

## FEATURES

- High ripple current and high reliability.
- Low equivalent series resistance ESR.
- Different case sizes available for each capacitance value.
- Load life with ripple current : 5,000 hours.



## SPECIFICATIONS

Item	Performance Characteristics	
Operating Temperature Range	-40 to +105°C	-25 to +105°C
Rated Working Voltage Range	10 to 100V	200 to 450V
Nominal Capacitance Range	100 to 33000µF	
Capacitance Tolerance	±20% at 120Hz, +20°C	
Leakage Current	$I \leq 3\sqrt{CV}$ (µA) after 5 minutes application of rated working voltage at +20°C	
tan δ (120Hz, +20°C)	Working Voltage (V)	10    16    25    35    50    63~100    200~400    450
	tan δ (max.)	0.60    0.45    0.30    0.25    0.20    0.15    0.15    0.20
Low Temperature Characteristics	Impedance ratio max. at 120Hz	
	Working Voltage (V)	10    16    25    35    50    63~100
	Z-25°C / Z+20°C	6    6    6    6    4    3
	Z-40°C / Z+20°C	15    15    15    15    15    15
High Temperature Loading	Working Voltage (V)	200    250    400    450
	Z-25°C / Z+20°C	8    8    8    8
Shelf Life	Test time	5,000 hours
	Test temperature	+105°C
Industrial Standard	Test conditions	Rated DC working voltage with rated ripple current
	Post test requirements at +20°C	Leakage current : ≤Initial specified value Cap. change : within ±20% of the initial measured value tan δ : ≤200% of the initial specified value
Shelf Life	At +105°C no voltage applied after 1,000 hours and then being stabilized at +20°C the capacitors shall meet the following limits	
	Leakage current	≤Initial specified value
Shelf Life	Cap. change	within ±15% of the initial measured value
	tan δ	≤150% of the initial specified value
Industrial Standard	JIS C - 5101-4 (IEC 60384-4)	

## RIPPLE CURRENT MULTIPLIER

### Frequency Coefficient

Coefficient	Freq. (Hz)	60	120	1k	10k~50k
	10~100V	0.90	1.00	1.15	1.25
	160~250V	0.80	1.00	1.25	1.47
	315~450V	0.80	1.00	1.30	1.47

## PART NUMBER SYSTEM (EXAMPLE : 250V 330µF)

1	2 3	4 5 6	7	8 9	10	11 12	13 14
E	FP	337	M	2 E	P	3 0	S W

Type (Terminal Code)  
 Case Length (30mm)  
 Diameter (30mm)  
 Voltage (250V)  
 Tolerance (±20%)  
 Capacitance (330µF)  
 Series  
 E-CAP



**STANDARD RATINGS**

Voltage (Code)		10V (1A)			16V (1C)			25V (1E)		
Cap. (μF)	Code	Case Size	Impedance	Ripple Current	Case Size	Impedance	Ripple Current	Case Size	Impedance	Ripple Current
4700	478							22 x 30	57	1.6
								25 x 25	57	1.6
6800	688	22 x 25	78	1.4	22 x 30	49	1.8	25 x 30	43	1.9
10000	109	22 x 30	56	1.8	25 x 30	36	2.2	25 x 40	32	2.5
15000	159	22 x 40	39	2.3	25 x 40	26	2.8	30 x 40	23	3.2
22000	229	30 x 35	28	3.0	30 x 40	18	3.5			
33000	339	30 x 45	20	3.9						

Maximum Allowable Ripple Current (Arms) at 105°C 120Hz Case Size ΦD x L (mm)  
Maximum Impedance (mΩ) at 20°C 20kHz

Voltage (Code)		35V (1V)			50V (1H)			63V (1J)		
Cap. (μF)	Code	Case Size	Impedance	Ripple Current	Case Size	Impedance	Ripple Current	Case Size	Impedance	Ripple Current
1000	108							22 x 25	159	1.0
1500	158							22 x 35	106	1.4
2200	228	22 x 25	90	1.1	22 x 35	90	1.4	25 x 35	72	1.7
								30 x 30	85	1.8
3300	338	22 x 30	60	1.5	25 x 35	60	1.8	30 x 40	56	2.3
		25 x 25	60	1.5						
4700	478	22 x 40	48	1.9	30 x 35	45	2.2	35 x 35	45	2.7
6800	688	25 x 40	37	2.3	30 x 50	35	2.9	35 x 50	31	3.6
10000	109	30 x 40	28	2.9	35 x 45	26	3.6			
15000	159	35 x 40	20	3.8						
18000	189	35 x 45	18	4.3						

Maximum Allowable Ripple Current (Arms) at 105°C 120Hz Case Size ΦD x L (mm)  
Maximum Impedance (mΩ) at 20°C 20kHz

Voltage (Code)		80V (1K)			100V (2A)			200V (2D)		
Cap. (μF)	Code	Case Size	Impedance	Ripple Current	Case Size	Impedance	Ripple Current	Case Size	Impedance	Ripple Current
220	227							22 x 30	700	0.96
330	337							22 x 40	470	1.3
470	477							25 x 40	330	1.7
								30 x 30	330	1.7
560	567				25 x 25	190	1.0			
680	687				22 x 35	156	1.2	30 x 40	230	2.2
1000	108	25 x 25	133	1.3	25 x 35	106	1.4	35 x 45	160	3.1
					30 x 30	106	1.5			
1200	128	30 x 25	110	1.5						
1500	158	25 x 35	89	1.8	30 x 40	70	1.9	35 x 50	110	3.9
2200	228	30 x 35	60	2.0	30 x 50	60	2.3			
3300	338	35 x 35	48	2.8	35 x 50	40	3.0			
4700	478	35 x 45	34	3.4						

Maximum Allowable Ripple Current (Arms) at 105°C 120Hz Case Size ΦD x L (mm)  
Maximum Impedance (mΩ) at 20°C 20kHz

Voltage (Code)		250V (2E)			400V (2G)			450V (2W)		
Cap. (μF)	Code	Case Size	Impedance	Ripple Current	Case Size	Impedance	Ripple Current	Case Size	Impedance	Ripple Current
100	107				25 x 30	1090	0.7	22 x 45	1600	0.75
								30 x 30	1600	0.76
150	157				25 x 40	730	0.95	25 x 45	1070	1.0
					30 x 30	730	0.94	30 x 35	1070	0.99
220	227	25 x 30	700	1.0	30 x 40	500	1.3	30 x 45	730	1.3
					35 x 30	500	1.3	35 x 35	730	1.3
330	337	25 x 40	470	1.4	30 x 50	330	1.7	35 x 50	490	1.8
		30 x 30	470	1.4	35 x 40	330	1.7			
390	397				35 x 45	280	1.9	35 x 50	410	2.0
470	477	30 x 35	330	1.8	35 x 50	240	2.2			
680	687	30 x 45	230	2.3						
1000	108	35 x 45	160	3.1						

Maximum Allowable Ripple Current (Arms) at 105°C 120Hz Case Size ΦD x L (mm)  
Maximum Impedance (mΩ) at 20°C 20kHz

Specifications are subject to change without notice. Should a safety or technical concern arise regarding the product, please be sure to contact our sales offices or agents immediately.