



HEL Series LONG LIFE ASSURANCE ELECTROLYTIC CAPACITOR

Wide temperature range -55~+105°C

Load life of 2000~3000 hours

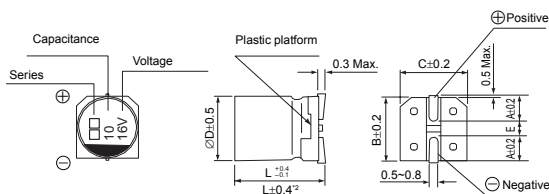
RoHS & REACH compliant, Halogen-free

SPECIFICATIONS

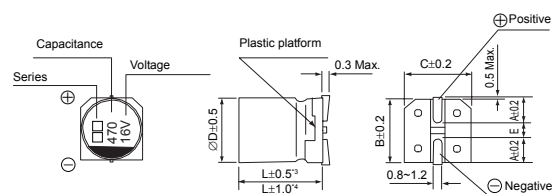
Items	Characteristics																																	
Operation Temperature Range	-55 ~ +105°C																																	
Voltage Range	6.3 ~ 50V																																	
Capacitance Range	0.1 ~ 1500μF																																	
Capacitance Tolerance	±20% at 120Hz, 20°C																																	
Leakage Current	Leakage current ≤0.01CV or 3μA (∅4~∅10), whichever is greater (after 2 minutes application of rated voltage at 20°C) Leakage current ≤0.03CV or 4μA (∅12.5~∅16), whichever is greater (after 1 minute application of rated voltage at 20°C) C: Nominal capacitance (μF) , V: Rated voltage (V)																																	
Dissipation Factor (tan δ)	Measurement frequency : 120Hz, Temperature : 20°C <table border="1"> <thead> <tr> <th>Rated Voltage (V)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> </tr> </thead> <tbody> <tr> <td>tan δ (max.) ∅4~∅10</td> <td>0.28</td> <td>0.24</td> <td>0.20</td> <td>0.16</td> <td>0.13</td> <td>0.12</td> </tr> <tr> <td>tan δ (max.) ∅12.5~∅16</td> <td>0.38</td> <td>0.34</td> <td>0.30</td> <td>0.26</td> <td>0.22</td> <td>0.18</td> </tr> </tbody> </table>	Rated Voltage (V)	6.3	10	16	25	35	50	tan δ (max.) ∅4~∅10	0.28	0.24	0.20	0.16	0.13	0.12	tan δ (max.) ∅12.5~∅16	0.38	0.34	0.30	0.26	0.22	0.18												
Rated Voltage (V)	6.3	10	16	25	35	50																												
tan δ (max.) ∅4~∅10	0.28	0.24	0.20	0.16	0.13	0.12																												
tan δ (max.) ∅12.5~∅16	0.38	0.34	0.30	0.26	0.22	0.18																												
Stability at Low Temperature	Measurement frequency : 120Hz <table border="1"> <thead> <tr> <th>Rated Voltage (V)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Impedance Ratio ∅4~∅10</td> <td>Z(-25°C) / Z(20°C)</td> <td>3</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z(-55°C) / Z(20°C)</td> <td>8</td> <td>5</td> <td>4</td> <td>3</td> <td>3</td> </tr> <tr> <td rowspan="2">ZT/Z20 (max.) ∅12.5~∅16</td> <td>Z(-25°C) / Z(20°C)</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z(-55°C) / Z(20°C)</td> <td>12</td> <td>10</td> <td>8</td> <td>5</td> <td>4</td> </tr> </tbody> </table>	Rated Voltage (V)	6.3	10	16	25	35	50	Impedance Ratio ∅4~∅10	Z(-25°C) / Z(20°C)	3	3	2	2	2	Z(-55°C) / Z(20°C)	8	5	4	3	3	ZT/Z20 (max.) ∅12.5~∅16	Z(-25°C) / Z(20°C)	5	4	3	2	2	Z(-55°C) / Z(20°C)	12	10	8	5	4
Rated Voltage (V)	6.3	10	16	25	35	50																												
Impedance Ratio ∅4~∅10	Z(-25°C) / Z(20°C)	3	3	2	2	2																												
	Z(-55°C) / Z(20°C)	8	5	4	3	3																												
ZT/Z20 (max.) ∅12.5~∅16	Z(-25°C) / Z(20°C)	5	4	3	2	2																												
	Z(-55°C) / Z(20°C)	12	10	8	5	4																												
Load Life	After 3000 hrs. (2000 hrs. for ∅4~∅6.3×5.8) application of the rated voltage at 105°C, they meet the characteristics listed below. <table border="1"> <tbody> <tr> <td>Capacitance Change</td> <td>Within ±25% of initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>200% or less of initial specified value</td> </tr> <tr> <td>Leakage Current</td> <td>initial specified value or less</td> </tr> </tbody> </table>	Capacitance Change	Within ±25% of initial value	Dissipation Factor	200% or less of initial specified value	Leakage Current	initial specified value or less																											
Capacitance Change	Within ±25% of initial value																																	
Dissipation Factor	200% or less of initial specified value																																	
Leakage Current	initial specified value or less																																	
Shelf Life	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above.																																	
Resistance to Soldering Heat	After reflow soldering and restored at room temperature, they meet the characteristics listed below. <table border="1"> <tbody> <tr> <td>Capacitance Change</td> <td>Within ±10% of initial value</td> </tr> <tr> <td>Dissipation Factor</td> <td>initial specified value or less</td> </tr> <tr> <td>Leakage Current</td> <td>initial specified value or less</td> </tr> </tbody> </table>	Capacitance Change	Within ±10% of initial value	Dissipation Factor	initial specified value or less	Leakage Current	initial specified value or less																											
Capacitance Change	Within ±10% of initial value																																	
Dissipation Factor	initial specified value or less																																	
Leakage Current	initial specified value or less																																	
Marking	Black print on the case top.																																	

DRAWING (Unit: mm)

(∅4~∅6.3×7.7)



(∅8×10.5~∅16)



- *1. Voltage mark for 6.3V is [6V]
- *2. Applicable to ∅6.3×7.7
- *3. Applicable to ∅8×10.5~∅10
- *4. Applicable to ∅12.5~∅16



DIMENSIONS (Unit: mm)

∅D x L	4 x 5.8	5 x 5.8	6.3 x 5.8	6.3 x 7.7	8 x 10.5	10 x 10.5	10 x 13.5	12.5 x 13.5	12.5 x 16	16 x 16.5
A	2.0	2.2	2.6	2.6	3.0	3.3	3.3	4.9	4.9	5.8
B	4.3	5.3	6.6	6.6	8.4	10.4	10.4	13.0	13.0	17.0
C	4.3	5.3	6.6	6.6	8.4	10.4	10.4	13.0	13.0	17.0
E ± 0.2	1.0	1.4	1.9	1.9	3.1	4.7	4.7	4.7	4.7	6.4
L	5.8	5.8	5.8	7.7	10.5	10.5	13.5	13.5	16.0	16.5

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT

μF	Code	6.3		10		16		25		35		50	
		Case size	Ripple current	Case size	Ripple current	Case size	Ripple current	Case size	Ripple current	Case size	Ripple current	Case size	Ripple current
0.1	104											4 x 5.8	1
0.22	224											4 x 5.8	2
0.33	334											4 x 5.8	3
0.47	474											4 x 5.8	5
1	105											4 x 5.8	10
2.2	225											4 x 5.8	16
3.3	335											4 x 5.8	16
4.7	475							4 x 5.8	13	4 x 5.8	14	5 x 5.8	23
10	106					4 x 5.8	18	5 x 5.8	20	5 x 5.8	21	6.3 x 5.8	35
22	226	4 x 5.8	22	5 x 5.8	25	5 x 5.8	27	6.3 x 5.8	36	6.3 x 5.8	38	6.3 x 7.7	70
33	336	5 x 5.8	27	5 x 5.8	30	6.3 x 5.8	40	6.3 x 5.8	60	6.3 x 7.7	84	8 x 10.5	90
47	476	5 x 5.8	33	6.3 x 5.8	41	6.3 x 5.8	48	6.3 x 7.7	90	8 x 10.5	98	8 x 10.5	90
100	107	6.3 x 5.8	50	6.3 x 5.8	53	6.3 x 5.8	60	8 x 10.5	130	8 x 10.5	130	10 x 10.5	100
150	157	6.3 x 5.8	55	6.3 x 7.7	105	6.3 x 7.7	95	8 x 10.5	140	10 x 10.5	315	10 x 10.5	100
220	227	6.3 x 7.7	100	8 x 10.5	210	8 x 10.5	210	10 x 10.5	190	10 x 10.5	315	10 x 13.5 (10 x 10.5)	250 (100)
330	337	8 x 10.5	210	8 x 10.5	210	8 x 10.5	210	10 x 10.5	315	10 x 10.5	315	12.5 x 13.5	400
470	477	8 x 10.5	210	10 x 10.5	315	10 x 10.5	315	10 x 10.5	315	12.5 x 13.5 (10 x 13.5)	500 (360)	16 x 16.5 (12.5 x 16)	650 (500)
680	687	8 x 10.5	210	10 x 10.5	315	10 x 10.5	315	10 x 13.5	380	12.5 x 13.5	500		
1000	108	10 x 10.5	315	10 x 13.5 (10 x 10.5)	360 (315)	12.5 x 13.5 (10 x 13.5) (10 x 10.5)	450 (350) (315)	12.5 x 13.5	550	16 x 16.5 (12.5 x 16)	700 (550)		
1500	158	10 x 13.5 (10 x 10.5)	450 (315)	12.5 x 13.5	500	12.5 x 13.5	500	12.5 x 16	800				
2200	228	12.5 x 13.5	620	12.5 x 16 (12.5 x 13.5)	650 (600)	16 x 16.5	900	16 x 16.5	1000				
3300	338	12.5 x 16	750	16 x 16.5	950								

•Case size ∅DxL(mm), ripple current (mA rms) at 105°C, 120Hz

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT

Frequency		50Hz	120Hz	300Hz	1KHz	10KHz~
Coefficient	∅4 ~ ∅10	0.1 ~ 100μF	0.70	1.00	1.17	1.50
		150 ~ 1500μF	0.85	1.00	1.08	1.30
	∅12.5 ~ ∅16	~ 470μF	0.75	1.00	1.35	2.00
		680 ~ 3300μF	0.85	1.00	1.23	1.34

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

◆ How to order

<u>HEL</u>	<u>106</u>	<u>M</u>	<u>0035</u>	<u>0405</u>	<u>R</u>	<u>-</u>
↓	↓	↓	↓	↓	↓	↓
<u>Type</u>	<u>Capacitance code</u>	<u>Tolerance</u>	<u>Rated Voltage</u>	<u>Size Code</u>	<u>Package</u>	<u>Additional characters may be added for special requirements</u>
HEL	pF Code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow) 106 = 10uF 107 = 100uF	M: +/-20%	Code 0035: 35VDC For DC Voltage 0006: 6.3VDC 0035: 35VDC 0050: 50VDC	Code 0405: Size 4x5.8mm Size for V-chip E-cap 0405: Size 4x5.8mm 1010: Size 10x10.5mm 1616: Size 16x16.5mm	R: Tape & Reel	