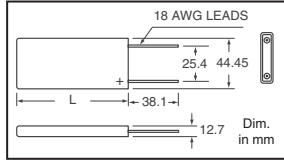




## MLS Series Flatpack, Ultra-Long Life, Aluminum Capacitors

The Type MLS extends the super performance of the MLP from a maximum operating temperature of 85°C to 125°C. While the MLP is inherently capable of operation at 125°C, its flat aluminum case can't withstand the higher temperature without inflating from internal pressure. The MLS incorporates a rugged, stainless steel case which assures flatness to beyond 125°C. The MLS is perfect for hi-rel military systems and applications operating above 85°C

**Features:** • Near hermetic welded seal • Stainless steel case • 100 years expected operating life • Two inch case size  
**Mounting Style:** Two leads/no tabs  
**Specifications:** • Operating Temperature: -55°C - 125°C up to 250VDC • Load Life: 2,000 hours @ 125°C • Leakage Current: 0.002CV<sub>0</sub> μA @ 25°C and 5 minutes • Terminals: 18AWG copper wire with 60/40 tin-lead electroplate

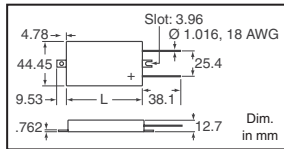


Voltage	Capacitance (μf)	ESR Maximum (mΩ) @ 25°C		Ripple Current (A) @ 85°C		Dim. L (mm)	Digi-Key Part No.	Price Each				Cornell Dubilier Part No.
		120Hz	20kHz	120Hz	20kHz			1	10	100	1,000	
40	4400	97	70	10.3	12.1	38.1	338-1377-ND	209.93	179.94	149.95	95.97	MLS442M040EK0C
40	6600	62	46	12.9	15.0	50.8	338-1378-ND	227.01	194.58	162.15	103.78	MLS662M040EAOc
60	1500	106	77	9.8	11.5	38.1	338-1379-ND	209.93	179.94	149.95	95.97	MLS152M060EK0C
60	2100	72	52	11.9	14.1	50.8	338-1380-ND	227.01	194.58	162.15	103.78	MLS212M060EAOc
75	1100	112	78	9.6	11.5	38.1	338-1381-ND	209.93	179.94	149.95	95.97	MLS112M075EK0C
75	2700	46	33	14.9	17.6	76.2	338-1382-ND	262.61	225.09	187.58	120.05	MLS272M075EBOC
200	330	426	258	4.9	6.2	38.1	338-1383-ND	209.93	179.94	149.95	95.97	MLS331M200EK0C
200	820	172	103	7.7	10.0	76.2	338-1384-ND	262.61	225.09	187.58	120.05	MLS821M200EBOC

## MLP Series Flatpack, Ultra-Long Life, Aluminum Capacitors

The MLPs high-energy storage and box shape make it perfect for voltage holdup or filtering in military SEM-E modules, telecom circuit packs and computer cards. The MLP delivers up to 20 joules of energy storage in a 1/2" height with a 50 year life at 45°C. May readily heatsink it to double the ripple-current capability. Ratings up to 250V can operate at 75% of rated voltage up to 125°C if clamped or potted to prevent expanding beyond 1/2".

**Features:** • Low profile replacement for snap-ins  
 • Double the ripple capability with a heatsink • Nearly hermetic welded seal assures 50-year life • Withstands more than 80,000 feet altitude  
**Specifications:**  
 • Operating Temperature: -55°C - 85°C up to 250VDC; -40°C - 85°C 300VDC and up • Leakage Current: ≤0.002CV<sub>0</sub> μA @ 25°C and 5 minutes • Terminals: 18AWG copper wire with 60/40 tin-lead electroplate



Voltage	Capacitance (μf)	ESR Maximum (mΩ) @ 25°C		Ripple Current (A) @ 85°C		Dim. L (mm)	Digi-Key Part No.	Price Each				Cornell Dubilier Part No.
		120Hz	20kHz	120Hz	20kHz			1	10	100	1,000	
16	38000	31	27	9.0	9.6	76.2	338-1210-ND	58.79	50.39	41.99	26.88	MLP383M016EBOA
25	20000	34	27	8.6	9.6	76.2	338-1201-ND	58.79	50.39	41.99	26.88	MLP203M025EBOA
35	5600	90	70	3.4	4.4	38.1	338-1217-ND	46.99	40.28	33.57	21.49	MLP562M035EKOA
35	14000	35	27	8.4	9.6	76.2	338-1197-ND	58.79	50.39	41.99	26.88	MLP143M035EBOA
50	4400	97	70	3.7	4.4	38.1	338-1213-ND	46.99	40.28	33.57	21.49	MLP442M050EKOA
50	4400	97	70	3.7	4.4	38.1	338-1214-ND	45.19	38.73	32.28	20.66	MLP442M050EK1A
50	11000	36	27	8.3	9.6	76.2	338-1192-ND	58.79	50.39	41.99	26.88	MLP113M050EBOA
50	11000	36	27	8.3	9.6	76.2	338-1193-ND	58.79	50.39	41.99	26.88	MLP113M050EB1A
80	1500	106	77	3.6	4.2	38.1	338-1199-ND	46.99	40.28	33.57	21.49	MLP152M080EKOA
80	3300	44	31	7.5	9.0	76.2	338-1208-ND	58.79	50.39	41.99	26.88	MLP332M080EBOA
100	1100	112	78	3.5	4.2	38.1	338-1191-ND	46.99	40.28	33.57	21.49	MLP112M100EKOA
200	400	388	253	1.9	2.3	38.1	338-1211-ND	46.99	40.28	33.57	21.49	MLP401M200EKOA
200	1000	158	100	3.8	5.0	76.2	338-1189-ND	58.79	50.39	41.99	26.88	MLP102M200EBOA
250	330	426	258	1.8	2.3	38.1	338-1205-ND	46.99	40.28	33.57	21.49	MLP331M250EKOA
250	820	172	103	3.8	4.9	76.2	338-1219-ND	58.79	50.39	41.99	26.88	MLP821M250EBOA
300	220	597	393	1.5	1.9	38.1	338-1202-ND	52.63	45.12	37.60	24.07	MLP221M300EKOA
300	560	240	157	3.2	4.0	76.2	338-1216-ND	65.85	56.45	47.04	30.11	MLP561M300EBOA
400	130	1320	970	1.0	1.2	38.1	338-1194-ND	121.07	103.77	86.48	55.35	MLP131M400EKOA
400	330	530	390	2.1	2.5	76.2	338-1206-ND	65.85	56.45	47.04	30.11	MLP331M400EBOA
420	330	530	390	2.1	2.5	76.2	338-1207-ND	65.85	56.45	47.04	30.11	MLP331M420EBOA
450	110	1456	1190	.96	1.1	38.1	338-1190-ND	50.61	43.38	36.15	23.14	MLP111M450EKOc
450	280	585	480	2.0	2.3	76.2	338-1204-ND	65.85	56.45	47.04	30.11	MLP281M450EBOA

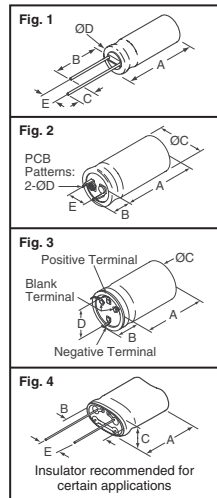
§ Polyester Insulation ‡ Two leads/no tabs, mounting style



## Ultracapacitors and Pseudocapacitors

The NessCap Ultracapacitor (ESHSR Series) is an Electric Double Layer Capacitor (EDLC) that uses an activated carbon powder and coating process to prepare electrodes. The NessCap ultracapacitor's high energy density is made possible through the use of a proprietary binder formulation and specially developed electrode-making process. The NessCap Pseudocapacitor (PSHLR Series) differs from the EDLC in that it uses a metal oxide rather than an activated carbon for electrode material. With this advantage, pseudocapacitor cell needs to be only 60% in volume as compared to an EDLC of the same capacitance. Conversely, it also means the pseudocapacitor holds 80% more energy than the equivalent-size EDLC.

Fig.	Working Voltage (DC)	Capacitance (F)	Nominal Internal Resistance at 1KHz (mΩ)	Dimensions - (mm)					Digi-Key Part No.	Price Each			NessCap Part No.
				A	B	C	D	E		1	10	100	
<b>Ultracapacitors (ESHSR Series)</b>													
1	2.7	3	75	20	15	4	8	3.5	589-1000-ND	2.28	1.95	1.47	ESHSR-0003C0-002R7
	2.7	5	60	20	15	4	10	5	589-1001-ND	2.73	2.34	1.76	ESHSR-0005C0-002R7
	2.7	10	35	30	15	4	10	5	589-1002-ND	3.54	3.25	2.66	ESHSR-0010C0-002R7
	2.7	25	20	25	15	4	16	7.5	589-1003-ND	5.70	5.23	4.28	ESHSR-0025C0-002R7
	2.7	50	16	40	15	4	18	7.5	589-1004-ND	8.25	7.57	6.19	ESHSR-0050C0-002R7
2	2.7	100	10	45	6	22	2	10	589-1005-ND	15.30	14.03	11.48	ESHSR-0100C0-002R7
3	2.7	360	3.2	62	6	35	22.5	—	589-1014-ND	31.88	26.22	20.55	ESHSR-0360C0-002R7
4	5.4	1.5	150	23	17	9	—	8.8	589-1007-ND	5.22	4.79	3.92	EMHSR-0001C5-005R4
	5.4	2.5	100	23	21	10.5	—	10.6	589-1008-ND	6.06	5.56	4.55	EMHSR-0002C5-005R4
<b>Pseudocapacitors (PSHLR Series)</b>													
1	2.3	20	40	30	15	4	10	5	589-1009-ND	5.70	5.23	4.28	PSHLR-0020C0-002R3
	2.3	30	35	40	15	4	10	5	589-1010-ND	6.48	5.94	4.86	PSHLR-0030C0-002R3
	2.3	50	30	25	15	4	16	7.5	589-1011-ND	7.47	6.85	5.61	PSHLR-0050C0-002R3
	2.3	120	20	40	15	4	18	7.5	589-1012-ND	12.57	11.53	9.43	PSHLR-0120C0-002R3
2	2.3	220	15	45	6	22	2	10	589-1013-ND	20.01	18.35	15.01	PSHLR-0220C0-002R3

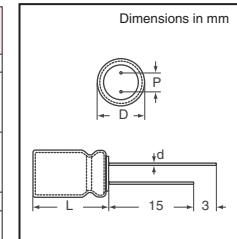


## TAIYO YUDEN High Capacitance PAS Capacitors

PAS (Polyacenic Semiconductor) which was originally developed by Shoen Electronics (now a Taiyo Yuden owned company), is a kind of conductive polymer, synthesized through pyrolytic treatment of phenolic resin. When PAS is employed for both positive and negative electrodes, it shows extremely high performance. The capacitors are 1/2 - 1/3 smaller than conventional electric double layer capacitors and its low internal resistance enables quick charging and large current discharging.

**FEATURES:** • High Capacitance: PAS can store a large number of ions into its amorphous structure (doping), which gives them much more capacitance than conventional electric double layer capacitors • Quick Charge & Discharge: These capacitors can be charged and discharged quickly due to low internal resistance • High Reliability: It's possible to charge/discharge the capacitors more than 100,000 times with less deterioration, compared to a secondary battery

WV DC	Nominal Capacitance (F)	Internal Resistance (mΩ)	Dimensions - (mm)				Digi-Key Part No.	Price Each			Taiyo Yuden Part No.
			D	L	d	P		1	10	100	
<b>Large Capacitance (LA Series)</b>											
2.3	4.7	300	10.0	20.0	0.6	5.0	587-2017-ND	7.68	7.04	5.76	PAS1020LA2R3475
	10	200	12.5	20.0	0.6	5.0	587-2018-ND	12.81	11.75	9.61	PAS1220LA2R3106
	22	100	12.5	35.0	0.6	5.0	587-2019-ND	17.94	16.45	13.46	PAS1235LA3R2326
	56	70	18.0	40.0	0.8	8.0	587-2020-ND	25.65	23.52	19.24	PAS1840LA2R3566
3.0	4.0	300	10.0	20.0	0.6	5.0	587-2021-ND	9.99	9.16	7.50	PAS1020LA3R0405
	9.0	200	12.5	20.0	0.6	5.0	587-2022-ND	16.68	15.29	12.51	PAS1220LA3R0905
	20	100	12.5	35.0	0.6	5.0	587-2023-ND	23.34	21.40	17.51	PAS1235LA3R2026
	50	70	18.0	40.0	0.8	8.0	587-2024-ND	33.33	30.56	25.00	PAS1840LA3R0506
<b>Low ESR (LR Series)</b>											
2.3	1.0	70	8.0	15.0	0.6	3.5	587-2015-ND	8.97	8.23	6.73	PAS0815LR2R3105
	2.0	50	10.0	16.0	0.6	5.0	587-2016-ND	11.55	10.59	8.67	PAS1016LR2R3205



More Product Available Online: [www.digkey.com](http://www.digkey.com)

Toll-Free: 1-800-344-4539 • Phone 218-681-6674 • Fax: 218-681-3380

(T083) 1543