

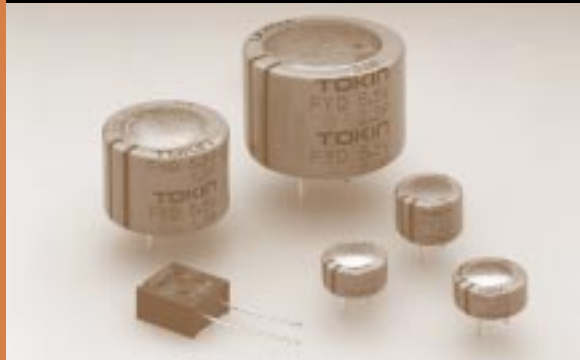
TOKIN

SUPER CAPACITORS
(ELECTRIC DOUBLE-LAYER CAPACITORS)

S Vol.4

Super capacitors

(ELECTRIC DOUBLE-LAYER CAPACITORS)



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

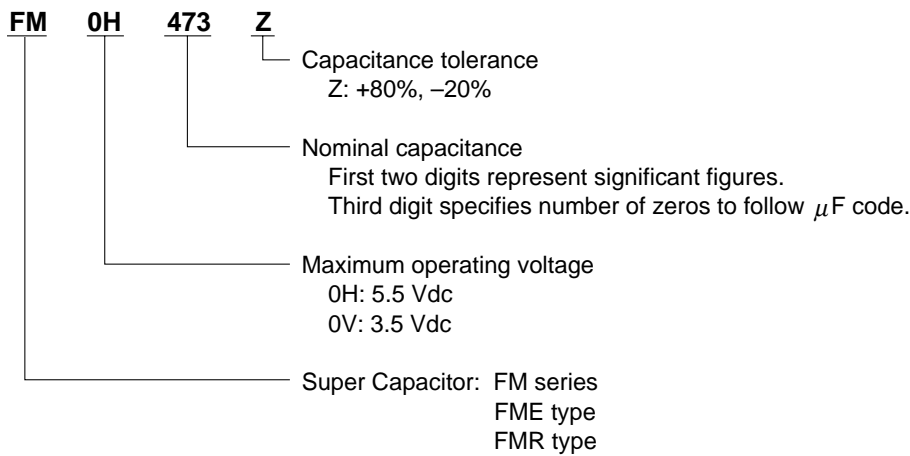
- High adaptability to automatic assembly
- Can be cleaned
- Excellent voltage holding characteristics ideal for long-time supply of 1 μ A to several hundred μ A (Except 3.5 V type, FME type)
- Space saving

Applications

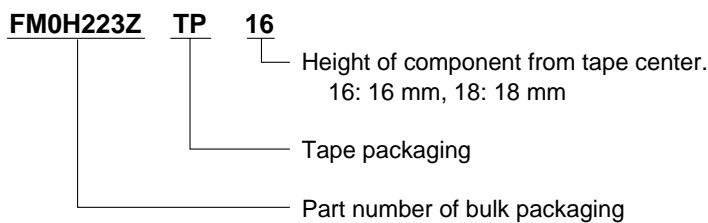
Backup of CMOS microcomputers, static RAMs, and DTSSs

Part Number System

- Bulk



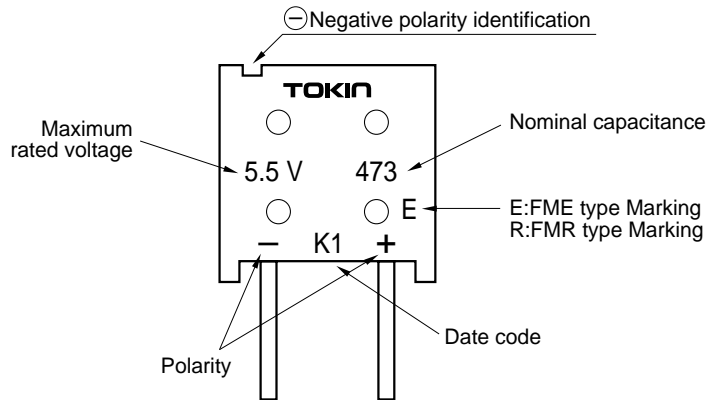
- Tape (Ammo Pack)



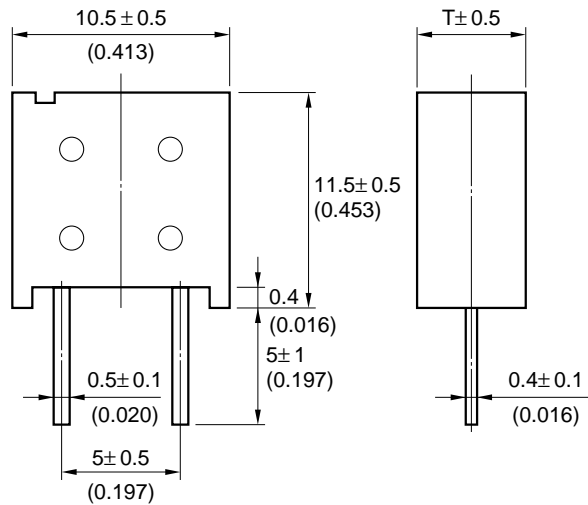
NUMBER OF PACKED CAPACITORS

Tape: 1000 pcs./box

Markings



Dimensions And Standard Ratings



Unit: mm
(inch)

● 5.5 V Type

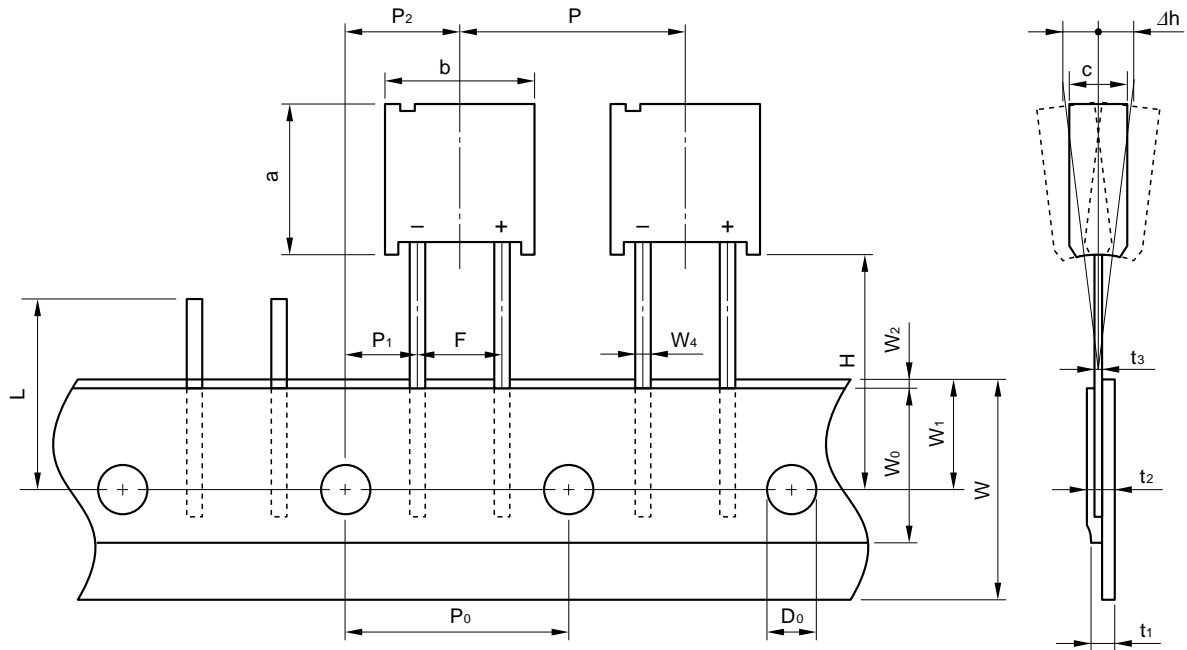
| Part Number | Max. Rated Voltage (VDC) | Nominal Capacitance | | Max. ESR (at 1 kHz) (Ω) | Max. Current at 30 minutes (mA) | Voltage Holding Characteristic min. (V) | T mm (inch) | Weight g (oz) |
|--------------------------------------|--------------------------|---------------------|----------------------|-------------------------|---------------------------------|---|-------------|---------------|
| | | Charge System (F) | Discharge System (F) | | | | | |
| FM0H103Z Ammo pack FM0H103ZTP () | 5.5 | 0.01 | 0.014 | 300 | 0.015 | 4.2 | 5.0 (0.197) | 1.3 (0.046) |
| FM0H223Z Ammo pack FM0H223ZTP () | 5.5 | 0.022 | 0.028 | 200 | 0.033 | 4.2 | 5.0 (0.197) | 1.3 (0.046) |
| FM0H473Z Ammo pack FM0H473ZTP () | 5.5 | 0.047 | 0.06 | 200 | 0.071 | 4.2 | 5.0 (0.197) | 1.3 (0.046) |
| FM0H104Z Ammo pack FM0H104ZTP () | 5.5 | 0.10 | 0.13 | 100 | 0.15 | 4.2 | 6.5 (0.256) | 1.6 (0.056) |
| FM0H224Z Ammo pack FM0H224ZTP () | 5.5 | 0.10 | 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 17.)

Specifications 5.5 V Type

| Item | | Standard | | Test Conditions | |
|--|----------------------|---|--|---|--|
| Operating Temperature Range | | -25°C to +70°C | | | |
| Maximum Operating Voltage | | 5.5 VDC | | | |
| Nominal Capacitance Range | | See Standard List. | | | |
| Capacitance Allowance | | +80%, -20% | | See characteristics measuring method. | |
| Equivalent Series Resistance | | See Standard List. | | See characteristics measuring method. | |
| Current (30-minutes value) | | See Standard List. | | See characteristics measuring method. | |
| Surge Voltage | | Capacitance | 90% or higher of initial standard value | Surge Voltage: 7.4 V Temperature: 70±2°C Charge: 30 sec. Discharge: 9 min. 30 sec. Number of cycles 1000 cycles. Series resistance: 0.01F: 1500 Ω 0.022 F: 560 Ω 0.047 F: 300 Ω 0.10 F: 150 Ω Discharge resistance: 0 Ω | |
| | | Equivalent series resistance | 1.2 or less times initial standard value | | |
| | | Current (30-minute value) | 1.2 or less times initial standard value | | |
| | | Appearance | No obvious abnormality. | | |
| Temperature Variation of Characteristics | Phase 2 | Capacitance | 50% or higher of initial value | Phase 1: +25 ± 2°C Phase 2: -25 ± 2°C Phase 3: -40 ± 2°C Phase 4: +25 ± 2°C Phase 5: +70 ± 2°C Phase 6: +25 ± 2°C | |
| | | Equivalent series resistance | 4 or less times initial value | | |
| | Phase 5 | Capacitance | 200% or below of initial value | | |
| | | Equivalent series resistance | Satisfy initial standard value | | |
| | | Current (30-minute value) | 1.5 CV (mA) or below | | |
| | Phase 6 | Capacitance | Within ±20% of initial value | | |
| | | Equivalent series resistance | Satisfy initial standard value | | |
| | | Current (30-minute value) | Satisfy initial standard value | | |
| | Pin Tensile Strength | | Pins not torn off. | | 1 kg 10sec. |
| Vibration Resistance | | Capacitance | Satisfy initial standard value | Frequency : 10 to 55 Hz Test duration : 6 hours | |
| | | Equivalent series resistance | | | |
| | | Current (30-minute value) | | | |
| | | Appearance | | | No obvious abnormality |
| Solderability | | 3/4 or more of the pin surface covered with new solder. | | Solder temperature: 230 ± 5°C Dipping duration: 5 ± 0.5 sec. Dipped up to 1.6 mm from the lower end of the capacitor. | |
| Solder Heat Resistance | | Capacitance | Satisfy initial standard value | Solder temperature: 260 ± 10°C Dipping duration: 10 ± 1 sec. Dipped up to 1.6 mm from the lower end of the capacitor. | |
| | | Equivalent series resistance | | | |
| | | Current (30-minute value) | | | |
| | | Appearance | | | No obvious able abnormality |
| Temperature Cycle | | Capacitance | Satisfy initial standard value | Temperature condition: -25°C → normal temperature → +70°C → normal temperature Number of cycles: 5 cycles | |
| | | Equivalent series resistance | | | |
| | | Current (30-minute value) | | | |
| | | Appearance | | | No obvious abnormality |
| Humidity Resistance | | Capacitance | Within 20% of initial value | Temperature: 40 ± 2°C Relative humidity: 90 to 95% RH Test duration: 240 ± 8 hours | |
| | | Equivalent series resistance | 1.2 or less times initial standard value | | |
| | | Current (30-minute value) | 1.2 or less times initial standard value | | |
| | | Appearance | No obvious abnormality | | |
| High Temperature Load | | Capacitance | Within 30% of initial value | Temperature: 70 ± 2°C Voltage applied: 5.5 Vdc Series protection resistance: 0 Ω Test duration: 1000 ⁺⁴⁸ ₀ hours | |
| | | Equivalent series resistance | Twice or less times initial standard value | | |
| | | Current (30-minute value) | Twice or less times initial standard value | | |
| | | Appearance | No obvious abnormality | | |
| Voltage Holding Characteristics (Self Discharge) | | Voltage between terminal leads higher than 4.2 V. | | Charging condition | Voltage applied: 5.0 VDC Series resistance: 0 Ω Charging time: 24hours |
| | | | | Storage | Time: 24hours Temperature: Lower than 25°C Humidity: Lower than 70%RH |

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



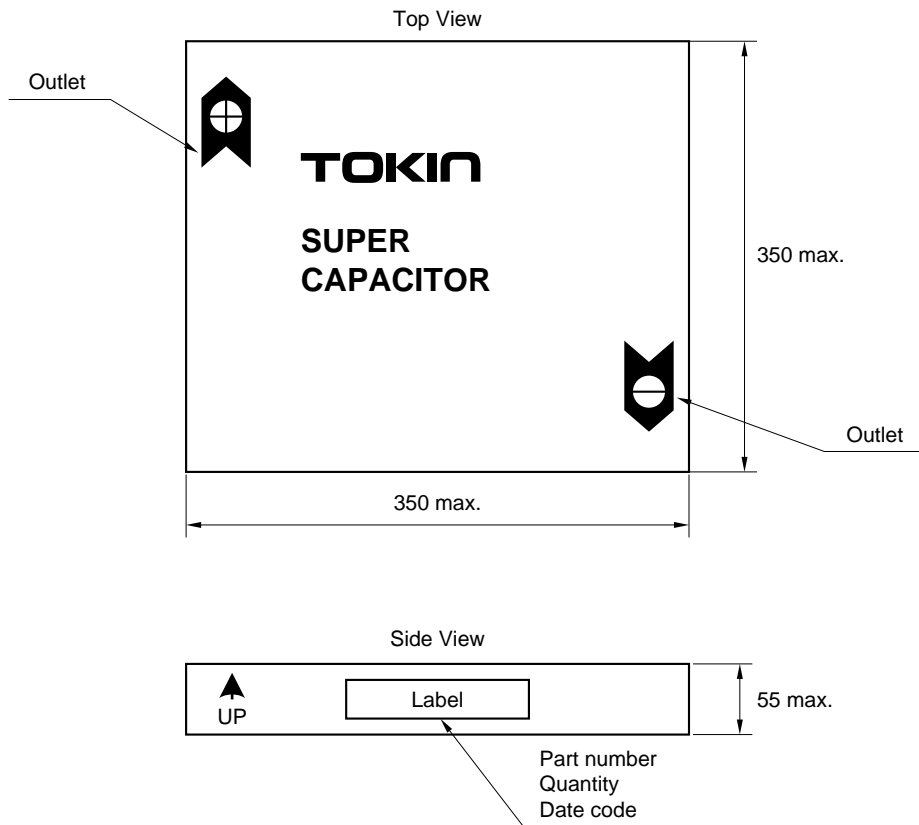
Unit : mm

| Item | Symbol | Value | Tolerance | Remarks |
|--------------------------------------|----------------|-----------|--------------|---|
| Component Height | a | 11.5 | ±0.5 | |
| Component Width | b | 10.5 | ±0.5 | |
| Component Thickness | C | - | ±0.5 | 5.5 V Type: 5.0/0.010 F~0.047 F, 6.5/0.10 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: 6.5/0.022F FMR Type: 6.5/0.047 F |
| Lead-wire Width | W ₄ | 0.5 | ±0.1 | |
| Lead-wire Thickness t ₃ | 0.4 | ±0.1 | | |
| Pitch of Component | P | 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 | Δh | 2.0 max. | - | Including tilting 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 | H | 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

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