



### 產品特點 Features

- Highly reliable capacitors that withstand under high ripple current.
- Two or three dimensions with same ratings.
- Aluminum case designed explosion-proof vent.
- Best for switching power supplies.
- 高紋波高可靠性品，帶有防爆外殼設計，適用於開關電源。

### 規格書 SPECIFICATIONS

項目 Item	特性參數 Characteristics								
使用溫度範圍 Operating Temperature Range	-40 to +105°C	-25 to +105°C							
額定電壓範圍 Rated Voltage Range	10 to 100V	160 to 500V							
容量範圍 Nominal Capacitance Range	47 to 56000 µF								
容量允許偏差(20°C,120Hz) Capacitance Tolerance	± 20% at 120Hz, +20°C								
漏電流(20°C) Leakage Current	$I \leq 3\sqrt{CV}$ (µA) after 5 minutes application of rated working voltage at +20°C								
損耗角正切值(20°C,120Hz) tan δ (120Hz, +20°C)	Working Voltage (V)	10    16    25    35    50    63    80    100							
	tan δ (max.)	0.55    0.50    0.45    0.35    0.30    0.30    0.25    0.20							
	Working Voltage (V)	160~220    250    315~385    400~500							
	tan δ (max.)	0.15    0.15    0.15    0.20							
For capacitance value 33000 µF, add following calculated value: $\frac{(\text{rated capacitance}) - 33000 \mu F}{10000 \mu F} \times 0.1$									
低溫特性 Low Temperature Characteristics	Impedance ratio max. at 120Hz								
	Working Voltage (V)	10	16	25	35	50	63	80	100
	Z-25°C / Z+20°C	6	6	6	6	4	3	3	3
	Z-40°C / Z+20°C	15	15	15	15	15	15	15	15
	Working Voltage (V)	160~180	200~220	250	315~385	400	450	500	
Z-25°C / Z+20	8	8	8	8	8	8	8	8	
高溫負荷特性 High Temperature Loading	105°C條件下施加額定電壓與額定紋波2000H後取出，待產品恢復至常溫後測試 Test time :2,000 hours Test temperature :+105°C 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							
高溫貯存特性 Shelf Life	在105°C不加電壓存放1000H後取出，待產品恢復常溫後測試 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							
	Cap. change	within ± 15% of the initial measured value							
	tan δ	≤ 150% of the initial specified value							
參考國際標準 Industrial Standard	JIS C – 5101-4 (IEC 60384-4)								

牛角電解電容

### 紋波電流修正系數 RIPPLE CURRENT MULTIPLIER

Frequency Coefficient

Coefficient \ Freq. (Hz)	60	120	1k	10k~50k
Rated Voltage				
10~100V	0.90	1.00	1.15	1.25
160~250V	0.80	1.00	1.25	1.47
315~500V	0.80	1.00	1.30	1.47

一覽表 Standard

Voltage (Code)		10V		16V		25V		35V	
Cap. (μF)	Code	Case Size	Ripple Current						
2700	278							20 × 25	1.62
3300	338							20 × 30	1.94
								22 × 25	1.90
3900	398					20 × 25	1.72	20 × 35	2.02
								22 × 30	2.00
4700	478					20 × 30	2.04	20 × 40	2.21
						22 × 25	2.00	22 × 35	2.20
								25 × 25	2.20
5600	568			20 × 25	1.89	20 × 35	2.23	22 × 35	2.40
						22 × 30	2.20	25 × 30	2.40
6800	688	20 × 25	1.41	20 × 30	2.25	20 × 40	2.72	22 × 40	2.60
				22 × 25	2.20	22 × 30	2.40	25 × 35	2.78
						25 × 25	2.40	30 × 25	2.78
8200	828	20 × 30	1.67	20 × 35	2.43	22 × 35	2.70	22 × 50	2.90
				22 × 30	2.40	25 × 30	2.70	25 × 40	2.90
						30 × 25	2.70	30 × 30	2.90
10000	109	20 × 30	1.88	20 × 40	2.79	22 × 40	3.00	25 × 45	3.20
		22 × 25	1.80	22 × 30	2.60	25 × 35	3.00	30 × 35	3.20
				25 × 25	2.60	30 × 30	3.00		
12000	129	20 × 35	2.23	22 × 35	2.90	22 × 50	3.20	25 × 50	3.50
		22 × 30	2.20	25 × 30	2.90	25 × 40	3.20	30 × 40	3.50
		25 × 25	2.20	30 × 25	2.90	30 × 30	3.20	35 × 30	3.50
15000	159	20 × 40	2.31	22 × 40	3.20	25 × 45	3.60	30 × 45	3.90
		22 × 35	2.30	25 × 35	3.20	30 × 35	3.60	35 × 35	3.90
		25 × 25	2.30	30 × 30	3.20	35 × 30	3.60		
18000	189	22 × 40	2.52	22 × 45	3.50	30 × 40	3.90	35 × 40	4.51
		25 × 30	2.40	25 × 40	3.50	35 × 35	3.90		
		30 × 25	2.49	30 × 30	3.50				
22000	229	22 × 45	2.60	25 × 45	3.80	30 × 45	4.30	35 × 45	5.24
		25 × 35	2.60	30 × 35	3.80	35 × 35	4.30		
		30 × 25	2.60	35 × 30	3.80				
27000	279	22 × 50	3.19	25 × 50	4.20	35 × 45	4.80		
		25 × 40	3.10	30 × 40	4.20				
		30 × 30	3.10	35 × 30	4.20				
33000	339	25 × 45	3.40	30 × 45	4.70	35 × 50	5.55		
		30 × 35	3.40	35 × 35	4.70				
		35 × 30	3.40						
39000	399	30 × 40	3.79	30 × 50	5.10				
		35 × 30	3.70	35 × 40	5.10				
47000	479	30 × 45	4.26	35 × 45	5.50				
		35 × 35	4.20						
56000	569	35 × 40	5.00						

Maximum Allowable Ripple Current (Arms) at 105°C 120Hz  
 在105°C 120Hz條件的最大紋波值

Case Size Φ D x L (mm)  
 尺寸 Φ D x L (mm)

一覽表 Standard

Voltage (Code)		50V		63V		80V		100V	
Cap. (μF)	Code	Case Size	Ripple Current						
560	567							20 × 25	0.95
680	687							20 × 30	1.15
								22 × 25	1.09
820	827					20 × 25	1.04	20 × 35	1.31
								22 × 30	1.40
1000	108			20 × 25	1.21	20 × 30	1.24	20 × 35	1.43
								22 × 30	1.47
								25 × 25	1.45
1200	128			20 × 30	1.43	20 × 35	1.43	20 × 40	1.61
				22 × 25	1.40	22 × 30	1.50	22 × 35	1.69
								25 × 30	1.68
1500	158	20 × 25	1.29	20 × 35	1.52	20 × 35	1.57	22 × 40	1.97
				22 × 30	1.50	22 × 30	1.59	25 × 35	1.98
						25 × 25	1.59	30 × 25	1.95
1800	188	20 × 30	1.53	20 × 35	1.72	20 × 40	1.77	22 × 45	2.23
		22 × 25	1.50	22 × 30	1.70	22 × 35	1.79	25 × 40	2.20
				25 × 25	1.70	25 × 30	1.71	30 × 30	2.20
2200	228	20 × 35	1.72	20 × 40	2.01	22 × 40	2.03	25 × 45	2.53
		22 × 30	1.70	22 × 30	1.87	25 × 35	2.10	30 × 35	2.55
				25 × 30	2.00	30 × 25	1.98	35 × 30	2.60
2700	278	20 × 35	1.82	22 × 40	2.20	22 × 45	2.39	25 × 50	2.82
		22 × 30	1.80	25 × 35	2.20	25 × 40	2.35	30 × 40	2.86
		25 × 25	1.80	30 × 25	2.20	30 × 30	2.35	35 × 35	2.90
3300	338	20 × 40	2.01	22 × 45	2.60	25 × 45	2.64	30 × 45	3.30
		22 × 35	2.00	25 × 35	2.39	30 × 35	2.61	35 × 35	3.25
		25 × 30	2.00	30 × 30	2.50	35 × 30	2.60		
3900	398	22 × 40	2.23	25 × 40	2.57	25 × 25	2.92	30 × 50	3.60
		25 × 30	2.20	30 × 35	2.70	30 × 40	2.82	35 × 40	3.67
		30 × 25	2.20			35 × 30	2.97		
4700	478	22 × 45	2.50	25 × 50	3.00	30 × 45	3.34	35 × 45	3.80
		25 × 35	2.43	30 × 40	3.00	35 × 35	3.38		
		30 × 30	2.50	35 × 30	3.00				
5600	568	22 × 50	2.80	30 × 40	3.22	30 × 50	3.80	35 × 50	4.05
		25 × 40	2.80	35 × 35	3.30	35 × 40	3.80		
		30 × 30	2.76						
6800	688	25 × 45	3.30	30 × 50	3.86	35 × 45	3.90		
		30 × 35	3.30	35 × 40	3.84				
		35 × 30	3.30						
8200	828	30 × 40	3.71	35 × 45	4.43	35 × 50	4.20		
		35 × 35	3.85						
10000	109	30 × 45	4.30	35 × 50	5.11				
		35 × 40	4.49						
12000	129	35 × 45	4.56						
15000	159	35 × 50	4.80						

Maximum Allowable Ripple Current (Arms) at 105°C 120Hz  
在105°C 120Hz條件的最大紋波值

Case Size Φ D × L (mm)  
尺寸 Φ D × L (mm)

牛角電解電容

一覽表 Standard

Voltage (Code)		160V		180V		200V		220V	
Cap. (μF)	Code	Case Size	Ripple Current						
180	187							20 × 25	0.90
220	227			20 × 25	1.00	20 × 25	1.00	20 × 30	1.00
								22 × 25	1.00
270	277	20 × 25	1.10	20 × 30	1.10	20 × 30	1.10	20 × 35	1.15
				22 × 25	1.00	22 × 25	1.10	22 × 30	1.15
330	337	20 × 30	1.20	20 × 30	1.20	20 × 35	1.20	20 × 40	1.25
		22 × 25	1.20	22 × 25	1.20	22 × 30	1.25	22 × 35	1.25
						25 × 25	1.25	25 × 25	1.25
390	397	20 × 35	1.42	20 × 35	1.30	20 × 40	1.31	20 × 45	1.40
				22 × 30	1.30	22 × 30	1.35	22 × 30	1.35
						25 × 25	1.35	25 × 25	1.35
470	477	20 × 40	1.34	20 × 40	1.40	22 × 35	1.50	22 × 40	1.51
		22 × 30	1.55	22 × 35	1.50	25 × 30	1.50	25 × 30	1.44
		25 × 25	1.55	25 × 30	1.50	30 × 25	1.50	30 × 25	1.50
560	567	22 × 35	1.67	22 × 40	1.67	22 × 40	1.67	22 × 45	1.70
				25 × 30	1.67	25 × 30	1.59	25 × 35	1.64
		25 × 30	1.67	30 × 25	1.67	30 × 25	1.67	30 × 30	1.70
								35 × 25	1.71
680	687	22 × 40	1.82	22 × 45	1.78	22 × 45	1.78	25 × 40	1.84
		25 × 35	1.85	25 × 35	1.78	25 × 35	1.72	30 × 35	1.93
		30 × 25	1.82	30 × 30	1.78	30 × 30	1.78	35 × 30	1.89
820	827	22 × 45	2.04	22 × 50	2.04	25 × 40	1.99	25 × 45	2.08
		25 × 35	2.04	25 × 40	2.04	30 × 35	2.04	30 × 40	2.19
		30 × 30	2.04	30 × 30	2.04	35 × 25	2.04	35 × 30	2.16
1000	108	25 × 45	2.40	25 × 45	2.30	25 × 50	2.42	30 × 45	2.50
		30 × 35	2.25	30 × 35	2.30	30 × 35	2.30	35 × 35	2.44
				35 × 30	2.30	35 × 30	2.30		
1200	128	25 × 50	2.62	30 × 40	2.55	30 × 40	2.65	35 × 40	2.79
		30 × 35	2.49	35 × 35	2.55	35 × 35	2.65		
		35 × 30	2.49						
1500	158	30 × 40	2.84	30 × 45	2.90	35 × 40	3.08	35 × 45	3.22
		35 × 35	2.84	35 × 35	2.90				
1800	188	30 × 50	3.32	35 × 40	3.30	35 × 45	3.48		
		35 × 35	3.00						
2200	228	35 × 45	3.50	35 × 50	3.65				

Maximum Allowable Ripple Current (Arms) at 105°C 120Hz  
 在105°C 120Hz條件的最大紋波值

Case Size Φ D × L (mm)  
 尺寸 Φ D × L (mm)

牛角電解電容

一覽表 Standard

Voltage (Code)		250V		315V		350V		385V	
Cap. (μF)	Code	Case Size	Ripple Current						
56	566							20 × 25	0.37
68	686					20 × 25	0.47	20 × 30	0.44
								22 × 25	0.45
82	826			20 × 25	0.64	20 × 30	0.54	20 × 30	0.50
								22 × 30	0.52
100	107			20 × 30	0.69	20 × 30	0.60	20 × 35	0.56
						22 × 25	0.69	20 × 30	0.58
								25 × 25	0.57
120	127			20 × 30	0.75	20 × 35	0.68	20 × 40	0.66
				22 × 25	0.75	22 × 25	0.70	22 × 30	0.64
								25 × 30	0.68
150	157	20 × 25	0.79	20 × 35	0.82	20 × 40	0.78	22 × 40	0.79
				22 × 30	0.82	22 × 30	0.77	25 × 30	0.78
				25 × 25	0.82			30 × 25	0.75
180	187	20 × 30	0.90	20 × 40	0.90	22 × 35	0.87	22 × 40	0.84
		22 × 25	0.88	22 × 30	0.86	25 × 30	0.92	25 × 35	0.86
				25 × 25	0.86	30 × 25	0.90	30 × 30	0.88
220	227	20 × 35	1.00	22 × 35	0.98	22 × 40	1.00	22 × 45	0.96
		22 × 25	1.00	25 × 30	1.04	25 × 35	1.04	25 × 35	0.94
				30 × 25	1.04	30 × 30	1.02	30 × 30	1.00
270	277	20 × 40	1.10	22 × 40	1.10	22 × 45	1.11	25 × 45	1.13
		22 × 30	1.18	25 × 35	1.16	25 × 40	1.18	30 × 35	1.08
		25 × 30	1.27	30 × 25	1.16	30 × 30	1.17	35 × 30	1.10
330	337	22 × 35	1.30	22 × 45	1.27	25 × 45	1.29	30 × 45	1.31
		25 × 30	1.30	25 × 40	1.33	30 × 35	1.34	35 × 30	1.24
		30 × 25	1.35	30 × 30	1.33	35 × 30	1.22		
390	397	22 × 40	1.49	25 × 40	1.40	25 × 50	1.51	30 × 45	1.41
		25 × 35	1.49	30 × 35	1.47	30 × 35	1.43	35 × 35	1.40
		30 × 25	1.49	35 × 30	1.47				
470	477	22 × 45	1.65	30 × 40	1.70	30 × 40	1.57	35 × 40	1.68
		25 × 40	1.65	35 × 30	1.70	35 × 35	1.69		
		30 × 30	1.65						
560	567	25 × 45	1.80	30 × 40	1.95	30 × 50	1.85	35 × 45	1.87
		30 × 35	1.80	35 × 35	2.05	35 × 40	1.90		
680	687	25 × 50	2.03	35 × 40	2.17	35 × 45	2.20		
		30 × 35	2.00						
		35 × 30	2.00						
820	827	30 × 40	2.30	35 × 45	2.20				
		35 × 35	2.30						
1000	108	30 × 50	2.70						
		35 × 40	2.69						
1200	128	35 × 45	3.09						

Maximum Allowable Ripple Current (Arms) at 105°C 120Hz  
在105°C 120Hz條件的最大紋波值

Case Size Φ D x L (mm)  
尺寸 Φ D x L (mm)

牛角電解電容

一覽表 Standard

Voltage (Code)		400V		420V		450V		500V	
Cap. (μF)	Code	Case Size	Ripple Current						
47	476					20 × 25	0.39	22 × 25	0.35
56	566	20 × 25	0.51	20 × 25	0.51	20 × 30	0.51	22 × 25	0.38
						22 × 25	0.50		
68	686	20 × 30	0.56	20 × 30	0.56	20 × 35	0.56	22 × 30	0.45
		22 × 25	0.55	22 × 25	0.55	22 × 30	0.53		
						25 × 25	0.53		
82	826	20 × 30	0.64	20 × 35	0.64	20 × 35	0.64	22 × 35	0.54
		22 × 25	0.64	22 × 25	0.64	22 × 30	0.64		
						25 × 25	0.64		
100	107	20 × 35	0.70	20 × 35	0.70	22 × 30	0.65	22 × 35	0.56
		22 × 30	0.70	22 × 30	0.70	25 × 25	0.64		
		25 × 25	0.70	25 × 25	0.70	30 × 25	0.72		
120	127	20 × 40	0.75	20 × 40	0.75	22 × 40	0.80	22 × 40	0.64
		22 × 30	0.70	22 × 30	0.70	25 × 30	0.80		
				30 × 25	0.78	30 × 25	0.80		
150	157	22 × 40	0.88	22 × 40	0.88	22 × 40	0.84	25 × 40	0.76
		25 × 30	0.83	25 × 35	0.88	25 × 35	0.88		
		30 × 25	0.88	30 × 25	0.88	30 × 30	0.88		
180	187	22 × 40	0.93	22 × 40	0.90	25 × 40	1.00	30 × 35	0.86
		25 × 35	0.98	25 × 35	0.92				
		30 × 30	0.98	30 × 30	0.96	30 × 30	1.00		
				35 × 25	0.94				
220	227	22 × 45	1.05	22 × 45	1.05	25 × 45	1.12	30 × 40	0.97
		25 × 35	1.04	30 × 30	1.03	30 × 35	1.12		
		30 × 30	1.10	35 × 25	1.10	35 × 30	1.12		
270	277	25 × 50	1.29	25 × 50	1.37	30 × 40	1.28	30 × 45	1.12
		30 × 35	1.22	30 × 35	1.18	35 × 35	1.28		
		35 × 30	1.22	35 × 30	1.22				
330	337	30 × 45	1.55	30 × 45	1.49	30 × 45	1.39		
		35 × 30	1.44	35 × 30	1.36	35 × 40	1.45		
390	397	30 × 45	1.60	30 × 45	1.60	35 × 40	1.55		
		35 × 35	1.60	35 × 40	1.66				
470	477	35 × 40	1.90	35 × 40	1.81	35 × 50	1.85		
560	567	35 × 45	2.12						

Maximum Allowable Ripple Current (Arms) at 105°C 120Hz  
 在105°C 120Hz條件的最大紋波值

Case Size Φ D × L (mm)  
 尺寸 Φ D × L (mm)

牛角電解電容