

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°C

Ideal for low profile power supply applications

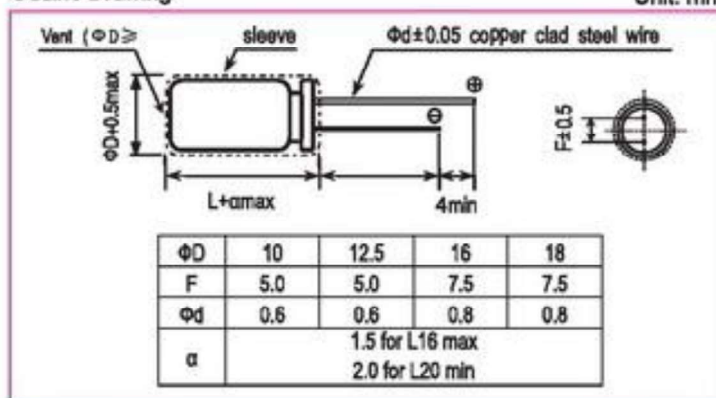
Non solvent resistant type

RoHS Compliant

RoHS

Outline Drawing

Unit: mm



Photo



Marking color: white print on black sleeve

Specifications

No.	Item	Performance					
1	Temperature range (°C)	-40 to +105(200,400Vdc)				-25 to +105(420,450Vdc)	
2	Leakage current (μ A)	Less than 0.03CV or 3 whichever is larger (after two minutes) C: Rated Capacitance (μ F). V: Rated voltage (V) 20°C					
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)	$Z_{(-25^{\circ}\text{C})}/Z_{(+20^{\circ}\text{C})}$	3	5	6	6
			$Z_{(-40^{\circ}\text{C})}/Z_{(+20^{\circ}\text{C})}$	6	6	--	--
6	Endurance (105°C) (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°C)	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-5102 and JIS-C-5141					

Coefficient of Frequency for Ripple Current

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

KAG Miniature Aluminum Electrolytic Capacitors

Dimension: Φ D×L(mm)

Ripple Current: mA/rms at 120Hz, 105°C

DIMENSION & PERMISSIBLE RIPPLE CURRENT

μ F	V.DC Contents	200V				400V			
		Φ D×L	mA	* Φ D×L	mA	Φ D×L	mA	* Φ D×L	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	-	-				

High Reliability Type

μ F	V.DC Contents	420V				450V			
		Φ D×L	mA	* Φ D×L	mA	Φ D×L	mA	* Φ D×L	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		

KJH Miniature Aluminum Electrolytic Capacitors

105°C Use, High-Reliability, Low Impedance Capacitors, Series KJH.

The capacitor of this Series achieves high reliability under the environmental

Loading prevailing in a piece of equipment on which it is mounted

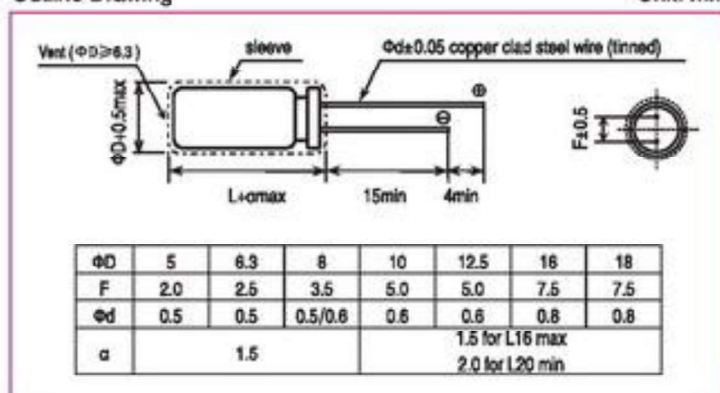
Guarantees 5000 hours at 105°C (Φ5 to 6.3: 2000hours; Φ8 to 10: 3000 hours)

RoHS

Outline Drawing

Unit: mm

Photo



Marking color: White print on deep green sleeve

Specifications

No.	Item	Performance										
1	Temperature range (°C)	-55 to +105										
2	Leakage current(μ A)	Less than 0.01CV or 3 whichever is larger(after two minutes)								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℃	
		Tan δ (max)	0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.07	120Hz	
		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)	$Z_{(25℃)}/Z_{(40℃)}$	2	2	2	2	2	2	2		2
			$Z_{(40℃)}/Z_{(45℃)}$	3	3	3	3	3	3	3		3
6	Endurance (105℃) (Applied ripple current)	Test time		5000hours (Φ5 to 6.3: 2000hours; Φ8 to 10: 3000 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		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-5102 and JIS-C-5141										

Coefficient of Frequency for Ripple Current

Frequency (Hz)	120	1K	10K	100K
Capacitance (μF)				
CAP ≤ 4.7	0.40	0.68	0.78	1.00
4.7 < CAP ≤ 47	0.50	0.76	0.87	1.00
47 < CAP ≤ 220	0.70	0.85	0.90	1.00
220 < CAP ≤ 1000	0.80	0.93	0.98	1.00
1000 < CAP	0.90	0.95	1.00	1.00

Coefficient of Temperature for Ripple Current

Temperature (°C)	45	60	70	85	95	105
Coefficient	2.10	1.90	1.65	1.40	1.25	1.00

Dimension: Φ DXL(mm)

Ripple Current: mA/rms at 100KHz, 105°C

DIMENSION & PERMISSIBLE RIPPLE CURRENT

V.DC μF Item	6.3V				10V			
	Φ DXL	Impedance (Ω ,Max/100KHz)		Ripple Current (mA/rms,105°C) 100KHz	Φ DXL	Impedance (Ω ,Max/100KHz)		Ripple Current (mA/rms,105°C) 100KHz
		20°C	-10°C			20°C	-10°C	
47					5X11	2.10	5.50	111
56					5X11	1.90	4.80	121
68					5X11	1.30	3.90	154
100	5X11	1.30	3.90	154	6.3X11	0.60	1.80	260
220	6.3X11	0.60	1.80	260	8X11.5	0.33	0.99	400
330	8X11.5	0.33	0.88	400	8X11.5	0.33	0.99	400
390	8X11.5	0.33	0.88	400	10X12.5	0.27	0.75	510
470	10X12.5	0.25	0.75	510	10X12.5	0.25	0.75	510
560	10X12.5	0.25	0.75	510	10X16	0.19	0.57	635
680	10X16	0.19	0.57	635	10X16	0.19	0.57	635
1000	10X20	0.14	0.42	860	10X20	0.14	0.37	860
1200	10X20	0.14	0.42	860	10X25	0.12	0.30	1030
2200	12.5X20	0.085	0.26	1250	12.5X25	0.070	0.21	1355
3300	12.5X25	0.070	0.21	1355	12.5X25	0.070	0.21	1355
4700	16X25	0.060	0.18	1770	16X31.5	0.048	0.14	2030

V.DC μF Item	16V				25V			
	Φ DXL	Impedance (Ω ,Max/100KHz)		Ripple Current (mA/rms,105°C) 100KHz	Φ DXL	Impedance (Ω ,Max/100KHz)		Ripple Current (mA/rms,105°C) 100KHz
		20°C	-10°C			20°C	-10°C	
33	5X11	1.30	3.90	154	5X11	1.30	3.90	154
39	5X11	1.30	3.90	154	6.3X11	0.60	1.80	260
47	6.3X11	0.60	1.80	260	6.3X11	0.60	1.80	260
56	6.3X11	0.60	1.80	260	6.3X11	0.60	1.80	260
68	6.3X11	0.60	1.80	260	6.3X11	0.60	1.80	260
100	6.3X11	0.60	1.80	260	8X11.5	0.33	0.99	400
220	8X11.5	0.33	0.99	400	10X12.5	0.25	0.75	510
330	10X12.5	0.25	0.75	510	10X16	0.19	0.57	635
390	10X16	0.19	0.57	635	10X20	0.14	0.42	635
470	10X16	0.19	0.57	635	10X20	0.14	0.42	635
560	10X20	0.14	0.42	860	10X25	0.12	0.30	1030
680	10X20	0.14	0.42	860	12.5X20	0.085	0.26	1250
1000	12.5X20	0.085	0.26	1250	12.5X25	0.070	0.23	1355
1200	12.5X20	0.085	0.26	1250	12.5X25	0.070	0.21	1355
2200	12.5X25	0.070	0.21	1355	16X25	0.060	0.18	1770
3300	16X31.5	0.048	0.14	2030	16X35.5	0.044	0.13	2295
4700	16X35.5	0.044	0.13	2295	18X40	0.037	0.10	2740

Dimension: Φ DXL(mm)

Ripple Current: mA/rms at 100KHz, 105°C

DIMENSION & PERMISSIBLE RIPPLE CURRENT

V.DC Item μF	35V				50V			
	Φ DXL	Impedance (Ω , Max/100KHz)		Ripple Current (mA/rms, 105°C) 100KHz	Φ DXL	Impedance (Ω , Max/100KHz)		Ripple Current (mA/rms, 105°C) 100KHz
		20°C	-10°C			20°C	-10°C	
1					5X11	4.00	15.0	78
2.2					5X11	4.00	12.0	88
3.3					5X11	3.50	11.0	94
4.7					5X11	3.00	9.00	100
6.8					5X11	3.00	9.00	100
10					5X11	2.00	6.00	124
22	5X11	1.30	3.90	154	6.3X11	0.60	1.80	260
33	6.3X11	0.60	1.80	260	6.3X11	0.60	1.80	260
39	6.3X11	0.60	1.80	260	6.3X11	0.60	1.80	260
47	6.3X11	0.60	1.80	260	8X11.5	0.33	0.99	400
56	6.3X11	0.60	1.80	260	8X11.5	0.33	0.99	400
68	6.3X11	0.60	1.80	260	8X11.5	0.33	0.99	400
100	8X11.5	0.33	0.99	400	10X16	0.19	0.57	635
220	10X16	0.19	0.57	635	10X25	0.12	0.30	1030
330	10X20	0.12	0.42	860	12.5X20	0.085	0.26	1250
390	10X25	0.12	0.30	1030	12.5X25	0.070	0.21	1355
470	12.5X20	0.085	0.26	1250	12.5X25	0.070	0.21	1355
560	12.5X20	0.085	0.26	1250	12.5X25	0.070	0.21	1355
680	12.5X25	0.070	0.21	1355	16X25	0.060	0.18	1770
1000	12.5X25	0.070	0.21	1355	16X25	0.060	0.18	1770
1200	12.5X25	0.070	0.21	1355	16X31.5	0.048	0.14	2030
2200	16X35.5	0.044	0.13	2295	18X40	0.037	0.10	2740
3300	18X40	0.037	0.10	2740				

V.DC Item μF	63V				100V			
	Φ DXL	Impedance (Ω , Max/100KHz)		Ripple Current (mA/rms, 105°C) 100KHz	Φ DXL	Impedance (Ω , Max/100KHz)		Ripple Current (mA/rms, 105°C) 100KHz
		20°C	-10°C			20°C	-10°C	
1					5X11	7.00	25.0	66
2.2					5X11	6.00	21.0	72
3.3					5X11	5.00	18.0	78
4.7					6.3X11	1.20	4.20	180
6.8					6.3X11	1.20	4.20	180
10	6.3X11	1.20	4.20	180	8X11.5	0.56	2.00	305
22	6.3X11	1.20	4.20	180	8X11.5	0.56	2.00	308
33	8X11.5	0.56	2.00	305	10X12.5	0.50	1.80	380
39	8X11.5	0.56	2.00	305	10X16	0.32	1.10	500
47	8X11.5	0.56	2.00	305	10X20	0.27	0.95	620

Dimension: Φ DXL(mm)

Ripple Current: mA/rms at 100KHz, 105°C

DIMENSION & PERMISSIBLE RIPPLE CURRENT

V.DC Item μF	63V				100V			
	Φ DXL	Impedance (Ω , Max/100KHz)		Ripple Current (mA/rms, 105°C) 100KHz	Φ DXL	Impedance (Ω , Max/100KHz)		Ripple Current (mA/rms, 105°C) 100KHz
		20°C	-10°C			20°C	-10°C	
56	10X12.5	0.50	1.80	380	10X20	0.27	0.95	620
68	10X12.5	0.50	1.80	380	10X25	0.21	0.63	760
100	10X20	0.27	0.95	620	12.5X20	0.16	0.56	890
220	12.5X20	0.094	0.24	820	16X25	0.090	0.32	1440
330	12.5X25	0.073	0.21	1100	16X31.5	0.060	0.17	1790
390	12.5X25	0.073	0.21	1100	16X35.5	0.056	0.14	2065
470	16X25	0.060	0.18	1770				
560	16X31.5	0.048	0.14	2030				
680	16X31.5	0.048	0.14	2030				
1000	18X35.5	0.041	0.11	2240				

KLH Miniature Aluminum Electrolytic Capacitors

105°C Use, High-Reliability, Low Impedance Capacitors, Series KLH.

The capacitor of this Series achieves high reliability under the environmental loading prevailing in a piece of equipment on which it is mounted

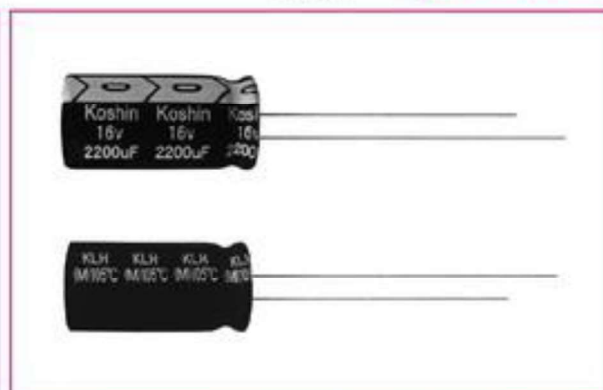
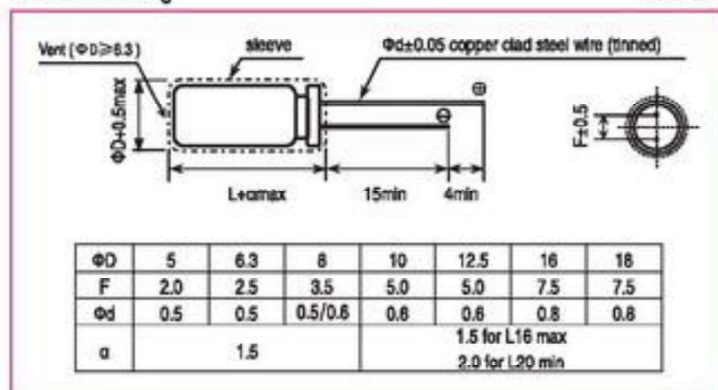
Guarantees 5000 hours at 105°C (Φ5 to 6.3: 2000hours; Φ8: 3000 hours)

Outline Drawing

Unit: mm

Photo

RoHS



Marking color: White print on deep green sleeve

Specifications

No.	Item	Performance														
1	Temperature range (°C)	-40 to +105(6.3V~100V)								-25 to +105 (160V~500V)						
2	Leakage current (μ A)	Less than 0.01CV or 3 whichever is larger (after two minutes)								Less than 0.03CV whichever is large (after two minutes)						
		C: Rated 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	160	200-250	350-400	450-500	20℃	
		Tan δ (max)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.15	0.15	0.15	0.15	120Hz	
		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	160	200-250	350-400	450-500	120Hz	
		Impedance ratio (max)	$Z_{(-25℃)}/Z_{(+20℃)}$		4	3	3	2	2	2	2	2	2	5		6
			$Z_{(-40℃)}/Z_{(+20℃)}$		8	6	4	4	4	3	3	3	3	6		6
6	Endurance (105℃) (Applied ripple current)	Test time	Φ 5 to Φ 6.3: 2000hours, Φ 8: 3000 hours, D≥Φ10:5000hours													
		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	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-5102 and JIS-C-5141														

Coefficient of Frequency for Ripple Current

Frequency (Hz)	50 - 60	120	1K	10K	100K
Capacitance (μF)					
CAP ≤ 10	0.47	0.59	0.85	0.97	1.00
10 < CAP ≤ 100	0.52	0.65	0.89	0.97	1.00
100 < CAP ≤ 1000	0.58	0.72	0.90	0.98	1.00
1000 < CAP	0.63	0.78	0.91	0.98	1.00

Coefficient of Temperature for Ripple Current

Temperature(°C)	45	60	85	95	105
Coefficient	2.10	1.90	1.65	1.25	1.00

Dimension: Φ DXL(mm)

Ripple Current: mA/rms at 100KHz, 105°C

DIMENSION & PERMISSIBLE RIPPLE CURRENT

V.DC Contents μ F	6.3V			10V			16V		
	Φ DXL	Impedance Ω /100KHz 20°C	Ripple Current (mA/rms, 105°C)	Φ DXL	Impedance Ω /100KHz 20°C	Ripple Current (mA/rms, 105°C)	Φ DXL	Impedance Ω /100KHz 20°C	Ripple Current (mA/rms, 105°C)
10							5X11	4.00	37
22				5X11	2.700	56	5X11	2.000	70
33				5X11	2.200	58	5X11	1.260	130
47				5X11	1.200	120	5X11	0.520	190
100	5X11	1.100	185	6.3X11	0.480	205	6.3X11	0.310	260
220	6.3X11	0.700	300	6.3X11	0.280	330	8X11.5	0.210	455
330	8X11.5	0.390	390	8X11.5	0.150	445	8X11.5	0.120	550
470	8X11.5	0.350	415	8X11.5	0.115	555	10X12.5	0.095	722
1000	10X12.5	0.300	700	10X16	0.072	1010	10X25	0.050	1180
2200				10X25	0.052	1450	10X25	0.050	1750
	10X25	0.080	1400	12.5X25	0.041	1690	12.5X25	0.035	1950
3300	12.5X25	0.050	1425	12.5X30	0.029	1980	16X25	0.028	2340
4700	12.5X30	0.025	1950	16X31.5	0.031	2100	16X31.5	0.024	2650

V.DC Contents μ F	25V			35V			50V		
	Φ DXL	Impedance Ω /100KHz 20°C	Ripple Current (mA/rms, 105°C)	Φ DXL	Impedance Ω /100KHz 20°C	Ripple Current (mA/rms, 105°C)	Φ DXL	Impedance Ω /100KHz 20°C	Ripple Current (mA/rms, 105°C)
0.47							5X11	6.300	15
1							5X11	4.000	25
2.2							5X11	2.800	33
3.3							5X11	2.400	45
4.7							5X11	2.400	58
10	5X11	2.100	56	5X11	2.800	70	5X11	1.800	100
22	5X11	1.800	120	5X11	1.500	130	5X11	1.000	135
33	5X11	1.200	150	5X11	1.300	175	6.3X11	0.800	230
47	5X11	0.500	220	6.3X11	0.800	250	6.3X11	0.500	285
100	6.3X11	0.280	300	8X11.5	0.190	380	8X11.5	0.180	475
220	8X11.5	0.125	550	10X12.5	0.098	720	10X20	0.080	900
330	10X12.5	0.082	720	10X16	0.065	995	10X25	0.068	1050
470	10X16	0.065	1040	12.5X25	0.050	1150	12.5X20	0.055	1490
1000	12.5X25	0.039	1530	12.5X30	0.031	1950	16X31.5	0.036	2130
2200	16X25	0.028	2405	16X31.5	0.025	2650	18X35.5	0.025	2900
3300	16X31.5	0.020	3050						
4700	18X35.5	0.017	3490						

KLH Miniature Aluminum Electrolytic Capacitors

Dimension: Φ D $\times$ L(mm)

Ripple Current: mA/rms at 100KHz, 105°C

DIMENSION & PERMISSIBLE RIPPLE CURRENT

V.DC Contents μ F	63V			100V		
	Φ D $\times$ L	Impedance Ω /100KHz 20°C	Ripple Current (mA/rms, 105°C)	Φ D $\times$ L	Impedance Ω /100KHz 20°C	Ripple Current (mA/rms, 105°C)
0.47	5X11	6.300	16	5X11	20.00	20
1	5X11	4.000	27	5X11	9.500	30
2.2	5X11	2.800	38	5X11	6.500	42
3.3	5X11	2.400	48	5X11	4.500	55
4.7	5X11	2.400	62	5X11	2.400	72
10	5X11	1.900	105	6.3X11	2.400	130
22	6.3X11	0.850	245	8X11.5	1.800	220
33	6.3X11	0.610	265	10X12.5	0.680	320
47	8X11.5	0.560	351	10X16	0.460	420
100	10X16	0.240	610	12.5X20	0.370	560
220	10X25	0.110	1020	16X25	0.180	880
330	12.5X20	0.070	1160	16X31.5	0.100	1440
470	16X25	0.050	2000	16X35.5	0.090	1790
1000	16X35.5	0.032	2450	18X40	0.076	2500

V.DC Contents μ F	160V			200V			250V		
	Φ D $\times$ L	Impedance Ω /100KHz 20°C	Ripple Current (mA/rms, 105°C)	Φ D $\times$ L	Impedance Ω /100KHz 20°C	Ripple Current (mA/rms, 105°C)	Φ D $\times$ L	Impedance Ω /100KHz 20°C	Ripple Current (mA/rms, 105°C)
0.47	6.3X11	9.950	35	6.3X11	9.155	35	6.3X11	8.950	30
1	6.3X11	8.050	50	6.3X11	7.850	50	6.3X11	6.750	50
2.2	6.3X11	5.815	75	6.3X11	5.320	75	8X11.5	5.100	85
3.3	8X11.5	4.570	110	8X11.5	4.510	130	10X12.5	4.180	120
4.7	8X11.5	4.360	130	10X12.5	4.220	155	10X16	3.580	165
6.8	10X16	3.61	160	10X16	3.250	170	10X16	2.750	180
10	10X16	3.050	250	10X16	2.750	250	10X20	2.160	220
22	10X16	1.870	300	10X20	1.585	320	12.5X20	1.375	340
33	10X20	1.215	380	12.5X20	1.050	440	12.5X25	0.960	460
47	12.5X25	1.020	600	12.5X20	0.525	500	12.5X25	0.455	550
68	12.5X25	0.560	660	12.5X25	0.415	660	16X25	0.390	730
100	12.5X25	0.510	850	16X25	0.200	850	16X31.5	0.285	990
150	16X25	0.275	1210	16X31.5	0.185	1210	18X31.5	0.240	1300
220	16X31.5	0.200	1470	18X35.5	0.150	1630	18X40	0.215	1730
330	18X35.5	0.175	2000						

KLH Miniature Aluminum Electrolytic Capacitors

Dimension: $\Phi \times D \times L$ (mm)

Ripple Current: mA/rms at 100KHz, 105°C

DIMENSION & PERMISSIBLE RIPPLE CURRENT

V.DC Contents μF	350V			400V			450V		
	$\Phi \times D \times L$	Impedance Ω /100KHz 20°C	Ripple Current (mA/rms, 105°C)	$\Phi \times D \times L$	Impedance Ω /100KHz 20°C	Ripple Current (mA/rms, 105°C)	$\Phi \times D \times L$	Impedance Ω /100KHz 20°C	Ripple Current (mA/rms, 105°C)
0.47	6.3X11	8.82	36	6.3X11	33	26	6.3X11	34	28
1	6.3X11	7.90	50	6.3X11	16.5	36	6.3X11	18	38
2.2	8X11.5	6.35	75	8X11.5	13	65			
	10X12.5	4.025	85	10X12.5	13	76	10X12.5	14	80
3.3	10X12.5	3.85	100	8X11.5	12	86			
	10X16	3.580	120				10X16	9.680	130
4.7	10X12.5	3.12	130	10X12.5	4.980	130			
	10X16	2.950	150				10X20	5.075	190
6.8	10X16	2.43	170	10X16	7.5	160	10X20	4.750	200
10	10X20	1.455	190	10X20	3.350	183	12.5X20	4.580	277
22	12.5X20	1.320	310	12.5X20	2.875	314	12.5X25	2.835	510
33	12.5X25	0.860	420	12.5X25	1.280	422	16X25	2.420	620
47	16X25	0.625	560	16X25	0.925	560	18X31.5	1.670	790
68	16X31.5	0.580	750	16X31.5	0.850	750	18X35.5	0.852	990
100	16X31.5	0.530	1010	18X31.5	0.575	1010	18x40	0.740	1050

High Reliability Type

V.DC Contents μF	500V		
	$\Phi \times D \times L$	Impedance Ω /100KHz 20°C	Ripple Current (mA/rms, 105°C)
2.2	8X11.5	10.0	85
3.3	10X12.5	8.00	140
4.7	10X16	6.00	180
10	10X20	4.00	190
22	12.5X25	3.50	310
33	16X25	3.00	420
47	18X31.5	2.50	560

KZH Miniature Aluminum Electrolytic Capacitors

105°C Use, Ultra Low Impedance Capacitors, Series KZH.

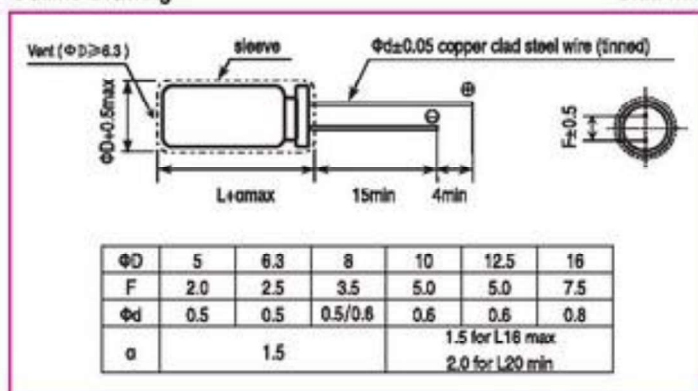
Suitable for Application of Mother Board

Guaranteed 2000 hours at 105°C

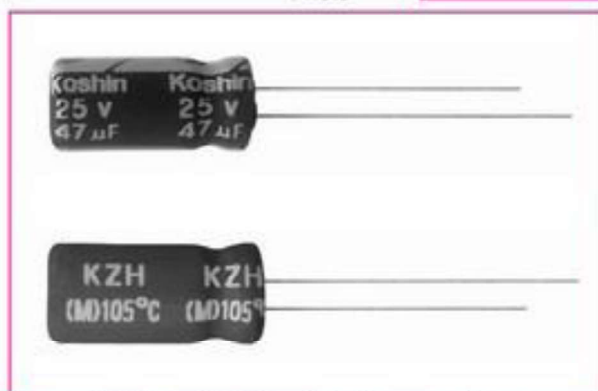
RoHS

Outline Drawing

Unit: mm



Photo



Marking color: White print on deep green sleeve

Specifications

No.	Item	Performance									
1	Temperature range (°C)	-40 to +105									
2	Leakage current(μ A)	less than 0.01CV or 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	20℃	
		Tan δ (max)		0.22	0.19	0.16	0.14	0.12	0.10	120Hz	
		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	120Hz	
		Impedance ratio (max)	$Z_{(-25℃)}/Z_{(-40℃)}$		2	2	2	2	2		2
			$Z_{(-40℃)}/Z_{(+20℃)}$		3	3	3	3	3		3
6	Endurance (105℃) (Applied ripple current)	Test time		2000 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		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-5102 and JIS-C-5141									

Coefficient of Frequency for Ripple Current

Frequency (Hz)	50 ~ 60	120	1K	10K	100K
Capacitance (μF)					
CAP ≤ 100	0.60	0.70	0.85	0.95	1.00
100 < CAP ≤ 1000	0.65	0.75	0.90	0.98	1.00
1000 < CAP	0.75	0.80	0.95	0.98	1.00

Coefficient of Temperature for Ripple Current

Temperature (°C)	70	85	105
Coefficient	1.78	1.40	1.00

KZH Miniature Aluminum Electrolytic Capacitors

Dimension: Φ DXL(mm)

Ripple Current: mA/rms at 100KHz, 105°C

DIMENSION & PERMISSIBLE RIPPLE CURRENT

VDC Item Φ DXL	6.3V					10V					16V				
	μ F	Impedance (Ω ,Max/100KHz)		Ripple Current (mA/rms,105°C)		μ F	Impedance (Ω ,Max/100KHz)		Ripple Current (mA/rms,105°C)		μ F	Impedance (Ω ,Max/100KHz)		Ripple Current (mA/rms,105°C)	
		20°C	-10°C	120Hz	100KHz		20°C	-10°C	120H z	100KHz		20°C	-10°C	120H z	100KHz
5X11	150	0.30	1.00	175	250	100	0.30	1.00	175	250	56	0.30	1.00	175	250
6.3X11	330	0.13	0.41	284	405	220	0.13	0.41	284	405	120	0.13	0.41	284	405
8X11.5	560	0.07	0.22	570	760	470	0.07	0.22	570	760	330	0.07	0.22	532	760
8X15	820	0.056	0.17	746	995	680	0.056	0.17	746	995	470	0.056	0.17	746	995
8X20	1200	0.041	0.13	1000	1250	1000	0.041	0.13	938	1250	680	0.041	0.13	938	1250
10X12.5	1000	0.053	0.16	773	1030	680	0.053	0.16	773	1030	470	0.053	0.16	773	1030
10X16	1200	0.038	0.12	1144	1430	1000	0.038	0.12	1144	1430	680	0.038	0.12	1073	1430
10X20	1500	0.023	0.069	1456	1820	1200	0.023	0.069	1456	1820	1000	0.023	0.069	1365	1820
10X25	2200	0.022	0.066	1720	2150	1500	0.022	0.066	1720	2150	1200	0.022	0.066	1720	2150
12.5X20	3300	0.021	0.053	1888	2360	2200	0.021	0.053	1888	2360	1500	0.021	0.053	1888	2360
12.5X25	3900	0.018	0.045	2216	2770	3300	0.018	0.045	2216	2770	2200	0.018	0.045	2216	2770
12.5X30	4700	0.016	0.041	2632	3290	3900	0.016	0.041	2632	3290	2700	0.016	0.041	2632	3290
12.5X35	5600	0.015	0.039	2720	3400	4700	0.015	0.039	2720	3400	3300	0.015	0.039	2720	3400
16X25	6800	0.016	0.043	2768	3460	5600	0.016	0.043	2768	3460	3900	0.016	0.043	2768	3460

VDC Item Φ DXL	25V					35V					50V				
	μ F	Impedance (Ω ,Max/100KHz)		Ripple Current (mA/rms,105℃)		μ F	Impedance (Ω ,Max/100KHz)		Ripple Current (mA/rms,105℃)		μ F	Impedance (Ω ,Max/100KHz)		Ripple Current (mA/rms,105℃)	
		20℃	-10℃	120Hz	100KHz		20℃	-10℃	120H z	100KHz		20℃	-10℃	120H z	100KHz
5X11	47	0.30	1.00	175	250	33	0.30	1.00	138	250	22	0.34	1.18	131	238
6.3X11	100	0.13	0.41	284	405	56	0.13	0.41	284	405	56	0.14	0.50	270	385
8X11.5	220	0.07	0.22	532	760	150	0.07	0.22	532	760	100	0.074	0.22	507	724
8X15	330	0.056	0.17	697	995	220	0.056	0.17	697	995	120	0.061	0.18	665	950
8X20	470	0.041	0.13	938	1250	270	0.041	0.13	875	1250	180	0.046	0.14	833	1190
10X12.5	330	0.053	0.16	721	1030	220	0.053	0.16	721	1030	150	0.061	0.18	685	979
10X16	470	0.038	0.12	1073	1430	330	0.038	0.12	1001	1430	220	0.042	0.12	959	1370
10X20	680	0.023	0.069	1365	1820	470	0.023	0.069	1365	1820	270	0.030	0.09	1106	1580
10X25	820	0.022	0.066	1613	2150	560	0.022	0.066	1613	2150	330	0.028	0.085	1309	1870
12.5X20	1000	0.021	0.053	1770	2360	680	0.021	0.053	1770	2360	470	0.027	0.068	1538	2050
12.5X25	1500	0.018	0.045	2216	2770	1000	0.018	0.045	2078	2770	560	0.023	0.059	1808	2410
12.5X30	1800	0.016	0.041	2632	3290	1200	0.016	0.041	2632	3290	680	0.021	0.052	2145	2860
12.5X35	2200	0.015	0.039	2720	3400	1500	0.015	0.039	2720	3400	820	0.019	0.051	2220	2960
16X25	2700	0.016	0.043	2768	3460	1800	0.016	0.043	2768	3460	1000	0.021	0.056	2258	3010

High Reliability Type

KRH Aluminum Electrolytic Capacitors

105°C Use, Long Life Capacitors, Series KRH.

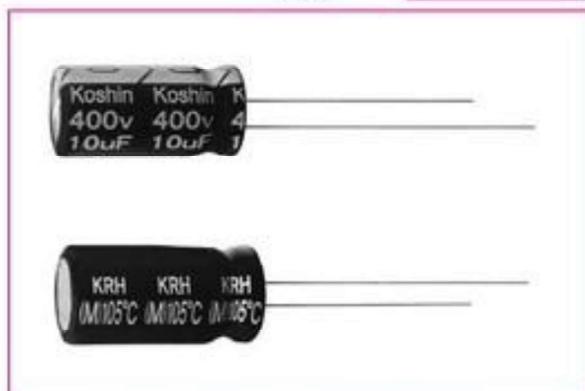
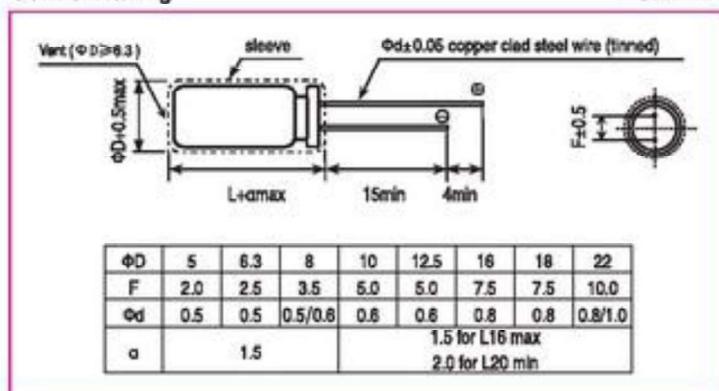
Guarantees 5000 hours at 105°C (Φ5 to 6.3: 3000 hours)

Outline Drawing

Unit: mm

Photo

RoHS



Marking color: White print on black sleeve

Specifications

No.	Item	Performance													
1	Temperature range (°C)	-40 to +105(6.3V~100V)						-25 to +105(160V~450V)							
2	Leakage current (μ A)	Less than 0.01CV or 3 whichever is larger (after one minutes)						Less than 0.03CV or 3 whichever is larger (after one minutes)							
		C: Rated Capacitance (μ F). V: Rated voltage (V) 20°C													
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	160-250	350-450	20°C		
		Tan δ (max)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.15	0.15	120Hz		
		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	160-250	350-450	120Hz
		Impedance	Z _{(-25℃)/Z_(+20℃)}			4	3	2	2	2	2	2	3	3	
		ratio (max)	Z _{(-40℃)/Z_(+20℃)}			8	6	4	3	3	3	3	8	-	
6	Endurance (105°C) (Applied ripple current)	Test time			Φ5~Φ6.3:3000hours, D≥Φ8:5000hours										
		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°C)	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-5102 and JIS-C-5141													

Coefficient of Frequency for Ripple Current

Frequency (Hz)	120	400	1K	10K	100K
CAP ≤ 10	1.00	1.82	1.91	2.50	2.94
10 < CAP ≤ 100	1.00	1.89	1.94	2.54	2.70
100 < CAP	1.00	1.34	1.25	1.73	1.92

Coefficient of Temperature for Ripple Current

Temperature(°C)	65	85	105
Coefficient	2.00	1.65	1.00

Dimension: Φ DXL(mm)

Ripple Current: mA/rms at 120Hz, 105°C

DIMENSION & PERMISSIBLE RIPPLE CURRENT

VDC Contents μ F	6.3V		10V		16V		25V	
	Φ DXL	mA	Φ DXL	mA	Φ DXL	mA	Φ DXL	mA
4.7							5X11	28
10					5X11	39	5X11	41
22	5X11	47	5X11	53	5X11	58	5X11	62
33	5X11	57	5X11	62	5X11	66	5X11	83
47	5X11	67	5X11	73	5X11	88	5X11	92
100	5X11	103	5X11	116	6.3X11	138	6.3X11	175
220	6.3X11	191	6.3X11	212	8X11.5	279	8X11.5	314
330	6.3X11	238	8X11.5	313	8X11.5	347	10X12.5	433
470	8X11.5	337	8X11.5	373	10X12.5	466	10X16	575
1000	10X12.5	564	10X16	698	10X20	825	12.5X20	1024
2200	12.5X20	1019	12.5X20	1105	12.5X25	1344	16X25	1639
3300	12.5X20	1287	12.5X25	1462	16X25	1755	16X31.5	1960
4700	16X25	1784	16X25	1885	16X31.5	2072	18X35.5	2530
6800	16X25	1964	16X31.5	2172	18X35.5	2743	22X40	3216
10000	16X31.5	2259	18X35.5	2610	18X40	3127		
15000	18X35.5	2752	18X40	2711	22X40	3757		
18000	18X40	3049	22X40	3132				
22000	22X40	3074						

VDC Contents μ F	35V		50V		63V		100V	
	Φ DXL	mA	Φ DXL	mA	Φ DXL	mA	Φ DXL	mA
0.1			5X11	1			5X11	4
0.22			5X11	3			5X11	6
0.33			5X11	4			5X11	7
0.47			5X11	8			5X11	9
1			5X11	14			5X11	18
2.2			5X11	22			5X11	23
3.3			5X11	33			5X11	37
4.7	5X11	30	5X11	41	5X11	44	5X11	44
10	5X11	44	5X11	59	5X11	65	6.3X11	67
22	5X11	74	6.3X11	99	6.3X11	96	8X11.5	121
33	5X11	88	6.3X11	127	8X11.5	160	10X12.5	183
47	6.3X11	132	6.3X11	146	8X11.5	191	10X16	243
100	8X11.5	220	8X11.5	252	10X12.5	276	12.5X20	435
220	10X12.5	374	10X16	560	10X20	554	16X25	1011
330	10X16	512	10X20	756	12.5X20	757	16X31.5	1179
470	10X20	664	12.5X20	881	12.5X25	987	18X40	2222
1000	12.5X25	1241	16X25	1626	18X31.5	1843		
2200	16X31.5	1783	18X35.5	2212	18X40	2079		
3300	18X35.5	2274	22X40	2828	22X35	2193		
4700	18X40	2875						

Dimension: Φ DXL(mm)

Ripple Current: mA/rms at 120Hz, 105°C

DIMENSION & PERMISSIBLE RIPPLE CURRENT

μF	V.DC Contents	160V		200V		250V		350V		400V		450V	
		Φ DXL	mA	Φ DXL	mA	Φ DXL	mA	Φ DXL	mA	Φ DXL	mA	Φ DXL	mA
0.47		6.3X11	14	6.3X11	12	6.3X11	9						
1		6.3X11	21	6.3X11	19	6.3X11	19	8X11.5	24	8X11.5	25	10X12.5	24
2.2		6.3X11	31	6.3X11	27	8X11.5	35	8X11.5	38	10X12.5	38	10X16	34
3.3		8X11.5	45	8X11.5	39	8X11.5	38	10X12.5	57	10X16	50	10X20	44
4.7		8X11.5	54	10X12.5	61	8X11.5	42	10X12.5	61	10X16	63	10X20	58
10		10X16	88	10X16	88	10X16	100	10X20	100	10X20	110	12.5X20	102
22		10X20	133	10X20	138	10X20	168	12.5X20	182	16X20	206	16X20	323
33		10X20	175	10X20	150	12.5X20	301	16X31.5	238	16X20	264	16X25	338
47		12.5X25	429	12.5X20	250	12.5X20	301	18X25	361	16X25	365	18X25	354
100		16X25	500	16X20	400	16X25	530						
150		18X25	830	18X31.5	680	18X25	550						
220		16X31.5	855	18X35.5	723	18X40	633						
270		18X40	972	18X40	1039								
330		22X40	1083										

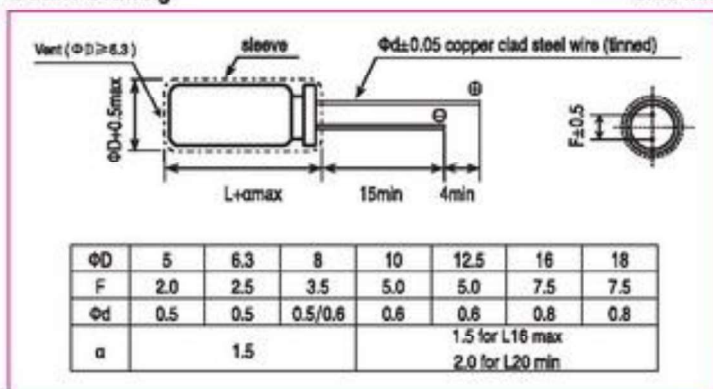
KLF Aluminum Electrolytic Capacitors

105°C Use, Long Life Capacitors, Series KLF

Guarantees 5000-10000 hours at 105°C

Outline Drawing

Unit: mm



Photo

RoHS



Marking color: White print on black sleeve

Specifications

No.	Item	Performance									
1	Temperature range (°C)	-40 to +105(10V~50V)					-25 to +105(160V~450V)				
2	Leakage current (μ A)	Less than 0.01CV or 3 whichever is larger (after one minutes)					Less than 0.03CV or 3 whichever is larger (after one minutes)				
		C: Rated Capacitance (μ F). V: Rated voltage (V) 20°C									
3	Capacitance tolerance (%)	±20 (20°C,120Hz)									
4	Tangent of the loss angle (Tan δ)	Rated voltage (V)	10	16	25	35	50	160-250	350-450	20°C,120Hz	
		Tan δ (max)	0.19	0.16	0.14	0.12	0.10	0.15	0.15		
		0.02 is added to every 1000 μ F increase over 1000 μ F									
5	Low temperature characteristics	Rated voltage (V)	10	16	25	35	50	160-250	350-450	120Hz	
		Impedance ratio (max)	Z(-25℃)/Z(+20℃)	4	3	2	2	2	3	6	
6	Endurance (105°C) (Applied ripple current)	Test time	D< Φ 8:5000 hours, Φ 8:8000 hours, D≥ Φ 10:10000hours								
		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°C)	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-5102 and JIS-C-5141									

Coefficient of Frequency for Ripple Current

Frequency (Hz)	120	1K	10K	100K~
Coefficient	0.50	0.80	0.85	1.00

Coefficient of Temperature for Ripple Current

Temperature	60 or less	85	105
Coefficient	2.00	1.40	1.00

Dimension: Φ D $\times$ L(mm)

Ripple Current: mA/rms at 100KHz, 105°C

DIMENSION & PERMISSIBLE RIPPLE CURRENT

V.DC Contents μ F	10V		16V		25V		35V		50V	
	Φ D $\times$ L	mA	Φ D $\times$ L	mA	Φ D $\times$ L	mA	Φ D $\times$ L	mA	Φ D $\times$ L	mA
6.8									5X11	75
10							5X11	65	5X11	85
22					5X11	105	5X11	120	6.3X11	130
33			5X11	100	5X11	125	6.3X11	155	8X11.5	210
47	5X11	90	5X11	150	6.3X11	200	8X11.5	235	8X11.5	250
68	5X11	115	6.3X11	190	8X11.5	255	8X11.5	280	10X12.5	310
100	6.3X11	185	8X11.5	230	8X11.5	285	10X12.5	360	10X16	450
150	6.3X11	245	8X11.5	260	10X12.5	400	10X16	550	10X20	650
220	6.3X11	310	10X12.5	400	10X16	535	10X20	700	12.5X20	850
330	8X11.5	415	10X16	510	10X20	700	12.5X20	900	12.5X25	1000
470	10X12.5	500	10X20	700	12.5X20	950	12.5X25	1020	16X25	1350
1000	10X16	920	12.5X20	1020	12.5X25	1350	16X31.5	1680	18X31.5	1820
2200	12.5X20	1450	16X25	1820	16X31.5	2280				
3300	16X25	1800								

V.DC Contents μ F	160V		200V		250V		350V		400V		450V	
	Φ D $\times$ L	mA	Φ D $\times$ L	mA	Φ D $\times$ L	mA	Φ D $\times$ L	mA	Φ D $\times$ L	mA	Φ D $\times$ L	mA
6.8							10X20	180	10X20	180	12.5X20	120
10	10X16	220	10X20	220	10X20	240	12.5X20	220	12.5X20	220	12.5X25	270
22	10X20	350	10X20	350	12.5X20	420	12.5X25	300	16X25	370	16X25	460
33	12.5X20	400	12.5X20	470	12.5X25	580	16X21	350	18X21	420	18X25	500
47	12.5X20	520	12.5X20	520	16X21	650	18X21	500	18X25	600	18X31.5	630
68	12.5X25	700	16X25	700	18X21	830	18X25	630	18X31.5	780		
100	18X21	920	18X21	920	18X25	1020						
150	18X25	1070	18X25	1070	18X31.5	1220						
220	18X25	1130	18X31.5	1300								