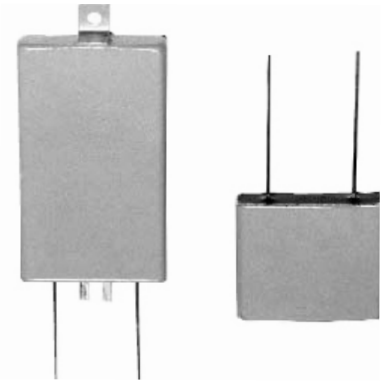
Type MLS 125 ºC Stainless Flatpack,Ultra-Long Life, Aluminum

Type MLS 125 °C



The Type MLS extends the super performance of the MLP from a maximum operating temperature of 85 ºC to 125 ºC. While the MLP is inherently capable of operation at 125 ºC, 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 ºC. The MLS is perfect for hi-rel military systems and applications operating above 85 ºC.

Highlights

- Near-hermetic welded seal
- Stainless-steel case
- 100 years expected operating life
- New 2 inch case size

Specifications

Operating Temperature: –55 °C to +125 °C

Rated Voltage: 5.0 to 250 Vdc

Capacitance: 220 to 47,000 µF ±20%

Load Life: 2,000 h @ +125 °C

Leakage Current: 0.002 CV µA @ 25 °C and 5 min

Cold Impedance: –55 ºC multiple of 25 ºC Z is ≤ 10 for up to 20 V, 2 for 25 V to 250 V

Ripple Current Multipliers:

Case Temperature

45 °C	55 °C	65 °C	75 °C	85 °C	95 °C	105 °C	115 °C	125 °C
1.41	1.32	1.22	1.12	1.00	0.87	0.71	0.50	0.00

Ambient Temperature, No Heatsink

45 °C	55 °C	65 °C	75 °C	85 °C	95 °C	105 °C	115 °C	125 °C
0.63	0.58	0.54	0.49	0.44	0.38	0.31	0.22	0.00

Frequency

	50 Hz	60 Hz	120 Hz	360 Hz	1 kHz	5 kHz	10 kHz & up
5 to 40 V	0.95	0.96	1.00	1.03	1.04	1.04	1.04
60 to 250 V	0.80	0.84	1.00	1.18	1.25	1.30	1.30

EIA Ripple Life: 10,000 h full load at 85 C per EIA IS-749
Δ capacitance ±10%
ESR 200% of limit
DCL 100% of limit

Shelf Life: 500 h at 125 °C, capacitance, ESR & DCL, initial requirements

Thermal Resistance:

Large Sides Heatsinked	Case Length / Insulation	1.5" ºC/W	2.0" ºC/W	3.0" ºC/W
one	None	3.3	2.6	1.3
	Polyester	4.5	3.6	1.8
both	None	2.8	2.2	1.1
	Polyester	4	3.2	1.6

RoHS Compliant

RoHS-5 Compliant
Has more than 1000 ppm lead in some homogenous material but otherwise complies with the EU Directive 2002/95/EC requirement restricting the use of Lead (Pb), Mercury (Hg), Cadmium (Cd), Hexavalent chromium (Cr(VI)), PolyBrominated Biphenyls (PBB) and PolyBrominated Diphenyl Ethers (PBDE).

Vibration: 10 Hz to 2 kHz 0.06" pp max and 10 g, MIL-STD-202, Meth. 204

ESL: < 30 nH measured 1/4" from case at 1 MHz

Weight: Case EK 43 g typical
Case EA 76 g typical
Case EB 92 g typical

Terminals: 18 AWG copper wire with 60/40 tin-lead electroplate

Type MLS 125 ºC Stainless Flatpack,Ultra-Long Life, Aluminum

Specifications

Ripple Current Capability is set by the maximum permissible internal core temperature, 125 ºC.

Air Cooled. The ripple currents in the ratings tables are for 85 ºC case temperatures. For air temperatures without a heatsink use the Ambient Temperature, No Heatsink multipliers.

Heatsink Cooled. Temperature rise from the internal hottest spot, the core, to ambient air is:

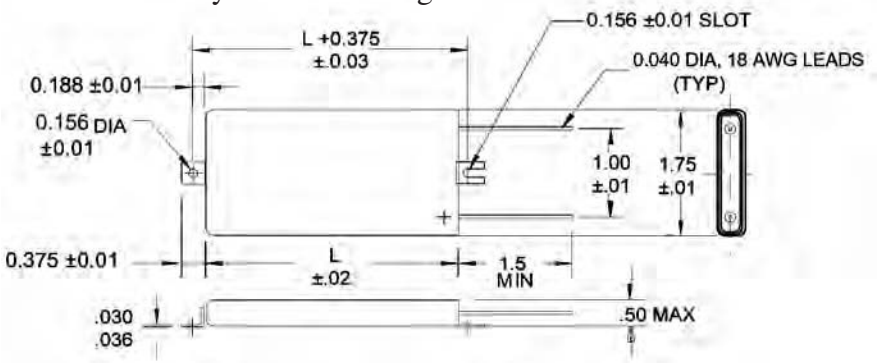
$$\Delta T = I^2(ESR)(\Theta cc + \Theta ca)$$

where Θcc is the thermal resistance from core to case and Θca from case to ambient. To calculate maximum ripple capability with the MLP attached to a heatsink use the maximum core temperature and the values for Θcc.

As an illustration, suppose you operate an MLS332M060EB1C in 65 ºC air and attach it to a commercial heatsink with a free-air thermal resistance of 2.7 ºC/W. Use a good thermal grease between the MLS and the heatsink, and the total thermal resistance is 2.7 + 1.8 or 4.5 ºC/W. The power which would heat the core to 125 ºC is (125-65)/4.5 or 13.3 W. For an ESR of 31 mΩ, 13.3 W equates to a ripple current of 20.7A, however, the wire leads are rated for only 20 A.

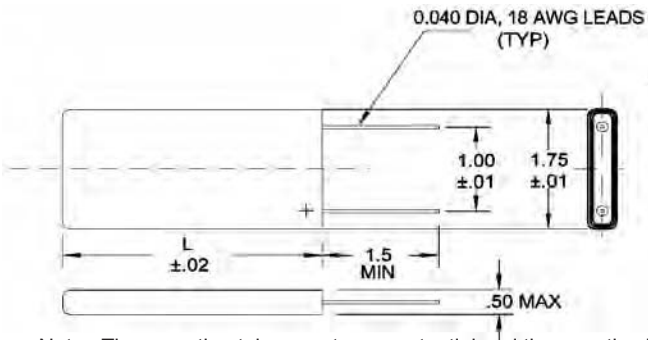
Outline Drawings

Style A: Mounting Tabs

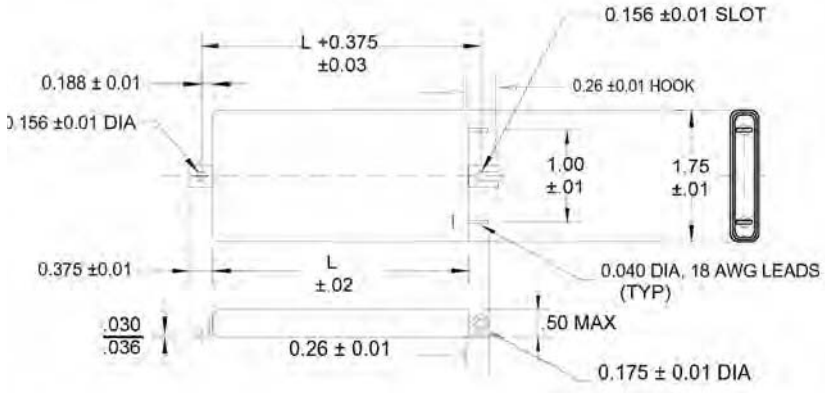


Case Code	Length L (in)	Weight (g)
EK	1.5	43
EA	2.0	76
EB	3.0	92

Style C: Two Leads, No Tabs



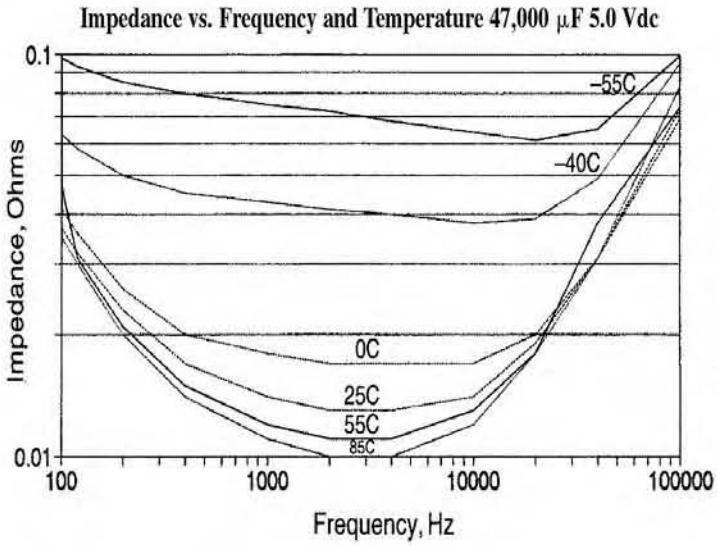
Style D: Hook Leads

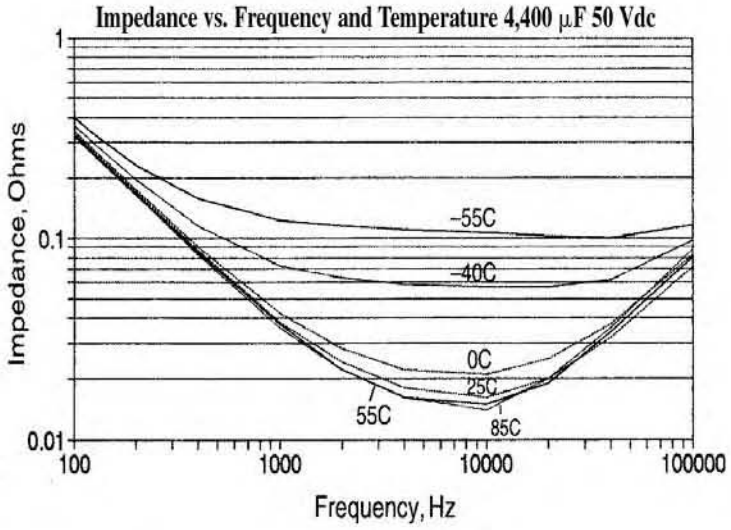


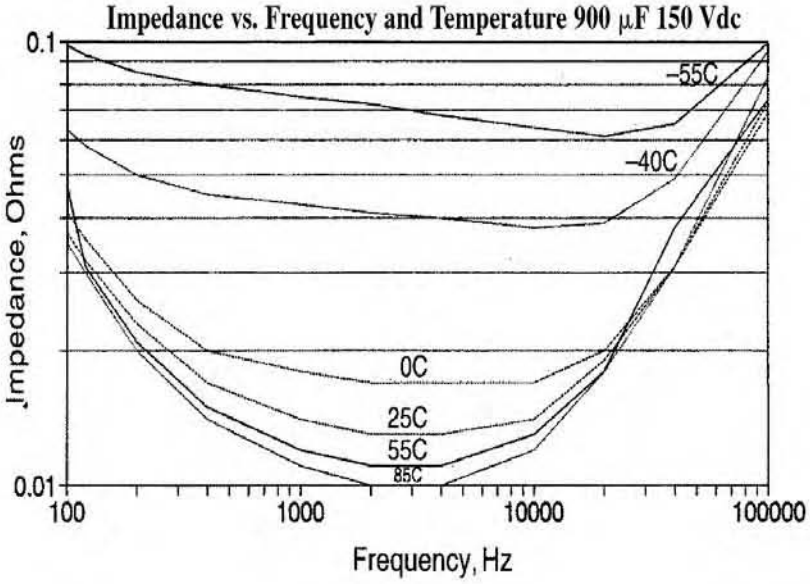
Note: The mounting tabs are at case potential and the negative lead connects to the case through the electrolyte.

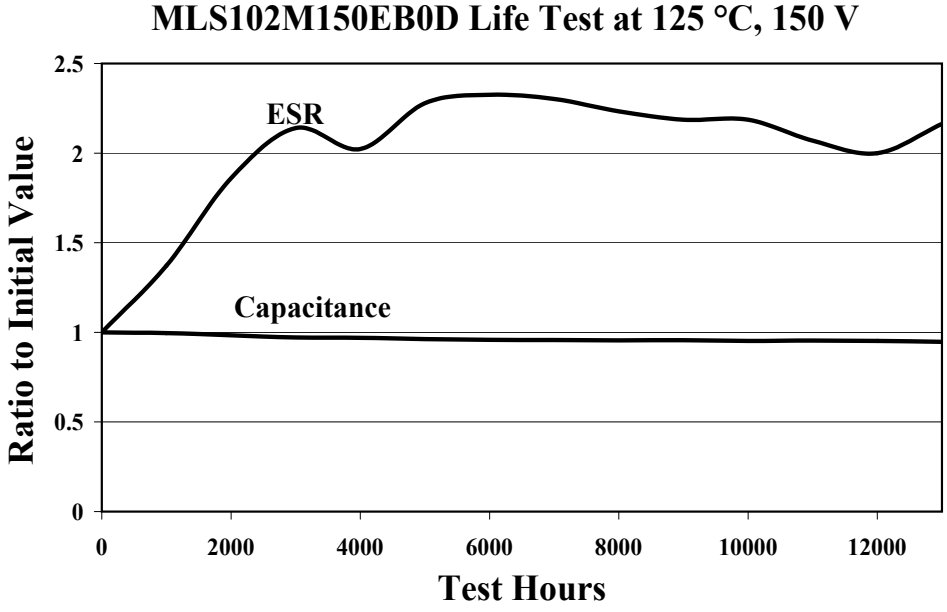
Part Numbering System

MLS	821	M	200	EB	O	A
Type	**Capacitance**	**Tolerance**	**Rated Voltage**	**Case Code**	**Insulation**	**Mounting Style**
MLS	**821**=820 µF **102** = 1000 µF	**M=**±20%	Vdc	**EK,** L=1.5 in. **EA,** L=2.0 in. **EB**, L=3.0 in.	**0** = bare can **1** = polyester	**A =** mounting tabs **C** = two leads/no tabs **D** = hook leads/tabs


Impedance vs. Frequency and Temperature 47,000 µF 5.0 Vdc
Impedance, Ohms
0.1
0.01
100
1000
10000
100000
Frequency, Hz
-55C
-40C
0C
25C
55C
85C

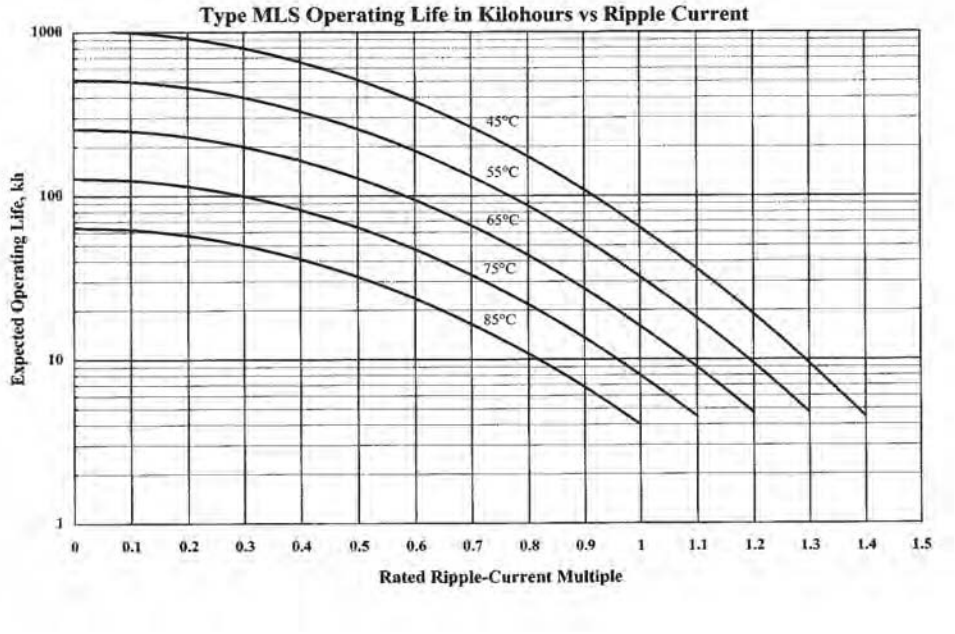

Impedance vs. Frequency and Temperature 4,400 µF 50 Vdc
Impedance, Ohms
1
0.1
0.01
100
1000
10000
100000
Frequency, Hz
-55C
-40C
0C
25C
55C
85C


Impedance vs. Frequency and Temperature 900 µF 150 Vdc
Impedance, Ohms
0.1
0.01
100
1000
10000
100000
Frequency, Hz
-55C
-40C
0C
25C
55C
85C


MLS102M150EB0D Life Test at 125 °C, 150 V
Ratio to Initial Value
2.5
2
1.5
1
0.5
0
0
2000
4000
6000
8000
10000
12000
Test Hours
ESR
Capacitance

Type MLS 125 ºC Stainless Flatpack,Ultra-Long Life, Aluminum

Typical Performance Curves



Ratings

Cap (µF)	Catalog Part Number	ESR max 25 °C (mΩ) 120 Hz	ESR max 25 °C (mΩ) 20 kHz	Ripple (A) Case @ 85°C 120 Hz	Ripple (A) Case @ 85°C 20 kHz	Length (inches)
5 Vdc (7.5 Vdc Surge) [105 °C: 7.5 Vdc (10 Vdc Surge)]						
19,000	MLS193M5R0EK0C	76	66	12.6	13.6	1.5
28,000	MLS283M5R0EA0C	50	44	19.9	21.4	2.0
47,000	MLS473M5R0EB0C	30	26	32.0	34.4	3.0
7.5 Vdc (10 Vdc Surge) [105 °C: 10 Vdc (13 Vdc Surge)]						
17,000	MLS173M7R5EK0C	77	67	12.5	13.5	1.5
26,000	MLS263M7R5EA0C	51	45	19.8	21.1	2.0
43,000	MLS433M7R5EB0C	31	27	31.5	33.8	3.0
10 Vdc (15 Vdc Surge) [105 °C: 16 Vdc (20 Vdc Surge)]						
13,000	MLS133M010EK0C	81	69	12.2	13.3	1.5
23,000	MLS233M010EA0C	51	45	19.8	21.1	2.0
38,000	MLS383M010EB0C	31	27	31.5	33.8	3.0
20 Vdc (30 Vdc Surge) [105 °C: 30 Vdc (40 Vdc Surge)]						
6,800	MLS682M020EK0C	84	69	11.0	12.2	1.5
10,000	MLS103M020EA0C	56	46	13.6	15.0	2.0
17,000	MLS173M020EB0C	33	27	17.6	19.5	3.0
40 Vdc (50 Vdc Surge) [105 °C: 50 Vdc (63 Vdc Surge)]						
4,400	MLS442M040EK0C	97	70	10.3	12.1	1.5
6,600	MLS662M040EA0C	62	46	12.9	15.0	2.0
11,000	MLS113M040EB0C	36	27	16.9	19.5	3.0
60 Vdc (75 Vdc Surge) [105 °C: 80 Vdc (100 Vdc Surge)]						
1,500	MLS152M060EK0C	106	77	9.8	11.5	1.5
2,100	MLS212M060EA0C	72	52	11.9	14.1	2.0
3,300	MLS332M060EB0C	44	31	15.3	18.2	3.0
75 Vdc (100 Vdc Surge) [105 °C: 100 Vdc (125 Vdc Surge)]						
1,100	MLS112M075EK0C	112	78	9.6	11.5	1.5
1,600	MLS162M075EA0C	76	54	11.6	13.8	2.0
2,700	MLS272M075EB0C	46	33	14.9	17.6	3.0
100 Vdc (125 Vdc Surge) [105 °C: 150 Vdc (180 Vdc Surge)]						
500	MLS501M100EK0C	355	248	5.4	6.4	1.5
770	MLS771M100EA0C	238	166	6.6	7.8	2.0
1,300	MLS132M100EB0C	143	100	8.5	10.1	3.0
150 Vdc (175 Vdc Surge) [105 °C: 200 Vdc (250 Vdc Surge)]						
400	MLS401M150EK0C	388	253	5.1	6.4	1.5
600	MLS601M150EA0C	261	168	6.3	7.8	2.0
1,000	MLS102M150EB0C	158	100	8.1	10.1	3.0
200 Vdc (225 Vdc Surge) [105 °C: 250 Vdc (300 Vdc Surge)]						
330	MLS331M200EK0C	426	258	4.9	6.2	1.5
490	MLS491M200EA0C	285	172	6.0	7.7	2.0
820	MLS821M200EB0C	172	103	7.7	10.0	3.0
250 Vdc (275 Vdc Surge) [105 °C: 250 Vdc (300 Vdc Surge)]						
220	MLS221M250EK0C	597	393	4.1	5.1	1.5
330	MLS331M250EA0C	399	262	5.0	6.3	2.0
560	MLS561M250EB0C	240	157	6.5	8.1	3.0

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