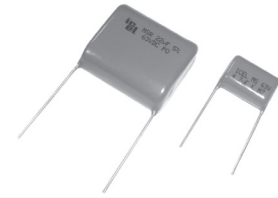


# MSR - Not for new design

## Metallized polyester film capacitor

### MKT - General purpose capacitor



#### Main applications

Blocking, filtering, bypassing, timing, coupling, decoupling, general applications in electronics. Low pulse operation

#### Dielectric

Polyester

#### Electrodes

Vacuum deposited metal layers

#### Coating

Hard, water proof, solvent resistant resin (UL class 94 V-0). Flame retardant execution

#### Construction

Extended metallized film (refer to general technical information). Internal series connection for  $U_r \geq 1000V_{dc}$

#### Terminals

Tinned copper wire (lead free)

#### Reference standard

IEC 60384/2, IEC 60068, RoHS compliant

#### Climatic category

55/100/56 (IEC 60068/1), FMD (DIN 40040)

#### Operating temperature range

-55°...+105°C

#### Rated capacitance (Cr)

0,01 $\mu$ F to 22 $\mu$ F, in compliance with IEC 60063, E6 series. Refer to article table

#### Capacitance tolerance (at 1kHz)

$\pm 10\%$  (code=K),  $\pm 5\%$  (code=J),  $\pm 20\%$  (code=M). Other tolerances upon request

#### Capacitance temperature coefficient

Refer to graphs in general technical information

#### Long term stability (at 1 kHz)

Capacitance variation  $\leq \pm 2\%$  after a period of 2 years at standard environmental conditions

#### Rated voltage (Ur)

63, 100, 250, 400, 630, 1000, 1500Vdc  
(permissible AC voltage at 60Hz: 40, 63, 160, 200, 220, 250, 300Vac)

#### Category voltage (Uc)

$U_c = U_r$  at +85°C;  $U_c = 0,8 \times U_r$  at +100°C

#### Temperature derated voltage

For  $T > +85^\circ C$ ,  $U_r$  must be decreased 1,25% for every °C exceeding +85°C

#### Self inductance

$\leq 1nH/mm$  of capacitor pitch

#### Maximum pulse rise time

Refer to article table. The pulse characteristic  $K_o$  depends on the voltage waveform. In any case the value given in the article table must not be exceeded

#### Dissipation factor (DF), max.

$tg\delta \times 10^{-4}$ , measured at 25 $\pm 5^\circ C$

Freq.	$Cr \leq 0.1\mu F$	$0.1\mu F < Cr \leq 1\mu F$	$Cr > 1\mu F$
1kHz	80	80	100
10kHz	150	150	-
100kHz	300	-	-

#### Insulation resistance (IR)

Measured between terminals, at 25 $\pm 5^\circ C$ , after 1 minute of electrification at 100Vdc for  $U_r \geq 100V_{dc}$  and 50Vdc for  $U_r < 100V_{dc}$

$U_r$	Cr	IR
$\leq 100$	$\leq 0,33\mu F$	$\geq 15000M\Omega$
$> 100$	$\leq 0,33\mu F$	$\geq 30000M\Omega$
$\leq 100$	$> 0,33\mu F$	$\geq 5000s$
$> 100$	$> 0,33\mu F$	$\geq 10000s$

#### Test voltage between terminals (Ut)

1,6x $U_r$  (DC) applied for 2s at 25 $\pm 5^\circ C$  (1 minute for type test)

#### Damp heat test (steady state)

Test conditions:

Temperature= +40 $\pm 2^\circ C$

Relative humidity=93 $\pm 2\%$

Test duration= 56 days

Performance:

Capacitance change  $\leq \pm 5\%$

DF change  $\leq 0.0050$  at 1kHz

IR  $\geq 50\%$  of initial limit value

#### Endurance test

Test conditions:

Temperature= +85 $\pm 2^\circ C$

Test duration= 2000h

Voltage applied=1,25x $U_r$ (DC)

Performance:

Capacitance change  $\leq \pm 5\%$

DF change  $\leq 0.0030$  at 10kHz for  $Cr \leq 1\mu F$

DF change  $\leq 0.0020$  at 1kHz for  $Cr > 1\mu F$

IR  $\geq 50\%$  of initial limit value

#### Resistance to soldering heat test

Test conditions:

Solder bath temperature= +260 $\pm 5^\circ C$

Dipping time (with heat screen)= 10 $\pm 1s$

Performance:

Capacitance change  $\leq \pm 2\%$

DF change  $\leq 0.0030$  at 10kHz for  $Cr \leq 1\mu F$

DF change  $\leq 0.0020$  at 1kHz for  $Cr > 1\mu F$

IR  $\geq 50\%$  of initial limit value

#### Reliability (MIL HDB 217)

Application conditions:

Applied voltage= 0,5 x  $U_r$ (DC)

Temperature= +40 $\pm 2^\circ C$

Failure rate:

(1FIT=1x10<sup>-9</sup> failures/components x hours)

$\leq 5FIT$  for  $U_r \leq 100V_{dc}$

$\leq 3FIT$  for  $U_r > 100V_{dc}$

Failure criteria (DIN44122):

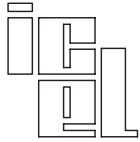
Capacitance change  $> \pm 10\%$

DF change  $> 2 \times$  initial value

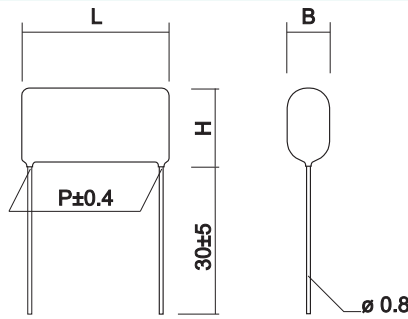
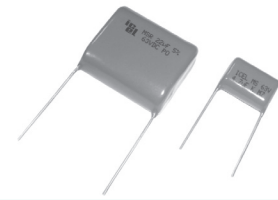
IR  $< 0,005 \times$  initial limit value

Short or open circuit

**Warning: this specification must be completed with the data given in the "General technical information" chapter**



**MSR - Not for new design**  
**Metallized polyester film capacitor**  
**MKT - General purpose capacitor**



**Dimensional tolerances (mm)**

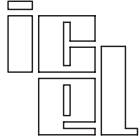
L.	L±	H±	B±
12,5	1,5	1,5	1,0
17,5	2,0	2,0	1,5
25,0	2,0	2,0	2,0
30,0	2,5	2,5	2,5

**MSR article table (different values available upon request) - NOT FOR NEW DESIGN**

Rated voltage		Cap. value (µF)	Dimension in mm					du/dt V/µs	Ko V²/µs	ICEL ordering code <sup>(1)</sup>
Vdc	Vac		B	H	L	P	d			
63	40	0,22	5	9	12,5	10	0,8	11	1380	MSR0633220*D
63	40	0,33	5	9	12,5	10	0,8	11	1380	MSR0633330*D
63	40	0,47	6	10	12,5	10	0,8	11	1380	MSR0633470*D
63	40	0,68	6	10	12,5	10	0,8	11	1380	MSR0633680*D
63	40	1	6	10	17,5	15	0,8	7	880	MSR0634100*E
63	40	1,5	6	10	17,5	15	0,8	7	880	MSR0634150*E
63	40	2,2	7	11	17,5	15	0,8	7	880	MSR0634220*E
63	40	3,3	7	11,5	25	22,5	0,8	5	630	MSR0634330*G
63	40	4,7	8	12,5	25	22,5	0,8	5	630	MSR0634470*G
63	40	6,8	8,5	13	30	27,5	0,8	4	500	MSR0634680*H
63	40	10	9	15	30	27,5	0,8	4	500	MSR0635100*H
63	40	15	9,5	19	30	27,5	0,8	4	500	MSR0635150*H
63	40	22	11,5	22,5	30	27,5	0,8	4	500	MSR0635220*H
100	63	0,15	5	9	12,5	10	0,8	15	3000	MSR1103150*D
100	63	0,22	6	9,5	12,5	10	0,8	15	3000	MSR1103220*D
100	63	0,33	6	9,5	17,5	15	0,8	9	1800	MSR1103330*E
100	63	0,47	6	10	17,5	15	0,8	9	1800	MSR1103470*E
100	63	0,68	6	10	17,5	15	0,8	9	1800	MSR1103680*E
100	63	1	6,5	11	17,5	15	0,8	9	1800	MSR1104100*E
100	63	1,5	6,5	11	25	22,5	0,8	6	1200	MSR1104150*G
100	63	2,2	7	12,5	25	22,5	0,8	6	1200	MSR1104220*G
100	63	3,3	8	14,5	25	22,5	0,8	6	1200	MSR1104330*G
100	63	4,7	9,5	16,5	30	27,5	0,8	4	800	MSR1104470*H
100	63	6,8	10	18,5	30	27,5	0,8	4	800	MSR1104680*H
100	63	10	12,5	21,5	30	27,5	0,8	4	800	MSR1105100*H
250	160	0,033	5	9	12,5	10	0,8	25	12500	MSR1252330*D
250	160	0,047	5	9	12,5	10	0,8	25	12500	MSR1252470*D
250	160	0,068	5	9	12,5	10	0,8	25	12500	MSR1252680*D
250	160	0,1	6	10	12,5	10	0,8	25	12500	MSR1253100*D
250	160	0,15	6,5	11	12,5	10	0,8	25	12500	MSR1253150*D
250	160	0,22	6,5	10,5	17,5	15	0,8	18	9000	MSR1253220*E
250	160	0,33	7	11,5	17,5	15	0,8	18	9000	MSR1253330*E
250	160	0,47	7	12	25	22,5	0,8	10	5000	MSR1253470*G
250	160	0,68	7	12,5	25	22,5	0,8	10	5000	MSR1253680*G
250	160	1	8	14,5	25	22,5	0,8	10	5000	MSR1254100*G
250	160	1,5	10	16	25	22,5	0,8	10	5000	MSR1254150*G
250	160	2,2	10	18	30	27,5	0,8	6,5	3250	MSR1254220*H
250	160	3,3	12	21	30	27,5	0,8	6,5	3250	MSR1254330*H
250	160	4,7	14	23,5	30	27,5	0,8	6,5	3250	MSR1254470*H
400	200	0,015	5	9	12,5	10	0,8	40	32000	MSR1402150*D
400	200	0,022	5	9	12,5	10	0,8	40	32000	MSR1402220*D
400	200	0,033	6	10	12,5	10	0,8	40	32000	MSR1402330*D
400	200	0,047	6	10,5	12,5	10	0,8	40	32000	MSR1402470*D
400	200	0,068	5	9	17,5	15	0,8	25	20000	MSR1402680*E
400	200	0,1	6	11	17,5	15	0,8	25	20000	MSR1403100*E
400	200	0,15	7	12	17,5	15	0,8	25	20000	MSR1403150*E
400	200	0,22	7	11	25	22,5	0,8	14	11200	MSR1403220*G
400	200	0,33	7,5	14	25	22,5	0,8	14	11200	MSR1403330*G
400	200	0,47	8,5	15	25	22,5	0,8	14	11200	MSR1403470*G
400	200	0,68	9	16	30	27,5	0,8	10	8000	MSR1403680*H
400	200	1	10,5	18,5	30	27,5	0,8	10	8000	MSR1404100*H
400	200	1,5	11,5	22,5	30	27,5	0,8	10	8000	MSR1404150*H
400	200	2,2	15	26,5	30	27,5	0,8	10	8000	MSR1404220*H
630	220 <sup>(2)</sup>	0,01	5	9	12,5	10	0,8	60	75600	MSR1632100*D
630	220 <sup>(2)</sup>	0,015	6	9	12,5	10	0,8	60	75600	MSR1632150*D

<sup>(1)</sup>Change the \* symbol with the needed capacitance tolerance code: J=±5%, K=±10%, M=±20%

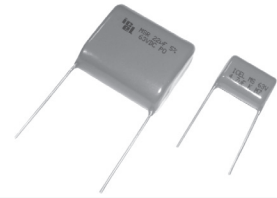
<sup>(2)</sup> Not suitable for across the line application



# MSR - Not for new design

## Metallized polyester film capacitor

### MKT - General purpose capacitor



Rated voltage		Cap. value (μF)	Dimension in mm					du/dt V/μs	Ko V <sup>2</sup> /μs	ICEL ordering code <sup>(1)</sup>
Vdc	Vac		B	H	L	P	d			
630	220 <sup>(2)</sup>	0,022	6	10	12,5	10	0,8	60	75600	MSR1632220*D
630	220 <sup>(2)</sup>	0,033	6	10	17,5	15	0,8	35	44100	MSR1632330*E
630	220 <sup>(2)</sup>	0,047	6	12	17,5	15	0,8	35	44100	MSR1632470*E
630	220 <sup>(2)</sup>	0,068	7	12	17,5	15	0,8	35	44100	MSR1632680*E
630	220 <sup>(2)</sup>	0,1	7	12	25	22,5	0,8	20	25200	MSR1633100*G
630	220 <sup>(2)</sup>	0,15	8	13	25	22,5	0,8	20	25200	MSR1633150*G
630	220 <sup>(2)</sup>	0,22	10	15	25	22,5	0,8	20	25200	MSR1633220*G
630	220 <sup>(2)</sup>	0,33	11	16	30	27,5	0,8	14	17600	MSR1633330*H
630	220 <sup>(2)</sup>	0,47	13	18	30	27,5	0,8	14	17600	MSR1633470*H
630	220 <sup>(2)</sup>	0,68	14	23	30	27,5	0,8	14	17600	MSR1633680*H
1000	250 <sup>(2)</sup>	0,01	7	10	12,5	10	0,8	80	160E03	MSR2102100*D
1000	250 <sup>(2)</sup>	0,015	7	11	12,5	10	0,8	80	160E03	MSR2102150*D
1000	250 <sup>(2)</sup>	0,022	7	10	17,5	15	0,8	40	80000	MSR2102220*E
1000	250 <sup>(2)</sup>	0,033	8	12	17,5	15	0,8	40	80000	MSR2102330*E
1000	250 <sup>(2)</sup>	0,047	7	12	25	22,5	0,8	33	66000	MSR2102470*G
1000	250 <sup>(2)</sup>	0,068	8	13	25	22,5	0,8	33	66000	MSR2102680*G
1000	250 <sup>(2)</sup>	0,1	9,5	14	25	22,5	0,8	33	66000	MSR2103100*G
1000	250 <sup>(2)</sup>	0,15	11	16	30	27,5	0,8	20	40000	MSR2103150*H
1000	250 <sup>(2)</sup>	0,22	12	20	30	27,5	0,8	20	40000	MSR2103220*H
1000	250 <sup>(2)</sup>	0,33	13,5	23	30	27,5	0,8	20	40000	MSR2103330*H
1000	250 <sup>(2)</sup>	0,47	16	24	30	27,5	0,8	20	40000	MSR2103470*H
1500	300 <sup>(2)</sup>	0,01	5,5	10	17,5	15	0,8	50	150E03	MSR2152100*E
1500	300 <sup>(2)</sup>	0,015	6,5	10,5	17,5	15	0,8	50	150E03	MSR2152150*E
1500	300 <sup>(2)</sup>	0,022	6,5	11	25	22,5	0,8	40	120E03	MSR2152220*G
1500	300 <sup>(2)</sup>	0,033	7	12	25	22,5	0,8	40	120E03	MSR2152330*G
1500	300 <sup>(2)</sup>	0,047	7	12	30	27,5	0,8	25	75000	MSR2152470*H
1500	300 <sup>(2)</sup>	0,068	7,5	14	30	27,5	0,8	25	75000	MSR2152680*H
1500	300 <sup>(2)</sup>	0,1	8,5	15,5	30	27,5	0,8	25	75000	MSR2153100*H
1500	300 <sup>(2)</sup>	0,15	11	19,5	30	27,5	0,8	25	75000	MSR2153150*H

<sup>(1)</sup>Change the \* symbol with the needed capacitance tolerance code: J=±5%, K=±10%, M=±20%

<sup>(2)</sup> Not suitable for across the line application

### Permissible AC voltage versus frequency (sinusoidal waveform) for ΔT=+10°C

#### Referred to the largest pitch execution among available ones

