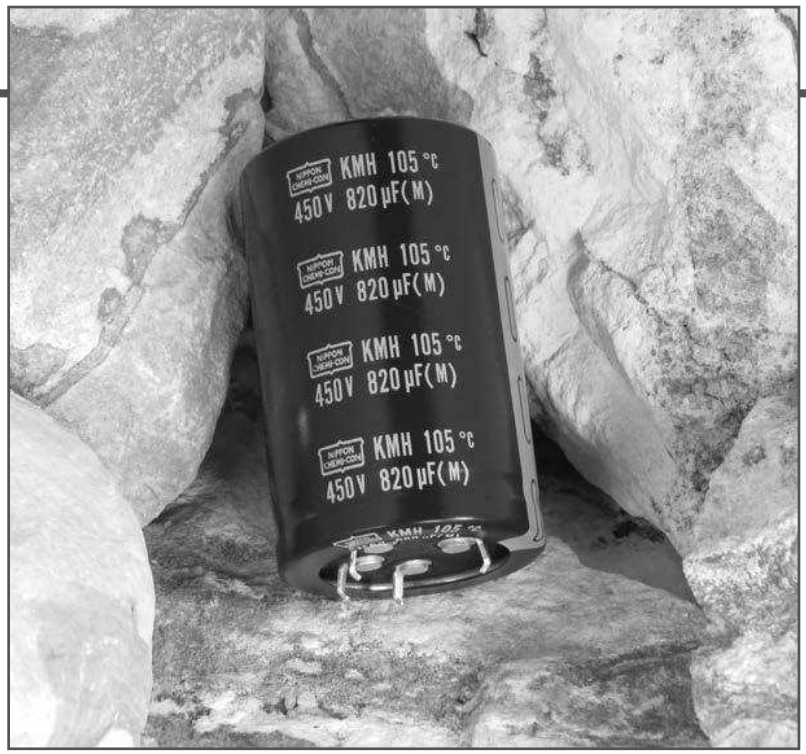
KMH Series UPDATE

UNITED CHEMI-CON

- **Snap Mount**
- **Large Capacitance**
- **High CV**
- **High Ripple**
- **RoHS Compliant**
- **+105°C Maximum Temperature**



The KMH series capacitors are the standard +105°C high temperature, large capacitance snap-in capacitors that offer a wide voltage range of 6.3 to 450VDC. The endurance for the KMH series is 2,000 hours at +105°C with the rated ripple current applied. With very high CV values and high ripple current capabilities these capacitors are ideal for use in power supply filter circuits.

All KMH series capacitors are RoHS compliant and available in a variety of sizes, with or without an end disk, and encased in a standard Pb-free PVC sleeve or an optional PET sleeve. The KMH capacitors are available with snap-in terminals (2 or 4-pin) depending on can diameter. Straight standoff terminals (5 pin) are optional for the 40mm can diameter.

Summary of Specifications

- **PC board 2 or 4-pin snap-in; optional 5-pin (Ø40 only) straight standoff terminals.**
- **Capacitance range: 47 to 220,000μF.**
- **Voltage range: 6.3 to 450VDC.**
- **Category temperature range: −40°C to +105°C for 6.3 to 100V; −25°C to +105°C for 160 to 450V.**
- **Leakage current: 0.02CV(μA) or 3mA, whichever is smaller, after 5 minutes at +20°C.**
- **Standard capacitance tolerance: ±20%**
- **Nominal case size (D×L): 22×20mm to 40×80mm.**
- **Rated lifetime: 2,000 hours at +105°C with the rated ripple current applied.**

KMH Specifications - Snap Mount

Item	Characteristics
Category Temperature Range	−40 to +105°C for 6.3 to 100VDC; −25 to +105°C for 160 to 450VDC
Rated Voltage Range	6.3 to 450VDC
Capacitance Range	47 to 220,000μF
Capacitance Tolerance	±20% (M) at +20°C, 120Hz
Leakage Current	I = 0.02CV (μA) or 3mA, whichever is smaller, after 5 minutes at +20°C. Where I = Max. leakage current (μA), C = Nominal capacitance (μF) and V = Rated voltage (V)
Dissipation Factor (Tan δ)	At +20°C, 120Hz

Rated Voltage (V)	6.3	10	16	25	35	50	63-100	160-250	315-450
Tan δ (DF) Max.†	0.60	0.50	0.40	0.30	0.25	0.20	0.15	0.10*	0.15

*0.15 maximum for 35mm and 40mm diameter or 20mm in length.
†For rated voltages ≤63V, values are not valid for case sizes >35mm in diameter or >50mm in length.

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.

Rated Voltage (V)	6.3-16	25	35	50, 63	80, 100	160-400	450
Z(−25°C)/Z(+20°C)	4	3	3	2	2	4	8
Z(−40°C)/Z(+20°C)	15	10	8	6	5	—	—

Rated Ripple Current Multipliers

Ambient Temperature (°C)

+45°C	+60°C	+70°C	+85°C	+105°C
2.64	2.23	2.12	1.73	1.00

Frequency (Hz)

DC Rated Voltage	50Hz	120Hz	300Hz	1kHz	10kHz	100kHz
6.3-50V	0.95	1.00	1.03	1.05	1.08	1.08
63-100V	0.92	1.00	1.07	1.13	1.19	1.20
160-250V	0.81	1.00	1.17	1.32	1.45	1.50
315-450V	0.77	1.00	1.16	1.30	1.41	1.43

Endurance (Load Life)

The following specifications shall be satisfied when the capacitors are restored to +20°C after subjecting them to DC voltage for 2,000 hours 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.

Capacitance change: ≤ ±20% of initial measured value
Tan δ (DF) : ≤ 200% of initial specified value
Leakage current : ≤ initial specified value

Shelf Life

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.

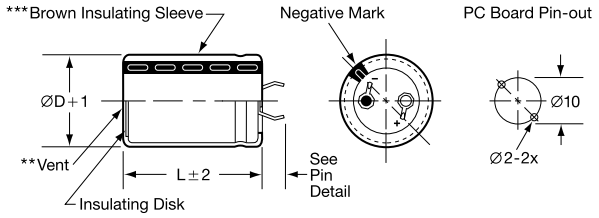
Capacitance change: ≤ ±20% of initial measured value
Tan δ (DF) : ≤ 150% of initial specified value
Leakage current : ≤ initial specified value

Diagram of Dimensions - Snap Mount

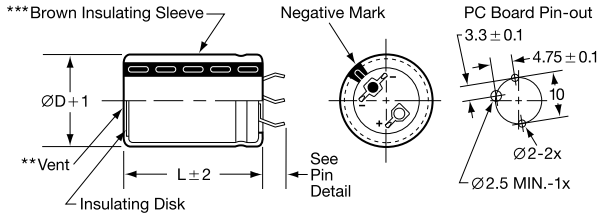
Snap Mount

Unit: mm

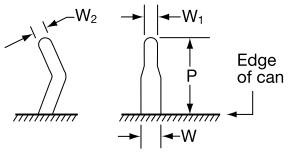
VSN Snap-in Ø22 and Ø35 standard
VNN Snap-in Ø22 and Ø35 optional



VEN Snap-in Ø30 and Ø35 optional



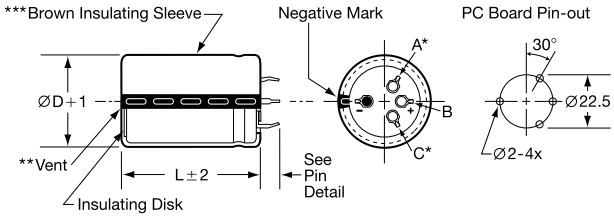
VS, VE & VN Snap-in Pin Dimensions



Type	P	W	W_1	W_2
VSN Ø22-Ø30	4.0±0.5	1.5±0.2	0.8±0.1	0.8±0.1
VSN Ø35	3.5±0.5			
VNN Ø22-Ø35	5.8±1.0			
VEN Ø30-Ø35	4.0±0.5			
VSD Ø35-Ø40	3.5±1.0			
VND Ø35-Ø40	5.8±1.0			

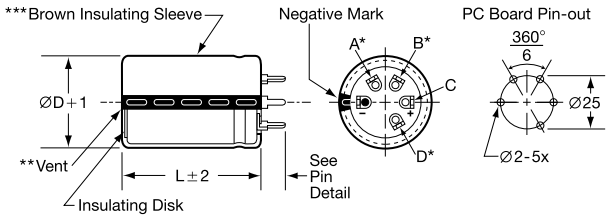
Snap Mount

VND Snap-in Ø35 and Ø40 standard
VSD Snap-in Ø35 and Ø40 optional

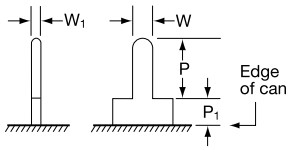


Straight Pin Mount

VQT Straight Standoff Ø40 optional



VQ Straight Standoff Pin Dimensions



Type	P	P_1	W	W_1
Standoff Pin (VQ)	3.75±1.0	2.0 max.	1.5±0.1	0.7±0.2

CAUTION:

*Use the blank terminals for mechanical support only. The blank terminals must not be connected to a solder trace on the PC board but be electrically isolated from the negative and positive terminals.

**The vent may be located either on the bottom or side of the can.

***The brown sleeve with gray stripe negative pin indicator is standard. Also note in some cases, the sleeve color may change slightly due to the operating conditions, however, the discoloration will not impair capacitor function.

Part Numbering System for KMH Series

When ordering, always specify complete 18-field global part number.

18 Fields

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
E	K	M	H	2	0	1	V	S	N	5	6	1	M	P	4	5	T

9 Supplement Code. Field 18.
All construction options listed have Sn100% terminal plating.
- T = Pb-free PVC sleeve with end disk.
- M = Pb-free PVC sleeve without end disk.
- W = PET sleeve with end disk.
- S = PET sleeve without end disk.

8 Case Size. Fields 15, 16 and 17.
The single letter diameter code is inserted in field 15.
- P = Ø22mm
- Q = Ø25.4mm
- R = Ø30mm
- A = Ø35mm
- B = Ø40mm

The double digit length code is inserted in fields 16 and 17.
- 20 = 20mm
- 25 = 25mm
- 30 = 30mm
- 35 = 35mm
- 40 = 40mm
- 45 = 45mm
- 50 = 50mm
- 63 = 63mm
- 80 = 80mm

7 Capacitance Tolerance. Field 14.
- M = ±20%

6 Capacitance. Fields 11, 12 and 13.
Expressed in Microfarads. The first two digits are significant figures inserted in fields 11 and 12, and the third digit inserted in field 13 indicates the number of zeros for capacitance of 10μF or more. R indicates the decimal point for capacitance less than 10μF (e.g. 5R6 = 5.6μF; 560 = 56μF; 561 = 560μF; 562 = 5,600μF; 563 = 56,000μF).

5 Dummy Terminals. Field 10.
- N = No dummy terminals.
- D = 2 dummy terminals.
- T = 3 dummy terminals.

4 Terminal Type. Fields 8 and 9.
- VS = Snap-in pins, 4.0mm in length, 3.5mm for Ø35 only.
- VN = Snap-in pins, 5.8mm in length.
- VE = Snap-in pins, polarized, Ø30 or Ø35 option.
- VQ = Straight standoff pins.

3 DC Rated Voltage. Fields 5, 6 and 7.
Expressed in Volts. The first two digits are significant figures inserted in fields 5 and 6, and the third digit inserted in field 7 indicates the number of zeros for rated voltage of 10VDC or more. R indicates the decimal point for rated voltage less than 10VDC (e.g. 2R0 = 2.0VDC; 200 = 20VDC; 201 = 200VDC).

Rule Exception: Coding for rated voltage 315VDC = 3B1.

2 Series Name. Fields 2, 3 and 4.
Enter the 3-letter/digit series name in fields 2, 3 and 4. If the series name is only 2 letters/digits, place a dash in field 4. For a series name with more than 3 letters/digits, refer to the individual series for the appropriate 3-field series name.

1 Capacitor Type. Field 1.
Aluminum Electrolytic Capacitor (Polar).

KMH Series

Standard Voltage Ratings - Snap Mount

Rated Voltage (WVDC)	Capacitance (µF)	Global Part Number†	Nominal Case Size* D × L (mm)	Case Size Code	Maximum ESR (Ω) at +20°C, 120Hz	Rated Ripple Current (A rms) at +105°C, 120Hz
6.3 Volts 8 Volts Surge	12,000	EKMH6R3VSN123MP25T	22 × 25	P25	0.083	1.54
	15,000	EKMH6R3VSN153MP25T	22 × 25	P25	0.066	1.72
	18,000	EKMH6R3VSN183MP30T	22 × 30	P30	0.055	1.95
	22,000	EKMH6R3VSN223MP35T	22 × 35	P35	0.045	2.23
	27,000	EKMH6R3VSN273MP40T	22 × 40	P40	0.037	2.54
	33,000	EKMH6R3VSN333MP45T	22 × 45	P45	0.03	2.88
	18,000	EKMH6R3VSN183MQ25T	25.4 × 25	Q25	0.055	1.96
	22,000	EKMH6R3VSN223MQ30T	25.4 × 30	Q30	0.045	2.25
	27,000	EKMH6R3VSN273MQ35T	25.4 × 35	Q35	0.037	2.57
	33,000	EKMH6R3VSN333MQ40T	25.4 × 40	Q40	0.03	2.93
	39,000	EKMH6R3VSN393MQ40T	25.4 × 40	Q40	0.026	3.18
	47,000	EKMH6R3VSN473MQ50T	25.4 × 50	Q50	0.021	3.69
	22,000	EKMH6R3VSN223MR25T	30 × 25	R25	0.045	2.28
	27,000	EKMH6R3VSN273MR25T	30 × 25	R25	0.037	2.52
	33,000	EKMH6R3VSN333MR30T	30 × 30	R30	0.03	2.89
	39,000	EKMH6R3VSN393MR35T	30 × 35	R35	0.026	3.26
	47,000	EKMH6R3VSN473MR40T	30 × 40	R40	0.021	3.69
	56,000	EKMH6R3VSN563MR45T	30 × 45	R45	0.018	4.16
	68,000	EKMH6R3VSN683MR50T	30 × 50	R50	0.015	4.71
	33,000	EKMH6R3VSN333MA25T	35 × 25	A25	0.03	2.93
	39,000	EKMH6R3VSN393MA30T	35 × 30	A30	0.026	3.4
	47,000	EKMH6R3VSN473MA30T	35 × 30	A30	0.021	3.73
	56,000	EKMH6R3VSN563MA35T	35 × 35	A35	0.018	4.12
	68,000	EKMH6R3VSN683MA40T	35 × 40	A40	0.015	4.69
	82,000	EKMH6R3VSN823MA45T	35 × 45	A45	0.012	5.32
	120,000	EKMH6R3VND124MA63T	35 × 63	A63	0.011	6.9
	180,000	EKMH6R3VND184MA80T	35 × 80	A80	0.008	9.04
	56,000	EKMH6R3VND563MB25T	40 × 25	B25	0.026	3.87
	68,000	EKMH6R3VND683MB30T	40 × 30	B30	0.02	4.47
	82,000	EKMH6R3VND823MB35T	40 × 35	B35	0.018	5.09
	100,000	EKMH6R3VND104MB40T	40 × 40	B40	0.014	5.79
	150,000	EKMH6R3VND154MB50T	40 × 50	B50	0.011	7.54
	180,000	EKMH6R3VND184MB63T	40 × 63	B63	0.009	8.82
	220,000	EKMH6R3VND224MB80T	40 × 80	B80	0.008	10.61
10 Volts 13 Volts Surge	10,000	EKMH100VSN103MP25T	22 × 25	P25	0.083	1.55
	12,000	EKMH100VSN123MP30T	22 × 30	P30	0.069	1.77
	15,000	EKMH100VSN153MP30T	22 × 30	P30	0.055	1.97
	18,000	EKMH100VSN183MP35T	22 × 35	P35	0.046	2.21
	22,000	EKMH100VSN223MP40T	22 × 40	P40	0.038	2.51
	27,000	EKMH100VSN273MP50T	22 × 50	P50	0.031	2.93
	15,000	EKMH100VSN153MQ25T	25.4 × 25	Q25	0.055	1.96
	18,000	EKMH100VSN183MQ30T	25.4 × 30	Q30	0.046	2.23
	22,000	EKMH100VSN223MQ35T	25.4 × 35	Q35	0.038	2.54
	27,000	EKMH100VSN273MQ40T	25.4 × 40	Q40	0.031	2.9
	33,000	EKMH100VSN333MQ45T	25.4 × 45	Q45	0.025	3.3
	39,000	EKMH100VSN393MQ50T	25.4 × 50	Q50	0.021	3.68
	22,000	EKMH100VSN223MR25T	30 × 25	R25	0.038	2.4
	27,000	EKMH100VSN273MR30T	30 × 30	R30	0.031	2.87
	33,000	EKMH100VSN333MR35T	30 × 35	R35	0.025	3.28
	39,000	EKMH100VSN393MR40T	30 × 40	R40	0.021	3.69
	47,000	EKMH100VSN473MR45T	30 × 45	R45	0.018	4.17
	56,000	EKMH100VSN563MR50T	30 × 50	R50	0.015	4.68
	27,000	EKMH100VSN273MA25T	35 × 25	A25	0.031	2.73
	33,000	EKMH100VSN333MA30T	35 × 30	A30	0.025	3.16
	39,000	EKMH100VSN393MA30T	35 × 30	A30	0.021	3.43
	47,000	EKMH100VSN473MA35T	35 × 35	A35	0.018	3.76
	56,000	EKMH100VSN563MA40T	35 × 40	A40	0.015	4.67
	68,000	EKMH100VSN683MA50T	35 × 50	A50	0.012	5.46

†For construction and terminal options, refer to the part numbering system for descriptions and codes.
*** Refer to diagram of dimensions for detailed case size specifications.**

KMH Series

Standard Voltage Ratings - Snap Mount

Rated Voltage (WVDC)	Capacitance (µF)	Global Part Number†	Nominal Case Size* D × L (mm)	Case Size Code	Maximum ESR (Ω) at +20°C, 120Hz	Rated Ripple Current (A rms) at +105°C, 120Hz
10 Volts 13 Volts Surge	100,000	EKMH100VND104MA63T	35 × 63	A63	0.011	6.9
	120,000	EKMH100VND124MA80T	35 × 80	A80	0.009	8.08
	39,000	EKMH100VND393MB25T	40 × 25	B25	0.027	3.54
	56,000	EKMH100VND563MB30T	40 × 30	B30	0.021	4.44
	68,000	EKMH100VND683MB35T	40 × 35	B35	0.018	5.08
	82,000	EKMH100VND823MB40T	40 × 40	B40	0.015	5.75
	120,000	EKMH100VND124MB50T	40 × 50	B50	0.012	7.39
	150,000	EKMH100VND154MB63T	40 × 63	B63	0.009	8.82
	180,000	EKMH100VND184MB80T	40 × 80	B80	0.008	10.51
16 Volts 20 Volts Surge	6,800	EKMH160VSN682MP25T	22 × 25	P25	0.098	1.57
	10,000	EKMH160VSN103MP30T	22 × 30	P30	0.066	1.97
	12,000	EKMH160VSN123MP35T	22 × 35	P35	0.055	2.22
	15,000	EKMH160VSN153MP40T	22 × 40	P40	0.044	2.55
	18,000	EKMH160VSN183MP45T	22 × 45	P45	0.037	2.87
	10,000	EKMH160VSN103MQ25T	25.4 × 25	Q25	0.066	1.97
	12,000	EKMH160VSN123MQ30T	25.4 × 30	Q30	0.055	2.24
	15,000	EKMH160VSN153MQ35T	25.4 × 35	Q35	0.044	2.58
	18,000	EKMH160VSN183MQ40T	25.4 × 40	Q40	0.037	2.92
	22,000	EKMH160VSN223MQ45T	25.4 × 45	Q45	0.03	3.32
	27,000	EKMH160VSN273MQ50T	25.4 × 50	Q50	0.025	3.78
	12,000	EKMH160VSN123MR25T	30 × 25	R25	0.055	2.45
	15,000	EKMH160VSN153MR25T	30 × 25	R25	0.044	2.52
	18,000	EKMH160VSN183MR30T	30 × 30	R30	0.037	2.88
	22,000	EKMH160VSN223MR35T	30 × 35	R35	0.03	3.29
	27,000	EKMH160VSN273MR40T	30 × 40	R40	0.025	3.77
	33,000	EKMH160VSN333MR45T	30 × 45	R45	0.02	4.3
	39,000	EKMH160VSN393MR50T	30 × 50	R50	0.017	4.81
	18,000	EKMH160VSN183MA25T	35 × 25	A25	0.037	2.92
	22,000	EKMH160VSN223MA25T	35 × 25	A25	0.03	3.23
	27,000	EKMH160VSN273MA30T	35 × 30	A30	0.025	3.45
	33,000	EKMH160VSN333MA35T	35 × 35	A35	0.02	4.26
	39,000	EKMH160VSN393MA40T	35 × 40	A40	0.017	4.79
	47,000	EKMH160VSN473MA45T	35 × 45	A45	0.014	5.43
	68,000	EKMH160VND683MA63T	35 × 63	A63	0.012	6.36
	100,000	EKMH160VND104MA80T	35 × 80	A80	0.009	8.25
	33,000	EKMH160VND333MB25T	40 × 25	B25	0.027	3.64
	39,000	EKMH160VND333MB30T	40 × 30	B30	0.021	4.15
	47,000	EKMH160VND333MB35T	40 × 35	B35	0.018	4.72
	56,000	EKMH160VND333MB40T	40 × 40	B40	0.015	5.31
	82,000	EKMH160VND333MB50T	40 × 50	B50	0.012	6.83
	100,000	EKMH160VND333MB63T	40 × 63	B63	0.010	8.05
	150,000	EKMH160VND333MB80T	40 × 80	B80	0.008	10.73
25 Volts 32 Volts Surge	4,700	EKMH250VSN472MP25T	22 × 25	P25	0.106	1.5
	5,600	EKMH250VSN562MP25T	22 × 25	P25	0.089	1.63
	6,800	EKMH250VSN682MP30T	22 × 30	P30	0.073	1.86
	8,200	EKMH250VSN822MP35T	22 × 35	P35	0.061	2.11
	10,000	EKMH250VSN103MP40T	22 × 40	P40	0.05	2.39
	12,000	EKMH250VSN123MP45T	22 × 45	P45	0.041	2.69
	6,800	EKMH250VSN682MQ25T	25.4 × 25	Q25	0.073	1.87
	8,200	EKMH250VSN822MQ30T	25.4 × 30	Q30	0.061	2.12
	10,000	EKMH250VSN103MQ35T	25.4 × 35	Q35	0.05	2.42
	12,000	EKMH250VSN123MQ40T	25.4 × 40	Q40	0.041	2.74
	15,000	EKMH250VSN153MQ45T	25.4 × 45	Q45	0.033	3.15
	18,000	EKMH250VSN183MQ50T	25.4 × 50	Q50	0.028	3.54
	8,200	EKMH250VSN822MR25T	30 × 25	R25	0.061	2.15
	10,000	EKMH250VSN103MR25T	30 × 25	R25	0.05	2.37
	12,000	EKMH250VSN123MR30T	30 × 30	R30	0.041	2.7
	15,000	EKMH250VSN153MR35T	30 × 35	R35	0.033	3.13

† For construction and terminal options, refer to the part numbering system for descriptions and codes.
*** Refer to diagram of dimensions for detailed case size specifications.**