FY SERIES

FYD TYPE: SMALL DIAMETER, EXCELLENT VOLTAGE HOLDING CHARACTERISTICS
FYH, and FYL TYPE: LOW PROFILE, EXCELLENT VOLTAGE HOLDING CHARACTERISTICS

The FY series includes small-sized electric double-layer capacitors with excellent voltage holding characteristics. The FYD type occupies only a small area on a printed circuit board, and the FYH and FYL types feature a low profile in height, so that they can be used in various systems.

These capacitors are ideal as long-time backup devices for minute-current loads in small and lightweight systems.

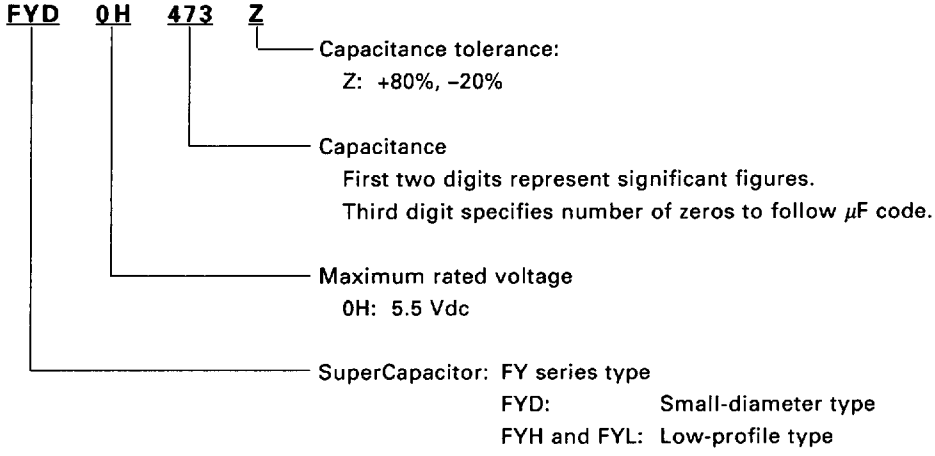
■ FEATURES

- Product variety makes the FYD, FYH, and FYL types suitable for use in many types of application systems
- Excellent voltage holding characteristics ideal for backup of 1 μA to several hundred μA
- Smaller than other SuperCapacitors (25% less than FS series in volume)
- Capacitance ranges from low to high (0.01 F to 2.2 F)

■ APPLICATIONS

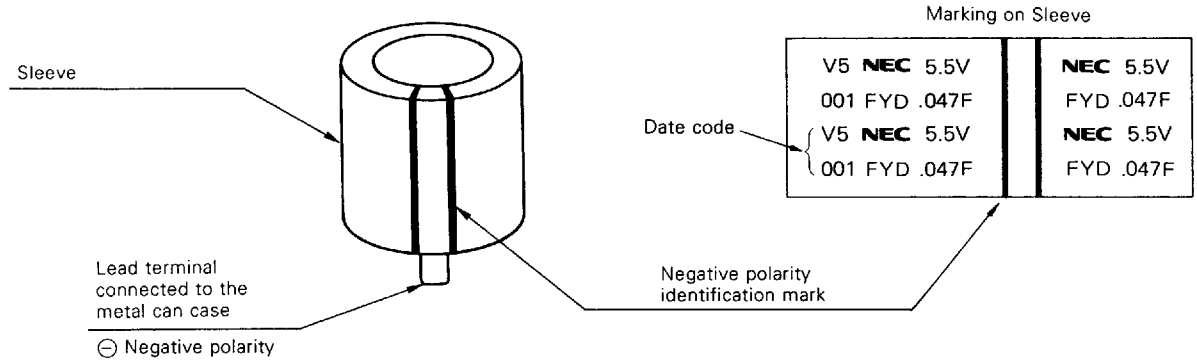
- Backup of CMOS microcomputers, static RAMs, DTSs (digital tuning systems)
- Memory backup of remote controllers and handy cassette player during battery exchange

■ PART NUMBER SYSTEM



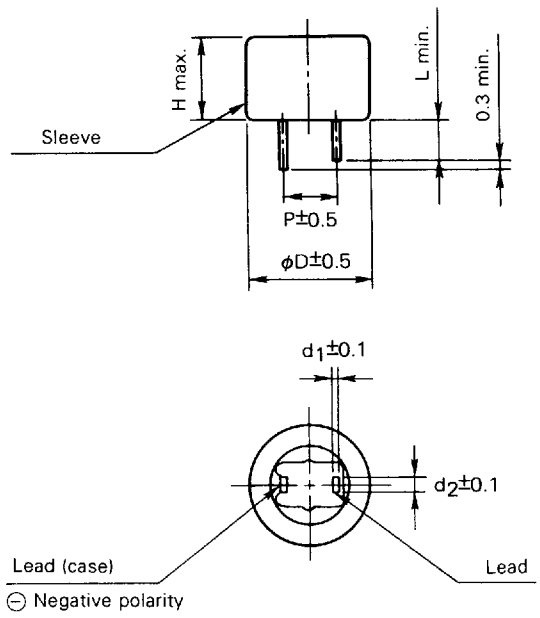
MARKING

Markings are made with black ink on the green sleeve.



DIMENSIONS AND STANDARD RATINGS

FYD-Type



Part No.	Dimensions mm (inch)						Weight
	D	H	P	d_1	d_2	L	g (oz)
FYD0H223Z	11.5 (0.453)	8.5 (0.335)	5.08 (0.200)	0.4 (0.016)	1.2 (0.047)	2.7 (0.106)	1.6 (0.056)
FYD0H473Z	11.5 (0.453)	8.5 (0.335)	5.08 (0.200)	0.4 (0.016)	1.2 (0.047)	2.7 (0.106)	1.65 (0.058)
FYD0H104Z	13.0 (0.512)	8.5 (0.335)	5.08 (0.200)	0.4 (0.016)	1.2 (0.047)	2.2 (0.087)	2.4 (0.085)
FYD0H224Z	14.5 (0.571)	15.0 (0.591)	5.08 (0.200)	0.4 (0.016)	1.2 (0.047)	2.4 (0.095)	4.3 (0.152)
FYD0H474Z	16.5 (0.65)	15.0 (0.591)	5.08 (0.200)	0.4 (0.016)	1.2 (0.047)	2.7 (0.106)	6.0 (0.212)
FYD0H105Z	21.5 (0.85)	16.0 (0.629)	7.62 (0.300)	0.6 (0.024)	1.2 (0.047)	3.0 (0.118)	11.0 (0.388)
FYD0H145Z	21.5 (0.85)	19.0 (0.748)	7.62 (0.300)	0.6 (0.024)	1.2 (0.047)	3.0 (0.118)	12.0 (0.424)
FYD0H225Z	28.5 (1.122)	22.0 (0.866)	10.16 (0.400)	0.6 (0.024)	1.4 (0.055)	6.1 (0.240)	22.9 (0.809)

Note: Weight is typical.

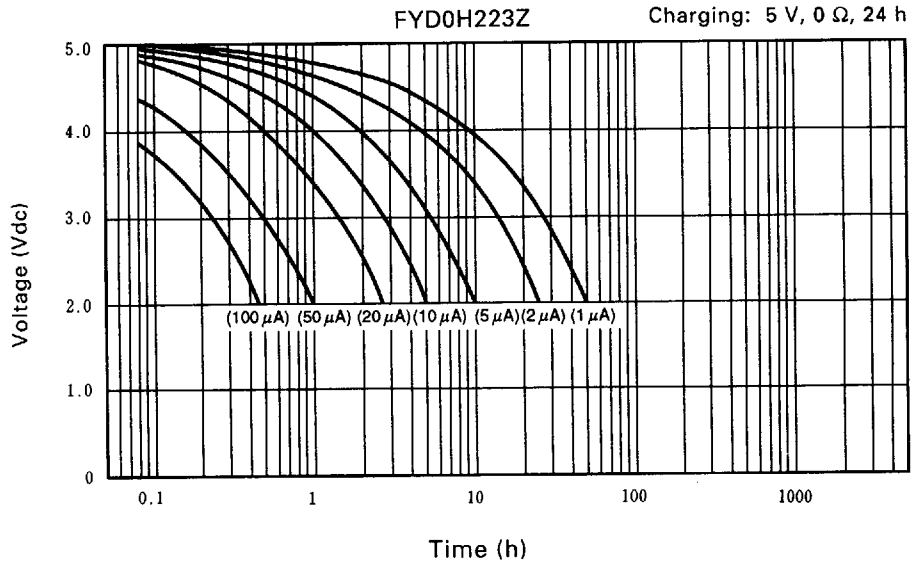
Part Number	Max. Rated Voltage (V)	Nominal Capacitance (F)	Max. ESR (at 1 kHz) (Ω)	Max. Current at 30 minutes (mA)	Voltage Holding Characteristic (V)
FYD0H223Z	5.5	0.022	220	0.033	4.2
FYD0H473Z	5.5	0.047	220	0.071	4.2
FYD0H104Z	5.5	0.10	100	0.15	4.2
FYD0H224Z	5.5	0.22	120	0.33	4.2
FYD0H474Z	5.5	0.47	65	0.71	4.2
FYD0H105Z	5.5	1.0	35	1.5	4.2
FYD0H145Z	5.5	1.4	45	2.1	4.2
FYD0H225Z	5.5	2.2	35	3.3	4.2

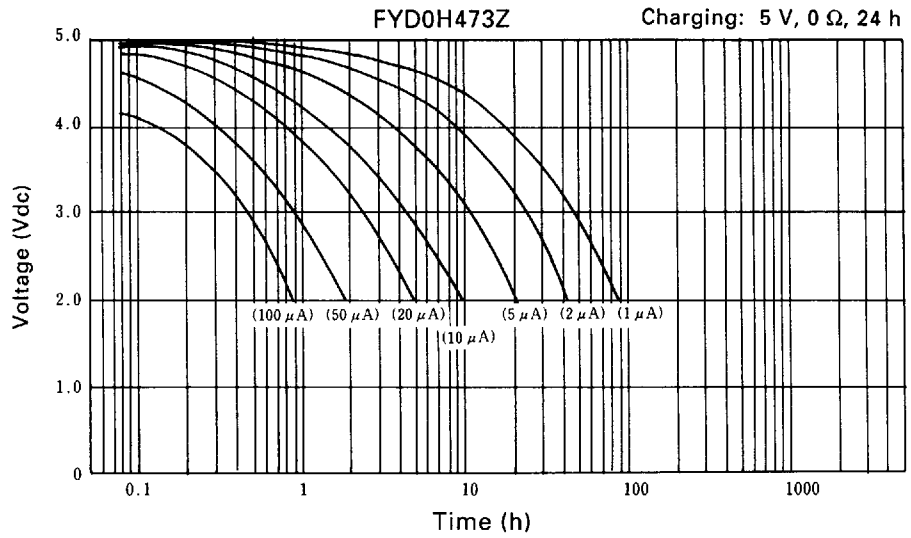
SPECIFICATIONS

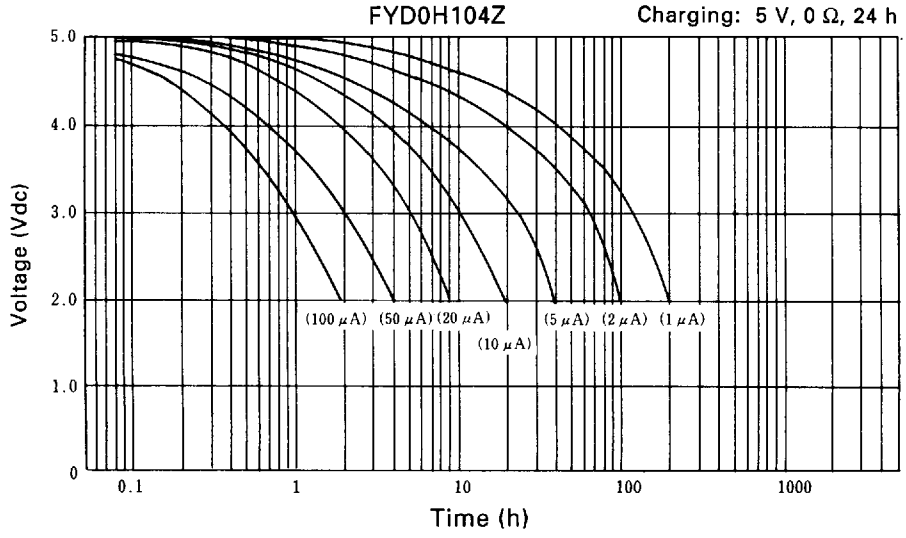
Items		Specifications		Test Conditions
Operating temp. Range		-25°C to +70°C		
Max. Working Volt.		5.5 Vdc		
Capacitance Range		See standard ratings		
Capacitance Tolerance		+80%, -20%		Refer to measuring conditions
ESR		See standard ratings		Refer to measuring conditions
Current at 30 minutes		See standard ratings		Refer to measuring conditions
Surge Voltage		Capacitance	More than 90% of initial requirement	Surge voltage : 6.3 V Temperature. 70 ± 2°C Charging for 30 seconds Discharging for 9 min 30 sec. Number of cycle : 1000 cycles. Charge resistance : 0.01 F 1500 Ω 1.4 F 15 Ω 0.022 F 560 Ω 2.2 F 10 Ω 0.047 F 300 Ω 0.10 F 150 Ω 0.22 F 56 Ω 0.47 F 30 Ω 1.0 F 15 Ω No discharge resistance
		ESR	Less than 120% of initial requirement	
		Current at 30 minutes	Less than 120% of initial requirement	
		Outlook	No significant change	
Temperature Characteristics	Step 2	Capacitance	More than 50% of initial value	Step 1: +25°C Step 2: -25°C Step 3: +25°C Step 4: +70°C Step 5: +25°C
		ESR	Less than 400% of initial value	
	Step 4	Capacitance	Less than 200% of initial value	
		ESR	Initial requirement	
		Current at 30 minutes	Less than 1.5 CV (mA)	
	Step 6	ΔC/C	In ±20% of initial value	
		ESR	Initial requirement	
		Current at 30 minutes	Initial requirement	
Terminal Strength		Terminals shall not be cut		FYD0H105Z FYD0H145Z FYD0H225Z FYH0H474Z FYH0H105Z : 2.5 kg-f 10± 1 sec Others : 1.0 kg-f 10± 1 sec
Vibration		Capacitance	Shall meet initial requirements	Frequency: 10 to 55 Hz Time of test: 6 hours
		ESR		
		Current at 30 minutes		
		Outlook	No significant change	
Solderability		Over 3/4 of surface shall be covered with the solder.		Temperature of solder: 230±5°C Time of immersion: 5±0.5 seconds To immerse capacitors up to 1.6 mm from the bottom
Soldering Heat Resistance		Capacitance	Shall meet initial requirements	Temperature of solder: 260±10°C Time of immersion: 10±1 second To immerse capacitors up to 1.6 mm from the bottom
		ESR		
		Current at 30 minutes		
		Outlook	No significant change	
Temperature Cycling		Capacitance	Shall meet initial requirements	Temperature condition: -25°C → +25°C → +70°C → +25°C Number of cycle: 5 cycles
		ESR		
		Current at 30 minutes		
		Outlook	No significant change	
Moisture Resistance (Steady State)		ΔC/C	Within ±20% of initial value	Temperature: 40±2°C Humidity: 90 to 95% RH Time of test: 240 hours
		ESR	Less than 120% of initial requirement	
		Current at 30 minutes	Less than 120% of initial requirement	
		Outlook	No significant change	
Load Life		ΔC/C	Within ±30% of initial value	Temperature: 70±2°C Series resistance: 0 Ω Applied voltage: 5.5 Vdc Time of test: 1000 hours
		ESR	Less than 200% of initial requirement	
		Current at 30 minutes	Less than 200% of initial requirement	
		Outlook	No significant change	
Voltage holding Characteristics (Self Discharge)		Voltage between terminal leads shall be higher than 4.2 V.		Charging condition: Applied voltage: 5.0 Vdc Series resistance: 0 Ω Charging time: 24 hours
				Storage: Load: nothing Temperature: lower than 25°C Humidity: lower than 70% RH Time: 24 hours

TYPICAL PERFORMANCE DATA

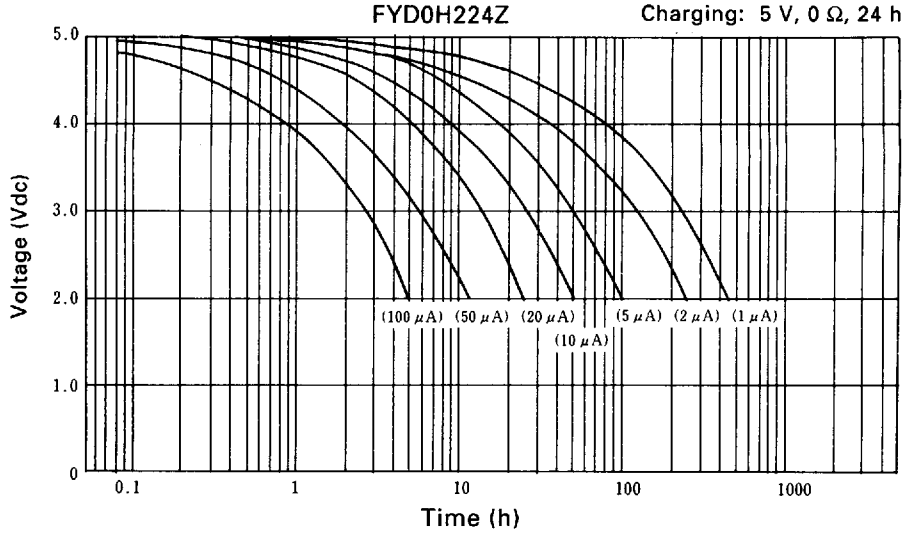
■ Resistive discharge characteristics of FYD type



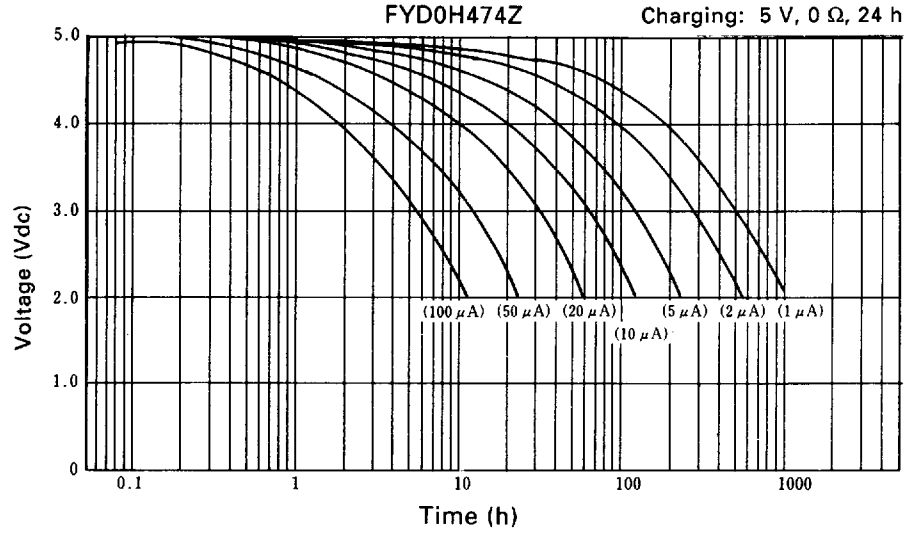




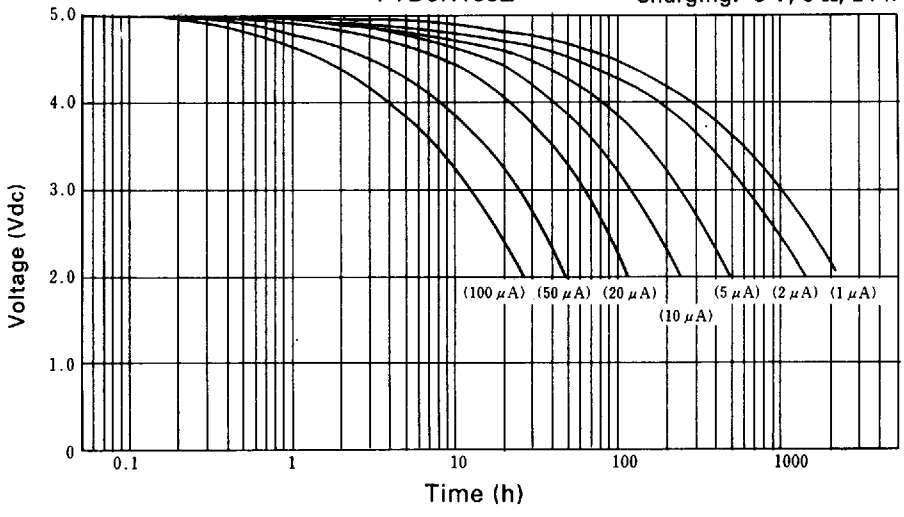
FYD0H224Z Charging: 5 V, 0 Ω, 24 h

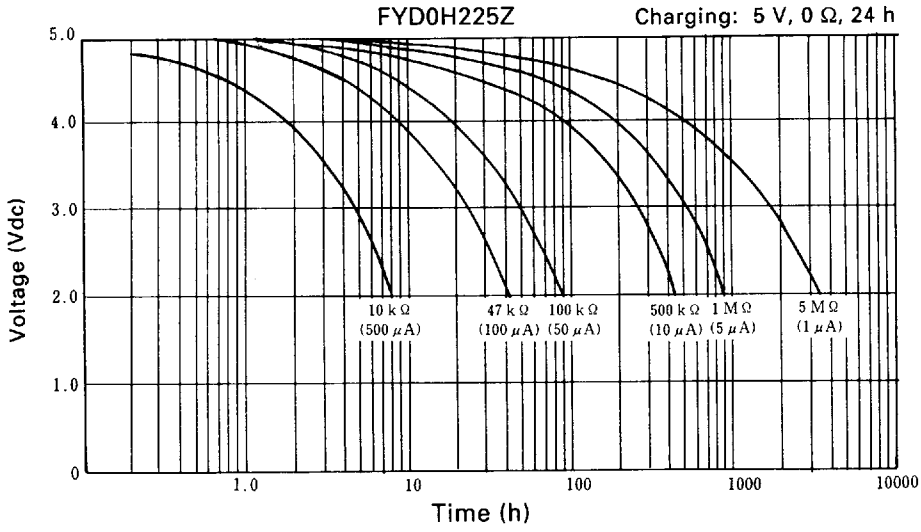


FYD0H474Z Charging: 5 V, 0 Ω, 24 h



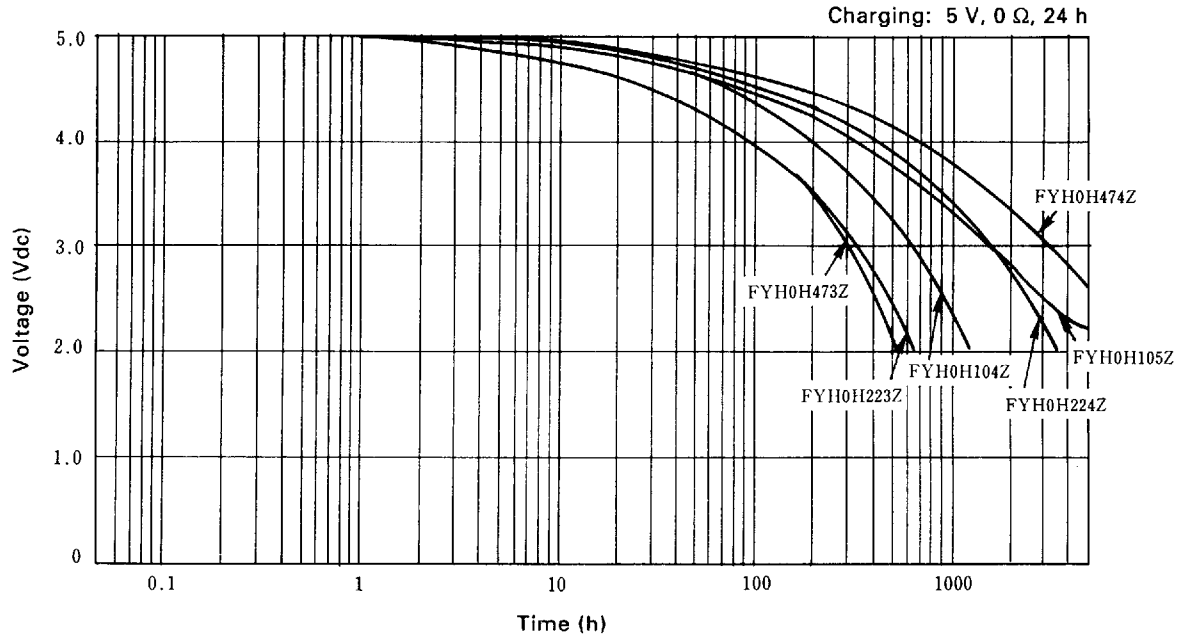
FYD0H105Z Charging: 5 V, 0 Ω, 24 h



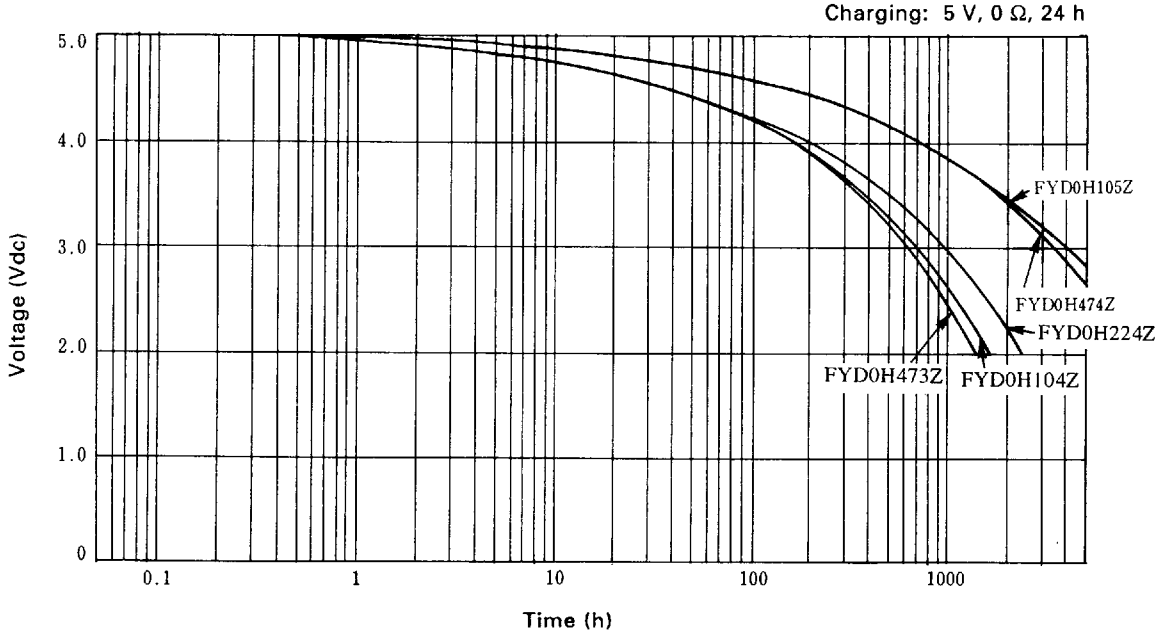


■ Voltage holding characteristics

FYH-type

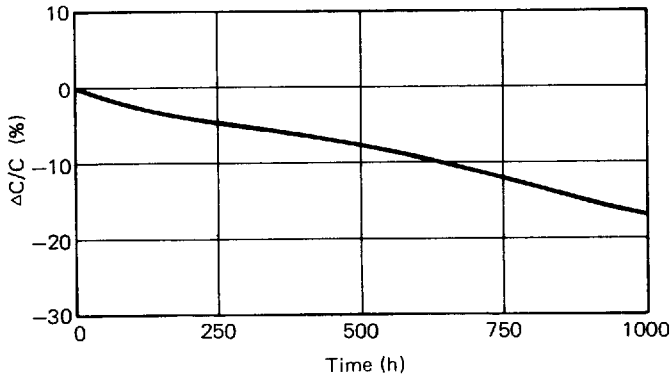


FYD-type

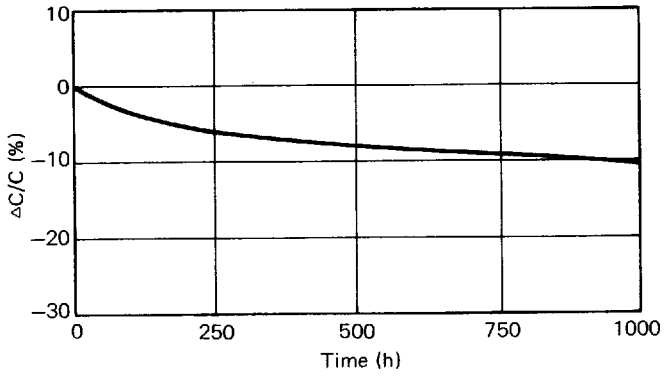


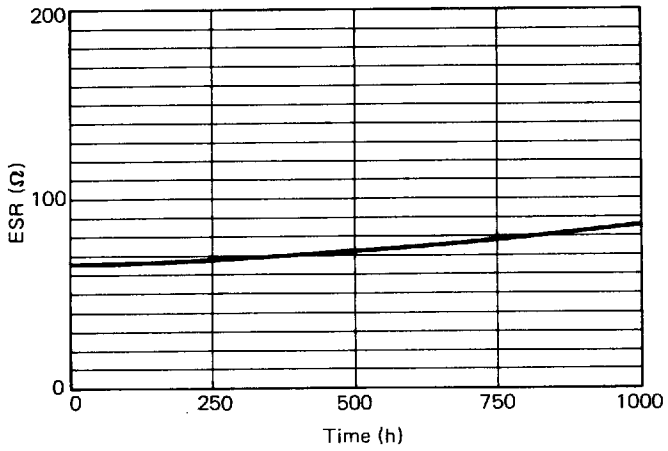
LIFE TEST DATA

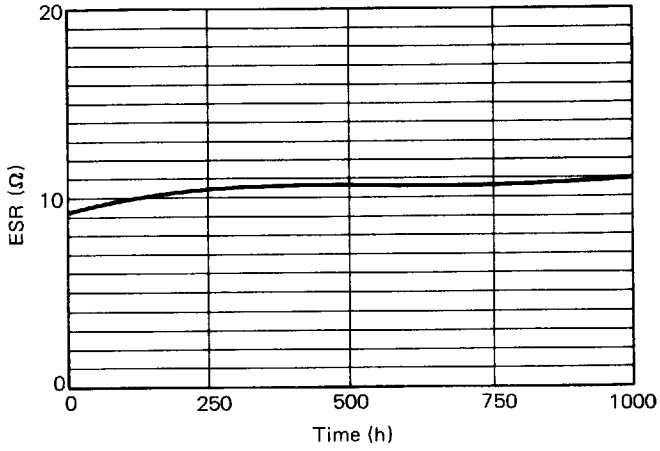
FYD0H473Z
Temperature: 70 °C
Applied voltage: 5.5 V

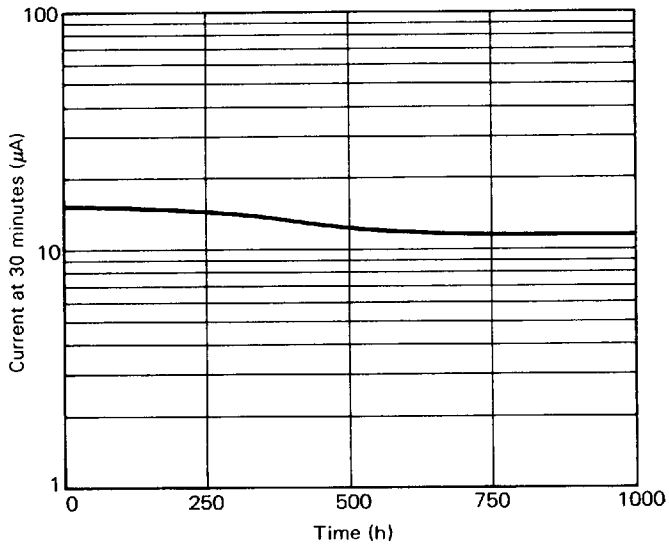


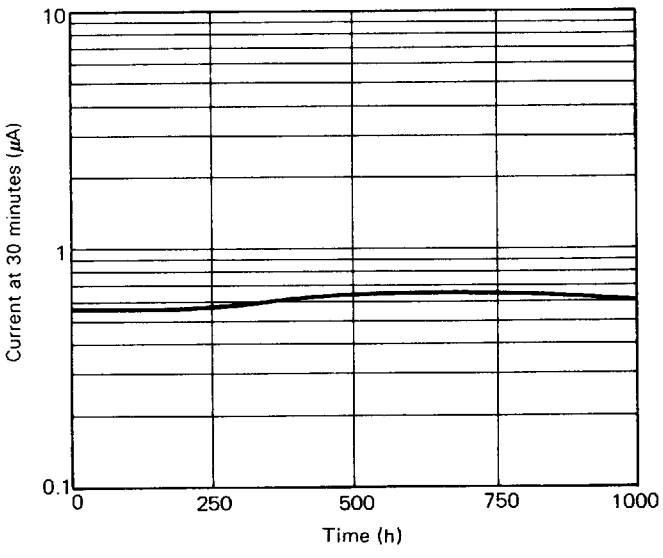
FYD0H105Z
Temperature: 70 °C
Applied voltage: 5.5 V











3.5 V, 6.5 V RATED VOLTAGE SERIES (FSH TYPE, FYD TYPE)

These 3.5 V and, 6.5 V rated voltage are suitable for use in portable or battery-driven equipment.

These capacitors are especially ideal as backup devices for cameras, remote controllers, headphone and stereos.

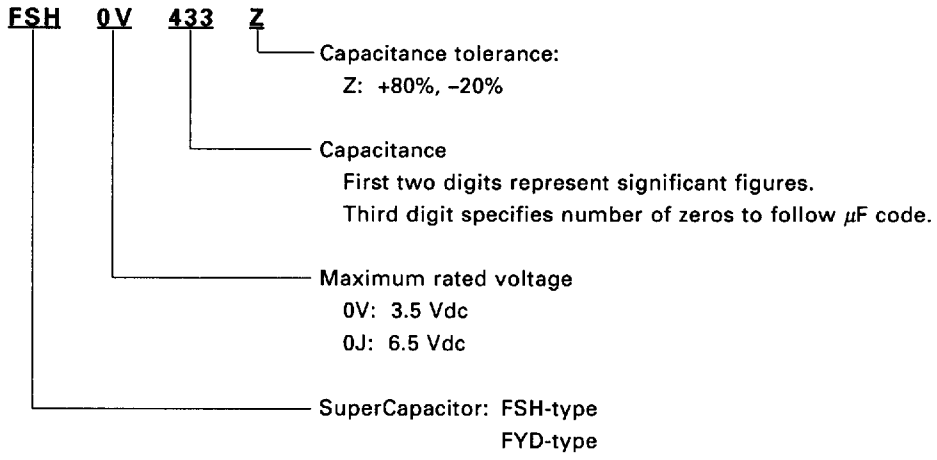
■ FEATURES

- The FSH-type is ideal for supplying several hundred μA to several mA for a short time. The FYD type is ideal for backup of 1 μA to several hundred μA for a long time.
- Smaller than existing series (25% less than FS series in C•V per volume)

■ APPLICATIONS

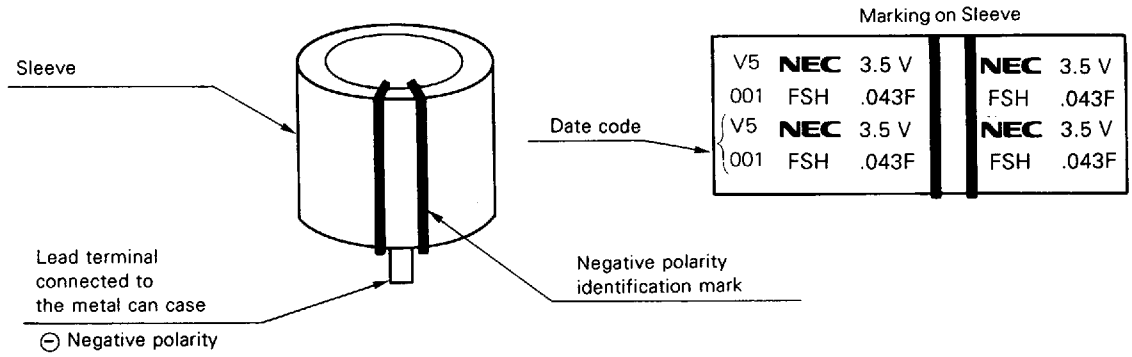
- Secondary backup power supply for cameras to charge an electronic flash (FSH type)
- Secondary backup power supply for motors (FSH-type)
- Backup of CMOS microprocessors, SRAMs, DTS ICs to charge the battery

■ PART NUMBER SYSTEM

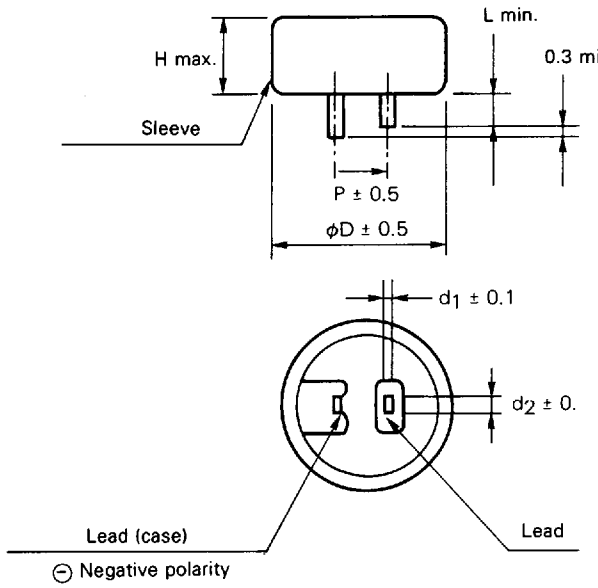


MARKING

Markings are made with black ink on the green sleeve.



DIMENSIONS AND STANDARD RATINGS



Part No.	Dimensions mm (inch)						Weight
	D	H	P	d_1	d_2	L	g (oz)
FSH0V433Z	11.0 (0.413)	5.2 (0.205)	5.08 (0.2)	0.2 (0.008)	1.2 (0.047)	2.7 (0.106)	1.0 (0.035)
FYD0V563Z	11.0 (0.413)	5.2 (0.205)	5.08 (0.2)	0.2 (0.008)	1.2 (0.047)	2.7 (0.106)	1.0 (0.035)
FSH0J223Z	11.5 (0.453)	8.5 (0.355)	5.08 (0.2)	0.4 (0.016)	1.2 (0.047)	2.7 (0.106)	1.7 (0.060)
FYD0J273Z	11.5 (0.453)	8.5 (0.355)	5.08 (0.2)	0.4 (0.016)	1.2 (0.047)	2.7 (0.106)	1.6 (0.056)

Note: The weight values are typical.

Part Number	Max. Rated Voltage (V)	Nominal Capacitance (F)	Max. ESR (at 1 kHz) (Ω)	Max. Current at 30 minutes (mA)
FSH0V433Z	3.5	0.043	50	0.039
FYD0V563Z	3.5	0.056	150	0.050
FSH0J223Z	6.5	0.022	60	0.040
FYD0J273Z	6.5	0.027	200	0.049

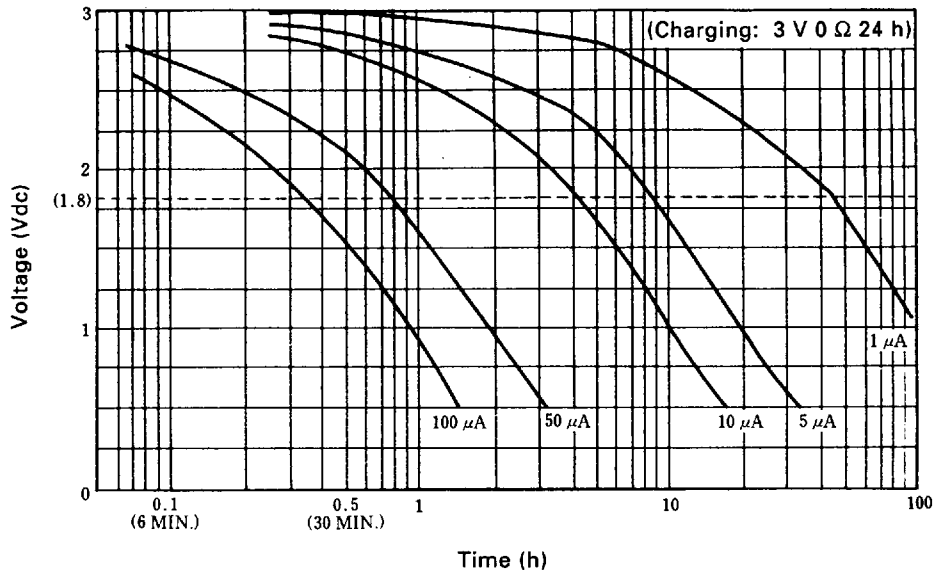
SPECIFICATIONS

Items		Specifications		Test Conditions
Operating temp. Range		−25 °C to +70 °C		
Max. Rated Volt.		3.5 Vdc, 6.5 Vdc		
Capacitance Range		See standard ratings		
Capacitance Tolerance		+80%, −20%		Refer to measuring conditions
ESR		See standard ratings		Refer to measuring conditions
Current at 30 min.		See standard ratings		Refer to measuring conditions
Surge Voltage		Capacitance	More than 90% of initial requirement	Surge voltage : 4.0 V (3.5 VDC), 7.4 V (6.5 VDC) rated part rated part Temperature. 70 ± 2°C Charging for 30 seconds Discharge for 9 min 30 sec. Number of cycle : 1000 cycles. Charge resistance : 0.022 F, 0.027 F 560 Ω 0.043 F 300 Ω 0.056 F 240 Ω No discharge resistance
		ESR	Less than 120% of initial requirement	
		Current 30 minutes	Less than 120% of initial requirement	
		Outlook	No significant change	
Temperature Characteristics	Step 2	Capacitance	More than 50% of initial value	Step 1: +25 °C Step 2: −25 °C Step 3: +25 °C Step 4: +70 °C Step 5: +25 °C
		ESR	Less than 400% of initial value	
	Step 4	Capacitance	Less than 200% of initial value	
		ESR	Initial requirement	
		Current 30 minutes	Less than 1.5 CV (mA)	
	Step 5	ΔC/C	In ±20% of initial value	
		ESR	Initial requirement	
		Current 30 minutes	Initial requirement	
Vibration		Capacitance	Shall meet initial requirements	Frequency: 10 to 55 Hz Time of test: 6 hours
		ESR		
		Current 30 minutes		
		Outlook	No significant change	
Solderability		Over 3/4 of surface shall be coverd with the solder		Temperature of solder: 230 ±5 °C Time of immersion: 5 ± 0.5 seconds To immerse capacitors up to 1.6 mm from the bottom
Soldering Heat Resistance		Capacitance	Shall meet initial requirements	Temperature of solder: 260 ± 10 °C Time of immersion: 10 ± 1 seconds To immerse capacitors up to 1.6 mm from the bottom
		ESR		
		Current 30 minutes		
		Outlook	No significant change	
Temperature Cycling		Capacitance	Shall meet initial requirements	Temperature condition: −25 °C → +25 °C → +70 °C → +25 °C Number of cycle: 5 cycle
		ESR		
		Current 30 minutes		
		Outlook	No significant change	
Moisture Resistance (Steady State)		ΔC/C	Within ±20% of initial value	Temperature: 40 ±2 °C Humidity: 90 to 95% RH Time of test: 240 hours
		ESR	Less than 200% of initial requirement	
		Current 30 minutes	Less than 120% of initial requirement	
		Outlook	No significant change	
Load Life		ΔC/C	Within ±30% of initial requirement	Temperature: 70 ±2 °C Series resistance: 0 Ω Applied voltage: 5.5 Vdc Time of test: 1000 hours
		ESR	Less than 300% of initial requirement	
		Current 30 minutes	Less than 200% of initial requirement	
		Outlook	No significant change	

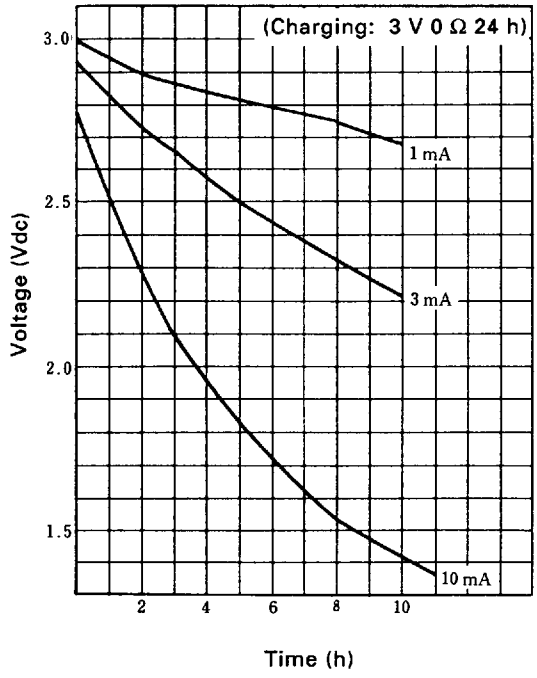
TYPICAL PERFORMANCE DATA

■ Resistive discharge characteristics

○ FYD0V563Z

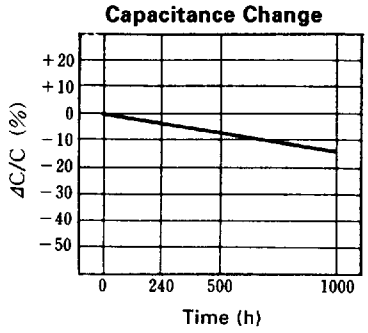


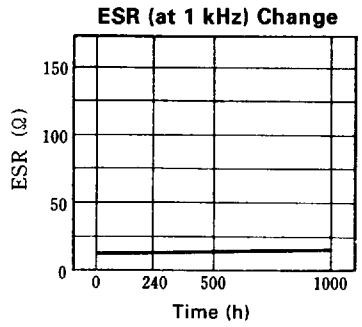
○ FSH0V433Z

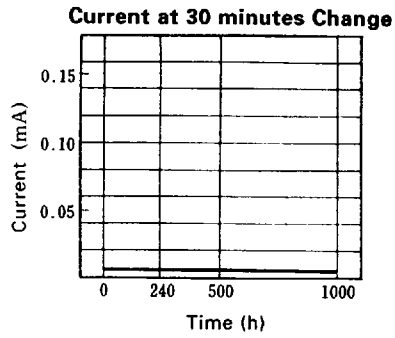


Load life characteristics (condition: 70 °C, max. Rated Voltage, 1,000 h)

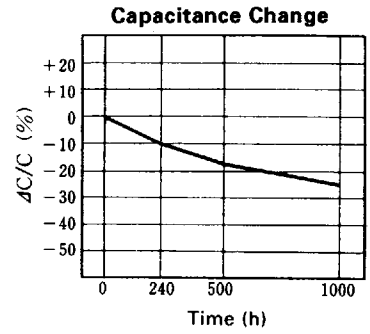
FSH0V433Z

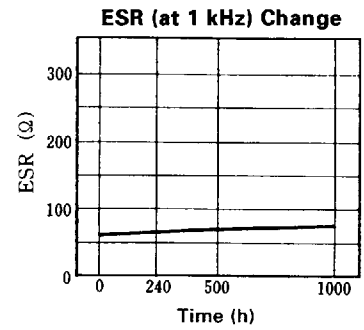


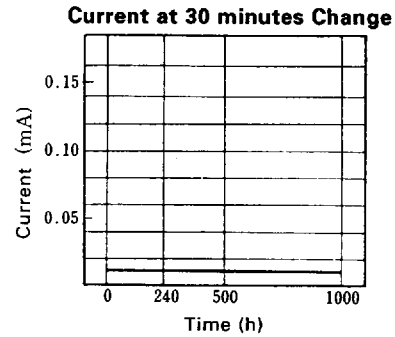




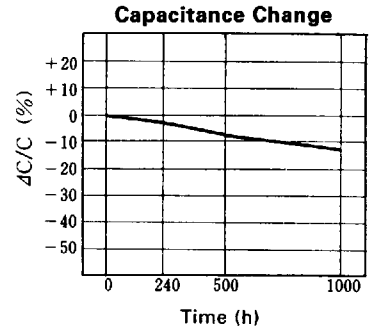
FYD0V563Z

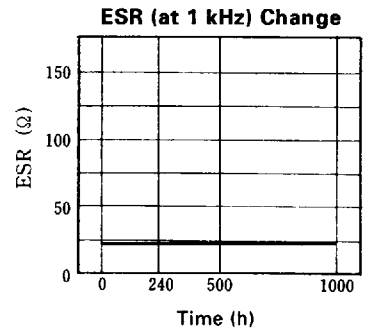


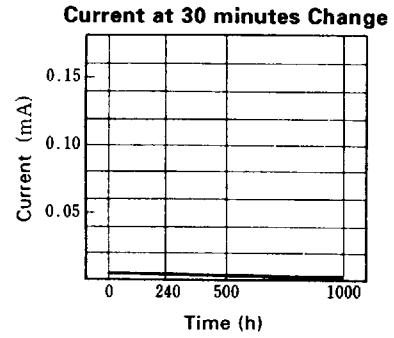




FSH0J233Z







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