Aluminum Capacitors
Power Printed Wiring Style



FEATURES

- Very long useful life: 15 000 h at + 85 °C
- Low ESR, high ripple current capability
- High resistance to shock and vibration
- Polarized aluminum electrolytic capacitors, non-solid electrolyte
- Large types, cylindrical aluminum case, insulated
- Provided with keyed polarity
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

Pb-free

RoHS COMPLIANT

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

QUICK REFERENCE DATA	
DESCRIPTION	VALUE
	≤ 100 V
Nominal case size (Ø D x L in mm)	25 x 30 to 40 x 100
Rated capacitance range (E6 series), C_R	470 µF to 68 000 µF
Tolerance on C_R	- 10 % to + 30 %
Rated voltage range, U_R	10 V to 100 V
Category temperature range	- 40 °C to + 85 °C
Endurance test at 85 °C	5000 h
Useful life at 85 °C	15 000 h
Useful life at 40 °C, 1.4 x I_R applied	200 000 h
Shelf life at 0 V, 85 °C	500 h
Based on sectional specification	IEC 60384-4/EN 130300
Climatic category IEC 60068	40/085/56

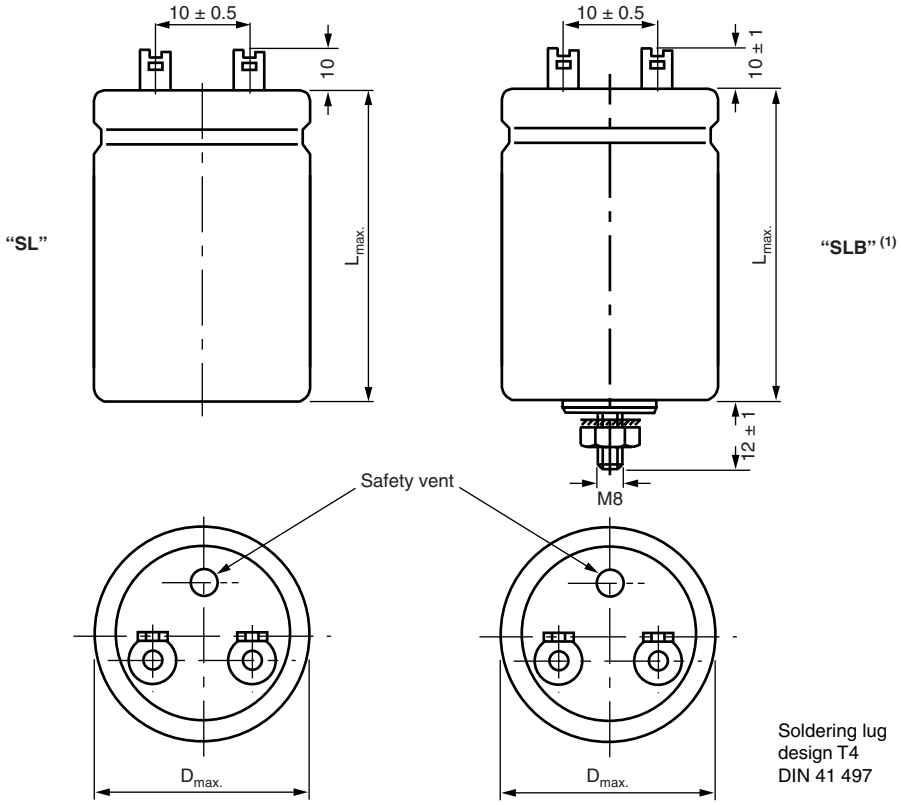
SELECTION CHART FOR C_R, U_R, AND RELEVANT NOMINAL CASE SIZES (Ø D x L in mm)

C_R (µF)	U_R (V)					
	10	16	25	40	63	100
470	-	-	-	-	-	25 x 30
680	-	-	-	-	-	25 x 40
1000	-	-	-	-	25 x 30	30 x 40
1500	-	-	-	25 x 30	25 x 40	35 x 40
2200	-	-	25 x 30	25 x 40	30 x 40	35 x 50
3300	-	25 x 30	25 x 40	30 x 40	35 x 40	40 x 50
4700	25 x 30	25 x 40	30 x 40	35 x 40	35 x 50	40 x 70
6800	25 x 40	30 x 40	35 x 40	35 x 50	40 x 50	40 x 100
10 000	30 x 40	35 x 40	35 x 50	40 x 50	40 x 70	-
15 000	35 x 40	35 x 50	40 x 50	40 x 70	40 x 100	-
22 000	35 x 50	40 x 50	40 x 70	40 x 100	-	-
33 000	40 x 50	40 x 70	40 x 100	-	-	-
47 000	40 x 70	40 x 100	-	-	-	-
68 000	40 x 100	-	-	-	-	-

For technical questions, contact: aluminumcaps2@vishay.com

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DIMENSIONS in millimeters AND AVAILABLE FORMS



Note

(1) The MOQ for SLB-version is 5000 pieces.

DIMENSIONS in millimeters, MASS, AND PACKAGING QUANTITIES					
NOMINAL CASE SIZE Ø D x L	Ø $D_{max.}$	$L_{max.}$	MASS (g)	PACKAGING QUANTITIES (units per box)	CARDBOARD BOX DIMENSIONS L x W x H
25 x 30	26	32	≈ 24	100	290 x 280 x 50
25 x 40	26	42	≈ 28	100	290 x 280 x 60
30 x 40	31	42	≈ 38	100	340 x 330 x 60
35 x 40	36	42	≈ 51	50	390 x 198 x 60
35 x 50	36	52	≈ 66	50	390 x 198 x 70
40 x 50	41	52	≈ 82	50	440 x 223 x 70
40 x 70	41	72	≈ 110	25	230 x 230 x 90
40 x 100	41	102	≈ 176	25	230 x 230 x 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.

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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 min at U_R
I_{L5}	Max. leakage current after 5 min at U_R
ESR	Max. equivalent series resistance at 100 Hz
Z	Max. impedance at 10 kHz

Note

- Unless otherwise specified, all electrical values apply at T_{amb} = 20 °C, P = 80 kPa to 120 kPa, RH = 45 % to 75 %.

ORDERING EXAMPLE

EY01: 10 000 µF/25 V

Version 01: (no stud mounting)
Size: 35 mm x 50 mm
Ordering code: MALLEY01CD510E02W

EY02: 10 000 µF/25 V

Version 02: (stud mounting) (1)
Size: 35 mm x 50 mm
Ordering code: MALLEY02CD510E01W

Note

(1) MOQ for version 02: 5000 pieces.

ELECTRICAL DATA AND ORDERING INFORMATION

U_R (V)	C_R 100 Hz (µF)	NOMINAL CASE SIZE Ø D 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 (mΩ)	Z 10 kHz (mΩ)	ORDERING CODE
10	4700	25 x 30	2.4	4.6	0.28	0.10	74	50	MALLEY01AV447C02W
	6800	25 x 40	3.2	6.1	0.41	0.14	51	37	MALLEY01AB468C02W
	10 000	30 x 40	3.8	7.2	0.60	0.20	39	29	MALLEY01BB510C02W
	15 000	35 x 40	4.1	7.8	0.90	0.30	35	26	MALLEY01CB515C02W
	22 000	35 x 50	5.0	9.5	1.32	0.44	27	21	MALLEY01CD522C02W
	22 000	40 x 40	4.2	8.0	1.32	0.44	36	27	MALLEY01DB522C02W
	33 000	40 x 50	5.0	9.5	1.98	0.66	29	22	MALLEY01DD533C02W
	47 000	40 x 70	6.8	12.9	2.82	0.94	20	17	MALLEY01DG547C02W
	68 000	40 x 100	9.2	17.5	4.08	1.36	15	14	MALLEY01DM568C02W
16	3300	25 x 30	2.4	4.6	0.32	0.11	75	50	MALLEY01AV433D02W
	4700	25 x 40	3.1	5.9	0.45	0.15	52	37	MALLEY01AB447D02W
	6800	30 x 40	3.7	7.0	0.65	0.22	40	30	MALLEY01BB468D02W
	10 000	35 x 40	4.1	7.8	0.96	0.32	36	27	MALLEY01CB510D02W
	15 000	35 x 50	5.0	9.5	1.44	0.48	28	21	MALLEY01CD515D02W
	15 000	40 x 40	4.2	8.0	1.44	0.48	36	27	MALLEY01DB515D02W
	22 000	40 x 50	5.0	9.5	2.12	0.71	29	22	MALLEY01DD522D02W
	33 000	40 x 70	6.7	12.7	3.17	1.06	20	17	MALLEY01DG533D02W
	47 000	40 x 100	9.1	17.3	4.51	1.51	15	14	MALLEY01DM547D02W
25	2200	25 x 30	2.3	4.4	0.33	0.11	78	52	MALLEY01AV422E02W
	3300	25 x 40	3.1	5.9	0.49	0.17	53	38	MALLEY01AB433E02W
	4700	30 x 40	3.7	7.0	0.70	0.24	42	31	MALLEY01BB447E02W
	6800	35 x 40	4.1	7.8	1.02	0.34	37	28	MALLEY01CB468E02W
	10 000	35 x 50	5.0	9.5	1.50	0.50	28	21	MALLEY01CD510E02W
	10 000	40 x 40	4.2	8.0	1.50	0.50	36	27	MALLEY01DB510E02W
	15 000	40 x 50	5.0	9.5	2.25	0.75	29	22	MALLEY01DD515E02W
	22 000	40 x 70	6.8	12.9	3.30	1.10	20	17	MALLEY01DG522E02W
	33 000	40 x 100	9.2	17.5	4.95	1.65	15	14	MALLEY01DM533E02W
40	1500	25 x 30	2.0	3.8	0.36	0.12	112	68	MALLEY01AV415G02W
	2200	25 x 40	2.7	5.1	0.53	0.18	76	51	MALLEY01AB422G02W
	3300	30 x 40	3.3	6.3	0.79	0.27	57	41	MALLEY01BB433G02W
	4700	35 x 40	3.8	7.2	1.13	0.38	48	35	MALLEY01CB447G02W
	6800	35 x 50	4.7	8.9	1.64	0.55	36	27	MALLEY01CD468G02W
	6800	40 x 40	4.1	7.8	1.64	0.55	45	33	MALLEY01DB468G02W
	10 000	40 x 50	4.9	9.3	2.40	0.80	35	27	MALLEY01DD510G02W
	15 000	40 x 70	6.6	12.5	3.60	1.20	25	20	MALLEY01DG515G02W
	22 000	40 x 100	9.0	17.1	5.28	1.76	18	16	MALLEY01DM522G02W
63	1000	25 x 30	1.8	3.4	0.38	0.13	122	74	MALLEY01AV410J02W
	1500	25 x 40	2.5	4.7	0.57	0.19	83	54	MALLEY01AB415J02W
	2200	30 x 40	3.1	5.9	0.83	0.28	57	41	MALLEY01BB422J02W
	3300	35 x 40	3.6	6.8	1.25	0.42	48	35	MALLEY01CB433J02W
	4700	35 x 50	4.4	8.3	1.78	0.60	36	27	MALLEY01CD447J02W
	4700	40 x 40	3.8	7.2	1.78	0.60	45	33	MALLEY01DB447J02W
	6800	40 x 50	4.7	8.9	2.57	0.86	35	27	MALLEY01DD468J02W
	10 000	40 x 70	6.2	11.8	3.78	1.26	25	20	MALLEY01DG510J02W
	15 000	40 x 100	8.5	16.1	5.67	1.89	18	16	MALLEY01DM515J02W

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ELECTRICAL DATA AND ORDERING INFORMATION

U_R (V)	C_R 100 Hz (µF)	NOMINAL CASE SIZE Ø D 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 (mΩ)	Z 10 kHz (mΩ)	ORDERING CODE
100	470	25 x 30	1.4	2.7	0.28	0.10	247	172	MALLEY01AV347L02W
	680	25 x 40	1.9	3.6	0.41	0.14	170	116	MALLEY01AB368L02W
	1000	30 x 40	2.5	4.7	0.60	0.20	123	88	MALLEY01BB410L02W
	1500	35 x 40	3.1	5.8	0.90	0.30	94	71	MALLEY01CB415L02W
	2200	35 x 50	3.9	7.4	1.32	0.44	69	55	MALLEY01CD422L02W
	2200	40 x 40	3.6	6.8	1.32	0.44	81	65	MALLEY01DB422L02W
	3300	40 x 50	4.6	8.7	1.98	0.66	59	48	MALLEY01DD433L02W
	4700	40 x 70	6.2	11.7	2.82	0.94	42	36	MALLEY01DG447L02W
	6800	40 x 100	8.2	15.5	4.08	1.36	32	28	MALLEY01DM468L02W

ADDITIONAL ELECTRICAL DATA

PARAMETER	CONDITIONS	VALUE
Voltage		
Surge voltage	≤ 250 V versions	$U_s = 1.15 \times U_R$
Reverse voltage		$U_{rev} \leq 1$ V
Current		
Leakage current	After 1 minute at U_R	$I_{L1} \leq 0.006\ C_R \times U_R + 4$ µA
	After 5 minutes at U_R	$I_{L5} \leq 0.002\ C_R \times U_R + 4$ µA
Inductance		
Equivalent series inductance (ESL)	Case Ø D = 25 mm	Max. 25 nH
	Case Ø D = 30 mm and 35 mm	Max. 30 nH
	Case Ø D = 40 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 (depending on I/I_R and T_{amb})									
FREQUENCY (Hz)							AMBIENT TEMPERATURE T_{amb} (°C)									
50	100	250	500	1000	> 2500	ΔT_0 (°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		combination		
1.88	2.00	2.10	2.15	2.23	2.34	15	3.4	2.5	1.8	1.3				not		
2.06	2.20	2.30	2.37	2.45	2.58	18	2.1	1.5	1.1					permitted		
2.25	2.40	2.51	2.58	2.68	2.81	21	1.2									

Notes

I_R 100 Hz alternating current (A) at upper category temperature T_{UC} taken from datasheet
I User current (A)
T_{amb} Ambient temperature of capacitor (°C)
ΔT_0 Surface temperature rise of capacitor caused by AC load (°C)
L Lifetime multiplier

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