



### Radial Lead Type

Series: **NHG** Type: **A**

This Series is no longer available for purchase in the country of Japan.

#### Features

- Endurance : 105 °C 1000 h to 2000 h
- RoHS compliant

#### Specifications

Category temp. range	-55 °C to +105 °C	-25 °C to +105 °C
Rated voltage range	6.3 V.DC to 100 V.DC	160 V.DC to 450 V.DC
Capacitance range	2.2 μF to 22000 μF	2.2 μF to 330 μF
Capacitance tolerance	±20 % (120 Hz/+20 °C)	
Leakage current	I ≤ 0.01 CV or 3 (μA) After 2 minutes (Which is greater)	I ≤ 0.06 CV + 10 (μA) After 2 minutes
Dissipation factor (tan δ)	Please see the attached characteristics list	
Endurance	After following life test with DC voltage and +105 °C±2 °C ripple current value applied (The sum of DC and ripple peak voltage shall not exceed the rated working voltage), When the capacitors are restored to 20 °C, the capacitors shall meet the limits specified below. Duration : 6.3 V.DC to 100 V.DC : (φ5 to φ8)=1000 h, (φ10 to φ18)=2000 h 160 V.DC to 450 V.DC : 2000 h	
	Capacitance change	Within ±20 % of the initial value
	tan δ	≤ 200 % of the initial limit
	DC leakage current	Within the initial limit
Shelf life	After storage for 1000 h at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance.(With voltage treatment)	

#### Frequency correction factor for ripple current

Rated voltage (V.DC)	Capacitance (μF)	Frequency (Hz)				
		60	120	1 k	10 k	100 k
6.3 to 100	2.2 to 33	0.75	1.00	1.55	1.80	2.00
	47 to 470	0.80	1.00	1.35	1.50	1.50
	1000 to 22000	0.85	1.00	1.10	1.15	1.15
160 to 450	2.2 to 330	0.80	1.00	1.35	1.50	1.50

#### Dimensions

\* L ≤ 16 : L±1.0  
L ≥ 20 : L±2.0

Unit : mm							
φD	5	6.3	8	10.0	12.5	16	18
φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5

### Characteristics list

Rated vol. (V.DC)	Cap. (±20 %) (μF)	Case size (mm)		Specification			Lead length(mm)				Part No.	Min. Packaging Q'ty	
		φD	L	Ripple current *1 (mA r.m.s)	tan δ *2	Endurance (hours)	Lead dia. (φd)	Lead space				Straight leads (pcs)	Taping (pcs)
								Straight	Taping *B	Taping *H			
6.3	100	5.0	11.0	91	0.28	1000	0.5	2.0	5.0	2.5	ECA0JHG101( )	200	2000
	220	5.0	11.0	140	0.28	1000	0.5	2.0	5.0	2.5	ECA0JHG221( )	200	2000
	470	6.3	11.2	230	0.28	1000	0.5	2.5	5.0	2.5	ECA0JHG471( )	200	2000
	1000	8.0	11.5	380	0.28	1000	0.6	3.5	5.0		ECA0JHG102( )	200	1000
	2200	10.0	16.0	710	0.30	2000	0.6	5.0	5.0		ECA0JHG222( )	200	500
	3300	10.0	20.0	840	0.32	2000	0.6	5.0	5.0		ECA0JHG332( )	200	500
	4700	12.5	20.0	1090	0.34	2000	0.6	5.0	5.0		ECA0JHG472( )	200	500
	6800	12.5	25.0	1350	0.38	2000	0.6	5.0	5.0		ECA0JHG682( )	200	500
	10000	16.0	25.0	1650	0.46	2000	0.8	7.5	7.5		ECA0JHG103( )	100	250
10	15000	16.0	31.5	2010	0.56	2000	0.8	7.5			ECA0JHG153	100	
	22000	18.0	35.5	2350	0.70	2000	0.8	7.5			ECA0JHG223	50	
	330	6.3	11.2	200	0.24	1000	0.5	2.5	5.0	2.5	ECA1AHG331( )	200	2000
	470	8.0	11.5	250	0.24	1000	0.6	3.5	5.0		ECA1AHG471( )	200	1000
	1000	10.0	12.5	460	0.24	2000	0.6	5.0	5.0		ECA1AHG102( )	200	500
	2200	10.0	20.0	760	0.26	2000	0.6	5.0	5.0		ECA1AHG222( )	200	500
	3300	12.5	20.0	1000	0.28	2000	0.6	5.0	5.0		ECA1AHG332( )	200	500
	4700	12.5	25.0	1260	0.30	2000	0.6	5.0	5.0		ECA1AHG472( )	200	500
	6800	16.0	25.0	1570	0.34	2000	0.8	7.5	7.5		ECA1AHG682( )	100	250
16	10000	16.0	31.5	1890	0.42	2000	0.8	7.5			ECA1AHG103	100	
	15000	18.0	35.5	2180	0.52	2000	0.8	7.5			ECA1AHG153	50	
	100	5.0	11.0	110	0.20	1000	0.5	2.0	5.0	2.5	ECA1CHG101( )	200	2000
	220	6.3	11.2	180	0.20	1000	0.5	2.5	5.0	2.5	ECA1CHG221( )	200	2000
	330	8.0	11.5	260	0.20	1000	0.6	3.5	5.0		ECA1CHG331( )	200	1000
	470	8.0	11.5	310	0.20	1000	0.6	3.5	5.0		ECA1CHG471( )	200	1000
	1000	10.0	16.0	560	0.20	2000	0.6	5.0	5.0		ECA1CHG102( )	200	500
	2200	12.5	20.0	920	0.22	2000	0.6	5.0	5.0		ECA1CHG222( )	200	500
	3300	12.5	25.0	1170	0.24	2000	0.6	5.0	5.0		ECA1CHG332( )	200	500
25	4700	16.0	25.0	1480	0.26	2000	0.8	7.5	7.5		ECA1CHG472( )	100	250
	6800	16.0	31.5	1780	0.30	2000	0.8	7.5			ECA1CHG682	100	
	10000	18.0	35.5	2060	0.38	2000	0.8	7.5			ECA1CHG103	50	
	47	5.0	11.0	91	0.16	1000	0.5	2.0	5.0	2.5	ECA1EHG470( )	200	2000
	100	6.3	11.2	130	0.16	1000	0.5	2.5	5.0	2.5	ECA1EHG101( )	200	2000
	220	8.0	11.5	230	0.16	1000	0.6	3.5	5.0		ECA1EHG221( )	200	1000
	330	8.0	11.5	310	0.16	1000	0.6	3.5	5.0		ECA1EHG331( )	200	1000
	470	10.0	12.5	380	0.16	2000	0.6	5.0	5.0		ECA1EHG471( )	200	500
	1000	10.0	20.0	680	0.16	2000	0.6	5.0	5.0		ECA1EHG102( )	200	500
35	2200	12.5	25.0	1090	0.18	2000	0.6	5.0	5.0		ECA1EHG222( )	200	500
	3300	16.0	25.0	1400	0.20	2000	0.8	7.5	7.5		ECA1EHG332( )	100	250
	4700	16.0	31.5	1750	0.22	2000	0.8	7.5			ECA1EHG472	100	
	6800	18.0	35.5	2040	0.26	2000	0.8	7.5			ECA1EHG682	50	
	47	5.0	11.0	90	0.14	1000	0.5	2.0	5.0	2.5	ECA1VHG470( )	200	2000
	100	6.3	11.2	150	0.14	1000	0.5	2.5	5.0	2.5	ECA1VHG101( )	200	2000
	220	8.0	11.5	270	0.14	1000	0.6	3.5	5.0		ECA1VHG221( )	200	1000
	330	10.0	12.5	350	0.14	2000	0.6	5.0	5.0		ECA1VHG331( )	200	500
	470	10.0	16.0	460	0.14	2000	0.6	5.0	5.0		ECA1VHG471( )	200	500
35	1000	12.5	20.0	810	0.14	2000	0.6	5.0	5.0		ECA1VHG102( )	200	500
	2200	16.0	25.0	1260	0.16	2000	0.8	7.5	7.5		ECA1VHG222( )	100	250
	3300	16.0	31.5	1610	0.18	2000	0.8	7.5			ECA1VHG332	100	
	4700	18.0	35.5	1910	0.20	2000	0.8	7.5			ECA1VHG472	50	

\*1: Ripple current (120 Hz / +105 °C)

\*2: tan δ (120 Hz / +20 °C)

•When requesting taped product, please put the letter "B" or "i" between the "( )". Lead wire pitch□

\*B=5 mm, 7.5 mm, i=2.5 mm.

•Please refer to the page of "Taping dimensions".

### Characteristics list

Rated vol. (V.DC)	Cap. (±20 %) (μF)	Case size (mm)		Specification			Lead length(mm)				Part No.	Min. Packaging Q'ty	
		φD	L	Ripple current *1 (mA r.m.s)	tan δ *2	Endurance (hours)	Lead dia. (φd)	Lead space				Straight leads (pcs)	Taping (pcs)
								Straight	Taping *B	Taping *H			
50	2.2	5.0	11.0	18	0.12	1000	0.5	2.0	5.0	2.5	ECA1HHG2R2( )	200	2000
	3.3	5.0	11.0	22	0.12	1000	0.5	2.0	5.0	2.5	ECA1HHG3R3( )	200	2000
	4.7	5.0	11.0	26	0.12	1000	0.5	2.0	5.0	2.5	ECA1HHG4R7( )	200	2000
	10	5.0	11.0	39	0.12	1000	0.5	2.0	5.0	2.5	ECA1HHG100( )	200	2000
	22	5.0	11.0	65	0.12	1000	0.5	2.0	5.0	2.5	ECA1HHG220( )	200	2000
	33	5.0	11.0	90	0.12	1000	0.5	2.0	5.0	2.5	ECA1HHG330( )	200	2000
	47	6.3	11.2	110	0.12	1000	0.5	2.5	5.0	2.5	ECA1HHG470( )	200	2000
	100	8.0	11.5	180	0.12	1000	0.6	3.5	5.0		ECA1HHG101( )	200	1000
	220	10.0	12.5	300	0.12	2000	0.6	5.0	5.0		ECA1HHG221( )	200	500
	330	10.0	16.0	410	0.12	2000	0.6	5.0	5.0		ECA1HHG331( )	200	500
	470	10.0	20.0	530	0.12	2000	0.6	5.0	5.0		ECA1HHG471( )	200	500
	1000	12.5	25.0	950	0.12	2000	0.6	5.0	5.0		ECA1HHG102( )	200	500
	2200	16.0	31.5	1470	0.14	2000	0.8	7.5			ECA1HHG222	100	
	3300	18.0	35.5	1770	0.16	2000	0.8	7.5			ECA1HHG332	50	
63	10	5.0	11.0	46	0.10	1000	0.5	2.0	5.0	2.5	ECA1JHG100( )	200	2000
	22	5.0	11.0	71	0.10	1000	0.5	2.0	5.0	2.5	ECA1JHG220( )	200	2000
	33	6.3	11.2	100	0.10	1000	0.5	2.5	5.0	2.5	ECA1JHG330( )	200	2000
	47	6.3	11.2	120	0.10	1000	0.5	2.5	5.0	2.5	ECA1JHG470( )	200	2000
	100	10.0	12.5	215	0.10	2000	0.6	5.0	5.0		ECA1JHG101( )	200	500
	220	10.0	16.0	335	0.10	2000	0.6	5.0	5.0		ECA1JHG221( )	200	500
	330	10.0	20.0	510	0.10	2000	0.6	5.0	5.0		ECA1JHG331( )	200	500
	470	12.5	20.0	640	0.10	2000	0.6	5.0	5.0		ECA1JHG471( )	200	500
	1000	16.0	25.0	930	0.10	2000	0.8	7.5	7.5		ECA1JHG102( )	100	250
	2200	18.0	35.5	1610	0.12	2000	0.8	7.5			ECA1JHG222	50	
100	2.2	5.0	11.0	21	0.08	1000	0.5	2.0	5.0	2.5	ECA2AHG2R2( )	200	2000
	3.3	5.0	11.0	31	0.08	1000	0.5	2.0	5.0	2.5	ECA2AHG3R3( )	200	2000
	4.7	5.0	11.0	38	0.08	1000	0.5	2.0	5.0	2.5	ECA2AHG4R7( )	200	2000
	10	6.3	11.2	54	0.08	1000	0.5	2.5	5.0	2.5	ECA2AHG100( )	200	2000
	22	6.3	11.2	93	0.08	1000	0.5	2.5	5.0	2.5	ECA2AHG220( )	200	2000
	33	8.0	11.5	130	0.08	1000	0.6	3.5	5.0		ECA2AHG330( )	200	1000
	47	10.0	12.5	165	0.08	2000	0.6	5.0	5.0		ECA2AHG470( )	200	500
	100	10.0	20.0	265	0.08	2000	0.6	5.0	5.0		ECA2AHG101( )	200	500
	220	12.5	25.0	440	0.08	2000	0.6	5.0	5.0		ECA2AHG221( )	200	500
	330	16.0	25.0	540	0.08	2000	0.8	7.5	7.5		ECA2AHG331( )	100	250
	470	16.0	25.0	715	0.08	2000	0.8	7.5	7.5		ECA2AHG471( )	100	250
1000	18.0	35.5	985	0.08	2000	0.8	7.5			ECA2AHG102	50		

\*1: Ripple current (120 Hz / +105 °C)

\*2: tan δ (120 Hz / +20 °C)

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\*B=5 mm, 7.5 mm, i=2.5 mm.

•Please refer to the page of "Taping dimensions".

### Characteristics list

Rated vol. (V.DC)	Cap. (±20 %) (μF)	Case size (mm)		Specification			Lead length(mm)				Part No.	Min. Packaging Q'ty	
		φD	L	Ripple current *1 (mA r.m.s)	tan δ *2	Endurance (hours)	Lead dia. (φd)	Lead space				Straight leads (pcs)	Taping (pcs)
								Straight	Taping *B	Taping *H			
160	2.2	6.3	11.2	25	0.15	2000	0.5	2.5	5.0	2.5	ECA2CHG2R2( )	200	2000
	3.3	6.3	11.2	36	0.15	2000	0.5	2.5	5.0	2.5	ECA2CHG3R3( )	200	2000
	4.7	6.3	11.2	43	0.15	2000	0.5	2.5	5.0	2.5	ECA2CHG4R7( )	200	2000
	10	10.0	12.5	70	0.15	2000	0.6	5.0	5.0		ECA2CHG100( )	200	500
	22	10.0	20.0	130	0.15	2000	0.6	5.0	5.0		ECA2CHG220( )	200	500
	33	10.0	20.0	180	0.15	2000	0.6	5.0	5.0		ECA2CHG330( )	200	500
	47	12.5	20.0	220	0.15	2000	0.6	5.0	5.0		ECA2CHG470( )	200	500
	100	16.0	25.0	335	0.15	2000	0.8	7.5	7.5		ECA2CHG101( )	100	250
	220	16.0	31.5	540	0.15	2000	0.8	7.5			ECA2CHG221	100	
330	18.0	31.5	705	0.15	2000	0.8	7.5			ECA2CHG331	50		
200	2.2	6.3	11.2	25	0.15	2000	0.5	2.5	5.0	2.5	ECA2DHG2R2( )	200	2000
	3.3	6.3	11.2	36	0.15	2000	0.5	2.5	5.0	2.5	ECA2DHG3R3( )	200	2000
	4.7	8.0	11.5	50	0.15	2000	0.6	3.5	5.0		ECA2DHG4R7( )	200	1000
	10	10.0	16.0	80	0.15	2000	0.6	5.0	5.0		ECA2DHG100( )	200	500
	22	10.0	20.0	140	0.15	2000	0.6	5.0	5.0		ECA2DHG220( )	200	500
	33	12.5	20.0	190	0.15	2000	0.6	5.0	5.0		ECA2DHG330( )	200	500
	47	12.5	20.0	220	0.15	2000	0.6	5.0	5.0		ECA2DHG470( )	200	500
	100	16.0	25.0	335	0.15	2000	0.8	7.5	7.5		ECA2DHG101( )	100	250
220	18.0	31.5	575	0.15	2000	0.8	7.5			ECA2DHG221	50		
250	2.2	6.3	11.2	29	0.15	2000	0.5	2.5	5.0	2.5	ECA2EHG2R2( )	200	2000
	3.3	8.0	11.5	42	0.15	2000	0.6	3.5	5.0		ECA2EHG3R3	200	1000
	4.7	8.0	11.5	50	0.15	2000	0.6	3.5	5.0		ECA2EHG4R7( )	200	1000
	10	10.0	16.0	88	0.15	2000	0.6	5.0	5.0		ECA2EHG100( )	200	500
	22	12.5	20.0	155	0.15	2000	0.6	5.0	5.0		ECA2EHG220( )	200	500
	33	12.5	20.0	190	0.15	2000	0.6	5.0	5.0		ECA2EHG330( )	200	500
	47	12.5	25.0	230	0.15	2000	0.6	5.0	5.0		ECA2EHG470( )	200	500
	100	16.0	31.5	365	0.15	2000	0.8	7.5			ECA2EHG101	100	
350	2.2	8.0	11.5	31	0.20	2000	0.6	3.5	5.0		ECA2VHG2R2( )	200	1000
	3.3	10.0	12.5	38	0.20	2000	0.6	5.0	5.0		ECA2VHG3R3( )	200	500
	4.7	10.0	16.0	50	0.20	2000	0.6	5.0	5.0		ECA2VHG4R7( )	200	500
	10	10.0	20.0	82	0.20	2000	0.6	5.0	5.0		ECA2VHG100( )	200	500
	22	12.5	20.0	130	0.20	2000	0.6	5.0	5.0		ECA2VHG220( )	200	500
	33	16.0	25.0	195	0.20	2000	0.8	7.5	7.5		ECA2VHG330( )	100	250
	47	16.0	25.0	230	0.20	2000	0.8	7.5	7.5		ECA2VHG470( )	100	250
	100	18.0	31.5	375	0.20	2000	0.8	7.5			ECA2VHG101	50	

\*1: Ripple current (120 Hz / +105 °C)

\*2: tan δ (120 Hz / +20 °C)

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\*B=5 mm, 7.5 mm, i=2.5 mm.

·Please refer to the page of "Taping dimensions".

### Characteristics list

Rated vol. (V.DC)	Cap. (±20 %) (μF)	Case size (mm)		Specification			Lead length(mm)			Part No.	Min. Packaging Q'ty		
		φD	L	Ripple current *1 (mA r.m.s)	tan δ *2	Endurance (hours)	Lead dia. (φd)	Lead space			Straight leads (pcs)	Taping (pcs)	
								Straight	Taping *B				Taping *H
400	2.2	8.0	11.5	30	0.24	2000	0.6	3.5	5.0		ECA2GHG2R2( )	200	1000
	3.3	10.0	12.5	40	0.24	2000	0.6	5.0	5.0		ECA2GHG3R3( )	200	500
	4.7	10.0	16.0	50	0.24	2000	0.6	5.0	5.0		ECA2GHG4R7( )	200	500
	10	10.0	20.0	80	0.24	2000	0.6	5.0	5.0		ECA2GHG100( )	200	500
	22	12.5	25.0	145	0.24	2000	0.6	5.0	5.0		ECA2GHG220( )	200	500
	33	16.0	25.0	195	0.24	2000	0.8	7.5	7.5		ECA2GHG330( )	100	250
	47	16.0	31.5	250	0.24	2000	0.8	7.5			ECA2GHG470	100	
450	2.2	10.0	12.5	29	0.24	2000	0.6	5.0	5.0		ECA2WHG2R2( )	200	500
	3.3	10.0	16.0	41	0.24	2000	0.6	5.0	5.0		ECA2WHG3R3( )	200	500
	4.7	10.0	20.0	49	0.24	2000	0.6	5.0	5.0		ECA2WHG4R7( )	200	500
	10	12.5	20.0	75	0.24	2000	0.6	5.0	5.0		ECA2WHG100( )	200	500
	22	16.0	25.0	115	0.24	2000	0.8	7.5	7.5		ECA2WHG220( )	100	250
	33	16.0	31.5	155	0.24	2000	0.8	7.5			ECA2WHG330	100	

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\*B=5 mm, 7.5 mm, i=2.5 mm.

•Please refer to the page of "Taping dimensions".

## Guidelines and precautions regarding the technical information and use of our products described in this online catalog.

- If you want to use our products described in this online catalog for applications requiring special qualities or reliability, or for applications where the failure or malfunction of the products may directly jeopardize human life or potentially cause personal injury (e.g. aircraft and aerospace equipment, traffic and transportation equipment, combustion equipment, medical equipment, accident prevention, anti-crime equipment, and/or safety equipment), it is necessary to verify whether the specifications of our products fit to such applications. Please ensure that you will ask and check with our inquiry desk as to whether the specifications of our products fit to such applications use before you use our products.
- The quality and performance of our products as described in this online catalog only apply to our products when used in isolation. Therefore, please ensure you evaluate and verify our products under the specific circumstances in which our products are assembled in your own products and in which our products will actually be used.
- If you use our products in equipment that requires a high degree of reliability, regardless of the application, it is recommended that you set up protection circuits and redundancy circuits in order to ensure safety of your equipment.
- The products and product specifications described in this online catalog are subject to change for improvement without prior notice. Therefore, please be sure to request and confirm the latest product specifications which explain the specifications of our products in detail, before you finalize the design of your applications, purchase, or use our products.
- The technical information in this online catalog provides examples of our products' typical operations and application circuits. We do not guarantee the non-infringement of third party's intellectual property rights and we do not grant any license, right, or interest in our intellectual property.
- If any of our products, product specifications and/or technical information in this online catalog is to be exported or provided to non-residents, the laws and regulations of the exporting country, especially with regard to security and export control, shall be observed.

## <Regarding the Certificate of Compliance with the EU RoHS Directive/REACH Regulations>

- The switchover date for compliance with the RoHS Directive/REACH Regulations varies depending on the part number or series of our products.
- When you use the inventory of our products for which it is unclear whether those products are compliant with the RoHS Directive/REACH Regulation, please select "Sales Inquiry" in the website inquiry form and contact us.

**We do not take any responsibility for the use of our products outside the scope of the specifications, descriptions, guidelines and precautions described in this online catalog.**

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