FM Series for Automatic Assembly

The FM series includes small, resin-molded electric double-layer capacitors suitable for automatic assembly.

These capacitors are ideal as long-time backup devices for minute-current loads in VCRs, audio systems, cordless telephones, and compact electronic systems. (FME types are backup devices adaptable to current consumption mA level.)

Features

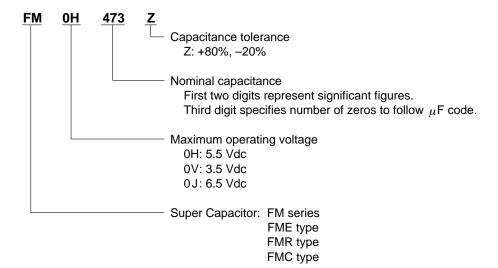
- · High adaptability to automatic assembly
- · Can be cleaned
- Excellent voltage holding characteristics ideal for long-time supply of 1 μ A to several hundred μ A (Except 3.5 V type, FME type)
- · Space saving

Applications

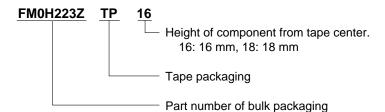
Backup of CMOS microcomputers, static RAMs, and DTSs

Part Number System

Bulk



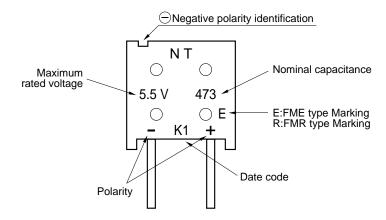
• Tape (Ammo Pack)



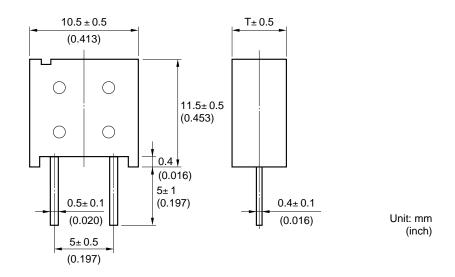
Number of Packed Capacitors

Tape: 1000 pcs./box

Markings



Dimensions And Standard Ratings



● 5.5 V Type

Pari	t Number Ammo pack	Max. Rated Voltage (VDC)	Nominal Capacitano Charge System	Discharge System	Max. ESR (at 1 kHz) (Ω)	Max. Current at 30 minutes (mA)	Voltage Holding Characteristic Min. (V)	T mm (inch)	Weight g (oz)
FM0H103Z	FM0H103ZTP()	5.5	0.01	0.014	300	0.015	4.2	5.0 (0.197)	1.3 (0.046)
FM0H223Z	FM0H223ZTP()	5.5	0.022	0.028	200	0.033	4.2	5.0 (0.197)	1.3 (0.046)
FM0H473Z	FM0H473ZTP()	5.5	0.047	0.06	200	0.071	4.2	5.0 (0.197)	1.3 (0.046)
FM0H104Z	FM0H104ZTP()	5.5	0.10	0.13	100	0.15	4.2	6.5 (0.256)	1.6 (0.056)
FM0H224Z	FM0H224ZTP()	5.5	_	0.22	100	0.33	4.2	6.5 (0.256)	1.6 (0.056)

Note: To complete part number, insert lead length H. (16 or 18 mm: Refer to Taping Specification on page 34.)

● 3.5 V Type

Part	Number	Max. Rated Voltage	Nominal Capacitance		Max. ESR (at 1 kHz)	Max. Current at 30 minutes	T mm	Weight g
	Ammo pack	(VDC)	Charge System (F)	Discharge System (F)	(Ω)	(mA)	(inch)	(oz)
FM0V473Z	FM0V473ZTP()	3.5	0.047	0.06	200	0.042	5.0 (0.197)	1.3 (0.046)
FM0V104Z	FM0V104ZTP()	3.5	0.10	0.13	100	0.090	5.0 (0.197)	1.3 (0.046)
FM0V224Z	FM0V224ZTP()	3.5	0.22	0.30	100	0.20	6.5 (0.256)	1.6 (0.056)

Note: To complete part number, insert lead length H. (16 or 18 mm: Refer to Taping Specification on page 34.)

● FME Type (Backup Large Current, mA Order)

Pari	t Number	Max. Rated Voltage	Nominal Capacitance Charge System	Discharge System	Max. ESR (at 1 kHz)	Max. Current at 30 minutes	T mm	Weight g
	Ammo pack	(VDC)	(F)	(F)	(Ω)	(mA)	(inch)	(oz)
FME0H223Z	FME0H223ZTP()	5.5	0.022	0.028	40	0.033	5.0	1.3
							(0.197)	(0.046)
FME0H473Z	FME0H473ZTP()	5.5	0.047	0.06	20	0.071	5.0	1.3
							(0.197)	(0.046)

Note: To complete part number, insert lead length H. (16 or 18 mm: Refer to Taping Specification on page 34.)

• FMR Type (Extended Operating Temperature range)

Par	t Number	Max. Rated Voltage	Nominal Capacitance Charge System	Discharge System	Max. ESR (at 1 kHz)	Max. Current at 30 minutes	Voltage Holding Characteristic	T mm	Weight g
	Ammo pack	(VDC)	(F)	(F)	(Ω)	(mA)	Min.(V)	(inch)	(oz)
FMR0H473Z	FMR0H473ZTP()	5.5	0.047	0.062	200	0.071	4.2	6.5	1.6

Note: To complete part number, insert lead length H. (16 or 18 mm: Refer to Taping Specification on page 34.)

● FM 6.5V Type

	Part	Number	Max. Rated Voltage	Nominal Capacitance	Discharge System	Max. ESR (at 1 kHz)	Max. Current at 30 minutes	T mm	Weight g
		Ammo pack	(VDC)	(F)	(F)	(Ω)	(mA)	(inch)	(oz)
FM0J ²	473Z	FM0J473ZTP()	6.5	0.047	0.062	200	0.085	6.5	1.6

Note: To complete part number, insert lead length H. (16 or 18 mm: Refer to Taping Specification on page 34.)

Specifications 5.5 V Type

Item			Standard		Test Conditions		
			Standard	Confo	rming to JIS C 5102 ⁻¹⁹⁹⁴		
Operating Temperat		–25°C to +70°C					
Maximum Operatin		5.5 VDC					
Nominal Capacitar		See standard list					
Capacitance Allow		+80%, -20%			teristics measuring method.		
Equivalent Series I		See standard list			teristics measuring method.		
Current (30-minute	es value)	See standard list		See charac	teristics measuring method.		
		Capacitance	More than 90% of initial requirement	Conforms Surge Volt	to 7.14 age: 6.3 V		
		Equivalent series resistance	Not to exceed 120% of initial requirement	Temperatu	age. 6.5 v ire: 70 ± 2°C		
		Current (30-minute value)	Not to exceed 120% of initial requirement	Charge: Discharge:	30 sec.		
Surge Voltage		Appearance	Appearance No obvious abnormality.		9 min. 30 sec. cycles 1000 cycles. stance: $1500~\Omega$ 0.22F: $56~\Omega$ $560~\Omega$ 300 Ω 150 Ω resistance: $0~\Omega$		
	Dhasa 0	Capacitance	50% or higher of initial value	Conforms	to 7.12		
	Phase 2	Equivalent series resistance	4 or less times initial value	Phase 1:			
Temperature		Capacitance	200% or below of initial value	Phase 2:			
Variation of	Phase 5	Equivalent series resistance	Satisty initial standard value	Phase 3: -			
Characteristics Phase 6		Current (30-minute value)	1.5 CV (mA) or below	Phase 5:			
		Capacitance	Within ±20% of initial value	Phase 6:			
		Equivalent series resistance	Satisty initial standard value				
		Current (30-minute value)	Satisty initial standard value				
Lead Strengh (Tensile)		No loosening nor perma	nent damage of the leads	Conforms 1 kg 10sed	to 8.1.2 (1)		
Vibration Resistance		Capacitance			to 8.2.3		
		Equivalent series resistance Satisty initial standard value			: 10 to 55 Hz		
		Current (30-minute value)		Test durati	on : 6 hours		
		Appearance	No obvious abnormality	-			
Solderability		3/4 or more of the pin su	rface should be covered with new solder	Conforms to 8.4 Solder temperature: $230 \pm 5^{\circ}$ C Dipping duration: 5 ± 0.5 sec. Dipped up to 1.6 mm from the lower of the capacitor.			
		Capacitance		Conforms to 8.5 Solder temperature: 260 ± 10°C			
0.11		Equivalent series resistance	Satisty initial standard value				
Soldering Heat Re	sistance	Current (30-minute value)		Dipping duration: 10 ± 1 sec. Dipped up to 1.6 mm from the lower e			
		Appearance	No obvious abnormality	of the capa			
		Capacitance		Conforms			
T O		Equivalent series resistance	Satisty initial standard value		re condition: → normal temperature		
Temperature Cycle	9	Current (30-minute value)			C → normal temperature		
		Appearance	No obvious abnormality	1	cycles: 5 cycles		
		Capacitance	Within 20% of initial value	Conforms	to 9.5		
		Equivalent series resistance	1.2 or less times initial standard value	Temperatu	ire: 40 ± 2°C		
Humidity Resistance		Current (30-minute value)	1.2 or less times initial standard value	Relative h	umidity: 90 to 95% RH		
		Appearance	No obuious abnormality	Test durati	on: 240 ± 8 hours		
		Capacitance Within 30% of initial value		Conforms			
High Tomporature Load		Equivalent series resistance	Twice or less times initial standard value	Temperatu	re: 70 ± 2°C		
High Temperature Load		Current (30-minute value)	Twice or less times initial standard value	Voltage ap	pplied: 5.5 Vdc tection resistance: 0 Ω		
		Appearance	No obvious abnormality	Test durati			
Voltage Holding Characteristics		Voltage between termina	al leads higher than 4.2 V	Charging condition	Voltage applied: 5.0 VDC Series resistance: 0Ω Charging time: 24hours		
(Self Discharge)				Storage	Time: 24hours Temperature:Lower than 25°C Humidity:Lower than 70%RH		

Specifications 3.5 V Type

				T . O . W.
Item			Standard	Test Conditions Conforming to JIS C 5102 ⁻¹⁹⁹⁴
Operating Tempera	ture Range	-25°C to +70°C		Comorning to die C 0102
Maximum Operatin		3.5 VDC		
Nominal Capacitar	<u> </u>	See standard list		
Capacitance Allow		+80%, -20%		See characteristics measuring method.
Equivalent Series		See standard list		See characteristics measuring method.
Current (30-minute		See standard list		See characteristics measuring method.
`	,	Capacitance	More than 90% of initial requirement	Conforms to 7.14
		Equivalent series resistance	Not to exceed 120% of initial requirement	Surge voltage: 4.0 V
		Current (30-minute value)	Not to exceed 120% of initial requirement	Temperature: 70 ± 2°C Charge: 30 sec.
Surge Voltage		Appearance	No obvious abnormality	Discharge: 9 min. 30 sec. Number of cycles 1000 cycles. Series resistance: 0.047 F: 300 Ω 0.10 F: 150 Ω 0.22 F: 56 Ω Discharge resistance: 0 Ω
Temperature Variation of Characteristics Phase 5 Phase 6 Lead Strengh (Tensile)		Capacitance	50% or higher of initial value	Conforms to 7.12
		Equivalent series resistance	4 or less times initial value	Phase 1: +25 ± 2°C
		Capacitance	200% or below of initial value	Phase 2: -25 ± 2°C
		Equivalent series resistance	Satisty initial standard value	Phase 3: -40 ± 2°C
		Current (30-minute value)	1.5 CV (mA) or below	─ Phase 4: +25 ± 2°C─ Phase 5: +70 ± 2°C
		Capacitance	Within ±20% of initial value	Phase 6: +25 ± 2°C
		Equivalent series resistance	Satisty initial standard value	
		Current (30-minute value)	Satisty initial standard value	
		No loosening nor perma	anent damage of the leads	Conforms to 8.1.2 (1) 1 kg 10 sec
		Capacitance		Conforms to 8.2.3
\/ibratian Desistan		Equivalent series resistance	Satisty initial standard value	Frequency: 10 to 55 Hz
Vibration Resistance		Current (30-minute value)		Test duration: 6 hours
		Appearance	No considerable abnormality	
Solderability		3/4 or more of the pin su	urface should be covered with new solder	Conforms to 8.4 Solder temperature: 230 ±5°C Dipping duration: 5 ± 0.5 sec. Dipped up to 1.6 mm from for the lower end of the capacitor.
		Capacitance		Conforms to 8.5
Caldadas Usat D	alatans -	Equivalent series resistance	Satisty initial standard value	Solder temperature: $260 \pm 10^{\circ}$ C Dipping duration: 10 ± 1 sec.
Soldering Heat Resistance Temperature Cycle Humidity Resistance		Current (30-minute value)		Dipping duration: 10 ± 1 sec. Dipped up to 1.6 mm from for the lower
		Appearance	No obvious abnormality	end of the capacitor.
		Capacitance		Conforms to 9.3
		Equivalent series resistance	Satisty initial standard value	Temperature condition:
		Current (30-minute value)		 -25°C → normal temperature → +70°C → normal temperature
		Appearance	No obvious abnormality	Number of cycles: 5 cycles
		Capacitance	Within ±20% of initial value	Conforms to 9.5
		Equivalent series resistance	1.2 or less times initial standard value	Temperature: 40 ± 2°C
		Current (30-minute value)	1.2 or less times initial standard value	Relative humidity: 90 to 95% RH Test duration: 240 ± 8 hours
		Appearance	No obvious abnormality	210 20 110410
		Capacitance	Within 30% of initial value	Conforms to 9.10
18 1 -		Equivalent series resistance	Twice or less times initial standard value	Temperature: 70 ± 2°C
High Temperature	Load	Current (30-minute value)	Twice or less times initial standard value	Voltage applied: 3.5 Vdc Series protection resistance: 0 Ω
		Appearance	No obvious abnormality	Test duration: 1000+48 hours
		Appearance	No obvious abnormality	Test duration: 1000 +48 hours

Specifications FME Type

Conforming JIS C 5102-1981 Conforming JI									
	Item			Standard	Test Conditions Conforming JIS C 5102 ⁻¹⁹⁹⁴				
Maximum Operating Voltage As S VDC See standard list See characteristics measuring method. See standard list See characteristics measuring method. Sondard measurement properative: 70 ± 2°C Charger (Internstity)	Operating Tempera	ture Range	-25°C to +70°C		20.110.11.11.11.19 310 0 0102				
Nominal Capacitance Range See standard list See characteristics measuring method.	1 0 1		5.5 VDC						
See characteristics measuring method. See		<u> </u>	See standard list						
See standard list			+80%. –20%		See characteristics measuring method.				
See standard list Capacitance More than 90% of initial requirement Equivalent series resistance Current (30-minute value) Not to exceed 120% of initial requirement Current (30-minute value) Not to exceed 120% of initial requirement Current (30-minute value) Not to exceed 120% of initial requirement Current (30-minute value) Not to exceed 120% of initial requirement Current (30-minute value) Not to exceed 120% of initial requirement Current (30-minute value) Not to exceed 120% of initial requirement Capacitance No obvious abnormality Series resistance:	•		· '						
Surge Voltage Surge Voltage	•		See standard list		•				
Surge Voltage		,	Capacitance	More than 90% of initial requirement	Conforms to 7.14				
Current (30-minute value) Not to exceed 120% of initial requirement Chargs: 30 sec. Solicy				<u>'</u>					
Surge Voltage Appearance Appearance No obvious abnormality Phase 2 Capacitance Equivalent series resistance Correct (30-minute value) Appearance No loosening nor permanent damage of the leads Vibration Resistance Vibration Resistance Vibration Resistance Solderability Pagearance Solderability Pagearance Soldering Heat Resistance Capacitance Capacitance Appearance Appearance No obvious abnormality No loosening nor permanent damage of the leads Appearance There should be no considerable abnormality Capacitance Solderability Solder temperature Appearance No obvious abnormality No loosening nor permanent damage of the leads Current (30-minute value) Appearance Appearance Should satisty initial standard value Current (30-minute value) Appearance Solder temperature: 200 ± 10°C Disping duration: Current (30-minute value) Appearance No obvious abnormality Satisty initial standard value Conforms to 8.4 Solder temperature: 200 ± 20°C Phase 6: +25 ± 2°C			<u> </u>						
Capacitance	Surge Voltage				Dischargs: 9 min. 30 sec. Number of cycles 1000 cycles. Series resistance: 0.022 F: 560Ω 0.047 F: 300Ω				
Temperature Variation of Characteristics Phase 5 Capacitance 150% or below of initial value Phase 2: -25 ± 2°C Phase 3: -40 ± 2°C Phase 4: +25 ± 2°C Phase 4: +25 ± 2°C Phase 4: +25 ± 2°C Phase 6: +70 ± 2		Dhasa 2	Capacitance	50% or higher of initial value	Conforms to 7.12				
Temperature Variation of Characteristics Phase 5 Equivalent series resistance Satisty initial standard value Phase 3: -40 ± 2°C Phase 4: +25 ± 2°C Phase 4: +25 ± 2°C Phase 6: +25 ± 2°C Phase 4: +25 ± 2°C Phase 4: +25 ± 2°C	Temperature Variation of Characteristics Phase 5		Equivalent series resistance	3 or less times initial value					
Variation of Characteristics Phase 5 (Current (30-minute value)) Satisty initial standard value Phase 5 (Current (30-minute value)) Phase 6 (Current (30-minute value)) Phase 3 (Durinute value) Phase 6 (Current (30-minute value)) Phase 3 (Durinute value) Phase 6 (Current (30-minute value))			Capacitance	150% or below of initial value	Phase 1: +25 ± 2°C Phase 2: -25 ± 2°C				
Characteristics Current (30-minute value) 1.5 CV (mA) or below Phase 5: +70 ± 2°C Phase 6: +25 ± 2°C Lead Strengh (Tensile) Phase 6: 425 ± 2°C Phase 6: +25 ± 2°C Phase 6: +25 ± 2°C Vibration Resistance No loosening nor permanent damage of the leads Conforms to 8.1.2 (1) 1 kg 10 sec Conforms to 8.2.3 Frequency: 10 to 55 Hz Test duration: 6 hours Solderability 3/4 or more of the pin surface should be no considerable abnormality There should be no considerable abnormality Conforms to 8.4 Solder temperature: 230 ± 5°C Solder temperature: 230 ± 5°C Dipping duration: 5 ± 0.5 sec. Dipped up to 1.6 mm from the lower end of the capacitor. Dipping duration: 10 ± 1 sec. Dipping duration: -25°C → normal temperature condition: -25°C → normal temperature with the paramone No obvious abnormality Conforms to 9.3 Temperature condition: -25°C → normal temperature Number of cycles: 5 cycles			Equivalent series resistance	Satisty initial standard value	Phase 3: -40 ± 2°C Phase 4: +25 ± 2°C				
Phase 6 Equivalent series resistance Satisty initial standard value			Current (30-minute value)	1.5 CV (mA) or below					
Current (30-minute value) Satisty initial standard value			Capacitance	Within ±20% of initial value	1				
Lead Strengh (Tensile) No loosening nor permanent damage of the leads Conforms to 8.1.2 (1) 1 kg 10 sec Conforms to 8.2.3 Frequency: 10 to 55 Hz Test duration: 6 hours Should satisty initial standard value There should be no considerable abnormality Conforms to 8.4 Solder temperature: 230 ± 5°C Dipping duration: 5 ± 0.5 sec. Dipped up to 1.6 mm from the lower end of the capacitor. Current (30-minute value) Appearance Capacitance Equivalent series resistance Current (30-minute value) Soldering Heat Resistance Current (30-minute value) Appearance No obvious abnormality Conforms to 8.4 Solder temperature: 230 ± 5°C Dipping duration: 5 ± 0.5 sec. Dipped up to 1.6 mm from the lower end of the capacitor. Conforms to 8.5 Solder temperature: 260 ± 10°C Dipping duration: 10 ± 1 sec. Dipped up to 1.6 mm from the lower end of the capacitor. Conforms to 9.3 Temperature condition: -25°C → normal temperature			Equivalent series resistance	Satisty initial standard value					
Vibration Resistance Capacitance Equivalent series resistance Current (30-minute value) Appearance There should be no considerable abnormality Conforms to 8.2.3 Frequency: 10 to 55 Hz Test duration: 6 hours Frequency: 10 to 55 Hz Test duration: 6 hours Frequency: 10 to 55 Hz			Current (30-minute value)	Satisty initial standard value					
Vibration Resistance Equivalent series resistance Should satisty initial standard value Frequency: 10 to 55 Hz Test duration: 6 hours Current (30-minute value) Appearance Should be no considerable abnormality Conforms to 8.4 Solder temperature: 230 ± 5°C Dipping duration: 5 ± 0.5 sec. Dipped up to 1.6 mm from the lower end of the capacitor. Copacitance Equivalent series resistance resistance Conforms to 8.5 Solder temperature: 260 ± 10°C Dipping duration: 10 ± 1 sec. Dipping duration: 10 ± 1 sec. Dipped up to 1.6 mm from the lower end of the capacitor. Temperature Cycle Capacitance Equivalent series resistance Satisty initial standard value Conforms to 9.3 Temperature condition: -25°C → normal temperature -25°C → normal tempe	Lead Strengh (Tensile)		No loosening nor perma	nent damage of the leads	` '				
Vibration Resistance Current (30-minute value) Test duration: 6 hours Current (30-minute value) There should be no considerable abnormality Solderability Conforms to 8.4 Solder temperature: 230 ± 5°C Dipping duration: 5 ± 0.5 sec. Dipped up to 1.6 mm from the lower end of the capacitor. Conforms to 8.5 Solder temperature: 260 ± 10°C Solder temperature: 260 ± 10°C Dipping duration: 10 ± 1 sec. Dipping duration: 10 ± 1 sec. Dipped up to 1.6 mm from the lower end of the capacitor. Temperature condition: -25°C → normal temperature → +70°C → normal temperature → +70°C → normal temperature → +70°C → normal temperature Appearance Temperature Cycle Appearance No obvious abnormality No obvious abnormality	- · · · ·		Capacitance						
Current (30-minute value) Appearance There should be no considerable abnormality Conforms to 8.4 Solder temperature: 230 ± 5°C Dipping duration: 5 ± 0.5 sec. Dipped up to 1.6 mm from the lower end of the capacitor. Conforms to 8.5 Solder temperature: 230 ± 5°C Dipped up to 1.6 mm from the lower end of the capacitor. Conforms to 8.5 Solder temperature: 260 ± 10°C Dipping duration: 10 ± 1 sec. Dipped up to 1.6 mm from the lower end of the capacitor. Current (30-minute value) Appearance No obvious abnormality Temperature Cycle Current (30-minute value) Appearance No obvious abnormality No obvious abnormality No obvious abnormality No obvious abnormality Number of cycles: 5 cycles			Equivalent series resistance	Should satisty initial standard value					
Solderability 3/4 or more of the pin surface should be covered with new solder 3/4 or more of the pin surface should be covered with new solder Dipping duration: 5 ± 0.5 sec. Dipped up to 1.6 mm from the lower end of the capacitor. Conforms to 8.5 Solder temperature: 260 ± 10°C Dipping duration: 10 ± 1 sec. Dipped up to 1.6 mm from the lower end of the capacitor. Current (30-minute value) Appearance No obvious abnormality Capacitance Equivalent series resistance Current (30-minute value) Appearance No obvious abnormality Satisty initial standard value Conforms to 9.3 Temperature condition: -25°C → normal temperature → +70°C → normal temperature Number of cycles: 5 cycles			Current (30-minute value)		Test duration: 6 hours				
Solder temperature: 230 ± 5°C Dipping duration: 5 ± 0.5 sec. Dipped up to 1.6 mm from the lower end of the capacitor. Capacitance Equivalent series resistance Current (30-minute value) Temperature Cycle Temperature Cycle Solder temperature: 230 ± 5°C Dipping duration: 5 ± 0.5 sec. Dipped up to 1.6 mm from the lower end of the capacitor. Conforms to 8.5 Solder temperature: 260 ± 10°C Dipping duration: 10 ± 1 sec. Dipped up to 1.6 mm from the lower end of the capacitor. Capacitance Equivalent series resistance Capacitance Equivalent series resistance Current (30-minute value) Appearance No obvious abnormality No obvious abnormality No obvious abnormality Number of cycles: 5 cycles			Appearance	There should be no considerable abnormality					
Soldering Heat Resistance	Solderability		3/4 or more of the pin su	urface should be covered with new solder	Solder temperature: $230 \pm 5^{\circ}\text{C}$ Dipping duration: $5 \pm 0.5 \text{ sec.}$ Dipped up to 1.6 mm from the lower end				
Soldering Heat Resistance Current (30-minute value) Appearance Capacitance Equivalent series resistance Current (30-minute value) Appearance Capacitance Equivalent series resistance Current (30-minute value) Appearance No obvious abnormality Dipping duration: 10 ± 1 sec. Dipped up to 1.6 mm from the lower end of the capacitor. Conforms to 9.3 Temperature condition: -25°C → normal temperature → +70°C → normal temperature Number of cycles: 5 cycles			Capacitance						
Temperature Cycle Current (30-minute value)	Soldering Heat Pa	sistance	Equivalent series resistance	Satisty initial standard value					
Temperature Cycle Capacitance Equivalent series resistance Current (30-minute value) Appearance Appearance No obvious abnormality Capacitance Conforms to 9.3 Temperature condition:	Soldering Heat Resistance		Current (30-minute value)		Dipped up to 1.6 mm from the lower end				
Temperature Cycle Equivalent series resistance Current (30-minute value) Appearance Equivalent series resistance Current (30-minute value) Satisty initial standard value Satisty initial standard value Temperature condition: -25°C → normal temperature → +70°C → normal temperature Number of cycles: 5 cycles	Coldening Fleat Nesistance		Appearance	No obvious abnormality	of the capacitor.				
Temperature Cycle Current (30-minute value) Appearance Current (30-minute value) Appearance No obvious abnormality Current (30-minute value) Appearance No obvious abnormality Number of cycles: 5 cycles			Capacitance						
Current (30-minute value) Appearance No obvious abnormality → +70°C → normal temperature Number of cycles: 5 cycles	Temperature Cycle		Equivalent series resistance	Satisty initial standard value					
			Current (30-minute value)		→ +70°C → normal temperature				
			Appearance	No obvious abnormality	Number of cycles: 5 cycles				
Capacitance Within ±20% of initial value Conforms to 9.5			Capacitance	Within ±20% of initial value	Conforms to 9.5				
Humidity Resistance Equivalent series resistance 1.2 or less times initial standard value Temperature: 40 ± 2°C	Humidity Resistance		Equivalent series resistance	1.2 or less times initial standard value	· •				
Current (30-minute value) 1.2 or less times initial standard value Relative humidity: 90 to 95% RH			Current (30-minute value)	1.2 or less times initial standard value					
Appearance No obvious abnormality Test duration: 240 ± 8 hours			Appearance	No obvious abnormality	Test duration: 240 ± 8 hours				
Capacitance Within 30% of initial value Conforms to 9.10			Capacitance	Within 30% of initial value					
Temperature: $70 \pm 2^{\circ}$ C	High Temperature	Load	Equivalent series resistance	Twice or less times initial standard value	Temperature: 70 ± 2°C				
	riigir reiriperature	Luau	Current (30-minute value)	Twice or less times initial standard value	Series protection resistance: 0Ω				
High Temperature Load Current (30-minute value) Twice of less times initial standard value Voltage applied: 5.5 Vdc Series protection resistance: 0 Ω			Appearance	No obvious abnormality	Test duration: 1000 ⁺⁴⁸ ₀ hours				

Specifications FMR Type

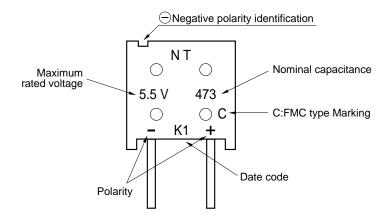
-		i wiit iypo						
Item			Standard	Confo	Test Conditions			
Operating Tempera	turo Pango	-40°C to +85°C		Conio	rming to JIS C 5102 ⁻¹⁹⁹⁴			
Maximum Operating		5.5 VDC						
Nominal Capacitar		See standard list						
Capacitance Allow		+80%, -20%		See characteristics measuring method.				
Equivalent Series		See standard list		+	teristics measuring method.			
Current (30-minute		See standard list			teristics measuring method.			
Current (30-minute	es value)	Capacitance	More than 90% of initial requirement					
		Equivalent series resistance	Not to exceed 120% of initial requirement	Conforms to 7.14 Surge Voltage: 6.3 V				
		Current (30-minute value)	Not to exceed 120% of initial requirement					
Surge Voltage		Appearance No obvious abnormality		Charge: Discharge: Number of Series resi 0.047 F:	30 sec. 9 min. 30 sec. cycles 1000 cycles. istance:			
		Capacitance	50% or higher initial value	Conforms	to 7.12			
	Phase 2	Equivalent series resistance	4 or less times initial value	Phase 1:				
	DI -	Capacitance	30% or higher initial value	Phase 2:				
_	Phase 3	Equivalent series resistance	7 or less times initial value	Phase 3:				
Temperature		Capacitance	200% or higher initial value	Phase 4:	+25 ± 2°C			
Variation of	Phase 5	Equivalent series resistance	Satisfy initial standard value	Phase 5:				
Characteristics		Current (30-minute value)	1.5 CV (mA) or below	Phase 6: +25 ± 2°C				
Phase 6 Lead Strengh (Tensile) Vibration Resistance		Capacitance	Within ±20% of initial standard value	1				
		Equivalent series resistance	Satisfy initial standard value	1				
		Current (30-minute value)	Satisfy initial standard value	-				
		,	anent damage of the leads	Conforms 1 kg 10sed	to 8.1.2 (1)			
		Capacitance		Conforms	to 8.2.3			
		Equivalent series resistance	Satisty initial standard value	Frequency				
		Current (30-minute value)			on : 6 hours			
		Appearance	No obvious abnormality	_ rest durati	on . o nouis			
Solderability		·	rface should be covered with new solder.	Conforms to 8.4 Solder temperature: $230 \pm 5^{\circ}$ C Dipping duration: 5 ± 0.5 set Dipped up to 1.6 mm from the low of the capacitor.				
		Capacitance		Conforms to 8.5				
Soldering Heat Re	sistance	Equivalent series resistance	Satisty initial standard value	Solder tem	nperature: 260 ± 10°C ration: 10 ± 1 sec.			
Coldening Fleat Re	5131A110E	Current (30-minute value)		Dipped up	to 1.6 mm from the lower end			
		Appearance	No obvious abnormality	of the capa	acitor.			
		Capacitance		Conforms				
Temperature Cycle	ż	Equivalent series resistance	Satisty initial standard value		re condition: → normal temperature			
remperature by ore	,	Current (30-minute value)			C → normal temperature			
		Appearance	No obvious abnormality	Number of	cycles: 5 cycles			
		Capacitance	Within 20% of initial value	Conforms	to 9.5			
Humidity Resistan	00	Equivalent series resistance	1.2 or less times initial standard value	Temperatu	re: 40 ± 2°C			
ramulty ixesistall	00	Current (30-minute value)	1.2 or less times initial standard value	Relative h	umidity: 90 to 95% RH			
High Temperature Load		Appearance	No obuious abnormality	Test durati	on: 240 ± 8 hours			
		Capacitance	Within 30% of initial value	Conforms				
		Equivalent series resistance	Twice or less times initial standard value	Temperatu				
		Current (30-minute value)	Twice or less times initial standard value	Voltage ap	tection resistance: 0 Ω			
		Appearance	No obvious abnormality	Test durati				
Voltage Holding Characteristics (Self Discharge)			al leads higher than 4.2 V	Charging condition	Voltage applied: 5.0 VDC Series resistance: 0Ω Charging time: 24hours			
				Storage	Time: 24hours Temperature:Lower than 25°C Humidity:Lower than 70%RH			

Specifications FM 6.5V Type

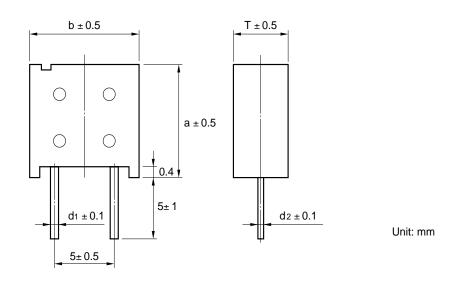
Item			Standard	Test Conditions
	. 5	2500 / 5000		Conforming to JIS C 5102 ⁻¹⁹⁹⁴
Operating Tempera		-25°C to +70°C		
Maximum Operatir		6.5 VDC		
Nominal Capacitar		See standard list		Con alternative management and another d
Capacitance Allow		+80%, -20%		See characteristics measuring method.
Equivalent Series		See standard list		See characteristics measuring method.
Current (30-minute	es value)	See standard list	Mana the account of initial and account	See characteristics measuring method.
		Capacitance	More than 90% of initial requirement	Conforms to 7.14 Surge Voltage: 7.4 V
		Equivalent series resistance	Not to exceed 120% of initial requirement	Temperature: 70±2°C
Surge Voltage		Current (30-minute value) Appearance	Not to exceed 120% of initial requirement No obvious abnormality	Charge: 30 sec. Discharge: 9 min. 30 sec. Number of cycles 1000 cycles. Series resistance: 0.047 F: 300Ω Discharge resistance: 0Ω
Phase 2		Capacitance	50% or higher of initial value	Conforms to 7.12
Phase 2		Equivalent series resistance	4 or less times initial value	Phase 1: +25 ± 2°C
Temperature		Capacitance	200% or below of initial value	Phase 2: -25 ± 2°C
Temperature Variation of Characteristics Phase 5		Equivalent series resistance	Satisty initial standard value	Phase 3: -40 ± 2°C
variation of		Current (30-minute value)	1.5 CV (mA) or below	Phase 4: +25 ± 2°C Phase 5: +70 ± 2°C
Characteristics Phase 6		Capacitance	Within ±20% of initial value	Phase 6: +25 ± 2°C
		Equivalent series resistance	Satisty initial standard value	
		Current (30-minute value)	Satisty initial standard value	
Lead Strengh (Tensile)		No loosening nor perma	anent damage of the leads	Conforms to 8.1.2 (1) 1 kg 10sec.
		Capacitance		Conforms to 8.2.3
Vibratian Basistan		Equivalent series resistance	Satisty initial standard value	Frequency : 10 to 55 Hz
Vibration Resistan	ce	Current (30-minute value)	*	Test duration : 6 hours
		Appearance	No obvious abnormality	
Solderability		3/4 or more of the pin su	urface should be covered with new solder	Conforms to 8.4 Solder temperature: 230 ± 5°C Dipping duration: 5 ± 0.5 sec. Dipped up to 1.6 mm from the lower end of the capacitor.
		Capacitance		Conforms to 8.5
0-14	-1-4	Equivalent series resistance	Satisty initial standard value	Solder temperature: $260 \pm 10^{\circ}$ C Dipping duration: 10 ± 1 sec.
Soldering Heat Re	sistance	Current (30-minute value)	-	Dipped up to 1.6 mm from the lower end
Soldering Heat Resistance		Appearance	No obvious abnormality	of the capacitor.
		Capacitance		Conforms to 9.3
Temperature Cycle		Equivalent series resistance	Satisty initial standard value	Temperature condition:
		Current (30-minute value)		 -25°C → normal temperature → +70°C → normal temperature
		Appearance	No obvious abnormality	Number of cycles: 5 cycles
		Capacitance	Within 20% of initial value	Conforms to 9.5
Humidity Resistance		Equivalent series resistance	1.2 or less times initial standard value	Temperature: 40 ± 2°C
riallially Nesislan	00	Current (30-minute value)	1.2 or less times initial standard value	Relative humidity: 90 to 95% RH
		Appearance	No obuious abnormality	Test duration: 240 ± 8 hours
	·	Capacitance	Within 30% of initial value	Conforms to 9.10
High Tomporature	Load	Equivalent series resistance	Twice or less times initial standard value	Temperature: 70 ± 2°C Voltage applied: 6.5 Vdc
High Temperature	LUdu	Current (30-minute value)	Twice or less times initial standard value	Series protection resistance: 0Ω
		Appearance	No obvious abnormality	Test duration: 1000 +48 hours

FMC Type

Markings



Dimensions And Standard Ratings



	Part Number		Rated	Nominal Capacitance	Discharge System	IVIAX. LON	Max. Current at 30 minutes	Voltage Holding Characteristic	а	b	Т	d1	d2	Weight
		Ammo pack	(VDC)	(F)	(F)	(Ω)	(mA)			(mm)	(mm)	(mm)	(mm)	(g)
F	MC0H473Z	FMC0H473ZTP()	5.5	0.047	0.062	less than 100	less than 0.071	more than 4.2V	11.5	10.5	5.0	0.5	0.4	1.3
F	MC0H104Z	FMC0H104ZTP()	5.5	0.10	0.13	less than 50	less than 0.15	more than 4.2V	11.5	10.5	6.5	0.5	0.4	1.6
F	MC0H334Z	FMC0H334ZTP()	5.5	_	0.33	less than 25	less than 0.50	more than 4.2V	15.0	14.0	9.0	0.6	0.6	3.5

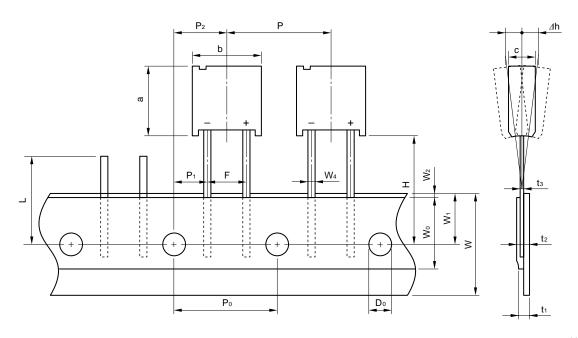
Chip parts applicable to treatment in bond hardening furnace (160 \pm 5°C for 120 \pm 10 seconds)

Note: To complete part number, insert lead length H. (16 or 18 mm: Refer to Taping Specification on page 34 or 35.)

Specifications FMC Type

Item			Standard		Test Conditions			
			Ciandara	Confo	rming to JIS C 5102 ⁻¹⁹⁹⁴			
Operating Tempera		-25°C to +70°C						
Maximum Operatin	<u> </u>	5.5 VDC						
Nominal Capacitar		0.047F , 0.10F , 0.33F		0 1				
Capacitance Allow		+80%, -20%			teristics measuring method.			
Equivalent Series		See standard list			teristics measuring method.			
Current (30-minute	es value)	See standard list	1 000/ ft W		teristics measuring method.			
		Capacitance	More than 90% of initial requirement	Conforms to 7.14 Surge Voltage: 6.3 V Temperature: 70 ± 2°C				
		Equivalent series resistance	Not to exceed 120% of initial requirement					
		Current (30-minute value)	Not to exceed 120% of initial requirement	Chargs:	30 sec.			
Surge Voltage		Appearance No obvious abnormality.		Series resi 0.047 F: 0.1 F: 0.33 F:	f cycles 1000 cycles. istance:			
	Dhoon 2	Capacitance	50% or higher of initial value	Conforms	to 7.12			
	Phase 2	Equivalent series resistance	4 or less times initial value	Phase 1:				
Temperature Variation of Phase 5		Capacitance	200% or below of initial value	Phase 2:				
Phase 5 Characteristics Phase 6		Equivalent series resistance	Satisty initial standard value	Phase 3:				
		Current (30-minute value)	1.5 CV (mA) or below	Phase 4:				
		Capacitance	Within ±20% of initial value	Phase 5: Phase 6:				
		Equivalent series resistance	Satisty initial standard value	Filase 0.	+23 ± 2 C			
		Current (30-minute value)	Satisty initial standard value					
Lead Strengh (Tenile)		No loosening nor permanent damage of the leads			to 8.1.2 (1)			
Vibration Resistance		Capacitance		Conforms	to 8.2.3			
		Equivalent series resistance	Should satisty initial standard value	Frequency				
		Current (30-minute value)		Test durati	on: 6 hours			
		Appearance	There should be no considerable abnormality					
Solderability		3/4 or more of the pin su	urface should be covered with new solder	Conforms Solder tem Dipping du Dipped up of the capa	nperature: $230 \pm 5^{\circ}$ C uration: 5 ± 0.5 sec. to 1.6 mm from the lower end			
		Capacitance		Conforms to 8.5 Solder temperature: 260 ± 10°C Dipping duration: 10 ± 1 sec. Dipped up to 1.6 mm from the lower e of the capacitor.				
		Equivalent series resistance	Satisty initial standard value					
Soldering Heat Re	sistance	Current (30-minute value)						
		Appearance	No obvious abnormality					
		Capacitance		Conforms				
Tomporatura Cycle		Equivalent series resistance	Satisty initial standard value		re condition:			
Temperature Cycle	3	Current (30-minute value)		→ +70°	→ normal temperature °C → normal temperature			
		Appearance	No obvious abnormality	Number of	cycles: 5 cycles			
		Capacitance	Within ±20% of initial value	Conforms	to 9.5			
Humidity Resistan	CB	Equivalent series resistance	1.2 or less times initial standard value	Conforms to 9.5 Temperature: 40 ± 2°C				
Humidity Resistance High Temperature Load		Current (30-minute value)	1.2 or less times initial standard value		umidity: 90 to 95% RH			
		Appearance	No obvious abnormality	Test durati				
		Capacitance	Within 30% of initial value	Conforms				
		Equivalent series resistance	Twice or less times initial standard value	Temperatu Voltage ap				
		Current (30-minute value)	Twice or less times initial standard value	Series pro	tection resistance: 0 Ω			
		Appearance	No obvious abnormality	Test durati	on: 1000 ⁺⁴⁸ ₀ hours			
Voltage Holding Characteristics		Voltage between terminal le	eads higher then 4.2V	Charging condition	Voltage applied: 5.0 VDC Series resistance: 0Ω Charging time: 24hours			
(Self Dischage)				Storage	Time: 24hours Temperature:Lower than 25°C Humidity:Lower than 70%RH			

Taping Specification (Ammo pack) (except FMC0H334ZTP())



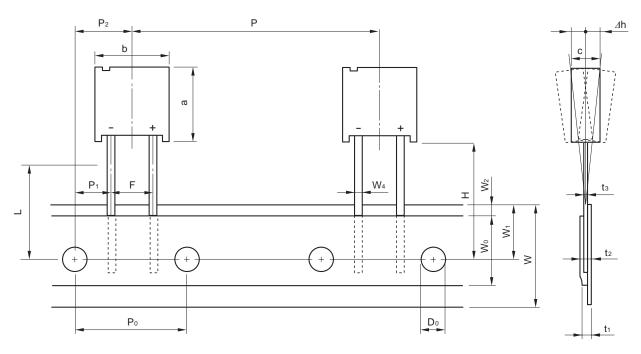
Unit: mm

Item	Symbol	Value	Tolerance	Remarks
Component Height	а	11.5	±0.5	
Component Width	b	10.5	±0.5	
Component Thickness	С	-	±0.5	5.5 V Type: 5.0/0.010 F~0.047 F, 6.5/0.10 F~0.22 F 3.5 V Type: 5.0/0.047 F~0.10 F, 6.5/0.22 F FME Type: 5.0/0.022 F~0.047 F 6.5 Type: 6.5/0.022 F FMR Type: 6.5/0.047 F FMC Type: 5.0/0.047 F, 6.5/0.10 F
Lead-wire Width	W ₄	0.5	±0.1	
Lead-wire Thickness t₃	tз	0.4	±0.1	
Pitch of Component	Р	12.7	±1.0	
Sprocket Pitch	P ₀	12.7	±0.3	
Sprocket Hole Center to Lead	P ₁	3.85	±0.7	
Sprocket Hole to Component Center	P ₂	6.35	±1.3	
Lead Spacing	F	5.0	±0.5	
Component Alignment	⊿h	2.0 Max.	_	Including tiltiing caused by bending of lead wire
Tape Width	W	18.0	+1.0 -0.5	
Hold-down tape Width	W ₀	12.5 Min.	_	
Sprocket Hole Position	W ₁	9.0	±0.5	
Hold-down Tape Position	W ₂	3.0 Max.	_	No protrusion of tape
Height of Component from Tape Center	Н	16.0	±0.5	
		18.0	±0.5	
Sprocket Hole Diameter	D ₀	φ4.0	±0.2	
Total Tape Thickness	t ₁	0.7	±0.2	
	t ₂	1.5 Max.	_	
Length of Shipped Lead	L	11.0 Max.	_	

Packing Quantity

1000 pcs. / box

Taping Specifications [FMC0H334ZTP()]



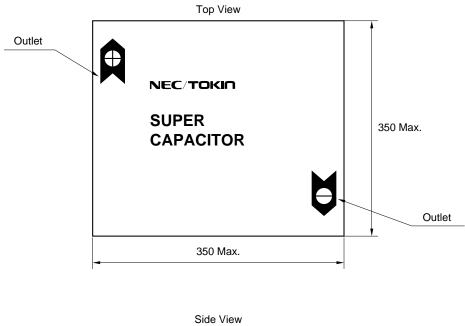
Unit: mm

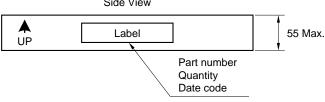
Item	Symbol	Value	Tolerance	Remarks
Component Height	а	15.0	±0.5	
Component Width	b	14.0	±0.5	
Component Thickness	С	9.0	±0.5	
Lead-wire Width	W ₄	0.6	±0.1	
Lead-wire Thickness	t ₃	0.6	±0.1	
Pitch of Component	Р	25.4	±1.0	
Sprocket Pitch	P ₀	12.7	±0.3	
Sprocket Hole Center to Lead	P ₁	3.85	±0.7	
Sprocket Hole to Component Center	P ₂	6.35	±1.3	
Lead Spacing	F	5.0	±0.5	
Component Alignment	⊿h	2.0 Max.	-	Including tiltiing caused by bending of lead wire
Tape Width	W	18.0	+1.0 -0.5	
Hold-down tape Width	W ₀	12.5 Min.	-	
Sprocket Hole Position	W ₁	9.0	±0.5	
Hold-down Tape Position	W ₂	3.0 Max.	_	No protrusion of tape
Height of Component from Tape Center	Н	16.0	±0.5	
		18.0	±0.5	
Sprocket Hole Diameter	D ₀	φ4.0	±0.2	
Total tape thickness	t ₁	0.67	±0.2	
	t ₂	1.7 Max.	_	
Length of Shipped Lead	L	11.0 Max.	_	

Packing Quantity

400 pcs. / box

Packing dimensions





Marking of Box

Marking shows the following items.

- (a) Terminal direction
- (b) Part number
- (c) Quantity
- (d) Date code
- (e) Company logo

Packing Quantity: 1000 pcs. / box (Except FMC0H334ZTP()) 400 pcs. / box (FMC0H334ZTP())