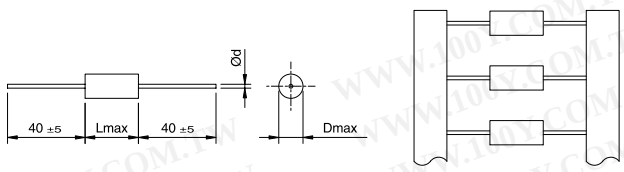
A50
MKT Series

Loose Taped



D max	<7	≥7<16	≥16
Ød ±0.05	0.6	0.8	1

All dimensions are in mm.

METALLIZED POLYESTER FILM CAPACITOR D.C. MULTIPURPOSE APPLICATIONS

Typical applications: blocking, coupling, decoupling, by-passing, interference suppression in low voltage applications (i.e.:AUTOMOTIVE).

PRODUCT CODE: **A50**

PRODUCT CODE SYSTEM

The part number, comprising 14 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
A	5	0										-	

Digit 1 to 3 Series code.

Digit 4 d.c. rated voltage:
C = 50V D = 63V E = 100V I = 250V
M =400V P =630V Q=1000V

Digit 5 Length (mm):
F=11; H=14; K=20.5; Q=28; T=33

Digit 6 to 9 Digits 7 - 8 - 9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to obtain the Rated Capacitance in pF.

Digit 10 to 11 Mechanical version and/or packaging (table1)

Digit 12 Identifies the dimensions and electrical characteristics.

Digit 13 Internal use

Digit 14 Capacitance tolerance:
J=5%; K=10%; M=20%.

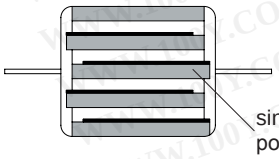
GENERAL TECHNICAL DATA

Dielectric: polyester film (polyethylene terephthalate).
Plates: aluminium layer deposited by evaporation under vacuum.
Winding: non-inductive type.
Leads: tinned wire.
Protection: polyester tape wrapping and thermosetting resin end fill.
Marking: Manufacturer's logo, series (1.50), dielectric code (MKT), capacitance, tolerance, D.C. rated voltage.
Climatic category: 55/105/56 IEC 60068-1
Operating temperature range: -55 to +105°C
Related documents: IEC 60384-2

Table 1 (for more detailed information, please refer to page 14).

Standard packaging style	Ordering code (Digit 10 to 11)
Reel Ø 355 mm	26
Loose	AA

Winding scheme



single sided metallized polyester film

Rated Cap.	50Vdc/30Vac		Max dv/dt	Max K_0	Part Number
	Dmax	Lmax	(V/µs)	(V^2/µs)	
0.47 µF	5.0	11.0	4.0	0.40 E3	A50CF 3470--0--
0.68 µF	5.0	11.0	4.0	0.40 E3	A50CF 3680--0--
1.0 µF	6.5	11.0	4.0	0.40 E3	A50CF 4100--0--
1.5 µF	7.0	14.0	4.0	0.40 E3	A50CH 4150--0--
2.2 µF	8.0	14.0	4.0	0.40 E3	A50CH 4220--0--
3.3 µF	7.5	20.5	2.0	0.20 E3	A50CK 4330--0--
4.7 µF	8.5	20.5	2.0	0.20 E3	A50CK 4470--0--
6.8 µF	10.0	20.5	2.0	0.20 E3	A50CK 4680--0--
10.0 µF	12.0	20.5	2.0	0.20 E3	A50CK 5100--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

Rated Cap.	63Vdc/40Vac		Max dv/dt	Max K_0	Part Number
	Dmax	Lmax	(V/µs)	(V^2/µs)	
0.33 µF	5.0	11.0	4.0	0.50 E3	A50DF 3330--6--
0.47 µF	6.0	14.0	4.0	0.50 E3	A50DH 3470--6--
0.68 µF	6.0	14.0	4.0	0.50 E3	A50DH 3680--6--
1.0 µF	7.0	14.0	4.0	0.50 E3	A50DH 4100--6--
1.5 µF	6.5	20.5	2.0	0.25 E3	A50DK 4150--6--
2.2 µF	8.0	20.5	2.0	0.25 E3	A50DK 4220--6--
3.3 µF	9.5	20.5	2.0	0.25 E3	A50DK 4330--6--
4.7 µF	9.5	28.0	1.5	0.19 E3	A50DQ 4470--6--
6.8 µF	11.0	28.0	1.5	0.19 E3	A50DQ 4680--6--
10.0 µF	11.5	33.0	1.0	0.13 E3	A50DT 5100--6--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

All dimensions are in mm.

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table.

A50
MKT Series

METALLIZED POLYESTER FILM CAPACITOR
D.C. MULTIPURPOSE APPLICATIONS

PRODUCT CODE: **A50**

Rated Cap.	100Vdc/63Vac		Max dv/dt	Max K_0	Part Number
	Dmax	Lmax	(V/µs)	(V^2/µs)	
0.10 µF	5.0	11.0	5.0	1.0 E3	A50EF 3100--6--
0.15 µF	5.0	11.0	5.0	1.0 E3	A50EF 3150--6--
0.22 µF	5.0	11.0	5.0	1.0 E3	A50EF 3220--6--
0.33 µF	6.0	14.0	5.0	1.0 E3	A50EH 3330--6--
0.47 µF	6.0	14.0	5.0	1.0 E3	A50EH 3470--6--
0.68 µF	7.0	14.0	5.0	1.0 E3	A50EH 3680--6--
1.0 µF	7.0	20.5	3.0	0.6 E3	A50EK 4100--6--
1.5 µF	8.0	20.5	3.0	0.6 E3	A50EK 4150--6--
2.2 µF	9.5	20.5	3.0	0.6 E3	A50EK 4220--6--
3.3 µF	9.5	28.0	2.0	0.4 E3	A50EQ 4330--6--
4.7 µF	10.0	33.0	1.0	0.3 E3	A50ET 4470--6--
6.8 µF	12.0	33.0	1.0	0.3 E3	A50ET 4680--6--
10.0 µF	14.5	33.0	1.0	0.3 E3	A50ET 5100--6--

Rated Cap.	250Vdc/160Vac		Max dv/dt	Max K_0	Part Number
	Dmax	Lmax	(V/µs)	(V^2/µs)	
0.047 µF	5.0	11.0	10.0	5.0 E3	A50IF 2470--6--
0.068 µF	5.0	11.0	10.0	5.0 E3	A50IF 2680--6--
0.10 µF	5.5	14.0	10.0	5.0 E3	A50IH 3100--6--
0.15 µF	5.5	14.0	10.0	5.0 E3	A50IH 3150--6--
0.22 µF	6.5	14.0	10.0	5.0 E3	A50IH 3220--6--
0.33 µF	6.0	20.5	7.0	3.5 E3	A50IK 3330--6--
0.47 µF	7.0	20.5	7.0	3.5 E3	A50IK 3470--6--
0.68 µF	8.5	20.5	7.0	3.5 E3	A50IK 3680--6--
1.0 µF	8.5	28.0	4.0	2.0 E3	A50IQ 4100--6--
1.5 µF	10.0	28.0	4.0	2.0 E3	A50IQ 4150--6--
2.2 µF	11.0	33.0	2.5	1.3 E3	A50IT 4220--6--
3.3 µF	13.0	33.0	2.5	1.3 E3	A50IT 4330--6--
4.7 µF	15.5	33.0	2.5	1.3 E3	A50IT 4470--6--
6.8 µF	18.5	33.0	2.5	1.3 E3	A50IT 4680--6--
10.0 µF	22.0	33.0	2.5	1.3 E3	A50IT 5100--6--

Rated Cap.	400Vdc/200Vac		Max dv/dt	Max K_0	Part Number
	Dmax	Lmax	(V/µs)	(V^2/µs)	
0.010 µF	5.0	11.0	13.5	11.0 E3	A50MF 2100--6--
0.015 µF	5.0	11.0	13.5	11.0 E3	A50MF 2150--6--
0.022 µF	5.0	11.0	13.5	11.0 E3	A50MF 2220--6--
0.033 µF	5.0	11.0	13.5	11.0 E3	A50MF 2330--6--
0.047 µF	6.0	14.0	13.5	11.0 E3	A50MH 2470--6--
0.068 µF	6.0	14.0	13.5	11.0 E3	A50MH 2680--6--
0.10 µF	6.5	14.0	13.5	11.0 E3	A50MH 3100--6--
0.15 µF	6.0	20.5	10.0	8.0 E3	A50MK 3150--6--
0.22 µF	7.5	20.5	10.0	8.0 E3	A50MK 3220--6--
0.33 µF	8.5	20.5	10.0	8.0 E3	A50MK 3330--6--
0.47 µF	8.5	28.0	6.5	5.2 E3	A50MQ 3470--6--
0.68 µF	10.0	28.0	6.5	5.2 E3	A50MQ 3680--6--
1.0 µF	10.5	33.0	4.0	3.2 E3	A50MT 4100--6--
1.5 µF	12.5	33.0	4.0	3.2 E3	A50MT 4150--6--
2.2 µF	15.0	33.0	4.0	3.2 E3	A50MT 4220--6--
3.3 µF	18.5	33.0	4.0	3.2 E3	A50MT 4330--6--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

All dimensions are in mm.

Rated Cap.	630Vdc/220Vac*		Max dv/dt	Max K_0	Part Number
	Dmax	Lmax	(V/µs)	(V^2/µs)	
1000 pF	5.0	11.0	20	25.0 E3	A50PF 1100--6--
1500 pF	5.0	11.0	20	25.0 E3	A50PF 1150--6--
2200 pF	5.0	11.0	20	25.0 E3	A50PF 1220--6--
3300 pF	5.0	11.0	20	25.0 E3	A50PF 1330--6--
4700 pF	5.0	11.0	20	25.0 E3	A50PF 1470--6--
6800 pF	5.0	11.0	20	25.0 E3	A50PF 1680--6--
0.010 µF	5.0	14.0	20	25.0 E3	A50PH 2100--6--
0.015 µF	5.0	14.0	20	25.0 E3	A50PH 2150--6--
0.022 µF	6.0	14.0	20	25.0 E3	A50PH 2220--6--
0.033 µF	6.0	20.5	15	19.0 E3	A50PK 2330--6--
0.047 µF	6.0	20.5	15	19.0 E3	A50PK 2470--6--
0.068 µF	7.0	20.5	15	19.0 E3	A50PK 2680--6--
0.10 µF	7.0	28.0	10	13.0 E3	A50PQ 3100--6--
0.15 µF	8.5	28.0	10	13.0 E3	A50PQ 3150--6--
0.22 µF	10.0	28.0	10	13.0 E3	A50PQ 3220--6--
0.33 µF	10.5	33.0	6	7.5 E3	A50PT 3330--6--
0.47 µF	12.0	33.0	6	7.5 E3	A50PT 3470--6--
0.68 µF	14.5	33.0	6	7.5 E3	A50PT 3680--6--
1.0 µF	17.5	33.0	6	7.5 E3	A50PT 4100--6--

Rated Cap.	1000Vdc/250Vac*		Max dv/dt	Max K_0	Part Number
	Dmax	Lmax	(V/µs)	(V^2/µs)	
1000 pF	6.5	14.0	50	100 E3	A50QH 1100--0--
1500 pF	6.5	14.0	50	100 E3	A50QH 1150--0--
2200 pF	6.5	14.0	50	100 E3	A50QH 1220--0--
3300 pF	6.5	14.0	50	100 E3	A50QH 1330--0--
4700 pF	7.5	14.0	50	100 E3	A50QH 1470--0--
6800 pF	8.0	14.0	50	100 E3	A50QH 1680--0--
0.010 µF	7.0	20.5	30	60 E3	A50QK 2100--0--
0.015 µF	7.5	20.5	30	60 E3	A50QK 2150--0--
0.022 µF	9.0	20.5	30	60 E3	A50QK 2220--0--
0.033 µF	8.0	28.0	15	30 E3	A50QQ 2330--0--
0.047 µF	9.0	28.0	15	30 E3	A50QQ 2470--0--
0.068 µF	10.5	28.0	15	30 E3	A50QQ 2680--0--
0.10 µF	12.5	28.0	15	30 E3	A50QQ 3100--0--
0.15 µF	13.5	33.0	10	20 E3	A50QT 3150--0--
0.22 µF	16.0	33.0	10	20 E3	A50QT 3220--0--
0.33 µF	19.0	33.0	10	20 E3	A50QT 3330--0--
0.47 µF	22.0	33.0	10	20 E3	A50QT 3470--0--

Mechanical version and packaging (Table1)
Internal use
Tolerance: J (±5%); K (±10%); M (±20%)

Note: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.
The pulse characteristic K_0 depends on the voltage wave-form and in any case it cannot overcome the value given in the above table.

*Not suitable for across-the-line applications. Please refer to Interference Suppression Capacitors (page 145).

A50
MKT Series

METALLIZED POLYESTER FILM CAPACITOR
D.C. MULTIPURPOSE APPLICATIONS

PRODUCT CODE: **A50**

ELECTRICAL CHARACTERISTICS

Rated voltage (V_R):
50 Vdc 63 Vdc 100 Vdc 250 Vdc
400 Vdc 630 Vdc 1000 Vdc

Rated temperature (T_R): +85 °C

Temperature derated voltage:
for temperatures between +85°C and +105°C a decreasing factor of 1.25% per degree °C on the rated voltage V_R (d.c. and a.c.) has to be applied.

Capacitance range: 1000pF to 10µF

Capacitance values: E6 series (IEC 60063 Norm).

Capacitance tolerances (measured at 1 kHz)**:**
±5% (J); ±10% (K); ±20% (M).

Total self-inductance (L)**:** ≈ 7nH
max 1 nH per 1 mm lead and capacitor length.

Dissipation factor (DF):
tgδ 10^{-4} at +25°C ±5°C

kHz	C≤0.1µF	0.1µF<C ≤1µF	C >1 µF
1	≤ 80	≤ 80	≤100
10	≤150	≤150	
100	≤250		

Insulation resistance:

Test conditions
Temperature: +25°C±5°C
Voltage charge time: 1 min
Voltage charge:
50 Vdc for V_R <100 Vdc
100 Vdc for V_R ≥100 Vdc

Performance
For V_R ≤100 Vdc
≥ 3750 MΩ for C ≤ 0.33µF (50000 MΩ)*
≥ 1000 s for C > 0.33µF (5000 s)*
For V_R >100 Vdc
≥30000 MΩ for C ≤ 0.33µF (50000 MΩ)*
≥10000 s for C > 0.33µF (17000 s)*
*Typical value

Test voltage between terminations:
1.6xV_R applied for 2 s at +25°C±5°C.

TEST METHOD AND PERFORMANCE

Damp heat, steady state:

Test conditions
Temperature: +40°C±2°C
Relative humidity (RH): 93% ±2%
Test duration: 56 days

Performance
Capacitance change |ΔC/C|: ≤ 5%
DF change (Δtgδ): ≤ 50x10^{-4} at 1kHz
Insulation resistance: ≥ 50% of initial limit.

Endurance:

Test conditions
Temperature: +85°C ±2°C
Test duration: 2000 h
Voltage applied: 1.25xV_R

Performance
Capacitance change |ΔC/C|: ≤ 5%
DF change (Δtgδ): ≤ 30x10^{-4} at 10kHz for C≤ 1µF
≤ 20x10^{-4} at 1kHz for C> 1µF
Insulation resistance: ≥ 50% of initial limit.

Resistance to soldering heat:

Test conditions
Solder bath temperature: +260°C±5°C
Dipping time (with heat screen):10 s±1 s

Performance
Capacitance change |ΔC/C|: ≤2%
DF change (Δtgδ): ≤ 30x10^{-4} at 10kHz for C≤ 1µF
≤ 20x10^{-4} at 1kHz for C> 1µF
Insulation resistance: ≥ initial limit.

Long term stability (after two years)**:**
Storage: standard environmental conditions (see page 12).

Performance
Capacitance change |ΔC/C|: ≤ 3% for C≤ 0.1µF
≤ 2% for C> 0.1µF

RELIABILITY:
Reference MIL HDB 217

Application conditions:
Temperature: +40°C±2°C
Voltage: 0.5xV_R
Failure rate: ≤ 5 FIT
(1 FIT = 1x10^{-9} failures/components x h)

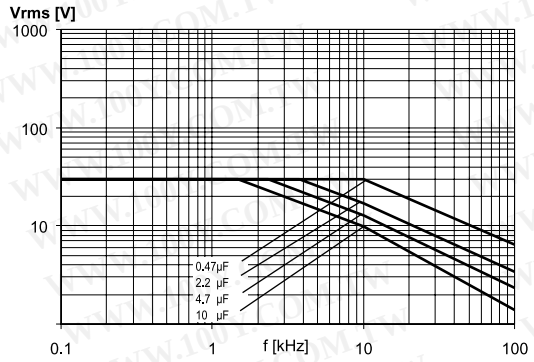
Failure criteria:
(according to DIN 44122)
Short or open circuit
Capacitance change |ΔC/C|: >10%
DF change (Δtgδ): >2 x initial limit.
Insulation resistance: <0.005 x initial limit.

METALLIZED POLYESTER FILM CAPACITOR
D.C. MULTIPURPOSE APPLICATIONS

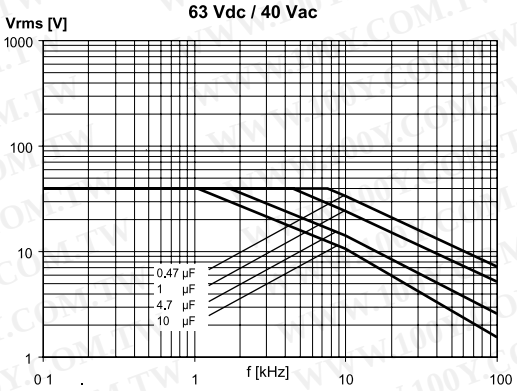
PRODUCT CODE: **A50**

MAX. VOLTAGE (Vr.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)

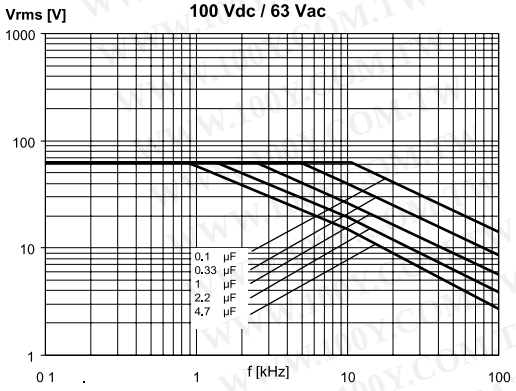
50 Vdc / 30 Vac



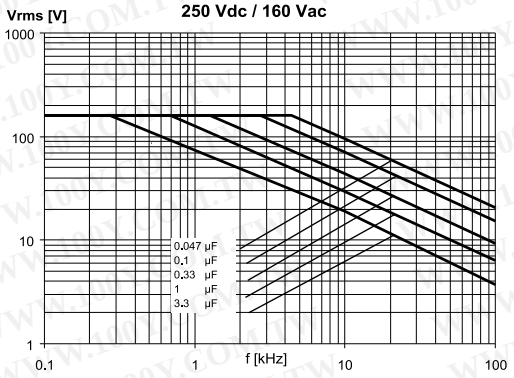
63 Vdc / 40 Vac



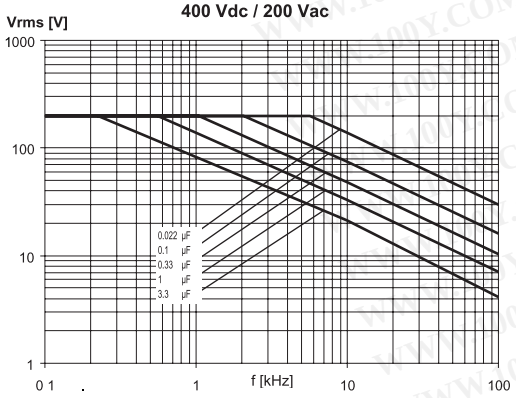
100 Vdc / 63 Vac



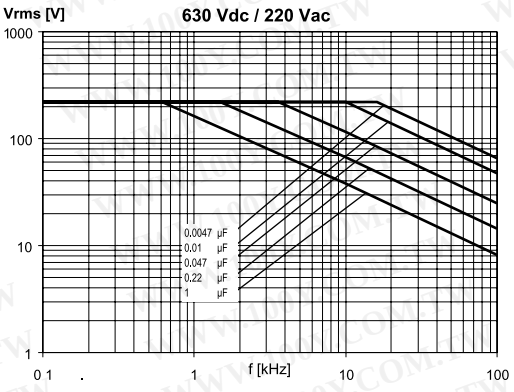
250 Vdc / 160 Vac



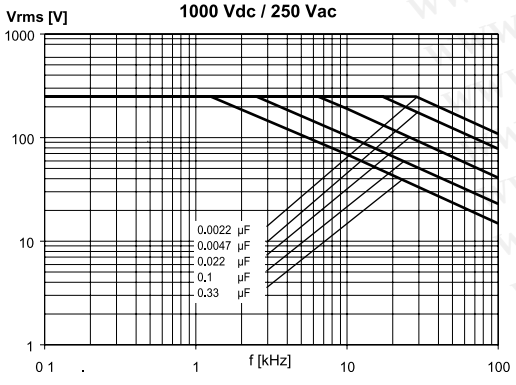
400 Vdc / 200 Vac



630 Vdc / 220 Vac



1000 Vdc / 250 Vac



METALLIZED POLYESTER FILM CAPACITOR
D.C. MULTIPURPOSE APPLICATIONS

PRODUCT CODE: **A50**

MAX. CURRENT (Ir.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 40°C)