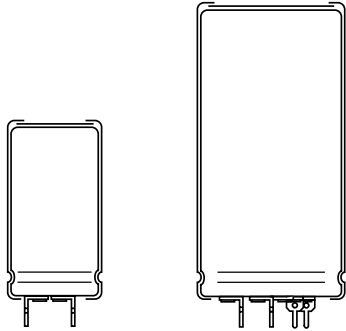


# Aluminum Capacitors Power Printed Wiring Style



Component outlines.

**FEATURES**

- Polarized aluminum electrolytic capacitors, non-solid electrolyte
- Large types with reduced dimensions, cylindrical aluminum case, insulated
- Provided with keyed polarity
- Long useful life: 12000 hours at 85 °C
- High ripple current capability
- High resistance to shock and vibration


**RoHS\***  
COMPLIANT

**APPLICATIONS**

- General purpose, industrial and audio/video systems
- Smoothing and filtering
- Standard and switched mode power supplies
- Energy storage in pulse systems

**MARKING**

The capacitors are marked (where possible) with the following information:

- Rated capacitance (in  $\mu\text{F}$ )
- Tolerance on rated capacitance, code letter in accordance with IEC 60062 (M for  $\pm 20\%$ )
- Rated voltage (in V)
- Date code (YYMM)
- Name of manufacturer
- Code for factory of origin
- Polarity of the terminals and ‘-’ sign to indicate the negative terminal, visible from the top and/or side of the capacitor
- Code number
- Climatic category in accordance with IEC 60068

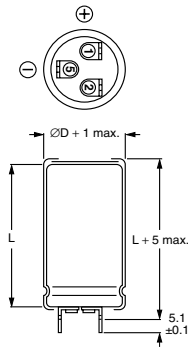
QUICK REFERENCE DATA		
DESCRIPTION	VALUE	
	NV	HV
Nominal case size ( $\varnothing D \times L$ in mm)	25 x 30 to 40 x 100	
Rated capacitance range (E6 series), $C_R$	680 to 150000 $\mu\text{F}$	68 to 2200 $\mu\text{F}$
Tolerance on $C_R$	$\pm 20\%$	
Rated voltage range, $U_R$	10 to 100 V	200 to 400 V
Category temperature range	- 40 to + 85 °C	
Endurance test at 85 °C	5000 hours	
Useful life at 85 °C	12000 hours	
Useful life at 40 °C, 1.4 x IR applied	190000 hours	
Shelf life at 0 V, 85 °C	500 hours	
Based on sectional specification	IEC 60384-4/EN130300	
Climatic category IEC 60068	40/085/56	

SELECTION CHART FOR $C_R$ , $U_R$ AND RELEVANT NOMINAL CASE SIZES ( $\varnothing D \times L$ in mm)									
$C_R$ ( $\mu\text{F}$ )	$U_R$ (V)								
	10	16	25	40	63	100	200	385	400
68	-	-	-	-	-	-	-	25 x 30	25 x 30
100	-	-	-	-	-	-	-	25 x 40	25 x 40
150	-	-	-	-	-	-	25 x 30	30 x 40	30 x 40
220	-	-	-	-	-	-	25 x 40	35 x 40	35 x 40
330	-	-	-	-	-	-	30 x 40	35 x 50	35 x 50
	-	-	-	-	-	-	-	40 x 40	40 x 40
470	-	-	-	-	-	-	35 x 40	40 x 50	40 x 50
680	-	-	-	-	-	25 x 30	35 x 50	40 x 70	40 x 70
	-	-	-	-	-	-	40 x 40	-	-
1000	-	-	-	-	-	25 x 40	40 x 50	40 x 100	40 x 100
1500	-	-	-	-	-	30 x 40	40 x 70	-	-
2200	-	-	-	-	25 x 30	35 x 40	40 x 100	-	-

\*Pb containing terminations are not RoHS compliant, exemptions may apply

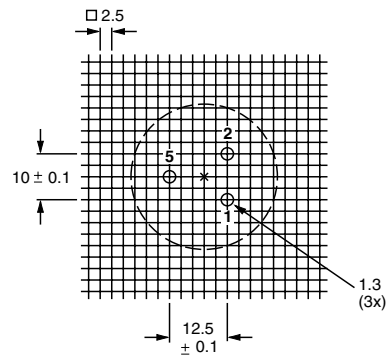
SELECTION CHART FOR C <sub>R</sub> , U <sub>R</sub> AND RELEVANT NOMINAL CASE SIZES (∅D × L in mm)									
C <sub>R</sub> (μF)	U <sub>R</sub> (V)								
	10	16	25	40	63	100	200	385	400
3300	–	–	–	25 × 30	25 × 40	35 × 50	–	–	–
4700	–	–	25 × 30	25 × 40	30 × 40	40 × 50	–	–	–
6800	–	25 × 30	25 × 40	30 × 40	35 × 40	40 × 70	–	–	–
10000	25 × 30	25 × 40	30 × 40	35 × 40	35 × 50	40 × 100	–	–	–
15000	–	–	–	–	40 × 40	–	–	–	–
15000	25 × 40	30 × 40	35 × 40	35 × 50	40 × 70	–	–	–	–
22000	–	–	–	40 × 40	–	–	–	–	–
22000	30 × 40	35 × 40	35 × 50	40 × 50	40 × 100	–	–	–	–
33000	–	–	40 × 40	–	–	–	–	–	–
33000	35 × 40	35 × 50	40 × 50	40 × 70	–	–	–	–	–
47000	–	40 × 40	–	–	–	–	–	–	–
47000	35 × 50	40 × 50	40 × 70	40 × 100	–	–	–	–	–
68000	40 × 40	–	–	–	–	–	–	–	–
68000	40 × 50	40 × 70	40 × 100	–	–	–	–	–	–
100000	40 × 70	40 × 100	–	–	–	–	–	–	–
150000	40 × 100	–	–	–	–	–	–	–	–

**DIMENSIONS** in millimeters **AND AVAILABLE FORMS**



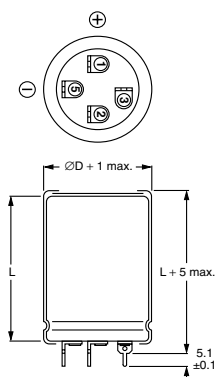
1 = positive terminal; 5 = negative terminal.  
Case ∅D = 25 mm.

Fig.2 Printed wiring pin version.



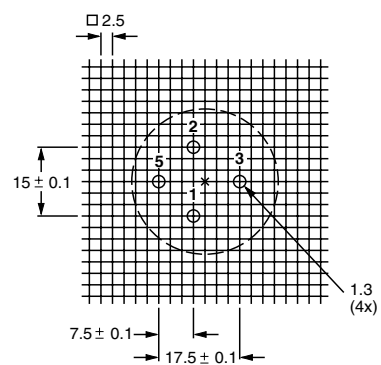
Case ∅D = 25 mm.

Fig.3 Mounting hole diagram viewed from the component side.



1 = positive terminal; 5 = negative terminal.  
Case ∅D = 30 mm and 35 mm.

Fig.4 Printed wiring pin version.



Case ∅D = 30 mm and 35 mm.

Fig.5 Mounting hole diagram viewed from the component side.

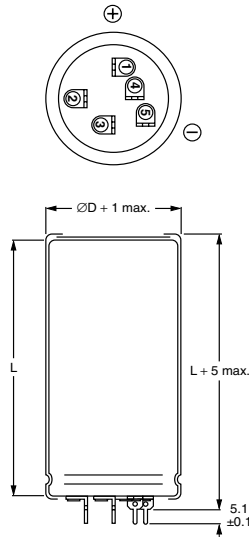
**DIMENSIONS** in millimeters **AND AVAILABLE FORMS** continued

 1 = positive terminal; 5 = negative terminal.  
 Case  $\varnothing D = 40 \text{ mm}$ .

Fig.6 Printed wiring pin version.

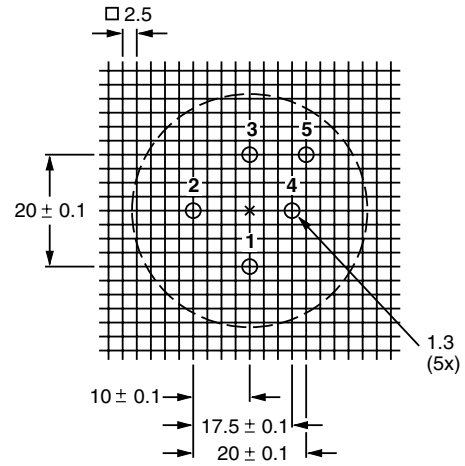

 Case  $\varnothing D = 40 \text{ mm}$ .

Fig.7 Mounting hole diagram viewed from the component side.

<b>DIMENSIONS</b> in millimeters, <b>MASS AND PACKAGING QUANTITIES</b>					
<b>NOMINAL CASE SIZE</b> $\varnothing D \times L$	$\varnothing D_{\text{max}}$	$L_{\text{max}}$	<b>MASS</b> (g)	<b>PACKAGING QUANTITIES</b> (units per box)	<b>CARDBOARD BOX DIMENSIONS</b> $L \times W \times H$
25 × 30	26	35	≈ 24	100	290 × 280 × 50
25 × 40	26	45	≈ 28	100	290 × 280 × 60
30 × 40	31	45	≈ 38	100	340 × 330 × 60
35 × 40	36	45	≈ 51	50	390 × 198 × 60
35 × 50	36	55	≈ 66	50	390 × 198 × 70
40 × 40	41	45	≈ 78	50	440 × 223 × 60
40 × 50	41	55	≈ 82	50	440 × 223 × 70
40 × 70	41	75	≈ 110	25	230 × 230 × 90
40 × 100	41	105	≈ 176	25	230 × 230 × 120

**MOUNTING**

When a number of capacitors are connected in a bank, they must not be closer together than 15 mm, when no derating of ripple current and/or temperature is applied.

**Pin numbers 2, 3 and 4 (if present) must be free from the electrical circuit.**

ELECTRICAL DATA	
SYMBOL	DESCRIPTION
$C_R$	rated capacitance at 100 Hz
$I_R$	rated RMS ripple current at 100 Hz, 85 °C or at 20 kHz, 70 °C
$I_{L1}$	max. leakage current after 1 minute at $U_R$
$I_{L5}$	max. leakage current after 5 minutes at $U_R$
ESR	max. equivalent series resistance at 100 Hz
Z	max. impedance at 10 kHz

## ORDERING EXAMPLE

10000  $\mu$ F/25 V;  $\pm$  20 %Nominal case size:  $\varnothing$ 30  $\times$  40 mm

Catalog number: EYD00BB510E02V

## Note

1. Unless otherwise specified, all electrical values apply at  
 $T_{amb} = 20$  °C, P = 86 to 106 kPa, RH = 45 to 75 %

ELECTRICAL DATA AND ORDERING INFORMATION									
$U_R$ (V)	$C_R$ 100 Hz ( $\mu$ F)	NOMINAL CASE SIZE $\varnothing$ X L (mm)	$I_R$ 100 Hz 85 °C (A)	$I_R$ 20 kHz 70 °C (A)	$I_{L1}$ 1 MIN (mA)	$I_{L5}$ 5 MIN (mA)	ESR 100 Hz (m $\Omega$ )	Z 10 kHz (m $\Omega$ )	CATALOG NUMBER
10	10000	25 $\times$ 30	3.1	5.9	0.60	0.20	51	40	EYD00AV510C02V
	15000	25 $\times$ 40	4.1	7.8	0.90	0.30	37	30	EYD00AB515C02V
	22000	30 $\times$ 40	5.0	9.5	1.32	0.44	30	25	EYD00BB522C02V
	33000	35 $\times$ 40	5.5	10.4	1.98	0.66	28	24	EYD00CB533C02V
	47000	35 $\times$ 50	6.8	12.9	2.82	0.94	23	20	EYD00CD547C02V
	47000	40 $\times$ 40	5.8	10.4	2.82	0.94	29	22	EYD00DB547C02V
	68000	40 $\times$ 50	7.1	13.5	4.08	1.36	24	20	EYD00DD568C02V
	100000	40 $\times$ 70	9.2	17.4	6.00	2.00	19	16	EYD00DG610C02V
150000	40 $\times$ 100	12.0	22.7	9.00	3.00	16	14	EYD00DM615C02V	
16	6800	25 $\times$ 30	3.1	5.9	0.65	0.22	53	42	EYD00AV468D02V
	10000	25 $\times$ 40	4.0	7.6	0.96	0.32	39	34	EYD00AB510D02V
	15000	30 $\times$ 40	5.0	9.5	1.44	0.48	31	27	EYD00BB515D02V
	22000	35 $\times$ 40	5.5	10.4	2.12	0.71	29	26	EYD00CB522D02V
	33000	35 $\times$ 50	6.7	12.7	3.17	1.06	23	21	EYD00CD533D02V
	33000	40 $\times$ 40	5.7	10.8	3.17	1.06	30	24	EYD00DB533D02V
	47000	40 $\times$ 50	7.0	13.3	4.52	1.51	24	20	EYD00DD547D02V
	68000	40 $\times$ 70	9.2	17.4	6.53	2.18	19	16	EYD00DG568D02V
100000	40 $\times$ 100	12.0	22.7	9.60	3.20	16	14	EYD00DM610D02V	
25	4700	25 $\times$ 30	2.9	5.5	0.71	0.24	60	42	EYD00AV447E02V
	6800	25 $\times$ 40	3.9	7.4	1.02	0.34	42	34	EYD00AB468E02V
	10000	30 $\times$ 40	4.8	9.1	1.50	0.50	34	27	EYD00BB510E02V
	15000	35 $\times$ 40	5.3	10.0	2.25	0.75	30	26	EYD00CB515E02V
	22000	35 $\times$ 50	6.5	12.3	3.30	1.10	24	21	EYD00CD522E02V
	22000	40 $\times$ 40	5.7	10.8	3.30	1.10	31	24	EYD00DB522E02V
	33000	40 $\times$ 50	7.0	13.3	4.95	1.65	25	20	EYD00DD533E02V
	47000	40 $\times$ 70	9.2	17.4	7.05	2.35	19	16	EYD00DG547E02V
68000	40 $\times$ 100	12.0	22.7	10.20	3.40	16	14	EYD00DM568E02V	
40	3300	25 $\times$ 30	2.9	5.5	0.80	0.27	87	63	EYD00AV433G02V
	4700	25 $\times$ 40	3.8	7.2	1.13	0.38	62	47	EYD00AB447G02V
	6800	30 $\times$ 40	4.7	8.9	1.64	0.55	49	38	EYD00BB468G02V
	10000	35 $\times$ 40	5.2	9.8	2.40	0.80	48	37	EYD00CB510G02V
	15000	35 $\times$ 50	6.3	11.9	3.60	1.20	37	28	EYD00CD515G02V
	15000	40 $\times$ 40	5.6	10.6	3.60	1.20	50	35	EYD00DB515G02V
	22000	40 $\times$ 50	5.8	11.0	5.28	1.76	39	28	EYD00DD522G02V
	33000	40 $\times$ 70	7.8	14.8	7.92	2.64	28	21	EYD00DG533G02V
47000	40 $\times$ 100	10.4	19.7	11.28	3.76	22	17	EYD00DM547G02V	



Aluminum Capacitors  
Power Printed Wiring Style

Vishay Roederstein

ELECTRICAL DATA AND ORDERING INFORMATION									
U <sub>R</sub> (V)	C <sub>R</sub> 100 Hz (μF)	NOMINAL CASE SIZE ØD X L (mm)	I <sub>R</sub> 100 Hz 85 °C (A)	I <sub>R</sub> 20 kHz 70 °C (A)	I <sub>L1</sub> 1 MIN (mA)	I <sub>L5</sub> 5 MIN (mA)	ESR 100 Hz (mΩ)	Z 10 kHz (mΩ)	CATALOG NUMBER
63	2200	25 × 30	2.5	4.7	0.84	0.28	83	62	EYD00AV422J02V
	3300	25 × 40	3.3	6.2	1.25	0.42	58	42	EYD00AB433J02V
	4700	30 × 40	4.1	7.8	1.78	0.60	49	38	EYD00BB447J02V
	6800	35 × 40	4.5	8.5	2.57	0.86	48	37	EYD00CB468J02V
	10000	35 × 50	5.4	10.2	3.78	1.26	37	28	EYD00CD510J02V
	10000	40 × 40	4.6	8.7	3.78	1.26	52	37	EYD00DB510J02V
	15000	40 × 70	7.5	14.2	5.67	1.89	29	24	EYD00DG515J02V
22000	40 × 100	10.0	19.0	8.32	2.77	22	19	EYD00DM522J02V	
100	680	25 × 30	1.74	3.30	0.41	0.14	190	130	EYD00AV368L02V
	1000	25 × 40	2.34	4.44	0.60	0.20	130	90	EYD00AB410L02V
	1500	30 × 40	2.95	5.59	0.90	0.30	95	67	EYD00BB415L02V
	2200	35 × 40	3.69	7.00	1.32	0.44	71	53	EYD00CB422L02V
	3300	35 × 50	4.37	8.29	1.98	0.66	55	41	EYD00CD433L02V
	3300	40 × 40	4.16	7.89	1.98	0.66	64	48	EYD00DB433L02V
	4700	40 × 50	5.21	9.88	2.82	0.94	49	38	EYD00DD447L02V
	6800	40 × 70	6.97	13.22	4.08	1.36	35	28	EYD00DG468L02V
	10000	40 × 100	9.50	18.00	6.00	2.00	26	21	EYD00DM510L02V
200	150	25 × 30	0.70	1.33	0.18	0.06	1000	770	EYD00AV315S02V
	220	25 × 40	0.94	1.78	0.26	0.09	680	525	EYD00AB322S02V
	330	30 × 40	1.27	2.41	0.40	0.14	460	360	EYD00BB333S02V
	470	35 × 40	1.66	3.15	0.57	0.19	320	250	EYD00CB347S02V
	680	35 × 50	2.19	4.15	0.82	0.28	220	170	EYD00CD368S02V
	680	40 × 40	2.17	4.11	0.82	0.28	220	170	EYD00DB368S02V
	1000	40 × 50	2.86	5.42	1.20	0.40	150	115	EYD00DD410S02V
	1500	40 × 70	3.81	7.22	1.80	0.60	110	85	EYD00DG415S02V
2200	40 × 100	5.20	9.86	2.64	0.88	80	60	EYD00DM422S02V	
385	68	25 × 30	0.47	0.89	0.16	0.06	2200	1480	EYD00AV268R02V
	100	25 × 40	0.64	1.21	0.23	0.08	1500	1020	EYD00AB310R02V
	150	30 × 40	0.90	1.71	0.35	0.12	1000	700	EYD00BB315R02V
	220	35 × 40	1.15	2.18	0.51	0.17	680	480	EYD00CB322R02V
	330	35 × 50	1.53	2.90	0.77	0.26	450	340	EYD00CD333R02V
	330	40 × 40	1.52	2.88	0.77	0.26	450	340	EYD00DB333R02V
	470	40 × 50	1.96	3.72	1.09	0.36	320	260	EYD00DD347R02V
	680	40 × 70	2.70	5.12	1.58	0.53	220	190	EYD00DG368R02V
	1000	40 × 100	3.70	7.02	2.31	0.78	180	140	EYD00DM410R02V
400	68	25 × 30	0.54	1.02	0.16	0.06	2100	1000	EYD00AV268X02V
	100	25 × 40	0.73	1.38	0.24	0.08	1400	780	EYD00AB310X02V
	150	30 × 40	0.98	1.86	0.36	0.12	950	520	EYD00BB315X02V
	220	35 × 40	1.28	2.43	0.52	0.17	650	400	EYD00CB322X02V
	330	35 × 50	1.67	3.17	0.79	0.26	480	280	EYD00CD333X02V
	330	40 × 40	1.67	3.17	0.79	0.26	480	280	EYD00DB333X02V
	470	40 × 50	2.12	4.02	1.12	0.37	340	220	EYD00DD347X02V
	680	40 × 70	2.90	5.50	1.63	0.54	235	155	EYD00DG368X02V
	1000	40 × 100	4.05	7.68	2.40	0.80	160	110	EYD00DM410X02V

ADDITIONAL ELECTRICAL DATA		
PARAMETER	CONDITIONS	VALUE
<b>Voltage</b>		
Surge voltage	≤ 250 V versions	U <sub>s</sub> = 1.15 × U <sub>R</sub>
	≥ 385 V versions	U <sub>s</sub> = 1.1 × U <sub>R</sub>
Reverse voltage		U <sub>rev</sub> ≤ 1 V
<b>Current</b>		
Leakage current	after 1 minute at U <sub>R</sub>	I <sub>L1</sub> ≤ 0.006 C <sub>R</sub> × U <sub>R</sub> + 4 μA
	after 5 minutes at U <sub>R</sub>	I <sub>L5</sub> ≤ 0.002 C <sub>R</sub> × U <sub>R</sub> + 4 μA
<b>Inductance</b>		
Equivalent series inductance (ESL)	case ØD = 25 mm	max. 25 nH
	case ØD = 30 and 35 mm	max. 30 nH
	case ØD = 40 mm	max. 35 nH

**LIFETIME TABLE** rated voltage: ≤ 100 V

<b>INTERRELATION BETWEEN ALTERNATING CURRENT, AMBIENT TEMPERATURE AND LIFETIME</b>																
$I/I_R$ (FREQUENCY DEPENDENT)						SURFACE TEMPERATURE RISE $\Delta T_o$ [°C]	LIFETIME MULTIPLIER L (depending on $I/I_R$ and $T_a$ )									
FREQUENCY [Hz]							AMBIENT TEMPERATURE $T_a$ [°C]									
50	100	250	500	1000	> 2500		40	45	50	55	60	65	70	75	80	85
0.19	0.20	0.21	0.22	0.23	0.24	0.2	63	40	26	17	11	7.4	5.0	3.4	2.4	1.64
0.39	0.40	0.42	0.44	0.46	0.47	0.6	57	36	23	15	10	6.8	4.6	3.2	2.2	1.53
0.58	0.60	0.62	0.66	0.69	0.71	1.3	48	31	20	13	8.9	6.0	4.1	2.8	2.0	1.38
0.78	0.80	0.83	0.88	0.92	0.95	2.1	39	25	17	11	7.5	5.1	3.5	2.4	1.7	1.21
0.97	1.00	1.04	1.10	1.15	1.18	3.2	30	20	13	9.0	6.1	4.2	2.9	2.0	1.4	1.00
1.17	1.20	1.25	1.31	1.38	1.42	4.4	22	15	10	7.0	4.8	3.4	2.3	1.7	1.2	
1.36	1.40	1.46	1.53	1.61	1.66	6.0	16	11	7.7	5.3	3.7	2.6	1.8	1.3		
1.55	1.60	1.67	1.75	1.84	1.89	7.9	11	8.0	5.6	3.9	2.8	2.0	1.4	1.0		
1.75	1.80	1.87	1.97	2.07	2.13	10	7.8	5.5	3.9	2.8	2.0	1.4	1.0			
1.94	2.00	2.08	2.19	2.30	2.37	12	5.3	3.8	2.7	2.0	1.4	1.0				
2.14	2.20	2.29	2.41	2.53	2.60	15	3.5	2.5	1.8	1.3						
2.33	2.40	2.50	2.63	2.76	2.84	17	2.2	1.6	1.2							
2.53	2.60	2.71	2.85	2.99	3.08	20	1.4	1.1								

$I_R$  100 Hz alternating current [A] at upper category temperature  $T_{UC}$  taken from data sheet.

I User current [A].

$T_a$  Ambient temperature of capacitor [°C].

$\Delta T_o$  Surface temperature rise of capacitor caused by AC load [°C].

L Lifetime multiplier.

**LIFETIME TABLE** rated voltage: > 100 V

<b>INTERRELATION BETWEEN ALTERNATING CURRENT, AMBIENT TEMPERATURE AND LIFETIME</b>																
$I/I_R$ (FREQUENCY DEPENDENT)						SURFACE TEMPERATURE RISE $\Delta T_o$ [°C]	LIFETIME MULTIPLIER L (depending on $I/I_R$ and $T_a$ )									
FREQUENCY [Hz]							AMBIENT TEMPERATURE $T_a$ [°C]									
50	100	250	500	1000	> 2500		40	45	50	55	60	65	70	75	80	85
0.16	0.20	0.25	0.27	0.28	0.29	0.2	94	60	38	25	17	11	7.5	5.1	2.4	1.64
0.32	0.40	0.49	0.54	0.57	0.59	0.6	83	53	35	23	15	10	6.9	3.2	2.2	1.54
0.48	0.60	0.74	0.81	0.85	0.88	1.2	68	45	30	20	13	9.0	6.2	2.8	2.0	1.39
0.64	0.80	0.98	1.07	1.13	1.18	2.0	54	36	24	16	11	7.6	5.3	2.5	1.7	1.22
0.80	1.00	1.23	1.34	1.42	1.47	3.1	41	28	19	13	9.0	6.3	2.9	2.1	1.5	1.00
0.96	1.20	1.47	1.61	1.70	1.76	4.9	30	21	15	10	7.1	5	2.4	1.7	1.2	
1.12	1.40	1.72	1.88	1.98	2.06	6.7	21	15	11	7.7	5.5	2.6	1.9	1.3		
1.28	1.60	1.96	2.15	2.27	2.35	8.6	15	11	7.9	5.7	2.7	2.0	1.4	1.0		
1.44	1.80	2.21	2.42	2.55	2.65	11	10	7.6	5.6	2.7	2.0	1.5	1.1			
1.60	2.00	2.45	2.69	2.83	2.94	13	7.0	5.3	2.6	2.0	1.5	1.1				
1.76	2.20	2.70	2.95	3.12	3.23	15	3.2	2.4	1.8	1.4	1.0					
1.92	2.40	2.94	3.22	3.40	3.53	18	2.1	1.6	1.2							
2.08	2.60	3.19	3.49	3.68	3.82	20	1.4	1.1								

$I_R$  100 Hz alternating current [A] at upper category temperature  $T_{UC}$  taken from data sheet.

I User current [A].

$T_a$  Ambient temperature of capacitor [°C].

$\Delta T_o$  Surface temperature rise of capacitor caused by AC load [°C].

L Lifetime multiplier.



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