EL Series

Long Life Assurance 宽温长寿命品

- Wide temperature range -55℃ to +105℃ with load life of 3000 hours
  温度范围从-55℃至+105℃
- Lead-free reflow soldering is available subject to customer's request
  无铅回流焊接可按照客户的要求

■主要技术性能 Specification

项目 Item	特性 Performance Characteristics
使用温度范围 Operating temperature rang	-55 ~ +105℃
额定电压范围 Rated voltage range	6.3 ~ 50 V
静电容量范围 Capacitance Range	0.1~4700 μF
静电容量允许偏差Capacitance Tolerance	±20% at 120 Hz, 20
漏电流 Leakage current	For Φ4～Φ10,after 2 minutes's application of rated voltage,leakagecurrent is not more than 0.01CV or 3(μA),whichever is greater.For Φ12.5～Φ16,after 1 minutes application of rated voltage,leakage current is not more than 0.03CV or 4(μA), whichever is greater. Φ4～Φ10; 施加额定工作电压2分钟，LC≤0. 01CV或3(μA),取较大值； Φ12.5～Φ16; 施加额定工作电压1分钟，LC≤0. 03CV或4(μA),取较大值。
损耗角正切值 Tan δ	Measurement frequency 测试频率: 120Hz,Temperature 温度:20℃

Rated voltage(V.DC) 额定工作电压		6.3	10	16	25	35	50
Tan δ 损耗角正切(max)	Φ4~Φ10	0.28	0.24	0.20	0.16	0.13	0.12
	Φ12.5~Φ16	0.38	0.34	0.30	0.26	0.22	0.18

Measurement frequency 测试频率: 120Hz

Rated voltage(V.DC) 额定工作电压			6.3	10	16	25	35	50
Impedance ratio 阻抗比 XT/Z20(max)	Φ4~Φ10	Z(-25℃)/Z(20℃)	3	3	2	2	2	2
		Z(-55℃)/Z(20℃)	8	5	4	3	3	3
	Φ12.5~Φ16	Z(-25℃)/Z(20℃)	5	4	3	2	2	2
		Z(-55℃)/Z(20℃)	12	10	8	5	4	3

低温特性 Stability at Low Temperature

高温负荷特性 Load Life

After 3000 hours (2000 hours for Φ4~Φ6.3 and Φ8×6.2) application of rated voltage at 105℃, capacitions meet the characteristics requirements listed at right.
在105℃环境中施加额定工作电压3000小时(Φ4~Φ6. 3和 Φ8×6. 2为2000小时后，电容器的特性符合右表的要求。

Capacitance Change 静电容量变化率	Within ±25% of the initial value 初始值±25%以内
Tan δ 损耗角正切	200% or less of the initial specified value 初始值的±200%以内
Leakage Current 漏电流	Initial specified value or less不大于规范值

高温储存特性 Shelf Life

After leaving capacitors under no load at 105℃ for 1000 hours, they meet the specified value for load life characteristics listed above.
在105℃环境中无负荷放置1000小时后，电容器的特性符合高温负荷特性中所列的规定值。

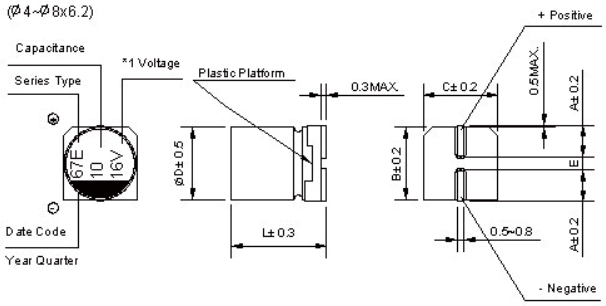
耐焊接热特性 Resistance to Soldering Heat

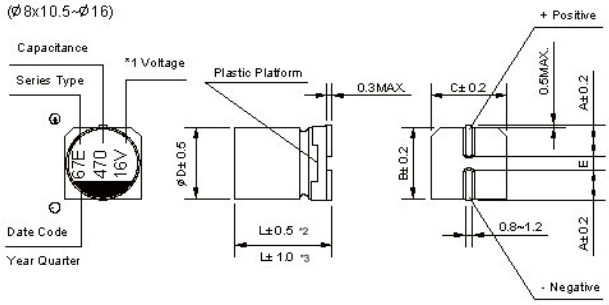
After reflow soldering and restored at room temperature, they meet the characteristics requirements listed at right.经过回流焊并冷却至室温后，电容器的特性符合右表的要求。

Capacitance Change 静电容量变化率	Within ±10% of the initial value 初始值±10%以内
Tan δ 损耗角正切	Initial specified value or less不大于规范值
Leakage Current 漏电流	Initial specified value or less不大于规范值

适用标准 Applicable Standards: IEC-60384-18

■外形图及尺寸图 Case size table





*1 Voltage mark [6V] represents 6.3V for Φ4～Φ10; *2 [L±0.5] is applicable to Φ8×10.5～Φ10; *3 [L±1.0] is applicable to Φ12.5～Φ16.Re: Date code and series type —1st digit for Year; 2nd digit for Quarter, 4 quarter codes in one year are 1, 4, 7, O; 3rd character for Series; EL Series = E.

EL Series

DXL	Φ4X5.8	Φ5X8	Φ6.3X5.8 / 7.7	Φ8X6.2	Φ8X10.5	Φ10X10.5 / 13.5	Φ12.5X13.5 / 16	Φ16X16.5 / 21.5
A	1.8	2.1	2.4	3.3	2.9	3.2	4.7	5.5
B	4.3	5.3	6.6	8.3	8.3	10.3	13.0	17.0
C	4.3	5.3	6.6	8.3	8.3	10.3	13.0	17.0
E±0.2	1.0	1.3	2.2	2.2	3.1	4.4	4.4	6.7
L	5.8	5.8	5.8 / 7.7	6.2	10.5	10.5 / 13.5	13.5 / 16	16.5 / 21.5

■ 规格尺寸及最大允许纹波电流及ESR值 Standard size Maximum permissible ripple current&ESR

容量 Cap(uF) \ WV电压		6.3		10		16		25		35		50	
		0J		1A		1C		1E		1E		1E	
0.1	0R1											4×5.8	1
0.22	R22											4×5.8	2
0.33	R33											4×5.8	3
0.47	R47											4×5.8	5
1	101											4×5.8	10
2.2	2R2											4×5.8	16
3.3	3R3											4×5.8	16
4.7	4R7							4×5.8	13	4×5.8	14	5×5.8	23
10	100					4×5.8	18	5×5.8	20	5×5.8	21	6.3×5.8	35
22	220	4×5.8	22	5×5.8	25	5×5.8	27	6.3×5.8	36	6.3×5.8	38	6.3×7.7 (8×6.2)	70 (70)
33	330	5×5.8	27	5×5.8	30	6.3×5.8	40	6.3×7.7 (8×6.2)	60	6.3×7.7 (8×6.2)	84 (84)	8×10.5	90
47	470	5×5.8	33	6.3×5.8	41	6.3×5.8	48	8×10.5	90 (91)	8×10.5	98	8×10.5	90
100	101	6.3×5.8	50	6.3×5.8 (8×6.2)	53 (110)	6.3×5.8	60	8×10.5	130	8×10.5	130	10×10.5	100
150	151	6.3×5.8	55	6.3×7.7	105	6.3×7.7	95	10×10.5	140	10×10.5	315	10×10.5	100
220	221	6.3×7.7	100	8×10.5	210	8×10.5	210	10×10.5	190	10×10.5	315	10×13.5 (10×10.5)	250 (100)
330	331	8×10.5	210	8×10.5	210	8×10.5	210	10×10.5	315	10×10.5	315	12.5×13.5	400
470	471	8×10.5	210	10×10.5	315	10×10.5	315	10×10.5	315	12.5×13.5 (10×13.5)	500 (360)	16×16.5 (12.5×16)	650 (500)
680	681	8×10.5	210	10×10.5	315	10×10.5	315	10×13.5	380	12.5×13.5	500		
1000	102	10×10.5 10×13.5	315 450	10×13.5 (10×10.5)	360 (315)	12.5×13.5 (10×13.5) (10×10.5)	450 (350) (315)	12.5×13.5	550	16×16.5 (12.5×16)	700 (550)	16×21.5	900
1500	152	(10×10.5)	(315)	12.5×13.5	500	12.5×13.5	550	12.5×16	800				
2200	222	12.5×13.5	620	12.5×16 (12.5×13.5)	650 (600)	16×16.5	900	16×16.5 16×21.5	1000 1200	16×21.5	1250		
3300	332	12.5×16	750	16×16.5	950	16×21.5	1150	16×21.5	1350				Ripples Current
4700	472	16×21.5	1250	16×21.5	1250	16×21.5	1300					Case Size	

Ripple Current (mA ms) at 105℃ 120Hz

■ 纹波电流频率补偿系数 Frequency Coefficient Factor of Rated Ripple Current

Capacitance(uF) \ Frequency		50Hz	120Hz	300Hz	1kHz	10kHz~
Φ4~Φ10	0.1~100	0.70	1.00	1.17	1.36	1.50
	150~1500	0.85	1.00	1.08	1.20	1.30
Φ12.5~Φ16	100~470	0.75	1.00	1.35	1.57	2.00
	680~4700	0.85	1.00	1.23	1.34	1.50

EL Parts List (1)

Size	Part No.	R.V. (V.DC)	Cap. (μF)	Tangent of Loss Angle (tan δ)	Leakage Current (μA)	ESR (Ω) (20℃, 120kHz)	Ripple Current (mA rms.) (120kHz,105℃)
D × L				max.	max.	max.	max.
4×5.8	6.3EL220MLC4×5.8EC	6.3	22	0.28	3.0	27.4	22
5×5.8	6.3EL330MLC5×5.8EC	6.3	33	0.28	3.0	18.3	27
5×5.8	6.3EL470MLC5×5.8EC	6.3	47	0.28	3.0	12.8	33
6.3×5.8	6.3EL101MLC6.3×5.8EC	6.3	100	0.28	6.3	6.0	50
6.3×5.8	6.3EL151MLC6.3×5.8EC	6.3	150	0.28	9.5	4.0	55
6.3×7.7	6.3EL221MLC6.3×7.7EC	6.3	220	0.28	13.9	2.7	100
8×10.5	6.3EL331MLC8×10.5EC	6.3	330	0.28	20.8	1.8	210
8×10.5	6.3EL471MLC8×10.5EC	6.3	470	0.28	29.6	1.3	210
8×10.5	6.3EL681MLC8×10.5EC	6.3	680	0.28	42.8	0.9	210
10×10.5	6.3EL102MLC10×10.5EC	6.3	1000	0.28	63.0	0.6	315
10×10.5	6.3EL152MLC10×10.5EC	6.3	1500	0.28	94.5	0.4	315
10×10.5	6.3EL152MLC10×10.5EC	6.3	1500	0.28	94.5	0.4	450
12.5×13.5	6.3EL222MLC12.5×13.5EC	6.3	2200	0.38	415.8	0.37	620
12.5×16	6.3EL332MLC12.5×16EC	6.3	3300	0.38	627.7	0.25	750
16×21.5	6.3EL472MLC16×21.5EC	6.3	4700	0.38	888.3	0.17	1250
5×5.8	10EL220MLC5×5.8EC	10	22	0.24	3.0	23.5	25
5×5.8	10EL330MLC5×5.8EC	10	33	0.24	3.3	15.7	30
6.3×5.8	10EL470MLC6.3×5.8EC	10	47	0.24	4.7	11.0	41
6.3×5.8	10EL101MLC6.3×5.8EC	10	100	0.24	10.0	5.2	53
8×6.2	10EL101MLC8×6.2EC	10	100	0.24	10.0	5.2	110
6.3×7.7	10EL151MLC6.3×7.7EC	10	150	0.24	15.0	3.5	105
8×10.5	10EL221MLC8×10.5EC	10	220	0.24	22.0	2.4	210
8×10.5	10EL331MLC8×10.5EC	10	330	0.24	33.0	1.6	210
10×10.5	10EL471MLC10×10.5EC	10	470	0.24	47.0	1.1	315
10×10.5	10EL681MLC10×10.5EC	10	680	0.24	68.0	0.8	315
10×10.5	10EL102MLC10×10.5EC	10	1000	0.24	100.0	0.5	315
10×13.5	10EL102MLC10×13.5EC	10	1000	0.24	100.0	0.5	360
12.5×13.5	10EL152MLC12.5×13.5EC	10	1500	0.34	450.0	0.49	500
12.5×13.5	10EL222MLC12.5×13.5EC	10	2200	0.34	660.0	0.33	600
12.5×16	10EL332MLC12.5×16EC	10	2200	0.34	660.0	0.33	650
16×16.5	10EL102MLC16×16.5EC	10	3300	0.34	990.0	0.22	950
16×21.5	10EL472MLC16×21.5EC	10	4700	0.34	1410.0	0.16	1250
4×5.8	16EL100MLC4×5.8EC	16	10	0.20	3.0	43.1	18
5×5.8	16EL220MLC4×5.8EC	16	22	0.20	3.5	19.6	27
6.3×5.8	16EL330MLC4×5.8EC	16	33	0.20	5.3	13.1	40
6.3×5.8	16EL470MLC4×5.8EC	16	47	0.20	7.5	9.2	48
6.3×5.8	16EL101MLC4×5.8EC	16	100	0.20	16.0	4.3	60
6.3×7.7	16EL151MLC4×5.8EC	16	150	0.20	24.0	2.9	95
8×10.5	16EL221MLC4×5.8EC	16	220	0.20	35.2	2.0	210
8×10.5	16EL331MLC4×5.8EC	16	330	0.20	52.8	1.3	210
10×10.5	16EL471MLC4×5.8EC	16	470	0.20	75.2	0.9	315
10×10.5	16EL681MLC4×5.8EC	16	680	0.20	108.8	0.6	315
10×10.5	16EL102MLC4×5.8EC	16	1000	0.20	160.0	0.4	315
10×13.5	16EL102MLC4×5.8EC	16	1000	0.20	160.0	0.43	350

EL Parts List (2)

Size	Part No.	R.V. (V.DC)	Cap. (μF)	Tangent of Loss Angle (tanδ)	Leakage Current (μA)	ESR (Ω (20℃, 120kHz)	Ripple Current (mA rms.) (120kHz,105℃)
D × L				max.	max.	max.	max.
12.5×13.5	16EL102MLC12.5×13.5EC	16	1000	0.30	480.0	0.65	450
12.5×13.5	16EL152MLC12.5×13.5EC	16	1500	0.30	720.0	0.43	500
16×16.5	16EL222MLC16×16.5EC	16	2200	0.30	1056.0	0.29	900
16×21.5	16EL332MLC16×21.5EC	16	3300	0.30	1584.0	0.20	1150
16×21.5	16EL472MLC16×21.5EC	16	4700	0.30	2256.0	0.14	1300
4×5.8	25EL4R7MLC4×5.8EC	25	4.7	0.16	3.0	73.4	13
5×5.8	25EL100MLC5×5.8EC	25	10	0.16	3.0	34.5	20
5×5.8	25EL220MLC5×5.8EC	25	22	0.16	5.5	15.7	36
6.3×5.8	25EL330MLC6.3×5.8EC	25	33	0.16	8.3	10.5	60
6.3×7.7	25EL470MLC6.3×7.7EC	25	47	0.16	11.8	7.3	90
8×6.2	25EL470MLC8×6.2EC	25	47	0.16	11.8	7.3	91
8×10.5	25EL101MLC8×10.5EC	25	100	0.16	25.0	3.5	130
8×10.5	25EL151LC8×10.5EC	25	150	0.16	37.5	2.3	140
10×10.5	25EL221MLC10×10.5EC	25	220	0.16	55.0	1.6	190
10×10.5	25EL331MLC10×10.5EC	25	330	0.16	82.5	1.0	315
10×10.5	25EL471MLC10×10.5EC	25	470	0.16	117.5	0.7	315
10×13.5	25EL681MLC10×13.5EC	25	680	0.16	170.5	0.51	380
12.5×13.5	25EL102MLC12.5×13.5EC	25	1000	0.16	750.0	0.56	550
12.5×16	25EL152MLC12.5×16EC	25	1500	0.16	1125.0	0.37	800
16×16.5	25EL222MLC16×16.5EC	25	2200	0.16	1650.0	0.25	1000
16×21.5	25EL222MLC16×21.5EC	25	2200	0.16	1650.0	0.25	1200
16×21.5	25EL332MLC16×21.5EC	25	3300	0.16	2475.0	0.17	1350
4×5.8	35EL4R7MLC4×5.8EC	35	4.7	0.13	3.0	59.6	14
5×5.8	35EL100MLC5×5.8EC	35	10	0.13	3.5	28.0	21
6.3×5.8	35EL220MLC6.3×5.8EC	35	22	0.13	7.7	12.7	38
6.3×7.7	35EL330MLC6.3×7.7EC	35	33	0.13	11.6	8.5	84
8×6.2	35EL470MLC8×6.2EC	35	33	0.13	11.6	8.5	84
8×10.5	35EL470MLC8×10.5EC	35	47	0.13	16.5	6.0	98
8×10.5	35EL101MLC8×10.5EC	35	100	0.13	35.0	2.8	130
10×10.5	35EL151LC10×10.5EC	35	150	0.13	52.5	1.9	315
10×10.5	35EL221MLC10×10.5EC	35	220	0.13	77.0	1.3	315
10×10.5	35EL331MLC10×10.5EC	35	330	0.13	155.5	0.8	315
10×13.5	35EL471MLC10×13.5EC	35	470	0.13	164.5	0.6	360
12.5×13.5	35EL471MLC12.5×13.5EC	35	470	0.22	493.5	1.01	500
12.5×13.5	35EL681MLC12.5×13.5EC	35	680	0.22	714.0	0.70	500
12.5×16	35EL102MLC12.5×16EC	35	1000	0.22	1050.0	0.47	550
16×16.5	35EL102MLC16×16.5EC	35	1000	0.22	1050.0	0.47	700
16×21.5	35EL222MLC16×21.5EC	35	2200	0.22	2310.0	0.22	1250
4×5.8	50EL0R1MLC4×5.8EC	50	0.1	0.12	3.0	2587.6	1
4×5.8	50ELR22MLC4×5.8EC	50	0.22	0.12	3.0	1176.2	2
4×5.8	50ELR33MLC4×5.8EC	50	0.33	0.12	3.0	784.1	3
4×5.8	50ELR47MLC4×5.8EC	50	0.47	0.12	3.0	550.5	5

EL Parts List (3)

Size D × L	Part No.	R.V. (V.DC)	Cap. (μF)	Tangent of Loss Angle (tan δ) max.	Leakage Current (μA) max.	ESR (Ω) (20℃, 120kHz) max.	Ripple Current (mA rms.) (120kHz,105℃) max.
4×5.8	50EL010MLC4×5.8EC	50	1	0.12	3.0	258.8	10
4×5.8	50EL2R2MLC4×5.8EC	50	2.2	0.12	3.0	117.6	16
4×5.8	50EL3R3MLC4×5.8EC	50	3.3	0.12	3.0	78.4	16
5×5.8	50EL4R7MLC4×5.8EC	50	4.7	0.12	3.0	55.1	23
6.3×5.8	50EL100MLC4×5.8EC	50	10	0.12	5.0	25.9	35
6.3×7.7	50EL220MLC4×5.8EC	50	22	0.12	11.0	11.8	70
8×6.2	50EL220MLC4×5.8EC	50	22	0.12	11.0	11.8	70
8×10.5	50EL330MLC4×5.8EC	50	33	0.12	16.5	7.8	90
8×10.5	50EL470MLC4×5.8EC	50	47	0.12	23.5	5.5	90
10×10.5	50EL101MLC4×5.8EC	50	100	0.12	50.0	2.6	100
10×10.5	50EL151MLC4×5.8EC	50	150	0.12	75.0	1.7	100
10×10.5	50EL221MLC4×5.8EC	50	220	0.12	110.0	1.2	100
10×13.5	50EL221MLC4×5.8EC	50	220	0.12	110.0	1.18	250
12.5×13.5	50EL331MLC4×5.8EC	50	330	0.18	495.0	1.18	400
12.5×16	50EL471MLC4×5.8EC	50	470	0.18	705.0	0.83	500
16×16.5	50EL471MLC16×16.5EC	50	470	0.18	705.0	0.83	650
16×21.5	50EL102MLC16×21.5EC	50	1000	0.18	1500.0	0.39	900