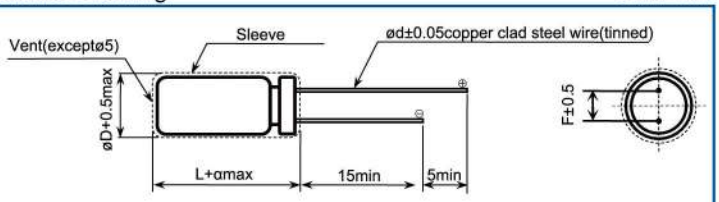
Koshin

KLL Miniature Aluminum Electrolytic Capacitors

105℃ Low Leakage Current Miniature Capacitors, Series KLL.
Guarantees 1000 hours at 105℃

RoHS

Outline Drawing — Unit: mm



øD	5	6.3	8	10	12.5	16	18
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8
α	1.5			1.5 for L16 max. 2.0 for L20 min.			

Photo

Marking color: Black print on orange sleeve

Specifications

No.	Item	Performance									
1	Temperature range(℃)	-55 to +105									
2	Leakage current (μA)	Less than 0.002CV or 0.3 whichever is larger (after two minutes) C: Capacitance(μ F);V: Rated voltage(V) 20℃									
3	Capacitance tolerance (%)	±20(20℃,120Hz)									
4	Tangent of the loss angle (Tan δ)	Rated voltage (V)	6.3	10	16	25	35	50	63	100	20℃,120Hz
		Tan δ (max)	0.20	0.17	0.13	0.10	0.09	0.08	0.08	0.08	
		0.02 is added to every 1000 μ F increase over 1000 μ F									
5	Low temperature characteristics	Rated voltage (V)	6.3	10	16	25	35	50	63	100	120Hz
		Impedance ratio(max) $Z_{(-25℃)}/Z_{(+20℃)}$	4	3	3	2	2	2	2	2	
		Impedance ratio(max) $Z_{(-40℃)}/Z_{(+20℃)}$	8	6	6	4	4	3	3	3	
6	Endurance (105℃) (Applied ripple current)	Test time	1000 hours								
		Leakage current	The initial specified value or less								
		Percentage of capacitance change	Within ±20% of initial value								
		Tangent of the loss angle	200% or less of the initial specified value								
7	Shelf life (105℃)	Test time	1000 hours								
		Leakage current	The initial specified value or less								
		Percentage of capacitance change	Within ±20% of initial value								
		Tangent of the loss angle	200% or less of the initial specified value								
		Voltage application treatment: According to JIS-C-5102									
8	Applicable standards	JIS-C-5101-4(IEC60384)									

Coefficient of Frequency for Ripple Current

Frequency (Hz) / Capacitance (μ F)	50・60	120	1K	10K	100K
CAP≤100	0.75	1.00	1.35	1.55	1.90
100<CAP≤1000	0.83	1.00	1.23	1.32	1.45
1000<CAP	0.90	1.00	1.12	1.10	1.12

Coefficient of Temperature for Ripple Current

Temperature(℃)	45	60	70	85	95	105
Coefficient	1.80	1.50	1.45	1.30	1.15	1.00

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DIMENSION & PERMISSIBLE RIPPLE CURRENT

Dimension:ΦDXL(mm)
Ripple Current: mA/rms at 120Hz,105℃

V.DC / Contents μF	6.3V		10V		16V		25V		35V		50V		63V		100V	
	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA
0.1											5X11	1.3			5X11	2.6
0.22											5X11	2.9			5X11	5.8
0.33											5X11	4.4			5X11	8.0
0.47											5X11	7.0			5X11	10
1											5X11	13			5X11	15
2.2											5X11	20			5X11	23
3.3											5X11	25			5X11	29
4.7							5X11	26	5X11	28	5X11	30	5X11	32	5X11	34
10					5X11	35	5X11	38	5X11	41	5X11	46	5X11	50	6.3X11	56
22			5X11	49	5X11	54	5X11	57	5X11	61	5X11	68	6.3X11	82	8X11.5	96
33	5X11	54	5X11	60	5X11	64	5X11	69	5X11	75	6.3X11	90	6.3X11	100	10X12.5	140
47	5X11	65	5X11	70	5X11	99	5X11	82	6.3X11	100	6.3X11	110	8X11.5	135	10X16	180
100	5X11	95	5X11	105	6.3X11	125	6.3X11	135	8X11.5	170	8X11.5	180	10X12.5	225	12.5X20	320
220	6.3X11	160	6.3X11	175	8X11.5	215	8X11.5	230	10X12.5	300	10X16	345	10X20	400	16X25	570
330	6.3X11	195	8X11.5	245	8X11.5	260	10X12.5	335	10X16	400	10X20	460	12.5X20	540	16X25	700
470	8X11.5	270	8X11.5	290	10X12.5	370	10X16	440	10X20	520	12.5X20	610	12.5X25	700	16X31.5	880
1000	10X12.5	460	10X16	550	10X20	640	12.5X20	770	12.5X25	920	16X25	1080	16X31.5	1210		
2200	12.5X20	810	12.5X20	860	12.5X25	1000	16X25	1170	16X31.5	1340	18X35.5	1530				
3300	12.5X20	960	12.5X25	1100	16X25	1300	16X31.5	1460	18X35.5	1650						
4700	16X25	1330	16X25	1400	16X31.5	1600	18X35.5	1780	18X40	1900						

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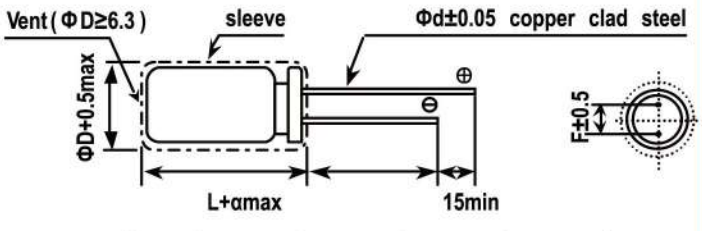
KAG Miniature Aluminum Electrolytic Capacitors

Downsize, high ripple design(ϕ 10 to 18)

Rated voltage range:200 to 450Vdc.,Capacitor range :18 to 560 μ F
Endurance with ripple current: 2,000 hours at 105℃
Ideal for low profile power supply applications
Non solvent resistant type
RoHS Compliant

RoHS

Outline Drawing Unit: mm



ΦD	10	12.5	16	18
F	5.0	5.0	7.5	7.5
Φd	0.6	0.6	0.8	0.8
α	1.5 for L16 max 2.0 for L20 min			

Photo

Marking color: white print on black sleeve

Specifications

No.	Item	Performance						
1	Temperature range(℃)	-40 to +105 (200,400Vdc)					-25 to +105 (420,450Vdc)	
2	Leakage current (μA)	Less than 0.02CV or 3 whichever is larger (after two minutes) C: Rated Capacitance (μ F). V: Rated voltage (V) 20℃						
3	Capacitance tolerance (%)	±20 (20˚C ,120Hz)						
4	Tangent of the loss angle (Tan δ)	Rated voltage (V)	200V	400V	420V	450V	20˚C 120Hz	
		Tan δ (max)	0.12	0.15	0.20	0.20		
5	Low temperature characteristics	Rated voltage (V)		200V	400V	420V	450V	120Hz
		Impedance ratio(max)	$Z_{(-25°C)}/Z_{(+20°C)}$	3	5	6	6	
			$Z_{(-40°C)}/Z_{(+20°C)}$	6	6	--	--	
6	Endurance (105℃) (Applied ripple current)	Test time		2000hours				
		Leakage current		The initial specified value or less				
		Percentage of capacitance change		Within ±20% of initial value				
		Tangent of the loss angle		200% or less of the initial specified value				
7	Shelf life (105℃)	Test time		1000hours				
		Leakage current		500% of the initial specified value or less				
		Percentage of capacitance change		Within ±20% of initial value				
		Tangent of the loss angle		200% or less of the initial specified value				
8	Applicable standards	JIS-C-5101-4(IEC60384)						

Coefficient of Frequency for Ripple Current

Frequency (Hz) / Capacitance(μ F)	120	1K	10K	100K
18 to 82	1.00	1.50	1.75	1.80
100 to 560	1.00	1.30	1.40	1.50

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KAG Miniature Aluminum Electrolytic Capacitors

DIMENSION & PERMISSIBLE RIPPLE CURRENT

Dimension:ΦDXL(mm)
Ripple Current: mA/rms at 120Hz,105℃

V.DC / Contents μF	200V				400V			
	ΦDXL	mA	*ΦDXL	mA	ΦDXL	mA	*ΦDXL	mA
27					10X30	260		
33					10X35	300		
39					10X40	340		
47					12.5X30	370		
56					12.5X35	420		
68					12.5X40	480		
82	10X30	440			16X30	530		
100	10X35	510			16X35	580	18X30	580
120	10X40	590			16X40	670	18X35	670
150	12.5X30	650			18X35	770		
180	12.5X35	750			18X40	880		
220	12.5X40	830			18X45	1000		
270	16X30	960						
330	16X35	1100	18X30	1100				
390	16X40	1240	18X35	1240				
470	18X40	1390						
560	18X45	1560						

V.DC / Contents μF	420V				450V			
	ΦDXL	mA	*ΦDXL	mA	ΦDXL	mA	*ΦDXL	mA
18					10X30	210		
22	10X30	230			10X35	240		
27	10X35	270			10X40	280		
33	10X40	310			12.5X30	310		
39	12.5X30	330			12.5X35	350		
47	12.5X35	390			12.5X40	390		
56	12.5X40	430			16X30	440		
68	16X30	510			16X35	500		
82	16X35	570			16X40	550	18X30	550
100	16X40	610	18X30	610	18X35	650		
120	18X35	690			18X40	740		
150	18X40	790			18X45	810		

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KCL Miniature Aluminum Electrolytic Capacitors

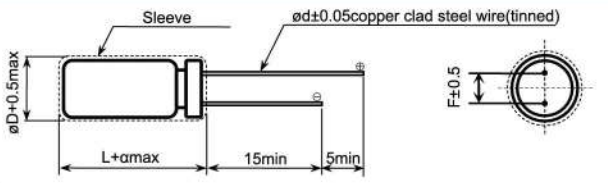
5mm L, Standard Capacitors, Low Leakage current, 85℃, Series KCL.

Diameters from Φ4 to Φ8 and a height of 5mm

Guaranteed 1000 hours at 85℃

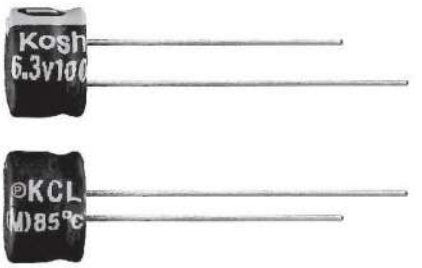
RoHS

Outline Drawing Unit: mm



øD	3	4	5	6.3	8
F	1.0	1.5	2.0	2.5	1.5
ød	0.4	0.45	0.45	0.45	0.45
α	1.0	1.0	1.0	1.0	1.0

Photo



Marking color: white print on purple sleeve

Specifications

No.	Item	Performance								
1	Temperature range(℃)	-40 to +85								
2	Leakage current (μA)	Less than 0.002CV or 0.4 whichever is larger (after two minutes) C: Rated Capacitance (μ F); V: Rated voltage (V) 20℃								
3	Capacitance tolerance (%)	±20 (20˚C ,120Hz)								
4	Tangent of the loss angle (Tan δ)	Rated voltage (V)		4	6.3	10	16	25	35	50	20˚C,120Hz
		Tan δ (max)		0.35	0.24	0.20	0.16	0.14	0.12	0.10	
5	Low temperature characteristics	Rated voltage (V)		4	6.3	10	16	25	35	50	120Hz
		Impedance ratio(max)	$Z_{(-25°C)}/Z_{(+20°C)}$	7	4	3	2	2	2	2	
			$Z_{(-40°C)}/Z_{(+20°C)}$	15	8	6	4	4	3	3	
6	Endurance (85℃) (Applied ripple current)	Test time		1000hours							
		Leakage current		The initial specified value or less							
		Percentage of capacitance change		Within ± 20% of initial value							
		Tangent of the loss angle		200% or less of the initial specified value							
7	Shelf life (85℃)	Test time		500hours							
		Leakage current		The initial specified value or less							
		Percentage of capacitance change		Within ± 20% of initial value							
		Tangent of the loss angle		200% or less of the initial specified value							
8	Applicable standards	JIS-C-5101-4(IEC60384)								

Coefficient of Frequency for Ripple Current

Frequency (Hz) / Capacitance (μ F)	50· 60	120	1K	10K~
CAP≤47	0.80	1.00	1.30	1.50
47<CAP	0.80	1.00	1.15	1.20

Coefficient of Temperature for Ripple Current

Temperature(℃)	45	50	70	85
Coefficient	1.80	1.50	1.30	1.00

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DIMENSION & PERMISSIBLE RIPPLE CURRENT

Dimension: ΦDXL(mm)
Ripple Current: mA/rms at 120Hz,85℃

V.DC / Contents μF	4V		6.3V		10V		16V		25V		35V		50V	
	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA
0.1													4X5	1.0
0.22													4X5	2.0
0.33													4X5	2.8
0.47													4X5	4.0
1													4X5	8.4
2.2													4X5	13
3.3													5X5	17
4.7									4X5	16	4X5	18	5X5	20
10							4X5	25	5X5	27	5X5	29	6.3X5	33
22			4X5	28	4X5	32	5X5	37	6.3X5	42	6.3X5	46	8X5	60
33	5X5	28	5X5	37	5X5	41	6.3X5	49	6.3X5	52				
47	5X5	33	5X5	45	6.3X5	52	6.3X5	58						
100	6.3X5	56	6.3X5	70										

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KLS Miniature Aluminum Electrolytic Capacitors

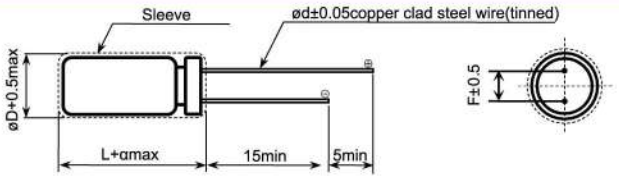
7mm L, 85℃ Low Leakage Current Miniature Capacitors, Series KLS.

Diameter from Φ4 to Φ8 and height of 7mm

Guaranteed 1000 hours at 85℃

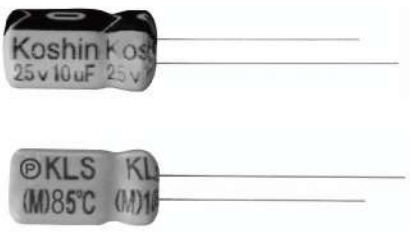
RoHS

Outline Drawing Unit: mm



øD	4	5	6.3	8
F	1.5	2.0	2.5	3.5
ød	0.45	0.45	0.45	0.45
α	1.0	1.0	1.0	1.0

Photo



Marking color: black print on orange sleeve

Specifications

No.	Item	Performance								
1	Temperature range(℃)	-40 to + 85								
2	Leakage current (μA)	Less than 0.002CV or 0.3 whichever is larger (after two minutes) C: Capacitance(μ F); V: Rated voltage(V) 20℃								
3	Capacitance tolerance (%)	±20 (20˚C,120Hz)								
4	Tangent of the loss angle (Tan δ)	Rated voltage (V)	4	6.3	10	16	25	35	50	63
		Tan δ (max)	0.35	0.24	0.20	0.16	0.14	0.12	0.10	0.09
		20˚C,120Hz								
5	Low temperature characteristics	Rated voltage (V)	4	6.3	10	16	25	35	50	63
		Impedance ratio(max) $Z_{(-25°C)}/Z_{(+20°C)}$	6	4	3	3	2	2	2	2
		Impedance ratio(max) $Z_{(-40°C)}/Z_{(+20°C)}$	12	8	6	4	4	3	3	3
		120Hz								
6	Endurance (85℃) (Applied ripple current)	Test time	1000 hours							
		Leakage current	The initial specified value or less							
		Percentage of capacitance change	Within ±20% of initial value							
		Tangent of the loss angle	200% or less of the initial specified value							
7	Shelf life (85℃)	Test time	500hours							
		Leakage current	The initial specified value or less							
		Percentage of capacitance change	Within ±20% of initial value							
		Tangent of the loss angle	200% or less of the initial specified value							
8	Applicable standards	JIS-C-5101-4(IEC60384)								

Coefficient of Frequency for Ripple Current

Frequency (Hz) / Capacitance (μ F)	50•60	120	1K	10K	100K
CAP≤47	0.70	1.00	1.20	1.30	1.45
CAP > 47	0.80	1.00	1.10	1.15	1.20

Coefficient of Temperature for Ripple Current

Temperature(℃)	45	60	70	85
Coefficient	1.80	1.50	1.30	1.00

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DIMENSION & PERMISSIBLE RIPPLE CURRENT

Dimension: ΦDXL(mm)
Ripple Current: mA/rms at 120Hz,85℃

V.DC / Contents μF	4V		6.3V		10V		16V		25V		35V		50V		63V	
	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA
0.1													4X7	3	4X7	3
0.22													4X7	5	4X7	5
0.33													4X7	6	4X7	6
0.47													4X7	7	4X7	7
1													4X7	10	4X7	10
2.2													4X7	16	5X7	19
3.3											4X7	18	4X7	20	6.3X7	29
4.7									4X7	19	5X7	21	5X7	24	6.3X7	36
10							4X7	27	5X7	29	6.3X7	36	6.3X7	40		
22					4X7	36	4X7	40	6.3X7	47	6.3X7	53				
33	4X7	33	4X7	41	5X7	44	5X7	55	6.3X7	63	8X7	71				
47	4X7	39	5X7	49	6.3X7	54	6.3X7	62	8X7	74						
100	6.3X7	59	6.3X7*	75	8X7	90	8X7	110								

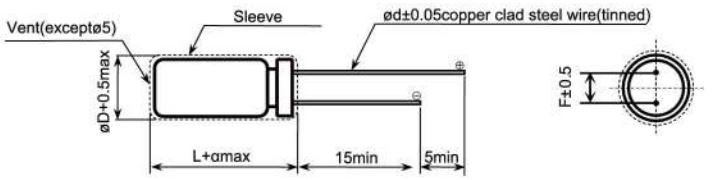
Koshin

KRL Miniature Aluminum Electrolytic Capacitors

85℃ Low Leakage Current Miniature Capacitors, Series KRL.
Guaranteed 2000 hours at 85℃

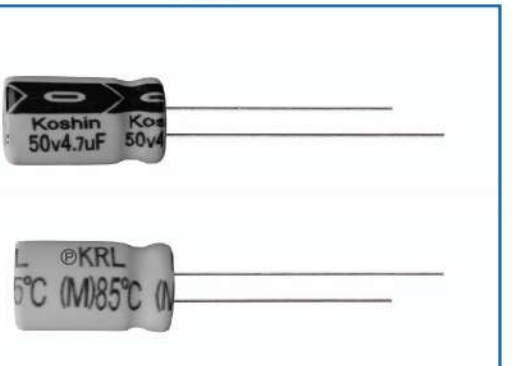
RoHS

Outline Drawing — Unit: mm



øD	5	6.3	8	10	12.5	16	18
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
ød	0.5	0.5	0.6	0.6	0.6	0.8	0.8
α	1.5			1.5 for L16 max. 2.0 for L20 min.			

Photo



Making color: black print on orange sleeve

Specifications

No.	Item	Performance								
1	Temperature range(℃)	-40 to + 85								
2	Leakage current (μA)	Less than 0.002CV or 0.3 whichever is larger(after two minutes) C: Rated Capacitance(μ F); V: Rated voltage(V) 20℃								
3	Capacitance tolerance (%)	±20(20˚C,120Hz)								
4	Tangent of the loss angle (Tan δ)	Rated voltage (V)	6.3	10	16	25	35	50	63	100	20˚C,120Hz
		Tan δ (max)	0.20	0.17	0.13	0.10	0.09	0.08	0.08	0.08	
		0.02 is added to every 1000 μ F increase over 1000 μ F									
5	Low temperature characteristics	Rated voltage (V)	6.3	10	16	25	35	50	63	100	120Hz
		Impedance ratio(max) $Z_{(-25°C)}/Z_{(+20°C)}$	4	3	2	2	2	2	2	2	
		Impedance ratio(max) $Z_{(-40°C)}/Z_{(+20°C)}$	8	6	4	4	4	3	3	3	
6	Endurance (85℃) (Applied ripple current)	Test time	2000hours								
		Leakage current	The initial specified value or less								
		Percentage of capacitance change	Within ± 20% of initial value								
		Tangent of the loss angle	200% or less of the initial specified value								
7	Shelf life (85℃)	Test time	1000hours								
		Leakage current	The initial specified value or less								
		Percentage of capacitance change	Within ± 20% of initial value								
		Tangent of the loss angle	200% or less of the initial specified value								
8	Applicable standards	JIS–C–5101–4(IEC60384)									

Coefficient of Frequency for Ripple Current

Frequency (Hz) / Capacitance (μ F)	50 • 60	120	1K	10K	100K
CAP≤100	0.70	1.00	1.35	1.55	2.00
100<CAP≤1000	0.83	1.00	1.23	1.32	1.50
1000<CAP	0.90	1.00	1.12	1.10	1.15

Coefficient of Temperature for Ripple Current

Temperature(℃)	45	60	70	85
Coefficient	1.80	1.50	1.30	1.00

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DIMENSION & PERMISSIBLE RIPPLE CURRENT

Dimension: ΦDXL(mm)
Ripple Current: mA/rms at 120Hz,85

V.DC / Contents μF	6.3V		10V		16V		25V		35V		50V		63V		100V	
	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA
0.1											5X11	1.3			5X11	2.6
0.22											5X11	2.9			5X11	5.8
0.33											5X11	4.4			5X11	8.8
0.47											5X11	7			5X11	12
1											5X11	13			5X11	22
2.2											5X11	29			5X11	33
3.3											5X11	35			5X11	40
4.7							5X11	31	5X11	40	5X11	42	5X11	45	5X11	48
10					5X11	44	5X11	54	5X11	58	5X11	65	5X11	70	6.3X11	80
22			5X11	59	5X11	75	5X11	80	5X11	87	5X11	95	6.3X11	115	8X11.5	135
33	5X11	55	5X11	84	5X11	90	5X11	97	5X11	105	6.3X11	125	6.3X11	140	10X12.5	195
47	5X11	79	5X11	100	5X11	110	5X11	115	6.3X11	145	6.3X11	150	8X11.5	190	10X16	255
100	5X11	130	5X11	145	6.3X11	180	6.3X11	190	8X11.5	240	8X11.5	255	10X12.5	320	12.5X20	450
220	6.3X11	230	6.3X11	250	8X11.5	300	8X11.5	320	10X12.5	420	10X16	490	10X20	565	16X25	810
330	6.3X11	280	8X11.5	350	8X11.5	370	10X12.5	470	10X16	570	10X20	650	12.5X20	765	16X25	990
470	8X11.5	380	8X11.5	415	10X12.5	520	10X16	620	10X20	740	12.5X20	860	12.5X25	990	16X31.5	1250
1000	10X12.5	650	10X16	790	10X20	910	12.5X20	1090	12.5X25	1300	16X25	1530	16X31.5	1700		
2200	12.5X20	1150	12.5X20	1240	12.5X25	1420	16X25	1660	16X31.5	1890	18X35.5	2160				
3300	12.5X20	1380	12.5X25	1590	16X25	1840	16X31.5	2070	18X35.5	2340						
4700	16X25	1880	16X25	1980	16X31.5	2260	18X35.5	2520	18X40	2690						

Koshin

KZL Miniature Aluminum Electrolytic Capacitors

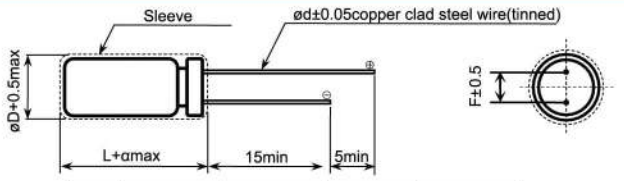
7mm L, 105℃ Low Leakage Current Miniature Capacitors, Series KZL.

Diameters from Φ4 to Φ8mm and height of 7mm

Guaranteed 1000 hours at 105℃

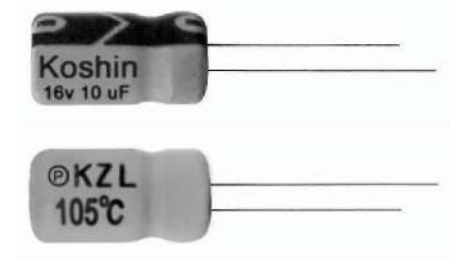
RoHS

Outline Drawing Unit: mm



øD	4	5	6.3	8
F	1.5	2.0	2.5	3.5
ød	0.45	0.45	0.45	0.45
α	1.0	1.0	1.0	1.0

Photo



Marking color: black print on orange sleeve

Specifications

No.	Item	Performance								
1	Temperature range(℃)	-40 to + 105								
2	Leakage current (μA)	Less than 0.002CV or 0.3 whichever is larger (after two minutes) C: Capacitance(μ F);V: Rated voltage(V) 20℃								
3	Capacitance tolerance (%)	±20 (20℃,120Hz)								
4	Tangent of the loss angle (Tan δ)	Rated voltage (V)	4	6.3	10	16	25	35	50	63
		Tan δ(max)	0.35	0.24	0.20	0.16	0.14	0.12	0.10	0.09
		20℃,120Hz								
5	Low temperature characteristics	Rated voltage (V)	4	6.3	10	16	25	35	50	63
		Impedance ratio(max) $Z_{(-25℃)}/Z_{(+20℃)}$	6	4	3	3	2	2	2	2
		Impedance ratio(max) $Z_{(-40℃)}/Z_{(+20℃)}$	12	10	6	6	4	4	4	3
		120Hz								
6	Endurance (105℃) (Applied ripple current)	Test time	1000 hours							
		Leakage current	The initial specified value or less							
		Percentage of capacitance change	Within ±20% of initial value							
		Tangent of the loss angle	200% or less of the initial specified value							
7	Shelf life (105℃)	Test time	500hours							
		Leakage current	The initial specified value or less							
		Percentage of capacitance change	Within ±20% of initial value							
		Tangent of the loss angle	200% or less of the initial specified value							
8	Applicable standards	JIS-C-5101-4(IEC60384)								

Coefficient of Frequency for Ripple Current

Frequency (Hz) / Capacitance (μ F)	50•60	120	1K	10K	100K
CAP≤47	0.70	1.00	1.20	1.30	1.45
CAP>47	0.80	1.00	1.10	1.15	1.20

Coefficient of Temperature for Ripple Current

Temperature(℃)	70 or less	85	105
Coefficient	2.10	1.80	1.00

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Site Web : www.es-france.com

DIMENSION & PERMISSIBLE RIPPLE CURRENT

Dimension: ΦDXL(mm)
Ripple Current: mA/rms at 120Hz,105℃

V.DC / Contents μF	4V		6.3V		10V		16V		25V		35V		50V		63V	
	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA	ΦDXL	mA
0.1													4X7	3	4X7	3
0.22													4X7	5	4X7	5
0.33													4X7	6	4X7	6
0.47													4X7	7	4X7	7
1													4X7	10	4X7	10
2.2													4X7	16	5X7	19
3.3											4X7	18	4X7	20	6.3X7	29
4.7									4X7	19	5X7	21	6.3X7	24	6.3X7	36
10							4X7	27	5X7	29	6.3X7	32	8X7	40		
22					4X7	36	4X7	40	6.3X7	44	6.3X7	49				
33	4X7	33	4X7	41	5X7	44	5X7	50	6.3X7	55	8X7	67				
47	4X7	39	5X7	49	6.3X7	54	6.3X7	62	8X7	74						
100	6.3X7	59	6.3X7	75	8X7	90										