

## Overview

The KEMET T491 Series, designed specifically for today's highly automated surface mount processes and equipment, is the leading choice for surface mount designs. The T491 combines KEMET's proven solid tantalum technology, acclaimed and respected throughout the world, with the latest in materials, processes and automation, resulting in unsurpassed total performance and value.

This product meets or exceeds the requirements of EIA standard 535BAAC. The physical outline and dimensions of this series conform to this global standard. Five low profile case sizes are available in the T491 Series. The R/2012-12, S/3216-12 and T/3528-12 case sizes have a maximum height of 1.2 mm. The U/6032-15 size has a maximum height of 1.5 mm, and the V/7343-20 has a maximum height of 2.0 mm.

The T491 standard terminations are 100% matte tin and provide excellent wetting characteristics and compatibility with today's surface mount solder systems. Tin/lead (Sn/Pb) terminations are available upon request for any part number. Gold-plated terminations are also available for use with conductive epoxy attachment processes. The symmetrical terminations offer total compliancy to provide the thermal and mechanical stress relief required with today's technology. Lead frame attachments to the tantalum pellet are made via a microprocessor-controlled welding operation, and a high temperature silver epoxy adhesive system.

Standard packaging of these devices is tape and reel in accordance with EIA 481-1. This system provides perfect compatibility with all tape-fed placement units.

## Benefits

- Meets or Exceeds EIA Standard 535BAAC
- Taped and Reeled per EIA 481-1
- Symmetrical, Compliant Terminations
- Optical Gold-Plated Terminations
- Laser-marked Case
- 100% Surge current test on C, D, E, U, V, X sizes
- Halogen Free Epoxy
- Capacitance: 0.1µF to 1000µF
- Tolerance: ±10%, ±20%
- Voltage: 2.5-50 VDC
- Extended Range Values
- Low Profile Case Sizes
- RoHS Compliance & Lead Free Terminations

(See [www.kemet.com](http://www.kemet.com) for transition information)

- Operating Temperature: -55°C to +125°C

## Applications

Typical applications include decoupling and filtering in industrial and automotive end applications such as DC/DC converters, portable electronics, telecommunications, and control units.



## Environmental Compliance

RoHS Compliant (6/6)\* according to Directive 2002/95/EC

\*When ordered with 100% Sn Solder

## SPICE

For a detailed analysis of specific part numbers, please visit [kemet.com](http://kemet.com) for a free download of KEMET's SPICE software. The KEMET SPICE program is freeware intended to aid design engineers in analyzing the performance of these capacitors over frequency, temperature, ripple, and DC bias conditions.

## Ordering Information

| T               | 491        | X                                                                                                                                                                 | 157                                                                                    | K                     | 020                                                                                                                            | A                   | T                                                                                                                         | XXXX                               |
|-----------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| Capacitor Class | Series     | Case Size                                                                                                                                                         | Capacitance Code (pF)                                                                  | Capacitance Tolerance | Voltage                                                                                                                        | Failure Rate/Design | Lead Material                                                                                                             | Packaging (C-Spec)                 |
| T = Tantalum    | Industrial | A = 3216-18<br>B = 3528-21<br>C = 6032-28<br>D = 7343-31<br>E = 7260-38<br>R = 2012-12<br>S = 3216-12<br>T = 3528-12<br>U = 6032-15<br>V = 7343-20<br>X = 7343-43 | First two digits represent significant figures. Third digit specifies number of zeros. | K = ±10%<br>M = ±20%  | 2R5 = 2.5V<br>003 = 3V<br>004 = 4V<br>006 = 6.3V<br>010 = 10V<br>016 = 16V<br>020 = 20V<br>025 = 25V<br>035 = 35V<br>050 = 50V | A = N/A<br>Z = N/A  | T = 100% Matte Tin (Sn) Plated<br>H = Standard Solder Coated (SnPb 5% Pb minimum)<br>G = Gold Plated (A, B, C, D, X only) | Blank = 7" Reel<br>7280 = 13" Reel |

## Performance Characteristics

| Item                    | Performance Characteristics                         |
|-------------------------|-----------------------------------------------------|
| Operating Temperature   | -55°C to 125°C                                      |
| Rated Capacitance Range | 0.1µF - 1000µF @ 120 Hz/25°C                        |
| Capacitance Tolerance   | K Tolerance (10%), M Tolerance (20%)                |
| Rated Voltage Range     | 2.5V - 50V                                          |
| DF(120Hz)               | Refer to Part Number Electrical Specification Table |
| ESR (100kHz)            | Refer to Part Number Electrical Specification Table |
| Leakage Current         | ≤ 0.01CV (µA) at Rated Voltage after 5 minutes      |

## Qualification

| Test                       | Condition                                                                                                      | Characteristics |                               |          |          |
|----------------------------|----------------------------------------------------------------------------------------------------------------|-----------------|-------------------------------|----------|----------|
| Endurance                  | 85°C @ Rated Voltage, 2000 Hrs.<br>125°C @ 2/3 Rated Voltage, 2000 Hrs.                                        | ΔC/C            | Within ± 10% of initial value |          |          |
|                            |                                                                                                                | DF              | Within initial limits         |          |          |
|                            |                                                                                                                | DCL             | Within 1.25 x initial limit   |          |          |
|                            |                                                                                                                | ESR             | Within initial limits         |          |          |
| Storage Life               | 125°C @ 0 Volts, 2000 Hrs.                                                                                     | ΔC/C            | Within ± 10% of initial value |          |          |
|                            |                                                                                                                | DF              | Within initial limits         |          |          |
|                            |                                                                                                                | DCL             | Within 1.25 x initial limit   |          |          |
|                            |                                                                                                                | ESR             | Within initial limits         |          |          |
| Thermal Shock              | Mil-Std-202, Method 107, Condition B, mounted, -55°C to 125°C, 1000 cycles                                     | ΔC/C            | Within ± 5% of initial value  |          |          |
|                            |                                                                                                                | DF              | Within initial limits         |          |          |
|                            |                                                                                                                | DCL             | Within 1.25 x initial limit   |          |          |
|                            |                                                                                                                | ESR             | Within initial limits         |          |          |
| Temperature Stability      | Extreme temperature exposure at a succession of continuous steps at +25°C, -55°C, +25°C, +85°C, +125°C, +25°C. | +25°C           | -55°C                         | +85°C    | +125°C   |
|                            |                                                                                                                | ΔC/C            | IL*                           | ±10%     | ±10%     |
|                            |                                                                                                                | DF              | IL                            | 1.5 x IL | 1.5 x IL |
|                            |                                                                                                                | DCL             | IL                            | n/a      | 10 x IL  |
| Surge Voltage              | 25°C and 85°C, 1.32 x Rated Voltage 1000 cycles (125°C, 1.2 x Rated Voltage)                                   | ΔC/C            | Within ± 5% of initial value  |          |          |
|                            |                                                                                                                | DF              | Within initial limits         |          |          |
|                            |                                                                                                                | DCL             | Within initial limits         |          |          |
|                            |                                                                                                                | ESR             | Within initial limits         |          |          |
| Mechanical Shock/Vibration | Mil-Std-202, Meth. 213, Cond. I, 100G Peak<br>Mil-Std-202, Meth. 204, Cond. D, 10Hz to 2000Hz, 20G Peak        | ΔC/C            | Within ±10 of initial value   |          |          |
|                            |                                                                                                                | DF              | Within initial limits         |          |          |
|                            |                                                                                                                | DCL             | Within initial limits         |          |          |

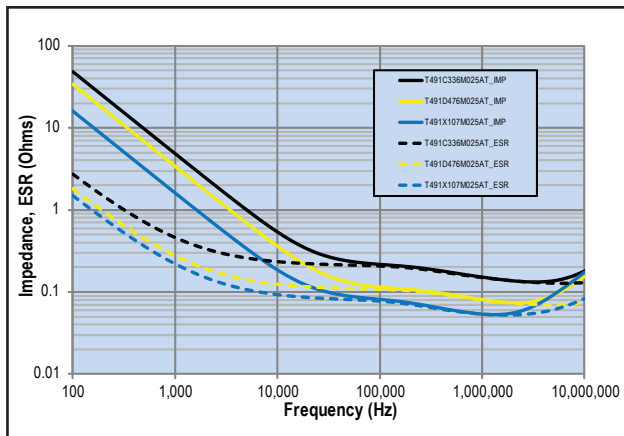
\*IL = Initial Limit

## Certification

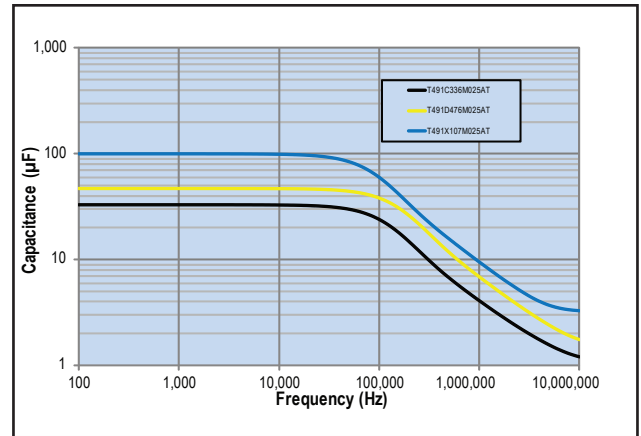
AEC-Q200

## Electrical Characteristics

### ESR vs. Frequency

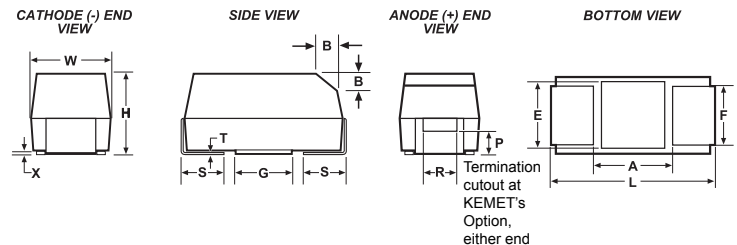


### Capacitance vs. Frequency



## Dimensions – Millimeters (Inches)

Metric will govern



| Case Size |         | Component                  |                            |                            |                    |                    |                         |                              |            |            |             |             |            |            |
|-----------|---------|----------------------------|----------------------------|----------------------------|--------------------|--------------------|-------------------------|------------------------------|------------|------------|-------------|-------------|------------|------------|
| KEMET     | EIA     | L*                         | W*                         | H*                         | F* ±0.1<br>±(.004) | S* ±0.3<br>±(.012) | B* ±0.15<br>(Ref) ±.006 | X (Ref)                      | P (Ref)    | R (Ref)    | T (Ref)     | A (Min)     | G (Ref)    | E (Ref)    |
| A         | 3216-18 | 3.2 ± 0.2<br>(.126 ± .008) | 1.6 ± 0.2<br>(.063 ± .008) | 1.6 ± 0.2<br>(.063 ± .008) | 1.2 (.047)         | 0.8 (.031)         | 0.4 (.016)              | 0.10 ± 0.10<br>(.004 ± .004) | 0.4 (.016) | 0.4 (.016) | 0.13 (.005) | 1.4 (.055)  | 1.1 (.043) | 1.3 (.051) |
| B         | 3528-21 | 3.5 ± 0.2<br>(.138 ± .008) | 2.8 ± 0.2<br>(.110 ± .008) | 1.9 ± 0.2<br>(.075 ± .008) | 2.2 (.087)         | 0.8 (.031)         | 0.4 (.016)              | 0.10 ± 0.10<br>(.004 ± .004) | 0.5 (.020) | 1.0 (.039) | 0.13 (.005) | 2.1 (.083)  | 1.8 (.071) | 2.2 (.087) |
| C         | 6032-28 | 6.0 ± 0.3<br>(.236 ± .03)  | 3.2 ± 0.3<br>(.126 ± .012) | 2.5 ± 0.3<br>(.098 ± .012) | 2.2 (.087)         | 1.3 (.051)         | 0.5 (.020)              | 0.10 ± 0.10<br>(.004 ± .004) | 0.9 (.035) | 1.0 (.039) | 0.13 (.005) | 3.1 (.122)  | 2.8 (.110) | 2.4 (.094) |
| D         | 7343-31 | 7.3 ± 0.3<br>(.287 ± .012) | 4.3 ± 0.3<br>(.169 ± .012) | 2.8 ± 0.3<br>(.098 ± .012) | 2.4 (.094)         | 1.3 (.051)         | 0.5 (.020)              | 0.10 ± 0.10<br>(.004 ± .004) | 0.9 (.035) | 1.0 (.039) | 0.13 (.005) | 3.8 (.150)  | 3.5 (.138) | 3.5 (.138) |
| X         | 7343-43 | 7.3 ± 0.3<br>(.287 ± .012) | 4.3 ± 0.3<br>(.169 ± .012) | 4.0 ± 0.3<br>(.157 ± .012) | 2.4 (.094)         | 1.3 (.051)         | 0.5 (.020)              | 0.10 ± 0.10<br>(.004 ± .004) | 1.7 (.067) | 1.0 (.039) | 0.13 (.005) | 3.8 (.150)  | 3.5 (.138) | 3.5 (.138) |
| E         | 7260-38 | 7.3 ± 0.3<br>(.287 ± .012) | 6.0 ± 0.3<br>(.236 ± .012) | 3.6 ± 0.2<br>(.142 ± .008) | 4.1 (.161)         | 1.3 (.051)         | 0.5 (.020)              | 0.10 ± 0.10<br>(.004 ± .004) | 0.9 (.035) | 1.0 (.039) | 0.13 (.005) | 0.13 (.005) | 3.5 (.138) | 3.5 (.138) |
| R         | 2012-12 | 2.0 ± 0.2<br>(.079 ± .008) | 1.3 ± 0.2<br>(.051 ± .008) | 1.2 (.047) max             | 0.9 (.035)         | 0.5 (.020)         | n/a                     | 0.05 (.002)                  | n/a        | n/a        | 0.13 (.005) | 0.8 (.031)  | 0.5 (.020) | 0.8 (.031) |
| S         | 3216-12 | 3.2 ± 0.2<br>(.126 ± .008) | 1.6 ± 0.2<br>(.063 ± .008) | 1.2 (.047) max             | 1.2 (.047)         | 0.8 (.031)         | n/a                     | 0.05 (.002)                  | n/a        | n/a        | 0.13 (.005) | 1.4 (.055)  | 1.1 (.043) | 1.3 (.051) |
| T         | 3528-12 | 3.5 ± 0.2<br>(.138 ± .008) | 2.8 ± 0.2<br>(.110 ± .008) | 1.2 (.047) max             | 2.2 (.087)         | 0.8 (.031)         | n/a                     | 0.05 (.002)                  | n/a        | n/a        | 0.13 (.005) | 2.1 (.083)  | 1.8 (.071) | 2.2 (.087) |
| U         | 6032-15 | 6.0 ± 0.3<br>(.236 ± .012) | 3.2 ± 0.2<br>(.110 ± .008) | 1.5 (.059) max             | 2.2 (.087)         | 1.3 (.051)         | n/a                     | 0.05 (.002)                  | n/a        | n/a        | 0.13 (.005) | 3.1 (.122)  | 2.8 (.110) | 2.4 (.094) |
| V         | 7343-20 | 7.3 ± 0.3<br>(.287 ± .012) | 4.3 ± 0.3<br>(.169 ± .012) | 1.9 (.075) max             | 2.4 (.094)         | 1.3 (.051)         | n/a                     | 0.05 (.002)                  | n/a        | n/a        | 0.13 (.005) | 3.8 (.150)  | 3.5 (.138) | 3.5 (.138) |

Notes: (Ref) – Dimensions provided for reference only. No dimensions provided for B, P or R because low profile cases do not have a bevel or a notch.

\* MIL-C-55365/8 specified dimensions

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

| Rated Voltage | Rated Cap | Case Code/<br>Case Size | KEMET Part Number            | DC Leakage  | DF          | ESR          | Maximum Allowable Ripple Current |              |               | Moisture Sensitivity |
|---------------|-----------|-------------------------|------------------------------|-------------|-------------|--------------|----------------------------------|--------------|---------------|----------------------|
| 85°C          | 120Hz     | KEMET/EIA               | (See below for part options) | μAmps +20°C | +20°C 120Hz | +20°C 100kHz | +25°C 100kHz                     | +85°C 100kHz | +125°C 100kHz | Temp≤260°C           |
| VDC           | μF        |                         |                              | max/5min    | % Max       | Ohms         | mAmps                            | mAmps        | mAmps         | J-STD-020D           |
| 2.5           | 100       | T/3528-12               | T491T107(1)2R5A(2)           | 2.5         | 24.0        | 3.9          | 134                              | 121          | 54            | 1.0                  |
| 2.5           | 220       | D/7343-31               | T491D227(1)2R5A(2)           | 5.5         | 8.0         | 0.3          | 707                              | 636          | 283           | 1.0                  |
| 3             | 33        | A/3216-18               | T491A336(1)003A(2)           | 1.0         | 6.0         | 4.0          | 137                              | 123          | 55            | 1.0                  |
| 4             | 3.3       | A/3216-18               | T491A335(1)004A(2)           | 0.1         | 6.0         | 8.0          | 97                               | 87           | 39            | 1.0                  |
| 4             | 4.7       | A/3216-18               | T491A475(1)004A(2)           | 0.2         | 6.0         | 8.0          | 97                               | 87           | 39            | 1.0                  |
| 4             | 6.8       | A/3216-18               | T491A685(1)004A(2)           | 0.3         | 6.0         | 6.0          | 112                              | 101          | 45            | 1.0                  |
| 4             | 6.8       | S/3216-12               | T491S685(1)004A(2)           | 0.3         | 6.0         | 15.0         | 63                               | 57           | 25            | 1.0                  |
| 4             | 10        | B/3528-20               | T491B106(1)004A(2)           | 0.4         | 6.0         | 3.5          | 156                              | 140          | 62            | 1.0                  |
| 4             | 10        | A/3216-18               | T491A106(1)004A(2)           | 0.4         | 6.0         | 6.0          | 112                              | 101          | 45            | 1.0                  |
| 4             | 10        | S/3216-12               | T491S106(1)004A(2)           | 0.4         | 6.0         | 15.0         | 63                               | 57           | 25            | 1.0                  |
| 4             | 10        | R/2012-12               | T491R106(1)004A(2)           | 0.4         | 8.0         | 10.0         | 50                               | 45           | 20            | 1.0                  |
| 4             | 15        | B/3528-20               | T491B156(1)004A(2)           | 0.6         | 6.0         | 3.5          | 156                              | 140          | 62            | 1.0                  |
| 4             | 15        | A/3216-18               | T491A156(1)004A(2)           | 0.6         | 6.0         | 4.0          | 137                              | 123          | 55            | 1.0                  |
| 4             | 15        | T/3528-12               | T491T156(1)004A(2)           | 0.6         | 6.0         | 5.0          | 118                              | 106          | 47            | 1.0                  |
| 4             | 15        | S/3216-12               | T491S156(1)004A(2)           | 0.6         | 10.0        | 15.0         | 63                               | 57           | 25            | 1.0                  |
| 4             | 22        | C/6032-28               | T491C226(1)004A(2)           | 0.9         | 6.0         | 1.8          | 247                              | 222          | 99            | 1.0                  |
| 4             | 22        | B/3528-20               | T491B226(1)004A(2)           | 0.9         | 6.0         | 3.5          | 156                              | 140          | 62            | 1.0                  |
| 4             | 22        | A/3216-18               | T491A226(1)004A(2)           | 0.9         | 6.0         | 4.0          | 137                              | 123          | 55            | 1.0                  |
| 4             | 22        | T/3528-12               | T491T226(1)004A(2)           | 0.9         | 6.0         | 5.0          | 118                              | 106          | 47            | 1.0                  |
| 4             | 22        | S/3216-12               | T491S226(1)004A(2)           | 0.9         | 10.0        | 10.0         | 77                               | 69           | 31            | 1.0                  |
| 4             | 33        | C/6032-28               | T491C336(1)004A(2)           | 1.3         | 6.0         | 1.8          | 247                              | 222          | 99            | 1.0                  |
| 4             | 33        | U/6032-15               | T491U336(1)004A(2)           | 1.3         | 6.0         | 1.8          | 224                              | 202          | 90            | 1.0                  |
| 4             | 33        | B/3528-20               | T491B336(1)004A(2)           | 1.3         | 6.0         | 3.5          | 156                              | 140          | 62            | 1.0                  |
| 4             | 33        | A/3216-18               | T491A336(1)004A(2)           | 1.3         | 6.0         | 4.0          | 137                              | 123          | 55            | 1.0                  |
| 4             | 33        | T/3528-12               | T491T336(1)004A(2)           | 1.3         | 8.0         | 5.0          | 118                              | 106          | 47            | 1.0                  |
| 4             | 47        | C/6032-28               | T491C476(1)004A(2)           | 1.9         | 6.0         | 1.8          | 247                              | 222          | 99            | 1.0                  |
| 4             | 47        | U/6032-15               | T491U476(1)004A(2)           | 1.9         | 6.0         | 1.8          | 224                              | 202          | 90            | 1.0                  |
| 4             | 47        | B/3528-20               | T491B476(1)004A(2)           | 1.9         | 6.0         | 3.0          | 168                              | 151          | 67            | 1.0                  |
| 4             | 47        | A/3216-18               | T491A476(M)004A(2)           | 1.9         | 12.0        | 2.5          | 173                              | 156          | 69            | 1.0                  |
| 4             | 47        | T/3528-12               | T491T476(M)004A(2)           | 1.9         | 12.0        | 6.0          | 108                              | 97           | 43            | 1.0                  |
| 4             | 68        | D/7343-31               | T491D686(1)004A(2)           | 2.7         | 6.0         | 0.8          | 433                              | 390          | 173           | 1.0                  |
| 4             | 68        | C/6032-28               | T491C686(1)004A(2)           | 2.7         | 6.0         | 1.6          | 262                              | 236          | 105           | 1.0                  |
| 4             | 68        | U/6032-15               | T491U686(1)004A(2)           | 2.7         | 6.0         | 1.8          | 224                              | 202          | 90            | 1.0                  |
| 4             | 68        | B/3528-20               | T491B686(1)004A(2)           | 2.7         | 6.0         | 3.5          | 156                              | 140          | 62            | 1.0                  |
| 4             | 68        | A/3216-18               | T491A686(1)004A(2)           | 2.7         | 30.0        | 4.0          | 137                              | 123          | 55            | 1.0                  |
| 4             | 100       | D/7343-31               | T491D107(1)004A(2)           | 4.0         | 8.0         | 0.8          | 433                              | 390          | 173           | 1.0                  |
| 4             | 100       | C/6032-28               | T491C107(1)004A(2)           | 4.0         | 8.0         | 1.2          | 303                              | 273          | 121           | 1.0                  |
| 4             | 100       | U/6032-15               | T491U107(1)004A(2)           | 4.0         | 10.0        | 1.8          | 224                              | 202          | 90            | 1.0                  |
| 4             | 100       | B/3528-20               | T491B107(M)004A(2)           | 4.0         | 8.0         | 0.9          | 307                              | 276          | 123           | 1.0                  |
| 4             | 100       | A/3216-18               | T491A107(M)004A(2)           | 4.0         | 30.0        | 4.0          | 137                              | 123          | 55            | 1.0                  |
| 4             | 100       | T/3528-12               | T491T107(M)004A(2)           | 4.0         | 30.0        | 5.0          | 118                              | 106          | 47            | 1.0                  |
| 4             | 150       | D/7343-31               | T491D157(1)004A(2)           | 6.0         | 8.0         | 0.8          | 433                              | 390          | 173           | 1.0                  |
| 4             | 150       | U/6032-15               | T491U157(1)004AT             | 6.0         | 8.0         | 1.3          | 263                              | 237          | 105           | 1.0                  |
| 4             | 150       | V/7343-19               | T491V157(1)004A(2)           | 6.0         | 8.0         | 0.7          | 423                              | 381          | 169           | 1.0                  |
| 4             | 150       | C/6032-28               | T491C157(1)004A(2)           | 6.0         | 8.0         | 1.2          | 303                              | 273          | 121           | 1.0                  |
| 4             | 150       | B/3528-20               | T491B157(M)004A(2)           | 6.0         | 12.0        | 2.0          | 206                              | 185          | 82            | 1.0                  |
| VDC           | μF        | KEMET/EIA               | (See below for part options) | max/5min    | % Max       | Ohms         | mAmps                            | mAmps        | mAmps         | J-STD-020D           |
| 85°C          | 120Hz     |                         |                              | μAmps +20°C | +20°C 120Hz | +20°C 100kHz | +25°C 100kHz                     | +85°C 100kHz | +125°C 100kHz | Temp≤260°C           |
| Rated Voltage | Rated Cap | Case Code/<br>Case Size | KEMET Part Number            | DC Leakage  | DF          | ESR          | Maximum allowable ripple current |              |               | Moisture Sensitivity |

Other part number options:

Where the 10th character equal to K (10% tolerance) is also available in M (20% tolerance).

Where the 10th character equal to M (20% tolerance) is only available in M (20% tolerance).

Standard with tin terminations (14th character = T). Tin/lead terminations is also available (14th character = H)

Also available on large (13 inch) reels. Add 7280 to the end of the part number.

Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitutions will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings &amp; Part Number Reference con't

| Rated Voltage | Rated Cap | Case Code/<br>Case Size | KEMET Part Number            | DC Leakage  | DF          | ESR          | Maximum Allowable Ripple Current |              |               | Moisture Sensitivity |
|---------------|-----------|-------------------------|------------------------------|-------------|-------------|--------------|----------------------------------|--------------|---------------|----------------------|
| 85°C          | 120Hz     | KEMET/EIA               | (See below for part options) | μAmps +20°C | +20°C 120Hz | +20°C 100kHz | +25°C 100kHz                     | +85°C 100kHz | +125°C 100kHz | Temp≤260°C           |
| VDC           | μF        |                         |                              | max/5min    | % Max       | Ohms         | mAmps                            | mAmps        | mAmps         | J-STD-020D           |
| 4             | 220       | V/7343-19               | T491V227(1)004A(2)           | 8.8         | 8.0         | 0.7          | 423                              | 381          | 169           | 1.0                  |
| 4             | 220       | B/3528-20               | T491B227(M)004A(2)           | 8.8         | 18.0        | 0.5          | 412                              | 371          | 165           | 1.0                  |
| 4             | 220       | C/6032-28               | T491C227(1)004AT             | 8.8         | 15.0        | 1.2          | 303                              | 273          | 121           | 1.0                  |
| 4             | 220       | D/7343-31               | T491D227(1)004AT             | 8.8         | 8.0         | 0.8          | 433                              | 390          | 173           | 1.0                  |
| 4             | 220       | W/7343-15               | T491W227(1)004AT             | 8.8         | 8.0         | 0.8          | 474                              | 427          | 190           | 1.0                  |
| 4             | 330       | D/7343-31               | T491D337(1)004A(2)           | 13.2        | 8.0         | 0.7          | 463                              | 417          | 185           | 1.0                  |
| 4             | 330       | V/7343-19               | T491V337(1)004A(2)           | 13.2        | 12.0        | 0.7          | 423                              | 381          | 169           | 1.0                  |
| 4             | 330       | C/6032-28               | T491C337(1)004A(2)           | 13.2        | 10.0        | 0.9          | 350                              | 315          | 140           | 1.0                  |
| 4             | 330       | X/7343-43               | T491X337(1)004AT             | 13.2        | 8.0         | 0.8          | 454                              | 409          | 182           | 1.0                  |
| 4             | 470       | X/7343-43               | T491X477(1)004A(2)           | 18.8        | 8.0         | 0.5          | 574                              | 517          | 230           | 1.0                  |
| 4             | 470       | D/7343-31               | T491D477(1)004A(2)           | 18.8        | 8.0         | 0.8          | 433                              | 390          | 173           | 1.0                  |
| 4             | 680       | X/7343-43               | T491X687(1)004A(2)           | 27.2        | 12.0        | 0.5          | 574                              | 517          | 230           | 1.0                  |
| 4             | 680       | D/7343-31               | T491D687(1)004A(2)           | 27.2        | 12.0        | 0.5          | 548                              | 493          | 219           | 1.0                  |
| 4             | 1000      | X/7343-43               | T491X108(1)004A(2)           | 40.0        | 12.0        | 0.5          | 574                              | 517          | 230           | 1.0                  |
| 4             | 1000      | E/7260-38               | T491E108(M)004A(2)           | 40.0        | 15.0        | 0.2          | 1000                             | 900          | 400           | 1.0                  |
| 6.3           | 2.2       | R/2012-12               | T491R225(1)006A(2)           | 0.1         | 6.0         | 25.0         | 32                               | 29           | 13            | 1.0                  |
| 6.3           | 2.2       | A/3216-18               | T491A225(1)006A(2)           | 0.1         | 6.0         | 8.0          | 97                               | 87           | 39            | 1.0                  |
| 6.3           | 3.3       | A/3216-18               | T491A335(1)006A(2)           | 0.2         | 6.0         | 8.0          | 97                               | 87           | 39            | 1.0                  |
| 6.3           | 4.7       | A/3216-18               | T491A475(1)006A(2)           | 0.3         | 6.0         | 6.0          | 112                              | 101          | 45            | 1.0                  |
| 6.3           | 4.7       | S/3216-12               | T491S475(1)006A(2)           | 0.3         | 6.0         | 15.0         | 63                               | 57           | 25            | 1.0                  |
| 6.3           | 6.8       | B/3528-20               | T491B685(1)006A(2)           | 0.4         | 6.0         | 3.5          | 156                              | 140          | 62            | 1.0                  |
| 6.3           | 6.8       | A/3216-18               | T491A685(1)006A(2)           | 0.4         | 6.0         | 6.0          | 112                              | 101          | 45            | 1.0                  |
| 6.3           | 6.8       | S/3216-12               | T491S685(1)006A(2)           | 0.4         | 6.0         | 15.0         | 63                               | 57           | 25            | 1.0                  |
| 6.3           | 6.8       | R/2012-12               | T491R685(1)006A(2)           | 0.4         | 8.0         | 15.0         | 41                               | 37           | 16            | 1.0                  |
| 6.3           | 10        | B/3528-20               | T491B106(1)006A(2)           | 0.6         | 6.0         | 3.5          | 156                              | 140          | 62            | 1.0                  |
| 6.3           | 10        | A/3216-18               | T491A106(1)006A(2)           | 0.6         | 6.0         | 4.0          | 137                              | 123          | 55            | 1.0                  |
| 6.3           | 10        | T/3528-12               | T491T106(1)006A(2)           | 0.6         | 6.0         | 5.0          | 118                              | 106          | 47            | 1.0                  |
| 6.3           | 10        | S/3216-12               | T491S106(1)006A(2)           | 0.6         | 10.0        | 15.0         | 63                               | 57           | 25            | 1.0                  |
| 6.3           | 10        | R/2012-12               | T491R106(1)006A(2)           | 0.6         | 8.0         | 10.0         | 50                               | 45           | 20            | 1.0                  |
| 6.3           | 15        | C/6032-28               | T491C156(1)006A(2)           | 0.9         | 6.0         | 1.8          | 247                              | 222          | 99            | 1.0                  |
| 6.3           | 15        | B/3528-20               | T491B156(1)006A(2)           | 0.9         | 6.0         | 3.5          | 156                              | 140          | 62            | 1.0                  |
| 6.3           | 15        | A/3216-18               | T491A156(1)006A(2)           | 0.9         | 6.0         | 3.5          | 146                              | 131          | 58            | 1.0                  |
| 6.3           | 15        | T/3528-12               | T491T156(1)006A(2)           | 0.9         | 6.0         | 5.0          | 118                              | 106          | 47            | 1.0                  |
| 6.3           | 15        | S/3216-12               | T491S156(1)006A(2)           | 0.9         | 15.0        | 10.0         | 77                               | 69           | 31            | 1.0                  |
| 6.3           | 22        | C/6032-28               | T491C226(1)006A(2)           | 1.4         | 6.0         | 1.8          | 247                              | 222          | 99            | 1.0                  |
| 6.3           | 22        | U/6032-15               | T491U226(1)006A(2)           | 1.4         | 6.0         | 1.8          | 224                              | 202          | 90            | 1.0                  |
| 6.3           | 22        | B/3528-20               | T491B226(1)006A(2)           | 1.4         | 6.0         | 3.5          | 156                              | 140          | 62            | 1.0                  |
| 6.3           | 22        | A/3216-18               | T491A226(1)006A(2)           | 1.4         | 6.0         | 4.0          | 137                              | 123          | 55            | 1.0                  |
| 6.3           | 22        | T/3528-12               | T491T226(1)006A(2)           | 1.4         | 8.0         | 5.0          | 118                              | 106          | 47            | 1.0                  |
| 6.3           | 33        | C/6032-28               | T491C336(1)006A(2)           | 2.1         | 6.0         | 1.8          | 247                              | 222          | 99            | 1.0                  |
| 6.3           | 33        | U/6032-15               | T491U336(1)006A(2)           | 2.1         | 6.0         | 1.8          | 224                              | 202          | 90            | 1.0                  |
| 6.3           | 33        | B/3528-20               | T491B336(1)006A(2)           | 2.1         | 6.0         | 3.0          | 168                              | 151          | 67            | 1.0                  |
| 6.3           | 33        | A/3216-18               | T491A336(1)006A(2)           | 2.1         | 12.0        | 2.5          | 173                              | 156          | 69            | 1.0                  |
| 6.3           | 33        | T/3528-12               | T491T336(1)006A(2)           | 2.1         | 12.0        | 6.0          | 108                              | 97           | 43            | 1.0                  |
| 6.3           | 47        | D/7343-31               | T491D476(1)006A(2)           | 3.0         | 6.0         | 0.8          | 433                              | 390          | 173           | 1.0                  |
| 6.3           | 47        | C/6032-28               | T491C476(1)006A(2)           | 3.0         | 6.0         | 1.6          | 262                              | 236          | 105           | 1.0                  |
| 6.3           | 47        | U/6032-15               | T491U476(1)006A(2)           | 3.0         | 6.0         | 1.8          | 224                              | 202          | 90            | 1.0                  |
| VDC           | μF        | KEMET/EIA               | (See below for part options) | max/5min    | % Max       | Ohms         | mAmps                            | mAmps        | mAmps         | J-STD-020D           |
| 85°C          | 120Hz     |                         |                              | μAmps +20°C | +20°C 120Hz | +20°C 100kHz | +25°C 100kHz                     | +85°C 100kHz | +125°C 100kHz | Temp≤260°C           |
| Rated Voltage | Rated Cap | Case Code/<br>Case Size | KEMET Part Number            | DC Leakage  | DF          | ESR          | Maximum allowable ripple current |              |               | Moisture Sensitivity |

Other part number options:

Where the 10th character equal to K (10% tolerance) is also available in M (20% tolerance).

Where the 10th character equal to M (20% tolerance) is only available in M (20% tolerance).

Standard with tin terminations (14th character = T). Tin/lead terminations is also available (14th character = H)

Also available on large (13 inch) reels. Add 7280 to the end of the part number.

Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitutions will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings &amp; Part Number Reference con't

| Rated Voltage | Rated Cap | Case Code/<br>Case Size | KEMET Part Number            | DC Leakage  | DF          | ESR          | Maximum Allowable Ripple Current |              |               | Moisture Sensitivity |
|---------------|-----------|-------------------------|------------------------------|-------------|-------------|--------------|----------------------------------|--------------|---------------|----------------------|
| 85°C          | 120Hz     | KEMET/EIA               | (See below for part options) | μAmps +20°C | +20°C 120Hz | +20°C 100kHz | +25°C 100kHz                     | +85°C 100kHz | +125°C 100kHz | Temp≤260°C           |
| VDC           | μF        |                         |                              | max/5min    | % Max       | Ohms         | mAmps                            | mAmps        | mAmps         | J-STD-020D           |
| 6.3           | 47        | V/7343-19               | T491V476(1)006AT             | 3.0         | 6.0         | 0.7          | 423                              | 381          | 169           | 1.0                  |
| 6.3           | 47        | B/3528-20               | T491B476(1)006A(2)           | 3.0         | 6.0         | 2.0          | 206                              | 185          | 82            | 1.0                  |
| 6.3           | 47        | A/3216-18               | T491A476(M)006A(2)           | 3.0         | 12.0        | 3.5          | 146                              | 131          | 58            | 1.0                  |
| 6.3           | 47        | T/3528-12               | T491T476(1)006A(2)           | 3.0         | 24.0        | 4.4          | 126                              | 113          | 50            | 1.0                  |
| 6.3           | 68        | D/7343-31               | T491D686(1)006A(2)           | 4.3         | 6.0         | 0.8          | 433                              | 390          | 173           | 1.0                  |
| 6.3           | 68        | C/6032-28               | T491C686(1)006A(2)           | 4.3         | 6.0         | 1.2          | 303                              | 273          | 121           | 1.0                  |
| 6.3           | 68        | U/6032-15               | T491U686(1)006A(2)           | 4.3         | 10.0        | 1.8          | 224                              | 202          | 90            | 1.0                  |
| 6.3           | 68        | V/7343-19               | T491V686(1)006AT             | 4.3         | 6.0         | 0.7          | 423                              | 381          | 169           | 1.0                  |
| 6.3           | 68        | B/3528-20               | T491B686(1)006A(2)           | 4.3         | 8.0         | 0.9          | 307                              | 276          | 123           | 1.0                  |
| 6.3           | 68        | A/3216-18               | T491A686(1)006A(2)           | 4.3         | 30.0        | 4.0          | 137                              | 123          | 55            | 1.0                  |
| 6.3           | 100       | D/7343-31               | T491D107(1)006A(2)           | 6.3         | 8.0         | 0.8          | 433                              | 390          | 173           | 1.0                  |
| 6.3           | 100       | V/7343-19               | T491V107(1)006A(2)           | 6.3         | 8.0         | 0.7          | 423                              | 381          | 169           | 1.0                  |
| 6.3           | 100       | C/6032-28               | T491C107(1)006A(2)           | 6.3         | 8.0         | 0.9          | 350                              | 315          | 140           | 1.0                  |
| 6.3           | 100       | M/3528-15               | T491M107(1)006AT             | 6.3         | 20.0        | 1.0          | 346                              | 311          | 138           | 1.0                  |
| 6.3           | 100       | U/6032-15               | T491U107(1)006A(2)           | 6.3         | 10.0        | 1.8          | 224                              | 202          | 90            | 1.0                  |
| 6.3           | 100       | B/3528-20               | T491B107(1)006A(2)           | 6.3         | 15.0        | 3.0          | 168                              | 151          | 67            | 1.0                  |
| 6.3           | 150       | D/7343-31               | T491D157(1)006A(2)           | 9.5         | 8.0         | 0.7          | 463                              | 417          | 185           | 1.0                  |
| 6.3           | 150       | C/6032-28               | T491C157(1)006A(2)           | 9.5         | 8.0         | 1.2          | 303                              | 273          | 121           | 1.0                  |
| 6.3           | 150       | V/7343-19               | T491V157(1)006A(2)           | 9.5         | 8.0         | 0.7          | 423                              | 381          | 169           | 1.0                  |
| 6.3           | 150       | U/6032-15               | T491U157(1)006AT             | 9.5         | 8.0         | 0.6          | 387                              | 348          | 155           | 1.0                  |
| 6.3           | 150       | W/7343-15               | T491W157(1)006AT             | 9.5         | 8.0         | 0.8          | 474                              | 427          | 190           | 1.0                  |
| 6.3           | 220       | X/7343-43               | T491X227(1)006A(2)           | 13.9        | 8.0         | 0.7          | 486                              | 437          | 194           | 1.0                  |
| 6.3           | 220       | D/7343-31               | T491D227(1)006A(2)           | 13.9        | 8.0         | 0.7          | 463                              | 417          | 185           | 1.0                  |
| 6.3           | 220       | C/6032-28               | T491C227(M)006A(2)           | 13.9        | 10.0        | 1.2          | 303                              | 273          | 121           | 1.0                  |
| 6.3           | 220       | V/7343-19               | T491V227(1)006A(2)           | 13.9        | 12.0        | 0.7          | 423                              | 381          | 169           | 1.0                  |
| 6.3           | 220       | W/7343-15               | T491W227(1)006AT             | 13.9        | 8.0         | 0.8          | 474                              | 427          | 190           | 1.0                  |
| 6.3           | 330       | V/7343-19               | T491V337(1)006AT             | 20.8        | 8.0         | 0.7          | 423                              | 381          | 169           | 1.0                  |
| 6.3           | 330       | X/7343-43               | T491X337(1)006A(2)           | 20.8        | 8.0         | 0.4          | 642                              | 578          | 257           | 1.0                  |
| 6.3           | 330       | D/7343-31               | T491D337(1)006A(2)           | 20.8        | 8.0         | 0.4          | 612                              | 551          | 245           | 1.0                  |
| 6.3           | 330       | E/7260-38               | T491E337(1)006A(2)           | 20.8        | 8.0         | 0.5          | 632                              | 569          | 253           | 1.0                  |
| 6.3           | 470       | X/7343-43               | T491X477(1)006A(2)           | 29.6        | 10.0        | 0.4          | 642                              | 578          | 257           | 1.0                  |
| 6.3           | 470       | D/7343-31               | T491D477(M)006A(2)           | 29.6        | 12.0        | 0.4          | 612                              | 551          | 245           | 1.0                  |
| 6.3           | 470       | E/7260-38               | T491E477(1)006A(2)           | 29.6        | 10.0        | 0.4          | 707                              | 636          | 283           | 1.0                  |
| 6.3           | 680       | X/7343-43               | T491X687(1)006AT             | 42.8        | 15.0        | 0.6          | 524                              | 472          | 210           | 1.0                  |
| 6.3           | 680       | E/7260-38               | T491E687(M)006A(2)           | 42.8        | 12.0        | 0.5          | 632                              | 569          | 253           | 1.0                  |
| 6.3           | 1000      | X/7343-43               | T491X108(1)006AT             | 63.0        | 15.0        | 0.6          | 524                              | 472          | 210           | 1.0                  |
| 10            | 1.5       | A/3216-18               | T491A155(1)010A(2)           | 0.2         | 6.0         | 8.0          | 97                               | 87           | 39            | 1.0                  |
| 10            | 2.2       | B/3528-20               | T491B225(1)010A(2)           | 0.2         | 6.0         | 3.5          | 156                              | 140          | 62            | 1.0                  |
| 10            | 2.2       | A/3216-18               | T491A225(1)010A(2)           | 0.2         | 6.0         | 8.0          | 97                               | 87           | 39            | 1.0                  |
| 10            | 3.3       | A/3216-18               | T491A335(1)010A(2)           | 0.3         | 6.0         | 6.0          | 112                              | 101          | 45            | 1.0                  |
| 10            | 3.3       | S/3216-12               | T491S335(1)010A(2)           | 0.3         | 6.0         | 15.0         | 63                               | 57           | 25            | 1.0                  |
| 10            | 3.3       | R/2012-12               | T491R335(1)010A(2)           | 0.3         | 8.0         | 15.0         | 41                               | 37           | 16            | 1.0                  |
| 10            | 4.7       | B/3528-20               | T491B475(1)010A(2)           | 0.5         | 6.0         | 3.5          | 156                              | 140          | 62            | 1.0                  |
| 10            | 4.7       | A/3216-18               | T491A475(1)010A(2)           | 0.5         | 6.0         | 5.0          | 122                              | 110          | 49            | 1.0                  |
| 10            | 4.7       | S/3216-12               | T491S475(1)010A(2)           | 0.5         | 6.0         | 15.0         | 63                               | 57           | 25            | 1.0                  |
| 10            | 4.7       | R/2012-12               | T491R475(1)010A(2)           | 0.5         | 8.0         | 10.0         | 50                               | 45           | 20            | 1.0                  |
| 10            | 6.8       | B/3528-20               | T491B685(1)010A(2)           | 0.7         | 6.0         | 3.5          | 156                              | 140          | 62            | 1.0                  |
| VDC           | μF        | KEMET/EIA               | (See below for part options) | max/5min    | % Max       | Ohms         | mAmps                            | mAmps        | mAmps         | J-STD-020D           |
| 85°C          | 120Hz     |                         |                              | μAmps +20°C | +20°C 120Hz | +20°C 100kHz | +25°C 100kHz                     | +85°C 100kHz | +125°C 100kHz | Temp≤260°C           |
| Rated Voltage | Rated Cap | Case Code/<br>Case Size | KEMET Part Number            | DC Leakage  | DF          | ESR          | Maximum allowable ripple current |              |               | Moisture Sensitivity |

Other part number options:

Where the 10th character equal to K (10% tolerance) is also available in M (20% tolerance).

Where the 10th character equal to M (20% tolerance) is only available in M (20% tolerance).

Standard with tin terminations (14th character = T). Tin/lead terminations is also available (14th character = H)

Also available on large (13 inch) reels. Add 7280 to the end of the part number.

Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitutions will be marked with the higher voltage rating. Substitutions can include better than series.



Table 1 – Ratings &amp; Part Number Reference con't

| Rated Voltage | Rated Cap | Case Code/<br>Case Size | KEMET Part Number            | DC Leakage  | DF          | ESR          | Maximum Allowable Ripple Current |              |               | Moisture Sensitivity |
|---------------|-----------|-------------------------|------------------------------|-------------|-------------|--------------|----------------------------------|--------------|---------------|----------------------|
| 85°C          | 120Hz     | KEMET/EIA               | (See below for part options) | μAmps +20°C | +20°C 120Hz | +20°C 100kHz | +25°C 100kHz                     | +85°C 100kHz | +125°C 100kHz | Temp≤260°C           |
| VDC           | μF        |                         |                              | max/5min    | % Max       | Ohms         | mAmps                            | mAmps        | mAmps         | J-STD-020D           |
| 10            | 6.8       | A/3216-18               | T491A685(1)010A(2)           | 0.7         | 6.0         | 4.0          | 137                              | 123          | 55            | 1.0                  |
| 10            | 6.8       | T/3528-12               | T491T685(1)010A(2)           | 0.7         | 6.0         | 5.0          | 118                              | 106          | 47            | 1.0                  |
| 10            | 6.8       | S/3216-12               | T491S685(1)010A(2)           | 0.7         | 10.0        | 15.0         | 63                               | 57           | 25            | 1.0                  |
| 10            | 10        | C/6032-28               | T491C106(1)010A(2)           | 1.0         | 6.0         | 1.8          | 247                              | 222          | 99            | 1.0                  |
| 10            | 10        | B/3528-20               | T491B106(1)010A(2)           | 1.0         | 6.0         | 3.5          | 156                              | 140          | 62            | 1.0                  |
| 10            | 10        | A/3216-18               | T491A106(1)010A(2)           | 1.0         | 6.0         | 4.0          | 137                              | 123          | 55            | 1.0                  |
| 10            | 10        | T/3528-12               | T491T106(1)010A(2)           | 1.0         | 6.0         | 5.0          | 118                              | 106          | 47            | 1.0                  |
| 10            | 10        | S/3216-12               | T491S106(1)010A(2)           | 1.0         | 10.0        | 15.0         | 63                               | 57           | 25            | 1.0                  |
| 10            | 10        | R/2012-12               | T491R106(1)010A(2)           | 1.0         | 24.0        | 30.0         | 29                               | 26           | 12            | 1.0                  |
| 10            | 15        | C/6032-28               | T491C156(1)010A(2)           | 1.5         | 6.0         | 1.8          | 247                              | 222          | 99            | 1.0                  |
| 10            | 15        | U/6032-15               | T491U156(1)010A(2)           | 1.5         | 6.0         | 1.8          | 224                              | 202          | 90            | 1.0                  |
| 10            | 15        | B/3528-20               | T491B156(1)010A(2)           | 1.5         | 6.0         | 2.8          | 174                              | 157          | 70            | 1.0                  |
| 10            | 15        | A/3216-18               | T491A156(1)010A(2)           | 1.5         | 8.0         | 6.0          | 112                              | 101          | 45            | 1.0                  |
| 10            | 15        | T/3528-12               | T491T156(1)010A(2)           | 1.5         | 8.0         | 5.0          | 118                              | 106          | 47            | 1.0                  |
| 10            | 22        | C/6032-28               | T491C226(1)010A(2)           | 2.2         | 6.0         | 1.8          | 247                              | 222          | 99            | 1.0                  |
| 10            | 22        | U/6032-15               | T491U226(1)010A(2)           | 2.2         | 6.0         | 1.8          | 224                              | 202          | 90            | 1.0                  |
| 10            | 22        | B/3528-20               | T491B226(1)010A(2)           | 2.2         | 6.0         | 2.4          | 188                              | 169          | 75            | 1.0                  |
| 10            | 22        | A/3216-18               | T491A226(M)010A(2)           | 2.2         | 10.0        | 6.0          | 112                              | 101          | 45            | 1.0                  |
| 10            | 22        | T/3528-12               | T491T226(1)010A(2)           | 2.2         | 12.0        | 8.0          | 94                               | 85           | 38            | 1.0                  |
| 10            | 33        | D/7343-31               | T491D336(1)010A(2)           | 3.3         | 6.0         | 0.8          | 433                              | 390          | 173           | 1.0                  |
| 10            | 33        | V/7343-19               | T491V336(1)010A(2)           | 3.3         | 6.0         | 0.7          | 423                              | 381          | 169           | 1.0                  |
| 10            | 33        | C/6032-28               | T491C336(1)010A(2)           | 3.3         | 6.0         | 1.6          | 262                              | 236          | 105           | 1.0                  |
| 10            | 33        | U/6032-15               | T491U336(1)010A(2)           | 3.3         | 6.0         | 1.8          | 224                              | 202          | 90            | 1.0                  |
| 10            | 33        | B/3528-20               | T491B336(1)010A(2)           | 3.3         | 6.0         | 1.8          | 217                              | 195          | 87            | 1.0                  |
| 10            | 33        | T/3528-12               | T491T336(1)010A(2)           | 3.3         | 24.0        | 5.0          | 118                              | 106          | 47            | 1.0                  |
| 10            | 33        | A/3216-18               | T491A336(1)010A(2)           | 3.3         | 15.0        | 6.0          | 112                              | 101          | 45            | 1.0                  |
| 10            | 47        | D/7343-31               | T491D476(1)010A(2)           | 4.7         | 6.0         | 0.8          | 433                              | 390          | 173           | 1.0                  |
| 10            | 47        | V/7343-19               | T491V476(1)010A(2)           | 4.7         | 6.0         | 0.7          | 423                              | 381          | 169           | 1.0                  |
| 10            | 47        | C/6032-28               | T491C476(1)010A(2)           | 4.7         | 6.0         | 1.2          | 303                              | 273          | 121           | 1.0                  |
| 10            | 47        | U/6032-15               | T491U476(1)010A(2)           | 4.7         | 10.0        | 2.2          | 202                              | 182          | 81            | 1.0                  |
| 10            | 47        | B/3528-20               | T491B476(1)010A(2)           | 4.7         | 8.0         | 1.0          | 292                              | 263          | 117           | 1.0                  |
| 10            | 68        | D/7343-31               | T491D686(1)010A(2)           | 6.8         | 6.0         | 0.8          | 433                              | 390          | 173           | 1.0                  |
| 10            | 68        | V/7343-19               | T491V686(1)010A(2)           | 6.8         | 6.0         | 0.7          | 423                              | 381          | 169           | 1.0                  |
| 10            | 68        | C/6032-28               | T491C686(1)010A(2)           | 6.8         | 6.0         | 1.2          | 303                              | 273          | 121           | 1.0                  |
| 10            | 68        | W/7343-15               | T491W686(1)010AT             | 6.8         | 6.0         | 1.2          | 387                              | 348          | 155           | 1.0                  |
| 10            | 68        | U/6032-15               | T491U686(1)010A(2)           | 6.8         | 10.0        | 1.8          | 224                              | 202          | 90            | 1.0                  |
| 10            | 68        | B/3528-20               | T491B686(M)010A(2)           | 6.8         | 10.0        | 3.0          | 168                              | 151          | 67            | 1.0                  |
| 10            | 100       | D/7343-31               | T491D107(1)010A(2)           | 10.0        | 8.0         | 0.7          | 463                              | 417          | 185           | 1.0                  |
| 10            | 100       | U/6032-15               | T491U107(1)010AT             | 10.0        | 8.0         | 0.7          | 359                              | 323          | 144           | 1.0                  |
| 10            | 100       | W/7343-15               | T491W107(1)010AT             | 10.0        | 8.0         | 0.8          | 474                              | 427          | 190           | 1.0                  |
| 10            | 100       | C/6032-28               | T491C107(1)010A(2)           | 10.0        | 8.0         | 1.2          | 303                              | 273          | 121           | 1.0                  |
| 10            | 100       | V/7343-19               | T491V107(1)010A(2)           | 10.0        | 8.0         | 0.7          | 423                              | 381          | 169           | 1.0                  |
| 10            | 150       | X/7343-43               | T491X157(1)010A(2)           | 15.0        | 8.0         | 0.7          | 486                              | 437          | 194           | 1.0                  |
| 10            | 150       | D/7343-31               | T491D157(1)010A(2)           | 15.0        | 8.0         | 0.7          | 463                              | 417          | 185           | 1.0                  |
| 10            | 150       | C/6032-28               | T491C157(1)010A(2)           | 15.0        | 10.0        | 0.9          | 350                              | 315          | 140           | 1.0                  |
| 10            | 150       | V/7343-19               | T491V157(1)010A(2)           | 15.0        | 8.0         | 0.7          | 423                              | 381          | 169           | 1.0                  |
| 10            | 220       | X/7343-43               | T491X227(1)010A(2)           | 22.0        | 8.0         | 0.5          | 574                              | 517          | 230           | 1.0                  |
| 10            | 220       | D/7343-31               | T491D227(1)010A(2)           | 22.0        | 8.0         | 0.5          | 548                              | 493          | 219           | 1.0                  |
| VDC           | μF        | KEMET/EIA               | (See below for part options) | max/5min    | % Max       | Ohms         | mAmps                            | mAmps        | mAmps         | J-STD-020D           |
| 85°C          | 120Hz     |                         |                              | μAmps +20°C | +20°C 120Hz | +20°C 100kHz | +25°C 100kHz                     | +85°C 100kHz | +125°C 100kHz | Temp≤260°C           |
| Rated Voltage | Rated Cap | Case Code/<br>Case Size | KEMET Part Number            | DC Leakage  | DF          | ESR          | Maximum allowable ripple current |              |               | Moisture Sensitivity |

Other part number options:

Where the 10th character equal to K (10% tolerance) is also available in M (20% tolerance).

Where the 10th character equal to M (20% tolerance) is only available in M (20% tolerance).

Standard with tin terminations (14th character = T). Tin/lead terminations is also available (14th character = H)

Also available on large (13 inch) reels. Add 7280 to the end of the part number.

Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitutions will be marked with the higher voltage rating. Substitutions can include better than series.



**Table 1 – Ratings & Part Number Reference con't**

| Rated Voltage | Rated Cap | Case Code/<br>Case Size | KEMET Part Number            | DC Leakage  | DF          | ESR          | Maximum Allowable Ripple Current |              |               | Moisture Sensitivity |
|---------------|-----------|-------------------------|------------------------------|-------------|-------------|--------------|----------------------------------|--------------|---------------|----------------------|
| 85°C          | 120Hz     | KEMET/EIA               | (See below for part options) | μAmps +20°C | +20°C 120Hz | +20°C 100kHz | +25°C 100kHz                     | +85°C 100kHz | +125°C 100kHz | Temp≤260°C           |
| VDC           | μF        |                         |                              | max/5min    | % Max       | Ohms         | mAmps                            | mAmps        | mAmps         | J-STD-020D           |
| 10            | 330       | D/7343-31               | T491D337(M)010A(2)           | 33.0        | 10.0        | 0.5          | 548                              | 493          | 219           | 1.0                  |
| 10            | 330       | X/7343-43               | T491X337(1)010A(2)           | 33.0        | 10.0        | 0.5          | 574                              | 517          | 230           | 1.0                  |
| 10            | 330       | E/7260-38               | T491E337(1)010A(2)           | 33.0        | 10.0        | 0.5          | 632                              | 569          | 253           | 1.0                  |
| 10            | 470       | X/7343-43               | T491X477(M)010A(2)           | 47.0        | 10.0        | 0.2          | 908                              | 817          | 363           | 1.0                  |
| 10            | 470       | E/7260-38               | T491E477(M)010A(2)           | 47.0        | 12.0        | 0.5          | 632                              | 569          | 253           | 1.0                  |
| 16            | 1         | A/3216-18               | T491A105(1)016A(2)           | 0.2         | 4.0         | 10.0         | 87                               | 78           | 35            | 1.0                  |
| 16            | 1.5       | A/3216-18               | T491A155(1)016A(2)           | 0.2         | 6.0         | 8.0          | 97                               | 87           | 39            | 1.0                  |
| 16            | 2.2       | A/3216-18               | T491A225(1)016A(2)           | 0.4         | 6.0         | 6.0          | 112                              | 101          | 45            | 1.0                  |
| 16            | 2.2       | S/3216-12               | T491S225(1)016A(2)           | 0.4         | 6.0         | 15.0         | 63                               | 57           | 25            | 1.0                  |
| 16            | 2.2       | R/2012-12               | T491R225(1)016A(2)           | 0.4         | 8.0         | 25.0         | 32                               | 29           | 13            | 1.0                  |
| 16            | 3.3       | B/3528-20               | T491B335(1)016A(2)           | 0.5         | 6.0         | 3.5          | 156                              | 140          | 62            | 1.0                  |
| 16            | 3.3       | A/3216-18               | T491A335(1)016A(2)           | 0.5         | 6.0         | 5.0          | 122                              | 110          | 49            | 1.0                  |
| 16            | 4.7       | C/6032-28               | T491C475(1)016A(2)           | 0.8         | 6.0         | 2.4          | 214                              | 193          | 86            | 1.0                  |
| 16            | 4.7       | B/3528-20               | T491B475(1)016A(2)           | 0.8         | 6.0         | 3.5          | 156                              | 140          | 62            | 1.0                  |
| 16            | 4.7       | A/3216-18               | T491A475(1)016A(2)           | 0.8         | 6.0         | 4.0          | 137                              | 123          | 55            | 1.0                  |
| 16            | 4.7       | T/3528-12               | T491T475(1)016A(2)           | 0.8         | 6.0         | 5.0          | 118                              | 106          | 47            | 1.0                  |
| 16            | 6.8       | C/6032-28               | T491C685(1)016A(2)           | 1.1         | 6.0         | 1.9          | 241                              | 217          | 96            | 1.0                  |
| 16            | 6.8       | B/3528-20               | T491B685(1)016A(2)           | 1.1         | 6.0         | 2.5          | 184                              | 166          | 74            | 1.0                  |
| 16            | 6.8       | A/3216-18               | T491A685(1)016A(2)           | 1.1         | 6.0         | 3.5          | 146                              | 131          | 58            | 1.0                  |
| 16            | 10        | C/6032-28               | T491C106(1)016A(2)           | 1.6         | 6.0         | 1.8          | 247                              | 222          | 99            | 1.0                  |
| 16            | 10        | U/6032-15               | T491U106(1)016A(2)           | 1.6         | 6.0         | 1.8          | 224                              | 202          | 90            | 1.0                  |
| 16            | 10        | B/3528-20               | T491B106(1)016A(2)           | 1.6         | 6.0         | 2.8          | 174                              | 157          | 70            | 1.0                  |
| 16            | 10        | A/3216-18               | T491A106(1)016A(2)           | 1.6         | 8.0         | 7.0          | 104                              | 94           | 42            | 1.0                  |
| 16            | 10        | T/3528-12               | T491T106(1)016A(2)           | 1.6         | 8.0         | 8.0          | 94                               | 85           | 38            | 1.0                  |
| 16            | 15        | C/6032-28               | T491C156(1)016A(2)           | 2.4         | 6.0         | 1.8          | 247                              | 222          | 99            | 1.0                  |
| 16            | 15        | U/6032-15               | T491U156(1)016A(2)           | 2.4         | 6.0         | 1.8          | 224                              | 202          | 90            | 1.0                  |
| 16            | 15        | B/3528-20               | T491B156(1)016A(2)           | 2.4         | 6.0         | 2.5          | 184                              | 166          | 74            | 1.0                  |
| 16            | 15        | A/3216-18               | T491A156(1)016A(2)           | 2.4         | 8.0         | 3.5          | 146                              | 131          | 58            | 1.0                  |
| 16            | 22        | D/7343-31               | T491D226(1)016A(2)           | 3.5         | 6.0         | 0.8          | 433                              | 390          | 173           | 1.0                  |
| 16            | 22        | C/6032-28               | T491C226(1)016A(2)           | 3.5         | 6.0         | 1.6          | 262                              | 236          | 105           | 1.0                  |
| 16            | 22        | U/6032-15               | T491U226(1)016A(2)           | 3.5         | 10.0        | 3.0          | 173                              | 156          | 69            | 1.0                  |
| 16            | 22        | B/3528-20               | T491B226(1)016A(2)           | 3.5         | 6.0         | 2.2          | 197                              | 177          | 79            | 1.0                  |
| 16            | 33        | D/7343-31               | T491D336(1)016A(2)           | 5.3         | 6.0         | 0.8          | 433                              | 390          | 173           | 1.0                  |
| 16            | 33        | C/6032-28               | T491C336(1)016A(2)           | 5.3         | 6.0         | 1.2          | 303                              | 273          | 121           | 1.0                  |
| 16            | 33        | U/6032-15               | T491U336(1)016A(2)           | 5.3         | 12.0        | 3.0          | 173                              | 156          | 69            | 1.0                  |
| 16            | 47        | D/7343-31               | T491D476(1)016A(2)           | 7.5         | 6.0         | 0.8          | 433                              | 390          | 173           | 1.0                  |
| 16            | 47        | V/7343-19               | T491V476(1)016A(2)           | 7.5         | 6.0         | 0.7          | 423                              | 381          | 169           | 1.0                  |
| 16            | 47        | C/6032-28               | T491C476(1)016A(2)           | 7.5         | 6.0         | 1.2          | 303                              | 273          | 121           | 1.0                  |
| 16            | 68        | V/7343-19               | T491V686(1)016A(2)           | 10.9        | 6.0         | 0.7          | 423                              | 381          | 169           | 1.0                  |
| 16            | 68        | C/6032-28               | T491C686(1)016A(2)           | 10.9        | 6.0         | 1.2          | 303                              | 273          | 121           | 1.0                  |
| 16            | 68        | W/7343-15               | T491W686(1)016A(2)           | 10.9        | 6.0         | 0.8          | 474                              | 427          | 190           | 1.0                  |
| 16            | 68        | D/7343-31               | T491D686(1)016A(2)           | 10.9        | 6.0         | 0.7          | 463                              | 417          | 185           | 1.0                  |
| 16            | 68        | C/6032-28               | T491C686(1)016A(2)           | 10.9        | 12.0        | 1.2          | 303                              | 273          | 121           | 1.0                  |
| 16            | 100       | X/7343-43               | T491X107(1)016A(2)           | 16.0        | 8.0         | 0.7          | 486                              | 437          | 194           | 1.0                  |
| 16            | 100       | C/6032-28               | T491C107(1)016A(2)           | 16.0        | 10.0        | 1.0          | 332                              | 299          | 133           | 1.0                  |
| 16            | 100       | V/7343-19               | T491V107(1)016A(2)           | 16.0        | 12.0        | 0.7          | 423                              | 381          | 169           | 1.0                  |
| 16            | 100       | D/7343-31               | T491D107(1)016A(2)           | 16.0        | 8.0         | 0.7          | 463                              | 417          | 185           | 1.0                  |
| VDC           | μF        | KEMET/EIA               | (See below for part options) | max/5min    | % Max       | Ohms         | mAmps                            | mAmps        | mAmps         | J-STD-020D           |
| 85°C          | 120Hz     |                         |                              | μAmps +20°C | +20°C 120Hz | +20°C 100kHz | +25°C 100kHz                     | +85°C 100kHz | +125°C 100kHz | Temp≤260°C           |
| Rated Voltage | Rated Cap | Case Code/<br>Case Size | KEMET Part Number            | DC Leakage  | DF          | ESR          | Maximum allowable ripple current |              |               | Moisture Sensitivity |

Other part number options:

Where the 10th character equal to K (10% tolerance) is also available in M (20% tolerance).

Where the 10th character equal to M (20% tolerance) is only available in M (20% tolerance).

Standard with tin terminations (14th character = T). Tin/lead terminations is also available (14th character = H)

Also available on large (13 inch) reels. Add 7280 to the end of the part number.

Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitutions will be marked with the higher voltage rating. Substitutions can include better than series.

**Table 1 – Ratings & Part Number Reference con't**

| Rated Voltage | Rated Cap | Case Code/<br>Case Size | KEMET Part Number            | DC Leakage  | DF          | ESR          | Maximum Allowable Ripple Current |              |               | Moisture Sensitivity |
|---------------|-----------|-------------------------|------------------------------|-------------|-------------|--------------|----------------------------------|--------------|---------------|----------------------|
| 85°C          | 120Hz     | KEMET/EIA               | (See below for part options) | μAmps +20°C | +20°C 120Hz | +20°C 100kHz | +25°C 100kHz                     | +85°C 100kHz | +125°C 100kHz | Temp≤260°C           |
| VDC           | μF        |                         |                              | max/5min    | % Max       | Ohms         | mAmps                            | mAmps        | mAmps         | J-STD-020D           |
| 16            | 150       | X/7343-43               | T491X157(1)016A(2)           | 24.0        | 8.0         | 0.5          | 574                              | 517          | 230           | 1.0                  |
| 16            | 150       | D/7343-31               | T491D157(1)016A(2)           | 24.0        | 12.0        | 0.7          | 463                              | 417          | 185           | 1.0                  |
| 16            | 220       | X/7343-43               | T491X227(1)016A(2)           | 35.2        | 10.0        | 0.5          | 574                              | 517          | 230           | 1.0                  |
| 16            | 220       | D/7343-31               | T491D227(1)016AT             | 35.2        | 15.0        | 0.9          | 408                              | 367          | 163           | 1.0                  |
| 16            | 220       | E/7260-38               | T491E227(1)016A(2)           | 35.2        | 7.2         | 0.9          | 471                              | 424          | 188           | 1.0                  |
| 20            | 0.47      | R/2012-12               | T491R474(1)020A(2)           | 0.1         | 4.0         | 35.0         | 27                               | 24           | 11            | 1.0                  |
| 20            | 0.68      | A/3216-18               | T491A684(1)020A(2)           | 0.1         | 4.0         | 12.0         | 79                               | 71           | 32            | 1.0                  |
| 20            | 1         | A/3216-18               | T491A105(1)020A(2)           | 0.2         | 4.0         | 9.0          | 91                               | 82           | 36            | 1.0                  |
| 20            | 1         | S/3216-12               | T491S105(1)020A(2)           | 0.2         | 6.0         | 18.0         | 58                               | 52           | 23            | 1.0                  |
| 20            | 1         | R/2012-12               | T491R105(1)020A(2)           | 0.2         | 6.0         | 20.0         | 35                               | 32           | 14            | 1.0                  |
| 20            | 1.5       | A/3216-18               | T491A155(1)020A(2)           | 0.3         | 6.0         | 6.5          | 107                              | 96           | 43            | 1.0                  |
| 20            | 1.5       | S/3216-12               | T491S155(1)020A(2)           | 0.3         | 6.0         | 15.0         | 63                               | 57           | 25            | 1.0                  |
| 20            | 2.2       | B/3528-20               | T491B225(1)020A(2)           | 0.4         | 6.0         | 3.5          | 156                              | 140          | 62            | 1.0                  |
| 20            | 2.2       | A/3216-18               | T491A225(1)020A(2)           | 0.4         | 0.6         | 7.0          | 104                              | 94           | 42            | 1.0                  |
| 20            | 2.2       | R/2012-12               | T491R225(1)020A(2)           | 0.4         | 8.0         | 8.0          | 56                               | 50           | 22            | 1.0                  |
| 20            | 3.3       | B/3528-20               | T491B335(1)020A(2)           | 0.7         | 6.0         | 3.0          | 168                              | 151          | 67            | 1.0                  |
| 20            | 3.3       | A/3216-18               | T491A335(1)020A(2)           | 0.7         | 6.0         | 4.5          | 129                              | 116          | 52            | 1.0                  |
| 20            | 3.3       | T/3528-12               | T491T335(1)020A(2)           | 0.7         | 6.0         | 5.0          | 118                              | 106          | 47            | 1.0                  |
| 20            | 4.7       | C/6032-28               | T491C475(1)020A(2)           | 0.9         | 6.0         | 2.4          | 214                              | 193          | 86            | 1.0                  |
| 20            | 4.7       | B/3528-20               | T491B475(1)020A(2)           | 0.9         | 6.0         | 3.0          | 168                              | 151          | 67            | 1.0                  |
| 20            | 4.7       | A/3216-18               | T491A475(1)020A(2)           | 0.9         | 6.0         | 4.0          | 137                              | 123          | 55            | 1.0                  |
| 20            | 6.8       | C/6032-28               | T491C685(1)020A(2)           | 1.4         | 6.0         | 1.9          | 241                              | 217          | 96            | 1.0                  |
| 20            | 6.8       | U/6032-15               | T491U685(1)020A(2)           | 1.4         | 6.0         | 1.9          | 218                              | 196          | 87            | 1.0                  |
| 20            | 6.8       | B/3528-20               | T491B685(1)020A(2)           | 1.4         | 6.0         | 2.5          | 184                              | 166          | 74            | 1.0                  |
| 20            | 6.8       | A/3216-18               | T491A685(M)020A(2)           | 1.4         | 8.0         | 6.0          | 112                              | 101          | 45            | 1.0                  |
| 20            | 10        | C/6032-28               | T491C106(1)020A(2)           | 2.0         | 6.0         | 1.8          | 247                              | 222          | 99            | 1.0                  |
| 20            | 10        | U/6032-15               | T491U106(1)020A(2)           | 2.0         | 6.0         | 1.8          | 224                              | 202          | 90            | 1.0                  |
| 20            | 10        | B/3528-20               | T491B106(1)020A(2)           | 2.0         | 6.0         | 2.1          | 201                              | 181          | 80            | 1.0                  |
| 20            | 10        | A/3216-18               | T491A106(M)020A(2)           | 2.0         | 10.0        | 5.0          | 122                              | 110          | 49            | 1.0                  |
| 20            | 15        | D/7343-31               | T491D156(1)020A(2)           | 3.0         | 6.0         | 1.0          | 387                              | 348          | 155           | 1.0                  |
| 20            | 15        | B/3528-20               | T491B156(1)020AT             | 3.0         | 6.0         | 2.5          | 184                              | 166          | 74            | 1.0                  |
| 20            | 15        | C/6032-28               | T491C156(1)020A(2)           | 3.0         | 6.0         | 1.7          | 254                              | 229          | 102           | 1.0                  |
| 20            | 22        | D/7343-31               | T491D226(1)020A(2)           | 4.4         | 6.0         | 0.8          | 433                              | 390          | 173           | 1.0                  |
| 20            | 22        | V/7343-19               | T491V226(1)020A(2)           | 4.4         | 6.0         | 0.7          | 423                              | 381          | 169           | 1.0                  |
| 20            | 22        | C/6032-28               | T491C226(1)020A(2)           | 4.4         | 6.0         | 1.2          | 303                              | 273          | 121           | 1.0                  |
| 20            | 22        | B/3528-20               | T491B226(1)020A(2)           | 4.4         | 8.0         | 4.0          | 146                              | 131          | 58            | 1.0                  |
| 20            | 33        | D/7343-31               | T491D336(1)020A(2)           | 6.6         | 6.0         | 0.8          | 433                              | 390          | 173           | 1.0                  |
| 20            | 33        | C/6032-28               | T491C336(M)020A(2)           | 6.6         | 6.0         | 1.2          | 303                              | 273          | 121           | 1.0                  |
| 20            | 33        | V/7343-19               | T491V336(1)020A(2)           | 6.6         | 8.0         | 0.7          | 423                              | 381          | 169           | 1.0                  |
| 20            | 47        | C/6032-28               | T491C476(M)020A(2)           | 9.4         | 10.0        | 0.9          | 350                              | 315          | 140           | 1.0                  |
| 20            | 47        | X/7343-43               | T491X476(1)020AT             | 9.4         | 6.0         | 0.8          | 454                              | 409          | 182           | 1.0                  |
| 20            | 47        | D/7343-31               | T491D476(1)020A(2)           | 9.4         | 6.0         | 0.7          | 463                              | 417          | 185           | 1.0                  |
| 20            | 68        | X/7343-43               | T491X686(1)020A(2)           | 13.6        | 6.0         | 0.7          | 486                              | 437          | 194           | 1.0                  |
| 20            | 68        | D/7343-31               | T491D686(1)020A(2)           | 13.6        | 8.0         | 0.7          | 463                              | 417          | 185           | 1.0                  |
| 20            | 100       | X/7343-43               | T491X107(1)020A(2)           | 20.0        | 8.0         | 0.5          | 574                              | 517          | 230           | 1.0                  |
| 20            | 100       | D/7343-31               | T491D107(1)020AT             | 20.0        | 8.0         | 0.9          | 408                              | 367          | 163           | 1.0                  |
| 20            | 100       | E/7260-38               | T491E107(1)020A(2)           | 20.0        | 8.0         | 0.5          | 632                              | 569          | 253           | 1.0                  |
| VDC           | μF        | KEMET/EIA               | (See below for part options) | max/5min    | % Max       | Ohms         | mAmps                            | mAmps        | mAmps         | J-STD-020D           |
| 85°C          | 120Hz     |                         |                              | μAmps +20°C | +20°C 120Hz | +20°C 100kHz | +25°C 100kHz                     | +85°C 100kHz | +125°C 100kHz | Temp≤260°C           |
| Rated Voltage | Rated Cap | Case Code/<br>Case Size | KEMET Part Number            | DC Leakage  | DF          | ESR          | Maximum allowable ripple current |              |               | Moisture Sensitivity |

Other part number options:

Where the 10th character equal to K (10% tolerance) is also available in M (20% tolerance).

Where the 10th character equal to M (20% tolerance) is only available in M (20% tolerance).

Standard with tin terminations (14th character = T). Tin/lead terminations is also available (14th character = H)

Also available on large (13 inch) reels. Add 7280 to the end of the part number.

Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitutions will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings &amp; Part Number Reference con't

| Rated Voltage | Rated Cap | Case Code/<br>Case Size | KEMET Part Number            | DC Leakage  | DF          | ESR          | Maximum Allowable Ripple Current |              |               | Moisture Sensitivity |
|---------------|-----------|-------------------------|------------------------------|-------------|-------------|--------------|----------------------------------|--------------|---------------|----------------------|
| 85°C          | 120Hz     | KEMET/EIA               | (See below for part options) | μAmps +20°C | +20°C 120Hz | +20°C 100kHz | +25°C 100kHz                     | +85°C 100kHz | +125°C 100kHz | Temp≤260°C           |
| VDC           | μF        |                         |                              | max/5min    | % Max       | Ohms         | mAmps                            | mAmps        | mAmps         | J-STD-020D           |
| 20            | 150       | X/7343-43               | T491X157(1)020A(2)           | 30.0        | 10.0        | 0.5          | 574                              | 517          | 230           | 1.0                  |
| 25            | 0.33      | A/3216-18               | T491A334(1)025A(2)           | 0.1         | 4.0         | 15.0         | 71                               | 64           | 28            | 1.0                  |
| 25            | 0.47      | A/3216-18               | T491A474(1)025A(2)           | 0.1         | 4.0         | 14.0         | 73                               | 66           | 29            | 1.0                  |
| 25            | 0.68      | A/3216-18               | T491A684(1)025A(2)           | 0.2         | 4.0         | 10.0         | 87                               | 78           | 35            | 1.0                  |
| 25            | 1         | B/3528-20               | T491B105(1)025A(2)           | 0.3         | 4.0         | 5.0          | 130                              | 117          | 52            | 1.0                  |
| 25            | 1         | A/3216-18               | T491A105(1)025A(2)           | 0.3         | 4.0         | 8.0          | 97                               | 87           | 39            | 1.0                  |
| 25            | 1         | S/3216-12               | T491S105(1)025A(2)           | 0.3         | 6.0         | 18.0         | 58                               | 52           | 23            | 1.0                  |
| 25            | 1.5       | B/3528-20               | T491B155(1)025A(2)           | 0.4         | 6.0         | 5.0          | 130                              | 117          | 52            | 1.0                  |
| 25            | 1.5       | A/3216-18               | T491A155(1)025A(2)           | 0.4         | 6.0         | 7.5          | 100                              | 90           | 40            | 1.0                  |
| 25            | 1.5       | R/2012-12               | T491R155(1)025A(2)           | 0.4         | 8.0         | 8.0          | 56                               | 50           | 22            | 1.0                  |
| 25            | 2.2       | C/6032-28               | T491C225(1)025A(2)           | 0.6         | 6.0         | 3.5          | 177                              | 159          | 71            | 1.0                  |
| 25            | 2.2       | A/3216-18               | T491A225(1)025AT             | 0.6         | 6.0         | 7.0          | 104                              | 94           | 42            | 1.0                  |
| 25            | 2.2       | B/3528-20               | T491B225(1)025A(2)           | 0.6         | 6.0         | 4.5          | 137                              | 123          | 55            | 1.0                  |
| 25            | 3.3       | C/6032-28               | T491C335(1)025A(2)           | 0.8         | 6.0         | 2.5          | 210                              | 189          | 84            | 1.0                  |
| 25            | 3.3       | A/3216-18               | T491A335(1)025AT             | 0.8         | 6.0         | 3.7          | 142                              | 128          | 57            | 1.0                  |
| 25            | 3.3       | B/3528-20               | T491B335(1)025A(2)           | 0.8         | 6.0         | 3.5          | 156                              | 140          | 62            | 1.0                  |
| 25            | 4.7       | C/6032-28               | T491C475(1)025A(2)           | 1.2         | 6.0         | 2.4          | 214                              | 193          | 86            | 1.0                  |
| 25            | 4.7       | B/3528-20               | T491B475(1)025A(2)           | 1.2         | 6.0         | 1.5          | 238                              | 214          | 95            | 1.0                  |
| 25            | 4.7       | A/3216-18               | T491A475(M)025A(2)           | 1.2         | 8.0         | 6.0          | 112                              | 101          | 45            | 1.0                  |
| 25            | 6.8       | C/6032-28               | T491C685(1)025A(2)           | 1.7         | 6.0         | 1.9          | 241                              | 217          | 96            | 1.0                  |
| 25            | 6.8       | D/7343-31               | T491D685(1)025AT             | 1.7         | 6.0         | 1.8          | 289                              | 260          | 116           | 1.0                  |
| 25            | 6.8       | B/3528-20               | T491B685(1)025A(2)           | 1.7         | 8.0         | 2.8          | 174                              | 157          | 70            | 1.0                  |
| 25            | 10        | D/7343-31               | T491D106(1)025A(2)           | 2.5         | 6.0         | 1.0          | 387                              | 348          | 155           | 1.0                  |
| 25            | 10        | C/6032-28               | T491C106(1)025A(2)           | 2.5         | 6.0         | 1.5          | 271                              | 244          | 108           | 1.0                  |
| 25            | 10        | B/3528-20               | T491B106(1)025A(2)           | 2.5         | 8.0         | 3.0          | 168                              | 151          | 67            | 1.0                  |
| 25            | 15        | D/7343-31               | T491D156(1)025A(2)           | 3.8         | 6.0         | 1.0          | 387                              | 348          | 155           | 1.0                  |
| 25            | 15        | V/7343-19               | T491V156(1)025AT             | 3.8         | 6.0         | 1.0          | 354                              | 319          | 142           | 1.0                  |
| 25            | 15        | C/6032-28               | T491C156(1)025A(2)           | 3.8         | 6.0         | 1.5          | 271                              | 244          | 108           | 1.0                  |
| 25            | 15        | B/3528-20               | T491B156(1)025A(2)           | 3.8         | 8.0         | 4.0          | 146                              | 131          | 58            | 1.0                  |
| 25            | 22        | D/7343-31               | T491D226(1)025A(2)           | 5.5         | 6.0         | 0.8          | 433                              | 390          | 173           | 1.0                  |
| 25            | 22        | C/6032-28               | T491C226(1)025A(2)           | 5.5         | 6.0         | 1.4          | 280                              | 252          | 112           | 1.0                  |
| 25            | 22        | V/7343-19               | T491V226(1)025A(2)           | 5.5         | 6.0         | 0.7          | 423                              | 381          | 169           | 1.0                  |
| 25            | 33        | X/7343-43               | T491X336(1)025A(2)           | 8.3         | 6.0         | 0.7          | 486                              | 437          | 194           | 1.0                  |
| 25            | 33        | D/7343-31               | T491D336(1)025A(2)           | 8.3         | 6.0         | 0.7          | 463                              | 417          | 185           | 1.0                  |
| 25            | 33        | C/6032-28               | T491C336(1)025A(2)           | 8.3         | 10.0        | 1.2          | 303                              | 273          | 121           | 1.0                  |
| 25            | 47        | X/7343-43               | T491X476(1)025A(2)           | 11.8        | 6.0         | 0.7          | 486                              | 437          | 194           | 1.0                  |
| 25            | 47        | D/7343-31               | T491D476(1)025A(2)           | 11.8        | 10.0        | 0.7          | 463                              | 417          | 185           | 1.0                  |
| 25            | 68        | X/7343-43               | T491X686(M)025A(2)           | 17.0        | 8.0         | 0.7          | 486                              | 437          | 194           | 1.0                  |
| 25            | 68        | D/7343-31               | T491D686(M)025A(2)           | 17.0        | 10.0        | 0.7          | 463                              | 417          | 185           | 1.0                  |
| 25            | 100       | X/7343-43               | T491X107(1)025A(2)           | 25.0        | 8.0         | 0.3          | 742                              | 668          | 297           | 1.0                  |
| 35            | 0.1       | A/3216-18               | T491A104(1)035A(2)           | 0.0         | 4.0         | 20.0         | 61                               | 55           | 24            | 1.0                  |
| 35            | 0.15      | A/3216-18               | T491A154(1)035A(2)           | 0.1         | 4.0         | 19.0         | 63                               | 57           | 25            | 1.0                  |
| 35            | 0.22      | A/3216-18               | T491A224(1)035A(2)           | 0.1         | 4.0         | 18.0         | 65                               | 59           | 26            | 1.0                  |
| 35            | 0.33      | A/3216-18               | T491A334(1)035A(2)           | 0.1         | 4.0         | 15.0         | 71                               | 64           | 28            | 1.0                  |
| 35            | 0.47      | B/3528-20               | T491B474(1)035A(2)           | 0.2         | 4.0         | 8.0          | 103                              | 93           | 41            | 1.0                  |
| 35            | 0.47      | A/3216-18               | T491A474(1)035A(2)           | 0.2         | 4.0         | 12.0         | 79                               | 71           | 32            | 1.0                  |
| VDC           | μF        | KEMET/EIA               | (See below for part options) | max/5min    | % Max       | Ohms         | mAmps                            | mAmps        | mAmps         | J-STD-020D           |
| 85°C          | 120Hz     |                         |                              | μAmps +20°C | +20°C 120Hz | +20°C 100kHz | +25°C 100kHz                     | +85°C 100kHz | +125°C 100kHz | Temp≤260°C           |
| Rated Voltage | Rated Cap | Case Code/<br>Case Size | KEMET Part Number            | DC Leakage  | DF          | ESR          | Maximum allowable ripple current |              |               | Moisture Sensitivity |

Other part number options:

Where the 10th character equal to K (10% tolerance) is also available in M (20% tolerance).

Where the 10th character equal to M (20% tolerance) is only available in M (20% tolerance).

Standard with tin terminations (14th character = T). Tin/lead terminations is also available (14th character = H)

Also available on large (13 inch) reels. Add 7280 to the end of the part number.

Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitutions will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings &amp; Part Number Reference con't

| Rated Voltage | Rated Cap | Case Code/<br>Case Size | KEMET Part Number            | DC Leakage  | DF          | ESR          | Maximum Allowable Ripple Current |              |               | Moisture Sensitivity |
|---------------|-----------|-------------------------|------------------------------|-------------|-------------|--------------|----------------------------------|--------------|---------------|----------------------|
| 85°C          | 120Hz     | KEMET/EIA               | (See below for part options) | μAmps +20°C | +20°C 120Hz | +20°C 100kHz | +25°C 100kHz                     | +85°C 100kHz | +125°C 100kHz | Temp≤260°C           |
| VDC           | μF        |                         |                              | max/5min    | % Max       | Ohms         | mAmps                            | mAmps        | mAmps         | J-STD-020D           |
| 35            | 0.68      | B/3528-20               | T491B684(1)035A(2)           | 0.2         | 4.0         | 6.5          | 114                              | 103          | 46            | 1.0                  |
| 35            | 0.68      | A/3216-18               | T491A684(1)035A(2)           | 0.2         | 4.0         | 8.0          | 97                               | 87           | 39            | 1.0                  |
| 35            | 1         | B/3528-20               | T491B105(1)035A(2)           | 0.4         | 4.0         | 5.0          | 130                              | 117          | 52            | 1.0                  |
| 35            | 1         | A/3216-18               | T491A105(1)035A(2)           | 0.4         | 4.0         | 7.5          | 100                              | 90           | 40            | 1.0                  |
| 35            | 1.5       | C/6032-28               | T491C155(1)035A(2)           | 0.5         | 6.0         | 4.5          | 156                              | 140          | 62            | 1.0                  |
| 35            | 1.5       | B/3528-20               | T491B155(1)035A(2)           | 0.5         | 6.0         | 5.0          | 130                              | 117          | 52            | 1.0                  |
| 35            | 2.2       | C/6032-28               | T491C225(1)035A(2)           | 0.8         | 6.0         | 3.5          | 177                              | 159          | 71            | 1.0                  |
| 35            | 2.2       | A/3216-18               | T491A225(1)035AT             | 0.8         | 6.0         | 4.5          | 129                              | 116          | 52            | 1.0                  |
| 35            | 2.2       | B/3528-20               | T491B225(1)035A(2)           | 0.8         | 6.0         | 4.0          | 146                              | 131          | 58            | 1.0                  |
| 35            | 3.3       | C/6032-28               | T491C335(1)035A(2)           | 1.2         | 6.0         | 2.5          | 210                              | 189          | 84            | 1.0                  |
| 35            | 3.3       | B/3528-20               | T491B335(1)035A(2)           | 1.2         | 6.0         | 3.5          | 156                              | 140          | 62            | 1.0                  |
| 35            | 4.7       | D/7343-31               | T491D475(1)035A(2)           | 1.6         | 6.0         | 1.5          | 316                              | 284          | 126           | 1.0                  |
| 35            | 4.7       | B/3528-20               | T491B475(1)035AT             | 1.6         | 6.0         | 3.1          | 166                              | 149          | 66            | 1.0                  |
| 35            | 4.7       | C/6032-28               | T491C475(1)035A(2)           | 1.6         | 6.0         | 2.2          | 224                              | 202          | 90            | 1.0                  |
| 35            | 6.8       | D/7343-31               | T491D685(1)035A(2)           | 2.4         | 6.0         | 1.3          | 340                              | 306          | 136           | 1.0                  |
| 35            | 6.8       | V/7343-19               | T491V685(1)035AT             | 2.4         | 6.0         | 1.2          | 323                              | 291          | 129           | 1.0                  |
| 35            | 6.8       | C/6032-28               | T491C685(1)035A(2)           | 2.4         | 6.0         | 1.8          | 247                              | 222          | 99            | 1.0                  |
| 35            | 10        | D/7343-31               | T491D106(1)035A(2)           | 3.5         | 6.0         | 1.0          | 387                              | 348          | 155           | 1.0                  |
| 35            | 10        | C/6032-28               | T491C106(M)035A(2)           | 3.5         | 6.0         | 1.6          | 262                              | 236          | 105           | 1.0                  |
| 35            | 10        | V/7343-19               | T491V106(1)035A(2)           | 3.5         | 6.0         | 2.0          | 250                              | 225          | 100           | 1.0                  |
| 35            | 15        | X/7343-43               | T491X156(1)035A(2)           | 5.3         | 6.0         | 0.9          | 428                              | 385          | 171           | 1.0                  |
| 35            | 15        | C/6032-28               | T491C156(1)035AT             | 5.3         | 6.0         | 1.4          | 280                              | 252          | 112           | 1.0                  |
| 35            | 15        | D/7343-31               | T491D156(1)035A(2)           | 5.3         | 6.0         | 0.8          | 433                              | 390          | 173           | 1.0                  |
| 35            | 22        | X/7343-43               | T491X226(1)035A(2)           | 7.7         | 6.0         | 0.7          | 486                              | 437          | 194           | 1.0                  |
| 35            | 22        | D/7343-31               | T491D226(1)035A(2)           | 7.7         | 6.0         | 0.7          | 463                              | 417          | 185           | 1.0                  |
| 35            | 33        | X/7343-43               | T491X336(1)035A(2)           | 11.6        | 6.0         | 0.6          | 524                              | 472          | 210           | 1.0                  |
| 35            | 47        | X/7343-43               | T491X476(1)035A(2)           | 16.5        | 8.0         | 0.6          | 524                              | 472          | 210           | 1.0                  |
| 35            | 47        | E/7260-38               | T491E476(1)035A(2)           | 16.5        | 10.0        | 0.5          | 632                              | 569          | 253           | 1.0                  |
| 50            | 0.1       | A/3216-18               | T491A104(1)050A(2)           | 0.1         | 4.0         | 20.0         | 61                               | 55           | 24            | 1.0                  |
| 50            | 0.15      | B/3528-20               | T491B154(1)050A(2)           | 0.1         | 4.0         | 16.0         | 73                               | 66           | 29            | 1.0                  |
| 50            | 0.15      | A/3216-18               | T491A154(1)050A(2)           | 0.1         | 4.0         | 15.0         | 71                               | 64           | 28            | 1.0                  |
| 50            | 0.22      | B/3528-20               | T491B224(1)050A(2)           | 0.1         | 4.0         | 14.0         | 78                               | 70           | 31            | 1.0                  |
| 50            | 0.22      | A/3216-18               | T491A224(1)050AT             | 0.1         | 4.0         | 18.0         | 65                               | 59           | 26            | 1.0                  |
| 50            | 0.33      | B/3528-20               | T491B334(1)050A(2)           | 0.2         | 4.0         | 10.0         | 92                               | 83           | 37            | 1.0                  |
| 50            | 0.47      | C/6032-28               | T491C474(1)050A(2)           | 0.2         | 4.0         | 8.0          | 117                              | 105          | 47            | 1.0                  |
| 50            | 0.47      | B/3528-20               | T491B474(1)050A(2)           | 0.2         | 4.0         | 9.0          | 97                               | 87           | 39            | 1.0                  |
| 50            | 0.68      | C/6032-28               | T491C684(1)050A(2)           | 0.3         | 4.0         | 7.0          | 125                              | 113          | 50            | 1.0                  |
| 50            | 0.68      | B/3528-20               | T491B684(1)050A(2)           | 0.3         | 4.0         | 8.0          | 103                              | 93           | 41            | 1.0                  |
| 50            | 1         | C/6032-28               | T491C105(1)050A(2)           | 0.5         | 4.0         | 5.5          | 141                              | 127          | 56            | 1.0                  |
| 50            | 1         | B/3528-20               | T491B105(1)050A(2)           | 0.5         | 6.0         | 6.0          | 119                              | 107          | 48            | 1.0                  |
| 50            | 1         | V/7343-19               | T491V105(1)050A(2)           | 0.5         | 4.0         | 6.0          | 144                              | 130          | 58            | 1.0                  |
| 50            | 1.5       | D/7343-31               | T491D155(1)050A(2)           | 0.8         | 6.0         | 3.5          | 207                              | 186          | 83            | 1.0                  |
| 50            | 1.5       | C/6032-28               | T491C155(1)050A(2)           | 0.8         | 6.0         | 4.5          | 156                              | 140          | 62            | 1.0                  |
| 50            | 2.2       | D/7343-31               | T491D225(1)050A(2)           | 1.1         | 6.0         | 2.5          | 245                              | 221          | 98            | 1.0                  |
| 50            | 2.2       | C/6032-28               | T491C225(1)050A(2)           | 1.1         | 6.0         | 3.0          | 191                              | 172          | 76            | 1.0                  |
| 50            | 3.3       | C/6032-28               | T491C335(1)050AT             | 1.7         | 6.0         | 2.5          | 210                              | 189          | 84            | 1.0                  |
| 50            | 3.3       | D/7343-31               | T491D335(1)050A(2)           | 1.7         | 6.0         | 2.0          | 274                              | 247          | 110           | 1.0                  |
| VDC           | μF        | KEMET/EIA               | (See below for part options) | max/5min    | % Max       | Ohms         | mAmps                            | mAmps        | mAmps         | J-STD-020D           |
| 85°C          | 120Hz     |                         |                              | μAmps +20°C | +20°C 120Hz | +20°C 100kHz | +25°C 100kHz                     | +85°C 100kHz | +125°C 100kHz | Temp≤260°C           |
| Rated Voltage | Rated Cap | Case Code/<br>Case Size | KEMET Part Number            | DC Leakage  | DF          | ESR          | Maximum allowable ripple current |              |               | Moisture Sensitivity |

Other part number options:

Where the 10th character equal to K (10% tolerance) is also available in M (20% tolerance).

Where the 10th character equal to M (20% tolerance) is only available in M (20% tolerance).

Standard with tin terminations (14th character = T). Tin/lead terminations is also available (14th character = H)

Also available on large (13 inch) reels. Add 7280 to the end of the part number.

Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitutions will be marked with the higher voltage rating. Substitutions can include better than series.

**Table 1 – Ratings & Part Number Reference con't**

| Rated Voltage | Rated Cap | Case Code/<br>Case Size | KEMET Part Number            | DC Leakage  | DF          | ESR          | Maximum Allowable Ripple Current |              |               | Moisture Sensitivity |
|---------------|-----------|-------------------------|------------------------------|-------------|-------------|--------------|----------------------------------|--------------|---------------|----------------------|
| 85°C          | 120Hz     | KEMET/EIA               | (See below for part options) | μAmps +20°C | +20°C 120Hz | +20°C 100kHz | +25°C 100kHz                     | +85°C 100kHz | +125°C 100kHz | Temp≤260°C           |
| VDC           | μF        |                         |                              | max/5min    | % Max       | Ohms         | mAmps                            | mAmps        | mAmps         | J-STD-020D           |
| 50            | 4.7       | D/7343-31               | T491D475(1)050A(2)           | 2.4         | 6.0         | 1.4          | 327                              | 294          | 131           | 1.0                  |
| 50            | 6.8       | X/7343-43               | T491X685(1)050A(2)           | 3.4         | 6.0         | 1.0          | 406                              | 365          | 162           | 1.0                  |
| 50            | 6.8       | D/7343-31               | T491D685(1)050A(2)           | 3.4         | 6.0         | 1.0          | 387                              | 348          | 155           | 1.0                  |
| 50            | 10        | X/7343-43               | T491X106(M)050A(2)           | 5.0         | 6.0         | 0.7          | 486                              | 437          | 194           | 1.0                  |
| 50            | 10        | D/7343-31               | T491D106(1)050A(2)           | 5.0         | 6.0         | 0.8          | 433                              | 390          | 173           | 1.0                  |
| 50            | 15        | X/7343-43               | T491X156(1)050A(2)           | 7.5         | 8.0         | 0.7          | 486                              | 437          | 194           | 1.0                  |
| 50            | 22        | X/7343-43               | T491X226(1)050A(2)           | 11.0        | 10.0        | 0.6          | 524                              | 472          | 210           | 1.0                  |
| VDC           | μF        | KEMET/EIA               | (See below for part options) | max/5min    | % Max       | Ohms         | mAmps                            | mAmps        | mAmps         | J-STD-020D           |
| 85°C          | 120Hz     |                         |                              | μAmps +20°C | +20°C 120Hz | +20°C 100kHz | +25°C 100kHz                     | +85°C 100kHz | +125°C 100kHz | Temp≤260°C           |
| Rated Voltage | Rated Cap | Case Code/<br>Case Size | KEMET Part Number            | DC Leakage  | DF          | ESR          | Maximum allowable ripple current |              |               | Moisture Sensitivity |

Other part number options:

Where the 10th character equal to K (10% tolerance) is also available in M (20% tolerance).

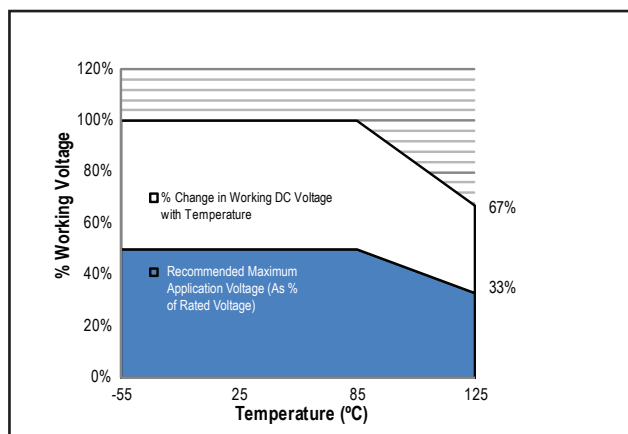
Where the 10th character equal to M (20% tolerance) is only available in M (20% tolerance).

Standard with tin terminations (14th character = T). Tin/lead terminations is also available (14th character = H)

Also available on large (13 inch) reels. Add 7280 to the end of the part number.

Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitutions will be marked with the higher voltage rating. Substitutions can include better than series.

## Recommended Voltage Derating Guidelines



## Ripple Current/Ripple Voltage

| Case Code |         | Maximum Power Dissipation (Pmax)<br>mWatts @ 25°C w/+20°C Rise |
|-----------|---------|----------------------------------------------------------------|
| KEMET     | EIA     |                                                                |
| A         | 3216-18 | 75                                                             |
| B         | 3528-21 | 85                                                             |
| C         | 6032-28 | 110                                                            |
| D         | 7343-31 | 150                                                            |
| X         | 7343-43 | 165                                                            |
| E         | 7260-38 | 200                                                            |
| R         | 2012-12 | 25                                                             |
| S         | 3216-12 | 60                                                             |
| T         | 3528-12 | 70                                                             |
| U         | 6032-15 | 90                                                             |
| V         | 7343-20 | 125                                                            |
| T510X     | 7343-43 | 270                                                            |
| T510E     | 7260-38 | 285                                                            |

| Temperature Compensation Multipliers<br>for Maximum Power Dissipation |      |       |
|-----------------------------------------------------------------------|------|-------|
| ≤25°C                                                                 | 85°C | 125°C |
| 1.00                                                                  | 0.90 | 0.40  |

*T = Environmental Temperature*

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$$I(max) = \sqrt{P_{max}/R}$$

$$E(max) = \sqrt{P_{max} \cdot R}$$

*I = rms ripple current (amperes)*

*E = rms ripple voltage (volts)*

*Pmax = maximum power dissipation(watts)*

*R = ESR at specified frequency (ohms)*



## Reverse Voltage

Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

| Temperature | Permissible Transient Reverse Voltage |
|-------------|---------------------------------------|
| 25° C       | 15% of Rated Voltage                  |
| 85° C       | 5% of Rated Voltage                   |
| 125° C      | 1% of Rated Voltage                   |

### Table 2 – Land Dimensions/Courtyard

| KEMET          | Metric Size Code | Density Level A:<br>Maximum (Most) Land Protrusion (mm) |      |      |       |      | Density Level B:<br>Median (Nominal) Land Protrusion (mm) |      |      |      |      | Density Level C:<br>Minimum (Least) Land Protrusion (mm) |      |      |      |      |
|----------------|------------------|---------------------------------------------------------|------|------|-------|------|-----------------------------------------------------------|------|------|------|------|----------------------------------------------------------|------|------|------|------|
| Case           | EIA              | X                                                       | Y    | C    | V1    | V2   | X                                                         | Y    | C    | V1   | V2   | X                                                        | Y    | C    | V1   | V2   |
| A              | 3216-18          | 1.35                                                    | 2.15 | 1.45 | 6.10  | 2.80 | 1.25                                                      | 1.75 | 1.35 | 5.00 | 2.30 | 1.15                                                     | 1.35 | 1.25 | 4.10 | 2.00 |
| B              | 3528-21          | 2.35                                                    | 2.15 | 1.45 | 6.10  | 4.00 | 2.25                                                      | 1.75 | 1.35 | 5.00 | 3.50 | 2.15                                                     | 1.35 | 1.25 | 4.10 | 3.20 |
| C              | 6032-28          | 2.35                                                    | 2.65 | 2.60 | 8.90  | 4.40 | 2.25                                                      | 2.25 | 2.50 | 7.80 | 3.90 | 2.15                                                     | 1.85 | 2.40 | 6.90 | 3.60 |
| D              | 7343-31          | 2.55                                                    | 3.75 | 2.70 | 10.20 | 5.50 | 2.45                                                      | 3.35 | 2.60 | 9.10 | 5.00 | 2.35                                                     | 2.95 | 2.50 | 8.20 | 4.70 |
| E <sup>1</sup> | 7260-38          | 4.25                                                    | 2.65 | 3.20 | 10.10 | 7.20 | 4.15                                                      | 2.25 | 3.30 | 9.40 | 6.70 | 4.05                                                     | 1.85 | 3.00 | 8.10 | 6.40 |
| R              | 2012-12          | 1.05                                                    | 1.80 | 1.00 | 4.80  | 2.40 | 0.95                                                      | 1.45 | 0.90 | 3.80 | 1.90 | 0.85                                                     | 1.05 | 0.80 | 2.90 | 1.60 |
| S <sup>2</sup> | 3216-12          | 1.35                                                    | 2.15 | 1.45 | 6.10  | 2.80 | 1.25                                                      | 1.75 | 1.35 | 5.00 | 2.30 | 1.15                                                     | 1.35 | 1.25 | 4.10 | 2.00 |
| T              | 3528-12          | 2.35                                                    | 2.15 | 1.45 | 6.10  | 4.00 | 2.25                                                      | 1.75 | 1.35 | 5.00 | 3.50 | 2.15                                                     | 1.35 | 1.25 | 4.10 | 3.20 |
| U              | 6032-15          | 2.55                                                    | 3.75 | 2.70 | 10.20 | 5.50 | 2.45                                                      | 3.35 | 2.60 | 9.10 | 5.00 | 2.35                                                     | 2.95 | 2.50 | 8.20 | 4.70 |
| V              | 7343-20          | 2.55                                                    | 3.75 | 2.70 | 10.20 | 5.50 | 2.45                                                      | 3.35 | 2.60 | 9.10 | 5.00 | 2.35                                                     | 2.95 | 2.50 | 8.20 | 4.70 |
| X <sup>1</sup> | 7343-43          | 2.55                                                    | 3.75 | 2.70 | 10.20 | 5.50 | 2.45                                                      | 3.35 | 2.60 | 9.10 | 5.00 | 2.35                                                     | 2.95 | 2.50 | 8.20 | 4.70 |

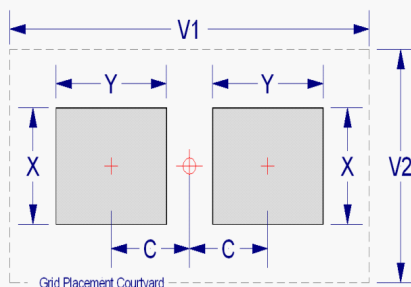
**Density Level A:** For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.

**Density Level B:** For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.

**Density Level C:** For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC-7351).

<sup>1</sup> Height of these chips may create problems in wave soldering.

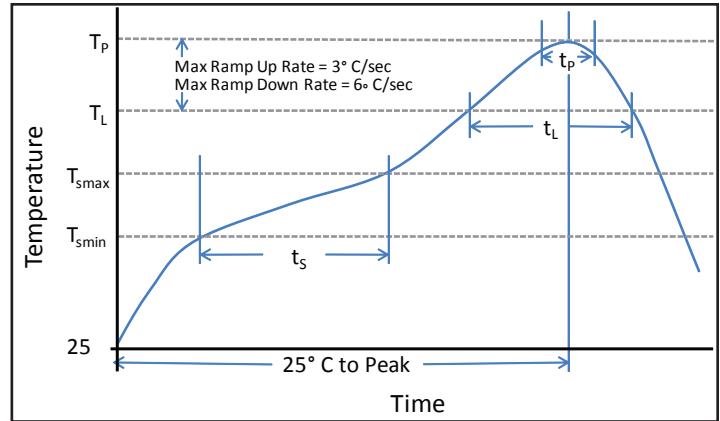
<sup>2</sup> Land pattern geometry is too small for silkscreen outline.



## Soldering Process

KEMET's families of surface mount tantalum capacitors are compatible with wave (single or dual), convection, IR or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J-STD-020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

Note that although the X/7343-43 case size can withstand wave soldering, the tall profile (4.3mm maximum) dictates care in wave process development.



Time/Temperature Soldering Profile

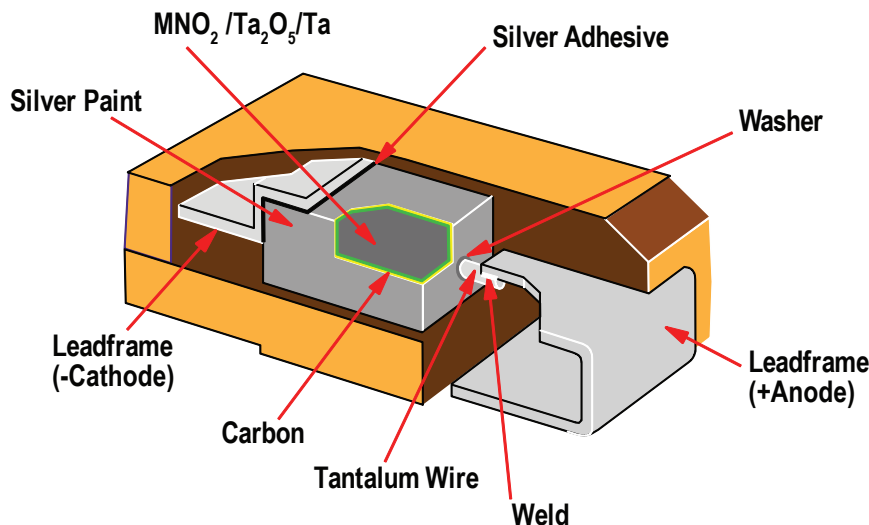
| Profile Feature                                   | Sn-Pb Assembly    | Pb-Free Assembly  |
|---------------------------------------------------|-------------------|-------------------|
| Preheat/Soak                                      |                   |                   |
| Temperature Min ( $T_{smin}$ )                    | 100°C             | 150°C             |
| Temperature Max ( $T_{smax}$ )                    | 150°C             | 200°C             |
| Time ( $t_s$ ) from $T_{smin}$ to $T_{smax}$      | 60-120 sec        | 60-120 sec        |
| Ramp-up rate ( $T_L$ to $T_P$ )                   | 3°C/sec max       | 3°C/sec max       |
| Liquidous temperature ( $T_L$ )                   | 183°C             | 217°C             |
| Time above liquidous ( $t_L$ )                    | 60-150 sec        | 60-150 sec        |
| Peak Temperature ( $T_P$ )                        | 220°C*<br>235°C** | 250°C*<br>260°C** |
| Time within 5°C of max peak temperature ( $t_p$ ) | 20 sec max        | 30 sec max        |
| Ramp-down rate ( $T_P$ to $T_L$ )                 | 6°C/sec max       | 6°C/sec max       |
| Time 25°C to peak temperature                     | 6 minutes max     | 8 minutes max     |

Note 1: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.

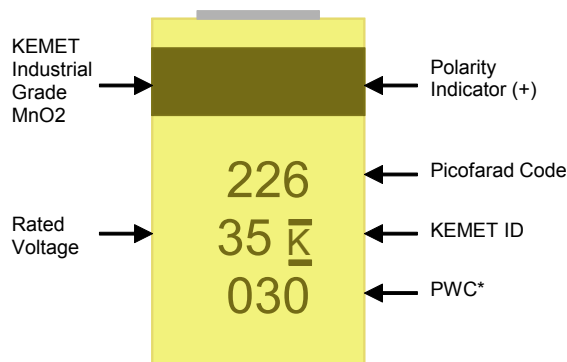
\* Case Size D, E, P, Y and X

\*\*Case Size A, B, C, H, I, K, M, R, S, T, U, V, W and Z

## Construction

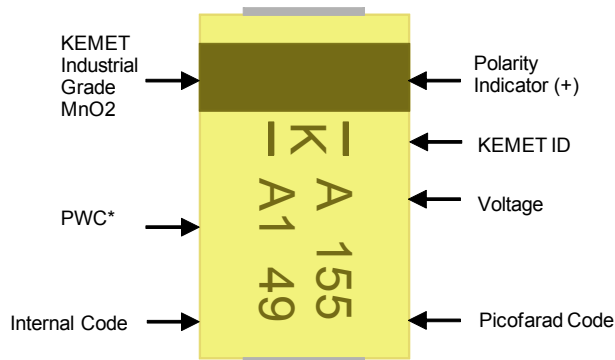


## Capacitor Marking

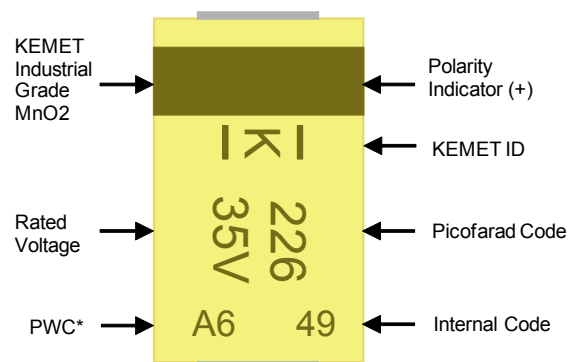


\* 030 = 30<sup>th</sup> week of 2010

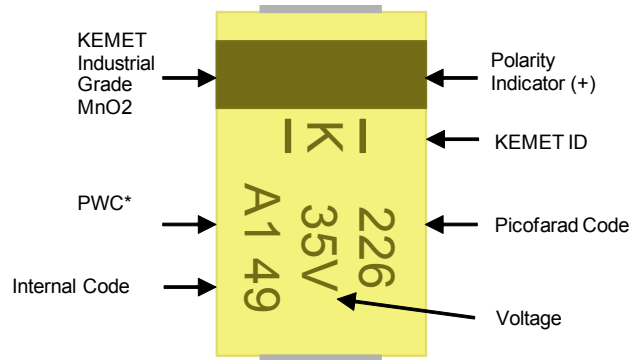
A Case Size



C, D, X Case Sizes



B or C Case Sizes



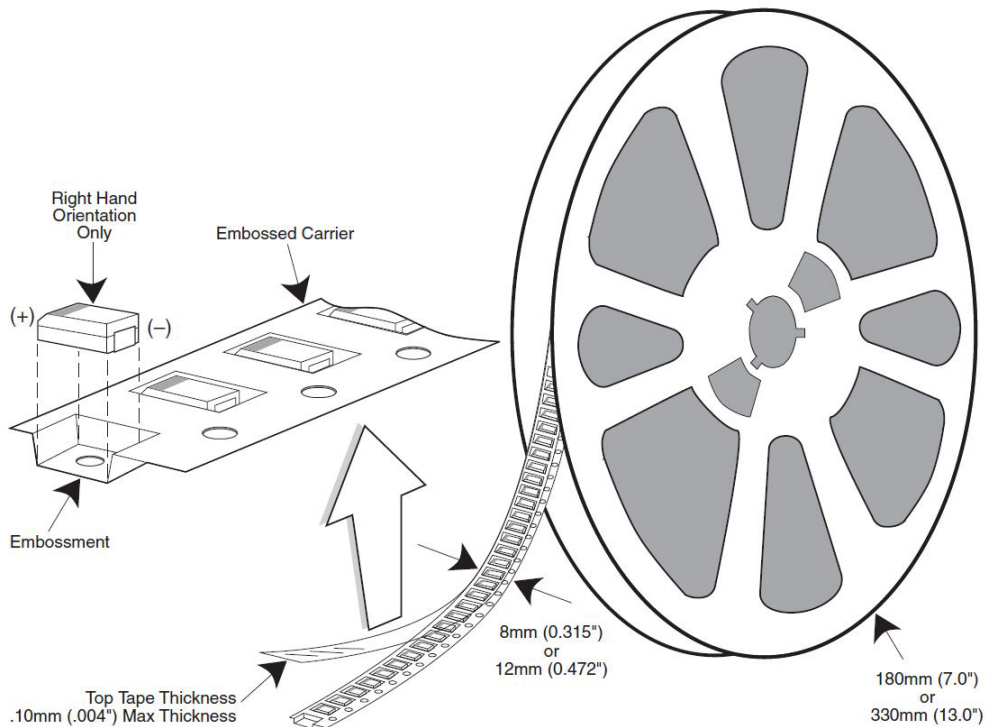
| PWC*     |         |         |
|----------|---------|---------|
| Year     | Month   |         |
| V = 2008 | 1 = Jan | 7 = Jul |
| W = 2008 | 2 = Feb | 8 = Aug |
| X = 2009 | 3 = Mar | 9 = Spt |
| A = 2010 | 4 = Apr | O = Oct |
| B = 2011 | 5 = May | N = Nov |
| C = 2012 | 6 = Jun | D = Dec |

## Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature - reels may soften or warp, and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40 degrees C, and maximum storage humidity not exceed 60% relative humidity. In addition, temperature fluctuations should be minimized to avoid condensation on the parts, and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability, chip stock should be used promptly, preferably within three years of receipt.

## Tape & Reel Packaging Information

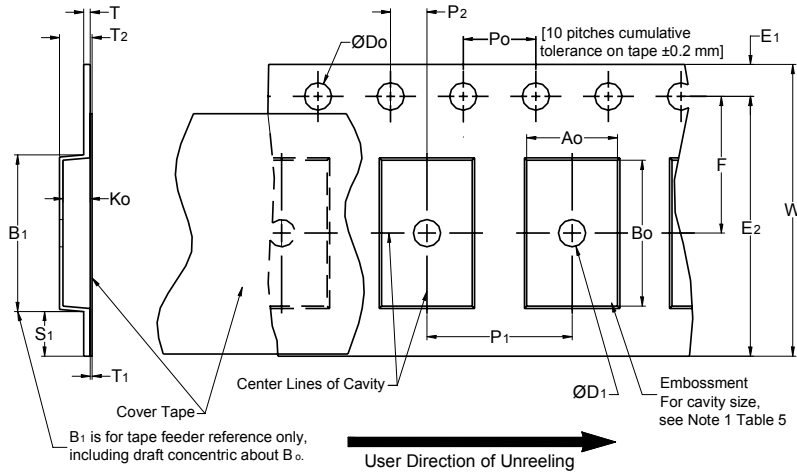
KEMET's Molded Tantalum and Aluminum Chip Capacitor families are packaged in 8 mm and 12 mm plastic tape on 7" and 13" reels, in accordance with EIA Standard 481-1: Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape fed automatic pick and place systems.



**Table 4 – Packaging Quantity**

| Case Code |         | Tape Width-mm | 7" Reel* | 13" Reel* |
|-----------|---------|---------------|----------|-----------|
| KEMET     | EIA     |               |          |           |
| R         | 2012-12 | 8             | 2,500    | 10,000    |
| I         | 3216-10 | 8             | 3,000    | 12,000    |
| S         | 3216-12 | 8             | 2,500    | 10,000    |
| T         | 3528-12 | 8             | 2,500    | 10,000    |
| M         | 3528-15 | 8             | 2,000    | 8,000     |
| U         | 6032-15 | 12            | 1,000    | 5,000     |
| L         | 6032-19 | 12            | 1,000    | 5,000     |
| W         | 7343-15 | 12            | 1,000    | 3,000     |
| Z         | 7343-17 | 12            | 1,000    | 3,000     |
| V         | 7343-20 | 12            | 1,000    | 3,000     |
| A         | 3216-18 | 8             | 2,000    | 9,000     |
| B         | 3528-21 | 8             | 2,000    | 8,000     |
| C         | 6032-28 | 12            | 500      | 3,000     |
| D         | 7343-31 | 12            | 500      | 2,500     |
| Y         | 7343-40 | 12            | 500      | 2,000     |
| X         | 7343-43 | 12            | 500      | 2,000     |
| E         | 7260-38 | 12            | 500      | 2,000     |

\* No c-spec required for 7" reel packaging. C-7280 required for 13" reel packaging.

**Figure 1 – Embossed (Plastic) Carrier Tape Dimensions****Table 5 – Embossed (Plastic) Carrier Tape Dimensions**

Metric will govern

| Constant Dimensions — Millimeters (Inches) |                                       |                               |                                |                               |                               |                    |                               |                                                 |                     |
|--------------------------------------------|---------------------------------------|-------------------------------|--------------------------------|-------------------------------|-------------------------------|--------------------|-------------------------------|-------------------------------------------------|---------------------|
| Tape Size                                  | D <sub>0</sub>                        | D <sub>1</sub> Min.<br>Note 1 | E <sub>1</sub>                 | P <sub>0</sub>                | P <sub>2</sub>                | R Ref.<br>Note 2   | S <sub>1</sub> Min.<br>Note 3 | T Max.                                          | T <sub>1</sub> Max. |
| 8mm                                        | 1.5 +0.10/-0.0<br>(0.059 +0.004/-0.0) | 1.0<br>(0.039)                | 1.75 ± 0.10<br>(0.069 ± 0.004) | 4.0 ± 0.10<br>(0.157 ± 0.004) | 2.0 ± 0.05<br>(0.079 ± 0.002) | 25.0<br>(0.984)    | 0.600<br>(0.024)              | 0.600<br>(0.024)                                | 0.100<br>(0.004)    |
| 12mm                                       |                                       | 1.5<br>(0.059)                |                                |                               |                               | 30<br>(1.181)      |                               |                                                 |                     |
| 16mm                                       |                                       |                               |                                |                               |                               |                    |                               |                                                 |                     |
| Variable Dimensions — Millimeters (Inches) |                                       |                               |                                |                               |                               |                    |                               |                                                 |                     |
| Tape Size                                  | Pitch                                 | B <sub>1</sub> Max.<br>Note 4 | E <sub>2</sub> Min.            | F                             | P <sub>1</sub>                | T <sub>2</sub> Max | W Max                         | A <sub>0</sub> ,B <sub>0</sub> & K <sub>0</sub> |                     |
| 8mm                                        | Single (4mm)                          | 4.35<br>(0.171)               | 6.25<br>(0.246)                | 3.5 ± 0.05<br>(0.138 ± 0.002) | 4.0 ± 0.10<br>(0.157 ± 0.004) | 2.5<br>(0.098)     | 8.3<br>(0.327)                | Note 5                                          |                     |
| 12mm                                       | Single (4mm) &<br>Double (8mm)        | 8.2<br>(0.323)                | 10.25<br>(0.404)               | 5.5 ± 0.05<br>(0.217 ± 0.002) | 8.0 ± 0.10<br>(0.315 ± 0.004) | 4.6<br>(0.181)     | 12.3<br>(0.484)               |                                                 |                     |
| 16mm                                       | Triple (12mm)                         | 12.1<br>(0.476)               | 14.25<br>(0.561)               | 5.5 ± 0.05<br>(0.217 ± 0.002) | 8.0 ± 0.10<br>(0.315 ± 0.004) | 4.6<br>(0.181)     | 16.3<br>(0.642)               |                                                 |                     |

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.
2. The tape with or without components shall pass around R without damage (see Figure 5).
3. If S<sub>1</sub> < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Document 481 paragraph 4.3 (b)).
4. B<sub>1</sub> dimension is a reference dimension for tape feeder clearance only.
5. The cavity defined by A<sub>0</sub>, B<sub>0</sub> and K<sub>0</sub> shall surround the component with sufficient clearance that:
  - (a) the component does not protrude above the top surface of the carrier tape.
  - (b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.
  - (c) rotation of the component is limited to 20° maximum for 8 and 12mm tapes and 10° maximum for 16mm tapes (see Figure 3).
  - (d) lateral movement of the component is restricted to 0.5 mm maximum for 8mm and 12mm wide tape and to 1.0mm maximum for 16mm tape (see Figure 4).
  - (e) for KPS Series product A<sub>0</sub> and B<sub>0</sub> are measured on a plane 0.3mm above the bottom of the pocket.
  - (f) see Addendum in EIA Document 481 for standards relating to more precise taping requirements.

## Packaging Information Performance Notes

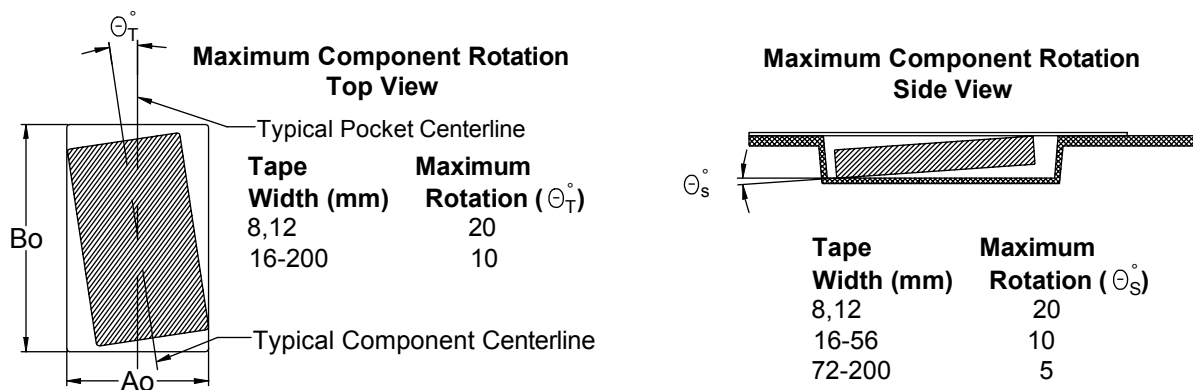
1. **Cover Tape Break Force:** 1.0 Kg Minimum.
2. **Cover Tape Peel Strength:** The total peel strength of the cover tape from the carrier tape shall be:

| Tape Width  | Peel Strength                            |
|-------------|------------------------------------------|
| 8mm         | 0.1 Newton to 1.0 Newton (10gf to 100gf) |
| 12mm & 16mm | 0.1 Newton to 1.3 Newton (10gf to 130gf) |

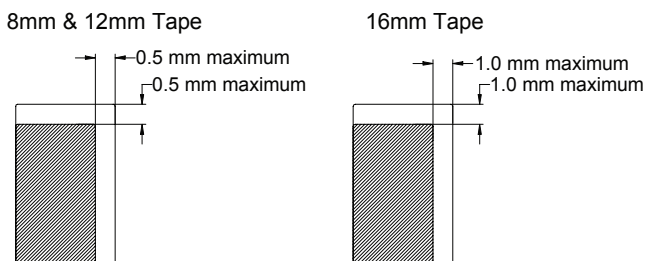
The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300±10 mm/minute.

3. **Labeling:** Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. Refer to EIA-556 and EIA-624.

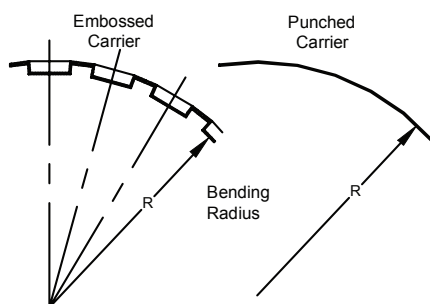
## Figure 3 – Maximum Component Rotation



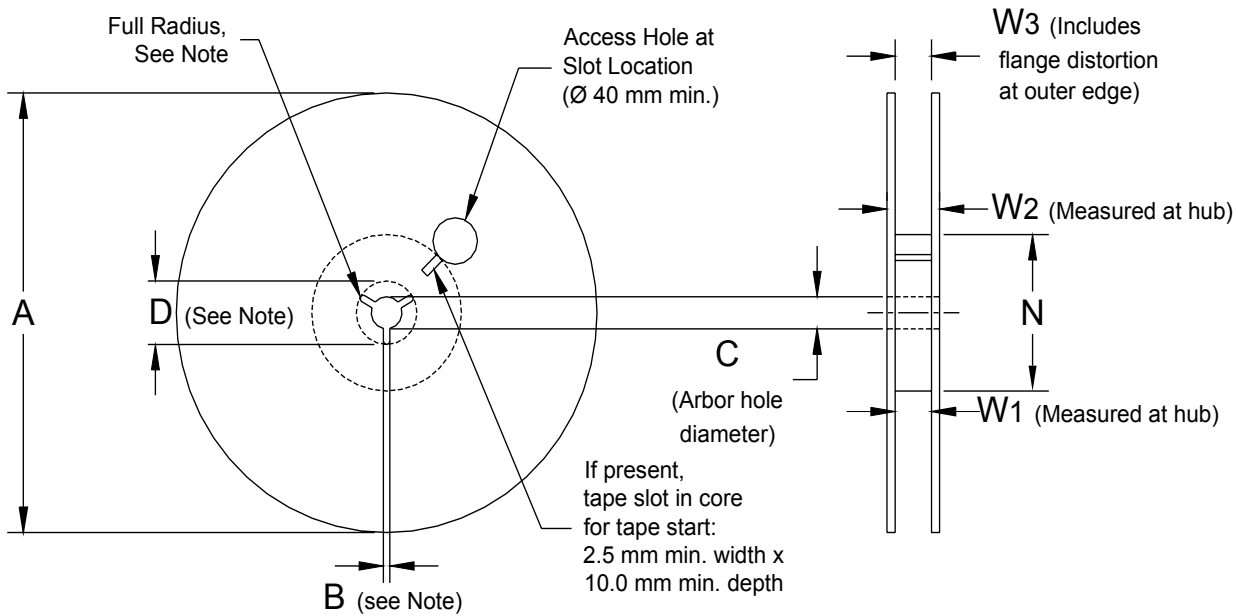
## Figure 4 – Maximum Lateral Movement



## Figure 5 – Bending Radius





**Figure 6 – Reel Dimensions**

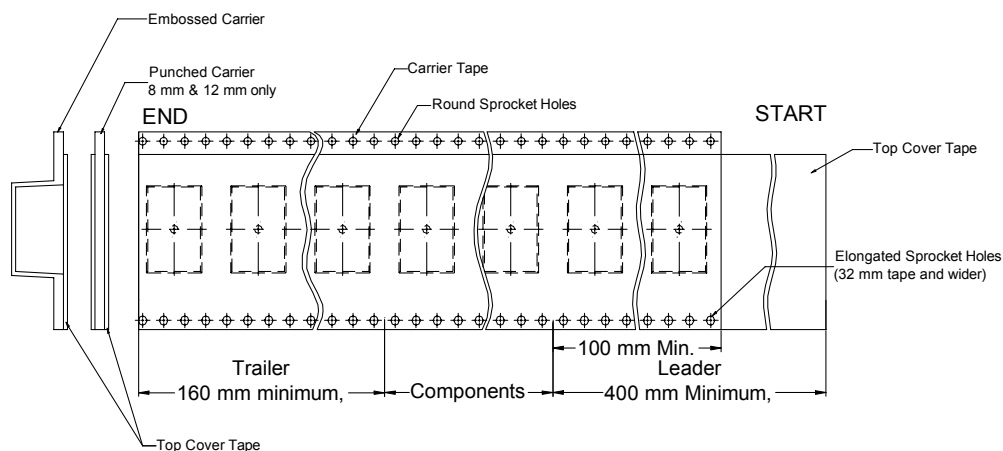
Note: Drive spokes optional; if used, dimensions B and D shall apply.

**Table 7 – Reel Dimensions**

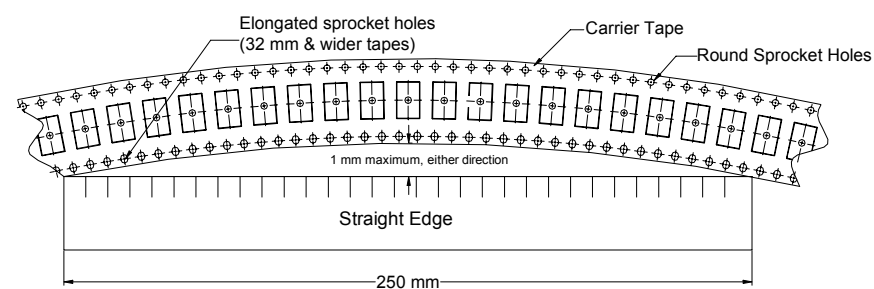
Metric will govern

| Constant Dimensions — Millimeters (Inches) |                                                                       |                                       |                                        |                                                      |
|--------------------------------------------|-----------------------------------------------------------------------|---------------------------------------|----------------------------------------|------------------------------------------------------|
| Tape Size                                  | A                                                                     | B Min                                 | C                                      | D Min                                                |
| 8mm                                        | 178 ± 0.20<br>(7.008 ± 0.008)<br>or<br>330 ± 0.20<br>(13.000 ± 0.008) | 1.5<br>(0.059)                        | 13.0 +0.5/-0.2<br>(0.521 +0.02/-0.008) | 20.2<br>(0.795)                                      |
| 12mm                                       |                                                                       |                                       |                                        |                                                      |
| 16mm                                       |                                                                       |                                       |                                        |                                                      |
| Variable Dimensions — Millimeters (Inches) |                                                                       |                                       |                                        |                                                      |
| Tape Size                                  | N Min                                                                 | W <sub>1</sub>                        | W <sub>2</sub> Max                     | W <sub>3</sub>                                       |
| 8mm                                        | 50<br>(1.969)                                                         | 8.4 +1.5/-0.0<br>(0.331 +0.059/-0.0)  | 14.4<br>(0.567)                        | Shall accommodate tape width<br>without interference |
| 12mm                                       |                                                                       | 12.4 +2.0/-0.0<br>(0.488 +0.078/-0.0) | 18.4<br>(0.724)                        |                                                      |
| 16mm                                       |                                                                       | 16.4 +2.0/-0.0<br>(0.646 +0.078/-0.0) | 22.4<br>(0.882)                        |                                                      |

**Figure 7 – Tape Leader & Trailer Dimensions**



**Figure 8 – Maximum Camber**



## Other KEMET Resources

| Tools                          |                                                                             |
|--------------------------------|-----------------------------------------------------------------------------|
| Resource                       | Location                                                                    |
| Configure A Part: CapEdge      | <a href="http://capacitoredge.kemet.com">http://capacitoredge.kemet.com</a> |
| SPICE & FIT Software           | <a href="http://www.kemet.com/spice">http://www.kemet.com/spice</a>         |
| Search Our FAQs: KnowledgeEdge | <a href="http://www.kemet.com/keask">http://www.kemet.com/keask</a>         |

| Product Information                                  |                                                                                           |
|------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Resource                                             | Location                                                                                  |
| Products                                             | <a href="http://www.kemet.com/products">http://www.kemet.com/products</a>                 |
| Technical Resources (Including Soldering Techniques) | <a href="http://www.kemet.com/technicalpapers">http://www.kemet.com/technicalpapers</a>   |
| RoHS Statement                                       | <a href="http://www.kemet.com/rohs">http://www.kemet.com/rohs</a>                         |
| Quality Documents                                    | <a href="http://www.kemet.com/qualitydocuments">http://www.kemet.com/qualitydocuments</a> |

| Product Request         |                                                                       |
|-------------------------|-----------------------------------------------------------------------|
| Resource                | Location                                                              |
| Sample Request          | <a href="http://www.kemet.com/sample">http://www.kemet.com/sample</a> |
| Engineering Kit Request | <a href="http://www.kemet.com/kits">http://www.kemet.com/kits</a>     |

| Contact            |                                                                                     |
|--------------------|-------------------------------------------------------------------------------------|
| Resource           | Location                                                                            |
| Website            | <a href="http://www.kemet.com">www.kemet.com</a>                                    |
| Contact Us         | <a href="http://www.kemet.com/contact">http://www.kemet.com/contact</a>             |
| Investor Relations | <a href="http://www.kemet.com/ir">http://www.kemet.com/ir</a>                       |
| Call Us            | 1-877-MyKEMET                                                                       |
| Twitter            | <a href="http://twitter.com/kemetcapacitors">http://twitter.com/kemetcapacitors</a> |

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Although we design and manufacture our products to the most stringent quality and safety standards, given the current state of the art, isolated component failures may still occur. Accordingly, customer applications which require a high degree of reliability or safety should employ suitable designs or other safeguards (such as installation of protective circuitry or redundancies) in order to ensure that the failure of an electrical component does not result in a risk of personal injury or property damage.

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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