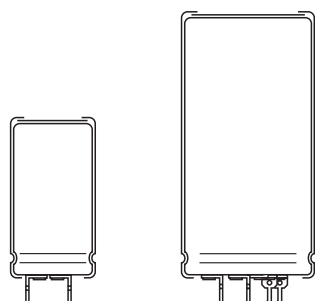


Aluminum Capacitors

Power Printed Wiring Style



Component outlines.

QUICK REFERENCE DATA

DESCRIPTION	VALUE	
	NV	HV
Nominal case size ($\varnothing D \times L$ in mm)	25 $\times$ 30 to 40 $\times$ 100	
Rated capacitance range (E6 series), C_R	470 to 68000 μF	47 to 1000 μF
Tolerance on C_R	-10 to + 30 %	
Rated voltage range, U_R	10 to 100 V	250 to 400 V
Category temperature range	- 40 to + 85 °C	
Endurance test at 85 °C	5000 hours	
Useful life at 85 °C	15000 hours	
Useful life at 40 °C, 1.4 $\times I_R$ applied	200000 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	

FEATURES

- Polarized aluminum electrolytic capacitors, non-solid electrolyte
- Large types, cylindrical aluminum case, insulated
- Provided with keyed polarity
- Very long useful life:
15000 hours at 85 °C
- Low ESR, high ripple current capability
- High resistance to shock and vibration.

APPLICATIONS

- Computer, telecommunication and industrial 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:

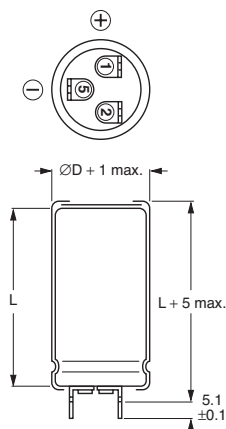
- Rated capacitance (in μF).
- Tolerance on rated capacitance, code letter in accordance with IEC 60062 (Q for - 10/+ 30 %).
- Rated voltage (in V).
- Date code (YYMM).
- Name of manufacturer.
- Code for factory of origin.
- Polarity of the terminals and '-' sign to indicate the negative terminal, visible from the top and/or side of the capacitor.
- Code number.
- Climatic category in accordance with IEC 60068.

SELECTION CHART FOR C_R , U_R AND RELEVANT NOMINAL CASE SIZES ($\varnothing D \times L$ in mm)

C_R (μF)	U_R (V)					
	10	16	25	40	63	100
470	—	—	—	—	—	25 $\times$ 30
680	—	—	—	—	—	25 $\times$ 40
1000	—	—	—	—	25 $\times$ 30	30 $\times$ 40
1500	—	—	—	25 $\times$ 30	25 $\times$ 40	35 $\times$ 40
2200	—	—	25 $\times$ 30	25 $\times$ 40	30 $\times$ 40	35 $\times$ 50
	—	—	—	—	—	40 $\times$ 40
3300	—	25 $\times$ 30	25 $\times$ 40	30 $\times$ 40	35 $\times$ 40	40 $\times$ 50
4700	25 $\times$ 30	25 $\times$ 40	30 $\times$ 40	35 $\times$ 40	35 $\times$ 50	40 $\times$ 70
	—	—	—	—	40 $\times$ 40	—
6800	25 $\times$ 40	30 $\times$ 40	35 $\times$ 40	35 $\times$ 50	40 $\times$ 50	40 $\times$ 100
	—	—	—	40 $\times$ 40	—	—
10000	30 $\times$ 40	35 $\times$ 40	35 $\times$ 50	40 $\times$ 50	40 $\times$ 70	—
	—	—	40 $\times$ 40	—	—	—
15000	35 $\times$ 40	35 $\times$ 50	40 $\times$ 50	40 $\times$ 70	40 $\times$ 100	—
	—	40 $\times$ 40	—	—	—	—
22000	35 $\times$ 50	40 $\times$ 50	40 $\times$ 70	40 $\times$ 100	—	—
	40 $\times$ 40	—	—	—	—	—
33000	40 $\times$ 50	40 $\times$ 70	40 $\times$ 100	—	—	—
47000	40 $\times$ 70	40 $\times$ 100	—	—	—	—
68000	40 $\times$ 100	—	—	—	—	—

SELECTION CHART FOR C_R , U_R AND RELEVANT NOMINAL CASE SIZES ($\varnothing D \times L$ in mm)

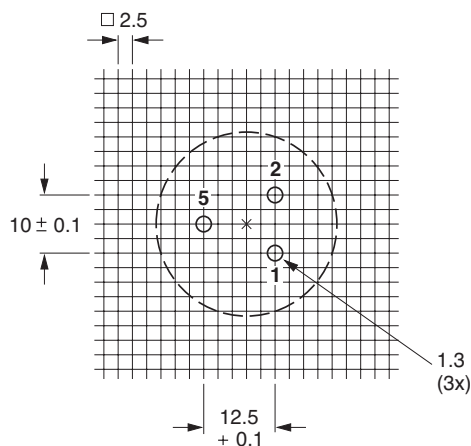
C_R (μF)	U_R (V)		
	250	385	400
47	—	25 × 30	25 × 30
68	—	25 × 40	25 × 40
100	25 × 30	30 × 40	30 × 40
150	25 × 40	35 × 40	35 × 40
220	30 × 40	35 × 50	35 × 50
	—	40 × 40	40 × 40
330	35 × 40	40 × 50	40 × 50
470	35 × 50	40 × 70	40 × 70
	40 × 40	—	—
680	40 × 50	—	40 × 100
1000	40 × 70	—	—

DIMENSIONS in millimeters **AND AVAILABLE FORMS**

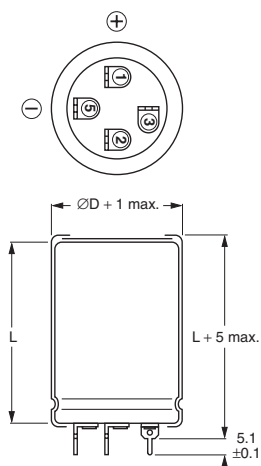
1 = positive terminal; 5 = negative terminal.

Case $\varnothing D = 25$ mm.

Printed wiring pin version.

Case $\varnothing D = 25$ mm.

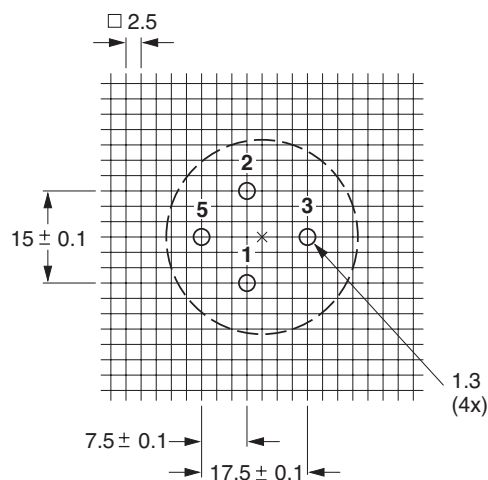
Mounting hole diagram viewed from component side.



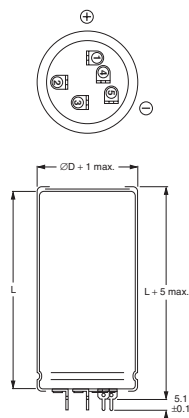
1 = positive terminal; 5 = negative terminal.

Case $\varnothing D = 30$ mm and 35 mm.

Printed wiring pin version

Case $\varnothing D = 30$ mm and 35 mm.

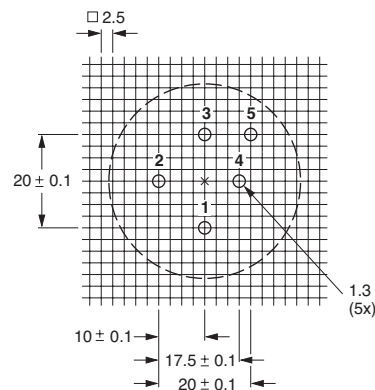
Mounting hole diagram viewed from component side.



1 = positive terminal; 5 = negative terminal.

Case ØD = 40 mm.

Printed wiring pin version.



Case ØD = 40 mm.

Mounting hole diagram viewed from component side.

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.

DIMENSIONS in millimeters, MASS AND PACKAGING QUANTITIES					
NOMINAL CASE SIZE ØD × L	ØD _{max}	L _{max}	MASS (g)	PACKAGING QUANTITIES (units per box)	CARDBOARD BOX DIMENSIONS L × W × 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

ELECTRICAL DATA	
SYMBOL	DESCRIPTION
C_R	rated capacitance at 100 Hz
I_R	rated RMS ripple current at 100 Hz, 85 °C or at 20kHz, 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 μ F/25 V; - 10/+30%Nominal case size: $\varnothing 35 \times 50$ mm

Catalog number: EYV00CD510E02V

Note

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

ELECTRICAL DATA AND ORDERING INFORMATION									
U_R (V)	C_R 100 Hz (μ F)	NOMINAL CASE SIZE $\varnothing D \times L$ (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 Ω)	Z 10 kHz (m Ω)	CATALOG NUMBER
10	4700	25 $\times$ 30	2.4	4.6	0.28	0.10	74	50	EYV00AV447C02V
	6800	25 $\times$ 40	3.2	6.1	0.41	0.14	51	37	EYV00AB468C02V
	10000	30 $\times$ 40	3.8	7.2	0.60	0.20	39	29	EYV00BB510C02V
	15000	35 $\times$ 40	4.1	7.8	0.90	0.30	35	26	EYV00CB515C02V
	22000	35 $\times$ 50	5.0	9.5	1.32	0.44	27	21	EYV00CD522C02V
	22000	40 $\times$ 40	4.2	8.0	1.32	0.44	36	27	EYV00DB522C02V
	33000	40 $\times$ 50	5.0	9.5	1.98	0.66	29	22	EYV00DD533C02V
	47000	40 $\times$ 70	6.8	12.9	2.82	0.94	20	17	EYV00DG547C02V
	68000	40 $\times$ 100	9.2	17.5	4.08	1.36	15	14	EYV00DM568C02V
16	3300	25 $\times$ 30	2.4	4.6	0.32	0.11	75	50	EYV00AV433D02V
	4700	25 $\times$ 40	3.1	5.9	0.45	0.15	52	37	EYV00AB447D02V
	6800	30 $\times$ 40	3.7	7.0	0.65	0.22	40	30	EYV00BB468D02V
	10000	35 $\times$ 40	4.1	7.8	0.96	0.32	36	27	EYV00CB510D02V
	15000	35 $\times$ 50	5.0	9.5	1.44	0.48	28	21	EYV00CD515D02V
	15000	40 $\times$ 40	4.2	8.0	1.44	0.48	36	27	EYV00DB515D02V
	22000	40 $\times$ 50	5.0	9.5	2.12	0.71	29	22	EYV00DD522D02V
	33000	40 $\times$ 70	6.7	12.7	3.17	1.06	20	17	EYV00DG533D02V
	47000	40 $\times$ 100	9.1	17.3	4.51	1.51	15	14	EYV00DM547D02V
25	2200	25 $\times$ 30	2.3	4.4	0.33	0.11	78	52	EYV00AV422E02V
	3300	25 $\times$ 40	3.1	5.9	0.49	0.17	53	38	EYV00AB433E02V
	4700	30 $\times$ 40	3.7	7.0	0.70	0.24	42	31	EYV00BB447E02V
	6800	35 $\times$ 40	4.1	7.8	1.02	0.34	37	28	EYV00CB468E02V
	10000	35 $\times$ 50	5.0	9.5	1.50	0.50	28	21	EYV00CD510E02V
	10000	40 $\times$ 40	4.2	8.0	1.50	0.50	36	27	EYV00DB510E02V
	15000	40 $\times$ 50	5.0	9.5	2.25	0.75	29	22	EYV00DD515E02V
	22000	40 $\times$ 70	6.8	12.9	3.30	1.10	20	17	EYV00DG522E02V
	33000	40 $\times$ 100	9.2	17.5	4.95	1.65	15	14	EYV00DM533E02V
40	1500	25 $\times$ 30	2.0	3.8	0.36	0.12	112	68	EYV00AV415G02V
	2200	25 $\times$ 40	2.7	5.1	0.53	0.18	76	51	EYV00AB422G02V
	3300	30 $\times$ 40	3.3	6.3	0.79	0.27	57	41	EYV00BB433G02V
	4700	35 $\times$ 40	3.8	7.2	1.13	0.38	48	35	EYV00CB447G02V
	6800	35 $\times$ 50	4.7	8.9	1.64	0.55	36	27	EYV00CD468G02V
	6800	40 $\times$ 40	4.1	7.8	1.64	0.55	45	33	EYV00DB468G02V
	10000	40 $\times$ 50	4.9	9.3	2.40	0.80	35	27	EYV00DD510G02V
	15000	40 $\times$ 70	6.6	12.5	3.60	1.20	25	20	EYV00DG515G02V
	22000	40 $\times$ 100	9.0	17.1	5.28	1.76	18	16	EYV00DM522G02V

**ELECTRICAL DATA AND ORDERING INFORMATION**

U_R (V)	C_R 100 Hz (μ F)	NOMINAL CASE SIZE $\varnothing D \times L$ (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 Ω)	Z 10 kHz (m Ω)	CATALOG NUMBER
63	1000	25 × 30	1.8	3.4	0.38	0.13	122	74	EYV00AV410J02V
	1500	25 × 40	2.5	4.7	0.57	0.19	83	54	EYV00AB415J02V
	2200	30 × 40	3.1	5.9	0.83	0.28	57	41	EYV00BB422J02V
	3300	35 × 40	3.6	6.8	1.25	0.42	48	35	EYV00CB433J02V
	4700	35 × 50	4.4	8.3	1.78	0.60	36	27	EYV00CD447J02V
	4700	40 × 40	3.8	7.2	1.78	0.60	45	33	EYV00DB447J02V
	6800	40 × 50	4.7	8.9	2.57	0.86	35	27	EYV00DD468J02V
	10000	40 × 70	6.2	11.8	3.78	1.26	25	20	EYV00DG510J02V
100	15000	40 × 100	8.5	16.1	5.67	1.89	18	16	EYV00DM515J02V
	470	25 × 30	1.4	2.7	0.28	0.10	247	172	EYV00AV347L02V
	680	25 × 40	1.9	3.6	0.41	0.14	170	116	EYV00AB368L02V
	1000	30 × 40	2.5	4.7	0.60	0.20	123	88	EYV00BB410L02V
	1500	35 × 40	3.1	5.8	0.90	0.30	94	71	EYV00CB415L02V
	2200	35 × 50	3.9	7.4	1.32	0.44	69	55	EYV00CD422L02V
	2200	40 × 40	3.6	6.8	1.32	0.44	81	65	EYV00DB422L02V
	3300	40 × 50	4.6	8.7	1.98	0.66	59	48	EYV00DD433L02V
250	4700	40 × 70	6.2	11.7	2.82	0.94	42	36	EYV00DG447L02V
	6800	40 × 100	8.2	15.5	4.08	1.36	32	28	EYV00DM468L02V
	100	25 × 30	0.6	1.15	0.15	0.05	1800	1300	EYV00AV310N02V
	150	25 × 40	0.8	1.5	0.23	0.08	1100	850	EYV00AB315N02V
	220	30 × 40	1.0	1.9	0.33	0.11	750	550	EYV00BB322N02V
	330	35 × 40	1.4	2.65	0.49	0.17	500	400	EYV00CB333N02V
	470	35 × 50	1.8	3.4	0.70	0.24	360	290	EYV00CD347N02V
	470	40 × 40	1.8	3.4	0.70	0.24	420	350	EYV00DB347N02V
385	680	40 × 50	2.3	4.4	1.02	0.34	250	190	EYV00DD368N02V
	1000	40 × 70	3.0	5.7	1.50	0.50	170	140	EYV00DG410N02V
	47	25 × 30	0.5	0.94	0.11	0.04	2370	1550	EYV00AV247R02V
	68	25 × 40	0.67	1.27	0.16	0.06	1640	1100	EYV00AB268R02V
	100	30 × 40	0.84	1.59	0.23	0.08	1275	950	EYV00BB310R02V
	150	35 × 40	1.13	2.14	0.34	0.11	850	635	EYV00CB315R02V
	220	35 × 50	1.48	2.8	0.50	0.17	580	430	EYV00CD322R02V
	220	40 × 40	1.48	2.8	0.50	0.17	580	430	EYV00DB322R02V
400	330	40 × 50	1.97	3.73	0.75	0.25	385	300	EYV00DD333R02V
	470	40 × 70	2.7	5.11	1.06	0.36	270	215	EYV00DG347R02V
	47	25 × 30	0.47	0.89	0.11	0.04	2700	2125	EYV00AV247X02V
	68	25 × 40	0.63	1.29	0.16	0.06	1875	1470	EYV00AB268X02V
	100	30 × 40	0.84	1.59	0.24	0.08	1275	1000	EYV00BB310X02V
	150	35 × 40	1.13	2.14	0.36	0.12	850	665	EYV00CB315X02V
	220	35 × 50	1.41	2.67	0.52	0.17	650	450	EYV00CD322X02V
	220	40 × 40	1.41	2.67	0.52	0.17	650	450	EYV00DB322X02V
	330	40 × 50	1.86	3.52	0.79	0.26	435	315	EYV00DD333X02V
	470	40 × 70	2.54	4.81	1.12	0.37	305	225	EYV00DG347X02V
	680	40 × 100	3.56	6.75	1.63	0.54	210	155	EYV00DM368X02V

450 V on request

ADDITIONAL ELECTRICAL DATA

PARAMETER	CONDITIONS	VALUE
Voltage		
Surge voltage	≤ 250 V versions	$U_s = 1.15 \times U_R$
	≥ 385 V versions	$U_s = 1.1 \times U_R$
Reverse voltage		$U_{rev} \leq 1 \text{ V}$
Current		
Leakage current	after 1 minute at U_R	$I_{L1} \leq 0.006 C_R \times U_R + 4 \mu\text{A}$
	after 5 minutes at U_R	$I_{L5} \leq 0.002 C_R \times U_R + 4 \mu\text{A}$
Inductance		
Equivalent series inductance (ESL)	case $\varnothing D = 25 \text{ mm}$	max. 25 nH
	case $\varnothing D = 30 \text{ and } 35 \text{ mm}$	max. 30 nH
	case $\varnothing D = 40 \text{ mm}$	max. 35 nH

LIFETIME TABLE rated voltage: ≤ 100 V

INTERRELATION BETWEEN ALTERNATING CURRENT, AMBIENT TEMPERATURE AND LIFETIME																
I/I _R (FREQUENCY DEPENDENT)						SURFACE TEMPERATURE RISE	LIFETIME MULTIPLIER L (depending on I/I _R and T _a)									
FREQUENCY [Hz]							AMBIENT TEMPERATURE T _a [°C]									
50	100	250	500	1000	>2500	ΔT _o [°C]	40	45	50	55	60	65	70	75	80	85
0.19	0.20	0.21	0.22	0.22	0.23	0.2	63	40	26	17	11	7.3	5.0	3.4	2.3	1.63
0.38	0.40	0.42	0.43	0.45	0.47	0.7	55	35	23	15	9.9	6.7	4.5	3.1	2.2	1.51
0.56	0.60	0.63	0.65	0.67	0.70	1.5	45	29	19	13	8.5	5.7	3.9	2.7	1.9	1.33
0.75	0.80	0.84	0.86	0.89	0.94	2.5	35	23	15	10	6.9	4.7	3.3	2.3	1.6	1.13
0.94	1.00	1.05	1.08	1.12	1.17	3.8	26	17	12	7.9	5.4	3.7	2.6	1.8	1.3	1.00
1.13	1.20	1.26	1.29	1.34	1.41	5.4	18	13	8.6	5.9	4.1	2.9	2.0	1.4	1.0	
1.31	1.40	1.47	1.51	1.56	1.64	7.4	13	8.7	6.1	4.2	3.0	2.1	1.5	1.1		
1.50	1.60	1.68	1.72	1.79	1.87	9.6	8.3	5.9	4.2	3.0	2.1	1.5	1.1			
1.69	1.80	1.89	1.94	2.01	2.11	12	5.4	3.9	2.8	2.0	1.4	1.0				
1.88	2.00	2.10	2.15	2.23	2.34	15	3.4	2.5	1.8	1.3						
2.06	2.20	2.30	2.37	2.45	2.58	18	2.1	1.5	1.1							
2.25	2.40	2.51	2.58	2.68	2.81	21	1.2									
combination not permitted																

combination
not
permitted

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].

ΔT_o Surface temperature rise of capacitor caused by AC load [°C].

L Lifetime multiplier.

LIFETIME TABLE rated voltage: > 100 V

INTERRELATION BETWEEN ALTERNATING CURRENT, AMBIENT TEMPERATURE AND LIFETIME																
I/I _R (FREQUENCY DEPENDENT)						SURFACE TEMPERATURE RISE ΔT _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	0.26	0.29	0.31	0.33	0.2	78	50	32	21	14	9.2	6.2	4.2	2.3	1.64
0.31	0.40	0.51	0.58	0.63	0.66	0.6	68	44	29	19	12	8.4	5.7	3.1	2.2	1.53
0.47	0.60	0.77	0.87	0.94	0.99	1.3	56	37	24	16	11	7.3	5.0	2.8	1.9	1.36
0.62	0.80	1.03	1.16	1.25	1.32	2.3	43	29	19	13	8.9	6.1	4.2	2.4	1.7	1.18
0.78	1.00	1.29	1.45	1.57	1.65	3.4	32	22	15	10	7.1	4.9	2.8	2.0	1.4	1.00
0.93	1.20	1.54	1.74	1.88	1.98	5.3	23	16	11	7.8	5.5	3.1	2.2	1.6	1.1	
1.09	1.40	1.80	2.04	2.19	2.31	7.2	16	12	8.2	5.8	4.1	2.4	1.7	1.2		
1.24	1.60	2.06	2.33	2.51	2.64	9.3	11	8.0	5.8	4.2	2.4	1.7	1.3			
1.40	1.80	2.31	2.62	2.82	2.97	12	7.4	5.4	3.2	2.3	1.7	1.3				
1.56	2.00	2.57	2.91	3.13	3.30	14	4.9	2.9	2.2	1.6	1.2		combination			
1.71	2.20	2.83	3.20	3.45	3.63	17	2.5	1.9	1.5	1.1		not				
1.86	2.40	3.09	3.49	3.76	3.96	19	1.6	1.2				permitted				
2.02	2.60	3.34	3.78	4.07	4.29	22	1.0									

combination
not
permitted

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].

ΔT_o Surface temperature rise of capacitor caused by AC load [°C].

L Lifetime multiplier.