

# JSN, Unencapsulated Stacked Chip with Flat Terminations, 63 – 250 VDC, for DC Link (Automotive Grade)

## Overview

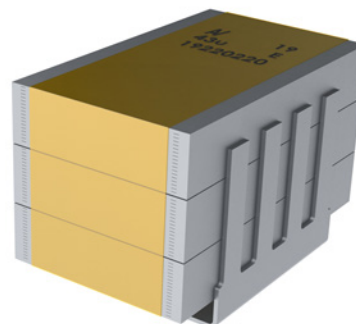
JSN is a jumbo stacked, naked metallized polyester film capacitor with flat terminations. Automotive grade devices meet the demanding Automotive Electronics Council's AEC-Q200 qualification requirements.

## Applications

JSN (Jumbo Stacked Naked) film capacitor is designed for applications requiring high reliability, long life, and severe working conditions, with high frequency SMPS, DC/DC and AC/DC converters, input/output filter in power supplies, DC-Link, industrial and automotive SMPS and inverters.

## Benefits

- Rated voltage: 63 – 250 VDC
- Rated voltage: 40 – 160 VAC
- Capacitance range: 5.6 – 82  $\mu$ F
- Capacitance tolerance:  $\pm 10\%$ ,  $\pm 20\%$
- Climatic category: 55/125/56
- RoHS compliant and lead-free terminations
- Operating temperature range of  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$
- Automotive Grade (AEC-Q200)
- Low ESR and ESL (high frequency applications)
- No piezoelectric effect
- No DC bias effect in capacitance drop and aging
- Nonpolarized construction (low self-heating in AC filtering applications)
- Inherent self-healing and elasticity properties



## Part Number System

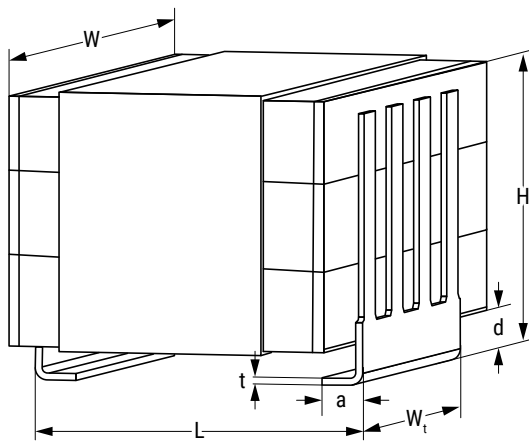
| JSN                       | E                            | K                     | 5100   | M                                | B                  | 6                      | L                          | 0            |
|---------------------------|------------------------------|-----------------------|--|----------------------------------|--------------------|------------------------|----------------------------|--------------|
| Series                    | Rated Voltage (VDC)          | Size Code             | Capacitance Code (pF)  | Capacitance Tolerance            | Dielectric         | Wt Terminal Width (mm) | Packaging                  | Internal Use |
| JSN = Jumbo Stacked Naked | D = 63<br>E = 100<br>I = 250 | K = 6080<br>J = 60115 | Digits 2-4 indicate the first three digits of the capacitance value.<br>First digit indicates the number of zeros to be added. | K = $\pm 10\%$<br>M = $\pm 20\%$ | B = Metallized PET | 6 = 20                 | See Ordering Options Table | 0 (Standard) |

## Ordering Options Table

| Packaging Type                    | Packaging Code |
|-----------------------------------|----------------|
| <b>Standard Packaging Options</b> |                |
| Bulk (Tray)                       | L              |
| Tape & Reel (Standard Reel)*      | N              |

\*Available only for size 60.80

## Dimensions – Millimeters



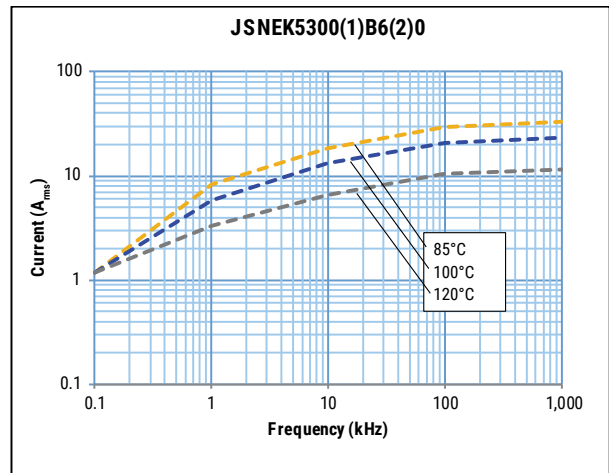
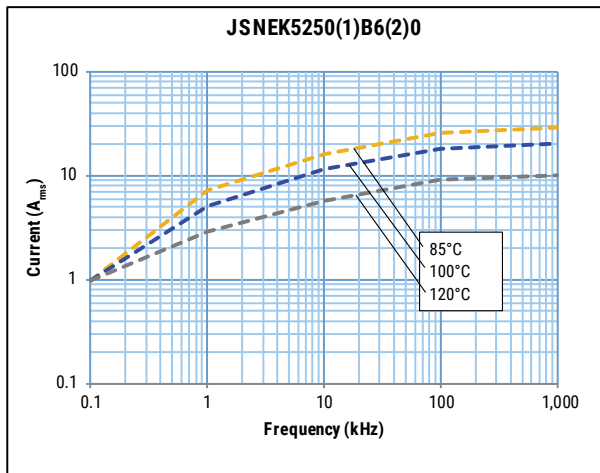
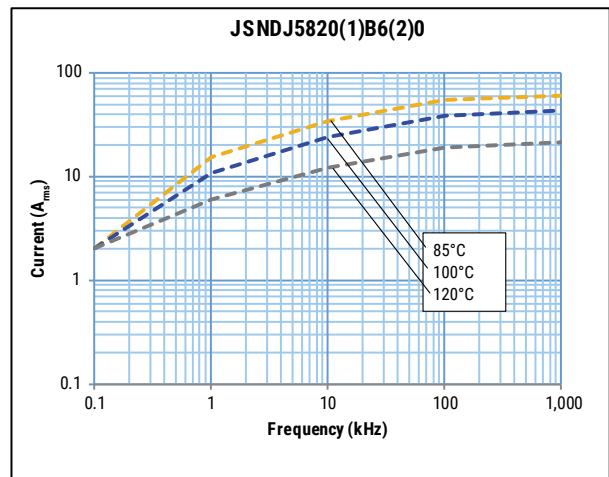
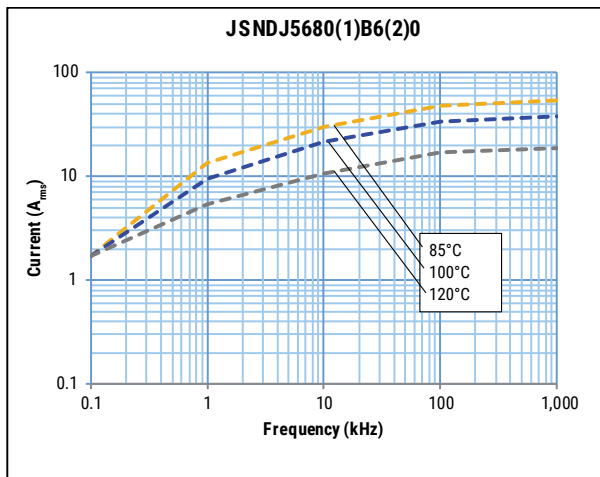
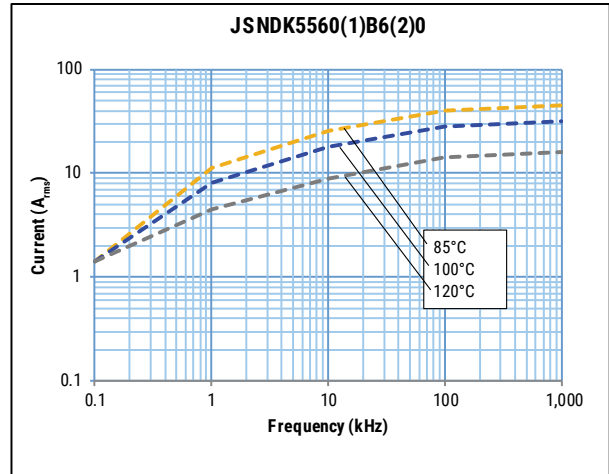
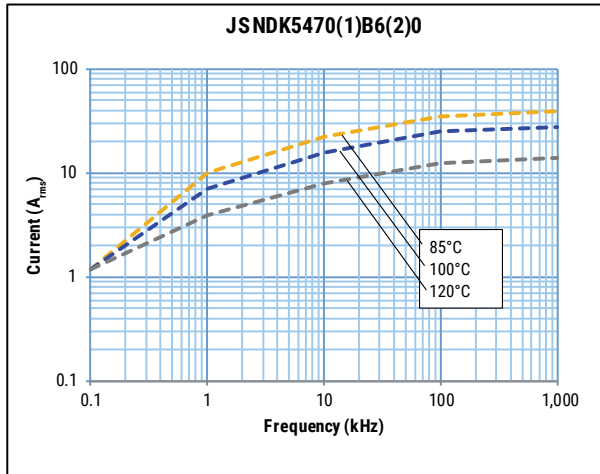
| Size Code | Chip Size | W       |           | W <sub>t</sub> |           | H                     | L       |           |
|-----------|-----------|---------|-----------|----------------|-----------|-----------------------|---------|-----------|
|           |           | Nominal | Tolerance | Nominal        | Tolerance |                       | Nominal | Tolerance |
| K         | 6080      | 21.5    | Maximum   | 20             | Maximum   | See Part Number Table | 17.3    | Maximum   |
| J         | 60115     | 30.0    | Maximum   | 20             | Maximum   |                       | 17.3    | Maximum   |

| Size Code | Chip Size | d       |           | a       |           | t       |           |
|-----------|-----------|---------|-----------|---------|-----------|---------|-----------|
|           |           | Nominal | Tolerance | Nominal | Tolerance | Nominal | Tolerance |
| K         | 6080      | 2       | ±1.0      | 2       | ±1.0      | 0.3     | ±0.1      |
| J         | 60115     | 2       | ±1.0      | 2       | ±1.0      | 0.3     | ±0.1      |

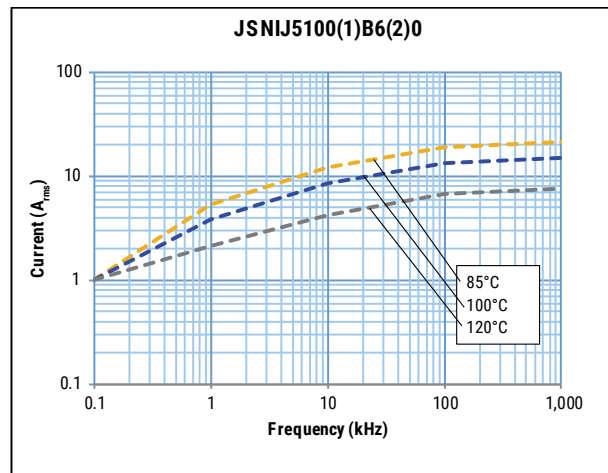
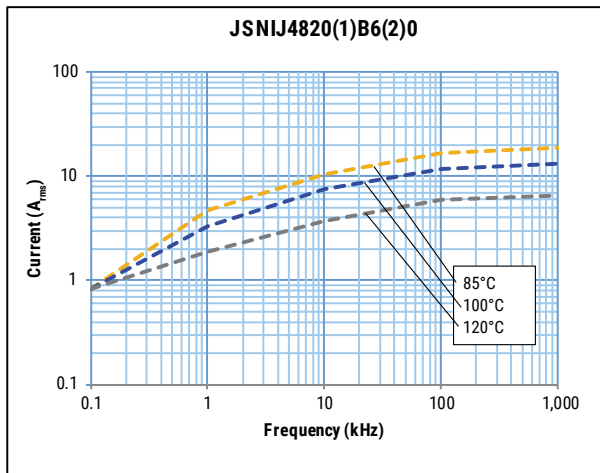
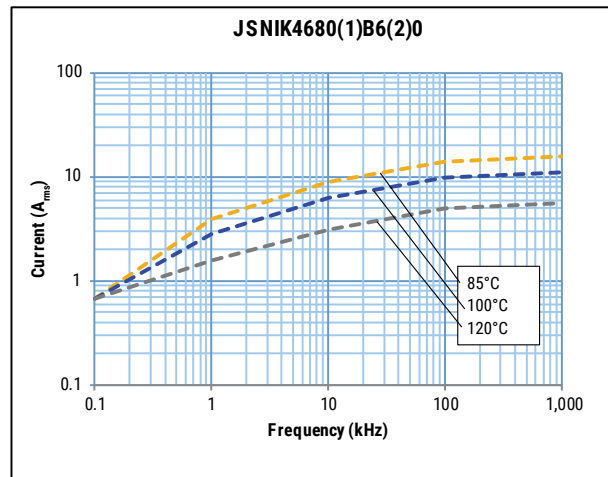
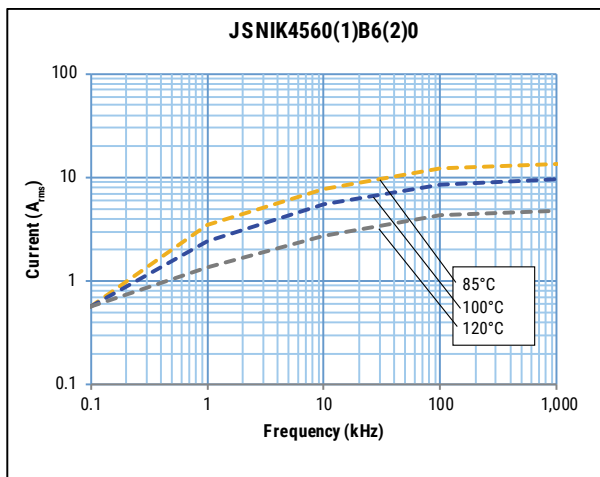
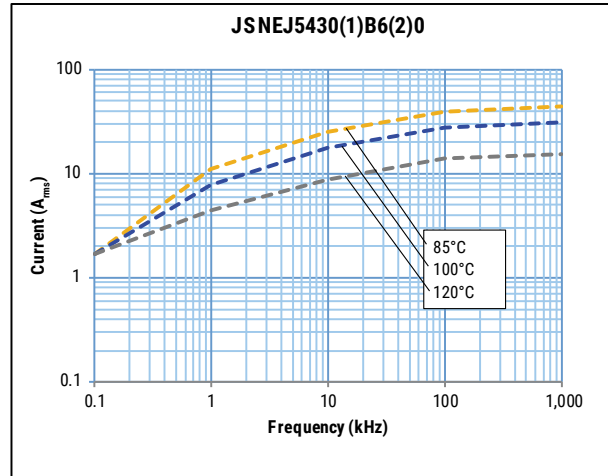
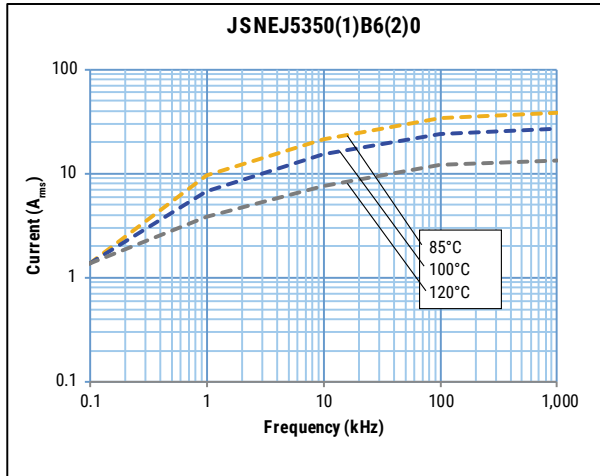
## Performance Characteristics

|                                     |  |  |          |
|-------------------------------------|--|--|----------|
| Voltage Range (VDC)                 | 63   | 100  | 250      |
| Voltage Range (VAC)                 | 40   | 63   | 160      |
| Capacitance Range ( $\mu\text{F}$ ) | 47 – 82  | 25 – 43                                      | 5.6 – 10 |
| Capacitance Tolerance               | $\pm 10\%$ , $\pm 20\%$  |  |          |
| Category Temperature Range          | -55°C to +125°C  |  |          |
| Rated Temperature                   | +105°C   |  |          |
| Maximum Temperature Exposure        | +150°C for maximum 250 hours, no Voltage applied                 |  |          |
| Voltage Derating                    | The rated voltage is decreased by 1.25%/°C from +105°C to +125°C |  |          |
| Climatic Category                   | 55/125/56 IEC 60068-1  |  |          |
| Test Voltage                        | 1.4 x $V_R$ applied for 2 seconds at +25°C, $\pm 5$              |  |          |
| Insulation Resistance               | Measured at +25°C, $\pm 5^\circ\text{C}$                         |  |          |
|                                     | $V_R$ (VDC)  | Between Terminals                            |          |
|                                     | 63   | $\geq 100 \text{ M}\Omega \cdot \mu\text{F}$ |          |
|                                     | 100  | $\geq 250 \text{ M}\Omega \cdot \mu\text{F}$ |          |
| 250                                 | $\geq 800 \text{ M}\Omega \cdot \mu\text{F}$                     |  |          |
| Dissipation Factor                  | Maximum Values at 25°C, $\pm 5^\circ\text{C}$                    |  |          |
|                                     | 1 kHz  | 1.0%   |          |

## Electrical Characteristics & Different Ambient Temperatures



## Electrical Characteristics & Different Ambient Temperatures cont.



## Environmental Test Data

| Biased Humidity             |                                   |
|-----------------------------|-----------------------------------|
| Test Conditions             |                                   |
| Temperature                 | +40°C ±2°C                        |
| Relative Humidity (RH)      | 93% ±2%                           |
| Applied Bias                | Rated Voltage                     |
| Test Duration               | 56 days                           |
| Performance                 |                                   |
| Capacitance Change  Δ C/C   | ≤ 10%                             |
| DF Change (Δtgδ)            | ≤ 0.5% at 1 kHz                   |
| Insulation Resistance       | ≥ 50% of limit value              |
| Endurance                   |                                   |
| Test Conditions             |                                   |
| Temperature                 | 125°C ±2°C                        |
| Test Duration               | 2,000 hours                       |
| Voltage Applied             | 1.25 x V <sub>c</sub>             |
| Performance                 |                                   |
| Capacitance Change  Δ C/C   | ≤ 5%                              |
| DF Change (Δtgδ)            | ≤ 50 x 10 <sup>-4</sup> at 1 kHz  |
| Insulation Resistance       | ≥ 50% of limit value              |
| Rapid Change of Temperature |                                   |
| Test Conditions             |                                   |
| Temperature                 | 1 hour at -55°C, 1 hour at +125°C |
| Number of Cycles            | 1,000                             |
| Performance                 |                                   |
| Capacitance Change  Δ C/C   | ≤ 5%                              |
| DF Change (Δtgδ)            | ≤ 50 x 10 <sup>-4</sup> at 1 kHz  |
| Insulation Resistance       | ≥ limit value                     |
| No Mechanical Damage        |                                   |

| Reflow   |                                  |
|--|----------------------------------|
| Test Conditions  | See Solder Process               |
| Performance  |                                  |
| Capacitance Change  Δ C/C  | ≤ 3%                             |
| DF Change (Δtgδ)   | ≤ 50 x 10 <sup>-4</sup> at 1 kHz |
| Insulation Resistance  | ≥ limit value                    |
| No Mechanical Damage   |                                  |
| Bending  |                                  |
| Test Conditions  |                                  |
| Deflection   | 1 – 6 mm                         |
| Performance  |                                  |
| Capacitance Change  Δ C/C  | ≤ 1%                             |
| No visible damage on the terminations (peeling) neither on the body (cracking) |                                  |

## Environmental Compliance

All KEMET surface mount capacitors are RoHS compliant.



**Table 1 – Ratings & Part Number Reference**

| VDC | VAC | Capacitance Value (μF) | Size Code | Chip Size | Dimensions in mm |                  |                  | dV/dt (V/μs) | KEMET Internal Part Number | Customer Part Number |
|-----|-----|------------------------|-----------|-----------|------------------|------------------|------------------|--------------|----------------------------|----------------------|
|     |     |                        |           |           | W <sub>MAX</sub> | H <sub>MAX</sub> | L <sub>MAX</sub> |              |                            |                      |
| 63  | 40  | 47                     | K         | 6080      | 21.5             | 15.4             | 17.3             | 25           | SNDK5470(1)B6(2)0          | JSNDK5470(1)B6(2)0   |
| 63  | 40  | 56                     | K         | 6080      | 21.5             | 17.8             | 17.3             | 25           | SNDK5560(1)B6(2)0          | JSNDK5560(1)B6(2)0   |
| 63  | 40  | 68                     | J         | 60115     | 30               | 15.7             | 17.3             | 25           | SNDJ5680(1)B6(2)0          | JSNDJ5680(1)B6(2)0   |
| 63  | 40  | 82                     | J         | 60115     | 30               | 17.8             | 17.3             | 25           | SNDJ5820(1)B6(2)0          | JSNDJ5820(1)B6(2)0   |
| 100 | 63  | 25                     | K         | 6080      | 21.5             | 15.4             | 17.3             | 27           | SNEK5250(1)B6(2)0          | JSNEK5250(1)B6(2)0   |
| 100 | 63  | 30                     | K         | 6080      | 21.5             | 17.8             | 17.3             | 27           | SNEK5300(1)B6(2)0          | JSNEK5300(1)B6(2)0   |
| 100 | 63  | 35                     | J         | 60115     | 30               | 15.4             | 17.3             | 27           | SNEJ5350(1)B6(2)0          | JSNEJ5350(1)B6(2)0   |
| 100 | 63  | 43                     | J         | 60115     | 30               | 17.8             | 17.3             | 27           | SNEJ5430(1)B6(2)0          | JSNEJ5430(1)B6(2)0   |
| 250 | 160 | 5.6                    | K         | 6080      | 21.5             | 15.3             | 17.3             | 40           | SNIK4560(1)B6(2)0          | JSNIK4560(1)B6(2)0   |
| 250 | 160 | 6.8                    | K         | 6080      | 21.5             | 17.8             | 17.3             | 40           | SNIK4680(1)B6(2)0          | JSNIK4680(1)B6(2)0   |
| 250 | 160 | 8.2                    | J         | 60115     | 30               | 16               | 17.3             | 40           | SNIJ4820(1)B6(2)0          | JSNIJ4820(1)B6(2)0   |
| 250 | 160 | 10                     | J         | 60115     | 30               | 18.3             | 17.3             | 40           | SNIJ5100(1)B6(2)0          | JSNIJ5100(1)B6(2)0   |
| VDC | VAC | Capacitance Value (μF) | Size Code | Chip Size | W <sub>MAX</sub> | H <sub>MAX</sub> | L <sub>MAX</sub> | dV/dt (V/μs) | KEMET Internal Part Number | Customer Part Number |

(1) K = ±10%, M = ±20%.

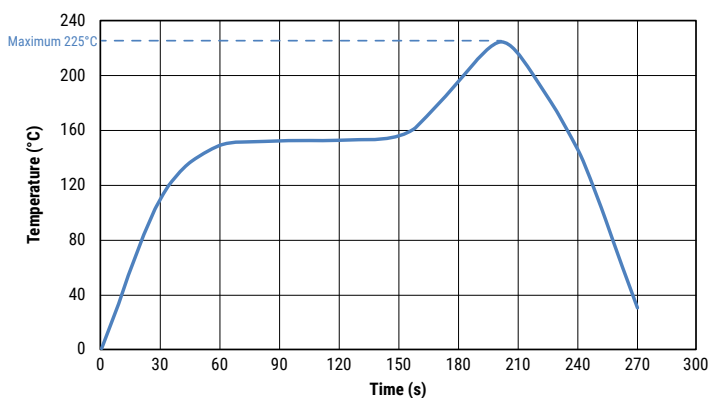
(2) Insert packaging code. See Ordering Options Table for available options.

## Soldering Process

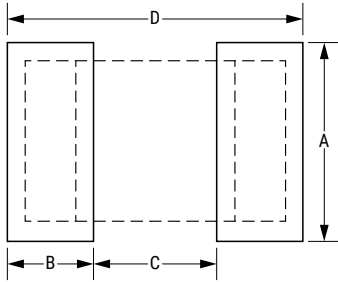
JSN Series capacitors are to be mounted with reflow process (see thermal profile) or gluing.

Reflow soldering temperature measured on the top body surface of the component: Preheating temperature should be less than 160°C. The peak temperature must not exceed 225°C.

If two reflow processes are needed, make sure that before the second reflow the temperature on the capacitor's surface is lower than 50°C.

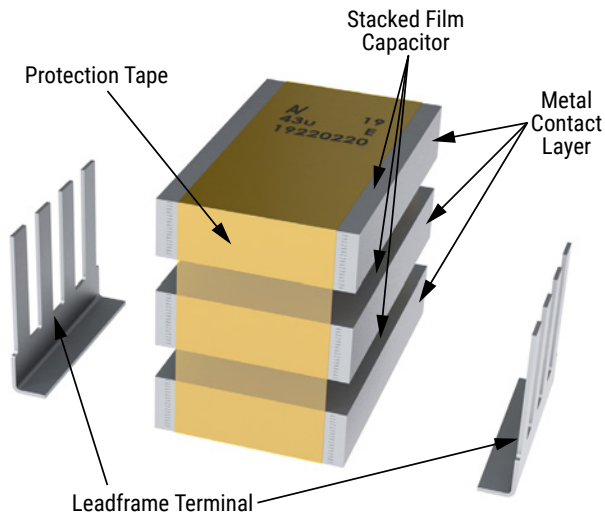


## Landing



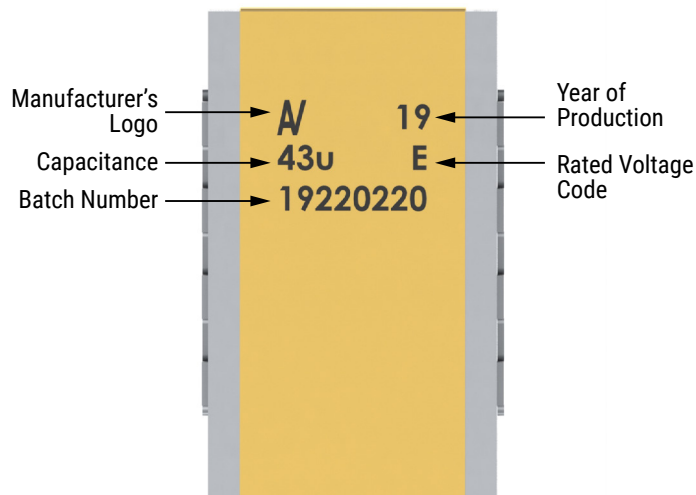
| Size Code  | Dimensions in mm |     |      |      |
|--|------------------|-----|------|------|
|  | A                | B   | C    | D    |
| 60.80  | 21.9             | 5.0 | 10.2 | 20.2 |
| 60.115   | 30.4             | 5.0 | 10.2 | 20.2 |
| Sn/Ag/Cu soldering paste (Suggested thickness: 0.20 – 0.25 mm) |                  |     |      |      |

## Construction





## Marking



| Manufacturing Date Code (IEC 60062) |      |           |      |
|-------------------------------------|------|-----------|------|
| Year                                | Code | Month     | Code |
| 2020                                | M    | January   | 1    |
| 2021                                | N    | February  | 2    |
| 2022                                | P    | March     | 3    |
| 2023                                | R    | April     | 4    |
| 2024                                | S    | May       | 5    |
| 2025                                | T    | June      | 6    |
| 2026                                | U    | July      | 7    |
| 2027                                | V    | August    | 8    |
| 2028                                | W    | September | 9    |
| 2029                                | X    | October   | 0    |
| 2030                                | A    | November  | N    |
| 2031                                | B    | December  | D    |
| 2032                                | C    |           |      |
| 2033                                | D    |           |      |
| 2034                                | E    |           |      |
| 2035                                | F    |           |      |
| 2036                                | H    |           |      |
| 2037                                | J    |           |      |
| 2038                                | K    |           |      |
| 2039                                | L    |           |      |
| 2040                                | M    |           |      |

## Flux & Cleaning

KEMET recommends using a no-clean flux with a halogen content lower than 0.1%. To clean the PCB assembly KEMET recommends to use a suitable solvent like Isopropyl alcohol, deionized water, or neutral pH detergents. Aggressive solvents shall not be used. For any different cleaning solvent used please contact KEMET Technical Services to analyze the potential impact on KEMET products.

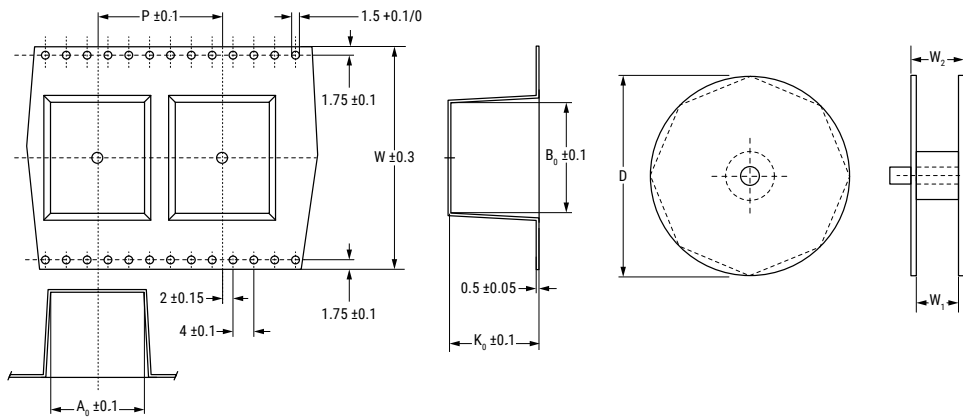
## Storage and Moisture Recommendations

KEMET SMD film capacitors are supplied in a moisture barrier bag (MBB) Class 1. We can guarantee a 24 month shelf life (temperature ≤ 40°C/relative humidity ≤ 90%). After the MBB has been opened, components may stay in areas with controlled temperature and humidity (temperature ≤ 30°C/relative humidity ≤ 60%) for 72 hours (MSL 4). For longer periods of time and/or higher temperature and/or higher relative humidity values, it is absolutely necessary to protect the components against humidity. If the reel inside the MBB is partially used, KEMET recommends to re-use the same MBB or to avoid areas without controlled temperature and humidity (see above). If the above conditions are not respected, components require baking (minimum time: 24 hours at 70 ±5°C) before the reflow.

## Packaging Quantities

| Chip Size (EIA) | Height (mm) | Tray | Reel |
|-----------------|-------------|------|------|
| 6080            | All         | 308  | 120  |
| 60115           | All         | 252  | -    |

## Carrier Taping & Packaging (IEC 60286-2)



| Chip Size (EIA)<br>Horizontal<br>Mounting | Taping Specification |      |                |                |                |      |                |                |
|---|----------------------|------|----------------|----------------|----------------|------|----------------|----------------|
|   | W                    | P    | A <sub>0</sub> | B <sub>0</sub> | K <sub>0</sub> | D    | W <sub>1</sub> | W <sub>2</sub> |
|   | ±0.3                 | ±0.1 | Nominal        | Nominal        | Nominal        | ±2.0 | -0/+2          | Maximum        |
| 6080                                      | 44                   | 24   | 18             | 22             | 17             | 330  | 44.5           | 49.5           |

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Although all product-related warnings, cautions and notes must be observed, the customer should not assume that all safety measures are indicated or that other measures may not be required.

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