

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.

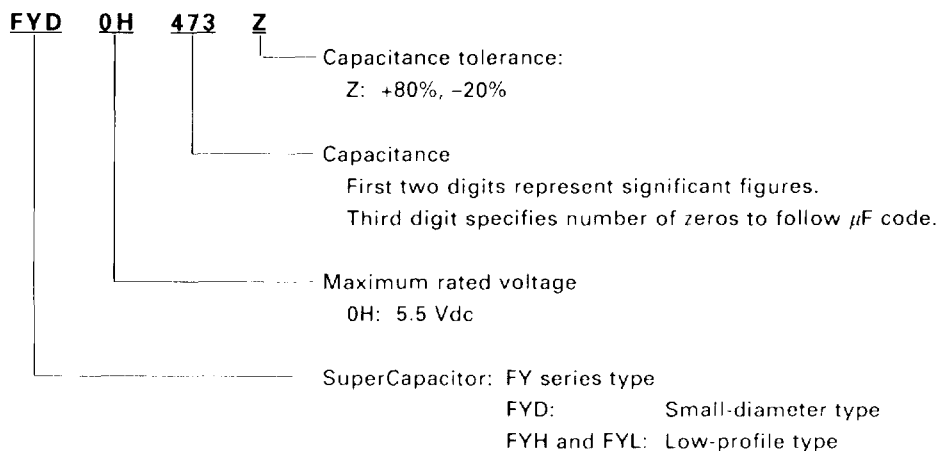
■ FEATURES

- 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

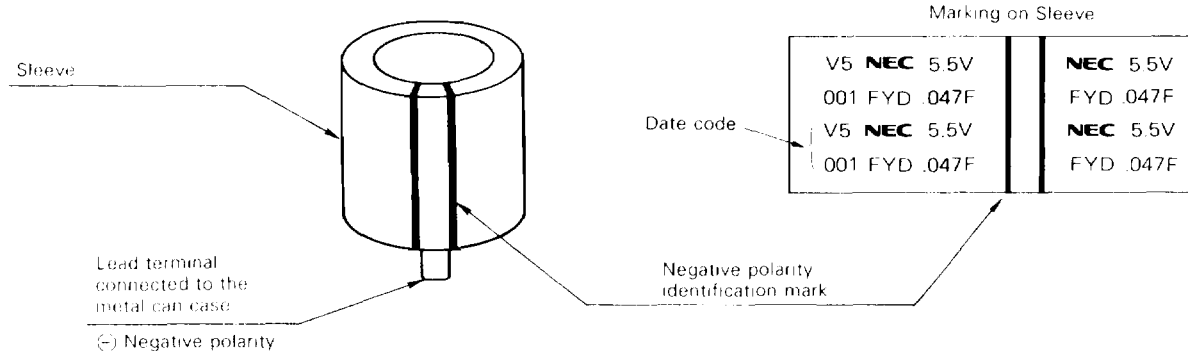
- Backup of CMOS microcomputers, static RAMs, DTSs (digital tuning systems)
- Memory backup of remote controllers and handy cassette player during battery exchange

■ PART NUMBER SYSTEM



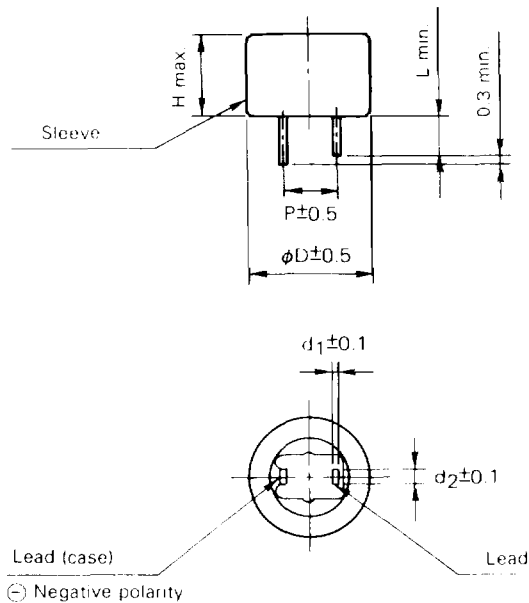
MARKING

Markings are made with black ink on the green sleeve.



DIMENSIONS AND STANDARD RATINGS

FYD-Type

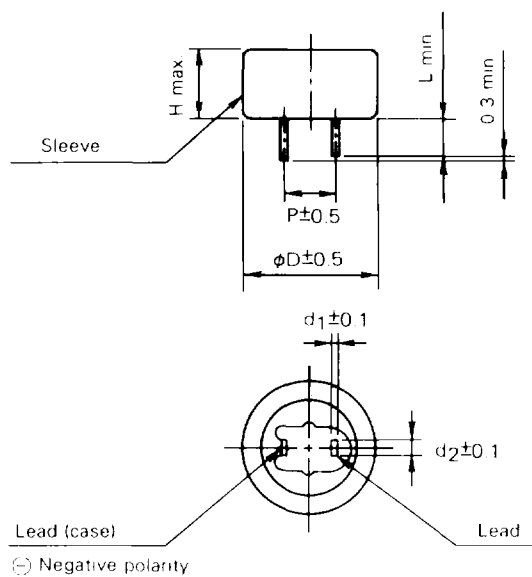


Part No.	Dimensions mm (inch)						Weight g (oz)
	D	H	P	d ₁	d ₂	L	
FYD0H223Z	11.5 (0.453)	8.5 (0.335)	5.08 (0.200)	0.4 (0.016)	1.2 (0.047)	2.7 (0.106)	1.6 (0.056)
FYD0H473Z	11.5 (0.453)	8.5 (0.335)	5.08 (0.200)	0.4 (0.016)	1.2 (0.047)	2.7 (0.106)	1.65 (0.058)
FYD0H104Z	13.0 (0.512)	8.5 (0.335)	5.08 (0.200)	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

FYH-Type

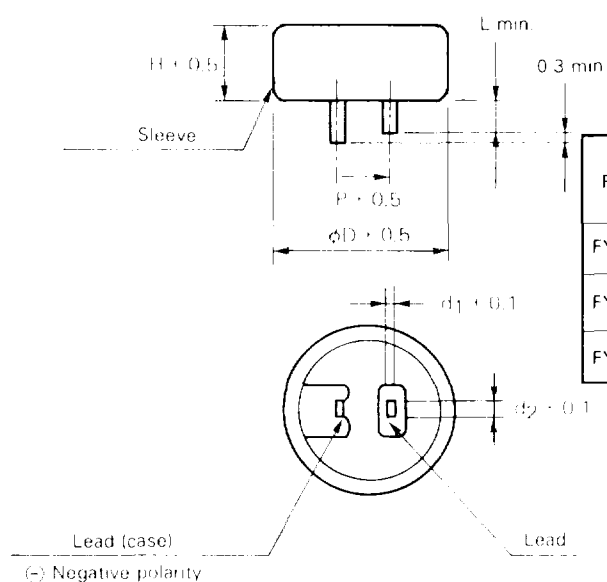


Part No.	Dimensions mm (inch)						Weight g (oz)
	D	H	P	d ₁	d ₂	L	
FYH0H223Z	11.5 (0.453)	7.0 (0.276)	5.08 (0.200)	0.4 (0.016)	1.2 (0.047)	2.7 (0.106)	1.5 (0.053)
FYH0H473Z	13.0 (0.512)	7.0 (0.276)	5.08 (0.200)	0.4 (0.016)	1.2 (0.047)	2.2 (0.087)	2.2 (0.078)
FYH0H104Z	16.5 (0.65)	7.5 (0.295)	5.08 (0.200)	0.4 (0.016)	1.2 (0.047)	2.7 (0.106)	3.4 (0.120)
FYH0H224Z	16.5 (0.65)	9.5 (0.374)	5.08 (0.200)	0.4 (0.016)	1.2 (0.047)	2.7 (0.106)	3.6 (0.127)
FYH0H474Z	21.5 (0.85)	10.0 (0.394)	7.62 (0.300)	0.6 (0.024)	1.2 (0.047)	3.0 (0.118)	7.2 (0.255)
FYH0H105Z	28.5 (1.122)	11.0 (0.433)	10.16 (0.400)	0.6 (0.024)	1.4 (0.055)	6.1 (0.240)	13.9 (0.491)

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)
FYH0H223Z	5.5	0.022	220	0.033	4.2
FYH0H473Z	5.5	0.047	100	0.071	4.2
FYH0H104Z	5.5	0.10	50	0.15	4.2
FYH0H224Z	5.5	0.22	60	0.33	4.2
FYH0H474Z	5.5	0.47	35	0.71	4.2
FYH0H105Z	5.5	1.0	20	1.5	4.2

FYL-Type



Part No.	Dimensions mm (inch)						Weight g (oz)
	D	H	P	d_1	d_2	L	
FYL0H103Z	11.0 (0.43)	5.0 (0.197)	5.08 (0.200)	0.2 (0.016)	1.2 (0.047)	2.7 (0.106)	0.9 (0.032)
FYL0H223Z	11.0 (0.43)	5.0 (0.197)	5.08 (0.200)	0.2 (0.016)	1.2 (0.047)	2.7 (0.106)	1.0 (0.035)
FYL0H473Z	12.0 (0.47)	5.0 (0.197)	5.08 (0.200)	0.2 (0.016)	1.2 (0.047)	2.2 (0.087)	1.2 (0.042)

Note: Weight is typical.

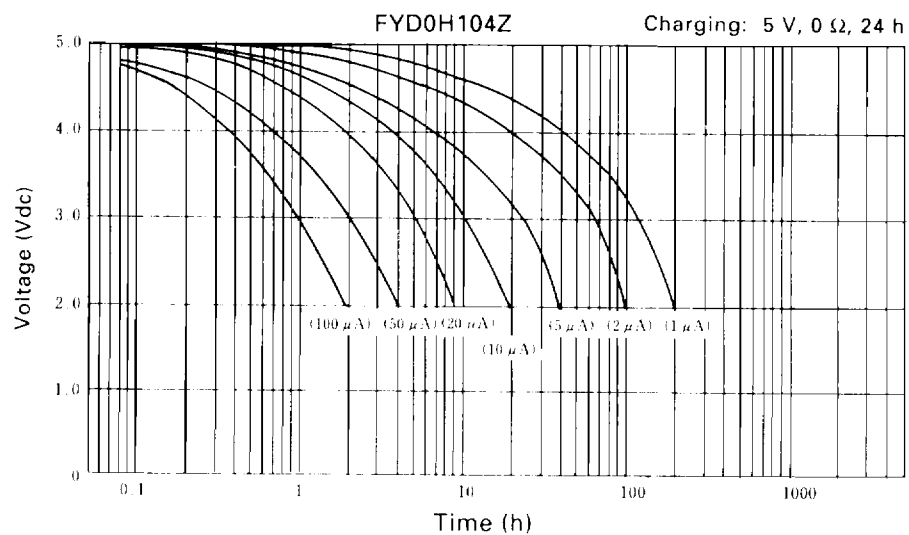
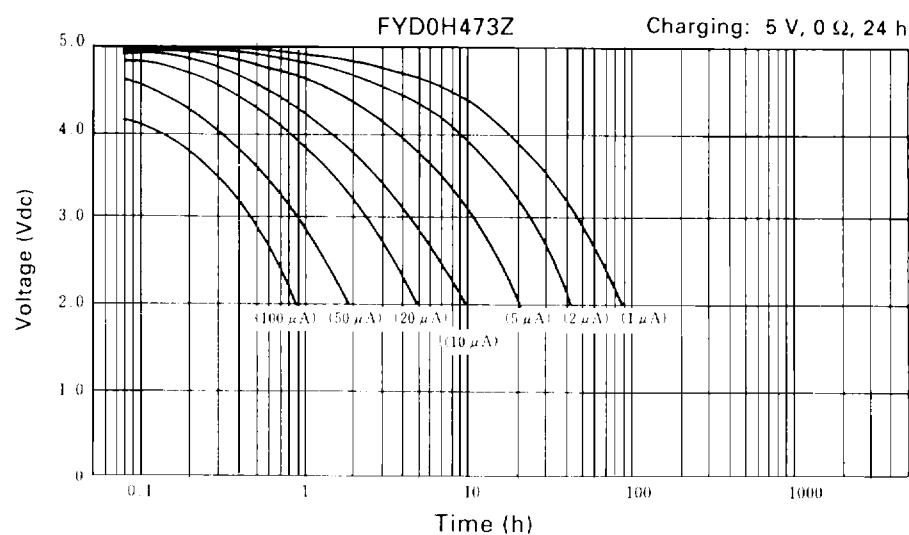
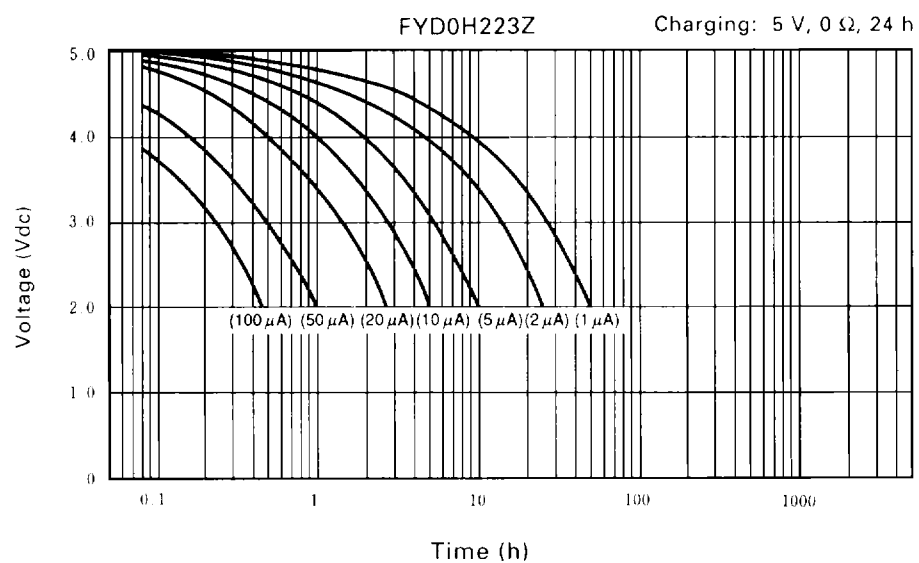
Part Number	Max. Rated Voltage (V)	Nominal Capacitance (F)	Max. ESR (at 1 kHz) (Ω)	Max. Current at 30 minutes (mA)	Voltage Holding Characteristic (V)
FYL0H103Z	5.5	0.010	300	0.015	4.2
FYL0H223Z	5.5	0.022	200	0.033	4.2
FYL0H473Z	5.5	0.047	200	0.071	4.2

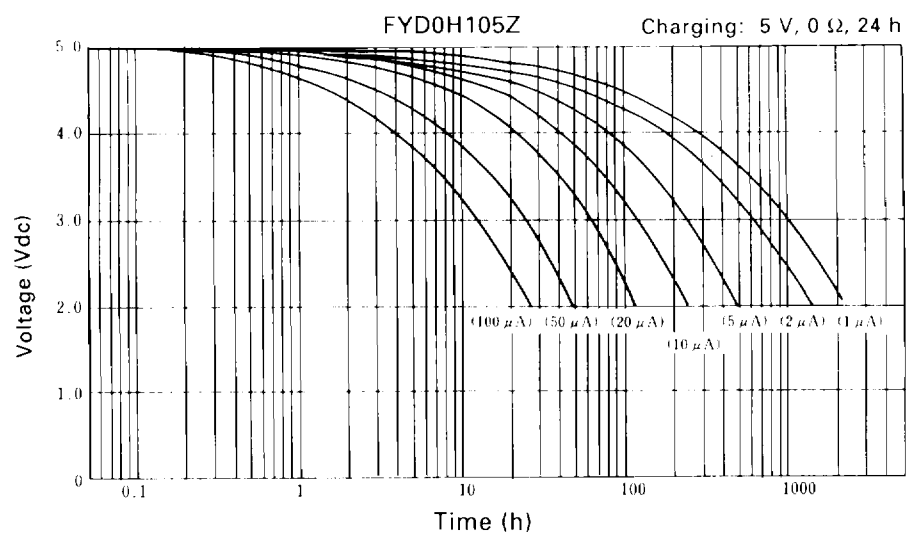
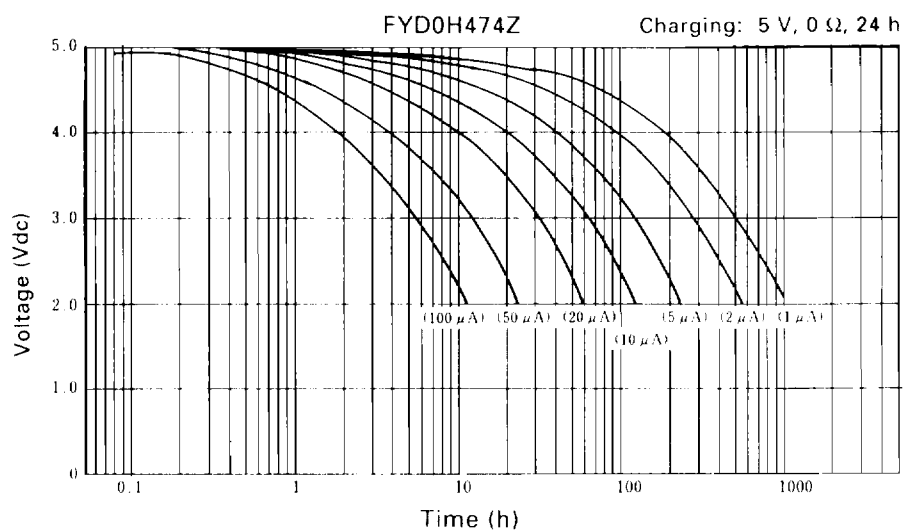
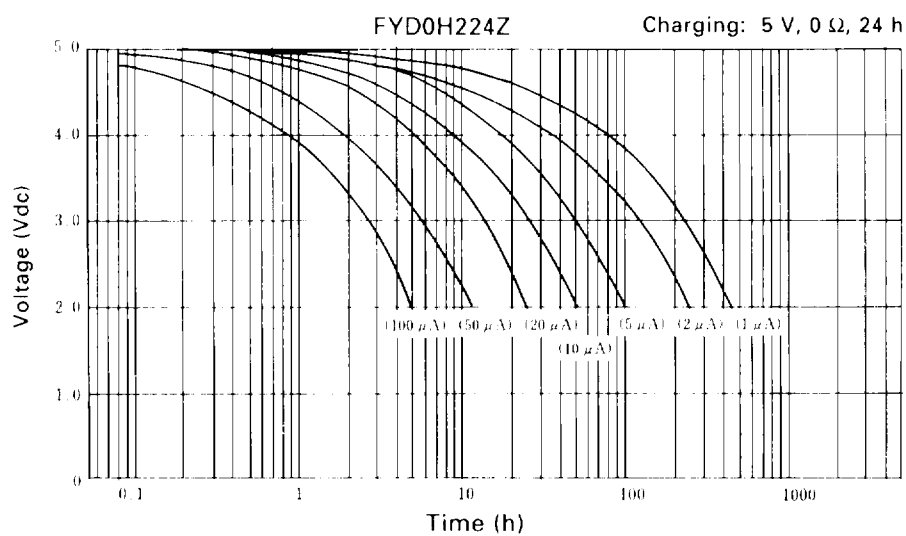
SPECIFICATIONS

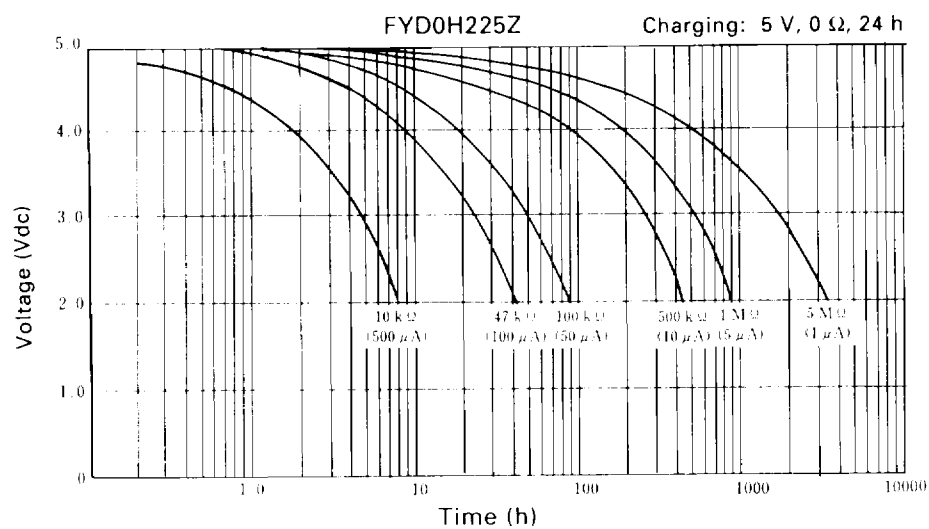
Items		Specifications		Test Conditions
Operating temp. Range		-25°C to $+70^{\circ}\text{C}$		
Max. Working Volt.		5.5 Vdc		
Capacitance Range		See standard ratings		
Capacitance Tolerance		$+80\%$, -20%		Refer to measuring conditions
ESR		See standard ratings		Refer to measuring conditions
Current at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

TYPICAL PERFORMANCE DATA

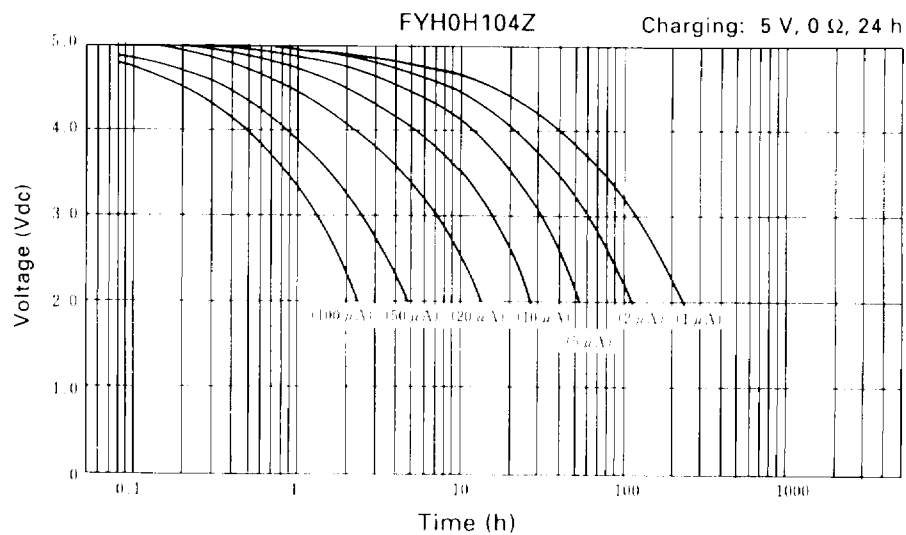
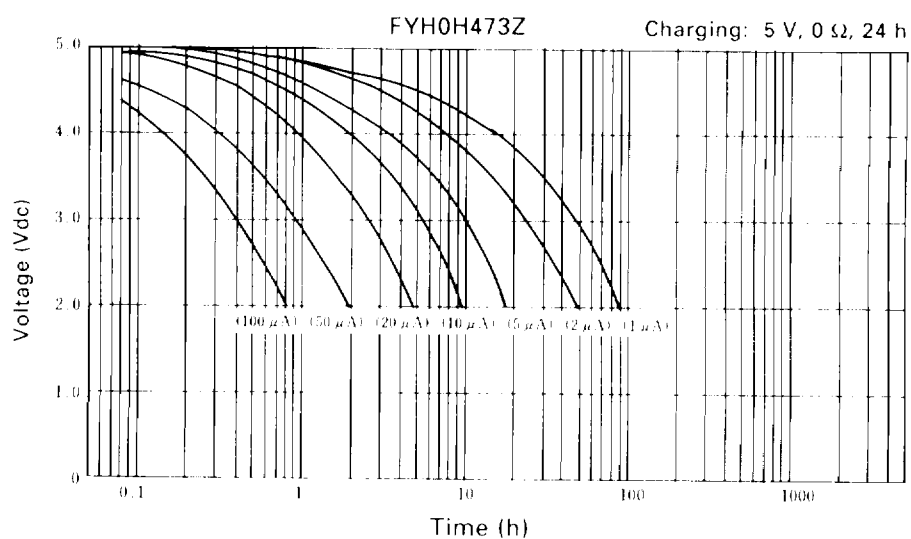
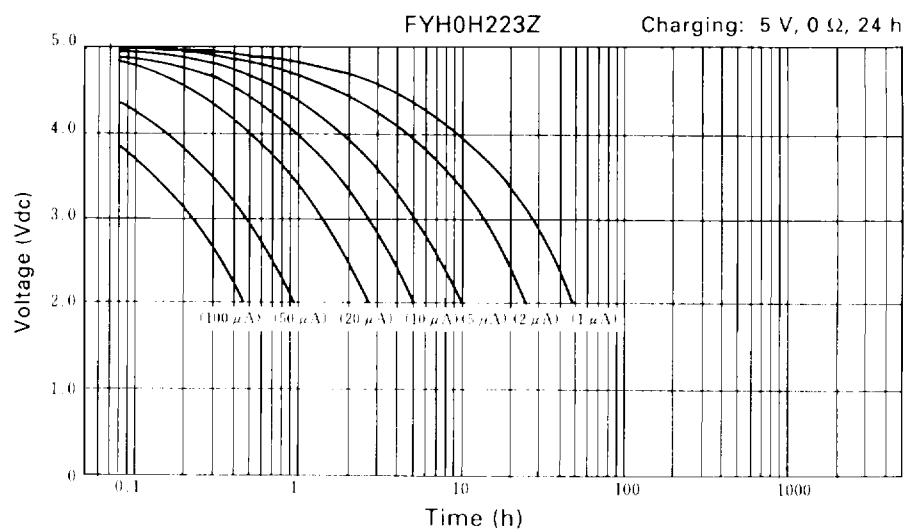
■ Resistive discharge characteristics of FYD type

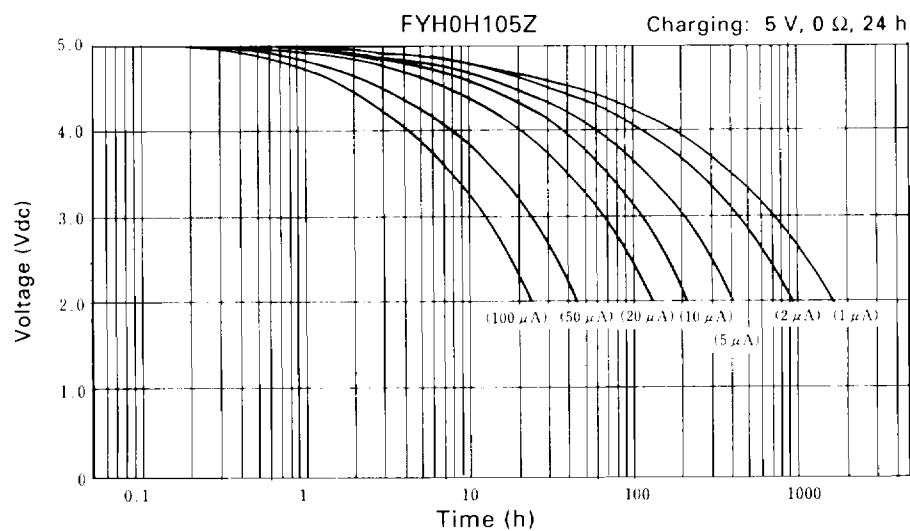
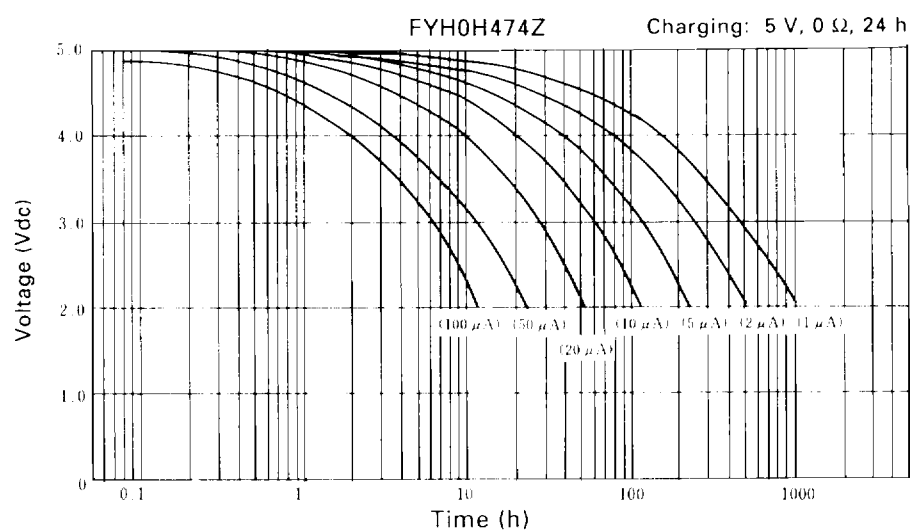
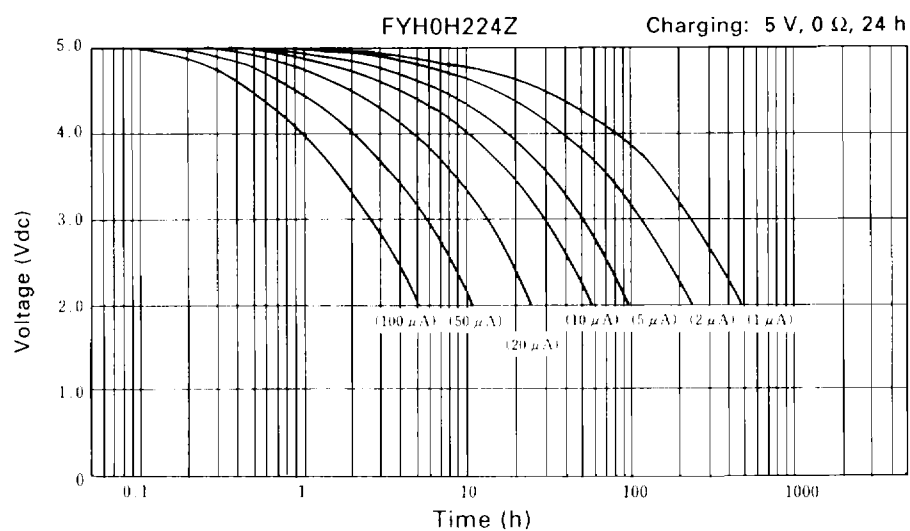






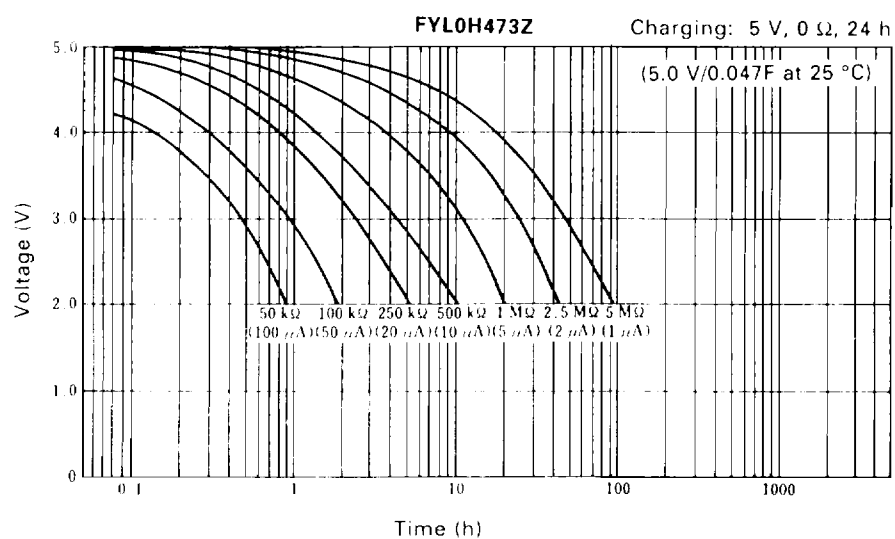
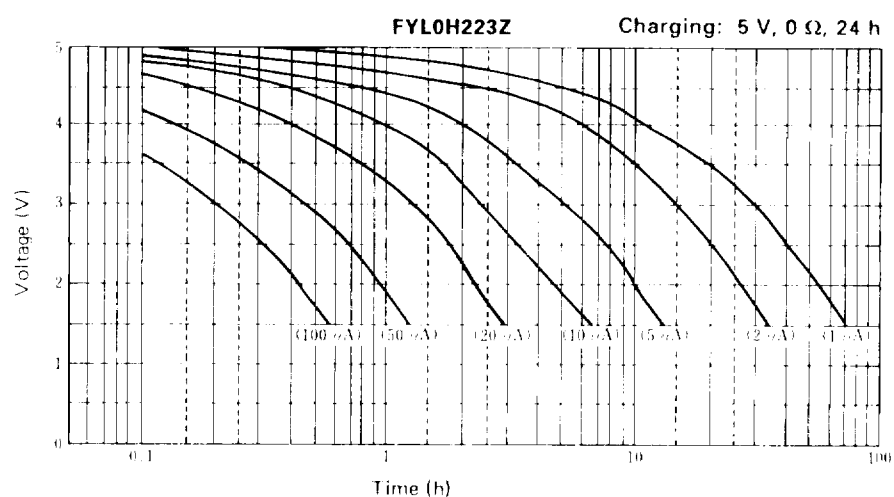
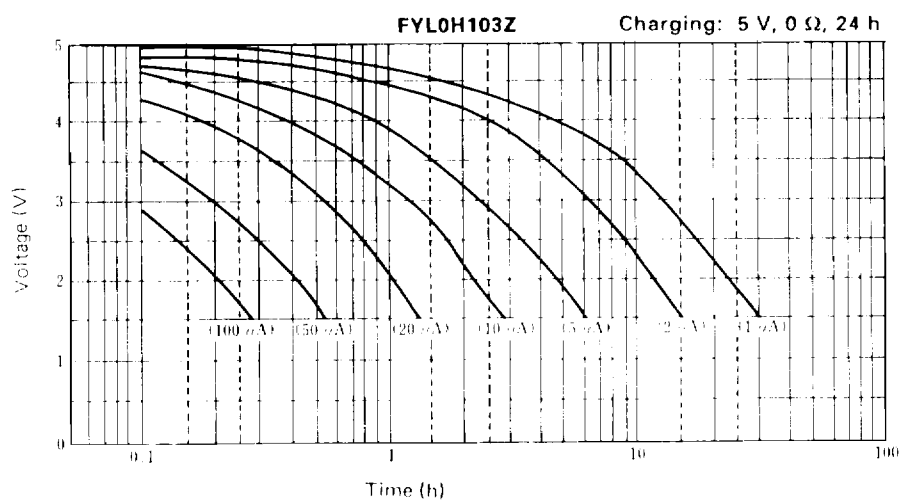
■ Resistive discharge characteristics of FYH-type



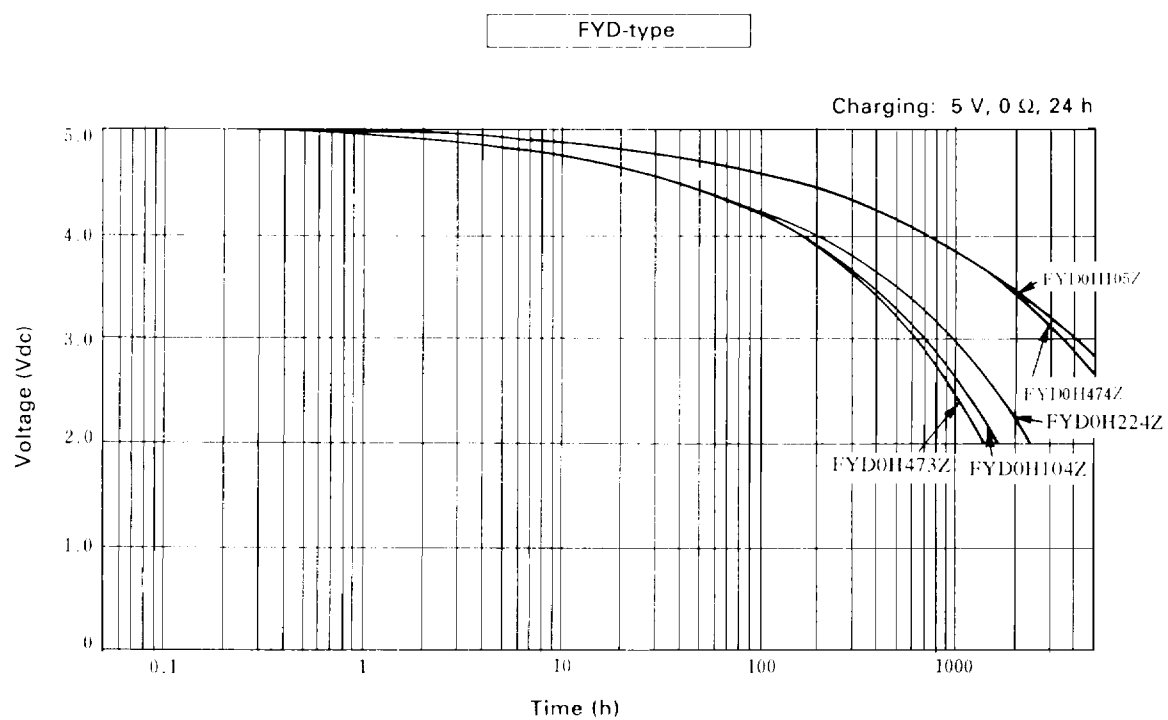
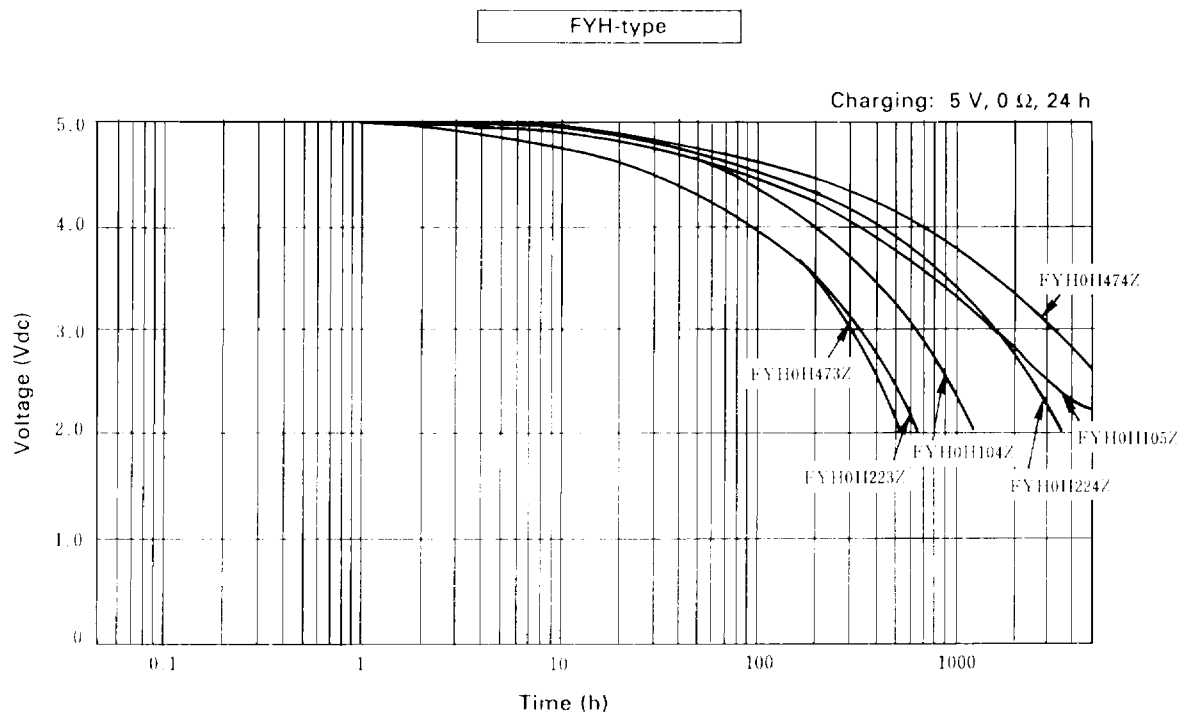


DATA OF TYPICAL CHARACTERISTICS

■ Resistive discharge characteristics of FYL-type



■ Voltage holding characteristics

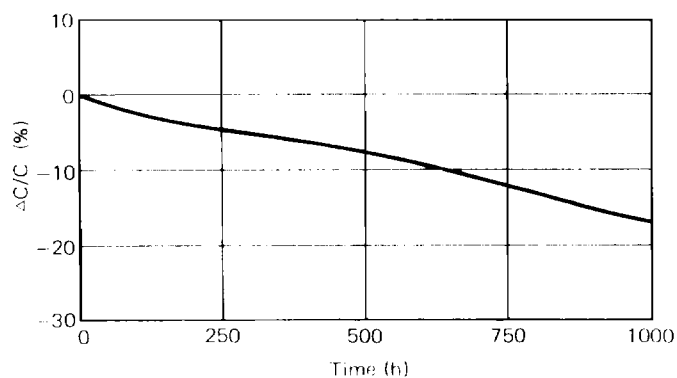


LIFE TEST DATA

FYD0H473Z

Temperature: 70 °C

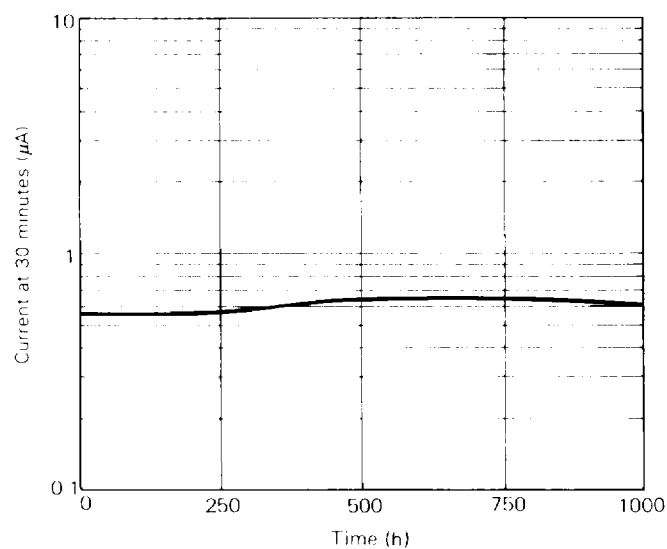
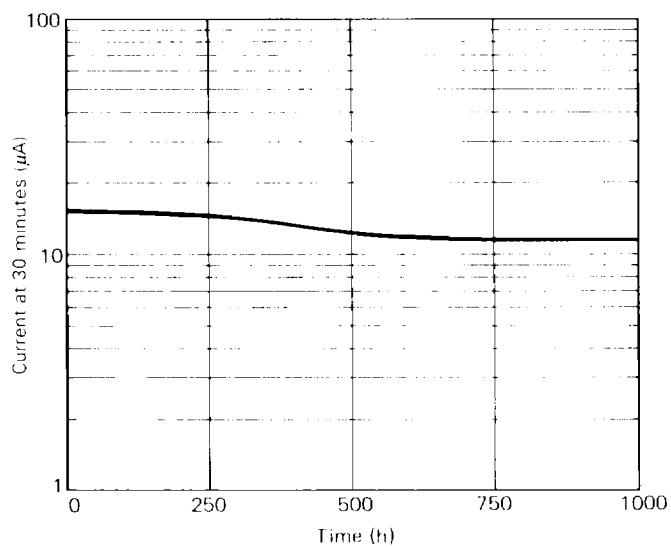
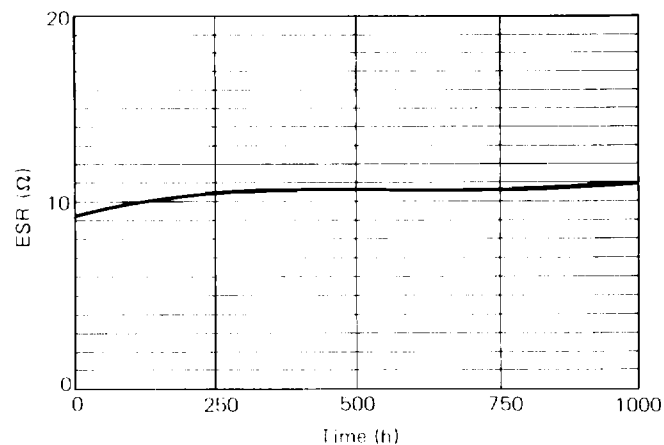
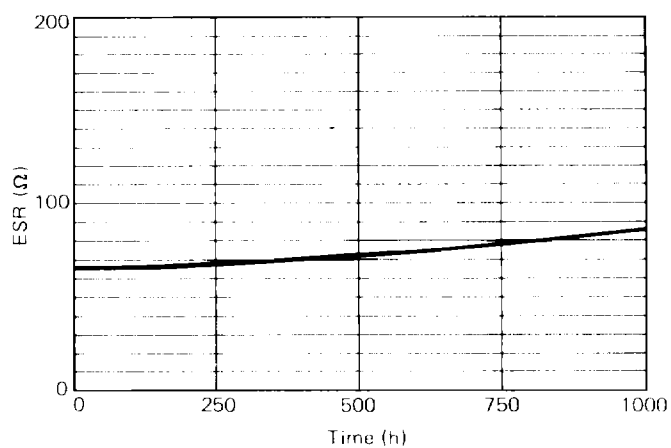
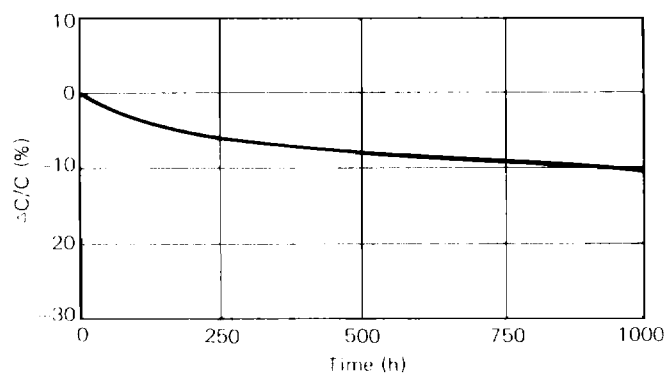
Applied voltage: 5.5 V



FYD0H105Z

Temperature: 70 °C

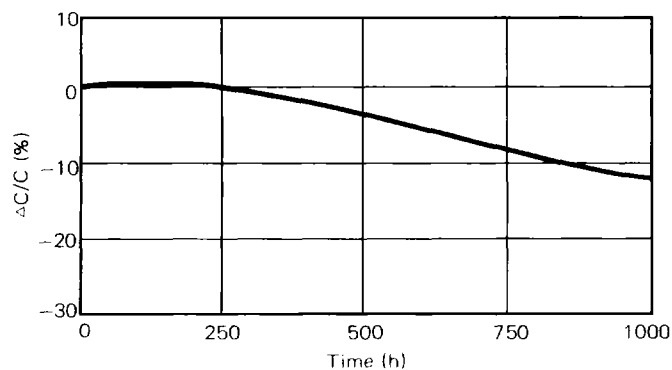
Applied voltage: 5.5 V



FYH0H223Z

Temperature: 70 °C

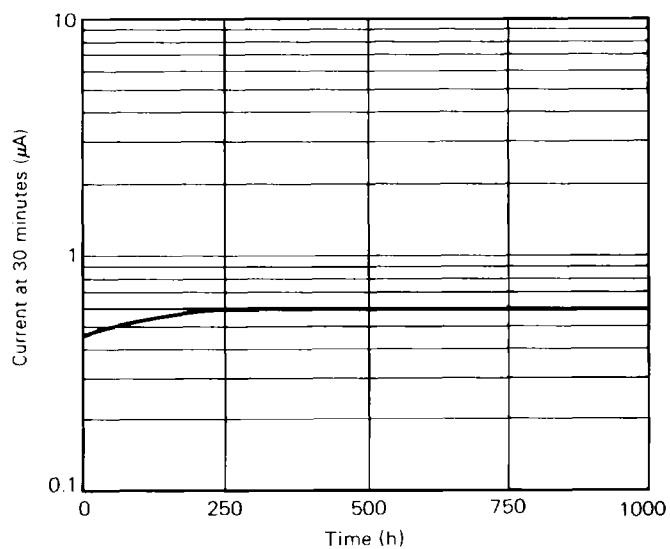
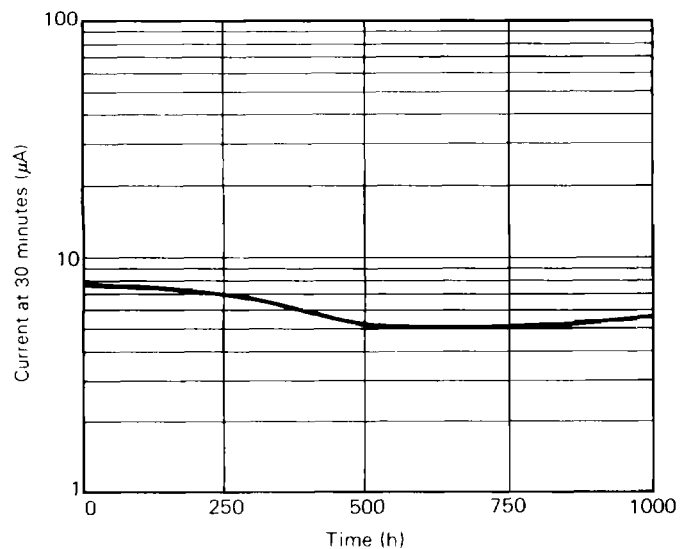
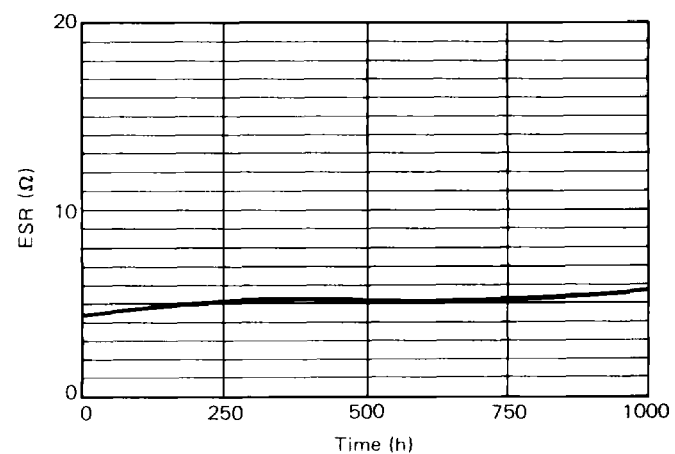
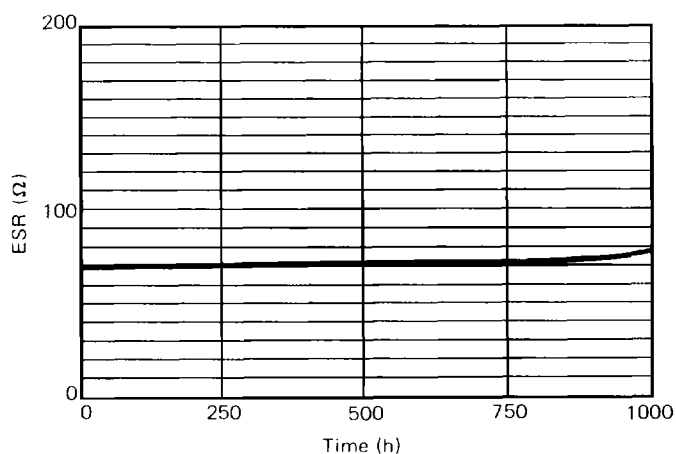
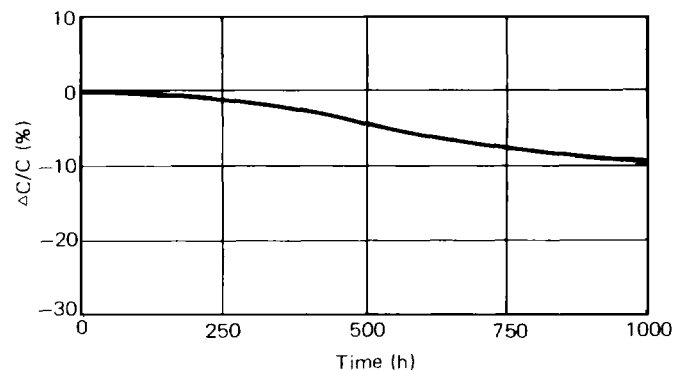
Applied voltage: 5.5 V



FYH0H105H

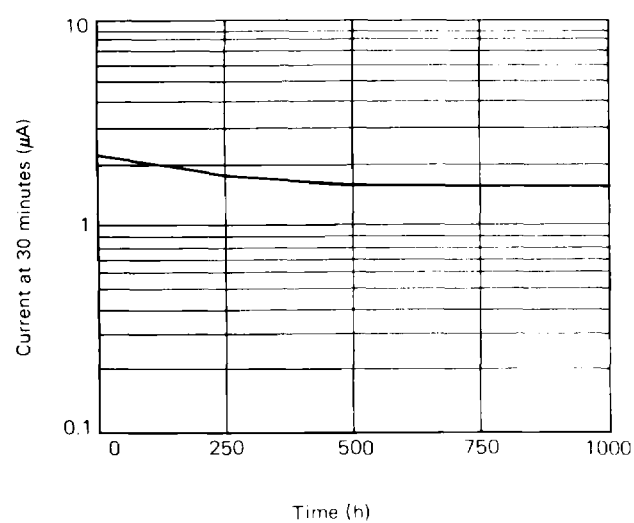
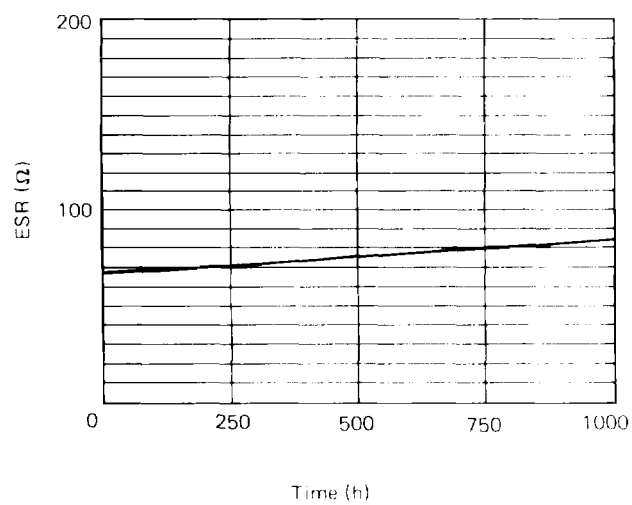
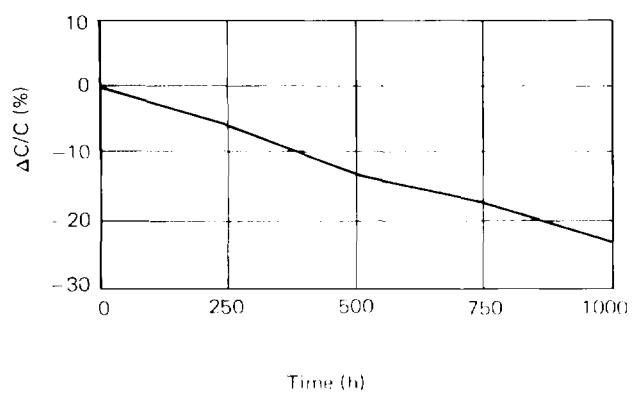
Temperature: 70 °C

Applied voltage: 5.5 V



FYL0H103Z

Temperature : 70 °C
Applied voltage : 5.5 V



FYL0H223Z

Temperature : 70 °C
Applied voltage : 5.5 V

