0.7 $\pm 0.2$ (not including lead) |      |

### \*Optional Taping Specifications

10mm diameter available with P dim. = 12.7mm  
(P/N Suf x: TB12.7MMP)

12.5mm diameter available with P dim. = 15mm, P<sub>1</sub> = 5.0mm,  
P<sub>0</sub> = 15.0mm & P<sub>2</sub> = 7.5mm (P/N Suf x: TB15MMP)



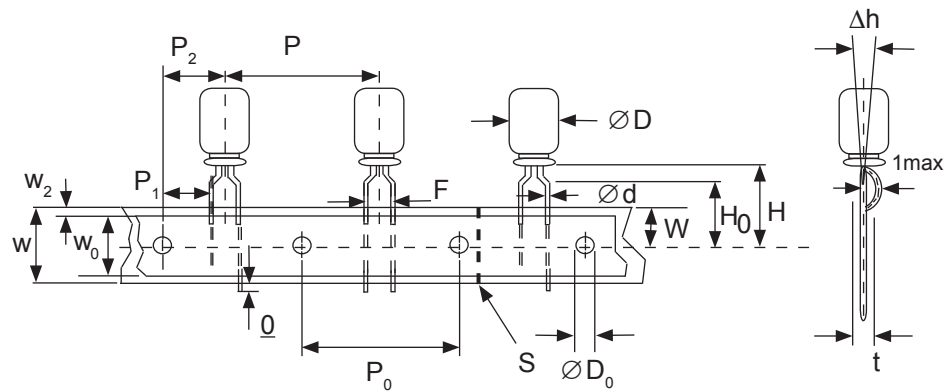
**NOTE:** ANODE (+) LEAD FEEDS OFF FIRST.  
FOR OPTION OF NEGATIVE (-) LEAD FIRST,  
SPECIFY "TBN".



## SPECIAL RADIAL TAPING (2.5mm LEAD SPACING, FORMED LEADS) TBF1

Taping Dimensions (mm)

| Case Dia.<br>(D $\phi$ ) | 4               | 5          |      |
|--------------------------|-----------------|------------|------|
| Case Size<br>Dim.        | 4x5<br>4x7      | 5x5<br>5x7 | 5x11 |
| d $\phi$ $\pm 0.05$      | 0.45            | 0.45       | 0.5  |
| H $\pm 0.75$             | 17.5            | 17.5       | 18.5 |
| H <sub>0</sub> $\pm 0.5$ | 16.0            | -          | -    |
| F                        | 2.5 -0.2 ~ +0.8 |            |      |
| P                        | 12.7 $\pm 1.0$  |            |      |
| P <sub>0</sub>           | 12.7 $\pm 0.2$  |            |      |
| P <sub>1</sub>           | 5.1 $\pm 0.5$   |            |      |
| P <sub>2</sub>           | 6.35 $\pm 1.0$  |            |      |
| W                        | 18.0 $\pm 0.5$  |            |      |
| W <sub>0</sub>           | 11.5 min.       |            |      |
| W <sub>1</sub>           | 9.0 $\pm 0.5$   |            |      |
| W <sub>2</sub>           | 0 ~ 1.5         |            |      |
| l                        | 1.0 max.        |            |      |
| D <sub>0</sub> $\phi$    | 4.0 $\pm 0.2$   |            |      |
| $\Delta h$               | 0 $\pm 1.0$     |            |      |
| t                        | 0.7 $\pm 0.2$   |            |      |



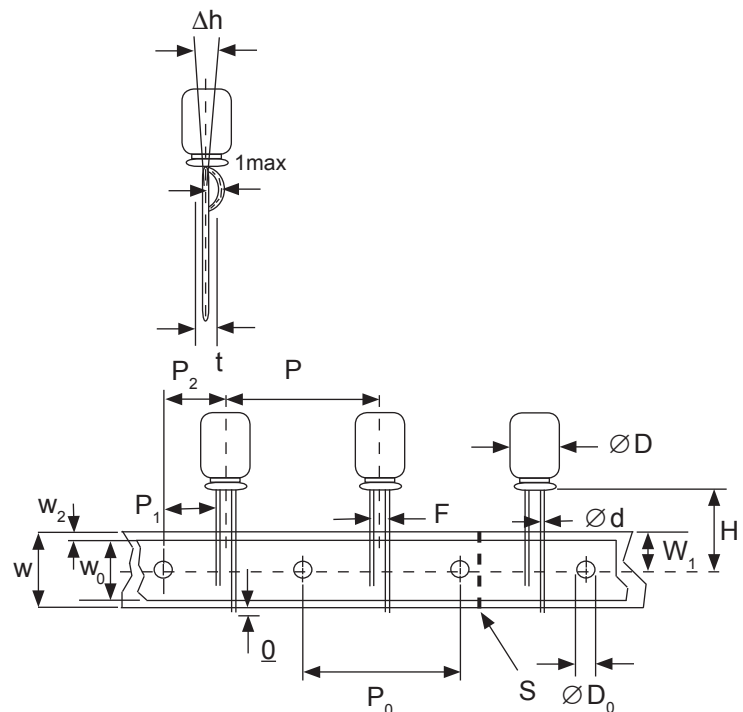
## SPECIAL STRAIGHT LEAD TAPING TBST

Taping Dimensions (mm)

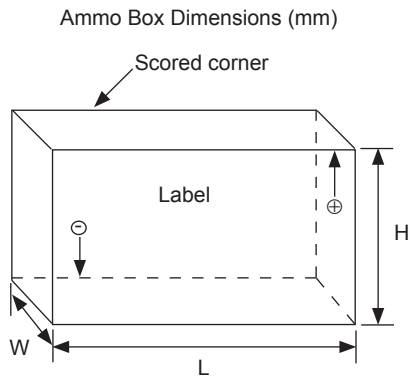
| Case Dia.<br>(D $\phi$ ) | 4                                  |      | 5    |       | 6.3    |        | 8 |
|--------------------------|------------------------------------|------|------|-------|--------|--------|---|
| Case Size                | 4x5                                | 5x5  | 5x11 | 6.3x5 | 6.3x11 | 8x11.5 |   |
| Dim.                     | 4x7                                | 5x7  |      | 6.3x7 |        |        |   |
| d $\phi$ $\pm$ 0.05      | 0.45                               | 0.45 | 0.5  | 0.45  | 0.5    | 0.6    |   |
| H $\pm$ 0.75             | 17.5                               | 17.5 | 18.5 | 17.5  | 18.5   | 20.0   |   |
| F +0.8 ~ -0.2            | 2.0*                               | 2.0  | 2.0  | 2.5   | 2.5    | 3.5    |   |
| P $\pm$ 1.0              | 12.7 $\pm$ 0.2                     |      |      |       |        |        |   |
| P <sub>0</sub>           | 12.7 $\pm$ 0.2                     |      |      |       |        |        |   |
| P <sub>1</sub>           | 5.1                                | 5.1  | 5.1  | 5.1   | 5.1    | 4.6    |   |
| P <sub>2</sub>           | 6.35 $\pm$ 1.0                     |      |      |       |        |        |   |
| W                        | 18.0 $\pm$ 0.5                     |      |      |       |        |        |   |
| W <sub>0</sub>           | 11.5 min.                          |      |      |       |        |        |   |
| W <sub>1</sub>           | 9.0 $\pm$ 0.5                      |      |      |       |        |        |   |
| W <sub>2</sub>           | 0 ~ 2.5                            |      |      |       |        |        |   |
| H <sub>0</sub>           | 16.0 $\pm$ 0.5                     |      |      |       |        |        |   |
| l                        | 1.0 max.                           |      |      |       |        |        |   |
| D <sub>0</sub> $\phi$    | 4.0 $\pm$ 0.2                      |      |      |       |        |        |   |
| $\Delta$ h               | 0 $\pm$ 1.0 (at top of can)        |      |      |       |        |        |   |
| t                        | 0.7 $\pm$ 0.2 (not including lead) |      |      |       |        |        |   |

\* Parts with 4mm diameter are taped with a slight  $\phi$  are in the lead and a 2.0mm lead-space.

\* Parts with 4mm diameter are taped with a slight are in the lead and a 2.0mm lead-space.



RADIAL TAPED PACKAGING



Ammo Box (Tape & Box) TB, TBF1, TBST

Size of box and component quantity

| Case Dia (D $\phi$ )<br>or Case Size | Q'ty per<br>Box<br>(pcs) | Dim. L | Dim. H | Dim.<br>W |
|--------------------------------------|--------------------------|--------|--------|-----------|
| 4x5, 4x7                             | 2,000                    | 331    | 175    | 43        |
| 5x5, 5x7                             | 2,000                    | 331    | 220    | 43        |
| 5x11                                 | 2,000                    | 340    | 255    | 55        |
| 6.3x5, 6.3x7                         | 2,000                    | 331    | 280    | 43        |
| 6.3x11                               | 2,000                    | 331    | 280    | 48        |
| 8x11.5, 8x12.5                       | 1,000                    | 335    | 235    | 53        |
| 10x12.5*                             | 500                      | 335    | 190    | 53        |
| 10x16*                               | 500                      | 335    | 300    | 53        |
| 10x20*                               | 500                      | 335    | 300    | 55        |
| 12.x20*                              | 500                      | 335    | 300    | 55        |
| 12.5x25*                             | 500                      | 335    | 300    | 61        |

\*Special Taping Consult Factory For Availability