

ALUMINUM ELECTROLYTIC CAPACITORS

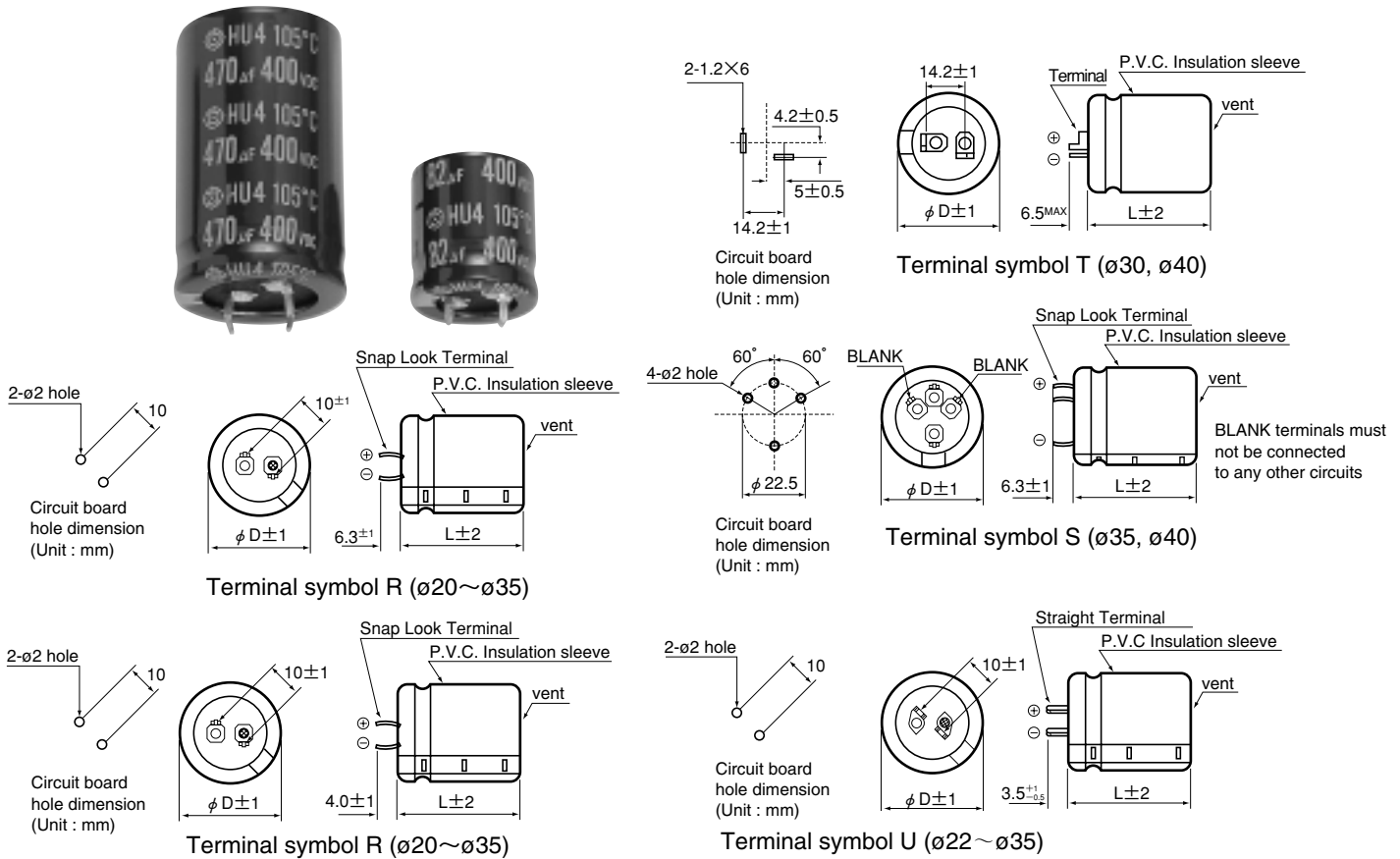
On-board self-supporting aluminum electrolytic capacitors

PS2 type	[High ripple current product]	(Warranty of 2,000 hours at 85°C)
US2 type	[High ripple current product]	(Warranty of 2,000 hours at 105°C)
HU5 type	[Small-sized product]	(Warranty of 2,000 hours at 105°C)
HU4 type	[Small-sized product]	(Warranty of 2,000 hours at 105°C)
HL2 type	[Long-life, small-sized product]	(Warranty of 5,000 hours at 105°C)
HP3 type	[Standard product]	(Warranty of 2,000 hours at 85°C)
HU3 type	[Standard product]	(Warranty of 2,000 hours at 105°C)
HL1 type	[Long-life, standard product]	(Warranty of 5,000 hours at 105°C)
HUL, HVL type	[Long-life, standard product]	(Warranty of 5,000 hours at 105°C)
XL1 type	[Long-life, standard product]	(Warranty of 10,000 hours at 105°C)
SS3 type	[Overvoltage-proof, small-sized product]	(Warranty of 2,000 hours at 105°C)
SS2 type	[Overvoltage-proof, small-sized product]	(Warranty of 2,000 hours at 105°C)
HF2 type	[Low type product]	(Warranty of 2,000 hours at 85°C)
HV2 type	[Low type product]	(Warranty of 2,000 hours at 105°C)

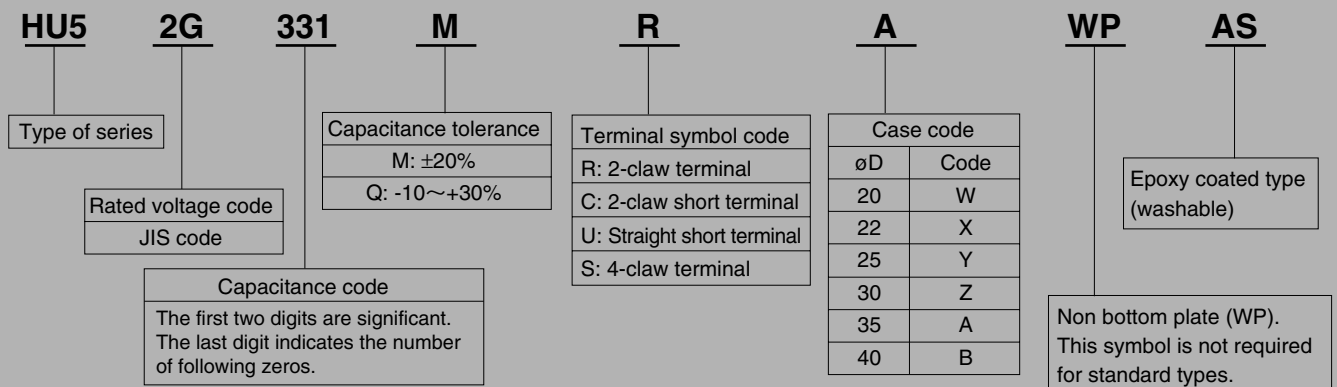
Features

- A large selection of series to meet the needs
- An extended range of standard values for each series
- Easily snapped in PC board and fixed by soldering
- The HL2 type is a small-size version of the predecessors named HL1 (5000 hours at 105°C).
- The HU4/HU5 type is a 10% smaller version of the preceding type named HU3 (2000 hours at 105°C).

Outline of drawings and dimensions



(Example) HU5 Series 400V.DC 330μF ±20% Terminal symbol R



New products

PS2, US2 type (PS2 type: Warranty of 2,000 hours at 85°C, US2 type: Warranty of 2,000 hours at 105°C)

Features

- The PS2 and US2 series are developed for the primary-side filter of the inverter or servo amplifier control circuit, and suitable for improvement of cost performance, being intended for a large-capacitance ripple current of $\phi 51$.



1) Higher ripple

- Higher ripple through improvement of heat radiation performance by new heat radiation construction
- Higher ripple through use of low-ESR material
Consequently, the permissible ripple current is improved by 27% in the windless status or 40% in the ventilated condition (0.5 m/s) as compared with conventional constructions (HP3, HU3 series).

2) Better installation method

- The blank (reinforcement) terminal is insulated through improvement of cap construction.
- Improvement in air exhaust (flow hole phenomenon) from the terminal insertion hole at solder fixing through improvement of cap construction.
- The operating space of the safety vent (arranged on the case bottom) is reduced from 5 mm (conventional necessary distance) into 1 mm through improvement of case construction. For these reasons, consideration is given to simplify pattern design.

Specifications

Item	Product specifications
Operating temperature range	PS2 : -40~+85°C US2 : -40~+105°C
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.01 CV (µA) or 5 (mA), whichever is smaller or less [C = Nominal capacitance (µF), V = Rated voltage (V)]
Dissipation factor	0.15 or less (20°C, 120 Hz)
Permissible ripple current	Described in the table of standard ratings.
High-temperature ripple load	After the rated voltage (specified ripple current convolution) is applied at the maximum operating temperature for 2000 hours, the following values are satisfied. Capacitance tolerance: ±15% or less of the initial value Dissipation factor: 175% or less of the specified initial value Leakage current: Specified initial value or less
Related standard	JIS-C-5101-4

Ripple current correction coefficient

1). Temperature correction coefficient

Temperature (°C)	PS2 (85°C)	US2 (105°C)
40	1.89	2.50
60	1.51	2.00
85	1.00	1.63
100	—	1.00

2). Frequency correction coefficient

Frequency (Hz)	PS2, US2 (85°C)
50/60	0.70
120	1.00
300	1.10
1K	1.30
10K \leq	1.40

3). Wind speed correction coefficient

Wind speed (m / s)	PS2, US2
0.5 >	1.00
0.5 \leq	1.10

Table of standard ratings

PS2 (85°C/2000h)

Item	Rated voltage V. DC (Code)				
	200V (2D)	250V (2E)	400V (2G)	420V (420V)	450V (2W)
	$\phi 51$				
Size (L)	Upper: nominal capacitance (µF) Lower: Max ripple current (Arms)120 Hz, 85°C				
51mm	3300	2700	1000	820	820
	7.07	6.40	5.88	5.11	5.11
61mm	3900	3300	1200	1200	1000
	7.76	7.14	6.51	6.25	5.70
71mm	4700	3900	1500	1500	1200
	8.49	7.73	7.25	6.96	6.22

US2 (105°C/2000h)

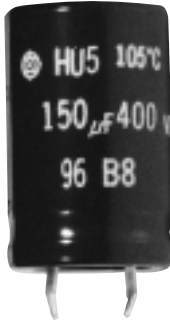
Item	Rated voltage V. DC (Code)				
	200V (2D)	250V (2E)	400V (2G)	420V (420V)	450V (2W)
	$\phi 51$				
Size (L)	Upper: nominal capacitance (µF) Lower: Max ripple current (Arms)120 Hz, 105°C				
51mm	2700	1800	820	820	680
	4.84	3.95	4.03	3.87	3.52
61mm	3900	2700	1200	1000	820
	5.87	4.88	4.92	4.31	3.90
71mm	4700	3300	1500	1200	1000
	6.42	5.38	5.48	4.71	4.30

ALUMINUM ELECTROLYTIC CAPACITORS

HU4/HU5 Series (105°C, Small Size, Warranty of 2,000 hours at 105°C)

Features

- The size is reduced by around 10%, of conventional HU3 series through development of electrolyte liquid and etched foil technology.



Product Specifications

Items	Specifications
Temperature range	-40°C to +105°C
Rated voltage	200 to 450V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	0.02CV (μA) or 3mA, whichever is smaller. [C=Capacitance (μF), V=Rated voltage (V)]
Dissipation factor	Less than 0.15 (20°C, 120Hz)
Permissible ripple current	As per table of standard ratings below. (105°C, 120Hz)
High temp. Load life test	After 105°C, 2000h, rated voltage (specified ripple current superposition) application Capacitance variation : Initial value ±15% Dissipation factor : 175% of less of specified initial value Leakage current : Not greater than the specified initial value
Others	JIS C 5101-4.

Ripple current correction coefficient

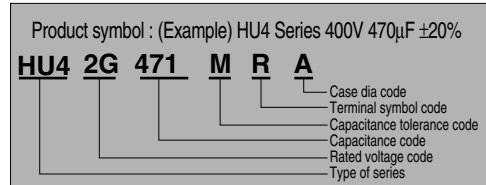
Temperature (°C)	40	60	70	85	105
Correction coefficient	2.5	2.2	2.0	1.8	1.0
Frequency (Hz)	50/60	120	300	1K	≥10K
Correction coefficient	0.7	1.0	1.1	1.3	1.4

A continuous load should be avoided over 10 A at the terminal in accordance with the permissible current.

Standard value and case size

Capacitance μF	Code	Rated voltage V.DC (Code)																								
		200 (2D)					250 (2E)					400 (2G)					420 (420V)					450 (2W)				
47	470	↑ Case dia dimensions øD (mm) Upper : Case size L (mm) Lower : Max ripple current (Arms) / 105°C, 120Hz																								
56	560	25	30	35	40	45	25	30	35	40	45	25	30	35	40	45	25	30	35	40	45	25	30	35	40	45
68	680	0.47	0.52	0.56	0.61	0.67	0.47	0.52	0.56	0.61	0.67	0.47	0.52	0.56	0.61	0.67	0.47	0.52	0.56	0.61	0.67	0.47	0.52	0.56	0.61	0.67
82	820	0.61	0.67	0.72	0.78	0.85	0.61	0.67	0.72	0.78	0.85	0.61	0.67	0.72	0.78	0.85	0.61	0.67	0.72	0.78	0.85	0.61	0.67	0.72	0.78	0.85
100	101	0.87	0.96	1.07	1.14	1.24	0.87	0.96	1.07	1.14	1.24	0.87	0.96	1.07	1.14	1.24	0.87	0.96	1.07	1.14	1.24	0.87	0.96	1.07	1.14	1.24
120	121	1.07	1.14	1.24	1.32	1.42	1.07	1.14	1.24	1.32	1.42	1.07	1.14	1.24	1.32	1.42	1.07	1.14	1.24	1.32	1.42	1.07	1.14	1.24	1.32	1.42
150	151	1.24	1.32	1.42	1.51	1.61	1.24	1.32	1.42	1.51	1.61	1.24	1.32	1.42	1.51	1.61	1.24	1.32	1.42	1.51	1.61	1.24	1.32	1.42	1.51	1.61
180	181	1.42	1.51	1.61	1.71	1.81	1.42	1.51	1.61	1.71	1.81	1.42	1.51	1.61	1.71	1.81	1.42	1.51	1.61	1.71	1.81	1.42	1.51	1.61	1.71	1.81
220	221	1.61	1.71	1.81	1.91	2.01	1.61	1.71	1.81	1.91	2.01	1.61	1.71	1.81	1.91	2.01	1.61	1.71	1.81	1.91	2.01	1.61	1.71	1.81	1.91	2.01
270	271	1.81	1.91	2.01	2.11	2.21	1.81	1.91	2.01	2.11	2.21	1.81	1.91	2.01	2.11	2.21	1.81	1.91	2.01	2.11	2.21	1.81	1.91	2.01	2.11	2.21
330	331	2.01	2.11	2.21	2.31	2.41	2.01	2.11	2.21	2.31	2.41	2.01	2.11	2.21	2.31	2.41	2.01	2.11	2.21	2.31	2.41	2.01	2.11	2.21	2.31	2.41
390	391	2.21	2.31	2.41	2.51	2.61	2.21	2.31	2.41	2.51	2.61	2.21	2.31	2.41	2.51	2.61	2.21	2.31	2.41	2.51	2.61	2.21	2.31	2.41	2.51	2.61
470	471	2.41	2.51	2.61	2.71	2.81	2.41	2.51	2.61	2.71	2.81	2.41	2.51	2.61	2.71	2.81	2.41	2.51	2.61	2.71	2.81	2.41	2.51	2.61	2.71	2.81
560	561	2.61	2.71	2.81	2.91	3.01	2.61	2.71	2.81	2.91	3.01	2.61	2.71	2.81	2.91	3.01	2.61	2.71	2.81	2.91	3.01	2.61	2.71	2.81	2.91	3.01
680	681	2.81	2.91	3.01	3.11	3.21	2.81	2.91	3.01	3.11	3.21	2.81	2.91	3.01	3.11	3.21	2.81	2.91	3.01	3.11	3.21	2.81	2.91	3.01	3.11	3.21
820	821	3.01	3.11	3.21	3.31	3.41	3.01	3.11	3.21	3.31	3.41	3.01	3.11	3.21	3.31	3.41	3.01	3.11	3.21	3.31	3.41	3.01	3.11	3.21	3.31	3.41
1000	102	3.21	3.31	3.41	3.51	3.61	3.21	3.31	3.41	3.51	3.61	3.21	3.31	3.41	3.51	3.61	3.21	3.31	3.41	3.51	3.61	3.21	3.31	3.41	3.51	3.61
1200	122	3.41	3.51	3.61	3.71	3.81	3.41	3.51	3.61	3.71	3.81	3.41	3.51	3.61	3.71	3.81	3.41	3.51	3.61	3.71	3.81	3.41	3.51	3.61	3.71	3.81
1500	152	3.61	3.71	3.81	3.91	4.01	3.61	3.71	3.81	3.91	4.01	3.61	3.71	3.81	3.91	4.01	3.61	3.71	3.81	3.91	4.01	3.61	3.71	3.81	3.91	4.01
1800	182	3.81	3.91	4.01	4.11	4.21	3.81	3.91	4.01	4.11	4.21	3.81	3.91	4.01	4.11	4.21	3.81	3.91	4.01	4.11	4.21	3.81	3.91	4.01	4.11	4.21
2200	222	4.01	4.11	4.21	4.31	4.41	4.01	4.11	4.21	4.31	4.41	4.01	4.11	4.21	4.31	4.41	4.01	4.11	4.21	4.31	4.41	4.01	4.11	4.21	4.31	4.41

HU5 series



Case dia code

øD	Code
20	W
22	X
25	Y
30	Z
35	A

ALUMINUM ELECTROLYTIC CAPACITORS

Standard value and case size for HP3 Series (160 to 250V.DC)

Capacitance		Rated voltage V.DC (Code)																												
		160 (2C)				180 (2P)				200 (2D)				250 (2E)																
μF	Code	22	25	30	35	22	25	30	35	40	22	25	30	35	40	22	25	30	35	40										
220	221	Case dia dimensions øD (mm)														25					25									
		Upper : Case size L (mm) Lower : Max Ripple current rms at 85°C 120Hz														1.36					1.36									
270	271										25					30	25				30	25								
											1.50					1.60	1.58				1.60	1.58								
330	331					25					30	25				35	30				35	30								
						1.38					1.76	1.89				1.87	1.86				1.87	1.86								
390	391	25				30	25				30	25				35	30	25			35	30	25							
		1.86				1.60	1.58				1.92	1.90				2.04	2.04	2.04			2.04	2.04	2.04							
470	471	30	25			30	25				35	30	25			40	35	25	25		40	35	25	25						
		1.76	1.74			1.76	1.74				2.23	2.23	2.23			2.35	2.35	2.24	2.38		2.35	2.35	2.24	2.38						
560	561	35	30			35	30	25			40	35	25			50	40	30	25		50	40	30	25						
		2.03	2.02			2.03	2.03	2.03			2.57	2.57	2.44			2.81	2.69	2.59	2.59		2.81	2.69	2.59	2.59						
680	681	40	30	25		40	35	25			45	35	30	25			45	35	30			45	35	30						
		2.36	2.24	2.24		2.36	2.35	2.24			2.98	2.86	2.86	2.86			3.11	3.01	3.01			3.11	3.01	3.01						
820	821	45	35	30		45	40	30	25			40	30	25			50	40	30			50	40	30						
		2.72	2.61	2.61		2.72	2.72	2.61	2.61			3.26	3.13	3.13			3.55	3.47	3.31			3.55	3.47	3.31						
1000	102	50	40	30	25		45	35	25			50	35	30				45	35				45	35						
		3.13	3.00	2.88	2.88		3.14	3.04	2.88			3.92	3.64	3.66				4.00	3.88				4.00	3.88						
1200	122		45	35	30		50	40	30				40	35				50	40	36			50	40	36					
			3.44	3.34	3.34		3.59	3.49	3.34				4.19	4.25				4.55	4.40	4.46			4.55	4.40	4.46					
1500	152			40	35			45	35					40	36					50	41			50	41					
				3.91	3.96			4.08	3.96					4.93	4.99					5.34	5.29			5.34	5.29					
1800	182			45	35				40	36				50	41						51				51					
				4.47	4.34				4.50	4.56				5.84	5.66						6.11				6.11					

Standard value and case size for HP3 Series (350 to 450 V.DC)

Capacitance		Rated voltage V.DC (Code)																									
		350 (2V)				400 (2G)				420 (420V)				450 (2W)													
μF	Code	22	25	30	35	40	22	25	30	35	40	22	25	30	35	40	22	25	30	35	40						
68	680											25															
												0.67															
82	820						25					30					30	25									
							0.83					0.79					0.89	0.88									
100	101	25					30	25				30	25			35	30	25			35	30	25				
		0.76					0.97	0.96				0.87	0.86			1.03	1.03	1.03			1.03	1.03	1.03				
120	121	30	25				30	25				35	30			40	30	25			40	30	25				
		0.89	0.88				1.07	1.06				1.00	1.00			1.19	1.13	1.13			1.19	1.13	1.13				
150	151	30	25				35	30	25			40	35	25		45	35	30			45	35	30				
		0.99	0.98				1.26	1.26	1.26			1.19	1.19	1.14		1.39	1.34	1.34			1.39	1.34	1.34				
180	181	35	30	25			40	35	25			45	40	30	25	50	40	30	25		50	40	30	25			
		1.15	1.15	1.15			1.46	1.45	1.38			1.36	1.37	1.32	1.32	1.60	1.52	1.46	1.46		1.60	1.52	1.46	1.46			
220	221	40	35	25			50	40	30	25			45	35	30			45	35	30			45	35	30		
		1.34	1.34	1.28			1.76	1.69	1.62	1.62			1.58	1.54	1.54			1.76	1.72	1.72			1.76	1.72	1.72		
270	271	50	40	30	25			45	35	30			50	35	30				40	35				40	35		
		1.63	1.56	1.50	1.50			1.96	1.90	1.90			1.83	1.71	1.71				1.99	2.02				1.99	2.02		
330	331		45	35	30			50	40	30				40	35				45	35				45	35		
			1.80	1.75	1.75			2.26	2.19	2.10				1.98	1.98				2.29	2.23				2.29	2.23		
390	391		50	40	30				45	35			50	40	36				40	36				40	36		
			2.04	1.99	1.90				2.50	2.42				2.34	2.25	2.29				2.51	2.54				2.51	2.54	
470	471			40	35					40	36				45	41				45	41				45	41	
				2.19	2.22					2.76	2.80				2.59	2.62				2.88	2.89				2.88	2.89	
560	561			50	40	36				45	41				50							51				51	
				2.59	2.54	2.54				3.13	3.16				2.93							3.41				3.41	
680	681				45	41					50																
					2.88	2.90					3.59																

ALUMINUM ELECTROLYTIC CAPACITORS

HU3 Series (105°C, Standard Size) (Warranty of 2,000 hours at 105°C)

Features

- The size is reduced by 20 to 30% of conventional HUR and HVR through development of etched foil technology.



Product Specifications (HU3 Series)

Items	Specifications																					
Temperature range	-40°C to +105°C																					
Rated voltage	16 to 450V.DC																					
Capacitance tolerance	±20% (20°C, 120Hz)																					
Leakage current	0.02CV (µA) or 3mA, whichever is smaller. [C=Capacitance (µF), V=Rated voltage (V)]																					
Dissipation factor	16~100V.DC Less than the value as per table of standard ratings below.																					
	(20°C, 120Hz) 160~450V.DC Less than 0.15																					
Permissible ripple current	As per table of standard ratings below. (105°C, 120Hz)																					
Permissible ripple current correction coefficient	Frequency correction coefficient																					
	<table border="1"> <thead> <tr> <th>Rated voltage (V)</th> <th>Frequency (Hz)</th> <th>50/60</th> <th>120</th> <th>300</th> <th>1K</th> <th>≥10K</th> </tr> </thead> <tbody> <tr> <td>16~100V</td> <td></td> <td>0.8</td> <td>1.0</td> <td>1.1</td> <td>1.2</td> <td>1.2</td> </tr> <tr> <td>160~450V</td> <td></td> <td>0.8</td> <td>1.0</td> <td>1.1</td> <td>1.3</td> <td>1.4</td> </tr> </tbody> </table>	Rated voltage (V)	Frequency (Hz)	50/60	120	300	1K	≥10K	16~100V		0.8	1.0	1.1	1.2	1.2	160~450V		0.8	1.0	1.1	1.3	1.4
	Rated voltage (V)	Frequency (Hz)	50/60	120	300	1K	≥10K															
	16~100V		0.8	1.0	1.1	1.2	1.2															
160~450V		0.8	1.0	1.1	1.3	1.4																
Temperature correction coefficient																						
<table border="1"> <thead> <tr> <th>Rated voltage (V)</th> <th>Temperature (°C)</th> <th>40</th> <th>60</th> <th>70</th> <th>85</th> <th>105</th> </tr> </thead> <tbody> <tr> <td>16~450V</td> <td></td> <td>2.5</td> <td>2.2</td> <td>2.0</td> <td>1.8</td> <td>1.0</td> </tr> </tbody> </table>	Rated voltage (V)	Temperature (°C)	40	60	70	85	105	16~450V		2.5	2.2	2.0	1.8	1.0								
Rated voltage (V)	Temperature (°C)	40	60	70	85	105																
16~450V		2.5	2.2	2.0	1.8	1.0																
High temp.	After 105°C, 2000h, rated voltage (specified ripple current superposition) application Capacitance variation : Initial value ±15%																					

Standard value and case size for HU3 Series (16 to 100 V.DC)

Capacitance	Rated voltage V.DC (Code)																												
	16 (1C)				25 (1E)				35 (1V)				50 (1H)				63 (1J)				80 (1K)				100 (2A)				
µF	Code	22	25	30	35	22	25	30	35	22	25	30	35	22	25	30	35	22	25	30	35	22	25	30	35	22	25	30	35
1000	102	Case dia dimensions øD (mm)																											
1500	152	Upper : Case size L (mm) Middle : Dissipation factor Lower : Max ripple current (Arms) / 105°C 120Hz																											
2200	222									25				30	25			35	30	25		50	40	30	25	45	35		
3300	332					25				30	25			35	30	25		45	40	30	25	50	40	30		45	35		
4700	472	25				30	25			35	30	25		45	35	30	25	50	35	30		50	40						45
6800	682	0.50				0.40	0.40			0.35	0.35	0.35		0.30	0.30	0.30	0.30	0.25	0.25	0.25		0.25	0.25	0.25		0.25	0.25		0.25
10000	103	0.93				1.00	0.98			1.05	1.05	1.05		1.16	1.11	1.12	1.12	1.27	1.18	1.18		1.34	1.30						1.35
15000	153	35	30			35	30	25		50	40	30	25	50	35	30		50	35	30		50	40						50
22000	223	0.50	0.50			0.40	0.40	0.40		0.35	0.35	0.35	0.35	0.30	0.30	0.30	0.30	0.25	0.25	0.25		0.25	0.25			0.25	0.25		0.25
33000	333	1.27	1.27			1.27	1.27	1.27		1.46	1.40	1.34	1.34	1.53	1.42	1.42		1.55	1.56			1.69							1.69
		45	35	25		45	35	30	25	50	35	30		45	40			50				50							50
		0.50	0.50	0.50		0.40	0.40	0.40	0.40	0.35	0.35	0.35		0.35	0.35			0.35	0.35			0.35				0.35			0.35
		1.43	1.36	1.30		1.43	1.38	1.38	1.38	1.57	1.46	1.46		1.59	1.60			1.74				1.74							1.74
			45	35	30		45	35	30		50	40					50												50
		0.50	0.50	0.50		0.40	0.40	0.40		0.35	0.35			0.35	0.35			0.35				0.35				0.35			0.35
		1.84	1.78	1.78		1.84	1.78	1.78		2.03	1.96			2.13															2.13
			45	35			45	40																					
			0.50	0.50			0.40	0.40																					
			2.36	2.27			2.36	2.38																					
				50				50																					
				0.50				0.40																					
				2.95				2.95																					

Product symbol : (Example) HU3 Series 16V 10,000µF ±20%

HU3 1C 103 M R X

- Case dia code
- Terminal symbol code
- Capacitance tolerance code
- Capacitance code
- Rated voltage code
- Type of series

Case dia code

øD	Code
22	X
25	Y
30	Z
35	A
40	B

ALUMINUM ELECTROLYTIC CAPACITORS

Standard value and case size for HU3 Series (160 to 250 V.DC)

Capacitance		Rated voltage V.DC (Code)																								
μF	Code	160 (2C)					180 (2P)					200 (2D)					250 (2E)									
		22	25	30	35	40	22	25	30	35	40	22	25	30	35	40	22	25	30	35	40					
150	151	Case dia dimensions ϕD (mm) Upper : Case size L (mm) Lower : Max ripple current (Arms) 105°C 120Hz																								
180	181																									
220	221											25					30	25								
270	271						25					0.92					1.00	0.98								
330	331	25					30	25				30	25				35	30	25							
390	391	1.10	1.09				1.10	1.09				1.39	1.31				1.48	1.46	1.39							
470	471	1.21	1.19				1.28	1.28	1.28				1.62	1.52	1.54				1.76	1.69	1.63	1.62				
560	561	1.40	1.40	1.40				1.47	1.40	1.40				1.85	1.75	1.78				1.93	1.87	1.78				
680	681	1.62	1.61	1.54				1.70	1.63	1.63	1.63				2.04	2.04	1.96	1.96				2.22	2.06	2.06		
820	821	1.86	1.86	1.79	1.79				1.94	1.87	1.79	1.79				2.34	2.27	2.27				2.48	2.41			
1000	102	2.15	2.09	1.98				2.15	2.09	2.09				2.70	2.63	2.51				2.76	2.80					
1200	122	2.46	2.29	2.29				2.39	2.29				3.00	2.92				3.14	3.17							
1500	152	2.80	2.72				2.91	2.72				3.38	3.43				3.66									
1800	182	3.09	3.13	40	36				3.09	3.13	40	36				4.01	3.89	50	41				51	4.20		

Standard value and case size for HU3 Series (350 to 450 V.DC)

Capacitance		Rated voltage V.DC (Code)																						
μF	Code	350 (2V)					400 (2G)					420				450 (2W)								
		22	25	30	35	40	22	25	30	35	40	22	25	30	35	22	25	30	35					
47	470	Case dia dimensions ϕD (mm) Upper : Case size L (mm) Lower : Max Ripple current (Arms) 105°C 120Hz																						
68	680	0.52					0.52					0.50				0.55	0.54							
82	820	0.47					0.60	0.60				0.54	0.54			0.64	0.64							
100	101	0.56	0.55				0.67	0.66				0.63	0.63			0.74	0.74	0.71						
120	121	0.61	0.60				0.78	0.77	0.78				0.73	0.70	0.70			0.85	0.80	0.82	0.82			
150	151	0.72	0.72	0.72				0.91	0.91	0.92				0.86	0.82	0.83			1.00	0.96	0.96			
180	181	0.83	0.83	0.84				1.04	1.04	1.01	1.01				0.94	0.91	0.90			1.14	1.06	1.06		
220	221	1.01	0.96	0.93	0.93				1.21	1.18	1.18				1.13	1.05	1.05			1.22	1.24			
270	271	1.12	1.09	1.09				1.40	1.37	1.31				1.22	1.23			1.48	1.43					
330	331	1.29	1.26	1.20				1.57	1.52				1.49	1.41				1.64						
390	391	1.43	1.38				1.73	1.74				1.61				1.86								
470	471	1.58	1.60	40	36				1.97	1.95	45	41				1.85	50							
560	561	1.79	1.80	45	41				2.23	50														

ALUMINUM ELECTROLYTIC CAPACITORS

HL1 type

(Warranty of 5,000 hours at 105°C, long-life, high-reliability, small-sized product)

Features

- The size of the 200 V. DC to 400 V. DC series of the HUL type and HVL type is reduced and the 450 V. DC series is added.



Product Specifications

Items	Specifications
Temperature range	-40°C~+105°C
Capacitance tolerance	±20% (20°C,120Hz)
Rated voltage	200~450V.DC
Leakage current	0.02 CV (µA) or 3 mA, whichever is smaller or less [C = Nominal capacitance (µF), V = Rated voltage (V)]
Dissipation factor	0.15 or less (20°C,120Hz)
Permissible ripple current	As per the following "Standard value and case size". (105°C,120Hz)
High-temperature load	After the rated voltage (specified ripple current convolution) is applied at 105°C for 5000 hours: Capacitance tolerance: ±15% or less of the initial value Dissipation factor: 175% or less of the specified initial value Leakage current: Specified initial value or less
Others	JIS C 5101-4.

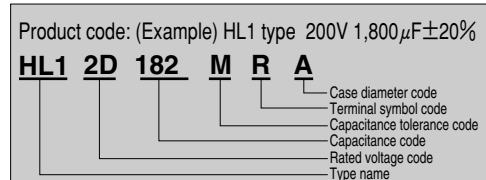
Ripple current correction coefficient

Frequency (Hz)	50/60	120	300	1K	≥10K
Correction coefficient	0.8	1.0	1.1	1.3	1.4
Temperature (°C)	40	60	70	85	105
Correction coefficient	2.5	2.2	2.0	1.8	1.0

A continuous load should be avoided over 10 A at the terminal in accordance with the permissible current.

Standard value and case size

Capacitance µF	Code	Rated voltage V. DC (code)															
		200 (2D)				250 (2E)				400 (2G)				450 (2W)			
		22	25	30	35	22	25	30	35	22	25	30	35	22	25	30	35
47	470	Case dia. dimension φD (mm) Upper: Case size L (mm) Lower: Max ripple current (Arms) /105°C 120Hz															
56	560													25			
68	680									25				0.34			
82	820									0.41				30			
100	101									0.48				0.41			
120	121									35	30			0.46			
150	151					25				0.57	0.55			0.51	0.50		
180	181					0.62				40	35	25		0.60	0.59	0.56	
220	221	25				0.73	0.70			45	40	30		0.73	0.67	0.66	0.66
270	271	30	25			0.81				50	35	30		0.80	0.78	0.78	
330	331	35	30			0.95	0.92			55	50	45	35	1.03	1.00		
390	391	40	35	25		1.05	1.01			60	55	50	40	1.20	1.16		
470	471	45	35	30		1.11	1.07	1.03		65	60	55	45	1.45			
560	561	50	40	30		1.27	1.23	1.20		70	65	60	50	1.66			
680	681	55	45	35	25	1.40	1.29	1.32		75	70	65	55				
820	821	60	50	40	30	1.59	1.48	1.44		80	75	70	60				
1000	102	65	55	45	35	1.77	1.67	1.58		85	80	75	65				
1200	122	70	60	50	40	1.92	1.83			90	85	80	70				
1500	152	75	65	55	45	2.09	1.94			95	90	85	75				
1800	182	80	70	60	50	2.22	2.15			100	95	90	80				
		85	75	65	55	2.53	2.44			105	100	95	85				
		90	80	70	60	2.85				110	105	100	90				
		95	85	75	65	3.25				115	110	105	95				



Case dia code

φ D	Code
22	X
25	Y
30	Z
35	A

ALUMINUM ELECTROLYTIC CAPACITORS

ALUMINUM ELECTROLYTIC CAPACITORS

HUL type, HVL type (Warranty of 5,000 hours at 105°C, long-life, high-reliability product)

Features

- Series with the guaranty of long life at high temperature for low-voltage applications that has been used.



Product Specifications

Items	Specifications
Temperature range	-40°C ~ +105°C
Capacitance tolerance	±20% (20°C, 120Hz)
Rated voltage	16~100V.DC
Leakage current	0.02 CV (μA) or 3 mA, whichever is smaller or less [C = Nominal capacitance (μF), V = Rated voltage (V)]
Dissipation factor	Value shown in the table of standard value and case size or less (20°C, 120Hz)
Permissible ripple current	As per the following "Standard value and case size". (105°C, 120Hz)
High-temperature load	After the rated voltage (specified ripple current convolution) is applied at 105°C for 5000 hours: Capacitance tolerance: ±15% or less of the initial value Dissipation factor: 175% or less of the specified initial value Leakage current: Specified initial value or less
Others	JIS C 5101-4.

Ripple current correction coefficient

Frequency (Hz)	50/60	120	300	1K	≥10K
Correction coefficient	0.8	1.0	1.1	1.3	1.4
Temperature (°C)	40	60	70	85	105
Correction coefficient	2.5	2.2	2.0	1.8	1.0

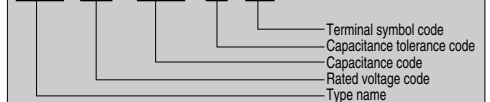
A continuous load should be avoided over 10 A at the terminal in accordance with the permissible current.

Standard value and case size

Capacitance		Rated voltage V. DC (code)											
		16 (1C)		25 (1E)		35 (1V)		50 (1H)		80 (1K)		100 (2A)	
μF	Code	HUL	HVL	HUL	HVL	HUL	HVL	HUL	HVL	HUL	HVL	HUL	HVL
220	221	Upper: Case size φ DXL (mm) Middle: Dissipation factor Lower: Max ripple current (Arms)/105°C, 120 Hz										22×25	25×25
												0.15	0.15
												0.43	0.44
330	331									22×25		22×30	30×25
										0.15		0.15	0.15
										0.52		0.56	0.58
470	471									22×30	25×25	22×40	30×30
										0.15	0.15	0.15	0.15
										0.67	0.64	0.74	0.73
680	681									22×40	30×25	22×50	35×30
										0.15	0.15	0.15	0.15
										0.89	0.83	0.98	0.93
1000	102							22×30	25×25	22×50	35×30	30×50	35×35
								0.20	0.20	0.15	0.15	0.15	0.15
								0.84	0.80	1.18	1.13	1.29	1.19
1500	152					22×30	25×25	22×35	30×25	30×50	35×35	35×50	
						0.20	0.25	0.20	0.20	0.15	0.15	0.15	
						1.03	0.88	1.09	1.07	1.58	1.46	1.65	
2200	222			22×30	25×25	22×35	30×25	22×50	30×30	35×50			
				0.25	0.25	0.20	0.25	0.20	0.20	0.15			
				1.12	1.07	1.32	1.16	1.52	1.38	2.00			
3300	332	22×30	25×25	22×35	30×25	22×50	30×30	25×50	35×35				
		0.25	0.35	0.25	0.25	0.20	0.25	0.20	0.20				
		1.37	1.10	1.44	1.42	1.86	1.51	1.89	1.87				
4700	472	22×40	30×25	22×40	30×30	25×50	35×35	30×50					
		0.25	0.35	0.25	0.25	0.20	0.25	0.25					
		1.81	1.43	1.81	1.52	2.02	2.00	2.16					
6800	682	22×50	30×30	25×50	35×30	30×50							
		0.25	0.35	0.25	0.35	0.25							
		2.39	1.83	2.43	1.93	2.60							
10000	103	25×50	35×35	30×50									
		0.35	0.35	0.35									
		2.49	2.46	2.67									
15000	153	35×50											
		0.35											
		3.42											

Product code: (Example) HUL type 100V 1,500μF±20%

HUL 2A 152 M ()



* Fill in this item except 2-claw terminal.

ALUMINUM ELECTROLYTIC CAPACITORS

XL1 type (Warranty of 10,000 hours at 105°C, long-life product)

Features

- Warranty of 10,000 hours at 105°C through improvement of electrolyte liquid and etched foil technology



Product Specifications

Items	Specifications
Temperature range	-40°C ~ +105°C
Capacitance tolerance	±20% (20°C, 120Hz)
Rated voltage	200~450V.DC
Leakage current	0.02 CV (μ A) or 3 mA, whichever is smaller or less [C = Nominal capacitance (μ F), V = Rated voltage (V)]
Dissipation factor	200,250V.DC.....0.15 or less (20°C, 120Hz) 400,450V.DC.....0.25 or less (20°C, 120Hz)
Permissible ripple current	As per the following "Standard value and case size". (105°C, 120Hz)
High-temperature load	After the rated voltage (specified ripple current convolution) is applied at 105°C for 10,000 hours: Capacitance tolerance: ±15% or less of the initial value Dissipation factor: 200% or less of the specified initial value Leakage current: Specified initial value or less
Others	JIS C 5101-4.

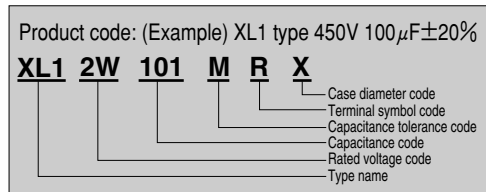
Ripple current correction coefficient

Frequency (Hz)	50/60	120	300	1K	≥10K
Correction coefficient	0.7	1.0	1.1	1.3	1.4
Temperature (°C)	40	60	70	85	105
Correction coefficient	2.5	2.2	2.0	1.8	1.0

A continuous load should be avoided over 10 A at the terminal in accordance with the permissible current.

Standard value and case size

Capacitance	Code	Rated voltage V. DC (code)																
		200 (2D)				250 (2E)				400 (2G)				450 (2W)				
μ F		22	25	30	35	22	25	30	35	22	25	30	35	22	25	30	35	
39	390	Upper: Case size L (mm) Lower: Max ripple current (Arms)/105°C 120Hz																
47	470													25				
56	560									25				35				
68	680									30				40				
82	820									35	25			40	35	25		
100	101									40	30			50	40	30		
120	121									45	35	25				45	35	30
150	151					25				50	40	30	25			50	40	30
180	181					0.62				0.82	0.76	0.74	0.75			0.83	0.81	0.78
220	221					30	25			0.73	0.70					45	35	30
270	271					0.86	0.83							50	40	30		
330	331					25								1.00	0.99	0.94		
390	391					30	25									45	35	30
470	471					0.90	0.86									50		
560	561					1.40	1.29	1.24								1.15	1.11	
680	681					1.05	1.01									1.32	1.28	
820	821					1.16	1.07	1.03								1.45		
1000	102					1.32	1.23	1.20								1.66		
1200	122					1.42	1.39	1.40										
1500	152					1.59	1.48	1.44										
						1.70	1.67	1.67										
						1.94	1.92	1.83										
						2.22	2.15											
						2.53	2.44											
						2.85												



Case dia code

ϕ D	Code
22	X
25	Y
30	Z
35	A

ALUMINUM ELECTROLYTIC CAPACITORS

ALUMINUM ELECTROLYTIC CAPACITORS

SS3 Series (Overvoltage-resistant and small size) (Warranty of 2,000 hours at 105°C)

SS2 Series (Overvoltage-resistant and standard size) (Warranty of 2,000 hours at 105°C)

Features

- SS2 series has good safe characteristics which shall be failed with open mode without catching any spike or fire when it is applied excess voltage.
- SS3 series is smaller sized versions of SS2 400V type.



Product Specifications

Items	Specifications
Temperature range	-40°C to +105°C
Rated voltage	200 to 450V.DC
Capacitance tolerance	±20% (20°C, 120Hz)
Leakage current	200V : $\sqrt{CV} / 5$ (μA) 400V : $\sqrt{CV} / 3$ (μA) [C=Capacitance (μF), V=Rated voltage (V)]
Dissipation factor	Less than 0.15 (20°C, 120Hz)
Permissible ripple current	As per table of standard ratings below. (105°C, 120Hz)
High temp. Load life test	After 85°C, 2000h, rated voltage (specified ripple current superposition) application Capacitance variation : Initial value ±15% Dissipation factor : 175% of less of specified initial value Leakage current : Not greater than the specified initial value
Withstanding	Do not catch any spike of fire when capacitor is applied.
Others	JIS C 5101-4.

Ripple current correction coefficient

Temperature (°C)	40	60	70	85	105
Correction coefficient	2.5	2.2	2.0	1.8	1.0
Frequency (Hz)	50/60	120	300	1K	≥10K
Correction coefficient	0.8	1.0	1.1	1.3	1.4

Over voltage test conditions

Voltage (V.DC)	Item		Test condition	
	Capacitance (μF)	Voltage	Voltage	Current
200	≤330	DC300V and 375V		4A
	≤330~470			5A
	470≤			7A
400	≤100	DC500V and 600V		2A
	≤100~220			4A
	220≤			7A

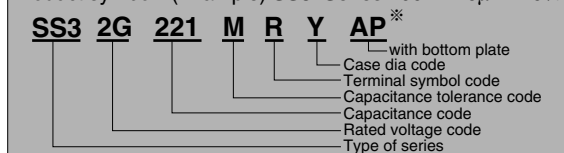
Standard value and case size for SS3 Series

Capacitance		Rated voltage V.DC (Code) : 400 (2G)			
μF	Code	Case size dimensions øD (mm)			
		22	25	30	35
68	680	25		Upper : Case size L (mm) Lower : Max Ripple current (Arms) / 105°C 120Hz	
		0.54			
82	820	30	25		
		0.64	0.61		
100	101	35	30		
		0.74	0.71		
120	121	40	30		
		0.86	0.79		
150	151	45	35	25	
		1.01	0.93	0.91	
			40	30	25
180	181		1.06	1.05	1.05
			45	35	30
220	221		1.24	1.11	1.23
				40	30
270	271			1.43	1.36
				45	35
330	331			1.64	1.58
					40
390	391				1.80
					45
470	471				2.06

Standard value and case size for SS2 Series

Capacitance	μF	Code	Rated voltage V.DC (Code)											
			200 (2D)				400 (2G)							
			22	25	30	35	22	25	30	35				
68	680	680	Case dia øD (mm)				30							
							0.58							
82	820	820					30	25						
							0.67	0.61						
100	101	101					40	30						
							0.79	0.72						
120	121	121					45	35	25					
							0.91	0.84	0.81					
150	151	151					25				40	30		
							0.62				0.99	0.96		
180	181	181					30				45	30	25	
							0.73				1.14	1.05	1.05	
220	221	221					30	25				35	30	
							0.79	0.77				1.23	1.24	
270	271	271					35	30				40	36	
							0.95	0.90				1.43	1.45	
330	331	331					40	30				50	40	
							1.10	1.00				1.73	1.67	
390	391	391					50	35	25				45	
							1.31	1.16	1.11				1.90	
470	471	471					40	30					50	
							1.33	1.30					2.16	
560	561	561					45	30	25					
							1.52	1.42	1.41					
680	681	681						35	30					
								1.65	1.65					
820	821	821						40	30					
								1.89	1.82					
1000	102	102						50	36					
								2.29	2.13					
1200	122	122							40					
									2.42					
1500	152	152							50					
									2.95					

Product symbol : (Example) SS3 Series 400V 220μF ±20%



øD	Code
22	X
25	Y
30	Z
35	A

* These series are provided without bottom plate as standard.

← Case size L (mm)
← Max Ripple current
(Arms) / 105°C, 120Hz

ALUMINUM ELECTROLYTIC CAPACITORS

HF2 Series (Low Profile 20 mm Type) (Warranty of 2,000 hours at 85°C)

• Specification

The HF2 type is the same as the HP3 type. with 20mm high.



Product Specifications

Items	Specifications																	
Temperature range	-40°C to +85°C																	
Rated voltage	160 to 450V.DC																	
Capacitance tolerance	±20% (20°C, 120Hz)																	
Leakage current	0.02CV (µA) or 3mA, whichever is smaller. [C=Capacitance (µF), V=Rated voltage (V)]																	
Dissipation factor	Less than 0.15 (20°C, 120Hz)																	
Permissible ripple current	As per table of standard ratings below. (85°C, 120Hz)																	
Permissible ripple current correction coefficient	<table border="1"> <caption>Frequency correction coefficient</caption> <thead> <tr> <th rowspan="2">Rated voltage (V)</th> <th colspan="5">Frequency (Hz)</th> </tr> <tr> <th>50/60</th> <th>120</th> <th>300</th> <th>1K</th> <th>≥10K</th> </tr> </thead> <tbody> <tr> <td>160~450V</td> <td>0.8</td> <td>1.0</td> <td>1.1</td> <td>1.3</td> <td>1.4</td> </tr> </tbody> </table>	Rated voltage (V)	Frequency (Hz)					50/60	120	300	1K	≥10K	160~450V	0.8	1.0	1.1	1.3	1.4
	Rated voltage (V)		Frequency (Hz)															
50/60		120	300	1K	≥10K													
160~450V	0.8	1.0	1.1	1.3	1.4													
	<table border="1"> <caption>Temperature correction coefficient</caption> <thead> <tr> <th rowspan="2">Rated voltage (V)</th> <th colspan="4">Temperature (°C)</th> </tr> <tr> <th>40</th> <th>60</th> <th>70</th> <th>85</th> </tr> </thead> <tbody> <tr> <td>160~450V</td> <td>1.8</td> <td>1.4</td> <td>1.2</td> <td>1.0</td> </tr> </tbody> </table>	Rated voltage (V)	Temperature (°C)				40	60	70	85	160~450V	1.8	1.4	1.2	1.0			
Rated voltage (V)	Temperature (°C)																	
	40	60	70	85														
160~450V	1.8	1.4	1.2	1.0														
High temp. Load life test	After 85°C, 2000h, rated voltage (specified ripple current superposition) application Capacitance variation : Initial value ±15% Dissipation factor : 175% of less of specified initial value Leakage current : Not greater than the specified initial value																	
Others	JIS C 5101-4.																	

Standard value and case size

Capacitance		Rated voltage V.DC (Code)							
µF	Code	160 (2C)	180 (2P)	200 (2D)	250 (2E)	350 (2V)	400 (2G)	450 (2W)	
33	330	Upper : Case size L (mm)							22×20
		Lower : Max ripple current (Arms) / 85°C 120Hz							0.35
47	470					22×20	22×20	25×20	
						0.42	0.42	0.46	
68	680					25×20	25×20	30×20	
						0.54	0.54	0.59	
100	101		22×20	22×20	22×20	30×20	30×20	35×20	
			0.61	0.61	0.61	0.72	0.72	0.77	
150	151	22×20	22×20	35×20	25×20	35×20	35×20		
		0.74	0.74	0.74	0.81	0.94	0.94		
220	221	22×20	22×20	35×20	30×20				
		0.98	0.98	0.98	1.07				
330	331	30×20	30×20	35×20	35×20				
		1.31	1.31	1.23	1.23				
470	471	35×20	35×20						
		1.47	1.47						

Product code: (Example) HF2 type 200V 150µF±20%

HF2 2D 151 M ()

Terminal symbol code
Capacitance tolerance code
Capacitance code
Rated voltage code
Type name

* Fill in this item except 2-claw terminal.

ALUMINUM ELECTROLYTIC CAPACITORS

HV2 Series (Low Profile 20 mm Type) (Warranty of 2,000 hours at 105°C)

- The HV2 type is the same as the HU3 type. with 20mm height.



Product Specifications

Items	Specifications												
Temperature range	-40°C to +105°C												
Rated voltage	160 to 450V.DC												
Capacitance tolerance	±20% (20°C, 120Hz)												
Leakage current	0.02CV (μA) or 3mA, whichever is smaller. [C=Capacitance (μF), V=Rated voltage (V)]												
Dissipation factor	Less than 0.15 (20°C,120Hz)												
Permissible ripple current	As per table of standard ratings below. (105°C,120Hz)												
Permissible ripple current correction coefficient	Frequency correction coefficient <table border="1"> <thead> <tr> <th>Rated voltage (V) \ Frequency (Hz)</th> <th>50/60</th> <th>120</th> <th>300</th> <th>1K</th> <th>≥10K</th> </tr> </thead> <tbody> <tr> <td>160~450V</td> <td>0.8</td> <td>1.0</td> <td>1.1</td> <td>1.3</td> <td>1.4</td> </tr> </tbody> </table>	Rated voltage (V) \ Frequency (Hz)	50/60	120	300	1K	≥10K	160~450V	0.8	1.0	1.1	1.3	1.4
	Rated voltage (V) \ Frequency (Hz)	50/60	120	300	1K	≥10K							
160~450V	0.8	1.0	1.1	1.3	1.4								
Temperature correction coefficient <table border="1"> <thead> <tr> <th>Rated voltage (V) \ Temperature (°C)</th> <th>40</th> <th>60</th> <th>70</th> <th>85</th> <th>105</th> </tr> </thead> <tbody> <tr> <td>16~450V</td> <td>2.5</td> <td>2.2</td> <td>2.0</td> <td>1.8</td> <td>1.0</td> </tr> </tbody> </table>	Rated voltage (V) \ Temperature (°C)	40	60	70	85	105	16~450V	2.5	2.2	2.0	1.8	1.0	
Rated voltage (V) \ Temperature (°C)	40	60	70	85	105								
16~450V	2.5	2.2	2.0	1.8	1.0								
High temp. Load life test	After 105°C, 2000h, rated voltage (specified ripple current superposition) application Capacitance variation : Initial value ±15% Dissipation factor : 175% of less of specified initial value Leakage current : Not greater than the specified initial value												
Others	JIS C 5101-4.												

Standard value and case size

Capacitance		-40~+105°C					
		Rated voltage V.DC (Code)					
μF	Code	160 (2C)	180 (2P)	200 (2D)	250 (2E)	350 (2V)	400 (2G)
33	330	Upper : Case size L (mm) Lower : Max ripple currnt (Arms) / 105°C 120Hz					22×20
47	470						
68	680				22×20	25×20	30×20
					0.38	0.39	0.43
100	101		22×20	22×20	22×20	30×20	35×20
			0.46	0.46	0.46	0.52	0.55
150	151	22×20	22×20	25×20	30×20	35×20	
		0.57	0.57	0.58	0.63	0.67	
220	221	25×20	25×20	30×20	35×20		
		0.70	0.70	0.77	0.82		
330	331	30×20	35×20	35×20			
		0.94	1.00	1.00			
470	471	35×20	35×20				
		1.19	1.19				

Product code: (Example) HV2 type 400V 100μF±20%

HV2 2G 101 M ()



* Fill in this item except 2-claw terminal.