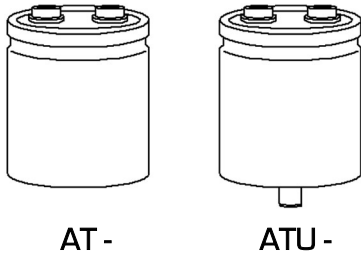


Series AT(U) - 105°C 8.000 h



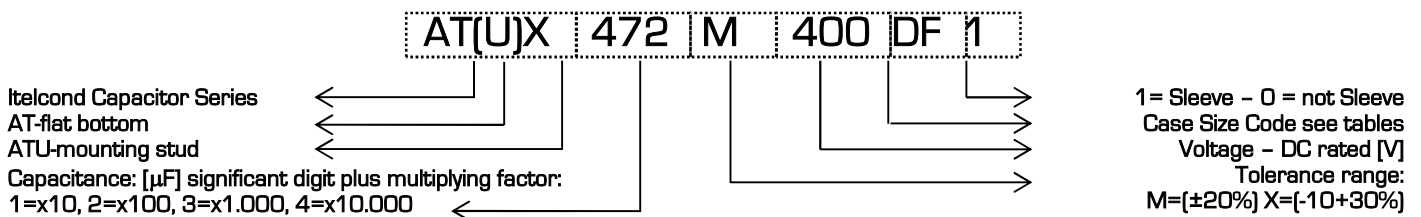
**Capacitors screw terminal type - High Ripple - High Reliability - Extra Useful Life**

- AT- Flat Bottom
- ATU- Mounting Stud
- Capacitance Tolerance: -20 + 20% - standard (M)
- Capacitance Tolerance: -10 + 30% - on request (X)
- Climatic category: 55/105/56
- Case: 51x83 - 90 x 222
- Temperature - 55°C + 105°C
- All welded construction reliable electrical contact

**Mechanical Outlines**

- Case: aluminium made
- Terminals: screw
- Sealing: hermetic by EPR gasket, on a resin cover
- Pressure Release Vent: silicone-rubber
- Sleeve: self-extinguishing thermo shrinkable
- Size: see enclosed drawings
- Mounting Hardware: see hardware section
- External Material UL94-V0

**Ordering Code: Example**



**Ripple Current**

The allowable values of ripple current in Ampères, are related to the temperature and frequency by following equation:

$$I_{\text{Ripple}} = K_t \cdot K_f \cdot I_{\text{Ripple@105}^\circ\text{C}}$$

Where:

- $I_{\text{Ripple@105}^\circ\text{C}}$  is the limit given by tables, @ 105°C/100HZ
- $K_t$  is the Temperature Correlation Factor
- $K_f$  is the Frequency Correlation Factor

Note .Superimposed alternating voltage summed to DC volage must not exceed rated voltage, rated ripple current must not be exceeded and no reverse polarity is allowed

|       |      |      |      |      |      |      |      |
|-------|------|------|------|------|------|------|------|
| °C    | 40   | 55   | 65   | 75   | 85   | 95   | 105  |
| $K_t$ | 2.50 | 2.40 | 2.20 | 2.00 | 1.80 | 1.30 | 1.00 |

Table 1- $K_t$  Values

|       |       |
|-------|-------|
| Hz    | $K_f$ |
| 50    | 0.78  |
| 100   | 1.00  |
| 120   | 1.02  |
| 200   | 1.06  |
| 300   | 1.08  |
| 400   | 1.09  |
| 500   | 1.32  |
| >1000 | 1.37  |

Table 2- $K_f$  Values

### Expected Lifetime End of Life Criteria

During useful life typical electrical parameters of electrolytic capacitor are subject to change.

End of Life criteria, when rated temperature, voltage and ripple are applied, are:

$$\frac{\Delta C}{C_{t0}} \leq 30\% \quad \text{Equation 1}$$

$$ESR \leq 3 \cdot ESR_{t0} \quad \text{Equation 2}$$

$$I_f \leq I_{ft0} \quad \text{Equation 3}$$

where  $t_0$  is the initial value

### Voltage Endurance Test Requirements

On Voltage Endurance Test are based Expected Lifetime Curves.

End of Life criteria, when rated temperature, and voltage are applied for 2'000hrs, are

$$\frac{\Delta C}{C_{t0}} \leq 20\% \quad \text{Equation 4}$$

$$ESR \leq 1,3 \cdot ESR_{t0} \quad \text{Equation 5}$$

$$I_f \leq I_{ft0} \quad \text{Equation 6}$$

where  $t_0$  is the initial value

### Expected Lifetime Vs Temperature and Ripple Current

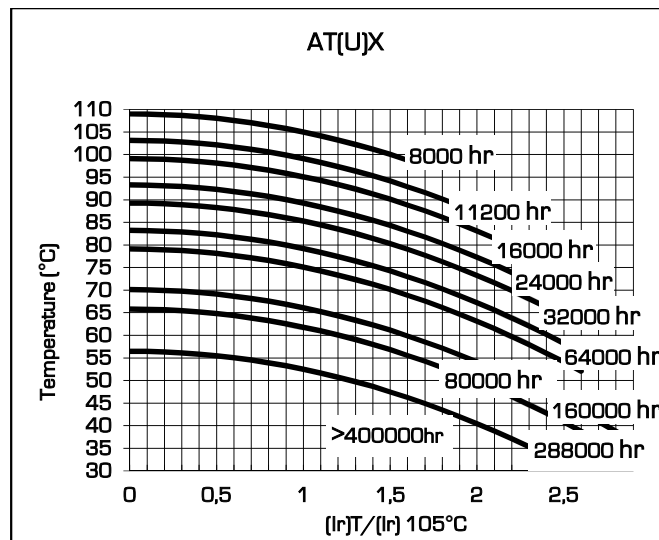


Table 3

### Leakage Current

After the rated voltage has been applied to the capacitor for 5 minutes the leakage current must be within those limits.

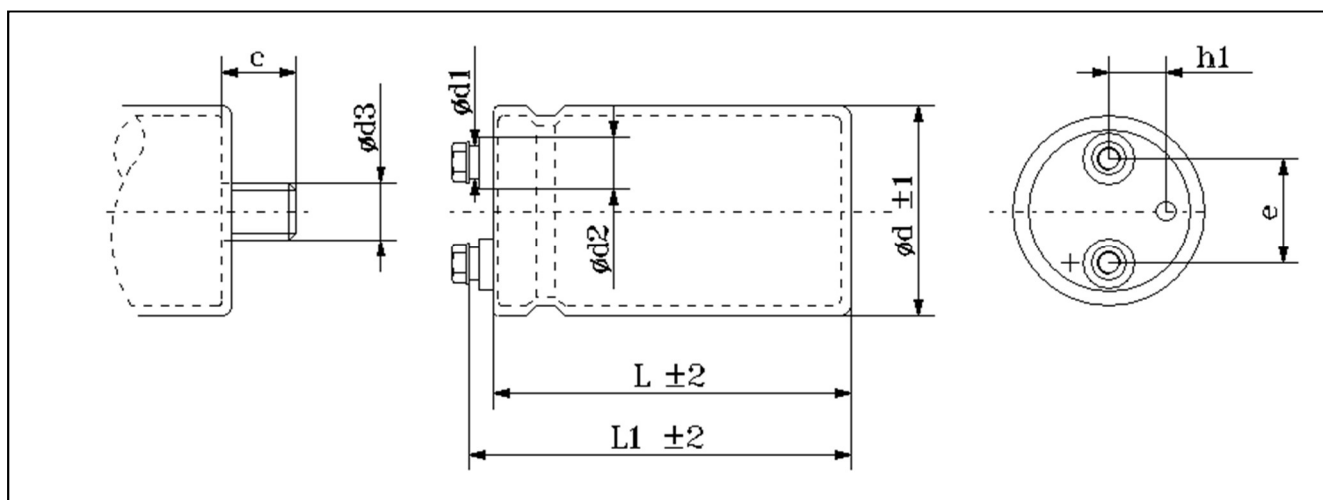
|                 |       |                                       |
|-----------------|-------|---------------------------------------|
| Maximum limit   | @25°C | $I_f \leq 1.3 \cdot \sqrt{C \cdot V}$ |
| Operating limit | @25°C | $I_f \leq 1.2 \cdot \sqrt{C \cdot V}$ |

Where:  $I_f$ =leakage current [ $\mu A$ ],  $C$ =capacitance [ $\mu F$ ],  $V$ =rated voltage [V]

### Surge Voltage

|                 |     |     |     |     |
|-----------------|-----|-----|-----|-----|
| Working Voltage | 350 | 400 | 420 | 450 |
| Surge Voltage   | 385 | 440 | 420 | 495 |

|       | Capacitance | Case | Diam | Height | Tanδ      | ESRmax   typ |            | Zmax       | Iripple @100Hz |                  | Ordering Code         |
|-------|-------------|------|------|--------|-----------|--------------|------------|------------|----------------|------------------|-----------------------|
|       | [μF]@100Hz  |      | [mm] | [mm]   | [%]@100Hz | [mΩ]@100Hz   | [mΩ]@10KHz | [mΩ]@10KHz | [A]@55°C       | [A]@105°C        | [U] for mounting stud |
| 350   | 2200        | CC   | 63   | 105    | 0,09      | 65           | 52         | 49         | 17,4           | 7,0              | AT(U)X222M350CC1      |
|       | 2700        | CC   | 63   | 105    | 0,09      | 53           | 42         | 40         | 19,3           | 7,7              | AT(U)X272M350CC1      |
|       | 3300        | CC   | 63   | 105    | 0,09      | 43           | 35         | 33         | 21,3           | 8,5              | AT(U)X332M350CC1      |
|       | 3900        | DC   | 76   | 145    | 0,09      | 37           | 29         | 28         | 29,6           | 11,8             | AT(U)X392M350DC1      |
|       | 4700        | DF   | 76   | 145    | 0,09      | 30           | 24         | 23         | 32,5           | 13,0             | AT(U)X472M350DF1      |
|       | 6800        | DF   | 76   | 145    | 0,09      | 21           | 17         | 16         | 39,1           | 15,6             | AT(U)X682M350DF1      |
|       | 8200        | DF   | 76   | 145    | 0,09      | 17           | 14         | 13         | 42,9           | 17,2             | AT(U)X822M350DF1      |
|       | 10000       | DJ   | 76   | 222    | 0,09      | 14           | 11         | 11         | 56,9           | 22,8             | AT(U)X103M350DJ1      |
|       | 12000       | DJ   | 76   | 222    | 0,09      | 12           | 10         | 9          | 62,3           | 24,9             | AT(U)X123M350DJ1      |
|       | 15000       | EJ   | 90   | 222    | 0,09      | 10           | 8          | 7          | 76,7           | 30,7             | AT(U)X153M350EJ1      |
| 18000 | EJ          | 90   | 222  | 0,09   | 8         | 6            | 6          | 83,6       | 33,5           | AT(U)X183M350EJ1 |                       |
| 400   | 1000        | CC   | 63   | 105    | 0,09      | 143          | 115        | 105        | 11,7           | 4,7              | AT(U)X102M400CC1      |
|       | 1500        | CC   | 63   | 105    | 0,09      | 96           | 76         | 72         | 14,4           | 5,7              | AT(U)X152M400CC1      |
|       | 2220        | CC   | 63   | 105    | 0,09      | 65           | 52         | 49         | 17,4           | 7,0              | AT(U)X222M400CC1      |
|       | 3300        | CC   | 63   | 105    | 0,09      | 43           | 35         | 33         | 21,3           | 8,5              | AT(U)X332M400CC1      |
|       | 3900        | DC   | 76   | 145    | 0,09      | 37           | 29         | 28         | 29,6           | 11,8             | AT(U)X392M400DC1      |
|       | 4700        | DC   | 76   | 145    | 0,09      | 30           | 24         | 23         | 32,5           | 13,0             | AT(U)X472M400DC1      |
|       | 5600        | DF   | 76   | 145    | 0,09      | 26           | 20         | 19         | 35,5           | 14,2             | AT(U)X562M400DF1      |
|       | 6800        | DF   | 76   | 145    | 0,09      | 21           | 17         | 16         | 39,1           | 15,6             | AT(U)X682M400DF1      |
|       | 8200        | DJ   | 76   | 222    | 0,09      | 17           | 14         | 13         | 51,5           | 20,6             | AT(U)X822M400DJ1      |
|       | 10000       | DJ   | 76   | 222    | 0,09      | 14           | 11         | 11         | 56,9           | 22,8             | AT(U)X103M400DJ1      |
| 12000 | EJ          | 90   | 222  | 0,09   | 12        | 10           | 9          | 68,3       | 27,3           | AT(U)X123M400EJ1 |                       |
| 450   | 1000        | CC   | 63   | 105    | 0,09      | 143          | 115        | 105        | 11,7           | 4,7              | AT(U)X102M450CC1      |
|       | 1500        | CC   | 63   | 105    | 0,09      | 96           | 76         | 72         | 14,4           | 5,7              | AT(U)X152M450CC1      |
|       | 2220        | CC   | 63   | 105    | 0,10      | 72           | 58         | 54         | 16,5           | 6,6              | AT(U)X222M450CC1      |
|       | 3300        | CC   | 63   | 105    | 0,12      | 58           | 46         | 43         | 18,5           | 7,4              | AT(U)X332M450CC1      |
|       | 3900        | DC   | 76   | 145    | 0,12      | 49           | 39         | 37         | 25,6           | 10,3             | AT(U)X392M450DC1      |
|       | 4700        | DC   | 76   | 145    | 0,12      | 41           | 33         | 30         | 28,1           | 11,3             | AT(U)X472M450DC1      |
|       | 5600        | DF   | 76   | 145    | 0,10      | 28           | 23         | 21         | 33,7           | 13,5             | AT(U)X562M450DF1      |
|       | 6800        | DF   | 76   | 145    | 0,10      | 23           | 19         | 18         | 37,1           | 14,8             | AT(U)X682M450DF1      |
|       | 8200        | DJ   | 76   | 222    | 0,12      | 23           | 19         | 17         | 44,6           | 17,8             | AT(U)X822M450DJ1      |
|       | 10000       | DJ   | 76   | 222    | 0,12      | 19           | 15         | 14         | 49,3           | 19,7             | AT(U)X103M450DJ1      |
|       |             |      |      |        |           |              |            |            |                |                  |                       |
|       |             |      |      |        |           |              |            |            |                |                  |                       |

**Dimension, Quantity and Weight for box**


| Case |        |     |    | Connections |    |      |          |        |        |        | Mounting Stud |    |        | Packaging |            |
|------|--------|-----|----|-------------|----|------|----------|--------|--------|--------|---------------|----|--------|-----------|------------|
| Code | DxL    | L1  | h1 | d1          | d2 | e    | Terminal | Screw  |        |        | Screw         |    |        | Pcs/Box   | Weight/box |
|      |        |     |    |             |    |      | Code     | Thread | Torque | Lenght | d3            | c  | Torque |           |            |
| BB   | 51x83  | 85  | 13 | 8           | 13 | 22.2 | X        | M5     | 2,0    | 10     | M12           | 16 | 10Nm   | 30        | 6-9        |
| BB   | 51x83  | 85  | 13 | 13          | 18 | 22.2 | X        | M5     | 2,0    | 10     | M12           | 16 | 10Nm   | 30        | 6-9        |
| BC   | 51x105 | 109 | 13 | 8           | 13 | 22.2 | X        | M5     | 2,0    | 10     | M12           | 16 | 10Nm   | 30        | 6-9        |
| BC   | 51x105 | 109 | 13 | 13          | 18 | 22.2 | X        | M5     | 2,0    | 10     | M12           | 16 | 10Nm   | 30        | 6-9        |
| CC   | 63x105 | 111 | 16 | 8           | 13 | 28.6 | X        | M5     | 2,0    | 10     | M12           | 16 | 10Nm   | 20        | 6-8        |
| CC   | 63x105 | 111 | 16 | 13          | 18 | 28.6 | X        | M5     | 2,0    | 10     | M12           | 16 | 10Nm   | 20        | 6-8        |
| DC   | 76x105 | 111 | 19 | 13          | 18 | 31.8 | X        | M5     | 2,0    | 10     | M12           | 16 | 10Nm   | 12        | 5-7        |
| DF   | 76x145 | 151 | 19 | 13          | 18 | 31.8 | X        | M5     | 2,0    | 10     | M12           | 16 | 10Nm   | 12        | 6-14       |
|      |        |     |    | 18          | 23 |      | G        | M6     | 2,5    |        |               |    |        |           |            |
| DK   | 76x165 | 173 | 19 | 13          | 18 | 31.8 | X        | M5     | 2,0    | 10     | M12           | 16 | 10Nm   | 12        | 6-14       |
|      |        |     |    | 18          | 23 |      | G        | M6     | 2,5    |        |               |    |        |           |            |
| DJ   | 76x222 | 222 | 19 | 13          | 18 | 31.8 | X        | M5     | 2,0    | 10     | M12           | 16 | 10Nm   | 8         | 9-11       |
|      |        |     |    | 18          | 23 |      | G        | M6     | 2,5    |        |               |    |        |           |            |
| EC   | 90x105 | 112 | 19 | 18          | 23 | 31,8 | G        | M6     | 2,5    | 10     | M12           | 16 | 10Nm   | 6         | 7-9        |
| EF   | 90x145 | 153 | 19 | 18          | 23 | 31,8 | G        | M6     | 2,5    | 10     | M12           | 16 | 10Nm   | 6         | 9-11       |
| EJ   | 90x222 | 227 | 19 | 18          | 23 | 31,8 | G        | M6     | 2,5    | 10     | M12           | 16 | 10Nm   | 6         | 8-12       |

*All dimensions in mm, torque in Nm, weight in kg*