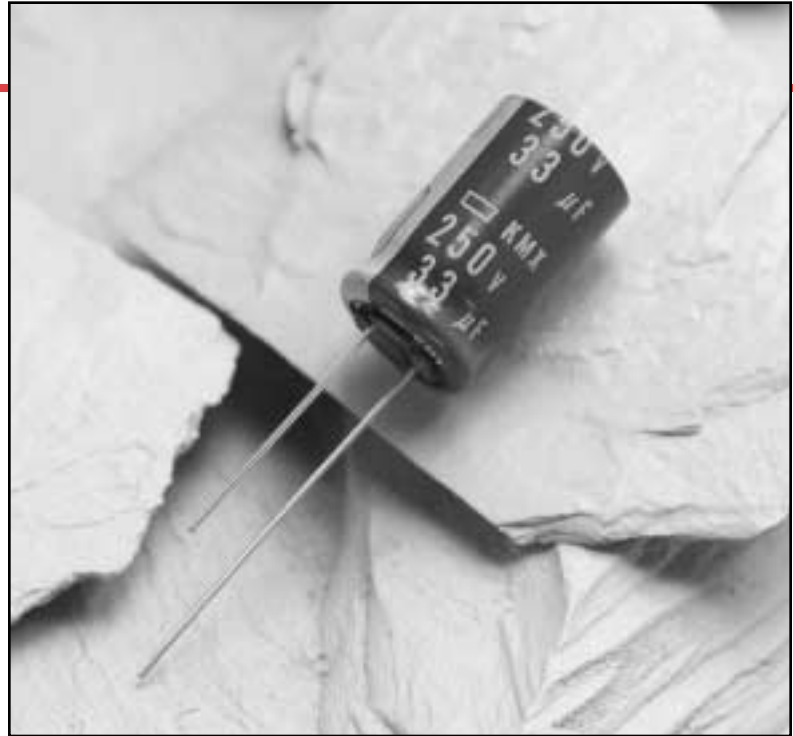


# KMX Series



- **Miniature**
- **Low Impedance**
- **Long Life**
- **For Electronic Ballasts**
- **+105°C Maximum Temperature**



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The KMX is the new long life, low impedance series from United Chemi-Con. These capacitors have a load life of 8,000 to 10,000 hours at +105°C with the full rated ripple current applied and a voltage range up to 450 volts. The KMX capacitors are ideal for use in electronic ballasts or any other high voltage application where a very long lifetime is required.

The KMX series capacitors are non-solvent proof and are not recommended when halogenated cleaning solvents are used. Refer to the Mini-Glossary for recommended cleaning conditions.

## Summary of Specifications

- Radial lead terminals.
- Capacitance range: 3.3 to 680 $\mu$ F.
- Voltage range: 160 to 450VDC.
- Operating temperature range: -40°C to +105°C for 160 to 400V; -25°C to +105°C for 450V.
- Leakage current: 0.1CV+40 $\mu$ A after 1 minute or 0.03CV+40 $\mu$ A after 5 minutes for 1,000CV or less; 0.04CV+100 $\mu$ A after 1 minute or 0.02CV+25 $\mu$ A after 5 minutes for more than 1,000CV at +20°C.
- Standard capacitance tolerance:  $\pm$ 20%
- Nominal case size (D $\times$ L): 10 $\times$ 20mm to 18 $\times$ 60mm.
- Rated lifetime: 8,000 to 10,000 hours at +105°C with the rated ripple current applied, depending on case size.

# KMX Series

## KMX Specifications

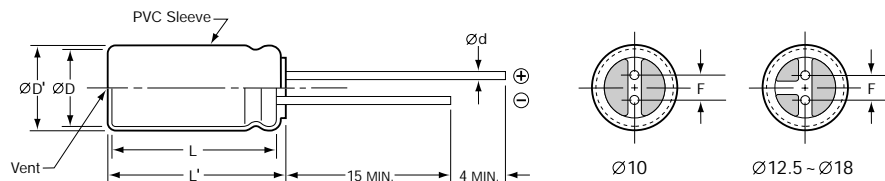
Item	Characteristics																					
Operating Temperature Range	- 40 to +105°C for 160 to 400VDC; - 25 to +105°C for 450VDC																					
Rated Voltage Range	160 to 450VDC																					
Capacitance Range	3.3 to 680 $\mu$ F																					
Capacitance Tolerance	$\pm$ 20% (M) at +20°C, 120Hz																					
Leakage Current	<p>At +20°C</p> <table border="1"> <thead> <tr> <th>CV Product</th> <th>After 1 Minute</th> <th>After 5 Minutes</th> </tr> </thead> <tbody> <tr> <td>CV<math>\leq</math>1,000</td> <td>I = 0.1CV + 40<math>\mu</math>A</td> <td>I = 0.03CV + 40<math>\mu</math>A</td> </tr> <tr> <td>CV &gt; 1,000</td> <td>I = 0.04CV + 100<math>\mu</math>A</td> <td>I = 0.02CV + 25<math>\mu</math>A</td> </tr> </tbody> </table> <p>Where I = Leakage current (<math>\mu</math>A), C = Nominal capacitance (<math>\mu</math>F) and V = Rated voltage (V)</p>	CV Product	After 1 Minute	After 5 Minutes	CV $\leq$ 1,000	I = 0.1CV + 40 $\mu$ A	I = 0.03CV + 40 $\mu$ A	CV > 1,000	I = 0.04CV + 100 $\mu$ A	I = 0.02CV + 25 $\mu$ A												
CV Product	After 1 Minute	After 5 Minutes																				
CV $\leq$ 1,000	I = 0.1CV + 40 $\mu$ A	I = 0.03CV + 40 $\mu$ A																				
CV > 1,000	I = 0.04CV + 100 $\mu$ A	I = 0.02CV + 25 $\mu$ A																				
Dissipation Factor (Tan $\delta$ )	<p>At +20°C, 120Hz</p> <table border="1"> <thead> <tr> <th>Rated Voltage (V)</th> <th>160</th> <th>200</th> <th>250</th> <th>300</th> <th>400</th> <th>450</th> </tr> </thead> <tbody> <tr> <td>Tan <math>\delta</math> (DF)</td> <td>0.20</td> <td>0.20</td> <td>0.20</td> <td>0.24</td> <td>0.24</td> <td>0.24</td> </tr> </tbody> </table>	Rated Voltage (V)	160	200	250	300	400	450	Tan $\delta$ (DF)	0.20	0.20	0.20	0.24	0.24	0.24							
Rated Voltage (V)	160	200	250	300	400	450																
Tan $\delta$ (DF)	0.20	0.20	0.20	0.24	0.24	0.24																
Low Temperature Characteristics	<p>At 120Hz, impedance (Z) ratio between the -25°C or -40°C value and +20°C value shall not exceed the values given below.</p> <table border="1"> <thead> <tr> <th>Rated Voltage (V)</th> <th>160</th> <th>200</th> <th>250</th> <th>300</th> <th>400</th> <th>450</th> </tr> </thead> <tbody> <tr> <td>Z(-25°C) / Z(+20°C)</td> <td>3</td> <td>3</td> <td>3</td> <td>5</td> <td>5</td> <td>6</td> </tr> <tr> <td>Z(-40°C) / Z(+20°C)</td> <td>6</td> <td>6</td> <td>6</td> <td>6</td> <td>6</td> <td>-</td> </tr> </tbody> </table>	Rated Voltage (V)	160	200	250	300	400	450	Z(-25°C) / Z(+20°C)	3	3	3	5	5	6	Z(-40°C) / Z(+20°C)	6	6	6	6	6	-
Rated Voltage (V)	160	200	250	300	400	450																
Z(-25°C) / Z(+20°C)	3	3	3	5	5	6																
Z(-40°C) / Z(+20°C)	6	6	6	6	6	-																
Ripple Current Multipliers <i>Refer to Section 4 of the Mini-Glossary for explanation of Ripple Current Multipliers.</i>	<p>Frequency (Hz)</p> <table border="1"> <thead> <tr> <th>Capacitance (<math>\mu</math>F)</th> <th>120Hz</th> <th>1kHz</th> <th>10kHz</th> <th>100kHz</th> </tr> </thead> <tbody> <tr> <td><math>\leq</math>10<math>\mu</math>F</td> <td>1.00</td> <td>1.69</td> <td>2.61</td> <td>2.87</td> </tr> <tr> <td>22-100<math>\mu</math>F</td> <td>1.00</td> <td>1.99</td> <td>2.60</td> <td>2.69</td> </tr> <tr> <td><math>\geq</math>220<math>\mu</math>F</td> <td>1.00</td> <td>1.23</td> <td>1.58</td> <td>1.81</td> </tr> </tbody> </table>	Capacitance ( $\mu$ F)	120Hz	1kHz	10kHz	100kHz	$\leq$ 10 $\mu$ F	1.00	1.69	2.61	2.87	22-100 $\mu$ F	1.00	1.99	2.60	2.69	$\geq$ 220 $\mu$ F	1.00	1.23	1.58	1.81	
Capacitance ( $\mu$ F)	120Hz	1kHz	10kHz	100kHz																		
$\leq$ 10 $\mu$ F	1.00	1.69	2.61	2.87																		
22-100 $\mu$ F	1.00	1.99	2.60	2.69																		
$\geq$ 220 $\mu$ F	1.00	1.23	1.58	1.81																		
Load Life	<p>The following specifications shall be satisfied when the capacitors are restored to +20°C after subjecting them to the DC rated voltage for the specified test time at +105°C with the rated ripple current applied. The sum of DC voltage and peak AC voltage must not exceed the full rated voltage of the capacitors.</p> <table border="0"> <tr> <td>Case Diameter</td> <td>Test Time</td> </tr> <tr> <td><math>\varnothing</math>10mm</td> <td>8,000 hours</td> </tr> <tr> <td><math>\varnothing</math>12.5mm &amp; above</td> <td>10,000 hours</td> </tr> </table> <p>Capacitance change: <math>\leq \pm</math>20% of initial measured value            Tan <math>\delta</math> (DF) : <math>\leq</math> 200% of initial specified value            Leakage current : <math>\leq</math> initial specified value</p>	Case Diameter	Test Time	$\varnothing$ 10mm	8,000 hours	$\varnothing$ 12.5mm & above	10,000 hours															
Case Diameter	Test Time																					
$\varnothing$ 10mm	8,000 hours																					
$\varnothing$ 12.5mm & above	10,000 hours																					
Shelf Life	<p>The following specifications shall be satisfied when the capacitors are restored to +20°C after exposing them for 1,000 hours at +105°C without voltage applied. The rated voltage shall be applied to the capacitors for a minimum of 30 minutes, at least 24 hours and not more than 48 hours before the measurements.</p> <p>Capacitance change: <math>\leq \pm</math>20% of initial measured value            Tan <math>\delta</math> (DF) : <math>\leq</math> 200% of initial specified value            Leakage current : <math>\leq</math> 500% of initial specified value</p>																					
Others	Satisfies characteristic W of JIS C5141																					

# KMX Series

## Diagram of Dimensions

VB/Radial Lead

Unit: mm



Gas escape end seal for all case diameters.

For optional lead configurations and tape and ammo packaging, refer to the beginning of the Miniature section.

ØD	ØD' max.	L' max.	Ød	F ± 0.5
10	ØD+0.5	L+1.5	0.6	5.0
12.5	ØD+0.5	L+1.5	0.6	5.0
16	ØD+0.5	L+1.5	0.8	7.5
18	ØD+0.5	L+1.5	0.8	7.5

## Part Numbering System for KMX Series

When ordering, always specify complete catalog number for KMX Series.

**KMX**   **250**   **VB**   **33R**   **M**   **12X25**   **LL**

- Lead Length: LL is Standard.
- Case Code: See Case Sizes in Tables.
- Capacitance Tolerance: M = ± 20%
- Capacitance Value: Expressed in Microfarads. The first two digits are significant figures, and the third digit indicates the number of zeros for capacitance of 100µF or more. R indicates the decimal point for capacitance less than 100µF (e.g. R33 = .33µF; 3R3 = 3.3µF; 33R = 33µF; 331 = 330µF; 332 = 3,300µF; 333 = 33,000µF).
- Lead Configuration: VB = Radial Lead Terminals.
- DC Rated Voltage: Expressed in Volts (e.g. 250 = 250VWDC).
- Series Name: Indicates Basic Capacitor Design.

## Standard Voltage Ratings - VB/Radial Lead

Rated Voltage (VWDC)	Capacitance (µF)	Catalog Part Number	Nominal Case Size* D × L (mm)	Maximum Impedance (Ω) at +20°C, 100kHz	Maximum Ripple Current (mA rms) at +105°C	
					120Hz	100kHz
160 Volts 200 Volts Surge	33	KMX160VB33RM10X20LL	10 × 20	1.3	210	565
	47	KMX160VB47RM12X20LL	12.5 × 20	0.91	270	725
	68	KMX160VB68RM12X25LL	12.5 × 25	0.63	350	950
	68	KMX160VB68RM16X20LL	16 × 20	0.47	430	970
	100	KMX160VB101M16X25LL	16 × 25	0.27	475	1,280
	100	KMX160VB101M18X20LL	18 × 20	0.31	465	1,180
	150	KMX160VB151M10X50LL	10 × 50	0.77	545	1,020
	150	KMX160VB151M16X31LL	16 × 31.5	0.22	625	1,300
	150	KMX160VB151M18X25LL	18 × 25	0.23	600	1,300
	220	KMX160VB221M12X45LL	12.5 × 45	0.52	740	1,200
	220	KMX160VB221M16X31LL	16 × 31.5	0.22	750	1,300
220	KMX160VB221M18X25LL	18 × 25	0.23	725	1,300	

\*The case sizes in table are with no sleeve, refer to diagram for case sizes with sleeve.

# KMX Series

## Standard Voltage Ratings - VB/Radial Lead

Rated Voltage (WVDC)	Capacitance (µF)	Catalog Part Number	Nominal Case Size* D × L (mm)	Maximum Impedance (Ω) at +20°C, 100kHz	Maximum Ripple Current (mA rms) at +105°C	
					120Hz	100kHz

<b>160 Volts 200 Volts Surge</b>	330	KMX160VB331M16X40LL	16 × 40	0.35	990	1,540
	330	KMX160VB331M18X31LL	18 × 31.5	0.22	960	1,700
	470	KMX160VB471M16X55LL	16 × 55	0.25	1,220	1,870
	560	KMX160VB561M16X60LL	16 × 60	0.23	1,350	2,140
	680	KMX160VB681M18X55LL	18 × 55	0.20	1,480	2,330

<b>200 Volts 250 Volts Surge</b>	22	KMX200VB22RM10X20LL	10 × 20	1.5	165	440
	33	KMX200VB33RM12X20LL	12.5 × 20	0.91	230	590
	47	KMX200VB47RM12X20LL	12.5 × 20	0.91	270	780
	68	KMX200VB68RM12X25LL	12.5 × 25	0.63	350	950
	68	KMX200VB68RM16X20LL	16 × 20	0.47	430	970
	100	KMX200VB101M10X50LL	10 × 50	0.73	430	930
	100	KMX200VB101M16X25LL	16 × 25	0.27	425	1,280
	100	KMX200VB101M18X20LL	18 × 20	0.31	465	1,180
	150	KMX200VB151M12X40LL	12.5 × 40	0.56	615	1,200
	150	KMX200VB151M16X25LL	16 × 25	0.27	580	1,300
	220	KMX200VB221M12X55LL	12.5 × 55	0.39	790	1,420
	220	KMX200VB221M18X31LL	18 × 31.5	0.22	780	1,700
	330	KMX200VB331M16X50LL	16 × 50	0.28	1,020	1,870
	470	KMX200VB471M18X50LL	18 × 50	0.23	1,230	2,180
	560	KMX200VB561M18X60LL	18 × 60	0.18	1,330	2,390

<b>250 Volts 300 Volts Surge</b>	10	KMX250VB10RM10X20LL	10 × 20	3.5	110	300
	22	KMX250VB22RM12X20LL	12.5 × 20	2.3	185	480
	33	KMX250VB33RM12X25LL	12.5 × 25	1.7	250	630
	47	KMX250VB47RM12X25LL	12.5 × 25	1.7	295	630
	47	KMX250VB47RM16X20LL	16 × 20	1.1	300	750
	68	KMX250VB68RM10X50LL	10 × 50	0.73	340	840
	68	KMX250VB68RM16X25LL	16 × 25	0.78	390	1,000
	68	KMX250VB68RM18X20LL	18 × 20	0.90	385	900
	100	KMX250VB101M12X40LL	12.5 × 40	0.56	500	1,200
	100	KMX250VB101M16X31LL	16 × 31.5	0.63	520	1,400
	100	KMX250VB101M18X25LL	18 × 25	0.63	500	1,345
	150	KMX250VB151M12X55LL	12.5 × 55	0.39	650	1,420
	150	KMX250VB151M18X31LL	18 × 31.5	0.42	640	1,450
	220	KMX250VB221M16X50LL	16 × 50	0.28	820	1,710
	220	KMX250VB221M18X40LL	18 × 40	0.35	820	1,485
330	KMX250VB331M18X50LL	18 × 50	0.23	1,030	2,140	

<b>300 Volts 350 Volts Surge</b>	22	KMX300VB22RM12X20LL	12.5 × 20	2.1	185	270
	33	KMX300VB33RM16X20LL	16 × 20	0.91	250	600
	47	KMX300VB47RM10X50LL	10 × 50	1.2	270	705
	47	KMX300VB47RM16X25LL	16 × 25	0.73	325	700
	47	KMX300VB47RM18X20LL	18 × 20	0.75	350	750
	68	KMX300VB68RM12X40LL	12.5 × 40	1.1	335	895
	68	KMX300VB68RM16X31LL	16 × 31.5	0.49	420	1,100
	68	KMX300VB68RM18X25LL	18 × 25	0.53	400	875
	100	KMX300VB101M12X55LL	12.5 × 55	0.71	435	1,050
	100	KMX300VB101M18X31LL	18 × 31.5	0.40	530	1,170
	150	KMX300VB151M16X50LL	16 × 50	0.51	690	1,400
	220	KMX300VB221M18X55LL	18 × 55	0.32	840	1,610

<b>400 Volts 450 Volts Surge</b>	10	KMX400VB10RM10X20LL	10 × 20	2.9	110	180
	22	KMX400VB22RM12X25LL	12.5 × 25	1.3	200	300
	22	KMX400VB22RM16X20LL	16 × 20	0.91	200	600
	33	KMX400VB33RM10X40LL	10 × 40	1.7	215	640
	33	KMX400VB33RM16X20LL	16 × 20	0.91	250	600
	47	KMX400VB47RM12X40LL	12.5 × 40	1.1	280	775
	47	KMX400VB47RM16X25LL	16 × 25	0.73	325	700
	47	KMX400VB47RM18X20LL	18 × 20	0.75	350	750

\*The case sizes in table are with no sleeve, refer to diagram for case sizes with sleeve.

# KMX Series

## Standard Voltage Ratings - VB/Radial Lead

Rated Voltage (WVDC)	Capacitance (μF)	Catalog Part Number	Nominal Case Size* D × L (mm)	Maximum Impedance (Ω) at +20°C, 100kHz	Maximum Ripple Current (mA rms) at +105°C	
					120Hz	100kHz
<b>400 Volts</b> 450 Volts Surge	68	KMX400VB68RM12X50LL	12.5 × 50	0.81	335	895
	68	KMX400VB68RM16X31LL	16 × 31.5	0.49	420	1,100
	68	KMX400VB68RM18X25LL	18 × 25	0.53	400	875
	100	KMX400VB101M16X40LL	16 × 40	0.63	540	1,210
	100	KMX400VB101M18X35LL	18 × 35.5	0.34	545	1,250
	150	KMX400VB151M16X60LL	16 × 60	0.41	695	1,490
<b>450 Volts</b> 500 Volts Surge	3.3	KMX450VB3R3M10X20LL	10 × 20	6.5	60	150
	4.7	KMX450VB4R7M12X20LL	12.5 × 20	3.6	80	200
	10	KMX450VB10RM12X25LL	12.5 × 25	2.5	125	315
	22	KMX450VB22RM10X45LL	10 × 45	2.3	185	520
	22	KMX450VB22RM16X25LL	16 × 25	1.7	210	570
	22	KMX450VB22RM18X20LL	18 × 20	2.1	200	550
	33	KMX450VB33RM12X40LL	12.5 × 40	1.3	235	710
	33	KMX450VB33RM16X31LL	16 × 31.5	1.1	275	620
	33	KMX450VB33RM18X25LL	18 × 25	1.1	280	590
	47	KMX450VB47RM12X50LL	12.5 × 50	0.95	300	845
	47	KMX450VB47RM18X31LL	18 × 31.5	0.93	340	900
	68	KMX450VB68RM16X40LL	16 × 40	0.71	445	985
	68	KMX450VB68RM18X35LL	18 × 35.5	0.71	420	980
	100	KMX450VB101M16X60LL	16 × 60	0.45	570	1,300
	150	KMX450VB151M18X60LL	18 × 60	0.41	690	1,510

\* The case sizes in table are with no sleeve, refer to diagram for case sizes with sleeve.

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