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Eurocap is a supplier of Selected Quality Electronic Components.

The company was established in 1988, to supply Aluminium Electrolytic Capacitors to OEM manufacturers. A quality product manufactured to the Japanese Industrial Standard C5141, supplied at competitive prices to compete on equal terms against the larger electrolytic capacitors manufacturers based in the Far East.

Today the Eurocap Brand is synonymous with established quality and personal service.

Our policy is to work closely with OEMs to provide tailored packages by understanding their requirements and needs, to provide a service that meets their engineering, purchasing, stocking and pricing criteria. Our Electrolytic Capacitor products are manufactured by Far Eastern owned factories.

We believe it is to our credit that we have continued to source from the same suppliers since our inception, who have a good understanding of our customers needs and provide us with consistent quality at the very best price.

The services offered by Eurocap and our Far Eastern principals include :

- ~ CONSISTENT QUALITY WITH COMPETITIVE PRICING.
- ~ ON TIME DELIVERIES WITH LOCAL STOCKING FACILITIES.
- ~ TECHNICAL BACKUP WITH TAILORED ENGINEERING SOLUTIONS.

We also supply a broad spectrum of other components which include:

Non-electrolytic Capacitors, Resistors, Varistors and Ferrites.

**Eurocap International Limited.**

**138, High Street, Cheshunt, Herts, EN8 0AP England**

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## Electrolytic Capacitor Selection Chart

Series	Lead Type	Characteristics	Temperature Range Degrees C	Voltage Range (V)	Capacitance Range (uF)	Page
GPP	Snap-In	Snap-In Terminal	-40 (-25) ~ +85	10 ~ 450	47 ~ 33000	3
GMP	Snap-In	Snap-In Terminal	-40 (-25) ~ +105	16 ~ 450	68 ~ 33000	8
GPS	Radial	Standard Use	-40 (-25) ~ +85	6.3 ~ 450	0.1 ~ 22000	13
GMS	Radial	Wide Temperature Range	-55, -40, -25 ~ +105	6.3 ~ 450	0.1 ~ 22000	16
FMEX	Radial	Low ESR, High Ripple Current	-55 ~ +105	6.3 ~ 63	0.47 ~ 15000	19
GP7	Radial	7mm L Standard Use	-40 ~ +85	6.3 ~ 50	0.1 ~ 220	23
GP5	Radial	5mm L Standard Use	-40 ~ +85	4 ~ 50	0.1 ~ 220	25
GPL	Radial	Low Leakage Current	-40 ~ +85	10 ~ 50	0.1 ~ 1000	27
GPN	Radial	Bi-Polar	-40 ~ +85	6.3 ~ 100	0.1 ~ 6800	29
GPST	Axial	Standard Use	-40 (-25) ~ +85	6.3 ~ 450	0.47 ~ 22000	31
GMST	Axial	Wide temperature range	-40 ~ +105	6.3 ~ 100	0.47 ~ 6800	34
MXM	Chip	Surface Mount	-40 ~ +85	4 ~ 50	0.1 ~ 820	36
MTM	Chip	Surface Mount	-40 ~ +105	4 ~ 50	0.1 ~ 470	36

# GPP Series



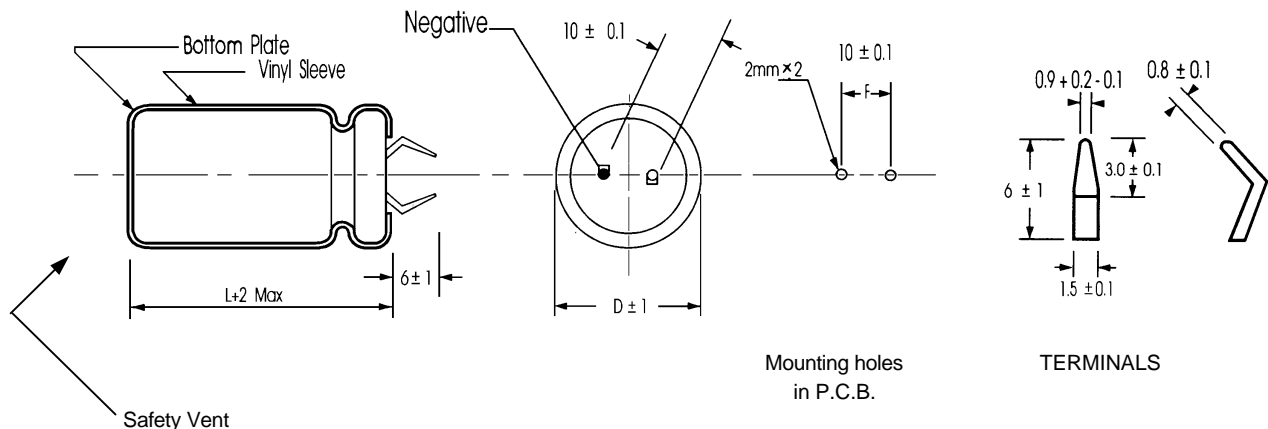
### Features

- \* Small low profile
- \* 10mm terminal spacing for direct PCB mounting
- \* Aluminium case with explosion proof vent
- \* 2000 Hour lifetime

Item	Performance Characteristics						
Operating Temperature Range	-40 to +85 deg C	-25 to +85 deg C					
Working Voltage Range	10 to 100 Volts D.C.	160 to 450 Volts D.C.					
Nominal Capacitance Range	470 to 68000 uF	47 to 2700 uF					
Capacitance Tolerance	+/- 20 % ( 120 Hz), 20 deg C						
Leakage Current (+20deg C)	I <= 0.02 CV after 5 Minutes						
Dissipation Factor % (120 Hz, +20 deg C)	Less than the value below:						
	WVDC	10~16	25~35	50~63	80~100	160~250	350~450
	uF						
	47~390					15	20
	470~3900	25	20	20	20	15	20
	4700~8200	35	30	30	25		
	10000~22000	40	35	30			
27000~47000	45	40	35				
56000~68000	50	45					
Stability at Low Temperature	Impedance Ratio at 120 Hz -25 to +20 deg C : 3 max -40 to +20 deg C : 12 max						
Load Life	<u>Test conditions</u> Duration time: 2000 Hrs Ambient temperature: +85 deg C Applied voltage: Rated working voltage Ripple Current: Maximum rated ripple current. <u>After testing--Measure at 20 deg C.</u> Capacitance change: <= +/- 20% of initial measured value Dissipation factor: <= 200% of initial specified value Leakage current: <= The initial specified value						
Shelf Life	<u>Test Conditions</u> Duration time: 500 Hrs Ambient temperature: +85 deg C Applied voltage: None <u>After testing--Measure at 20 deg C.</u> Same limits as for load life. Pre-treatment: The measurements shall be conducted after application of the Working D.C. voltage for 30 minutes.						
Marking	White print on black sleeve						

### Physical Dimensions and Mounting Details

The capacitors can also be supplied with an optional 4mm (+/-1mm) long terminal.



Eurocap International Limited.

Tel. +44 (0)1992 625407.

Fax +44 (0)1992 625420.

E-Mail: eurocap@dial.pipex.com

Website: www.eurocap-int.com/eurocap

# GPP Series



Ir (A) specified at 85°C and 120Hz  
 Impedence (Z) specified at 20°C and 120Hz

**GPP Standard Products Table 10 to 50 Volt**

uF	10 V		16 V		25 V		35 V		50 V	
	Dia x L	Ir(A)	Dia x L	Ir(A)	Dia x L	Ir(A)	Dia x L	Ir(A)	Dia x L	Ir(A)
1500									22 x 26	1.44
2200							22 x 26	2.18	22 x 26	2.04
2700									22 x 31	2.30
3300							22 x 26	2.46	22 x 31	2.64
									25 x 26	2.64
3900							22 x 31	2.64		
4700	22 x 21	2.40	22 x 21	2.40	22 x 26	2.64	22 x 31	2.68	22 x 36	2.88
							25 x 26	2.68	25 x 31	2.88
									30 x 25	2.88
5600					22 x 31	2.78			22 x 41	3.06
									25 x 36	3.06
									30 x 31	3.06
6800	22 x 26	2.84	22 x 26	2.84	22 x 31	2.93	22 x 36	3.06	22 x 51	3.24
					25 x 26	2.93	25 x 31	3.06	25 x 41	3.24
									30 x 31	3.24
8200	22 x 26	2.90	22 x 26	2.90	22 x 31	3.05			25 x 46	3.48
					25 x 26	3.05			30 x 36	3.48
10000	22 x 31	3.06	22 x 31	3.06	22 x 36	3.43	22 x 46	3.60	25 x 51	3.96
	25 x 26	3.06	25 x 26	3.06	25 x 31	3.43	25 x 41	3.60	30 x 41	3.96
					30 x 26	3.43	30 x 31	3.60	35 x 32	3.96
12000	22 x 31	3.43	22 x 31	3.43	22 x 41	3.84	25 x 46	4.08	30 x 46	4.10
	25 x 26	3.43	25 x 26	3.43	25 x 36	3.84	30 x 36	4.08	35 x 37	4.10
					30 x 31	3.84	35 x 32	4.08		
15000	22 x 36	3.94	22 x 36	3.94	22 x 51	4.39	25 x 51	3.92	30 x 51	4.70
	25 x 31	3.94	25 x 31	3.94	25 x 41	4.39	30 x 41	3.92	35 x 42	4.70
					30 x 31	4.39	35 x 32	3.92		
18000	22 x 41	4.34	22 x 41	4.34	25 x 46	4.80	30 x 46	4.70	35 x 47	5.31
	25 x 31	4.34	25 x 36	4.34	30 x 36	4.80	35 x 37	4.70		
22000	22 x 46	4.80	22 x 46	4.80	25 x 51	5.40	30 x 51	5.45	35 x 52	5.85
	25 x 36	4.80	25 x 36	4.80	30 x 41	5.40	35 x 42	5.45		
	30 x 31	4.80	30 x 31	4.80						
27000	25 x 46	7.57	25 x 46	7.57	30 x 46	5.97	35 x 47	5.78		
	30 x 36	7.57	30 x 36	7.57	35 x 36	5.97				
33000	25 x 51	8.20	25 x 51	8.20	30 x 51	6.24	35 x 52	6.36		
	30 x 41	8.20	30 x 41	8.20	35 x 42	6.24				
	35 x 32	8.20	35 x 32	8.20						
39000	30 x 46	8.33	30 x 46	8.33	35 x 47	7.10			40 x 60	8.50
	35 x 36	8.33	35 x 36	8.33						
47000	30 x 51	8.96	30 x 51	8.96	35 x 52	7.60				
	35 x 42	8.96	35 x 42	8.96						
56000	35 x 46	10.50	35 x 46	10.50						
68000	35 x 52	10.80	35 x 52	10.80						

# GPP Series



Ir (A) specified at 85°C and 120Hz  
 Impedence (Z) specified at 20°C and 120Hz

**GPP Standard Products Table 63 to 160 Volt**

uF	63 V		80 V		100 V		160 V	
	Dia x L	Ir(A)	Dia x L	Ir(A)	Dia x L	Ir(A)	Dia x L	Ir(A)
180							22 x 21	1.12
270							22 x 26	1.35
330							22 x 26	1.44
390							22 x 31	1.66
							25 x 26	1.66
470					22 x 21	1.34	22 x 31	1.76
							25 x 26	1.76
560							22 x 36	2.03
							25 x 31	2.03
							30 x 26	2.03
680			22 x 26	1.34	22 x 26	1.53	22 x 41	2.36
							25 x 36	2.36
							30 x 26	2.36
820							22 x 46	2.72
							25 x 41	2.72
							30 x 36	2.72
							35 x 25	2.30
1000	22 x 26	1.58	22 x 31	1.62	22 x 31	1.62	25 x 46	3.13
			25 x 26	1.62	25 x 26	1.62	30 x 36	3.13
							35 x 32	3.13
1200					22 x 36	1.74	25 x 51	3.44
					25 x 31	1.74	30 x 36	3.44
							35 x 32	3.44
1500	22 x 26	1.68	22 x 31	1.76	22 x 41	1.85	30 x 46	3.96
			25 x 26	1.76	25 x 36	1.85	35 x 37	3.96
					30 x 31	1.85		
1800	30 x 20	1.90	22 x 36	1.82	22 x 46	2.20	30 x 51	4.47
			25 x 31	1.82	25 x 41	2.20	35 x 42	4.47
					30 x 31	2.20		
2200	22 x 31	2.52	22 x 41	2.52	22 x 51	2.64	35 x 47	4.65
	25 x 26	2.52	25 x 31	2.52	25 x 41	2.64		
			30 x 26	2.52	30 x 31	2.64		
2700	22 x 36	2.82	22 x 46	2.76	25 x 46	3.16	35 x 52	4.76
	25 x 31	2.82	25 x 36	2.76	30 x 36	3.16		
			30 x 31	2.76				
3300	22 x 41	3.12	22 x 51	3.42	25 x 51	3.42		
	25 x 31	3.12	25 x 41	3.42	30 x 41	3.42		
	30 x 26	3.12	30 x 31	3.24				
3900	22 x 46	3.21	25 x 46	3.40	30 x 46	3.58		
	25 x 36	3.21	30 x 36	3.40	35 x 37	3.58		
	30 x 31	3.21						
4700	22 x 51	3.28	25 x 51	3.60	30 x 51	3.72		
	25 x 41	3.28	30 x 41	3.60	35 x 42	3.72		
	35 x 27	3.28						
5600	25 x 46	3.86	30 x 46	3.78	35 x 47	3.72		
	30 x 36	3.86	35 x 37	3.78				
	35 x 32	3.86						
6800	25 x 51	4.32	30 x 51	4.60	35 x 52	4.10		
	30 x 41	4.32	35 x 42	4.60				
	35 x 32	4.32						
8200	30 x 46	4.44	35 x 52	4.92				
	35 x 37	4.44						
10000	35 x 42	4.77	40 x 63	5.04				
12000	35 x 52	5.04						

# GPP Series



Ir (A) specified at 85°C and 120Hz  
 Impedence (Z) specified at 20°C and 120Hz

**GPP Standard Products Table 200 to 450 Volt**

uF	200 V		250 V		350 V		400 V		450 V	
	Dia x L	Ir(A)	Dia x L	Ir(A)	Dia x L	Ir(A)	Dia x L	Ir(A)	Dia x L	Ir(A)
47							22 x 21	0.42	22 x 26	0.36
68							22 x 26	0.51		
82							22 x 26	0.83	22 x 31	0.89
									25 x 26	0.89
100					22 x 26	0.76	22 x 31	1.03	22 x 36	1.03
							25 x 26	1.03	25 x 31	1.03
120			22 x 21	0.85	22 x 31	0.89	22 x 31	1.07	22 x 41	1.19
					25 x 26	0.89	25 x 26	1.07	30 x 35	1.19
150	22 x 21	0.96	22 x 26	0.98	22 x 36	0.90	22 x 41	1.26	22 x 51	1.39
					25 x 31	0.99	25 x 31	1.26	25 x 41	1.39
					30 x 26	0.99	30 x 26	1.26	30 x 31	1.39
180			22 x 26	1.12	22 x 41	1.15	22 x 46	1.46	22 x 51	1.52
					25 x 36	1.15	25 x 36	1.46	35 x 27	1.52
					30 x 26	1.15	30 x 31	1.46		
220	22 x 26	1.36	22 x 31	1.36	22 x 46	1.34	22 x 51	1.75	25 x 51	1.76
			25 x 26	1.36	25 x 41	1.34	25 x 41	1.75	35 x 37	1.76
					30 x 31	1.34	30 x 36	1.75		
					35 x 27	1.34	30 x 31	1.70		
270	22 x 26	1.50	22 x 31	1.60	25 x 46	1.63	25 x 46	1.96		
			25 x 26	1.60	30 x 36	1.63	30 x 36	1.96		
					35 x 27	1.63	35 x 32	1.96		
330	22 x 31	1.89	22 x 36	1.87	25 x 51	1.80	30 x 41	2.26	30 x 46	2.29
	25 x 26	1.89	25 x 31	1.87	30 x 41	1.80	35 x 37	2.26	35 x 37	2.29
			30 x 26	1.87	35 x 32	1.80				
390	22 x 31	1.92	22 x 41	2.04	30 x 46	2.02	30 x 46	2.50	35 x 42	2.54
	25 x 26	1.92	25 x 36	2.04	35 x 37	2.02	35 x 42	2.50	40 x 37	2.54
			30 x 26	2.04						
470	22 x 36	2.23	22 x 46	2.38	30 x 51	2.22	35 x 47	2.80	35 x 47	2.89
	25 x 31	2.23	25 x 41	2.38	35 x 42	2.22	40 x 37	2.80	40 x 42	2.89
	30 x 26	2.23	30 x 31	2.38			30 x 52	2.40		
560	22 x 41	2.57	25 x 46	2.81	35 x 47	2.59	35 x 52	3.16	40 x 52	3.26
	25 x 36	2.57	30 x 36	2.81						
	30 x 26	2.57	35 x 27	2.81						
680	22 x 46	2.98	25 x 51	3.11	35 x 52	2.90	40 x 52	3.59		
	25 x 36	2.98	30 x 41	3.11						
	30 x 31	2.98	35 x 32	3.11						
820	25 x 46	3.26	30 x 46	3.55						
	30 x 36	3.26	35 x 37	3.55						
	35 x 27	3.26								
1000	25 x 51	3.92	30 x 51	4.00						
	30 x 41	3.92	35 x 42	4.00						
	35 x 32	3.92								
1200	30 x 46	4.25	35 x 47	4.55						
	35 x 37	4.25								
		4.25								
1500	30 x 51	4.99	35 x 52	5.34						
	35 x 42	4.99								
		4.99								
1800	35 x 47	5.84	40 x 52	6.11						
2200	35 x 52	6.07								

# GPP Series



## GPP Application Data

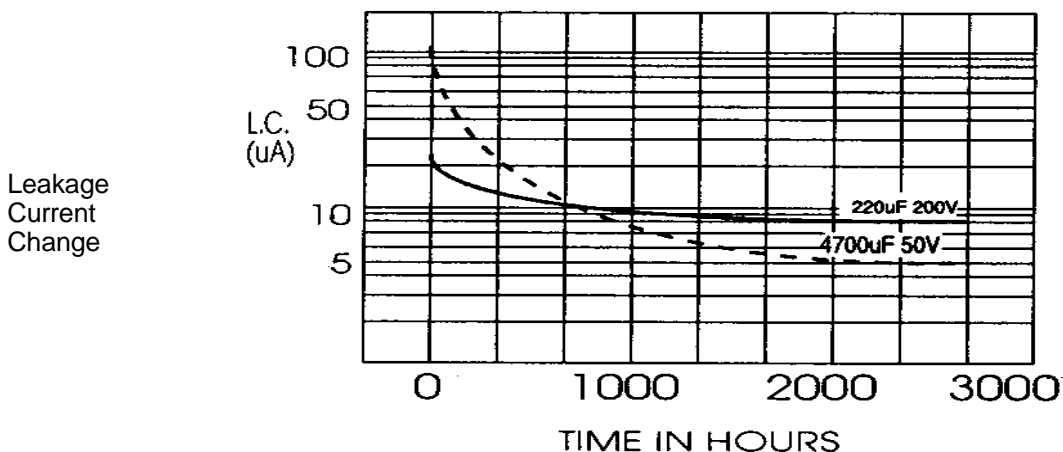
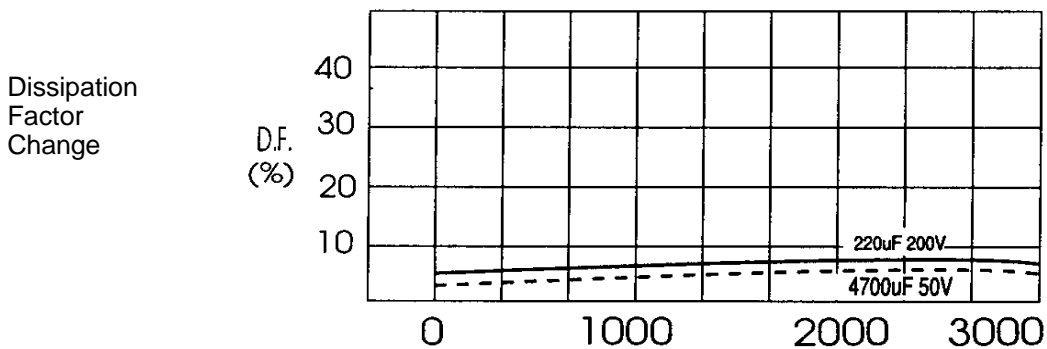
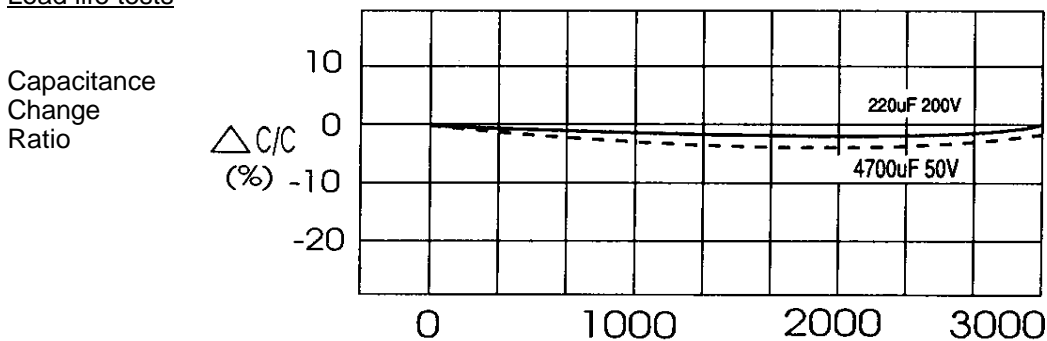
### Ripple current multipliers for frequency

Frequency	50 / 60	120	400	1K	10K	50K	100K
Capacitance (uF)							
<uF<= 10	0.80	1.00	1.30	1.45	1.65	1.70	1.70
10 <uF<= 100	0.80	1.00	1.23	1.36	1.48	1.53	1.53
100 <uF<= 1000	0.80	1.00	1.16	1.25	1.35	1.38	1.38
1000 <uF<=	0.80	1.00	1.11	1.17	1.25	1.28	1.28

### Ripple current multipliers for temperature

Temperature (deg. C.)	45	60	70	85
Factor	1.8	1.5	1.3	1

### Load life tests



# GMP Series



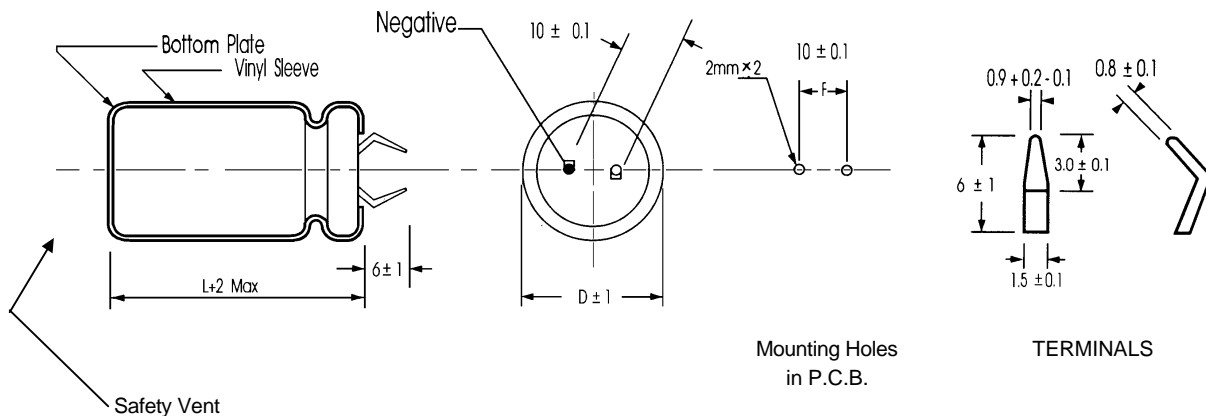
## Features

- \* High reliability with high ripple current
- \* Small low profile
- \* Temperature Rated at 105°C
- \* Aluminium case with explosion proof vent
- \* 2000 Hour lifetime

Item	Performance Characteristics						
Operating Temperature Range	-40 to + 105°C			-25 to +105°C			
Working Voltage Range	10 to 100 Volts D.C.			160 to 450 Volts D.C.			
Nominal Capacitance Range	330 to 68000 uF			33 to 2200 uF			
Capacitance Tolerance	+/- 20 % ( 120 Hz), 20°C						
Leakage Current (+20°C)	I <= 0.02 CV after 5 Minutes						
Dissipation Factor % (120 Hz, +20°C)	Less than the value below:						
	WVDC	10~16	25~35	50~63	80~100	160~250	350~450
	uF						
	33~470				15	15	20
	560~3900	25	20	20	20	15	20
	4700~8200	35	30	30	25		
	10000~22000	40	35	30			
Stability at Low Temperature	Impedance Ratio at 120 Hz						
	WVDC	10~16	25	35~100	160~250	400~450	
	Z(-25°C) / Z(+20°C)	5	4	4	4	8	
	Z(-40°C) / Z(+20°C)	15	15	12			
Load Life	<u>Test conditions</u>						
	Duration time:	2000 Hrs					
	Ambient temperature:	+105°C					
	Applied voltage:	Rated working voltage					
	Ripple Current:	Maximum rated ripple current.					
	<u>After testing--Measure at 20°C</u>						
	Capacitance change:	<= +/- 20% of initial measured value					
Dissipation factor:	<= 200% of initial specified value						
Leakage current:	<= The initial specified value						
Shelf Life	<u>Test Conditions</u>						
	Duration time:	500 Hrs					
	Ambient temperature:	+105°C					
	Applied voltage:	None					
	<u>After testing--Measure at 20°C</u>						
	Same limits as for load life. Pre-treatment: The measurements shall be conducted after application of the Working D.C. voltage for 30 minutes.						
Marking	White print on black sleeve						

## Physical Dimensions and Mounting Details

The capacitors can also be supplied with an optional 4mm (+/-1mm) long terminal.



# GMP Series



Ir (A) specified at 105°C and 120Hz

Impedence (Z) specified at 20°C and 120Hz

**GMP Standard Products Table 10 to 35 Volt**

uF	10 V		16 V		25 V		35 V	
	Dia x L	Ir(A)	Dia x L	Ir(A)	Dia x L	Ir(A)	Dia x L	Ir(A)
1500							22 x 26	1.26
2200					22 x 26	1.03	22 x 31	1.35
							25 x 26	1.35
3300			22 x 26	1.17	22 x 26	1.48	22 x 31	1.84
					25 x 26	1.48	25 x 26	1.84
							30 x 26	1.84
3900							22 x 31	2.23
4700	22 x 26	1.24	22 x 31	1.53	22 x 31	1.92	22 x 36	2.42
			25 x 26	1.53	25 x 26	1.92	25 x 31	2.42
					30 x 26	1.92	30 x 26	2.42
5600					22 x 31	2.25	22 x 36	2.89
							25 x 31	2.89
							30 x 26	2.89
6800	22 x 26	1.56	22 x 31	2.02	22 x 31	2.60	22 x 41	3.24
	25 x 26	1.56	25 x 26	2.02	25 x 26	2.60	25 x 36	3.24
			30 x 26	2.02	30 x 26	2.60	30 x 31	3.24
							35 x 27	3.24
8200	22 x 26	2.04	22 x 31	2.20	22 x 36	3.04	22 x 51	3.57
					25 x 31	3.04	25 x 41	3.57
					30 x 26	3.04	30 x 31	3.57
							35 x 27	3.57
10000	22 x 31	2.20	22 x 36	2.79	22 x 41	3.50	25 x 46	3.96
	25 x 26	2.20	25 x 31	2.79	25 x 36	3.50	30 x 36	3.96
	30 x 26	2.20	30 x 26	2.79	30 x 31	3.50	35 x 32	3.96
					35 x 27	3.50		
12000	22 x 36	2.34	22 x 36	3.06	22 x 46	4.02	25 x 51	4.21
			25 x 31	3.06	25 x 41	4.02	30 x 41	4.21
			30 x 26	3.06	30 x 31	4.02	35 x 32	4.21
					35 x 27	4.02		
15000	22 x 36	2.76	22 x 51	3.24	25 x 46	4.58	30 x 46	4.69
	25 x 31	2.76	25 x 41	3.24	30 x 36	4.58	35 x 37	4.69
	30 x 26	2.76	30 x 36	3.24	35 x 32	4.58		
			35 x 32	3.24				
18000	22 x 36	2.94	22 x 51	3.51	25 x 51	4.82	35 x 42	5.07
	25 x 31	2.94	25 x 46	3.51	30 x 41	4.82		
			30 x 36	3.51	35 x 37	4.82		
			35 x 32	3.51				
22000	22 x 41	3.12	25 x 51	4.08	30 x 46	5.12	35 x 52	5.50
	25 x 36	3.12	30 x 46	4.08	35 x 37	5.12		
	35 x 27	3.12	35 x 32	4.08				
27000	22 x 46	3.48	25 x 51	4.30	35 x 47	5.47		
	25 x 36	3.48	30 x 41	4.30				
	30 x 31	3.48	35 x 37	4.30				
	35 x 27	3.48						
33000	25 x 46	3.72	30 x 46	4.83	35 x 52	6.09		
	30 x 36	3.72	35 x 37	4.83				
	35 x 32	3.72						
39000	25 x 51	4.10	30 x 51	5.78				
	30 x 41	4.10	35 x 42	5.78				
	35 x 32	4.10						
47000	30 x 46	4.38	35 x 47	6.32				
	35 x 37	4.38						
56000	30 x 51	4.64	35 x 52	7.05				
	35 x 42	4.64						
68000	35 x 52	4.80						

# GMP Series



Ir (A) specified at 105°C and 120Hz

Impedance (Z) specified at 20°C and 120Hz

**GMP Standard Products Table 50 to 100 Volt**

uF	50 V		63 V		80 V		100 V	
	Dia x L	Ir(A)	Dia x L	Ir(A)	Dia x L	Ir(A)	Dia x L	Ir(A)
330							22 x 26	0.54
470					22 x 26	0.63	22 x 31	0.79
							25 x 26	0.79
560							25 x 26	0.96
680			22 x 26	0.70	22 x 31	0.84	22 x 31	1.02
					25 x 26	0.84	25 x 26	1.02
							30 x 26	1.02
820					22 x 31	1.02	22 x 31	1.24
							25 x 26	1.24
1000	22 x 26	0.84	22 x 26	0.85	22 x 36	1.16	22 x 36	1.38
			25 x 26	0.85	25 x 31	1.16	25 x 31	1.38
					30 x 26	1.16	30 x 26	1.38
1200			22 x 26	0.98	22 x 36	1.46	22 x 41	1.65
					25 x 31	1.46	25 x 36	1.65
							30 x 31	1.65
1500	22 x 31	1.10	22 x 31	1.10	22 x 41	1.74	22 x 46	1.83
	25 x 26	1.10	25 x 26	1.10	25 x 36	1.74	25 x 41	1.83
			30 x 26	1.10	30 x 31	1.74	30 x 31	1.83
							35 x 27	1.83
							25 x 36	1.20
1800	22 x 31	1.54	22 x 31	1.40	22 x 46	1.95	25 x 46	2.52
			25 x 26	1.40	25 x 41	1.95	30 x 36	2.52
					30 x 31	1.95	35 x 32	2.52
2200	22 x 31	1.65	22 x 36	1.65	22 x 51	2.25	25 x 51	3.03
	25 x 26	1.65	25 x 31	1.65	25 x 46	2.25	30 x 41	3.03
	30 x 26	1.65	30 x 26	1.65	30 x 36	2.25	35 x 32	3.03
					35 x 32	2.25		
2700	22 x 36	1.94	22 x 41	2.07	25 x 51	2.68	30 x 46	4.10
	25 x 31	1.94	25 x 36	2.07	30 x 41	2.68	35 x 37	4.10
			30 x 26	2.07	35 x 37	2.68		
3300	22 x 36	2.24	22 x 51	2.48	25 x 56	3.30	30 x 56	4.59
	25 x 31	2.24	25 x 41	2.48	30 x 51	3.30	35 x 47	4.59
	30 x 26	2.24	30 x 31	2.48	35 x 42	3.30		
			35 x 27	2.48				
3900	22 x 41	2.54	25 x 46	3.05	30 x 51	3.85	35 x 47	4.98
	25 x 36	2.54	30 x 36	3.05	35 x 42	3.85		
	30 x 31	2.54	35 x 32	3.05				
4700	22 x 46	2.95	30 x 41	3.43	30 x 51	4.29	35 x 52	5.43
	25 x 41	2.95	35 x 32	3.43	35 x 42	4.29		
	30 x 31	2.95	25 x 41	3.43				
	35 x 27	2.95						
5600	22 x 51	3.10	30 x 46	3.86	35 x 47	5.10		
	25 x 46	3.10	35 x 37	3.86				
	30 x 41	3.10						
	35 x 32	3.10						
6800	25 x 51	3.26	30 x 51	4.64	35 x 52	5.66		
	30 x 41	3.26	35 x 42	4.64				
	35 x 32	3.26						
8200	30 x 46	3.58	35 x 47	5.05				
	35 x 37	3.58						
10000	30 x 51	4.11	35 x 52	5.75				
	35 x 42	4.11						
12000	35 x 47	4.62						
15000	35 x 52	5.05						

# GMP Series

Ir (A) specified at 105°C and 120Hz  
 Impedence (Z) specified at 20°C and 120Hz



## GMP Standard Products Table 160 to 450 Volt

uF	160 V		200 V		250 V		400 V		450 V	
	Dia x L	Ir(A)	Dia x L	Ir(A)	Dia x L	Ir(A)	Dia x L	Ir(A)	Dia x L	Ir(A)
33							22 x 26	0.39	22 x 26	0.24
47							22 x 26	0.56	22 x 31	0.35
							25 x 26	0.56	25 x 26	0.35
56							22 x 31	0.68	22 x 31	0.41
									25 x 26	0.41
68					22 x 26	0.27	22 x 31	0.72	22 x 36	0.55
							25 x 26	0.72	25 x 31	0.55
							30 x 26	0.72	30 x 26	0.55
82							22 x 36	0.82	22 x 36	0.64
							25 x 31	0.82	25 x 31	0.64
									30 x 36	0.64
100			22 x 26	0.38	22 x 31	0.44	22 x 36	0.82	22 x 36	0.52
					25 x 26	0.44	25 x 31	0.82	22 x 41	0.74
							30 x 26	0.82	25 x 31	0.74
									30 x 31	0.74
120							22 x 26	0.90	22 x 46	0.82
							25 x 31	0.90	25 x 41	0.82
							30 x 26	0.90	30 x 31	0.82
150	22 x 26	0.37	22 x 26	0.54	22 x 31	0.60	22 x 46	0.98	22 x 51	0.96
			25 x 26	0.54	25 x 26	0.60	25 x 41	0.98	25 x 41	0.96
					30 x 26	0.60	30 x 31	0.98	30 x 36	0.96
180					22 x 31	0.69	25 x 46	1.14	25 x 51	1.14
					25 x 26	0.69	30 x 36	1.14	30 x 41	1.14
							35 x 32	1.14	35 x 32	1.14
220	22 x 26	0.65	22 x 31	0.92	22 x 36	1.00	30 x 31	1.21	30 x 46	1.24
			25 x 26	0.92	25 x 31	1.00	30 x 41	1.21	35 x 37	1.24
			30 x 26	0.92	30 x 26	1.00	35 x 32	1.21		
			22 x 25	0.83			25 x 46	1.10		
270	22 x 26	0.74	22 x 31	1.03	22 x 41	1.16	30 x 46	1.40	30 x 51	1.48
			25 x 26	1.03	25 x 36	1.16	35 x 37	1.40	35 x 42	1.48
					30 x 31	1.16				
330	22 x 31	0.98	22 x 36	1.21	22 x 46	1.28	30 x 51	1.57	35 x 47	1.64
	25 x 26	0.98	25 x 31	1.21	25 x 36	1.28	35 x 42	1.57		
	30 x 26	0.98	30 x 26	1.21	30 x 31	1.28				
390	22 x 36	1.10	22 x 41	1.39	22 x 46	1.48	35 x 47	1.74	35 x 52	1.86
	25 x 31	1.10	25 x 36	1.39	25 x 36	1.48				
			30 x 31	1.39	30 x 31	1.48				
470	22 x 36	1.21	22 x 46	1.62	25 x 46	1.76	35 x 52	1.98	35 x 52	1.90
	25 x 31	1.21	25 x 41	1.62	30 x 36	1.76	35 x 47	1.85		
			30 x 31	1.62	35 x 32	1.76				
			22 x 36	1.41						
560	22 x 41	1.40	22 x 51	1.85	25 x 51	1.93	35 x 52	2.23		
	25 x 36	1.40	25 x 41	1.85	30 x 41	1.93				
	30 x 31	1.40	30 x 36	1.85	35 x 32	1.93				
680	22 x 46	1.64	22 x 56	2.04	30 x 46	2.22				
	25 x 41	1.64	25 x 51	2.04	35 x 37	2.22				
	30 x 36	1.64	30 x 36	2.04						
	35 x 32	1.64								
820	25 x 46	1.85	25 x 56	2.34	30 x 51	2.48				
	30 x 36	1.85	30 x 41	2.34	35 x 42	2.48				
	35 x 32	1.85	35 x 37	2.34						
1000	25 x 51	2.15	30 x 51	2.70	35 x 47	2.80				
	30 x 41	2.15	35 x 42	2.70						
1200	25 x 56	2.46	30 x 51	3.00	35 x 52	3.17				
	30 x 46	2.46	35 x 42	3.00						
1500	30 x 51	2.80	35 x 52	3.43						
	35 x 42	2.80								
1800	30 x 51	3.13	35 x 52	4.01						
	35 x 42	3.13								
2200	35 x 52	3.39								

Eurocap International Limited.

Tel. +44 (0)1992 625407

E-Mail: eurocap@dial.pipex.com

Fax +44 (0)1992 625420

Website: www.eurocap-int.com/eurocap

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## GMP Application Data

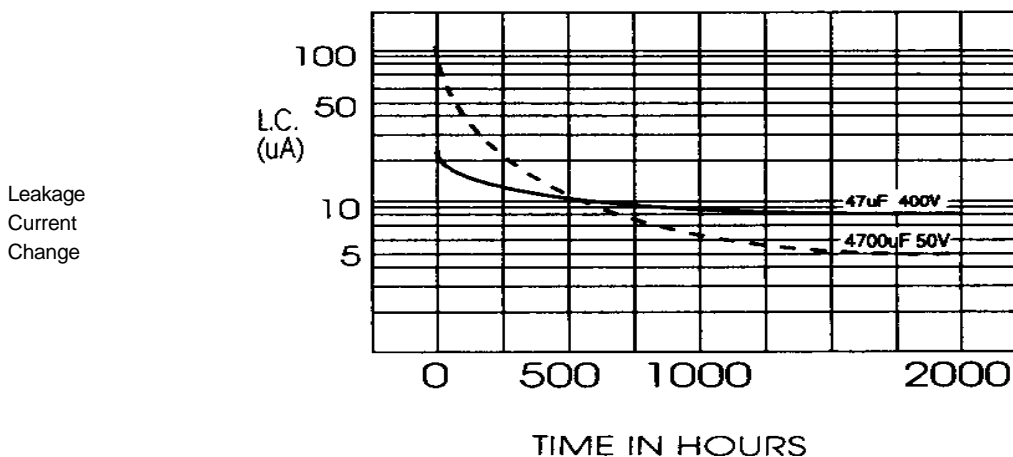
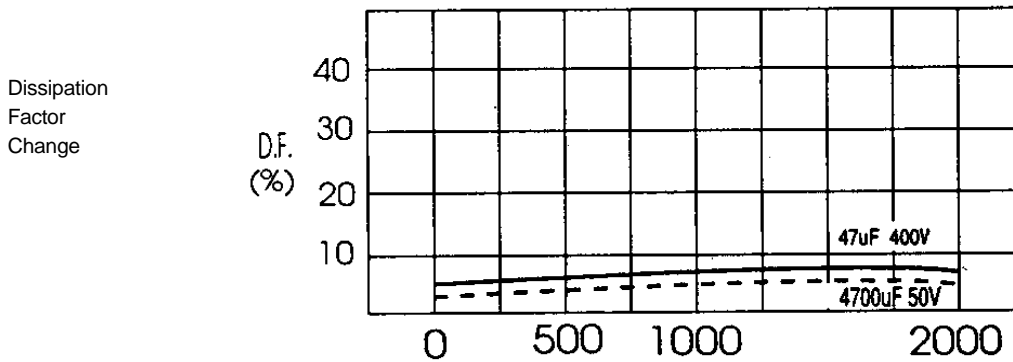
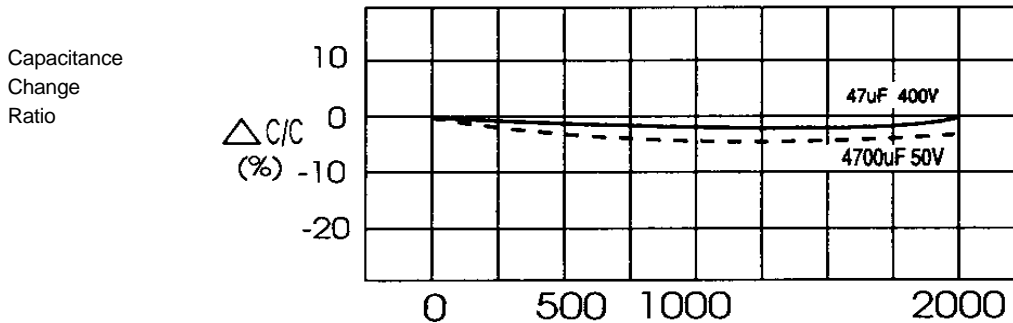
Ripple current multipliers for frequency

Frequency	50 / 60	120	400	1K	10K	50K	100K
Capacitance (uF)							
<uF<= 10	0.80	1.00	1.30	1.45	1.65	1.70	1.70
10 <uF<= 100	0.80	1.00	1.23	1.36	1.48	1.53	1.53
100 <uF<= 1000	0.80	1.00	1.16	1.25	1.35	1.38	1.38
1000 <uF<=	0.80	1.00	1.11	1.17	1.25	1.28	1.28

Ripple current multipliers for temperature

Temperature (deg. C.)	45	60	70	85	95	105
Factor	2.1	1.9	1.65	1.4	1.25	1

## Load life test



# GPS Series

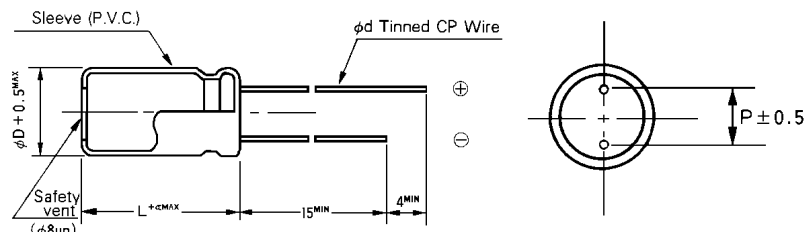


## Features

- \* Standard series for general purposes
- \* 2000 Hours lifetime at 85 °C
- \* Available for automatic mounting.
- \* Solvent proof

Item	Performance Characteristics					
Operating Temperature Range	-40 to + 85°C			-25 to 85°C		
Working Voltage Range	6.3 to 400 Volts D.C.			450 Volts D.C.		
Nominal Capacitance Range	0.1 to 22000 uF					
Capacitance Tolerance	+/- 20 % ( 120 Hz, 20°C)					
Leakage Current (+20°C)	6.3V to 100 V			160V to 450 V		
	I=0.03CV or 4uA whichever is greater after 1 min. application of rated voltage.			CV<=1000: I=0.1CV +40 uA or less after 1 min. application of rated voltage.		
Dissipation Factor % (120 Hz, +20°C)	I=0.01CV or 3uA whichever is greater after 2 mins. application of rated voltage.			CV>1000: I=0.04CV +100 uA or less after 1 min. application of rated voltage.		
	Less than the value below					
Temperature Characteristics	Impedance Ratio at 120 Hz					
	WVDC	6.3	10	16	25	35
	Z(-25°C) / Z(+20°C)	4	3	2	2	2
	Z(-40°C) / Z(+20°C)	10	8	6	4	3
Load Life	Test conditions					
	Duration time:			2000 Hrs		
	Ambient temperature:			+85°C		
	Applied voltage:			Rated working voltage		
Shelf Life	Ripple Current:			Maximum rated ripple current.		
	After testing--Measure at 20°C					
	Capacitance change:			<= +/- 20% of initial measured value		
	Dissipation factor:			<= 200% of initial specified value		
Marking	Leakage current:			<= The initial specified value		
	Test Conditions					
	Duration time:			1000 Hrs		
	Ambient temperature:			+85°C		
Applicable Standards	Applied voltage:			None		
	After testing--Measure at 20°C					
	Same limits as for load life.					
	Pretreatment before testing: According to JIS C-5102 4-3					
White print on black sleeve						
Characteristic W of JIS C-5141						

## Physical Dimensions and Mounting Details



Ø D	5	6.3	8	10	12.5	16	18	22
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0
Ød	0.5	0.5	0.5	0.6	0.6	0.8	0.8	0.8
α <= 100 WV	1.0	1.0	1.0	1.5	1.5	1.5	1.5	2.0
α >= 160 WV	-	1.5	1.5	2.0	2.0	2.0	2.0	2.5

# GPS Series



I<sub>r</sub> (mA) specified at 85°C and 120 KHz

**GPS Standard Products Table 6.3 to 35 Volt**

uF	6.3V		10 V		16 V		25 V		35 V	
	Dia x L	I <sub>r</sub> (mA)	Dia x L	I <sub>r</sub> (mA)	Dia x L	I <sub>r</sub> (mA)	Dia x L	I <sub>r</sub> (mA)	Dia x L	I <sub>r</sub> (mA)
4.7							5 x 11	30	5 x 11	35
10					5 x 11	40	5 x 11	50	5 x 11	55
22	5 x 11	35	5 x 11	55	5 x 11	75	5 x 11	80	5 x 11	85
33	5 x 11	55	5 x 11	80	5 x 11	90	5 x 11	95	5 x 11	105
47	5 x 11	75	5 x 11	95	5 x 11	110	5 x 11	115	6.3 x 11	135
100	5 x 11	130	5 x 11	145	6.3 x 11	175	6.3 x 11	185	8 x 11.5	230
220	6.3 x 11	210	6.3 x 11	230	8 x 11.5	300	8 x 11.5	320	10 x 12.5	370
330	6.3 x 11	260	8 x 11.5	330	8 x 11.5	360	10 x 12.5	420	10 x 16	490
470	8 x 11.5	360	8 x 11.5	390	10 x 12.5	470	10 x 16	540	10 x 20	630
1000	10 x 12.5	560	10 x 16	610	10 x 20	800	12.5 x 20	950	12.5 x 25	1110
1000(S)	8 x 12	560							13 x 21	1110
2200	12.5 x 20	1040	12.5 x 20	1130	12.5 x 25	1350	16 x 25	1590	16 x 31.5	1830
3300	12.5 x 20	1230	12.5 x 25	1430	16 x 25	1740	16 x 31.5	1980	18 x 35.5	2210
4700	16 x 25	1700	16 x 25	1820	16 x 31.5	2140	18 x 35.5	2360	18 x 40	2430
4700(S)									18 x 35.5	2380
6800	16 x 25	1920	16 x 31.5	2200	18 x 35.5	2490	22 x 36	2570	22 x 41	2810
10000	16 x 31.5	2310	18 x 35.5	2570	18 x 40	2730	22 x 41	2910	22 x 51	3370
15000	18 x 35.5	2670	18 x 40	2720	22 x 41	3080	22 x 51	3450		
22000	22 x 36	2830	22 x 41	3060	22 x 51	3530				

**GPS Standard Products Table 50 to 200 Volt**

uF	50V		63 V		100 V		160 V		200 V	
	Dia x L	I <sub>r</sub> (mA)	Dia x L	I <sub>r</sub> (mA)	Dia x L	I <sub>r</sub> (mA)	Dia x L	I <sub>r</sub> (mA)	Dia x L	I <sub>r</sub> (mA)
0.1	5 x 11	1			5 x 11	2				
0.22	5 x 11	2			5 x 11	4				
0.33	5 x 11	3			5 x 11	7				
0.47	5 x 11	5			5 x 11	10	6.3 x 11	11	6.3 x 11	11
1	5 x 11	10			5 x 11	21	6.3 x 11	16	6.3 x 11	16
2.2	5 x 11	23			5 x 11	30	6.3 x 11	25	6.3 x 11	25
3.3	5 x 11	35			5 x 11	40	8 x 11.5	35	8 x 11.5	35
4.7	5 x 11	40	5 x 11	45	5 x 11	50	8 x 11.5	40	10 x 12.5	45
10	5 x 11	65	5 x 11	70	6.3 x 11	75	10 x 12.5	65	10 x 16	70
22	5 x 11	95	6.3 x 11	110	8 x 11.5	135	10 x 20	110	10 x 20	110
33	6.3 x 11	125	6.3 x 11	135	10 x 12.5	175	12.5 x 20	150	12.5 x 25	160
47	6.3 x 11	150	8 x 11.5	185	10 x 16	225	12.5 x 25	190	12.5 x 25	190
100	8 x 11.5	250	10 x 12.5	280	12.5 x 20	400	16 x 25	310	16 x 31.5	340
220	10 x 16	440	10 x 20	500	16 x 25	710	18 x 35.5	520	18 x 40	530
330	10 x 20	580	12.5 x 20	680	16 x 25	870	22 x 36	640	22 x 41	680
470	12.5 x 20	770	12.5 x 25	880	16 x 31.5	980	22 x 46	850		
1000	16 x 25	1350	16 x 31.5	1540	18 x 40	1680				
2200	18 x 35.5	2090	18 x 40	2130	22 x 51	2640				
3300	22 x 36	2340	22 x 41	2540						
4700	22 x 41	2740	22 x 51	3150						
6800	22 x 51	3290								

Ir (mA) specified at 85°C and 120 KHz

**GPS Standard Products Table 250 to 450 Volt**

uF	250V		315 V		350 V		400 V		450 V	
	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)
0.47	6.3 x 11	11								
1	6.3 x 11	16	6.3 x 11	16	8 x 11.5	19	8 x 11.5	16	10 x 12.5	18
2.2	8 x 11.5	30	8 x 11.5	30	10 x 12.5	30	10 x 12.5	25	10 x 16	30
3.3	10 x 12.5	40	10 x 12.5	40	10 x 16	40	10 x 16	35	10 x 20	40
4.7	10 x 12.5	45	10 x 16	50	10 x 16	50	10 x 20	45	12.5 x 20	50
10	10 x 20	75	10 x 20	75	12.5 x 20	80	12.5 x 20	75	12.5 x 25	80
22	12.5 x 25	130	12.5 x 25	130	12.5 x 25	130	16 x 25	130	16 x 31.5	140
33	12.5 x 25	160	16 x 25	180	16 x 31.5	190	16 x 31.5	170	18 x 35.5	180
47	16 x 25	210	16 x 31.5	230	18 x 35.5	240	18 x 35.5	220	22 x 36	220
47	12.5 x 25	260								
100	18 x 35.5	360	18 x 40	350	22 x 36	360	22 x 41	330		
220	22 x 36	540	22 x 46	590						
330	22 x 46	720								

## Ripple Current Multipliers

Frequency

uF	WVDC	Freq.				
		50Hz	120Hz	300Hz	1KHz	>= 10 KHz
<=47	6.3 to 100	0.75	1	1.35	1.57	2.00
100~470		0.80	1	1.23	1.34	1.50
1000~22000		0.85	1	1.10	1.13	1.15
0.47~220	160 to 450	0.80	1	1.25	1.40	1.60
330~470		0.90	1	1.10	1.13	1.15

Temperature

Temp. °C	<=70	85
Multiplier	1.27	1

# GMS Series

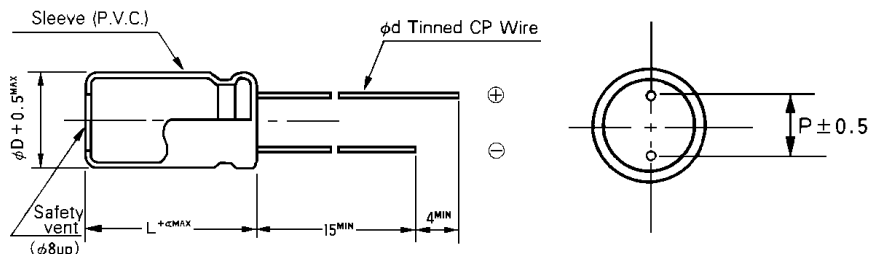


## Features

- \* Wide temperature range.
- \* 2000 Hours lifetime at 105°C (D>=10mm)
- \* Solvent proof

Item	Performance Characteristics					
	-55 to +105°C		-40 to +105°C		-25 to 105°C	
Operating Temperature Range	-55 to +105°C		-40 to +105°C		-25 to 105°C	
Working Voltage Range	6.3 to 100 Volts D.C.		160 to 400 Volts D.C.		450 Volts D.C.	
Nominal Capacitance Range	0.1 to 22000 uF					
Capacitance Tolerance	+/- 20 % ( 120 Hz, 20°C)					
Leakage Current (+20°C)	6.3V to 100 V			160V to 450 V		
	I=0.03CV or 4uA whichever is greater after 1 min. application of rated voltage.			CV<=1000: I=0.1CV +40 uA or less after 1 min. application of rated voltage.		
Dissipation Factor % (120 Hz, +20°C)	Less than the value below					
	WVDC	6.3	10	16	25	35
	tan d (Max)	0.24	0.2	0.16	0.14	0.12
	WVDC	50	63	100	160-350	400-450
Temperature Characteristics	Impedence Ratio at 120 Hz					
	WVDC	6.3	10	16	25	35
	Z(-25°C) / Z(+20°C)	4	3	2	2	2
	Z(-40°C) / Z(+20°C)	8	6	4	3	3
	WVDC	50-100	160-200	250	315-400	450
	Z(-25°C) / Z(+20°C)	2	2	3	3	5
Load Life	<u>Test conditions</u> Duration time: 2000 Hrs Ambient temperature: +105°C Applied voltage: Rated working voltage Ripple Current: Maximum rated ripple current. <u>After testing--Measure at 20°C</u> Capacitance change: <= +/- 20% of initial measured value Dissipation factor: <= 200% of initial specified value Leakage current: <= The initial specified value					
	<u>Test Conditions</u> Duration time: 500 Hrs Ambient temperature: +105°C Applied voltage: None <u>After testing--Measure at 20°C</u> Same limits as for load life. Pretreatment before testing: According to JIS C-5102 4-3					
Shelf Life	<u>Test Conditions</u> Duration time: 500 Hrs Ambient temperature: +105°C Applied voltage: None <u>After testing--Measure at 20°C</u> Same limits as for load life. Pretreatment before testing: According to JIS C-5102 4-3					
Marking	White print on black sleeve					
Applicable Standards	Characteristic W of JIS C-5141					

## Physical Dimensions and Mounting Details



Ø D	5	6.3	8	10	12.5	16	18	22
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0
Ø d	0.5	0.5	0.5	0.6	0.6	0.8	0.8	0.8
a <= 100 WV	1.0	1.0	1.0	1.5	1.5	1.5	1.5	2.0
a >= 160 WV		1.5	1.5	2.0	2.0	2.0	2.0	2.5

# GMS Series



Ir (mA) specified at 105°C and 120 Hz

**GMS Standard Products Table 6.3 to 35 Volt**

uF	6.3V		10 V		16 V		25 V		35 V	
	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)
4.7							5 x 11	20	5 x 11	25
10					5 x 11	35	5 x 11	40	5 x 11	45
22	5 x 11	30	5 x 11	50	5 x 11	60	5 x 11	65	5 x 11	70
33	5 x 11	50	5 x 11	65	5 x 11	75	5 x 11	80	5 x 11	85
47	5 x 11	70	5 x 11	80	5 x 11	90	5 x 11	95	6.3 x 11	110
100	5 x 11	105	5 x 11	115	6.3 x 11	140	6.3 x 11	150	8 x 11.5	190
100 (S)									6.3 x 11	180
220	6.3 x 11	170	6.3 x 11	190	8 x 11.5	240	8 x 11.5	260	10 x 12.5	330
330	6.3 x 11	200	8 x 11.5	270	8 x 11.5	300	10 x 12.5	380	10 x 16	450
470	8 x 11.5	290	8 x 11.5	320	10 x 12.5	420	10 x 16	490	10 x 20	580
1000	10 x 12.5	510	10 x 16	610	10 x 20	730	12.5 x 20	900	12.5 x 25	1030
1000(S)							10 x 20	770		
2200	12.5 x 20	980	12.5 x 20	1060	12.5 x 25	1250	16 x 25	1300	16 x 31.5	1420
3300	12.5 x 20	1150	12.5 x 25	1320	16 x 25	1420	16 x 31.5	1530	18 x 35.5	2215
4700	16 x 25	1390	16 x 25	1490	16 x 31.5	1650	18 x 35.5	1730	18 x 40	2090
4700	13 x 25	1595								
6800	16 x 25	1570	16 x 31.5	1700	18 x 35.5	1830	22 x 36	2160	22 x 41	2380
10000	16 x 31.5	1790	18 x 35.5	1880	18 x 40	2290	22 x 41	2480		
15000	18 x 35.5	1960	18 x 40	2340	22 x 41	2560				
22000	22 x 36	2380	22 x 41	2600						

**GMS Standard Products Table 50 to 200 Volt**

uF	50V		63 V		100 V		160 V		200 V	
	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)
0.1	5 x 11	1			5 x 11	2				
0.22	5 x 11	2			5 x 11	4				
0.33	5 x 11	3			5 x 11	7				
0.47	5 x 11	5			5 x 11	10	6.3 x 11	10	6.3 x 11	10
1	5 x 11	10			5 x 11	15	6.3 x 11	14	6.3 x 11	14
2.2	5 x 11	18			5 x 11	23	6.3 x 11	21	6.3 x 11	21
3.3	5 x 11	25			5 x 11	30	8 x 11.5	31	8 x 11.5	31
4.7	5 x 11	30	5 x 11	35	5 x 11	40	8 x 11.5	37	10 x 12.5	42
4.7(S)					6.3 x 11	40				
10	5 x 11	50	5 x 11	55	6.3 x 11	65	10 x 12.5	62	10 x 16	69
22	5 x 11	75	6.3 x 11	90	8 x 11.5	110	10 x 20	105	10 x 20	105
33	6.3 x 11	105	6.3 x 11	110	10 x 12.5	160	12.5 x 20	145	12.5 x 25	155
47	6.3 x 11	125	8 x 11.5	150	10 x 16	200	12.5 x 25	190	12.5 x 25	190
100	8 x 11.5	210	10 x 12.5	260	12.5 x 20	370	16 x 25	280	16 x 31.5	285
220	10 x 16	400	10 x 20	460	16 x 25	580	18 x 35.5	430	18 x 40	435
330	10 x 20	530	12.5 x 20	640	16 x 25	710	22 x 36	520	22 x 41	550
470	12.5 x 20	730	12.5 x 25	810	16 x 31.5	860	22 x 46	690		
680					18 x 35.5	935				
1000	16 x 25	1110	16 x 31.5	1190	18 x 40	1440				
2200	18 x 35.5	1530	18 x 40	1830						
3300	22 x 36	1970	22 x 41	2160						
4700	22 x 41	2320								

Ir (mA) specified at 105°C and 120 Hz

**GMS Standard Products Table 250 to 450 Volt**

uF	250V		315 V		350 V		400 V		450 V	
	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)
0.47	6.3 x 11	10								
1	6.3 x 11	14	6.3 x 11	14	8 x 11.5	17	8 x 11.5	15	10 x 12.5	17
2.2	8 x 11.5	25	8 x 11.5	25	10 x 12.5	29	10 x 12.5	24	10 x 16	29
3.3	10 x 12.5	35	10 x 12.5	35	10 x 16	39	10 x 16	34	10 x 20	38
4.7	10 x 12.5	42	10 x 16	47	10 x 16	47	10 x 20	43	12.5 x 20	49
4.7					16 x 29	231				
10	10 x 20	74	10 x 20	74	12.5 x 20	78	12.5 x 20	74	12.5 x 25	78
10(S)							10 x 20	80		
22	12.5 x 25	125	12.5 x 25	125	12.5 x 25	125	16 x 25	115	16 x 31.5	120
33	12.5 x 25	155	16 x 25	165	16 x 31.5	170	16 x 31.5	145	18 x 35.5	145
47	16 x 25	195	16 x 31.5	200	18 x 35.5	205	18 x 35.5	175	22 x 36	180
47(S)							16 x 31.5	250		
100	18 x 35.5	290	18 x 40	295	22 x 36	300	22 x 41	280		
220	22 x 36	440	22 x 46	480						
330	22 x 46	580								

### Ripple Current Multipliers

Frequency

uF	WVDC	Freq.	50Hz	120Hz	300Hz	1KHz	>= 10 KHz
		<=47		0.75	1	1.35	1.57
100 ~ 470	6.3 to 100		0.80	1	1.23	1.34	1.50
100 ~ 22000			0.85	1	1.10	1.13	1.15
0.47 ~ 220	160 to 450		0.80	1	1.25	1.40	1.60
330 ~ 470			0.90	1	1.10	1.13	1.15

### Temperature

Temp. °C	<=70	85	105
Multiplier	1.78	1.4	1

# FME X Series

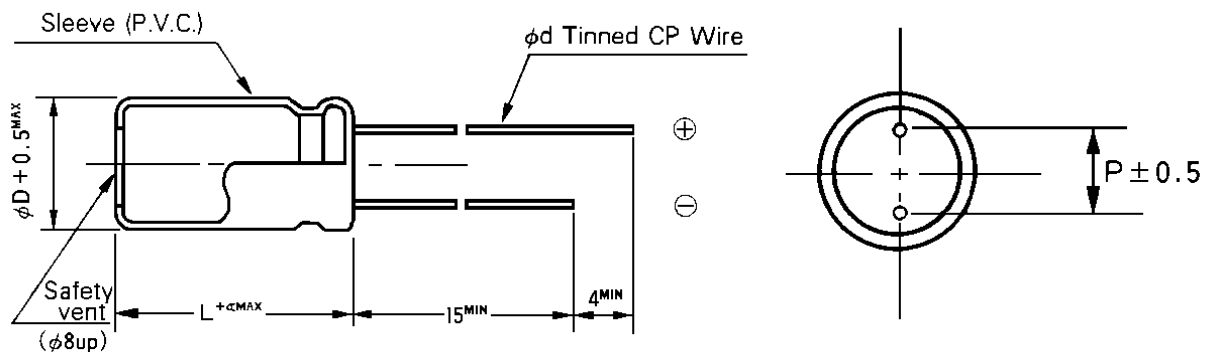


### Features

- \* High reliability with high ripple current
- \* Low impedance for high frequency operation
- \* Temperature Rated at 105°C
- \* 2000, 3000 and 5000 Hour lifetimes (Can size dependent)
- \* Available in standard and low profile can sizes
- \* Solvent proof

Item	Performance Characteristics																	
Operating Temperature Range	-55°C to +105°C																	
Working Voltage Range	6.3 to 63 Volts D.C.																	
Nominal Capacitance Range	0.47 to 15000 uF																	
Capacitance Tolerance	+/- 20 % ( 120 Hz), 20°C																	
Leakage Current (+20°C)	I <= 0.03 CV or 4 uA, whichever is greater after 1 Minute of applied voltage																	
Dissipation Factor % (120 Hz, +20°C)	Less than the value below:																	
	<table border="1"> <tr> <td>WVDC</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> <td rowspan="2">120 Hz 20°C</td> </tr> <tr> <td>tan δ (Max)</td> <td>0.24</td> <td>0.2</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.1</td> <td>0.09</td> </tr> </table>	WVDC	6.3	10	16	25	35	50	63	120 Hz 20°C	tan δ (Max)	0.24	0.2	0.16	0.14	0.12	0.1	0.09
	WVDC	6.3	10	16	25	35	50	63	120 Hz 20°C									
tan δ (Max)	0.24	0.2	0.16	0.14	0.12	0.1	0.09											
For capacitances of more than 1000uF, add 0.02 for every increase of 1000uF (120Hz, 20°C)																		
Temperature Characteristic	Impedance Ratio																	
	<table border="1"> <tr> <td>WVDC</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> <td rowspan="2">120 Hz</td> </tr> <tr> <td>Z(-55°C) / Z(+20°C)</td> <td>4</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> <td>2</td> <td>2</td> </tr> </table>	WVDC	6.3	10	16	25	35	50	63	120 Hz	Z(-55°C) / Z(+20°C)	4	4	3	3	3	2	2
WVDC	6.3	10	16	25	35	50	63	120 Hz										
Z(-55°C) / Z(+20°C)	4	4	3	3	3	2	2											
Load Life	<u>Test conditions</u>																	
	Duration:	<table border="0"> <tr> <td>∅ D &lt;= 6.3mm</td> <td>2000 Hrs</td> </tr> <tr> <td>8mm &lt; ∅ D &lt; 10mm</td> <td>3000 Hrs</td> </tr> <tr> <td>∅ D &gt; 10mm</td> <td>5000 Hrs</td> </tr> </table>	∅ D <= 6.3mm	2000 Hrs	8mm < ∅ D < 10mm	3000 Hrs	∅ D > 10mm	5000 Hrs										
	∅ D <= 6.3mm	2000 Hrs																
	8mm < ∅ D < 10mm	3000 Hrs																
	∅ D > 10mm	5000 Hrs																
	Ambient temperature:	+105°C																
	Applied voltage:	Rated working voltage																
Ripple Current:	Maximum rated ripple current.																	
<u>After testing--Measure at 20°C</u>																		
Capacitance change:	<= +/- 20% of initial measured value																	
Dissipation factor:	<= 200% of initial specified value																	
Leakage current:	<= The initial specified value																	
Shelf Life	<u>Test Conditions</u>																	
	Duration time:	1000 Hrs																
	Ambient temperature:	+105°C																
	Applied voltage:	According to JIS C-5102 4-3																
	<u>After testing--Measure at 20°C</u>																	
	Same limits as for load life.																	
Marking	White print on black sleeve																	
Applicable Standards	Characteristics of W of JIS C-5141																	

### Physical Dimensions and Mounting Details



Diameter	5	6.3	8	10	12.5	16	18
Lead Pitch	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Lead Diameter	0.5	0.5	0.5	0.6	0.6	0.8	0.8

Please Note: Case size 12.5 dia. and 25mm long has a lead dia. of 0.8 mm.

# FMEX Series



Ir (mA) specified at 105°C and 100 KHz  
 Impedence (Z) specified at 20°C and 100 KHz

**FMEX Standard Products Table 6.3 to 35 Volt**

uF	6.3 V (Case Code A)			6.3 V (Case Code B)			10 V (Case Code A)			10 V (Case Code B)		
	Dia x L	Ir(mA)	Z	Dia x L	Ir(mA)	Z	Dia x L	Ir(mA)	Z	Dia x L	Ir(mA)	Z
68							5 x 11	155	0.800			
100	5 x 11	150	0.850				6.3 x 11	220	0.550			
150	6.3 x 11	220	0.490				6.3 x 11	260	0.350			
220	6.3 x 11	260	0.300				6.3 x 15	370	0.240			
330	6.3 x 15	405	0.200				8 x 11.5	460	0.160			
470	8 x 15	550	0.140	10 x 12.5	570	0.140	8 x 16	590	0.120	10 x 12.5	590	0.130
680	8 x 20	735	0.100	10 x 15	700	0.110	8 x 20	790	0.085	10 x 15	775	0.090
1000	10 x 20	950	0.075	12.5 x 15	885	0.085	10 x 20	1060	0.060	12.5 x 15	1040	0.065
1500	10 x 25	1220	0.055	12.5 x 15	1040	0.065	10 x 31.5	1440	0.045	16 x 15	1320	0.050
2200	10 x 31.5	1470	0.043	16 x 15	1340	0.049	12.5 x 25	1710	0.034	18 x 15	1600	0.039
3300	12.5 x 25	1690	0.034	18 x 15	1600	0.039	12.5 x 35.5	2140	0.026	16 x 20	1850	0.031
4700	12.5 x 35.5	2100	0.028	18 x 20	1920	0.032	16 x 31.5	2440	0.023	18 x 25	2250	0.026
6800	16 x 31.5	2370	0.024	18 x 25	2190	0.027	16 x 35.5	2690	0.020	18 x 31.5	2540	0.022
10000	16 x 40	2750	0.020	18 x 31.5	2490	0.023	18 x 40	3020	0.017			
15000	18 x 40	2960	0.018									

uF	16 V (Case Code A)			16 V (Case Code B)			25 V (Case Code A)			25 V (Case Code B)		
	Dia x L	Ir(mA)	Z	Dia x L	Ir(mA)	Z	Dia x L	Ir(mA)	Z	Dia x L	Ir(mA)	Z
33							5 x 11	150	0.800			
47	5 x 11	155	0.800				6.3 x 11	220	0.550			
68	6.3 x 11	225	0.500				6.3 x 11	260	0.360			
100	6.3 x 11	265	0.350				6.3 x 15	380	0.240			
120										6.3 x 15	390	0.250
150	6.3 x 15	375	0.230				8 x 11.5	455	0.160			
220	8 x 11.5	460	0.160				8 x 15	615	0.110	10 x 12.5	600	0.130
270	8 x 12	465	0.160									
330	8 x 15	590	0.120	10 x 12.5	625	0.120	8 x 20	785	0.085	10 x 15	745	0.095
470	8 x 20	770	0.090	10 x 15	760	0.090	10 x 20	1010	0.065	12.5 x 15	980	0.070
680	10 x 20	1030	0.065	12.5 x 15	970	0.070	10 x 31.5	1380	0.046	16 x 15	1260	0.055
1000	10 x 31.5	1400	0.047	16 x 15	1270	0.055	12.5 x 25	1640	0.036	18 x 15	1490	0.043
1200	10 x 31	1440	0.044	12.5 x 20	1440	0.044						
1500	12.5 x 25	1620	0.036	18 x 15	1540	0.041	12.5 x 31.5	1960	0.029	16 x 20	1730	0.034
2200	12.5 x 31.5	2010	0.028	16 x 20	1760	0.033	12.5 x 40	2360	0.024	18 x 20	2020	0.028
3300	12.5 x 40	2390	0.023	18 x 20	2110	0.027	16 x 35.5	2610	0.020	18 x 31.5	2460	0.023
4700	16 x 35.5	2650	0.020	18 x 31.5	2480	0.023	18 x 40	2960	0.018			
6800	18 x 35.5	2890	0.018									

# FME X Series



Ir (mA) specified at 105°C and 100 KHz  
 Impedence (Z) specified at 20°C and 100 KHz

**FME X Standard Products Table 6.3 to 35 Volt**

uF	35 V (Case Code A)			35 V (Case Code B)			50 V (Case Code A)			50 V (Case Code B)		
	Dia x L	Ir(mA)	Z	Dia x L	Ir(mA)	Z	Dia x L	Ir(mA)	Z	Dia x L	Ir(mA)	Z
0.47							5 x 11	24	3.900			
0.68							5 x 11	30	3.700			
1							5 x 11	38	3.500			
1.5							5 x 11	46	3.300			
2.2							5 x 11	56	3.000			
3.3							5 x 11	70	2.600			
4.7							5 x 11	82	2.200			
6.8							5 x 11	92	1.800			
10							5 x 11	115	1.400			
15							5 x 11	145	0.930			
22	5 x 11	160	0.750				6.3 x 11	200	0.650			
33	6.3 x 11	225	0.490				6.3 x 11	235	0.430			
47	6.3 x 11	265	0.340				6.3 x 15	330	0.300			
56										6.3 x 15	405	0.290
68	6.3 x 15	370	0.240				8 x 11.5	410	0.200			
100	8 x 11.5	465	0.160				8 x 20	630	0.140	10 x 15	565	0.160
150	8 x 15	590	0.120	10 x 12.5	625	0.120	10 x 20	810	0.100	12.5 x 15	760	0.110
220	8 x 20	790	0.085	10 x 17	760	0.090	10 x 25	1030	0.075	12.5 x 15	880	0.080
330	10 x 20	1030	0.060	12.5 x 15	1020	0.065	10 x 31.5	1240	0.055	16 x 15	1210	0.060
470	10 x 31.5	1420	0.046	16 x 15	1280	0.055	12.5 x 25	1490	0.044	18 x 15	1430	0.046
680	12.5 x 25	1610	0.035	18 x 15	1490	0.042	12.5 x 35.5	1870	0.036	16 x 20	1630	0.040
1000	12.5 x 31.5	1970	0.029	16 x 20	1750	0.034	16 x 31.5	2180	0.030	18 x 25	2000	0.033
1500	12.5 x 40	2360	0.024	18 x 20	2040	0.028	16 x 40	2400	0.026	18 x 31.5	2240	0.029
1800				18 x 25	2290	0.034						
2200	16 x 35.5	2700	0.020	18 x 31.5	2490	0.023	18 x 40	2560	0.024			
3300	18 x 40	3040	0.017									

Ir (mA) specified at 105°C and 100 KHz  
 Impedence (Z) specified at 20°C and 100 KHz

**FME X Standard Products Table 63 to 100 Volt**

uF	63 V (Case Code A)			63 V (Case Code B)			100 V (Case Code A)			100V (Case Code B)		
	Dia x L	Ir(mA)	Z	Dia x L	Ir(mA)	Z	Dia x L	Ir(mA)	Z	Dia x L	Ir(mA)	Z
10	5 x 11	135	1.060									
15	6.3 x 11	190	0.730									
22	6.3 x 11	215	0.520							8 x 11.5	282	0.660
33	6.3 x 15	305	0.350									
47	8 x 11.5	365	0.250									
68	8 x 15	500	0.170	10 x 12.5	500	0.190						
100	10 x 20	750	0.120	12.5 x 15	700	0.140						
120				10 x 20	650	0.160						
150	10 x 25	950	0.090	12.5 x 15	820	0.095						
220	12.5 x 20	1100	0.065	16 x 15	1060	0.070						
270				12.5 x 25	1150	0.074						
330	12.5 x 25	1420	0.049	18 x 15	1370	0.050						
470	12.5 x 35.5	1780	0.039	16 x 25	1640	0.042						
680	16 x 31.5	2050	0.032	18 x 25	1940	0.035						
1000	16 x 40	2360	0.027	18 x 35.5	2220	0.029						

## Application Data

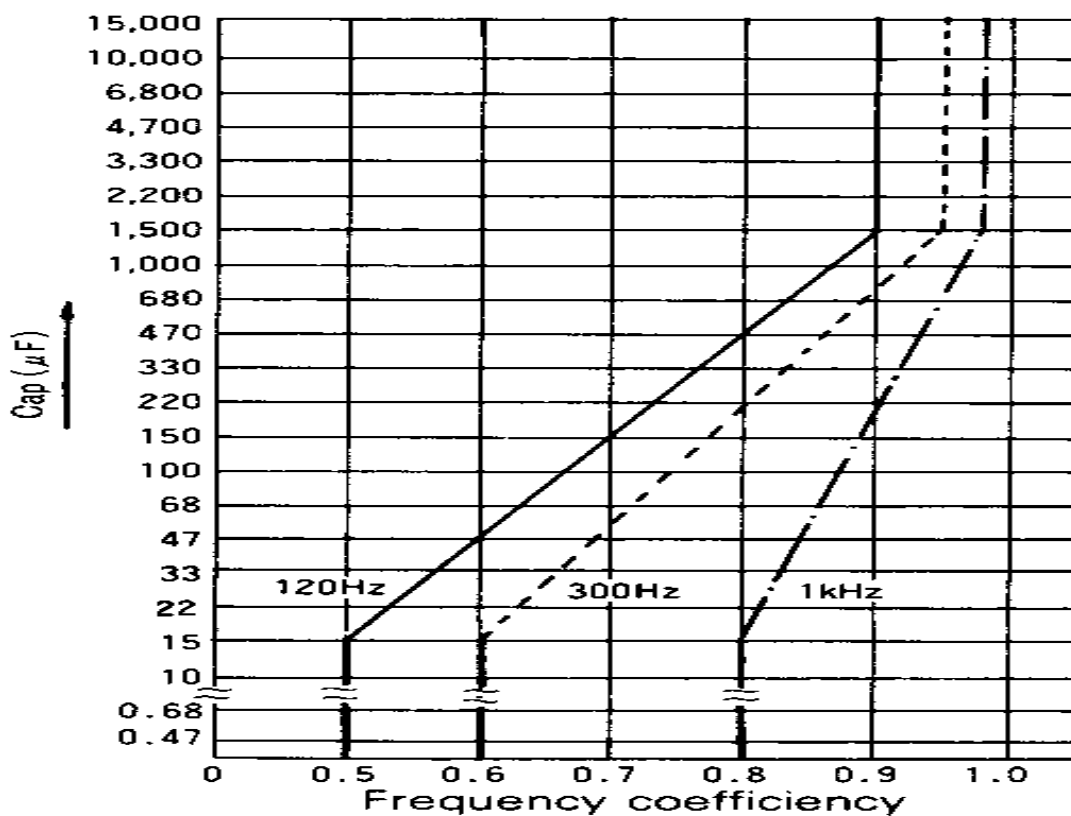
### Ripple current multipliers for temperature

Temperature (deg. C.)	+45	+60	+85	+105
Factor	1.8	1.5	1.3	1

### Ripple current multipliers for frequency

For operation at 10 KHz to 200 KHz  
Ripple current multiplier =1

For operation at other frequencies, use the graph below  
to determine the ripple current multiplier.



# GP7 Series

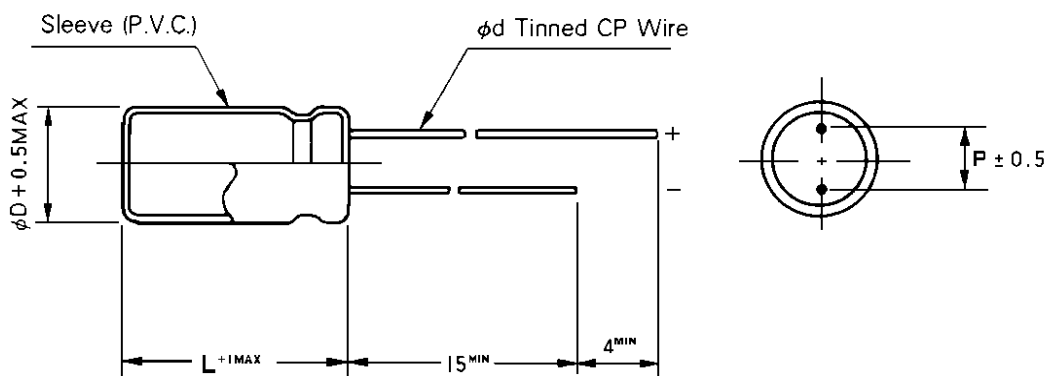


## Features

- \* Excellent spacing factors with 7mm height
- \* Lifetime of 1000 Hrs at 85 °C
- \* Available on tape for automatic insertion
- \* Solvent proof

Item	Performance Characteristics																								
Operating Temperature Range	-40°C to +85°C																								
Working Voltage Range	6.3 to 50 Volts D.C.																								
Nominal Capacitance Range	0.1 to 100 uF																								
Capacitance Tolerance	+/- 20 % ( 120 Hz), 20°C																								
Leakage Current (+20°C)	I <= 0.01 CV or 3 uA, whichever is greater after 2 minutes of applied voltage																								
Dissipation Factor % (120 Hz, +20°C)	Less than the value below:																								
	<table border="1"> <thead> <tr> <th>WVDC</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th></th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>120 Hz</td> </tr> <tr> <td>tan δ (Max)</td> <td>0.24</td> <td>0.2</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.1</td> <td>20°C</td> </tr> </tbody> </table>	WVDC	6.3	10	16	25	35	50									120 Hz	tan δ (Max)	0.24	0.2	0.16	0.14	0.12	0.1	20°C
WVDC	6.3	10	16	25	35	50																			
							120 Hz																		
tan δ (Max)	0.24	0.2	0.16	0.14	0.12	0.1	20°C																		
Temperature Characteristic	Impedance Ratio																								
	<table border="1"> <thead> <tr> <th>WVDC</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th></th> </tr> </thead> <tbody> <tr> <td>Z(-25°C) / Z(+20°C)</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>120 Hz</td> </tr> <tr> <td>Z(-40°C) / Z(+20°C)</td> <td>8</td> <td>6</td> <td>4</td> <td>4</td> <td>3</td> <td>3</td> <td></td> </tr> </tbody> </table>	WVDC	6.3	10	16	25	35	50		Z(-25°C) / Z(+20°C)	4	3	2	2	2	2	120 Hz	Z(-40°C) / Z(+20°C)	8	6	4	4	3	3	
	WVDC	6.3	10	16	25	35	50																		
Z(-25°C) / Z(+20°C)	4	3	2	2	2	2	120 Hz																		
Z(-40°C) / Z(+20°C)	8	6	4	4	3	3																			
Load Life	<u>Test conditions</u>																								
	Duration:	1000 Hrs																							
	Ambient temperature:	+85°C																							
	Applied voltage:	Rated working voltage																							
	Ripple Current:	Maximum rated ripple current.																							
	<u>After testing--Measure at 20°C</u>																								
Capacitance change:	<= +/- 25% of initial value (WV=4), +/- 20 % (WV>=6.3)																								
Dissipation factor:	<= 200% of initial specified value																								
Leakage current:	<= The initial specified value																								
Shelf Life	<u>Test Conditions</u>																								
	Duration time:	1000 Hrs																							
	Ambient temperature:	+85°C																							
	Applied voltage:	None																							
	<u>After testing--Measure at 20°C</u>																								
Pretreatment before testing:	According to JIS C-5102 4-3																								
Same limits as for load life.																									
Marking	White print on black sleeve																								
Applicable Standards	Characteristics of W of JIS C-5141																								

## Physical Dimensions and Mounting Details



Diameter	4	5	6.3
Lead Pitch	1.5	2.0	2.5
Lead Diameter	0.45	0.45	0.50

# GP7 Series



Ir (mA) specified at 85°C and 120 KHz  
All capacitors in this range are 7 mm tall

**GP7 Standard Products Table 4 to 16 Volt**

uF	6.3 V		Ir(mA)	10 V		Ir(mA)	16 V	
	Dia	L		Dia	L		Dia	L
10							4 x 7	27
22	4 x 7		29	5 x 7		39	5 x 7	43
33	5 x 7		43	5 x 7		48	6.3 x 7	58
47	5 x 7		52	6.3 x 7		61	6.3 x 7	69
100	7 x 7		82					

**GP7 Standard Products Table 25 to 50 Volt**

uF	25 V		Ir(A)	35 V		Ir(A)	50 V	
	Dia	L		Dia	L		Dia	L
0.1							4 x 7	1
0.22							4 x 7	2
0.33							4 x 7	3
0.47							4 x 7	5
1							4 x 7	10
2.2							4 x 7	16
3.3							4 x 7	19
4.7				4 x 7		21	5 x 7	25
10	5 x 7		31	5 x 7		34	6.3 x 7	40
22	6.3 x 7		50	6.3 x 7		54		
33	6.3 x 7		62					

# GP5 Series

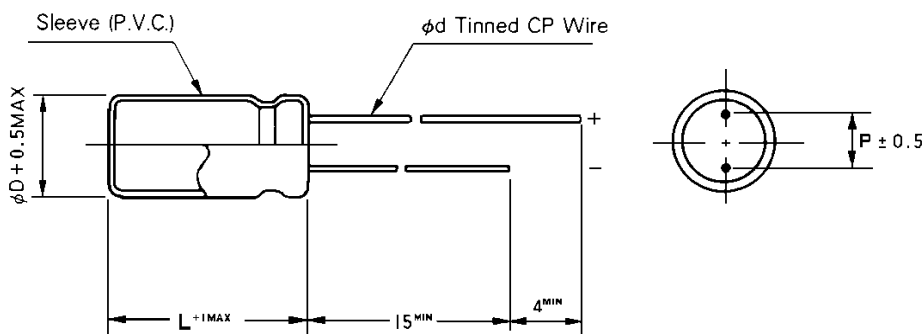


## Features

- \* Excellent spacing factors with 5mm height
- \* Lifetime of 1000 Hrs at 85 °C
- \* Available on tape for automatic insertion
- \* Solvent proof

Item	Performance Characteristics																											
Operating Temperature Range	-40°C to +85°C																											
Working Voltage Range	4 to 50 Volts D.C.																											
Nominal Capacitance Range	0.1 to 220 uF																											
Capacitance Tolerance	+/- 20 % ( 120 Hz, 20°C )																											
Leakage Current (+20°C)	$I \leq 0.01 CV$ or 3 uA, whichever is greater after 2 Minutes of applied voltage																											
Dissipation Factor % (120 Hz, +20°C)	Less than the value below:																											
	<table border="1"> <thead> <tr> <th>WVDC</th> <th>4</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th></th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>120 Hz</td> </tr> <tr> <td>tan δ (Max)</td> <td>0.35</td> <td>0.24</td> <td>0.2</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.1</td> <td>20°C</td> </tr> </tbody> </table>	WVDC	4	6.3	10	16	25	35	50										120 Hz	tan δ (Max)	0.35	0.24	0.2	0.16	0.14	0.12	0.1	20°C
WVDC	4	6.3	10	16	25	35	50																					
								120 Hz																				
tan δ (Max)	0.35	0.24	0.2	0.16	0.14	0.12	0.1	20°C																				
Temperature Characteristic	Impedance Ratio																											
	<table border="1"> <thead> <tr> <th>WVDC</th> <th>4</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th></th> </tr> </thead> <tbody> <tr> <td>Z(-25°C) / Z(+20°C)</td> <td>7</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>120 Hz</td> </tr> <tr> <td>Z(-40°C) / Z(+20°C)</td> <td>15</td> <td>8</td> <td>6</td> <td>4</td> <td>4</td> <td>3</td> <td>3</td> <td></td> </tr> </tbody> </table>	WVDC	4	6.3	10	16	25	35	50		Z(-25°C) / Z(+20°C)	7	4	3	2	2	2	2	120 Hz	Z(-40°C) / Z(+20°C)	15	8	6	4	4	3	3	
	WVDC	4	6.3	10	16	25	35	50																				
Z(-25°C) / Z(+20°C)	7	4	3	2	2	2	2	120 Hz																				
Z(-40°C) / Z(+20°C)	15	8	6	4	4	3	3																					
Load Life	<u>Test conditions</u>																											
	Duration:	1000 Hrs																										
	Ambient temperature:	+85°C																										
	Applied voltage:	Rated working voltage																										
	Ripple Current:	Maximum rated ripple current.																										
	<u>After testing--Measure at 20°C</u>																											
Capacitance change:	$\leq \pm 25\%$ of initial value (WV=4), $\pm 20\%$ (WV $\geq$ 6.3)																											
Dissipation factor:	$\leq 200\%$ of initial specified value																											
Leakage current:	$\leq$ The initial specified value																											
Shelf Life	<u>Test Conditions</u>																											
	Duration time:	1000 Hrs																										
	Ambient temperature:	+85°C																										
	Applied voltage:	According to JIS C-5102 4-3																										
	<u>After testing--Measure at 20°C</u>																											
Same limits as for load life.																												
Marking	White print on black sleeve																											
Applicable Standards	Characteristics of W of JIS C-5141																											

## Physical Dimensions and Mounting Details



Diameter	3	3.5	4	5	6.3
Lead Pitch	1.0	1.0	1.5	2.0	2.5
Lead Diameter	0.4	0.4	0.45	0.45	0.45

# GP5 Series



Ir (mA) specified at 85°C and 120 KHz

## GP5 Standard Products Table 4 to 16 Volt

uF	4 V		6.3 V		10 V		16 V	
	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)
4.7							3 x 5	10
4.7								
10			3 x 5	15			4 x 5	23
10							3.5 x 5	18
22	4 x 5	19	4 x 5	28	5 x 5	34	5 x 5	38
22	3 x 5	19						
33	4 x 5	28	5 x 5	38	5 x 5	41	6.3 x 5	50
47	4 x 5	34	5 x 5	45	6.3 x 5	54	6.3 x 5	60
100	5 x 5	55	6.3 x 5	70	6.3 x 5	80		
220	6.3 x 5	90						

Ir (mA) specified at 85°C and 120 KHz

## GP5 Standard Products Table 4 to 50 Volt

uF	25 V		35 V		50 V	
	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)
0.1					4 x 5	1
0.1					3 x 5	1
0.22					4 x 5	2
0.22					3 x 5	2
0.33					4 x 5	3
0.33					3 x 5	2.8
0.47					4 x 5	5
0.47					3 x 5	4
1					4 x 5	9
1					3 x 5	8
2.2			3 x 5	8	4 x 5	14
2.2					3.5 x 5	10
3.3	3 x 5	10	3.5 x 5	14	4 x 5	17
4.7	4 x 5	17	4 x 5	18	5 x 5	22
4.7	3.5 x 5	12				
10	5 x 5	27	5 x 5	29	6.3 x 5	35
22	6.3 x 5	44	6.3 x 5	47		
33	6.3 x 5	54				

# GPL Series

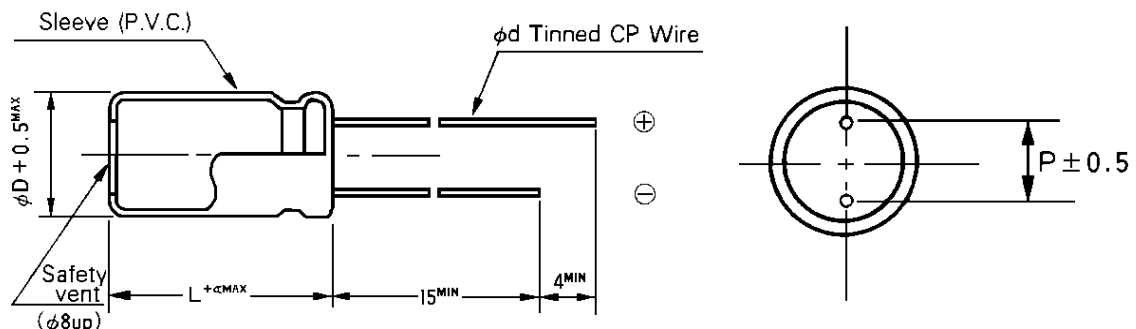


## Features

- \* Radial Low Leakage Type
- \* Standard series for general purposes.
- \* 2000 Hours lifetime at 85 °C.
- \* Available with rubber or resin seals.
- \* Solvent proof.

Item	Performance Characteristics					
Operating Temperature Range	-40 to + 85°C					
Working Voltage Range	10 to 50 Volts D.C.					
Nominal Capacitance Range	0.1 to 1000 uF					
Capacitance Tolerance	+/- 20 % ( 120 Hz, 20°C)					
Leakage Current (+20°C)	I = 0.002 CV or 0.4 uA whichever is greater, after 2 minutes of rated voltage					
Dissipation Factor % (120 Hz, +20°C)	Less than the value below					
	WVDC	10	16	25	35	50
Temperature Characteristics	tan δ (Max)	0.2	0.16	0.14	0.12	0.1
	Impedance Ratio at 120 Hz					
	WVDC	10	16	25	35	50
	Z(-25°C) / Z(+20°C)	3	2	2	2	2
Z(-40°C) / Z(+20°C)	6	4	4	3	3	
Load Life	<u>Test conditions</u>					
	Duration time:	2000 Hrs				
	Ambient temperature:	+85°C				
	Applied voltage:	Rated working voltage				
	Ripple Current:	Maximum rated ripple current.				
	<u>After testing--Measure at 20°C</u>					
	Capacitance change:	<= +/- 20% of initial measured value				
Dissipation factor:	<= 200% of initial specified value					
Leakage current:	<= The initial specified value					
Shelf Life	<u>Test Conditions</u>					
	Duration time:	1000 Hrs				
	Ambient temperature:	+85°C				
	Applied voltage:	None				
	<u>After testing--Measure at 20°C</u>					
	Same limits as for load life. Pretreatment before testing: According to JIS C-5102 4-3					
Marking	Black Print on Orange Sleeve					
Applicable Standards	Characteristic W of JIS C-5141					

## Physical Dimensions and Mounting Details



Ø D	5	6.3	8	10	12.5
P	2.0	2.5	3.5	5.0	5.0
Ød	0.5	0.5	0.5	0.6	0.6
α Rubber Seal	1.0			1.5	
α Resin Seal	2.0			2.5	

Ir (mA) specified at 85°C and 120 KHz

**GPL Standard Products Table 10 to 50 Volt**

uF	10 V		16 V		25 V		35 V		50 V	
	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)
0.1									5 x 11	1.1
0.15									5 x 11	1.6
0.22									5 x 11	2.3
0.33									5 x 11	3.5
0.47									5 x 11	5.0
0.68									5 x 11	7.3
1									5 x 11	10
1.5									5 x 11	16
2.2									5 x 11	23
3.3									5 x 11	35
4.7					5 x 11	35			5 x 11	45
6.8					5 x 11	45			5 x 11	50
10			5 x 11	50	5 x 11	55			5 x 11	60
15			5 x 11	60	5 x 11	65	5 x 11	70	6.3 x 11	85
22			5 x 11	75	5 x 11	80	6.3 x 11	95	6.3 x 11	100
33			5 x 11	90	6.3 x 11	105	6.3 x 11	115	8 x 11.5	145
47	5 x 11	100	6.3 x 11	120	6.3 x 11	130	8 x 11.5	160	8 x 11.5	175
68	6.3 x 11	130	6.3 x 11	145	8 x 11.5	180	8 x 11.5	190	10 x 12.5	225
100	6.3 x 11	155	8 x 11.5	200	8 x 11.5	215	10 x 12.5	250	10 x 16	295
150	8 x 11.5	220	8 x 11.5	250	10 x 12.5	280	10 x 16	330	10 x 20	395
220	8 x 11.5	270	10 x 12.5	320	10 x 16	370	10 x 20	435	12.5 x 20	530
330	10 x 12.5	350	10 x 16	425	10 x 20	495	12.5 x 20	590		
470	10 x 16	455	10 x 20	495						
1000	12.5 x 20	800								

# GPN Series

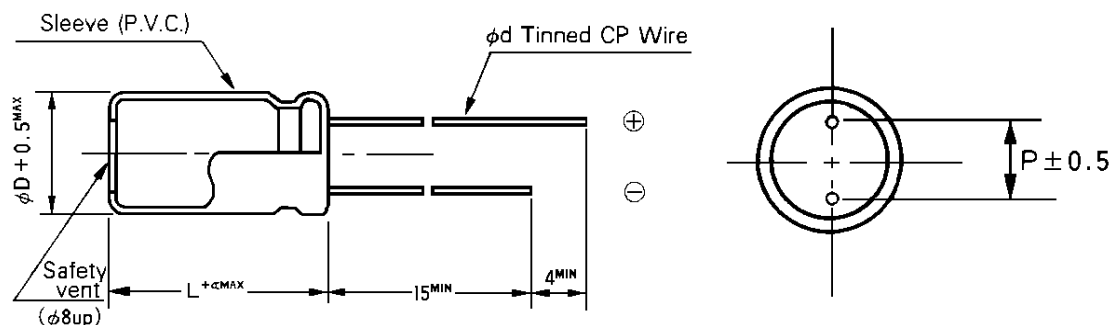


### Features

- \* Radial Bi-Polar type
- \* Smaller can size than conventional product
- \* 1000 Hour lifetime at 85°C
- \* Solvent proof

Item	Performance Characteristics																														
Operating Temperature Range	-40°C to +85°C																														
Working Voltage Range	6.3 to 100 Volts D.C.																														
Nominal Capacitance Range	0.1 to 6800 uF																														
Capacitance Tolerance	+/- 20 % ( 120 Hz), 20°C																														
Leakage Current (+20°C)	$I \leq 0.03 CV$ or 3 uA, whichever is greater after 5 minutes of applied voltage																														
Dissipation Factor % (120 Hz, +20°C)	Less than the value below																														
	<table border="1"> <thead> <tr> <th>WVDC</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> <th>120 Hz</th> </tr> </thead> <tbody> <tr> <td><math>\tan \delta</math> (Max)</td> <td>0.26</td> <td>0.24</td> <td>0.22</td> <td>0.2</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.1</td> <td>20°C</td> </tr> </tbody> </table>	WVDC	6.3	10	16	25	35	50	63	100	120 Hz	$\tan \delta$ (Max)	0.26	0.24	0.22	0.2	0.16	0.14	0.12	0.1	20°C										
	WVDC	6.3	10	16	25	35	50	63	100	120 Hz																					
$\tan \delta$ (Max)	0.26	0.24	0.22	0.2	0.16	0.14	0.12	0.1	20°C																						
For capacitances of more than 1000uF, add 0.02 for every increase of 1000uF (120Hz, 20°C)																															
Temperature Characteristic	Impedance Ratio																														
	<table border="1"> <thead> <tr> <th>WVDC</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> <th>120 Hz</th> </tr> </thead> <tbody> <tr> <td><math>Z(-25^\circ\text{C}) / Z(+20^\circ\text{C})</math></td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td></td> </tr> <tr> <td><math>Z(-40^\circ\text{C}) / Z(+20^\circ\text{C})</math></td> <td>10</td> <td>8</td> <td>6</td> <td>5</td> <td>4</td> <td>4</td> <td>3</td> <td>3</td> <td></td> </tr> </tbody> </table>	WVDC	6.3	10	16	25	35	50	63	100	120 Hz	$Z(-25^\circ\text{C}) / Z(+20^\circ\text{C})$	4	3	2	2	2	2	2	2		$Z(-40^\circ\text{C}) / Z(+20^\circ\text{C})$	10	8	6	5	4	4	3	3	
	WVDC	6.3	10	16	25	35	50	63	100	120 Hz																					
$Z(-25^\circ\text{C}) / Z(+20^\circ\text{C})$	4	3	2	2	2	2	2	2																							
$Z(-40^\circ\text{C}) / Z(+20^\circ\text{C})$	10	8	6	5	4	4	3	3																							
Load Life	<u>Test conditions</u>																														
	Duration:	1000 Hrs																													
	Ambient temperature:	+85°C																													
	Applied voltage:	Rated working voltage Polarity reversed every 250 Hrs																													
	Ripple Current:	Maximum rated ripple current.																													
	<u>After testing--Measure at 20°C</u>																														
	Capacitance change:	$\leq \pm 20\%$ of initial measured value																													
Dissipation factor:	$\leq 200\%$ of initial specified value																														
Leakage current:	$\leq$ The initial specified value																														
Shelf Life	<u>Test Conditions</u>																														
	Duration time:	1000 Hrs																													
	Ambient temperature:	+85°C																													
	Applied voltage:	According to JIS C-5102 4-3																													
	<u>After testing--Measure at 20°C</u>	Same limits as for load life.																													
Marking	White print on orange sleeve																														
Applicable Standards	Characteristics of W of JIS C-5141																														

### Physical Dimensions and Mounting Details



Diameter	5	6.3	8	10	12.5	16	18
Lead Pitch	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Lead Diameter	0.5	0.5	0.5	0.6	0.6	0.8	0.8

Ir (mA) specified at 85°C and 120 KHz

**GPN Standard Products Table 6.3 to 25 Volt**

uF	6.3 V		10 V		16 V		25 V	
	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)
4.7								
10					5 x 11	39	5 x 11	41
22			5 x 11	55	5 x 11	58	6.3 x 11	65
33	5 x 11	65	5 x 11	68	5 x 11	71	6.3 x 11	80
47	5 x 11	78	5 x 11	81	6.3 x 11	91	6.3 x 11	95
100	6.3 x 11	120	6.3 x 11	125	8 x 11.5	150	8 x 11.5	160
220	8 x 11.5	205	8 x 11.5	215	10 x 12.5	260	10 x 16	300
330	8 x 11.5	255	10 x 16	340	10 x 16	355	12.5 x 20	455
470	10 x 12.5	350	10 x 16	405	10 x 20	460	12.5 x 20	545
1000	10 x 20	615	12.5 x 20	720	12.5 x 25	815	12.5 x 25	950
2200	12.5 x 25	1070	16 x 25	1230	16 x 31.5	1380	16 x 31.5	1540
3300	16 x 25	1410	16 x 31.5	1570	18 x 35.5	1740		
4700	16 x 31.5	1750	18 x 35.5	1930				
6800	18 x 31.5	2120						

**GPN Standard Products Table 35 to 100 Volt**

uF	35 V		50 V		63 V		100 V	
	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)
0.1			5 x 11	1			5 x 11	2
0.22			5 x 11	2			5 x 11	4
0.33			5 x 11	3			5 x 11	7
0.47			5 x 11	5			5 x 11	10
1			5 x 11	10			5 x 11	18
2.2			5 x 11	23			6.3 x 11	29
3.3			5 x 11	28			6.3 x 11	35
4.7	5 x 11	31	5 x 11	33	5 x 11	36	6.3 x 11	42
10	5 x 11	45	6.3 x 11	52	6.3 x 11	57	8 x 11.5	71
22	6.3 x 11	73	8 x 11.5	89	8 x 11.5	96	10 x 16	135
33	8 x 11.5	100	8 x 11.5	105	10 x 12.5	135	12.5 x 20	200
47	8 x 11.5	120	10 x 12.5	150	10 x 16	180	12.5 x 20	240
100	10 x 16	225	10 x 20	265	12.5 x 20	320	16 x 25	425
220	12.5 x 20	415	12.5 x 25	480	16 x 25	575	18 x 35.5	725
330	12.5 x 20	510	16 x 25	650	16 x 31.5	755		
470	12.5 x 25	655	16 x 31.5	835	16 x 35.5	965		
1000	16 x 31.5	1140						

# GPST Series

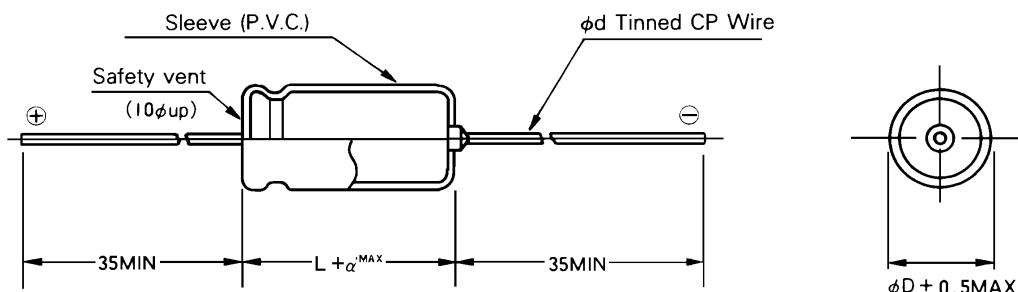


## Features

- \* Wide temperature range.
- \* 2000 Hours lifetime at 85 °C
- \* Solvent proof

Item	Performance Characteristics					
Operating Temperature Range	-40 to +85°C			-25 to +85°C		
Working Voltage Range	6.3 to 400 V			450 V		
Nominal Capacitance Range	0.47 to 22000 uF					
Capacitance Tolerance	+/- 20 % ( 120 Hz, 20°C)					
Leakage Current (+20°C)	6.3V to 100 V			160V to 450 V		
	I=0.03CV or 4uA whichever is greater after 1 min. application of rated voltage.			CV<=1000: I=0.1CV +40 uA or less after 1 min. application of rated voltage.		
Dissipation Factor % (120 Hz, +20°C)	I=0.01CV or 3uA whichever is greater after 2 mins. application of rated voltage.			CV>1000: I=0.04CV +100 uA or less after 1 min. application of rated voltage.		
	Less than the value below					
Temperature Characteristics	Impedence Ratio at 120 Hz					
	WVDC	6.3	10	16	25	35
	Z(-25°C) / Z(+20°C)	4	3	2	2	2
	Z(-40°C) / Z(+20°C)	10	8	6	4	3
Load Life	Test conditions					
	Duration time:			2000 Hrs		
	Ambient temperature:			+ 85°C		
	Applied voltage:			Rated working voltage		
Shelf Life	Ripple Current:			Maximum rated ripple current.		
	After testing--Measure at 20°C					
	Capacitance change:			<= +/- 20% of initial measured value		
	Dissipation factor:			<= 200% of initial specified value		
Marking	Leakage current:			<= The initial specified value		
	Test Conditions					
	Duration time:			1000 Hrs		
	Ambient temperature:			+85°C		
Applicable Standards	Applied voltage:			None		
	After testing--Measure at 20°C					
	Same limits as for load life.			Pretreatment before testing: According to JIS C-5102 4-3		
	White print on black sleeve					
Characteristic W of JIS C-5141						

## Physical Dimensions and Mounting Details



Ø D	5-12.5	16-18	22-25
Ø d	0.6	0.8	0.8
α <= 100 WV	1.0	1.0	2.0
α >= 160 WV	2.0	2.0	-

Eurocap International Limited.

Tel. +44 (0)1992 625407.

Fax +44 (0)1992 625420.

E-Mail: eurocap@dial.pipex.com

Website: www.eurocap-int.com/eurocap

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# GPST Series



I<sub>r</sub> (mA) specified at 85°C and 120 KHz

**GPST Standard Products Table 6.3 to 35 Volt**

uF	6.3V		10 V		16 V		25 V		35 V	
	Dia x L	I <sub>r</sub> (mA)	Dia x L	I <sub>r</sub> (mA)	Dia x L	I <sub>r</sub> (mA)	Dia x L	I <sub>r</sub> (mA)	Dia x L	I <sub>r</sub> (mA)
10							5 x 12.5	40	5 x 12.5	45
22					5 x 12.5	60	5 x 12.5	65	5 x 12.5	70
33			5 x 12.5	70	5 x 12.5	75	5 x 12.5	80	6.3 x 12.5	95
47			5 x 12.5	80	5 x 12.5	90	6.3 x 12.5	105	6.3 x 16	125
100	5 x 12.5	110	6.3 x 12.5	130	6.3 x 12.5	145	6.3 x 16	170	8 x 16	200
220	6.3 x 16	200	6.3 x 16	220	8 x 16	260	8 x 16	280	8 x 20	340
330	6.3 x 16	250	8 x 16	300	8 x 16	320	8 x 20	380	10 x 21	460
470	8 x 16	330	8 x 16	350	8 x 20	430	10 x 26	560	10 x 26	610
1000	10 x 21	600	10 x 21	640	10 x 26	770	12.5 x 26	900	12.5 x 31	1050
2200	12.5 x 26	1020	12.5 x 26	1090	12.5 x 31	1280	16 x 31	1470	16 x 31	1570
3300	12.5 x 26	1200	12.5 x 31	1380	16 x 31	1610	16 x 41	1910	16 x 41	2020
4700	16 x 31	1630	16 x 31	1720	16 x 41	2060	18 x 41	2170	22 x 41	2460
6800	16 x 31	1830	16 x 41	2160	18 x 41	2290	22 x 41	2560	22 x 51	2700
10000	16 x 41	2290	18 x 41	2390	22 x 41	2680	22 x 51	2800	25 x 61	3400
15000	22 x 41	2630	22 x 41	2750	22 x 51	2890	25 x 61	3480		
22000	22 x 51	2830	22 x 51	2940	25 x 61	3570				

**GPST Standard Products Table 50 to 200 Volt**

uF	50V		63 V		100 V		160 V		200 V	
	Dia x L	I <sub>r</sub> (mA)	Dia x L	I <sub>r</sub> (mA)	Dia x L	I <sub>r</sub> (mA)	Dia x L	I <sub>r</sub> (mA)	Dia x L	I <sub>r</sub> (mA)
0.47	5 x 12.5	5			5 x 12.5	10				
1	5 x 12.5	10			5 x 12.5	21	6.3 x 12.5	13	6.3 x 12.5	13
2.2	5 x 12.5	23			5 x 12.5	27	6.3 x 16	23	6.3 x 16	23
3.3	5 x 12.5	30			5 x 12.5	35	8 x 16	33	8 x 16	33
4.7	5 x 12.5	36	5 x 12.5	38	5 x 12.5	40	8 x 16	39	8 x 16	45
10	5 x 12.5	50	5 x 12.5	55	6.3 x 12.5	65	8 x 20	60	10 x 21	70
15			5 x 12.5	55						
22	6.3 x 12.5	85	6.3 x 12.5	90	8 x 16	115	10 x 26	120	12.5 x 26	140
33	6.3 x 16	115	6.3 x 16	125	8 x 16	145	12.5 x 26	170	12.5 x 26	190
47	6.3 x 16	140	8 x 16	160	8 x 20	190	12.5 x 31	220	12.5 x 31	250
100	8 x 16	220	8 x 20	260	10 x 26	340	16 x 41	420	16 x 41	420
220	10 x 21	410	10 x 26	480	12.5 x 26	560				
330	10 x 26	560	12.5 x 26	640	12.5 x 31	740				
470	12.5 x 26	730	12.5 x 31	830	16 x 31	960				
1000	16 x 31	1250	16 x 31	1320	22 x 41	1700				
2200	18 x 41	1920	22 x 41	2150	25 x 51	2590				
3300	22 x 41	2340	22 x 51	2450						
4700	22 x 51	2630	25 x 61	3180						
6800	25 x 61	3310								

Ir (mA) specified at 85°C and 120 KHz

**GPST Standard Products Table 250 to 450 Volt**

uF	250V		315 V		350 V		400 V		450 V	
	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)
1	6.3 x 16	15	6.3 x 16	15	6.3 x 16	15	8 x 16	16	8 x 16	16
2.2	8 x 16	27	8 x 16	27	8 x 16	27	8 x 20	27	10 x 21	31
3.3	8 x 16	33	8 x 20	37	8 x 20	37	10 x 21	38	10 x 21	38
4.7	8 x 20	45	8 x 20	45	10 x 21	50	10 x 21	45	10 x 26	50
10	10 x 21	70	10 x 26	80	12.5 x 26	90	12.5 x 26	85	12.5 x 26	85
22	12.5 x 26	140	12.5 x 31	150	12.5 x 31	150	16 x 31	150	16 x 31	150
33	12.5 x 31	190	16 x 31	210	16 x 31	210	16 x 41	220	18 x 41	230
47	16 x 31	250	16 x 31	250	16 x 41	290	18 x 41	280		
100	16 x 41	420								

## Ripple Current Multipliers

Frequency

uF	WVDC	Freq.				
		50Hz	120Hz	300Hz	1KHz	>= 10 KHz
<=47		0.75	1	1.35	1.57	2.00
100 ~ 470	6.3 to 100	0.80	1	1.23	1.34	1.50
100 ~ 22000		0.85	1	1.10	1.13	1.15
1 ~ 100	160 to 450	0.80	1	1.25	1.40	1.60

Temperature

Temp. °C	<=70	85
Multiplier	1.27	1

# GMST Series

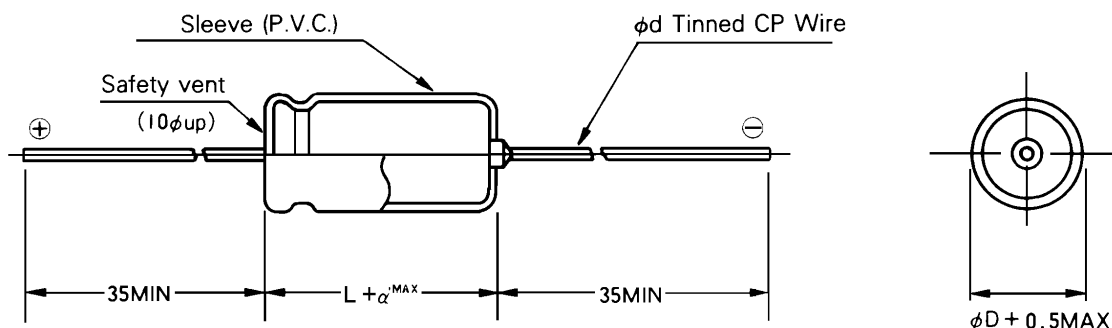


## Features

- \* Axial Mounting
- \* Wide Temperature Range
- \* 1000 Hour lifetime at 105°C
- \* Solvent proof

Item	Performance Characteristics																													
Operating Temperature Range	-40°C to +105°C																													
Working Voltage Range	6.3 to 100 Volts D.C.																													
Nominal Capacitance Range	0.47 to 6800 uF																													
Capacitance Tolerance	+/- 20 % ( 120 Hz), 20°C																													
Leakage Current (+20°C)	I ≤ 0.03 CV or 4 uA, whichever is greater after 1 minute of applied voltage																													
	I ≤ 0.01 CV or 3 uA, whichever is greater after 2 minutes of applied voltage																													
Dissipation Factor % (120 Hz, +20°C)	Less than the value below																													
	<table border="1"> <thead> <tr> <th>WVDC</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> <th>120 Hz</th> </tr> </thead> <tbody> <tr> <td>tan δ (Max)</td> <td>0.24</td> <td>0.2</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.1</td> <td>0.09</td> <td>0.08</td> <td>20°C</td> </tr> </tbody> </table>	WVDC	6.3	10	16	25	35	50	63	100	120 Hz	tan δ (Max)	0.24	0.2	0.16	0.14	0.12	0.1	0.09	0.08	20°C									
	WVDC	6.3	10	16	25	35	50	63	100	120 Hz																				
tan δ (Max)	0.24	0.2	0.16	0.14	0.12	0.1	0.09	0.08	20°C																					
For capacitances of more than 1000uF, add 0.02 for every increase of 1000uf (120Hz, 20°C)																														
Temperature Characteristic	Impedance Ratio																													
	<table border="1"> <thead> <tr> <th>WVDC</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> <th>120 Hz</th> </tr> </thead> <tbody> <tr> <td>Z(-25°C) / Z(+20°C)</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td rowspan="2"></td> </tr> <tr> <td>Z(-40°C) / Z(+20°C)</td> <td>10</td> <td>8</td> <td>6</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> </tbody> </table>	WVDC	6.3	10	16	25	35	50	63	100	120 Hz	Z(-25°C) / Z(+20°C)	4	3	2	2	2	2	2	2		Z(-40°C) / Z(+20°C)	10	8	6	4	3	3	3	3
	WVDC	6.3	10	16	25	35	50	63	100	120 Hz																				
Z(-25°C) / Z(+20°C)	4	3	2	2	2	2	2	2																						
Z(-40°C) / Z(+20°C)	10	8	6	4	3	3	3	3																						
Load Life	<u>Test conditions</u>																													
	Duration:	1000 Hrs																												
	Ambient temperature:	+105°C																												
	Applied voltage:	Rated working voltage																												
	Ripple Current:	Maximum rated ripple current.																												
	<u>After testing--Measure at 20°C</u>																													
	Capacitance change:	≤ +/- 20% of initial measured value																												
Dissipation factor:	≤ 200% of initial specified value																													
Leakage current:	≤ The initial specified value																													
Shelf Life	<u>Test Conditions</u>																													
	Duration time:	1000 Hrs																												
	Ambient temperature:	+105°C																												
	Applied voltage:	None																												
	<u>After testing--Measure at 20°C</u>																													
	Same limits as for load life.																													
Pretreatment before testing:	According to JIS C-5102 4-3																													
Marking	White print on black sleeve																													
Applicable Standards	Characteristics of W of JIS C-5141																													

## Physical Dimensions and Mounting Details



Diameter	5~12.5	16~18
Lead Diameter	0.6	0.8
α	1.0	

# GMST Series



Ir (mA) specified at 105°C and 120 KHz

**GMST Standard Products Table 6.3 to 25 Volt**

uF	6.3 V		10 V		16 V		25 V	
	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)
4.7							5 x 12.5	25
10							5 x 12.5	37
22					5 x 12.5	52	6.3 x 12.5	61
33			6.3 x 12.5	64	6.3 x 12.5	70	6.3 x 12.5	75
47			6.3 x 12.5	77	6.3 x 12.5	84	6.3 x 16	100
100	6.3 x 12.5	100	6.3 x 16	125	8 x 16	150	8 x 16	160
220	8 x 16	190	8 x 16	205	8 x 16	220	8 x 20	260
330	8 x 16	230	8 x 16	250	8 x 20	300	10 x 21	360
470	8 x 20	305	8 x 20	330	10 x 21	405	10 x 26	475
1000	10 x 26	555	10 x 26	595	12.5 x 26	715	12.5 x 26	765
2200	12.5 x 26	865	12.5 x 31	1000	16 x 31	1170	16 x 41	1410
3300	16 x 31	1030	16 x 31	1270	16 x 41	1550	18 x 41	1610
4700	16 x 31	1370	16 x 41	1650	18 x 41	1740		
6800	16 x 41	1760	18 x 41	1820				

**GMST Standard Products Table 35 to 100 Volt**

uF	35 V		50 V		63 V		100 V	
	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)
0.47			5 x 12.5	5	5 x 12.5	6	5 x 12.5	10
1			5 x 12.5	10	5 x 12.5	13	5 x 12.5	16
2.2			5 x 12.5	20	5 x 12.5	22	5 x 12.5	23
3.3			5 x 12.5	25	5 x 12.5	26	6.3 x 12.5	31
4.7	5 x 12.5	27	5 x 12.5	30	5 x 12.5	32	6.3 x 12.5	37
10	5 x 12.5	40	6.3 x 12.5	49	6.3 x 12.5	51	8 x 16	67
22	6.3 x 12.5	66	6.3 x 16	81	8 x 16	94	8 x 16	100
33	6.3 x 16	91	8 x 16	110	8 x 16	115	8 x 20	135
47	8 x 16	120	8 x 16	130	8 x 16	135	10 x 21	180
100	8 x 20	190	8 x 20	210	10 x 21	245	12.5 x 26	320
220	10 x 21	320	10 x 26	385	12.5 x 26	445	12.5 x 31	510
330	10 x 26	430	12.5 x 26	520	12.5 x 26	545	16 x 41	775
470	12.5 x 26	565	12.5 x 26	620	12.5 x 31	705	16 x 41	930
1000	12.5 x 31	890	16 x 31	1060	16 x 41	1270		
2200	16 x 41	1510	18 x 41	1610				

## GMST Application Data

### Frequency Multiplier

uF	50 Hz	120 Hz	300 Hz	1 KHz	10 KHz
~ 47	0.75	1	1.35	1.57	2.00
100 ~ 470	0.8	1	1.23	1.34	1.50
1000 ~ 6800	0.85	1	1.10	1.13	1.15

### Temperature Multiplier

Temp °C	70	85	105
Multiplier	1.62	1.4	1.00

# MXM : MTM Series

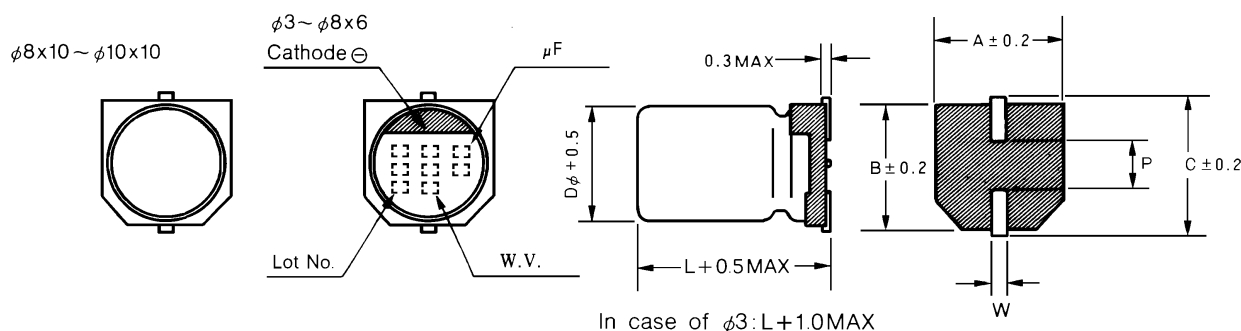


## Features

- \* Carrier tape packing for automatic insertion
- \* Especially suitable for dual surface, high density boards
- \* Solvent Proof

Item	Performance Characteristics								
	MXM				MTM				
Operating Temperature Range	-40°C to +85°C				-40°C to +105°C				
Working Voltage Range	4 to 50 Volts D.C.								
Nominal Capacitance Range	0.1 to 820 uF				0.1 to 470 uF				
Capacitance Tolerance	+/- 20 % ( 120 Hz, 20°C )								
Leakage Current (+20°C)	I <= 0.01 CV or 3 uA, whichever is greater after 2 Minutes of applied voltage								
Dissipation Factor % (120 Hz, +20°C)	Less than the value below:								
	WVDC	4	6.3	10	16	25	35	50	120 Hz
Temperature Characteristic	tan δ (Max)	0.35	0.26	0.2	0.16	0.14	0.12	0.12	20°C
	Impedance Ratio								
	WVDC	4	6.3	10	16	25	35	50	120 Hz
Load Life	Z(-25°C) / Z(+20°C)	7	4	3	2	2	2	2	
	Z(-40°C) / Z(+20°C)	15	8	6	4	4	3	3	
	<b>Test conditions</b>								
Shelf Life	Duration:	2000 Hrs			2000 Hrs				
	Ambient temperature:	+85°C			+105°C				
	Applied voltage:	Rated working voltage			Rated working voltage				
	Ripple Current:	Maximum rated Ir.			Maximum rated Ir.				
Resistance to Soldering Heat	<b>After testing--Measure at 20°C</b>								
	Capacitance change:	<= +/- 30% of initial value (WV=4), +/- 20 % (WV>=6.3)							
	Dissipation factor:	<= 200% of initial specified value							
	Leakage current:	<= The initial specified value							
Marking	<b>Test Conditions</b>								
	Duration time:	1000 Hrs			1000 Hrs				
	Ambient temperature:	+85°C			+105°C				
	Applied voltage:	To JIS C-5102 4-3			To JIS C-5102 4-3				
Applicable Standards	<b>After testing--Measure at 20°C</b>								
	Same limits as for load life.								
	The capacitors shall be kept on the hot plate maintained at 250°C for 30 seconds. After removal and cooling to room temperature, they shall meet the characteristics below								
	Capacitance change:	Within +/- 10% of Initial Value							
Dissipation factor:	Initial specified value or less								
Leakage current:	Initial specified value or less								
Dia. 3-8x6: Black Print on the Case Top. Dia. 8x10-Dia.10: Black Print on Clear Sleeve									
Characteristics of W of JIS C-5141									

## Physical Dimensions and Mounting Details



Case Size	3 x 5	4 x 5	5 x 5	6.3 x 5	8 x 6	8 x 10	10 x 10
A	3.3	4.3	5.3	6.6	8.3	8.3	10.3
B	3.3	4.3	5.3	6.6	8.3	8.3	10.3
C	3.6	5.0	6.0	7.3	9.0	9.0	11.0
P	0.6	1.0	1.5	2.2	2.2	3.2	4.6
Taping Code	TC3	TC4	TC5	TC6	TC7	TC8	TC0
W	0.45~ 0.75	0.5 ~ 0.8				0.7 ~ 1.0	

# MXM Series



Ir (mA) specified at 85°C and 120 KHz

**MXM Standard Products Table 4 to 16 Volt**

uF	4 V		6.3 V		10 V		16 V	
	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)
10							3 x 5	20
10							4 x 5	28
22	3 x 5	19	4 x 5	29			5 x 5	39
33	4 x 5	26			5 x 5	43		
47	4 x 5	34	5 x 5	46			6.3 x 5	70
100	5 x 5	61	6.3 x 5	71			8 x 6	200
220	6.3 x 5	82			8 x 6	250		
330			8 x 6	300	8 x 10	330		
470			8 x 10	380	10 x 10	400		
680			10 x 10	550				
820			10 x 10	660				

Ir (mA) specified at 85°C and 120 KHz

**MXM Standard Products Table 4 to 50 Volt**

uF	25 V		35 V		50 V		50 V	
	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)
0.1					4 x 5	1	3 x 5	1
0.22					4 x 5	2	3 x 5	2
0.33					4 x 5	3	3 x 5	3
0.47					4 x 5	5	3 x 5	5
1					4 x 5	10	3 x 5	8
2.2	3 x 5	8			4 x 5	16		
3.3	3 x 5	10			4 x 5	16		
4.7	3 x 5	12	4 x 5	22	5 x 5	23		
4.7	4 x 5	22						
10			5 x 5	30	6.3 x 5	35		
22			6.3 x 5	60	8 x 6	120		
33	6.3 x 5	65	8 x 6	130	8 x 10	120		
47			8 x 6	165	10 x 10	130		
100	8 x 10	180	10 x 10	210				
220	10 x 10	310						

# MTM Series



Ir (mA) specified at 105°C and 120 KHz

## MTM Standard Products Table 4 to 16 Volt

uF	4 V		6.3 V		10 V		16 V	
	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)
10							4 x 5	28
22			4 x 5	29			5 x 5	39
33	4 x 5	26	4 x 5	26				
47	4 x 5	26	5 x 5	46			6.3 x 5	70
100	5 x 5	61	6.3 x 5	71	8 x 6	110		
220	6.3 x 5	82			8 x 10	160	10 x 10	210
330			8 x 10	230			10 x 10	230
470					10 x 10	270		

## MTM Standard Products Table 4 to 50 Volt

uF	25 V		35 V		50 V	
	Dia x L	Ir(mA)	Dia x L	Ir(mA)	Dia x L	Ir(mA)
0.1					4 x 5	1
0.22					4 x 5	2
0.33					4 x 5	3
0.47					4 x 5	5
1					4 x 5	10
2.2					4 x 5	16
3.3					4 x 5	18
4.7	4 x 5	21			5 x 5	22
10	5 x 5	28			6.3 x 5	35
22	6.3 x 5	55			8 x 6	70
33	6.3 x 5	65	8 x 6	84	8 x 10	91
47	8 x 6	91	8 x 10	98	10 x 10	110
100	8 x 10	130	10 x 10	160		

# Lead Cutting and Forming



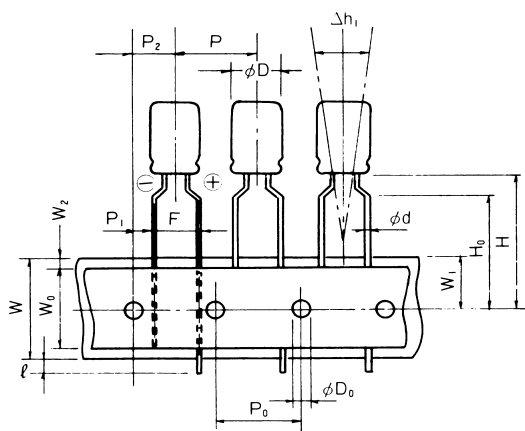
Type	Case Size	Order Code	Dimensions (mm)																																																																		
Forming Cut	4mm to 8 mm Diameter	FA	D	F	P	<p>※ Applicable to 5mmL and 7mmL series</p>																																																															
			4.0	5.0	1.5																																																																
			5.0	5.0	2.0																																																																
			6.3	5.0	2.5																																																																
			8.0	5.0	3.5																																																																
Straight Cut	10mm to 18mm Diameter	CA CO	D	F	P	<p>Dimension L = 5.08 mm Dimension L to Customer Requirements</p>																																																															
			4.0	5.0	--																																																																
			5.0	5.0	--																																																																
			6.3	7.5	--																																																																
			8.0	7.5	--																																																																
Kinked Cut	4mm to 8mm Diameter	KC	<p>※ Applicable to 5mmL and 7mmL series</p>																																																																		
Kinked Cut	10mm to 18mm Diameter	KC																																																																			
			<table border="1"> <thead> <tr> <th colspan="10">Dimensions (mm)</th> </tr> <tr> <th>D</th> <th>F</th> <th>P</th> <th>I</th> <th>H</th> <th>D</th> <th>F</th> <th>P</th> <th>I</th> <th>H</th> </tr> </thead> <tbody> <tr> <td>4.0</td> <td>5.0</td> <td>1.5</td> <td>0.85</td> <td>2.6</td> <td>10.0</td> <td>5.0</td> <td>--</td> <td>1.0</td> <td>2.7</td> </tr> <tr> <td>5.0</td> <td>5.0</td> <td>2.0</td> <td>0.85</td> <td>2.8</td> <td>12.5</td> <td>5.0</td> <td>--</td> <td>1.0</td> <td>2.7</td> </tr> <tr> <td>6.3</td> <td>5.0</td> <td>2.5</td> <td>0.85</td> <td>2.8</td> <td>16.0</td> <td>7.5</td> <td>--</td> <td>1.0</td> <td>2.7</td> </tr> <tr> <td>8.0</td> <td>5.0</td> <td>3.5</td> <td>1.00</td> <td>2.7</td> <td>18.0</td> <td>7.5</td> <td>--</td> <td>1.0</td> <td>2.7</td> </tr> </tbody> </table>										Dimensions (mm)										D	F	P	I	H	D	F	P	I	H	4.0	5.0	1.5	0.85	2.6	10.0	5.0	--	1.0	2.7	5.0	5.0	2.0	0.85	2.8	12.5	5.0	--	1.0	2.7	6.3	5.0	2.5	0.85	2.8	16.0	7.5	--	1.0	2.7	8.0	5.0	3.5	1.00	2.7	18.0	7.5
Dimensions (mm)																																																																					
D	F	P	I	H	D	F	P	I	H																																																												
4.0	5.0	1.5	0.85	2.6	10.0	5.0	--	1.0	2.7																																																												
5.0	5.0	2.0	0.85	2.8	12.5	5.0	--	1.0	2.7																																																												
6.3	5.0	2.5	0.85	2.8	16.0	7.5	--	1.0	2.7																																																												
8.0	5.0	3.5	1.00	2.7	18.0	7.5	--	1.0	2.7																																																												

# Taping and Packaging Specifications

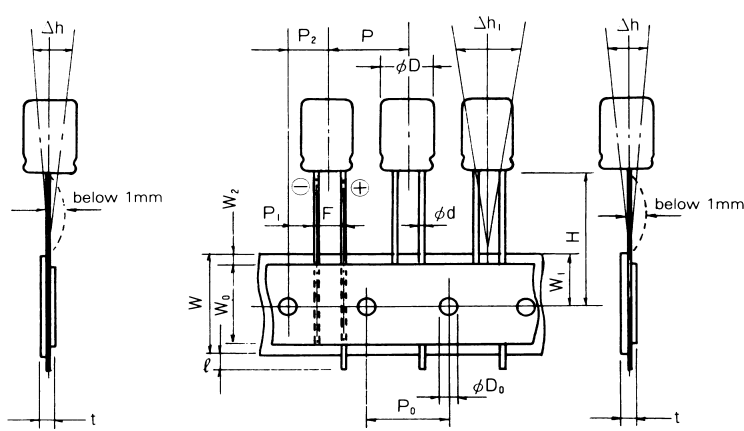


## Radial Lead Taping Specifications

Formed Lead Type



Straight Lead Type



## Coding

Specifications					Dia.	Symbol
Packing	Lead Style	Leader	F	Po		
Ammo Pack	Formed	--	5	12.7	4 ~ 8	TA
	Straight	--	See Below	12.7	3 ~ 10	TAS+F
Reel Pack	Formed	Cathode	5	12.7	4 ~ 8	TM5
		Anode	5	12.7	4 ~ 8	TP5
	Straight	Cathode	See Below	12.7	3 ~ 10	TM+F
		Anode	See Below	12.7	3 ~ 10	TP+F

Select "F" from table below

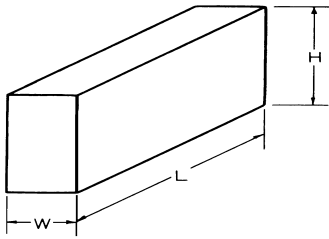
Select "F" from table below

Select "F" from table below

## Dimensions

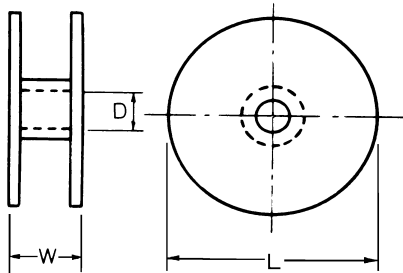
Item	Dia==>	Forming Lead Type			Straight Lead Type					Tol.
		5L, 7L	8mm	Others	3, 3.5, 4	5	6.3	8	10	
Lead Wire Dia.	d	0.45	0.6	0.5	0.4/0.45	0.45/0.5	0.45/0.5	0.6	0.6	+/-0.1
Body Pitch	P	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	+/-1.0
Feeding Hole Pitch	P <sub>0</sub>	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	+/-0.2
Feeding Hole Off Alignment	P <sub>1</sub>	3.85	3.85	3.85	5.1	5.1	5.1	4.6	3.85	+/-0.7
Feeding Hole Off Alignment	P <sub>2</sub>	6.35	6.35	6.35	6.35	6.35	6.35	6.35	6.35	+/-1.0
Lead Centre Spacing	F	5	5	5	2.5	2.5	2.5	3.5	5	+0.8/-0.2
Tape Width	W	18	18	18	18	18	18	18	18	+/-0.5
Adhesive Tape Width	W <sub>0</sub>	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	MIN
Feeding Hole Off Alignment	W <sub>1</sub>	9	9	9	9	9	9	9	9	+/-0.5
Adhesive Tape Off Alignment	W <sub>2</sub>	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	MAX
Body (Bottom) Height	H	17.5	20	18.5	18.5	18.5	18.5	18.5	18.5	+/-0.75
Lead Clinch Height	H <sub>0</sub>	16	16	16	--	--	--	--	--	+/-0.5
Cut Lead Height	l	1	1	1	1	1	1	1	1	MAX
Feed Hole Diameter	D <sub>0</sub>	4	4	4	4	4	4	4	4	+/-0.2
Body Inclination	h	0	0	0	0	0	0	0	0	+/-2.0
Body Inclination	h <sub>1</sub>	0	0	0	0	0	0	0	0	+/-2.0
Total Tape Thickness	t	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	+/-0.2

## Radial Lead Packing Specification Ammo-Pack



L	H	W	Size	Q'ty
340	190	48	3x5, 3.5x5, 4x5, 4x7	2000
340	280	48	5x5, 5x7, 6.3x5, 6.3x7	2000
340	280	54	5x9, 5x11, 6.3x9, 6.3x11	2000
			6.3x11, 6.3x15	2000
			8x9, 8x11.5, 8x15	1000
			10x9, 10x12.5	500
340	280	62	8x20	1000
			10x16, 10x20	500

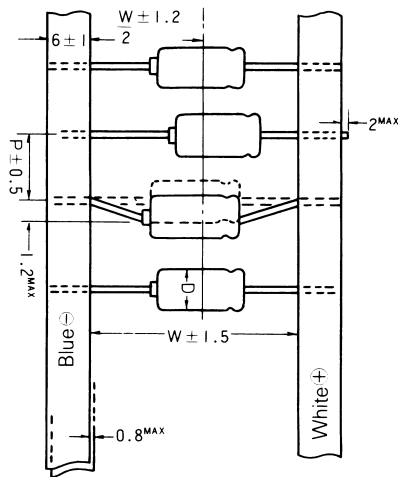
## Reel-Pack



Reel Size and Packing Quantity

L	H	W	Size	Q'ty
360	54	30	3x5, 3.5x5, 4x5, 4x7	1500
			5x5, 5x7, 5x9, 5x11	1000
			6.3x5, 6.3x7, 6.3x9	1000
			6.3x11, 6.3x15	1000
			8x9, 8x11.5, 8x15	800
			10x9, 10x12.5	500
380	62	15	8x20	800
			10x16, 10x20	500

## Axial Lead Taping Specifications

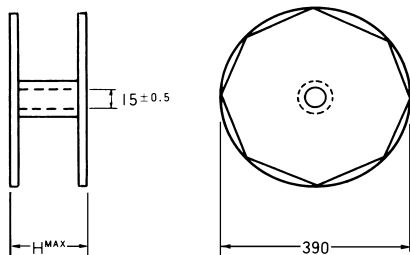


Details for reeled packing

W	P	Product Diameter	Code
52.4	10	5, 6.3, 8	TR0
63.5	10	5, 6.3, 8	TR1
52.4	15	10	TR6
63.5	15	10, 12.5	TR7

Reel Size and Packing Quantity

W	H	Product Diameter	Q'ty
52.4	82	5	1500
		6.3, 8	1000
63.5	93	5, 6.3, 8	1000
		10	500
		12.5	300



## Standard Preferred Packing Quantities

### Radial

#### Long Legs

Dia	L	Pieces per bag	Pieces per box	Pieces per carton
4 x 7		1000	15000	45000
5 x 7		1000	15000	45000
5 x 11		1000	10000	30000
6.3 x 7		1000	10000	30000
6.3 x 11		1000	8000	24000
8 x 12		500	5000	15000
8 x 16		500	5000	15000
8 x 20		500	3000	9000
8 x 7		500	6000	18000
8 x 9		500	6000	18000
10 x 13		500	4000	12000
10 x 16		500	3000	9000
10 x 20		500	2500	7500
10 x 25		400	2000	6000
13 x 20		300	1500	4500
13 x 25		200	1200	3600
13 x 32		200	1000	3000
13 x 36		200	1000	3000
13 x 40		150	900	2700
16 x 25		100	600	1200
16 x 32		100	600	1800
16 x 36		100	500	1500
18 x 36		100	500	1500
22 x 36		50	300	900
22 x 41		50	250	750

#### Cut Legs

Dia	L	Pieces per bag	Pieces per box	Pieces per carton
4 x 7		2500	20000	60000
5 x 7		2500	20000	60000
5 x 11		2500	20000	60000
6.3 x 7		1000	12000	36000
6.3 x 11		1000	12000	36000
8 x 12		1000	8000	24000
8 x 16		500	3000	9000
8 x 20		500	3000	9000
8 x 7		1000	8000	24000
10 x 13		600	3000	9000
10 x 16		500	3000	9000
10 x 20		400	2400	7200
13 x 20		250	1500	4500
13 x 25		200	1200	3600
16 x 25		150	900	2700
16 x 32		100	600	1800
16 x 36		100	600	1800
18 x 36		50	300	900

### Snap-in

Dia	L	Pieces per bag	Pieces per box	Pieces per carton
22 x 21		100	200	800
22 x 26		100	200	800
22 x 31		100	200	800
22 x 41		100	200	800
22 x 51		100	200	800
25 x 25		80	160	640
25 x 26		80	160	640
25 x 31		80	160	640
25 x 36		80	160	640
25 x 41		80	160	640
25 x 51		80	160	640

Dia	L	Pieces per bag	Pieces per box	Pieces per carton
30 x 31		49	98	392
30 x 36		49	98	392
30 x 41		49	98	392
30 x 46		49	98	392
30 x 51		49	98	392
35 x 27		36	72	288
35 x 32		36	72	288
35 x 37		36	72	288
35 x 42		36	72	288
35 x 47		36	72	288
35 x 52		36	72	288

### T/A Type

Dia	L	Pieces per box	Pieces per carton
4 x All		2500	25000
5 x All		2000	20000
6 x All		1500	15000
8 x All		1000	10000
10 x 13		600	6000
10 x 16		500	5000
10 x 20		500	5000
13 x All		300	3000
16 x All		200	2000

# Environmental Properties



## A. Raw Material Composition of Eurocap Electrolytics

<u>Part Name</u>	<u>Raw Materials</u>	<u>Percentage weight of capacitor</u>		
		<u>5 x 11 mm</u>	<u>10 x 16 mm</u>	<u>18 x 35 mm</u>
Aluminium Foil	Anode > 99.9% Al Cathode >99.4% Al	15.7	25.9	31
Lead Wire (a)	Lead Tab +ve >99.92% Lead Tab -ve >99.90% Lead Wire copper iron wire	25.3	9	3.3
Paper	Manila Hemp	4.7	8.1	9
Aluminium Can	Aluminium >99.9%	27.69	20.8	18.2
Rubber	Ethylene Propylene Tarpolymer	11.8	17.2	14.8
Sleeve (b)	Polyvinyl Chloride	6.1	4.2	2.8
Electrolyte	Ethylene Glycol	6.5	14.1	20.5
Tape for Element	Polypropylene	2	0.7	0.4

As can be seen from the above table, a trend can be established for the the varying percentage as the case size of the component increases.

## B. Hazardous Sustances

The EACEM list of Hazardous Substances is used as a guideline.

The list has been drawn up the European Association of Consumer Electronics Manufacturers. They stipulate allowed concentrations (ppm mg/Kg).

We draw to your attention:

(a) Lead is present in the tin plating on the Copper ply lead wire for soldering in percentages 3 to 5%  
The maximum concentration based on EACEM for lead is 100 mg/Kg

(b) The sleeve of all electrolytic capacitors is made from Poly Vinyl Chloride. If this is burned, there is a possible occurance of Hydrochloric Acid Gas.

The maximum concentration based on EACEM for Poly Vinyl Chloride is 1000mg/Kg

## C. CFC, Asbestos and Cadmium

The use or inclusion of CFCs, asbestos and Cadmium for production of materials, parts and appliances is prohibited by our factory.

## D. Disposal

It is recommended that in the case of disposal either of the following actions be taken:

(a) Consignment to specialists of industrial waste.

(b) Controlled incineration after crushing the capacitor body.

Please note that all Eurocap Capacitors are manufactured to the Japanese Industrial Standard C5141.