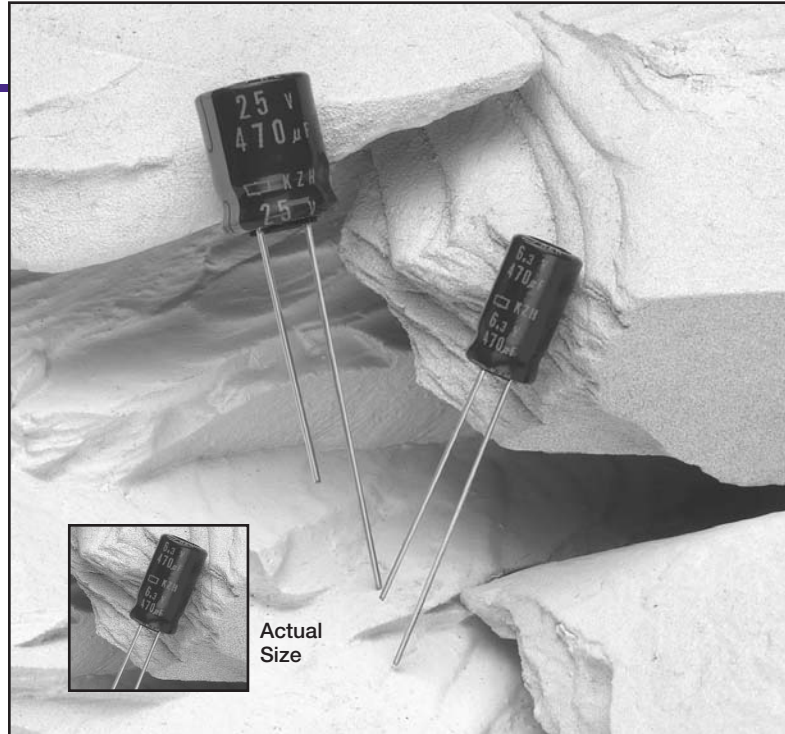


- **Miniature**
- **Ultra Low Impedance**
- **Long Life  
5k-6k Hours**
- **For VRM Circuits**
- **+105°C  
Maximum  
Temperature**



The KZH series is a new ultra low impedance and long life capacitor series that uses a unique water base electrolyte. This series is designed for use in personal computers and storage equipment and is specifically targeted for use in motherboard VRM circuits. The KZH series capacitors have a life expectancy of 5,000 to 6,000 hours (depending on case diameter) at +105°C with the rated ripple current applied. This high reliability series has a voltage range of 6.3 to 35 volts and a capacitance range of 47 to 8,200 $\mu$ F.

The KZH series capacitors are non-solvent proof. Refer to the Mini-Glossary for cleaning guidelines and recommended cleaning agents that are compatible with United Chemi-Con products.

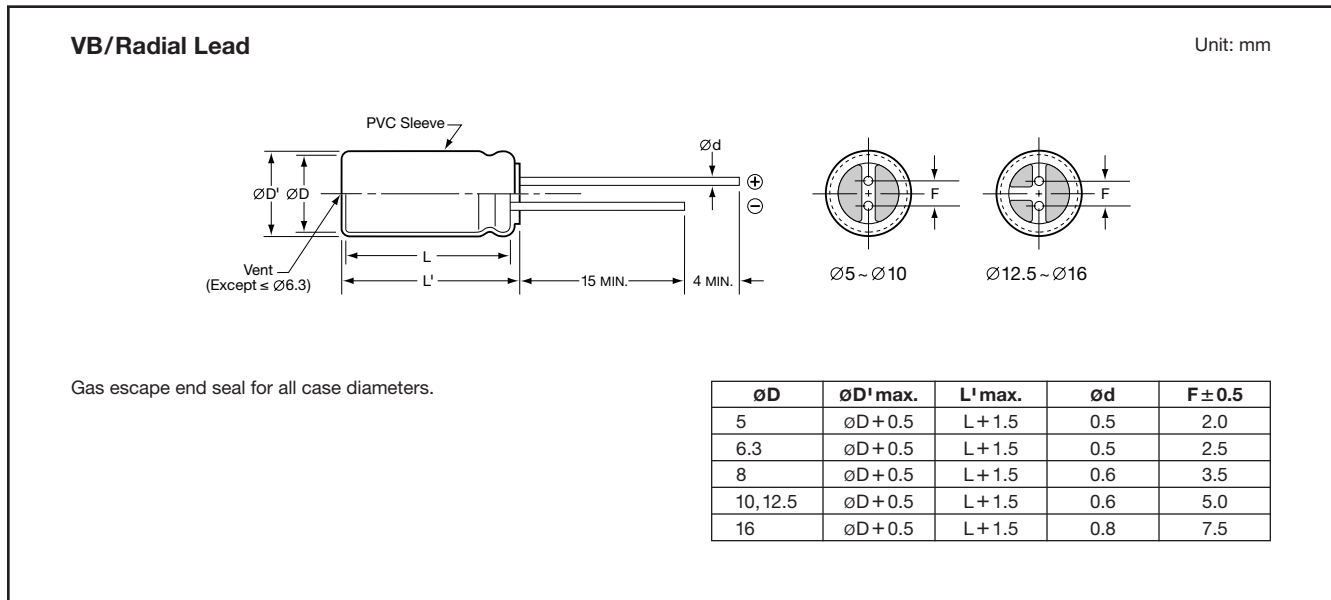
## Summary of Specifications

- **Radial leads.**
- **Capacitance range: 47 to 8,200 $\mu$ F.**
- **Voltage range: 6.3 to 35VDC.**
- **Category temperature range: -40°C to +105°C.**
- **Leakage current: 0.01CV or 3 $\mu$ A, whichever is greater, after 2 minutes at +20°C.**
- **Standard capacitance tolerance:  $\pm$ 20%**
- **Nominal case size (D  $\times$  L): 5  $\times$  11mm to 16  $\times$  25mm.**
- **Rated lifetime: 5,000 to 6,000 hours at +105°C with the rated ripple current applied, depending on case diameter.**

## KZH Specifications

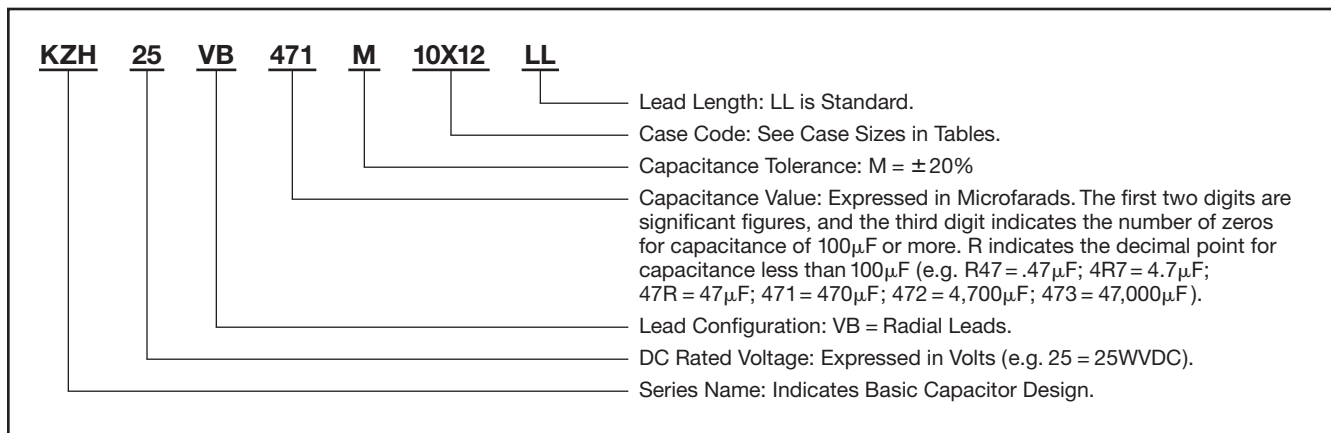
Item	Characteristics																														
Category Temperature Range	- 40 to +105°C																														
Rated Voltage Range	6.3 to 35VDC																														
Capacitance Range	47 to 8,200 $\mu$ F																														
Capacitance Tolerance	$\pm$ 20% (M) at +20°C, 120Hz																														
Leakage Current	I = 0.01CV or 3 $\mu$ A, whichever is greater, after 2 minutes at +20°C. Where I = Max. leakage current ( $\mu$ A), C = Nominal capacitance ( $\mu$ F) and V = Rated voltage (V)																														
Dissipation Factor (Tan $\delta$ )	At +20°C, 120Hz <table border="1"> <tr> <td>Rated Voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> </tr> <tr> <td>Tan <math>\delta</math> (DF)</td> <td>0.22</td> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> </tr> </table> When nominal capacitance exceeds 1,000 $\mu$ F, add 0.02 to the values above for each 1,000 $\mu$ F increase.	Rated Voltage (V)	6.3	10	16	25	35	Tan $\delta$ (DF)	0.22	0.19	0.16	0.14	0.12																		
Rated Voltage (V)	6.3	10	16	25	35																										
Tan $\delta$ (DF)	0.22	0.19	0.16	0.14	0.12																										
Low Temperature Characteristics	At 120Hz, impedance (Z) ratio between the -25°C or -40°C value and +20°C value shall not exceed the values given below. <table border="1"> <tr> <td>Rated Voltage (V)</td> <td>6.3-35</td> </tr> <tr> <td>Z(-25°C) / Z(+20°C)</td> <td>2</td> </tr> <tr> <td>Z(-40°C) / Z(+20°C)</td> <td>3</td> </tr> </table>	Rated Voltage (V)	6.3-35	Z(-25°C) / Z(+20°C)	2	Z(-40°C) / Z(+20°C)	3																								
Rated Voltage (V)	6.3-35																														
Z(-25°C) / Z(+20°C)	2																														
Z(-40°C) / Z(+20°C)	3																														
Rated Ripple Current Multipliers <i>Refer to Section 4 of the Mini-Glossary for explanation of Rated Ripple Current Multipliers.</i>	Frequency (Hz) <table border="1"> <tr> <td>Capacitance (<math>\mu</math>F)</td> <td>120Hz</td> <td>1kHz</td> <td>10kHz</td> <td>100kHz</td> </tr> <tr> <td>47-150<math>\mu</math>F</td> <td>0.40</td> <td>0.75</td> <td>0.90</td> <td>1.00</td> </tr> <tr> <td>220-560<math>\mu</math>F</td> <td>0.50</td> <td>0.85</td> <td>0.94</td> <td>1.00</td> </tr> <tr> <td>680-1,800<math>\mu</math>F</td> <td>0.60</td> <td>0.87</td> <td>0.95</td> <td>1.00</td> </tr> <tr> <td>2,200-3,900<math>\mu</math>F</td> <td>0.75</td> <td>0.90</td> <td>0.95</td> <td>1.00</td> </tr> <tr> <td>4,700-8,200<math>\mu</math>F</td> <td>0.85</td> <td>0.95</td> <td>0.98</td> <td>1.00</td> </tr> </table>	Capacitance ( $\mu$ F)	120Hz	1kHz	10kHz	100kHz	47-150 $\mu$ F	0.40	0.75	0.90	1.00	220-560 $\mu$ F	0.50	0.85	0.94	1.00	680-1,800 $\mu$ F	0.60	0.87	0.95	1.00	2,200-3,900 $\mu$ F	0.75	0.90	0.95	1.00	4,700-8,200 $\mu$ F	0.85	0.95	0.98	1.00
Capacitance ( $\mu$ F)	120Hz	1kHz	10kHz	100kHz																											
47-150 $\mu$ F	0.40	0.75	0.90	1.00																											
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4,700-8,200 $\mu$ F	0.85	0.95	0.98	1.00																											
Endurance (Load Life)	The following specifications shall be satisfied when the capacitors are restored to +20°C after subjecting them to DC voltage for the specified test time at +105°C with the rated ripple current applied. The sum of the DC voltage and peak AC voltage must not exceed the full rated voltage of the capacitors. <table border="1"> <tr> <td>Case Diameter</td> <td><math>\varnothing</math>5 &amp; <math>\varnothing</math>6mm</td> <td><math>\varnothing</math>8mm &amp; Above</td> </tr> <tr> <td>Test Time</td> <td>5,000 Hours</td> <td>6,000 Hours</td> </tr> </table> Capacitance change: $\leq$ $\pm$ 30% of initial measured value for 6.3-10V $\leq$ $\pm$ 25% of initial measured value for 16-35V Tan $\delta$ (DF) : $\leq$ 200% of initial specified value Leakage current : $\leq$ initial specified value	Case Diameter	$\varnothing$ 5 & $\varnothing$ 6mm	$\varnothing$ 8mm & Above	Test Time	5,000 Hours	6,000 Hours																								
Case Diameter	$\varnothing$ 5 & $\varnothing$ 6mm	$\varnothing$ 8mm & Above																													
Test Time	5,000 Hours	6,000 Hours																													
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to +20°C after exposing them for 500 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. Capacitance change: $\leq$ $\pm$ 30% of initial measured value for 6.3-10V $\leq$ $\pm$ 25% of initial measured value for 16-35V Tan $\delta$ (DF) : $\leq$ 200% of initial specified value Leakage current : $\leq$ initial specified value																														

## Diagram of Dimensions



## Part Numbering System for KZH Series

When ordering, always specify complete catalog number for KZH Series.\*



\*Refer to our web site for specifications and suffix codes for lead cut/forming options and taping and ammo box packaging.

## Standard Voltage Ratings - VB/Radial Lead

Rated Voltage (WVDC)	Capacitance (µF)	Catalog Part Number	Nominal Case Size* D × L (mm)	Maximum Impedance (Ω) at		Rated Ripple Current (mA rms) at +105°C, 100kHz
				+20°C, 100kHz	-10°C, 100kHz	
6.3 Volts 8 Volts Surge	220	KZH6.3VB221M5X11LL	5 × 11	0.24	0.80	330
	470	KZH6.3VB471M6X11LL	6.3 × 11	0.11	0.35	500
	820	KZH6.3VB821M8X11LL	8 × 11.5	0.062	0.19	900
	1,200	KZH6.3VB122M8X15LL	8 × 15	0.048	0.15	1,210
	1,200	KZH6.3VB122M10X12LL	10 × 12.5	0.045	0.14	1,240
	1,500	KZH6.3VB152M8X20LL	8 × 20	0.033	0.11	1,410
	1,800	KZH6.3VB182M10X16LL	10 × 16	0.032	0.10	1,650
	2,200	KZH6.3VB222M10X20LL	10 × 20	0.020	0.060	1,960
	2,700	KZH6.3VB272M10X25LL	10 × 25	0.018	0.054	2,250
	3,900	KZH6.3VB392M12X20LL	12.5 × 20	0.017	0.043	2,480
	4,700	KZH6.3VB472M12X25LL	12.5 × 25	0.015	0.038	2,900
	5,600	KZH6.3VB562M12X30LL	12.5 × 30	0.013	0.033	3,450
	6,800	KZH6.3VB682M12X35LL	12.5 × 35	0.012	0.031	3,570
	6,800	KZH6.3VB682M16X20LL	16 × 20	0.015	0.038	3,250
8,200	KZH6.3VB822M16X25LL	16 × 25	0.013	0.035	3,630	

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

## Standard Voltage Ratings - VB/Radial Lead

Rated Voltage (VWDC)	Capacitance (μF)	Catalog Part Number	Nominal Case Size* D × L (mm)	Maximum Impedance (Ω) at		Rated Ripple Current (mA rms) at +105°C, 100kHz
				+20°C, 100kHz	-10°C, 100kHz	
<b>10 Volts</b> 13 Volts Surge	150	KZH10VB151M5X11LL	5 × 11	0.24	0.80	330
	330	KZH10VB331M6X11LL	6.3 × 11	0.11	0.35	500
	680	KZH10VB681M8X11LL	8 × 11.5	0.062	0.19	900
	1,000	KZH10VB102M8X15LL	8 × 15	0.048	0.15	1,210
	1,000	KZH10VB102M10X12LL	10 × 12.5	0.045	0.14	1,240
	1,500	KZH10VB152M8X20LL	8 × 20	0.033	0.11	1,410
	1,500	KZH10VB152M10X16LL	10 × 16	0.032	0.10	1,650
	1,800	KZH10VB182M10X20LL	10 × 20	0.020	0.060	1,960
	2,200	KZH10VB222M10X25LL	10 × 25	0.018	0.054	2,250
	3,300	KZH10VB332M12X20LL	12.5 × 20	0.017	0.043	2,480
	3,900	KZH10VB392M12X25LL	12.5 × 25	0.015	0.038	2,900
	4,700	KZH10VB472M12X30LL	12.5 × 30	0.013	0.033	3,450
	4,700	KZH10VB472M16X20LL	16 × 20	0.015	0.038	3,250
	5,600	KZH10VB562M12X35LL	12.5 × 35	0.012	0.031	3,570
6,800	KZH10VB682M16X25LL	16 × 25	0.013	0.035	3,630	
<b>16 Volts</b> 20 Volts Surge	100	KZH16VB101M5X11LL	5 × 11	0.24	0.80	330
	220	KZH16VB221M6X11LL	6.3 × 11	0.11	0.35	500
	470	KZH16VB471M8X11LL	8 × 11.5	0.062	0.19	900
	680	KZH16VB681M8X15LL	8 × 15	0.048	0.15	1,210
	680	KZH16VB681M10X12LL	10 × 12.5	0.045	0.14	1,240
	1,000	KZH16VB102M8X20LL	8 × 20	0.033	0.11	1,410
	1,000	KZH16VB102M10X16LL	10 × 16	0.032	0.10	1,650
	1,500	KZH16VB152M10X20LL	10 × 20	0.020	0.060	1,960
	1,800	KZH16VB182M10X25LL	10 × 25	0.018	0.054	2,250
	2,200	KZH16VB222M12X20LL	12.5 × 20	0.017	0.043	2,480
	2,700	KZH16VB272M12X25LL	12.5 × 25	0.015	0.038	2,900
	3,300	KZH16VB332M12X30LL	12.5 × 30	0.013	0.033	3,450
	3,300	KZH16VB332M16X20LL	16 × 20	0.015	0.038	3,250
	3,900	KZH16VB392M12X35LL	12.5 × 35	0.012	0.031	3,570
4,700	KZH16VB472M16X25LL	16 × 25	0.013	0.035	3,630	
<b>25 Volts</b> 32 Volts Surge	68	KZH25VB68RM5X11LL	5 × 11	0.24	0.80	330
	150	KZH25VB151M6X11LL	6.3 × 11	0.11	0.35	500
	330	KZH25VB331M8X11LL	8 × 11.5	0.062	0.19	900
	390	KZH25VB391M8X15LL	8 × 15	0.048	0.15	1,210
	470	KZH25VB471M10X12LL	10 × 12.5	0.045	0.14	1,240
	560	KZH25VB561M8X20LL	8 × 20	0.033	0.11	1,410
	680	KZH25VB681M10X16LL	10 × 16	0.032	0.10	1,650
	820	KZH25VB821M10X20LL	10 × 20	0.020	0.060	1,960
	1,000	KZH25VB102M10X25LL	10 × 25	0.018	0.054	2,250
	1,500	KZH25VB152M12X20LL	12.5 × 20	0.017	0.043	2,480
	1,800	KZH25VB182M12X25LL	12.5 × 25	0.015	0.038	2,900
	2,200	KZH25VB222M12X30LL	12.5 × 30	0.013	0.033	3,450
	2,200	KZH25VB222M16X20LL	16 × 20	0.015	0.038	3,250
	2,700	KZH25VB272M12X35LL	12.5 × 35	0.012	0.031	3,570
	3,300	KZH25VB332M16X25LL	16 × 25	0.013	0.035	3,630
	<b>35 Volts</b> 44 Volts Surge	47	KZH35VB47RM5X11LL	5 × 11	0.24	0.80
100		KZH35VB101M6X11LL	6.3 × 11	0.11	0.35	500
220		KZH35VB221M8X11LL	8 × 11.5	0.062	0.19	900
270		KZH35VB271M8X15LL	8 × 15	0.048	0.15	1,210
330		KZH35VB331M10X12LL	10 × 12.5	0.045	0.14	1,240
390		KZH35VB391M8X20LL	8 × 20	0.033	0.11	1,410
470		KZH35VB471M10X16LL	10 × 16	0.032	0.10	1,650
560		KZH35VB561M10X20LL	10 × 20	0.020	0.060	1,960
680		KZH35VB681M10X25LL	10 × 25	0.018	0.054	2,250
1,000		KZH35VB102M12X20LL	12.5 × 20	0.017	0.043	2,480

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

## Standard Voltage Ratings - VB/Radial Lead

Rated Voltage (WVDC)	Capacitance (μF)	Catalog Part Number	Nominal Case Size* D × L (mm)	Maximum Impedance (Ω) at		Rated Ripple Current (mA rms) at +105°C, 100kHz
				+20°C, 100kHz	-10°C, 100kHz	
<b>35 Volts 44 Volts Surge</b>	1,200	KZH35VB122M12X25LL	12.5 × 25	0.015	0.038	2,900
	1,500	KZH35VB152M12X30LL	12.5 × 30	0.013	0.033	3,450
	1,500	KZH35VB152M16X20LL	16 × 20	0.015	0.038	3,250
	1,800	KZH35VB182M12X35LL	12.5 × 35	0.012	0.031	3,570
	2,200	KZH35VB222M16X25LL	16 × 25	0.013	0.035	3,630

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