

HL Series Low ESR, Snap-in Type

Features

- ◆ Highly reliable capacitors that withstand low ESR & long life.
- ◆ Two or three dimensions with same ratings.
- ◆ RoHS Compliant



Specifications

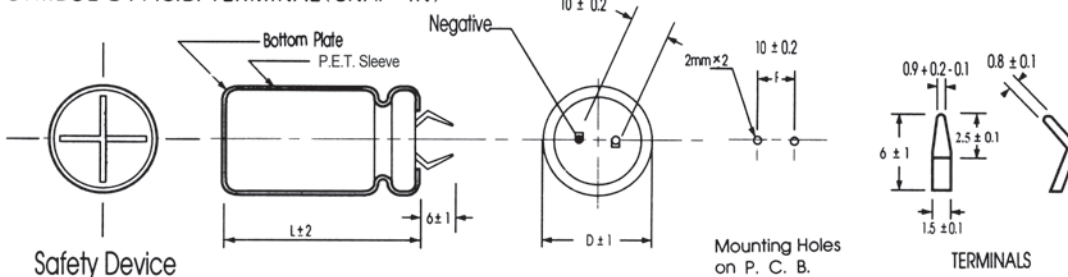
Item	Performance Characteristics												
Operating Temperature Range	-40 to +105°C	-25 to +105°C											
Rated Voltage Range	10 to 100 VDC	160 to 500 VDC											
Capacitance Range	560 to 47000 μF	47 to 1500 μF											
Capacitance Tolerance	±20% (120Hz, +20°C)												
Leakage Current (+20°C, max.)	I ≤ 0.02CV After 5 minutes with rated working voltage applied.												
Dissipation Factor (tan δ, at 20°C, 120Hz)	Less than the value under table (%)												
	Working Voltage(VDC)	10	16	25	35	50	63	80	100	160 ~ 250	350 ~ 400	450	500
D.F. (%) max.	55	40	30	25	20	15	15	15	15	15	20	25	
Low Temperature Characteristics (at 120Hz)	Impedance ratio max.												
	Working voltage (VDC)	10, 16	25	35	50, 63	80, 100	160 to 400	450, 500					
	Z -25°C / Z +20°C	4	3	3	2	2	4	6					
Z -40°C / Z +20°C	15	10	8	6	5	—	—						
Endurance	Test conditions												
	Duration time	:5000 Hrs											
Ambient temperature	:+105°C												
Applied voltage	:Rated DC working voltage												
Shelf Life	After test requirement at +20°C												
	Capacitance change	:≤ ±25% of the initial measured value											
	Dissipation factor	:≤ 250% of the initial specified value											
	Leakage current	:≤ The initial specified value											
Shelf Life	Test conditions												
	Duration time	:1000 Hrs											
Ambient temperature	:+105°C												
Applied voltage	:None												
After test requirement at +20°C : The same limits as Endurance.													
Pre-treatment for measurements shall be conducted after application of DC working voltage for 30 minutes.													

Multiplier for Ripple Current vs. Frequency

VDC \ Frequency(Hz)	50	120	300	1K	10K	50K
10~50 WV	0.95	1	1.03	1.05	1.08	1.08
63~100 WV	0.93	1	1.07	1.13	1.19	1.20
160,250 WV	0.81	1	1.17	1.32	1.45	1.50
350,400 WV	0.77	1	1.16	1.30	1.41	1.43

Diagram of Dimensions:(unit:mm)

SYMBOL G : P.C.B. TERMINAL (SNAP-IN)



Case Size

φ DxL(mm)

Cap (μF)	φ D	10											
		22			25			30			35		
		Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR
5600	22x25	1.1	50										
6800	22x25	1.3	41	25x25	1.3	41							
8200	22x25	1.56	34	25x25	1.56	34							
10000	22x30	1.6	32	25x25	1.6	32	30x25	1.6	32				
12000	22x35	1.8	27	25x30	1.8	27	30x25	1.8	27				
15000	22x35	2.1	21	25x30	2.1	21	30x25	2.1	21				
18000	22x35	2.2	18	25x30	2.2	18	30x30	2.2	18				
22000	22x40	2.75	14	25x35	2.75	14	30x30	2.75	14	35x25	2.75	14	
27000				25x50	3.05	13	30x40	3.05	13	35x30	3.05	13	
33000				25x50	3.4	11	30x40	3.4	11	35x35	3.4	11	
39000							30x50	3.6	9	35x40	3.6	9	
47000							30x50	4.6	8	35x50	4.6	8	

Cap (μF)	φ D	16											
		22			25			30			35		
		Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR
5600	22x25	1.4	50										
6800	22x30	1.6	41	25x25	1.6	41							
8200	22x35	1.8	34	25x30	1.8	34							
10000	22x40	2.1	32	25x30	2.1	32	30x25	2.1	32				
12000	22x40	2.4	27	25x35	2.4	27	30x25	2.4	27				
15000	22x50	2.7	21	25x40	2.7	21	30x30	2.7	21				
18000				25x50	3.05	18	30x35	3.05	18	35x30	3.05	18	
22000				25x50	3.4	14	30x40	3.4	14	35x45	3.4	14	
27000							30x50	4.02	13	35x40	4.02	13	
33000							30x50	4.32	11	35x40	4.32	11	
39000										35x50	4.95	9	

Cap (μF)	φ D	25											
		22			25			30			35		
		Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR
3900	22x25	1.3	51										
4700	22x30	1.5	51	25x25	1.5	51							
5600	22x35	1.6	43	25x25	1.6	43							
6800	22x40	1.87	35	25x30	1.87	35	30x25	1.87	35				
8200	22x45	2.2	29	25x35	2.2	29	30x30	2.2	29	35x25	2.2	29	
10000	22x50	2.35	28	25x40	2.35	28	30x35	2.35	28	35x30	2.35	28	
12000				25x50	2.7	23	30x35	2.7	23	35x30	2.7	23	
15000							30x40	3.15	19	35x35	3.15	19	
18000							30x50	3.6	15	35x40	3.6	15	
22000										35x45	3.9	13	
27000										35x50	4.6	12	

Cap (μF)	φ D	35											
		22			25			30			35		
		Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR
2200	22x25	1.1	90										
2700	22x25	1.29	74										
3300	22x30	1.4	60	25x25	1.4	60							
3900	22x35	1.55	51	25x30	1.55	51							
4700	22x40	1.75	42	25x30	1.75	42	30x25	1.75	42				
5600	22x45	1.95	36	25x35	1.95	36	30x30	1.95	36	35x25	1.95	36	
6800	22x50	2.2	29	25x40	2.2	29	30x35	2.2	29	35x30	2.2	29	
8200				25x50	2.5	24	30x35	2.5	24	35x30	2.5	24	
10000							30x40	2.8	24	35x35	2.8	24	
12000							30x50	3.3	20	35x40	3.3	20	
15000										35x50	4.25	16	

Ripple Current (A, rms) at 105°C 120Hz

Max ESR (mΩ) at 20°C 30KHz

φ DxL(mm)

Cap (μF)	φ D	50											
		22			25			30			35		
		Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR
1500		22x25	1	80									
1800		22x30	1.1	66	25x25	1.1	66						
2200		22x35	1.3	54	25x25	1.3	54						
2700		22x40	1.45	44	25x30	1.45	44	30x25	1.45	44			
3300		22x40	1.7	36	25x35	1.7	36	30x30	1.7	36			
3900		22x50	1.9	31	25x40	1.9	31	30x35	1.9	31			
4700					25x40	2.1	25	30x35	2.1	25	35x30	2.1	25
5600					25x50	2.36	21	30x40	2.36	21	35x35	2.36	21
6800								30x50	2.7	18	35x40	2.7	18
8200								30x50	3.16	15	35x40	3.16	15
10000											35x50	3.5	16

Cap (μF)	φ D	63											
		22			25			30			35		
		Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR
1000		22x25	1	100									
1200		22x25	1.15	86	25x25	1.15	86						
1500		22x35	1.3	69	25x30	1.3	69						
1800		22x40	1.45	58	25x30	1.45	58	30x25	1.45	58			
2200		22x45	1.65	47	25x35	1.65	47	30x30	1.65	47	35x25	1.65	47
2700		22x50	1.9	38	25x40	1.9	38	30x35	1.9	38	35x30	1.9	38
3300					25x50	2.15	31	30x35	2.15	31	35x30	2.15	31
3900								30x40	2.4	27	35x35	2.4	27
4700								30x50	2.7	22	35x40	2.7	22
5600								30x50	3.1	18	35x40	3.1	18
6800											35x50	3.5	15

Cap (μF)	φ D	80											
		22			25			30			35		
		Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR
680		22x25	0.95	140									
820		22x30	1	120									
1000		22x35	1.2	96	25x25	1.2	96						
1200		22x40	1.4	80	25x30	1.4	80						
1500		22x45	1.6	64	25x35	1.6	64	30x25	1.6	64			
1800		22x50	1.8	53	25x40	1.8	53	30x30	1.8	53	35x25	1.8	53
2200					25x50	2.05	43	30x35	2.05	43	35x30	2.05	43
2700								30x40	2.35	35	35x35	2.35	35
3300								30x50	2.7	29	35x40	2.7	29
3900											35x45	2.8	24
4700											35x50	3.4	20

Cap (μF)	φ D	100											
		22			25			30			35		
		Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR
560		22x30	0.95	170	25x25	0.95	170						
680		22x35	1.1	140	25x30	1.1	140						
820		22x40	1.4	120	25x30	1.4	120	30x25	1.4	120			
1000		22x45	1.4	96	25x35	1.4	96	30x30	1.4	96	35x25	1.4	96
1200		22x50	1.6	80	25x40	1.6	80	30x35	1.6	80	35x30	1.6	80
1500					25x50	1.85	64	30x40	1.85	64	35x30	1.85	64
1800								30x45	2.05	53	35x35	2.05	53
2200								30x50	2.4	43	35x40	2.4	43
2700											35x50	2.8	35

Ripple Current (A, rms) at 105°C 120Hz

Max ESR (mΩ) at 20°C 30KHz

φ DxL(mm)

Cap (μF)	φ D	160											
		22			25			30			35		
		Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR
270		22x30	0.6	320									
330		22x35	0.8	270	25x25	0.8	270						
390		22x35	0.85	220	25x30	0.85	220						
470		22x45	1.1	190	25x35	1.1	190	30x30	1.1	190			
560		22x45	1.16	160	25x35	1.16	160	30x30	1.16	160			
680					25x45	1.3	130	30x35	1.3	130			
820					25x45	1.43	110	30x40	1.43	110	35x30	1.43	110
1000								30x45	1.69	88	35x35	1.69	88
1200											35x45	1.95	73
1500											35x50	2.4	58

Cap (μF)	φ D	200											
		22			25			30			35		
		Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR
180		22x25	0.57	490									
220		22x30	0.65	400									
270		22x35	0.78	320	25x25	0.78	320						
330		22x40	0.9	270	25x30	0.9	270						
390		22x40	0.98	220	25x35	0.98	220	30x25	0.98	220			
470		22x40	1.15	190	25x35	1.15	190	30x25	1.15	190			
560		22x45	1.3	160	25x35	1.3	160	30x25	1.3	160			
680		22x50	1.45	130	25x40	1.45	130	30x30	1.45	130	35x25	1.45	130
820					25x45	1.6	110	30x35	1.6	110	35x35	1.77	110
1000					25x55	1.9	88	30x45	1.9	88	35x35	1.9	88
1200								30x50	2.1	73	35x40	2.1	73

Cap (μF)	φ D	250											
		22			25			30			35		
		Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR
150		22x25	0.52	580									
180		22x30	0.64	490	25x25	0.64	490						
220		22x35	0.75	400	25x30	0.75	400						
270		22x40	0.85	320	25x30	0.85	320	30x25	0.85	320			
330		22x45	1	270	25x35	1	270	30x30	1	270	35x25	1	270
390		22x50	1.1	220	25x40	1.1	220	30x35	1.1	220			
470					25x50	1.2	190	30x35	1.2	190	35x30	1.2	190
560								30x40	1.35	160	35x35	1.35	160
680								30x50	1.55	130	35x40	1.55	130
820								30x55	1.7	110			
1000											35x50	2	88

Cap (μF)	φ D	350											
		22			25			30			35		
		Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR
68		22x25	0.34	1290									
82		22x30	0.4	1070									
100		22x35	0.5	880	25x25	0.5	880						
120		22x40	0.56	730	25x30	0.56	730	30x25	0.56	730			
150		22x45	0.63	580	25x35	0.63	580	30x30	0.63	580			
180		22x50	0.7	490	25x40	0.7	490	30x30	0.7	490			
220					25x50	0.82	400	30x35	0.82	400	35x30	0.82	400
270								30x40	0.9	320	35x35	0.9	320
330								30x50	1.1	270	35x40	1.1	270
390											35x45	1.2	220
470											35x50	1.3	190

Ripple Current (A, rms) at 105°C 120Hz

Max ESR (mΩ) at 20°C 30KHz

φ DxL(mm)

Cap. (μF)	φ D	400											
		22			25			30			35		
		Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR
56		22x25	0.32	1560									
68		22x30	0.4	1290	25x25	0.4	1290						
82		22x35	0.45	1070	25x30	0.45	1070						
100		22x40	0.5	880	25x30	0.5	880	30x25	0.5	880			
120		22x40	0.55	730	25x35	0.55	730	30x30	0.55	730			
150		22x50	0.65	580	25x40	0.65	580	30x35	0.65	580			
180					25x45	0.75	490	30x35	0.75	490	35x30	0.75	490
220					25x50	0.85	400	30x40	0.85	400	35x35	0.85	400
270								30x50	1.05	320	35x40	1.05	320
330											35x45	1.1	270
390											35x50	1.2	220

Cap. (μF)	φ D	450											
		22			25			30			35		
		Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR
47		22x25	0.35	1860									
56		22x30	0.41	1560	25x25	0.41	1560						
68		22x30	0.54	1290	25x25	0.54	1290						
82		22x35	0.62	1070	25x30	0.62	1070	30x25	0.62	1070			
100		22x40	0.70	880	25x35	0.70	880	30x30	0.70	880			
120		22x45	0.84	730	25x40	0.84	730	30x35	0.84	730			
150		22x50	0.95	580	25x40	0.95	580	30x35	0.95	580	35x30	0.95	580
180					25x45	1.00	490	30x40	1.00	490	35x30	1.10	490
220					25x50	1.15	400	30x45	1.15	400	35x35	1.15	400
270								30x50	1.32	320	35x40	1.32	320
330											35x45	1.50	270
390											35x50	1.78	220
470											35x55	2.03	190

Cap. (μF)	φ D	500											
		22			25			30			35		
		Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR	Size	Ripple	ESR
47		22x30	0.35	2020									
56		22x35	0.41	1690	25x30	0.41	1690						
68		22x35	0.54	1390	25x30	0.54	1390						
82		22x40	0.62	1160	25x35	0.62	1160	30x30	0.62	1160			
100		22x45	0.70	950	25x40	0.70	950	30x35	0.70	950			
120		22x50	0.84	790	25x40	0.84	790	30x35	0.84	790	35x30	0.84	790
150					25x45	0.95	630	30x40	0.95	630	35x30	0.95	630
180					25x50	1.00	530	30x40	1.00	530	35x35	1.10	530
220								30x45	1.15	430	35x40	1.17	430
270								30x50	1.32	350	35x45	1.32	350
330											35x50	1.50	290
390											35x55	1.78	240
470											35x60	2.12	200

Ripple Current (A, rms) at 105°C 120Hz

Max ESR (mΩ) at 20°C 30KHz