

■ INTRODUCTION

MES Series are constructed with metallized polyester film dielectric, copperply lead and epoxy resin powder coating. They are suitable for blocking, coupling, decoupling, filtering, bypass timing circuit and ideal for use in telecommunication equipment, data processing, equipment, industrial instruments, automatic control systems, and other general electronic equipment.

■ FEATURES

- High moisture resistance
- Good solderability
- Non-inductive construction
- Self-healing property
- Miniature size
- Standard 5mm lead spacing
- Wide rated voltage range
- Wide rated capacitance range
- Available for wire automatic insertion range

■ CONSTRUCTION

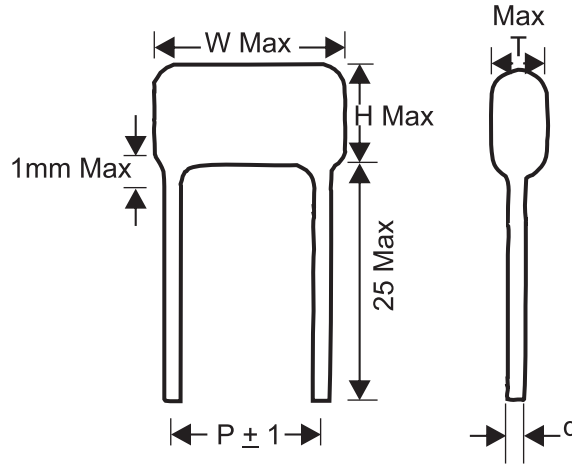
- Dielectric: Metallized Polyester Film
- Winding: Non-inductive type
- Lead Wire: Tinned Wire (Cu wire) or Tinned Copper Clad Wire, Lead Free Solder
- Inner Coating: epoxy resin
- Outer Coating: Flame retarding epoxy resin (UL-94V-0)
- Conditional Standard Test: Temperature of from 15°C to 35°C. RH45 to 75%.

■ SPECIFICATIONS

Item	Performance
Operating Temp. Range	-40°C ~ 125°C (VR Derates 1.25% per °C over 105°C)
Capacitance Range	0.001μF ~ 1.2 μF
Capacitance Tolerance	± 5%(J), 10%(K), +20%(M)
Rated Voltage VR 85°C	50/63Vdc, 100Vdc, 250Vdc, 400Vdc, 630Vdc
Dissipation Factor	1.0%(0.01)max @ 1Khz, 25°C
Insulation Resistance	$V_R \leq 100V_{DC} \geq 15000M\Omega$ ($C \leq 0.33\mu F$) $\geq 5000M\Omega \times \mu F$ ($C > 0.33\mu F$) $V_R \leq 100V_{DC} \geq 30000M\Omega$ ($C \leq 0.33\mu F$) $\geq 10000M\Omega \times \mu F$ ($C > 0.33\mu F$)

■ PERFORMANCE

Item	Metalized Polyester
Capacitance Drift	Cycled through the operating temperature range 2%.
Humidity Test	Will withstand the test of R.H. 95% at 40°C for 1000hrs. $C \leq 5\%$ $DF < 1.2\%$ $IR > 10000M\Omega$
Load Test	Will withstand a testing voltage at 140% of W.V. for 1000hrs at 85°C. $C \leq 5\%$ $DF < 1.2\%$ $IR > 5000M\Omega$
Lead Pull Test	Will withstand a pull of 1.5Kg applied axially for 10 seconds.
Lead Bend Test	Will sustain two cycles without breaking when attaching a load of 0.5Kg to the end of the lead and then rotating the capacitor 90° from the direction of lead egress. Then 180 in opposite direction, then back to the starting point.
Solderability	Immersed in molten solder (230 ± 0.5 sec.) after testing, the wound lead and gap in the wound lead will be covered and filled by solder. Will be difficult to unwind by finger.
Dielectric Strength	Shall withstand 200% or 160% of rated voltage at 25°C for 1 minute with current limiting resistance of 1 Ω / V.



■ **MAXIMUM DIMENSIONS (mm)**

W. V. (μ F)	code	50 / 63VDC (1H/1J)						100VDC (2A)						250VDC (2E)						400VDC (2G)						630VDC (2J)					
		W	H	T	P	d	V/ μ s	W	H	T	P	d	V/ μ s	W	H	T	P	d	V/ μ s	W	H	T	P	d	V/ μ s	W	H	T	P	d	V/ μ s
0.001	102	6.5	6.5	3.5	5	0.5	10	6.5	6.5	3.5	5	0.5	15	6.5	6.5	3.5	5	0.5	50	6.5	6.5	3.5	5	0.5	50	6.5	6.5	3.5	5	0.5	50
0.002	122	6.5	6.5	3.5	5	0.5	10	6.5	6.5	3.5	5	0.5	15	6.5	6.5	3.5	5	0.5	50	6.5	6.5	3.5	5	0.5	50	6.5	6.5	3.5	5	0.5	50
0.003	332	6.5	6.5	3.5	5	0.5	10	6.5	6.5	3.5	5	0.5	15	6.5	6.5	3.5	5	0.5	50	6.5	6.5	3.5	5	0.5	50	6.5	6.5	3.5	5	0.5	50
0.005	472	6.5	6.5	3.5	5	0.5	10	6.5	6.5	3.5	5	0.5	15	6.5	6.5	3.5	5	0.5	50	6.5	6.5	3.5	5	0.5	50	6.5	6.5	3.5	5	0.5	50
0.006	562	6.5	6.5	3.5	5	0.5	10	6.5	6.5	3.5	5	0.5	15	6.5	6.5	3.5	5	0.5	50	6.5	6.5	3.5	5	0.5	50						
0.007	682	6.5	6.5	3.5	5	0.5	10	6.5	6.5	3.5	5	0.5	15	6.5	6.5	3.5	5	0.5	50	6.5	6.5	3.5	5	0.5	50						
0.008	822	6.5	6.5	3.5	5	0.5	10	6.5	6.5	3.5	5	0.5	15	6.5	6.5	3.5	5	0.5	50	6.5	6.5	3.5	5	0.5	50						
0.010	103	6.5	6.5	4.0	5	0.5	25	6.5	6.5	4.0	5	0.5	25	6.5	6.5	3.5	5	0.5	50	6.5	6.5	3.5	5	0.5	50						
0.012	123	6.5	6.5	4.0	5	0.5	25	6.5	6.5	4.0	5	0.5	25	6.5	6.5	3.5	5	0.5	50												
0.015	153	6.5	6.5	4.0	5	0.5	25	6.5	6.5	4.0	5	0.5	25	6.5	6.5	3.5	5	0.5	50												
0.018	183	6.5	6.5	4.0	5	0.5	25	6.5	6.5	4.0	5	0.5	25	6.5	6.5	3.5	5	0.5	50												
0.022	223	6.5	6.5	4.0	5	0.5	25	6.5	6.5	4.0	5	0.5	25	6.5	6.5	3.5	5	0.5	50												
0.027	273	6.5	6.5	4.0	5	0.5	25	6.5	6.5	4.0	5	0.5	25	7.5	9.5	3.5	5	0.5	30												
0.033	333	6.5	6.5	4.0	5	0.5	25	6.5	6.5	4.0	5	0.5	25	7.5	9.5	4.5	5	0.5	30												
0.039	393	6.5	6.5	4.0	5	0.5	25	6.5	6.5	4.0	5	0.5	25	7.5	9.5	4.5	5	0.5	30												
0.047	473	6.5	6.5	4.0	5	0.5	25	6.5	6.5	4.0	5	0.5	25	7.5	9.5	4.5	5	0.5	30	7.5	10	6	5	0.6	30						
0.056	563	6.5	6.5	4.0	5	0.5	25	6.5	6.5	4.0	5	0.5	25	7.5	9.5	4.5	5	0.5	30												
0.068	683	6.5	6.5	4.0	5	0.5	25	6.5	6.5	4.0	5	0.5	25	7.5	9.5	4.5	5	0.5	30												
0.082	823	6.5	6.5	4.0	5	0.5	25	6.5	6.5	4.0	5	0.5	25	7.5	9.5	4.5	5	0.5	30												
0.1	104	6.5	6.5	4.5	5	0.5	25	6.5	6.5	4.5	5	0.5	25	7.5	9.5	4.5	5	0.5	30												
0.12	124	6.5	6.5	4.5	5	0.5	25	6.5	6.5	4.5	5	0.5	25	7.5	10	5.0	5	0.5	30												
0.15	154	6.5	6.5	4.5	5	0.5	25	6.5	6.5	4.5	5	0.5	25	7.5	10	5.0	5	0.5	30												
0.18	184	6.5	6.5	4.5	5	0.5	25	6.5	6.5	4.5	5	0.5	25	7.5	10	6.0	5	0.5	50												
0.22	224	6.5	6.5	4.5	5	0.5	25	6.5	6.5	4.5	5	0.5	25	7.5	10	6.0	5	0.5	50												
0.27	274	6.5	6.5	4.5	5	0.5	25	6.5	6.5	4.5	5	0.5	25	7.5	11	7.0	5	0.5	50												
0.33	334	6.5	6.5	4.5	5	0.5	25	6.5	6.5	4.5	5	0.5	25	7.5	11	7.0	5	0.5	50												
0.39	394	6.5	6.5	4.5	5	0.5	25	7.5	6.5	4.5	5	0.5	25	7.5	12	8.0	5	0.5	50												
0.47	474	7.0	7.5	4.5	5	0.6	25	7.5	7.5	4.5	5	0.6	25	7.5	12	8.5	5	0.5	50												
0.56	564	7.0	8.5	5.0	5	0.6	25	7.5	8.5	5.0	5	0.6	25																		
0.68	684	7.0	8.5	5.0	5	0.6	25	7.5	8.5	5.0	5	0.6	25																		
0.82	824	7.0	8.5	5.0	5	0.6	25	7.5	10	6.0	5	0.6	25																		
1.0	105	7.0	10	6.5	5	0.5	25	7.5	10	6.0	5	0.6	25																		
1.2	125	7.0	10	6.5	5	0.6	20	7.5	11	7.0	5	0.6	20																		

■ **RADIAL TAPING**

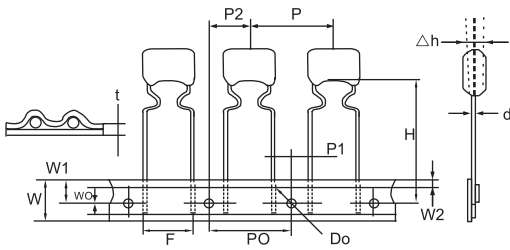


Fig. 1
F=5mm
(RT1)

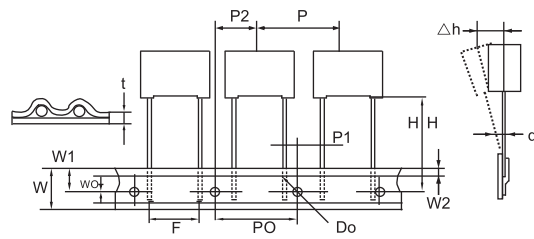


Fig. 2
F=5mm
(RT1)

■ **PACKAGING**

Method	Bulk	Ammo	Reel
Code	B	A	R

■ **TAPE CODE (Lead spacing of tape)**

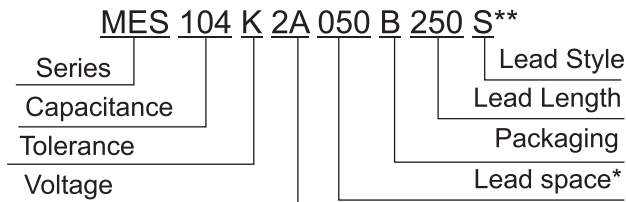
Spacing	5mm
Packing	A or R
Code	RT1 (See Diagram)

■ **TAPING SPECIFICATIONS**

Description	Letter	Dimension (mm)
		RT1
Lead Wire Diameter	d	0.5 / 0.6
Tapping Pitch	P	12.7
Feed Hole Pitch	PO	12.7
Centering of the Lead Wire	P1	3.85
Centering of the Body	P2	6.35
Lead Spacing (Pitch)	F	5
Component Alignment	Δh	0
Height of Component from Tape Center	H	18.5
Carrier Tape Width	W	18
Hold Down Tape Width	W0	6
Hole Position	W1	9
Hold Down Tape Position	W2	3
Feed Hole Diameter	Do	4
Tape Thickness	t	0.7
Figure	fig	1 or 2

Remark: *Allowance of accumulated pitch less than 1mm at the sum of 20 pitches.
*Continuous empty component less than 3 consecutive pieces.
*Total empty on one reel less than 1%.

■ PART NUMBER EXAMPLE



* Leadspace is straight lead non-formed original leadspace.

■ TOLERANCE

Code	Tolerance
J	± 5%
K	± 10%
M	± 20%

■ LEAD LENGTH FROM SEATING PLANE

mm	5	10	15	20	25	(Bulk Pack)
Code	050	100	150	200	250	

■ RADIAL LEAD SPACING

mm	5
Code	050

* Leadspace is straight lead non-formed original leadspace.

■ CAPACITANCE CODE

μF	0.01	0.047	0.1	0.47	1.0
pF	10000	47000	100000	470000	-
Code	103	473	104	474	105

■ RATED VOLTAGE

WV	50	63	100	250	400	630
Code	1H	1J	2A	2E	2G	2J

■ STRAIGHT LEAD SPACING (P)

mm	10	15	22.5	27.5	37.5
Code	100	150	225	275	375

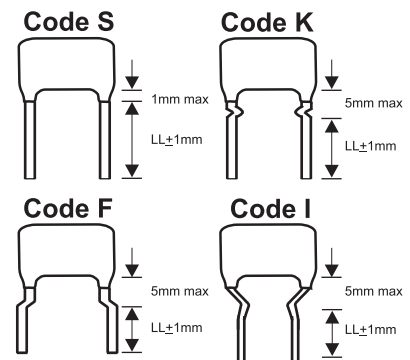
* Leadspace is straight lead non-formed original leadspace.

■ LEAD STYLE

Code	Style
S	Straight
K	Kink-In (Stand Off)
F	Form Out

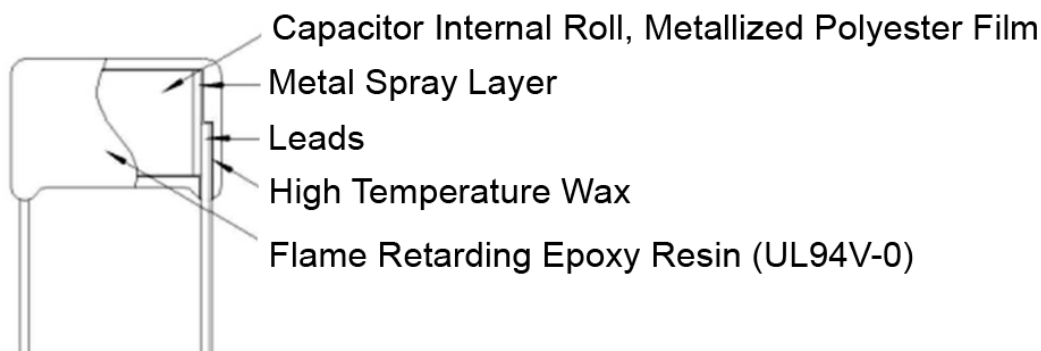
** For Bulk packaging with formed leads, add an additional 3 digit lead spacing code at end of part number.

■ LEAD STYLE EXAMPLES



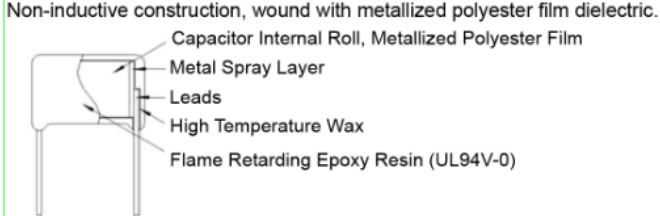
Typical length (LL) is 20 mm for straight lead, bulk pack

Non-inductive construction, wound with metallized polyester film dielectric.



TYPE: MES

Product Specifications

1. Scope	This specification applies to directly film capacitors of the following type: Metallized polyester dielectric fixed capacitor	
2. Product Name	Miniature Metallized Polyester Film Capacitor	
3. Construction (Dimensions and Materials)	Dimensions: Refer to Dimensions Drawing	
4. Characteristics	Materials:	
	1. Element:	Metallized Polyester Film
	2. Metal Spray:	Special Solder (Lead Free)
	3. Lead wire:	Tinned wire (Cu wire) or Tinned copper clad steel (CP wire) Lead Free
	4. Inner coating:	Epoxy Resin
	5. Outer coating:	Flame retarding epoxy resin (UL-94V-0 Standard)
<p>Non-inductive construction, wound with metallized polyester film dielectric.</p>  <p>Capacitor Internal Roll, Metallized Polyester Film Metal Spray Layer Leads High Temperature Wax Flame Retarding Epoxy Resin (UL94V-0)</p>		

CHARACTERISTICS

Standard Atmospheric Conditions

Unless otherwise specified, the standard range of atmospheric conditions for making measurements and tests is as follows:

Ambient Temperature:	15 to 35°C
Relative Humidity:	45 to 85%
Air Pressure:	86 to 106 kpa

If there may be any doubt on the results, measurements shall be made within the following limits:

Ambient Temperature:	20°C to 5°C
Relative Humidity:	60 to 70%
Operating Temperature Range	-40 to +125°C
Rated Temperature Range	-40 to +125°C

Rated Temperature Range is the range of ambient temperature for which the capacitor can be operated continuously at rated voltage.

ELECTRICAL CHARACTERISTICS

Rated Voltage (Vg):	50/63 Vdc, 100 Vdc, 250 Vdc, 400 Vdc, 630 Vdc	
Category Voltage (Vc):	105°C	Vc = Vg
For temperatures over 105°C, a decreasing factor of 1.25% per degree celcius °C on the nominal voltage Vg has to be applied.		
Rated upper limit temperature:	105°C	
Usable upper limit temperature:	125°C	
Capacitance Range:	0.01µF to 10µF	
Capacitance Tolerances:	(Measured at 1KHz, 1V) ±5% (J), ±10% (K), ±20% (M),	
Dissipation Factor: (DF%)	LCR METER : HP -4284A, at 20°C ±5°C	
	1.0% (max.) at 1 KHz.	
	1.5% (max.) at 10 KHz.	

ELECTRICAL CHARACTERISTICS (continued)

Insulation resistance between terminals

Test conditions:

Temperature:	20°C ±5°C
Voltage charge time:	1 minute
Voltage charge:	100 Vdc

Performance:

≥9000MΩ	for C ≤ 0.33 μF
≥3000MΩ x μF	for C > 0.33 μF

Test voltage between terminals:

1.6 x Vg applied for 2 sec, at 20°C ±5°C (cut off current 10mA)

Performance: There shall be no dielectric breakdown or other damage.

Dielectric strength:

Between terminal and enclosure

Apply 200% of rated voltage between terminals and enclosure for 2 to 5 seconds.

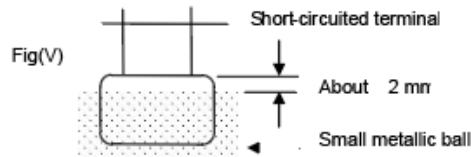
Method of the test as described below:

Put the 1mm diameter of small metallic balls in a vessel.

The test capacitor shall be submerged with the small metallic balls. Distance of the metallic balls and the terminals shall be kept about

The test voltage shall be applied between the short-circuited terminals and the metallic balls

Performance: There should be no dielectric breakdown or other damage



Rapid change of temperature. (Testing method IEC 68-2-21)

The test capacitor shall be kept in the testing oven and be kept at conditions of the following table, and it shall be repeated for 5 cycles successfully. After the test, the capacitor shall be left alone at the ordinary conditions for 2 hours.

Step	temperature	minute
1	-40±3	30± 3
2	ordinary	3 or under
3	110±2	30 ± 3
4	ordinary	3 or under

Performance:

Capacitance change ΔC/C:	≤ ± 10%
DF change Δtan δ:	≤ 0.5% at 1KHz
Insulation resistance:	≥ 50% at limit value

MECHANICAL CHARACTERISTICS

Terminal strength (Testing method IEC 68-2-21)

Tensile: (Test Ua)

A load of 10N (1.0kg) shall be gradually applied to the terminal in the axial direction and held thus for 10 seconds.

Bending: (Test Ub)

While a load of 500g applied to the lead wire, the body of the capacitor shall bent 90° and returned to the original position. This operation shall be conducted in a few seconds. Then the body shall be bent 90° in the opposite direction and returned to the original position.

Performance:

There shall be no such mechanical damage as terminal damage, etc.

ENDURANCE CHARACTERISTICS		
Solderability: (Testing method IEC 68-2-20 Ta)		
	Solder temperature:	245°C ±5°C
	Immersion time:	2.5 ± 0.5 seconds
Performance:		
	At least 95% of the circumferential face of lead wire up to immersed level shall be covered with new solder.	
Resistance to soldering heat: (Testing method IEC 68-2-20 Tb)		
	Solder bath method	
	Solder temperature:	260°C ±5°C
	Immersion time:	10 ± 1 second
	Thickness of heat shunt (printed wiring board)	1.6mm
	Performance: (Capacitance change ΔC/C)	≤ ± 3%
	DF change Δtan δ:	≤ ± 0.5% at 1 KHz
Vibration Proof: (Testing method IEC 68-2-6 Fc)		
	The frequency shall be varied from 10Hz to 55Hz at 1.5mm amplitude and back to 10Hz in approximately 1 minute intervals. This motion shall be applied for a period of 2 hours in each of 3 mutually perpendicular directions. During the last 20 min of vibration in each direction, checks shall be made for open or short-circuiting and interruption.	
	Performance:	
	Bending strength:	There shall be no open or short-circuiting and the connections must be stabilized.
	Appearance:	There shall be no such mechanical damage as terminal damage, etc.
Damp heat (steady state): (Testing method IEC 69-2-3 Ca)		
	The capacitor shall be stored at a temperature of 40 ±2°C and relative humidity of 90% to 95% for 1000 hours.	
	And then the capacitor shall be subjected to standard atmospheric conditions for 1 to 2 hours, after which measurement shall be made.	
	Performance: (Capacitance change ΔC/C)	≤ ± 5%
	DF change Δtan δ:	≤ ± 0.5% at 1 KHz
	Insulation resistance:	≥ 50% of limit value
Electrical endurance: (Testing method IEC 60384-2)		
	hours. And then the capacitor shall be subjected to standard atmospheric conditions for 1 to 2 hours, after which measurement shall be made. The lead resistor in series with the capacitor shall be 20Ω to 1KΩ.	
	Performance: (Capacitance change ΔC/C)	≤ ± 10%
	DF change Δtan δ:	≤ ± 0.5% at 1 KHz
	Insulation resistance:	≥ 50% of limit value

STORAGE CONDITIONS

It should be noted that the solderability of the terminals may be deteriorated when stored barely in an atmosphere for long periods. It should not be located in particularly high temperature and high humidity, it must submit to the following conditions (Keeping in the original package)

Temperature:	5°C ~ 35°C
Relative Humidity:	≤ 70%
Storage Period:	≤ 12 months
(following the manufacturing date marked on the label in package bag)	

Capacitors shall avoid the conditions of being wetted by water, oil, salt water and/or poisonous gases.

If using a capacitor past its storage time, its characteristics should be tested or contact our technical engineer.

■ **SOLDERING**

Metalized Polyester Film Capacitor recommended solder profile

