

## Series AD(U) – 85°C 15.000 h

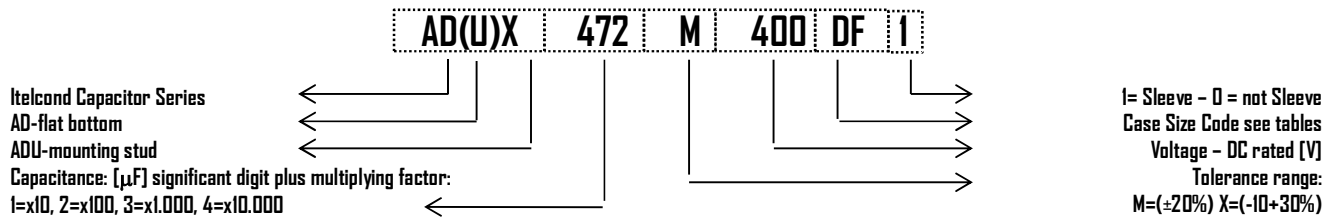
### Capacitors screw terminal type – Low ESR

- AD- Flat Bottom
- ADU- Mounting Stud
- Capacitance Tolerance: -20 + 20% - standard (M)
- Capacitance Tolerance: -10 + 30% - on request (X)
- Climatic category: 40/85/56
- Case: 51x83 - 90x240
- Temperature - 40°C + 85°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:

$$I_{\text{Ripple}} = K_t \cdot K_f \cdot I_{\text{Ripple@85C}}$$

Where:

- $I_{\text{Ripple@85°C}}$  is the limit given by tables, @ 85°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
$K_t$	1.55	1.40	1.20	1.10	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

$$\frac{\Delta C}{C_{t0}} \leq 15\% \quad \text{Equation 4}$$

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

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

where  $t_0$  is the initial value

### Expected Lifetime Vs Temperature and Ripple Current

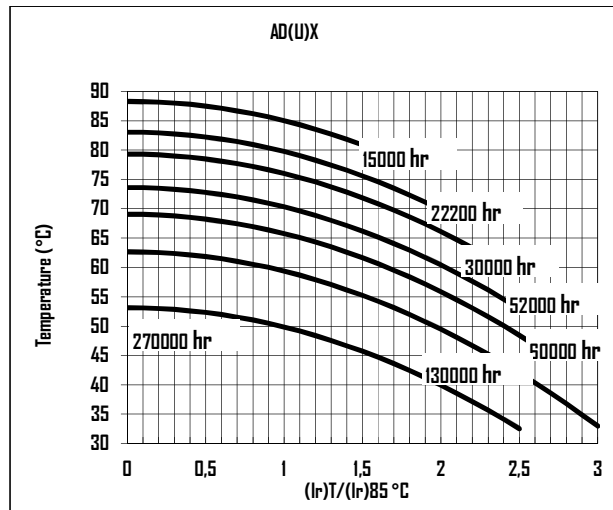


Table 3

### 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	$I_f \leq 0,004 \times C \times V$
Operating limit	@25°C	$I_f \leq 0,001 \times C \times V$

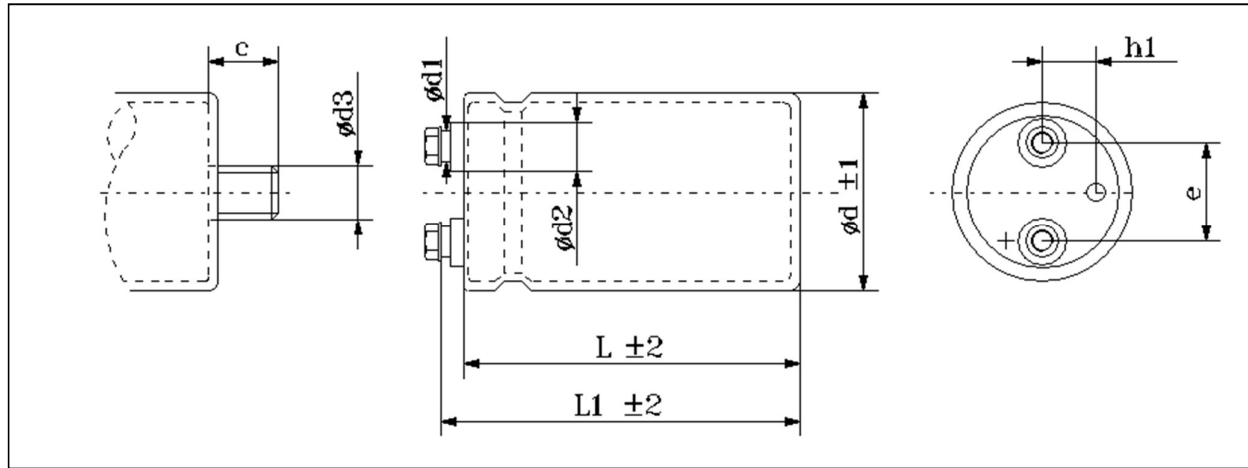
Where:  $I_f$ =leakage current [ $\mu$ A],  $C$ =capacitance [ $\mu$ F],  
 $V$ =rated voltage [V]

### Surge Voltage

Working Voltage	160	200	250	350	400	420	450
Surge Voltage	185	230	290	385	440	460	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]@85°C	(U) for mounting stud
<b>160</b>	4700	BC	51	105	0,09	30	24	23	14,9	10,6	AD(U)X472M160BCI
		CC	63	107	0,09	30	24	23	16,9	12,0	AD(U)X472M160CCI
	6800	DC	76	107	0,09	21	17	16	22,6	16,1	AD(U)X682M160DCI
	10000	DC	76	107	0,09	14	11	11	27,4	19,5	AD(U)X103M160DCI
	15000	DF	76	147	0,09	10	8	7	38,5	27,5	AD(U)X153M160DFI
		EF	90	220	0,09	7	5	5	46,6	33,3	AD(U)X223M160DFI
<b>200</b>	3300	BC	51	105	0,08	39	31	29	13,2	9,4	AD(U)X332M200BCI
	4700	CC	63	107	0,08	27	22	20	17,9	12,8	AD(U)X472M200CCI
		DC	76	107	0,08	27	22	20	19,9	14,2	AD(U)X472M200DCI
	6800	DC	76	107	0,08	19	15	14	23,9	17,1	AD(U)X682M200DCI
	10000	DF	76	147	0,08	13	10	10	33,3	23,8	AD(U)X103M200DFI
	15000	DF	76	147	0,08	8	7	6	40,8	29,1	AD(U)X153M200DFI
	22000	DF	76	147	0,08	6	5	4	49,4	35,3	AD(U)X223M200DFI
		DK	76	167	0,08	6	5	4	52,3	37,4	AD(U)X223M200DKI
33000	DK	76	167	0,08	4	3	3	64,1	45,8	AD(U)X333M200DKI	
<b>250</b>	2200	BB	51	83	0,07	51	41	38	10,4	7,4	AD(U)X222M250BBI
		BC	51	105	0,07	51	41	38	11,5	8,2	AD(U)X222M250BCI
	3300	BC	51	105	0,07	34	27	25	14,1	10,1	AD(U)X332M250BCI
		CC	63	107	0,07	34	27	25	16,0	11,4	AD(U)X332M250CCI
	4700	DC	76	107	0,07	24	19	18	21,3	15,2	AD(U)X472M250DCI
	6800	DC	76	107	0,07	16	13	12	25,6	18,3	AD(U)X682M250DCI
	10000	DF	76	147	0,07	11	9	8	35,6	25,4	AD(U)X103M250DFI
		EC	90	107	0,07	11	9	8	34,2	24,5	AD(U)X103M250ECI
	15000	DF	76	147	0,07	7	6	6	43,6	31,2	AD(U)X153M250DFI
EJ		90	222	0,07	7	6	6	57,6	41,1	AD(U)X153M250EJI	
<b>350</b>	4700	DC	76	107	0,06	20	16	15	23,0	16,4	AD(U)X472M350DCI
		DF	76	147	0,06	20	16	15	26,4	18,8	AD(U)X472M350DFI
	6800	DF	76	147	0,06	14	11	11	31,7	22,7	AD(U)X682M350DFI
		EC	90	107	0,06	14	11	11	30,5	21,8	AD(U)X682M350ECI
	10000	DF	76	147	0,06	10	8	7	38,5	27,5	AD(U)X103M350DFI
		DJ	76	222	0,06	10	8	7	46,4	33,1	AD(U)X103M350DJI
		EC	90	107	0,06	10	8	7	37,0	26,4	AD(U)X103M350ECI
	15000	DJ	76	222	0,06	6	5	5	56,8	40,5	AD(U)X153M350DJI
		EF	90	147	0,06	6	5	5	51,8	37,0	AD(U)X153M350EFI
		EJ	90	222	0,06	6	5	5	62,2	44,4	AD(U)X153M350EJI
22000	EJ	90	222	0,06	4	3	3	75,4	53,8	AD(U)X223M350EJI	
25000	EL	90	240	0,06	4	3	3	83,2	59,5	AD(U)X253M350ELI	

	Capacitance	Case	Diam	Height	Tanδ	ESRmax   typ		Zmax	Iripple @100Hz		Ordering Code
	[μF]@100Hz		[mm]	[mm]	[%]@100Hz	[mΩ]@100Hz	[mΩ]@10KHz	[A]@55°C	[A]@85°C	(U) for mounting stud	
<b>400</b>	3300	DC	76	107	0,06	29	23	22	19,3	13,8	AD(U)X332M400DCI
	4700	DC	76	107	0,06	20	16	15	23,0	16,4	AD(U)X472M400DCI
	4700	DF	76	147	0,06	20	16	15	26,4	18,8	AD(U)X472M400DFI
	6800	DF	76	147	0,06	14	11	11	31,7	22,7	AD(U)X682M400DFI
	10000	DJ	76	222	0,06	10	8	7	46,4	33,1	AD(U)X103M400DJI
		EF	90	147	0,06	10	8	7	42,3	30,2	AD(U)X103M400EFI
	15000	EJ	90	222	0,06	6	5	5	62,2	44,4	AD(U)X153M400EJI
20000	EL	90	240	0,06	5	4	4	74,4	53,2	AD(U)X203M400ELI	
<b>450</b>	2200	CC	63	107	0,07	51	41	38	13,1	9,3	AD(U)X222M450CCI
		DC	76	107	0,07	51	41	38	14,6	10,4	AD(U)X222M450DCI
	3300	DC	76	107	0,07	34	27	25	17,8	12,7	AD(U)X332M450DCI
		DF	76	147	0,07	34	27	25	20,5	14,6	AD(U)X332M450DFI
	4700	DF	76	147	0,07	24	19	18	24,4	17,4	AD(U)X472M450DFI
		EC	90	107	0,07	24	19	18	23,5	16,8	AD(U)X472M450ECI
	6800	DF	76	147	0,07	16	13	12	29,4	21,0	AD(U)X682M450DFI
		DJ	76	222	0,07	16	13	12	35,4	25,3	AD(U)X682M450DJI
	10000	DJ	76	222	0,07	11	9	8	42,9	30,7	AD(U)X103M450DJI
		EJ	90	222	0,07	11	9	8	47,0	33,6	AD(U)X103M450EJI
	15000	EJ	90	222	0,07	7	6	6	57,6	41,1	AD(U)X153M450EJI
18000	EL	90	240	0,07	6	5	5	65,4	46,7	AD(U)X183M450ELI	

**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	151	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
EL	90x240	245	19	18	23	31.8	G	M6	2,5	10	M12	16	10Nm	6	9-13

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