

# T216 Series Axial MIL-PRF-39003 (CSS13 Style) and T256 (CSS33 Style)

## Overview

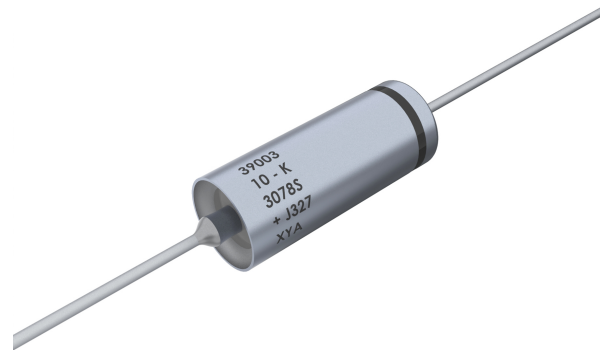
The T216 and T256 are KEMET's designation for MIL Style CSS13 and CSS33 capacitors. The T216/T256 Series is qualified to all failure rates per MIL-PRF-39003/10. Products meeting this specification have passed rigorous test requirements and are used in space applications or other equally demanding environments.

## Applications

These capacitors provide circuit designers an excellent choice for blocking, bypass, decoupling, filtering, and timing applications.

## Benefits

- Taped and reeled per EIA Specification RS-296
- Marking per MIL-STD-1285
- Qualified to MIL-PRF-39003 (CSS13 and CSS33 Style)
- Failure rate options: Graded – B, C
- The T216 is available in capacitance ratings from 0.12 – 330  $\mu$ F and voltage rating from 6 – 75 VDC
- The T256 is available in capacitance ratings from 1.2 – 1,000  $\mu$ F and voltage rating from 6 – 50 VDC
- Tolerances of  $\pm 10\%$
- Operating temperature range of  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$
- Case sizes: A, B, C, D



## Ordering Information – T216/T256

| T               | 216  | A                | 106  | K                     | 050   | C  | S                                   |   |
|-----------------|--|------------------|--|-----------------------|---|--|-------------------------------------|---|
| Capacitor Class | Series   | Case Size        | Capacitance Code (pF)  | Capacitance Tolerance | Rated Voltage (VDC)   | Failure Rate                                     | Termination Finish                  | C-Spec  |
| T = Tantalum    | 216 (MIL-C-39003/10, CSS13)<br><br>256 (MIL-C-39003/10, CSS33) | A<br>B<br>C<br>D | First two digits represent significant figures. Third digit specifies number of zeros. | K = $\pm 10\%$        | 006 = 6<br>010 = 10<br>015 = 15<br>020 = 20<br>035 = 35<br>050 = 50<br>075 = 75 | Graded:<br>B = 0.1%/k hours<br>C = 0.01%/k hours | S = Standard (Solder-coated nickel) | Blank = Sleeved/Bulk<br>0100 = Unsleeved/Bulk<br>7200 = Tape & Reel<br>All capacitors are sleeved unless specified. |

## Ordering Information – T216 (CSS13 Style)

MIL product

| M39003                        | /10                        | 2049               | S   |
|-------------------------------|----------------------------|--------------------|---|
| Capacitor Class               | Slash                      | Dash Number        | Sleeve                                    |
| Military specification number | Specification sheet number | Failure rate level | S = Sleeved<br>U = Unsleeved use C - 0100 |

One world. One KEMET

## Ordering Information – T256 (CSS33 Style)

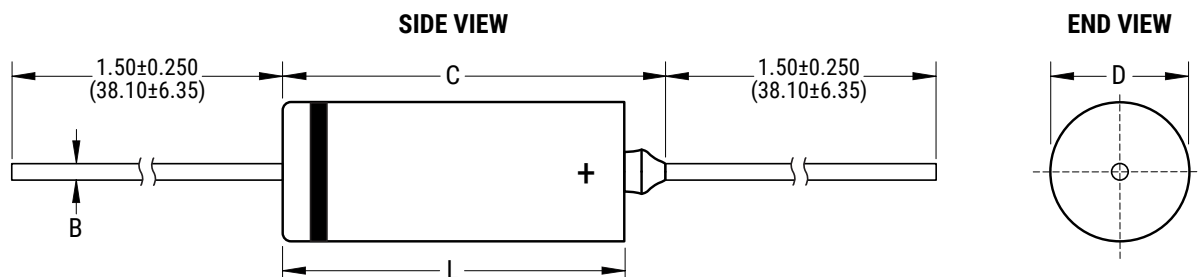
MIL product

| M39003                        | /10                        | 2549               | S   |
|-------------------------------|----------------------------|--------------------|---|
| Capacitor Class               | Slash                      | Dash Number        | Sleeve                                    |
| Military specification number | Specification sheet number | Failure rate level | S = Sleeved<br>U = Unsleeved use C - 0100 |

## Performance Characteristics

| Item  | Performance Characteristics  |
|---|--|
| Operating Temperature   | -55°C to 125°C   |
| Rated Capacitance Range                                       | CSS13 = 0.12 – 330 µF at 120 Hz/25°C<br>CSS33 = 1.2 – 1,000 µF at 120 Hz/25°C    |
| Capacitance Tolerance   | K Tolerance (10%)  |
| Rated Voltage Range   | CSS13 = 6 – 75 V<br>CSS33 = 6 – 50 V   |
| DF (120 Hz at 25°C)   | Refer to Part Number Electrical Specification Table                              |
| ESR and Impedance (100 kHz at 25°C)                           | Refer to Part Number Electrical Specification Table                              |
| Leakage Current   | Refer to Part Number Electrical Specification Table (rated voltage up to +125°C) |
| Failure Rate (MIL-PRF-39003, CSS13 and CSS33 capacitors only) | Approved failure rate: C (0.01%/k hours) – Graded                                |

## Dimensions – Inches (Millimeters)



| Case Size | Uninsulated       |                   | Insulated         |                   | B<br>±0.002<br>±(0.05) | C<br>Maximum     |
|-----------|-------------------|-------------------|-------------------|-------------------|------------------------|------------------|
|           | D                 | L                 | D                 | L                 |                        |                  |
|           | ±0.005<br>±(0.13) | ±0.031<br>±(0.79) | ±0.010<br>±(0.25) | ±0.031<br>±(0.79) |                        |                  |
| A         | 0.125<br>(3.18)   | 0.250<br>(6.35)   | 0.135<br>(3.43)   | 0.286<br>(7.26)   | 0.020<br>(0.51)        | 0.422<br>(10.72) |
| B         | 0.175<br>(4.45)   | 0.438<br>(11.13)  | 0.185<br>(4.70)   | 0.474<br>(12.04)  | 0.020<br>(0.51)        | 0.610<br>(15.49) |
| C         | 0.279<br>(7.09)   | 0.650<br>(16.51)  | 0.289<br>(7.34)   | 0.686<br>(17.42)  | 0.025<br>(0.64)        | 0.822<br>(20.88) |
| D         | 0.341<br>(8.66)   | 0.750<br>(19.05)  | 0.351<br>(8.92)   | 0.786<br>(19.96)  | 0.025<br>(0.64)        | 0.922<br>(23.42) |

**Table 1A – T216 Ratings & Part Number Reference**

| Rated Voltage | Rated Capacitance | Case Size Code | DC Leakage                   | DF % at 25°C   | ESR                   | MIL-PRF-39003 (CSS13 Style)        |          |                           |
|---------------|-------------------|----------------|------------------------------|----------------|-----------------------|------------------------------------|----------|---------------------------|
|               |                   |                |                              |                |                       | Dash Number Reference              |          | KEMET Equivalent Military |
|               |                   |                |                              |                |                       | Failure Rate Level (%/1,000 Hours) |          |                           |
|               |                   |                |                              |                |                       | MIL-PRF-39003/10                   |          |                           |
|               |                   |                |                              |                |                       | Graded                             |          |                           |
| (V) 85°C      | µF                |                | µA at 25°C Maximum/5 Minutes | 120 Hz Maximum | Q at 25°C 100 kHz Max | B (0.1)                            | C (0.01) | Part Number               |
| 6             | 5.6               | A              | 0.3                          | 4              | 0.90                  | 2001(1)                            | 3001(1)  | T216A565K006(2)S          |
| 6             | 6.8               | A              | 0.3                          | 6              | 0.80                  | 2002(1)                            | 3002(1)  | T216A685K006(2)S          |
| 6             | 47.0              | B              | 1.5                          | 6              | 0.24                  | 2003(1)                            | 3003(1)  | T216B476K006(2)S          |
| 6             | 56.0              | B              | 1.5                          | 6              | 0.24                  | 2004(1)                            | 3004(1)  | T216B566K006(2)S          |
| 6             | 150.0             | C              | 4.5                          | 8              | 0.09                  | 2005(1)                            | 3005(1)  | T216C157K006(2)S          |
| 6             | 180.0             | C              | 5.5                          | 8              | 0.08                  | 2006(1)                            | 3006(1)  | T216C187K006(2)S          |
| 6             | 270.0             | D              | 6.5                          | 8              | 0.07                  | 2007(1)                            | 3007(1)  | T216D277K006(2)S          |
| 6             | 330.0             | D              | 7.5                          | 8              | 0.06                  | 2008(1)                            | 3008(1)  | T216D337K006(2)S          |
| 10            | 3.9               | A              | 0.3                          | 4              | 1.00                  | 2009(1)                            | 3009(1)  | T216A395K010(2)S          |
| 10            | 4.7               | A              | 0.4                          | 4              | 0.90                  | 2010(1)                            | 3010(1)  | T216A475K010(2)S          |
| 10            | 27.0              | B              | 2.0                          | 6              | 0.25                  | 2011(1)                            | 3011(1)  | T216B276K010(2)S          |
| 10            | 33.0              | B              | 2.5                          | 6              | 0.24                  | 2012(1)                            | 3012(1)  | T216B336K010(2)S          |
| 10            | 39.0              | B              | 2.5                          | 6              | 0.24                  | 2013(1)                            | 3013(1)  | T216B396K010(2)S          |
| 10            | 82.0              | C              | 4.0                          | 6              | 0.12                  | 2014(1)                            | 3014(1)  | T216C826K010(2)S          |
| 10            | 100.0             | C              | 5.0                          | 8              | 0.11                  | 2015(1)                            | 3015(1)  | T216C107K010(2)S          |
| 10            | 120.0             | C              | 6.0                          | 8              | 0.10                  | 2016(1)                            | 3016(1)  | T216C127K010(2)S          |
| 10            | 180.0             | D              | 9.0                          | 8              | 0.08                  | 2017(1)                            | 3017(1)  | T216D187K010(2)S          |
| 10            | 220.0             | D              | 10.0                         | 8              | 0.07                  | 2018(1)                            | 3018(1)  | T216D227K010(2)S          |
| 15            | 2.7               | A              | 0.3                          | 4              | 1.20                  | 2019(1)                            | 3019(1)  | T216A275K015(2)S          |
| 15            | 3.3               | A              | 0.4                          | 4              | 1.00                  | 2020(1)                            | 3020(1)  | T216A335K015(2)S          |
| 15            | 18.0              | B              | 2.0                          | 6              | 0.27                  | 2021(1)                            | 3021(1)  | T216B186K015(2)S          |
| 15            | 22.0              | B              | 2.0                          | 6              | 0.26                  | 2022(1)                            | 3022(1)  | T216B226K015(2)S          |
| 15            | 56.0              | C              | 4.0                          | 6              | 0.15                  | 2023(1)                            | 3023(1)  | T216C566K015(2)S          |
| 15            | 68.0              | C              | 5.0                          | 6              | 0.13                  | 2024(1)                            | 3024(1)  | T216C686K015(2)S          |
| 15            | 120.0             | D              | 9.0                          | 8              | 0.09                  | 2025(1)                            | 3025(1)  | T216D127K015(2)S          |
| 15            | 150.0             | D              | 10.0                         | 8              | 0.09                  | 2026(1)                            | 3026(1)  | T216D157K015(2)S          |
| 20            | 1.2               | A              | 0.3                          | 4              | 1.40                  | 2027(1)                            | 3027(1)  | T216A125K020(2)S          |
| 20            | 1.5               | A              | 0.3                          | 4              | 1.30                  | 2028(1)                            | 3028(1)  | T216A155K020(2)S          |
| 20            | 1.8               | A              | 0.3                          | 4              | 1.25                  | 2029(1)                            | 3029(1)  | T216A185K020(2)S          |
| 20            | 2.2               | A              | 0.4                          | 4              | 1.20                  | 2030(1)                            | 3030(1)  | T216A225K020(2)S          |
| 20            | 8.2               | B              | 1.0                          | 6              | 0.39                  | 2031(1)                            | 3031(1)  | T216B825K020(2)S          |
| 20            | 10.0              | B              | 1.5                          | 6              | 0.35                  | 2032(1)                            | 3032(1)  | T216B106K020(2)S          |
| 20            | 12.0              | B              | 1.8                          | 6              | 0.32                  | 2033(1)                            | 3033(1)  | T216B126K020(2)S          |
| 20            | 15.0              | B              | 2.0                          | 6              | 0.29                  | 2034(1)                            | 3034(1)  | T216B156K020(2)S          |
| 20            | 27.0              | C              | 2.5                          | 6              | 0.21                  | 2035(1)                            | 3035(1)  | T216C276K020(2)S          |
| 20            | 33.0              | C              | 3.5                          | 6              | 0.19                  | 2036(1)                            | 3036(1)  | T216C336K020(2)S          |
| 20            | 39.0              | C              | 4.0                          | 6              | 0.17                  | 2037(1)                            | 3037(1)  | T216C396K020(2)S          |
| 20            | 47.0              | C              | 4.5                          | 6              | 0.16                  | 2038(1)                            | 3038(1)  | T216C476K020(2)S          |
| 20            | 56.0              | D              | 5.5                          | 6              | 0.13                  | 2039(1)                            | 3039(1)  | T216D566K020(2)S          |
| 20            | 68.0              | D              | 7.0                          | 6              | 0.12                  | 2040(1)                            | 3040(1)  | T216D686K020(2)S          |
| 20            | 82.0              | D              | 8.0                          | 6              | 0.11                  | 2041(1)                            | 3041(1)  | T216D826K020(2)S          |
| 20            | 100.0             | D              | 10.0                         | 8              | 0.10                  | 2042(1)                            | 3042(1)  | T216D107K020(2)S          |
| 35            | 5.6               | B              | 1.3                          | 4              | 0.47                  | 2043(1)                            | 3043(1)  | T216B565K035(2)S          |
| 35            | 6.8               | B              | 1.5                          | 6              | 0.43                  | 2044(1)                            | 3044(1)  | T216B685K035(2)S          |
| 35            | 22.0              | C              | 4.0                          | 6              | 0.25                  | 2045(1)                            | 3045(1)  | T216C226K035(2)S          |
| 35            | 27.0              | D              | 4.5                          | 6              | 0.18                  | 2046(1)                            | 3046(1)  | T216D276K035(2)S          |
| 35            | 33.0              | D              | 5.5                          | 6              | 0.17                  | 2047(1)                            | 3047(1)  | T216D336K035(2)S          |
| 35            | 39.0              | D              | 7.0                          | 6              | 0.15                  | 2048(1)                            | 3048(1)  | T216D396K035(2)S          |
| (V) 85°C      | µF                | Case Size Code | µA at 25°C Maximum/5 Minutes | 120 Hz Maximum | Q at 25°C 100 kHz Max | B (0.1)                            | C (0.01) | Part Number               |
| Rated Voltage | Rated Capacitance |                | DC Leakage                   | DF % at 25°C   | ESR                   | MIL-PRF-39003 (CSS13 Style)        |          |                           |

(1) To complete MIL-PRF-39003 dash part number, insert S for sleeved or U for unsleeved. If "U" ordered also use C0100.

(2) To complete KEMET Part Number (T216, T256), insert Graded failure rate - B for .1%/k hours, C for .01%/k hours. Designates reliability level.

**Table 1A – T216 Ratings & Part Number Reference cont'd**

| Rated Voltage | Rated Capacitance | Case Size Code | DC Leakage                   | DF % at 25°C   | ESR                   | MIL-PRF-39003 (CSS13 Style)        |          |                           |
|---------------|-------------------|----------------|------------------------------|----------------|-----------------------|------------------------------------|----------|---------------------------|
|               |                   |                |                              |                |                       | Dash Number Reference              |          | KEMET Equivalent Military |
|               |                   |                |                              |                |                       | Failure Rate Level (%/1,000 Hours) |          |                           |
|               |                   |                |                              |                |                       | MIL-PRF-39003/10                   |          |                           |
|               |                   |                |                              |                |                       | Graded                             |          |                           |
| (V) 85°C      | µF                |                | µA at 25°C Maximum/5 Minutes | 120 Hz Maximum | Q at 25°C 100 kHz Max | B (0.1)                            | C (0.01) | Part Number               |
| 35            | 47.0              | D              | 8.0                          | 6              | 0.14                  | 2049(1)                            | 3049(1)  | T216D476K035(2)S          |
| 50            | 0.12              | A              | 0.3                          | 4              | 6.50                  | 2067(1)                            | 3067(1)  | T216A124K050(2)S          |
| 50            | 0.15              | A              | 0.3                          | 4              | 5.50                  | 2068(1)                            | 3068(1)  | T216A154K050(2)S          |
| 50            | 0.18              | A              | 0.3                          | 4              | 5.00                  | 2069(1)                            | 3069(1)  | T216A184K050(2)S          |
| 50            | 0.22              | A              | 0.3                          | 4              | 4.00                  | 2070(1)                            | 3070(1)  | T216A224K050(2)S          |
| 50            | 0.27              | A              | 0.3                          | 4              | 3.50                  | 2071(1)                            | 3071(1)  | T216A274K050(2)S          |
| 50            | 0.33              | A              | 0.3                          | 4              | 3.30                  | 2072(1)                            | 3072(1)  | T216A334K050(2)S          |
| 50            | 0.39              | A              | 0.3                          | 4              | 3.20                  | 2073(1)                            | 3073(1)  | T216A394K050(2)S          |
| 50            | 0.47              | A              | 0.3                          | 4              | 3.00                  | 2074(1)                            | 3074(1)  | T216A474K050(2)S          |
| 50            | 0.56              | A              | 0.3                          | 4              | 2.50                  | 2075(1)                            | 3075(1)  | T216A564K050(2)S          |
| 50            | 0.68              | A              | 0.3                          | 4              | 1.80                  | 2076(1)                            | 3076(1)  | T216A684K050(2)S          |
| 50            | 0.82              | A              | 0.3                          | 4              | 1.60                  | 2077(1)                            | 3077(1)  | T216A824K050(2)S          |
| 50            | 1.0               | A              | 0.4                          | 4              | 1.40                  | 2078(1)                            | 3078(1)  | T216A105K050(2)S          |
| 50            | 1.2               | B              | 0.4                          | 4              | 1.20                  | 2079(1)                            | 3079(1)  | T216B125K050(2)S          |
| 50            | 1.5               | B              | 0.6                          | 4              | 1.10                  | 2080(1)                            | 3080(1)  | T216B155K050(2)S          |
| 50            | 1.8               | B              | 0.7                          | 4              | 0.92                  | 2081(1)                            | 3081(1)  | T216B185K050(2)S          |
| 50            | 2.2               | B              | 0.8                          | 4              | 0.80                  | 2082(1)                            | 3082(1)  | T216B225K050(2)S          |
| 50            | 2.7               | B              | 1.0                          | 4              | 0.68                  | 2083(1)                            | 3083(1)  | T216B275K050(2)S          |
| 50            | 3.3               | B              | 1.2                          | 4              | 0.62                  | 2084(1)                            | 3084(1)  | T216B335K050(2)S          |
| 50            | 3.9               | B              | 1.5                          | 4              | 0.56                  | 2085(1)                            | 3085(1)  | T216B395K050(2)S          |
| 50            | 4.7               | B              | 1.7                          | 4              | 0.51                  | 2086(1)                            | 3086(1)  | T216B475K050(2)S          |
| 50            | 5.6               | C              | 2.2                          | 4              | 0.44                  | 2087(1)                            | 3087(1)  | T216C565K050(2)S          |
| 50            | 6.8               | C              | 2.2                          | 6              | 0.40                  | 2088(1)                            | 3088(1)  | T216C685K050(2)S          |
| 50            | 8.2               | C              | 2.5                          | 6              | 0.36                  | 2089(1)                            | 3089(1)  | T216C825K050(2)S          |
| 50            | 10.0              | C              | 2.5                          | 6              | 0.33                  | 2090(1)                            | 3090(1)  | T216C106K050(2)S          |
| 50            | 12.0              | C              | 3.0                          | 6              | 0.30                  | 2091(1)                            | 3091(1)  | T216C126K050(2)S          |
| 50            | 15.0              | C              | 4.0                          | 6              | 0.27                  | 2092(1)                            | 3092(1)  | T216C156K050(2)S          |
| 50            | 18.0              | C              | 4.5                          | 6              | 0.25                  | 2093(1)                            | 3093(1)  | T216C186K050(2)S          |
| 50            | 22.0              | D              | 5.5                          | 6              | 0.20                  | 2094(1)                            | 3094(1)  | T216D226K050(2)S          |
| 75            | 0.15              | A              | 0.3                          | 4              | 4.4                   | 2097(1)                            | 3097(1)  | T216A154K075(2)S          |
| 75            | 0.18              | A              | 0.3                          | 4              | 4.0                   | 2098(1)                            | 3098(1)  | T216A184K075(2)S          |
| 75            | 0.22              | A              | 0.3                          | 4              | 3.5                   | 2099(1)                            | 3099(1)  | T216A224K075(2)S          |
| 75            | 0.27              | A              | 0.3                          | 4              | 3.1                   | 2100(1)                            | 3100(1)  | T216A274K075(2)S          |
| 75            | 0.33              | A              | 0.3                          | 4              | 2.8                   | 2101(1)                            | 3101(1)  | T216A334K075(2)S          |
| 75            | 0.39              | A              | 0.3                          | 4              | 2.6                   | 2102(1)                            | 3102(1)  | T216A394K075(2)S          |
| 75            | 0.47              | A              | 0.3                          | 4              | 2.4                   | 2103(1)                            | 3103(1)  | T216A474K075(2)S          |
| 75            | 0.56              | A              | 0.3                          | 4              | 2.25                  | 2104(1)                            | 3104(1)  | T216A564K075(2)S          |
| 75            | 0.68              | A              | 0.3                          | 4              | 2.10                  | 2105(1)                            | 3105(1)  | T216A684K075(2)S          |
| 75            | 0.82              | B              | 0.3                          | 4              | 1.47                  | 2106(1)                            | 3106(1)  | T216B824K075(2)S          |
| 75            | 1.0               | B              | 0.4                          | 4              | 1.40                  | 2107(1)                            | 3107(1)  | T216B105K075(2)S          |
| 75            | 1.2               | B              | 0.4                          | 4              | 1.33                  | 2108(1)                            | 3108(1)  | T216B125K075(2)S          |
| 75            | 1.5               | B              | 0.6                          | 4              | 1.06                  | 2109(1)                            | 3109(1)  | T216B155K075(2)S          |
| 75            | 1.8               | B              | 0.7                          | 4              | 0.92                  | 2110(1)                            | 3110(1)  | T216B185K075(2)S          |
| 75            | 2.2               | B              | 0.8                          | 4              | 0.80                  | 2111(1)                            | 3111(1)  | T216B225K075(2)S          |
| 75            | 2.7               | B              | 1.0                          | 4              | 0.68                  | 2112(1)                            | 3112(1)  | T216B275K075(2)S          |
| 75            | 3.3               | B              | 1.2                          | 4              | 0.62                  | 2113(1)                            | 3113(1)  | T216B335K075(2)S          |
| 75            | 3.9               | B              | 1.5                          | 4              | 0.56                  | 2114(1)                            | 3114(1)  | T216B395K075(2)S          |
| 75            | 4.7               | C              | 3.0                          | 4              | 0.47                  | 2115(1)                            | 3115(1)  | T216C475K075(2)S          |
| (V) 85°C      | µF                | Case Size Code | µA at 25°C Maximum/5 Minutes | 120 Hz Maximum | Q at 25°C 100 kHz Max | B (0.1)                            | C (0.01) | Part Number               |
| Rated Voltage | Rated Capacitance | Case Size Code | DC Leakage                   | DF % at 25°C   | ESR                   | MIL-PRF-39003 (CSS13 Style)        |          |                           |

(1) To complete MIL-PRF-39003 dash part number, insert S for sleeved or U for unsleeved. If "U" ordered also use C0100.

(2) To complete KEMET Part Number (T216, T256), insert Graded failure rate - B for .1%/k hours, C for .01%/k hours. Designates reliability level.

**Table 1A – T216 Ratings & Part Number Reference cont'd**

| Rated Voltage | Rated Capacitance | Case Size Code | DC Leakage                   | DF % at 25°C   | ESR                   | MIL-PRF-39003 (CSS13 Style)        |          |                           |
|---------------|-------------------|----------------|------------------------------|----------------|-----------------------|------------------------------------|----------|---------------------------|
|               |                   |                |                              |                |                       | Dash Number Reference              |          | KEMET Equivalent Military |
|               |                   |                |                              |                |                       | Failure Rate Level (%/1,000 Hours) |          |                           |
|               |                   |                |                              |                |                       | MIL-PRF-39003/10                   |          |                           |
|               |                   |                |                              |                |                       | Graded                             |          |                           |
| (V) 85°C      | µF                |                | µA at 25°C Maximum/5 Minutes | 120 Hz Maximum | Ω at 25°C 100 kHz Max | B (0.1)                            | C (0.01) | Part Number               |
| 75            | 5.6               | C              | 3.0                          | 4              | 0.44                  | 2116(1)                            | 3116(1)  | T216C565K075(2)S          |
| 75            | 6.8               | C              | 5.0                          | 6              | 0.44                  | 2117(1)                            | 3117(1)  | T216C685K075(2)S          |
| 75            | 8.2               | C              | 5.0                          | 6              | 0.36                  | 2118(1)                            | 3118(1)  | T216C825K075(2)S          |
| 75            | 10.0              | C              | 5.0                          | 6              | 0.33                  | 2119(1)                            | 3119(1)  | T216C106K075(2)S          |
| 75            | 12.0              | D              | 5.0                          | 6              | 0.26                  | 2120(1)                            | 3120(1)  | T216D126K075(2)S          |
| 75            | 15.0              | D              | 7.0                          | 6              | 0.23                  | 2121(1)                            | 3121(1)  | T216D156K075(2)S          |
| (V) 85°C      | µF                | Case Size Code | µA at 25°C Maximum/5 Minutes | 120 Hz Maximum | Ω at 25°C 100 kHz Max | B (0.1)                            | C (0.01) | Part Number               |
| Rated Voltage | Rated Capacitance |                | DC Leakage                   | DF % at 25°C   | ESR                   | MIL-PRF-39003 (CSS13 Style)        |          |                           |

**Table 1B – T256 Ratings & Part Number Reference**

| Rated Voltage | Rated Capacitance | Case Size Code | DC Leakage                   | DF % at 25°C   | ESR                   | MIL-PRF-39003 (CSS33 Style)        |          |                           |
|---------------|-------------------|----------------|------------------------------|----------------|-----------------------|------------------------------------|----------|---------------------------|
|               |                   |                |                              |                |                       | Dash Number Reference              |          | KEMET Equivalent Military |
|               |                   |                |                              |                |                       | Failure Rate Level (%/1,000 Hours) |          |                           |
|               |                   |                |                              |                |                       | MIL-PRF-39003/10                   |          |                           |
|               |                   |                |                              |                |                       | Graded                             |          |                           |
| (V) 85°C      | µF                |                | µA at 25°C Maximum/5 Minutes | 120 Hz Maximum | Ω at 25°C 100 kHz Max | B (0.1)                            | C (0.01) | Part Number               |
| 6             | 10.0              | A              | 0.5                          | 6              | 0.70                  | 2500(1)                            | 3500(1)  | T256A106K006(2)S          |
| 6             | 12.0              | A              | 0.5                          | 6              | 0.60                  | 2501(1)                            | 3501(1)  | T256A126K006(2)S          |
| 6             | 100.0             | B              | 1.0                          | 8              | 0.20                  | 2502(1)                            | 3502(1)  | T256B107K006(2)S          |
| 6             | 330.0             | C              | 2.0                          | 8              | 0.065                 | 2503(1)                            | 3503(1)  | T256B337K006(2)S          |
| 6             | 390.0             | C              | 2.0                          | 10             | 0.065                 | 2504(1)                            | 3504(1)  | T256C397K006(2)S          |
| 6             | 470.0             | C              | 2.0                          | 10             | 0.060                 | 2505(1)                            | 3505(1)  | T256C447K006(2)S          |
| 6             | 680.0             | D              | 5.0                          | 10             | 0.060                 | 2506(1)                            | 3506(1)  | T256D687K006(2)S          |
| 6             | 820.0             | D              | 5.0                          | 10             | 0.055                 | 2507(1)                            | 3507(1)  | T256D827K006(2)S          |
| 6             | 1000.0            | D              | 5.0                          | 10             | 0.050                 | 2508(1)                            | 3508(1)  | T256D108K006(2)S          |
| 10            | 6.8               | A              | 0.5                          | 6              | 0.80                  | 2509(1)                            | 3509(1)  | T256A685K010(2)S          |
| 10            | 8.2               | A              | 0.5                          | 6              | 0.70                  | 2510(1)                            | 3510(1)  | T256A825K010(2)S          |
| 10            | 47.0              | B              | 1.0                          | 6              | 0.22                  | 2511(1)                            | 3511(1)  | T256B476K010(2)S          |
| 10            | 56.0              | B              | 1.0                          | 6              | 0.20                  | 2512(1)                            | 3512(1)  | T256B566K010(2)S          |
| 10            | 68.0              | B              | 1.0                          | 6              | 0.18                  | 2513(1)                            | 3513(1)  | T256B686K010(2)S          |
| 10            | 82.0              | B              | 1.0                          | 6              | 0.15                  | 2514(1)                            | 3514(1)  | T256B826K010(2)S          |
| 10            | 220.0             | C              | 1.0                          | 2              | 0.090                 | 2515(1)                            | 3515(1)  | T256C227K010(2)S          |
| (V) 85°C      | µF                | Case Size Code | µA at 25°C Maximum/5 Minutes | 120 Hz Maximum | Ω at 25°C 100 kHz Max | B (0.1)                            | C (0.01) | Part Number               |
| Rated Voltage | Rated Capacitance |                | DC Leakage                   | DF % at 25°C   | ESR                   | MIL-PRF-39003 (CSS33 Style)        |          |                           |

(1) To complete MIL-PRF-39003 dash part number, insert S for sleeved or U for unsleeved. If "U" ordered also use C0100.

(2) To complete KEMET Part Number (T216, T256), insert Graded failure rate - B for .1%/k hours, C for .01%/k hours. Designates reliability level.

**Table 1B – T256 Ratings & Part Number Reference cont'd**

| Rated Voltage | Rated Capacitance | Case Size Code | DC Leakage                   | DF % at 25°C   | ESR                   | MIL-PRF-39003 (CSS33 Style)        |          |                           |
|---------------|-------------------|----------------|------------------------------|----------------|-----------------------|------------------------------------|----------|---------------------------|
|               |                   |                |                              |                |                       | Dash Number Reference              |          | KEMET Equivalent Military |
|               |                   |                |                              |                |                       | Failure Rate Level (%/1,000 Hours) |          |                           |
|               |                   |                |                              |                |                       | MIL-PRF-39003/10                   |          |                           |
|               |                   |                |                              |                |                       | Graded                             |          |                           |
| (V) 85°C      | µF                |                | µA at 25°C Maximum/5 Minutes | 120 Hz Maximum | Q at 25°C 100 kHz Max | B (0.1)                            | C (0.01) | Part Number               |
| 10            | 270.0             | C              | 2.0                          | 2              | 0.075                 | 2516(1)                            | 3516(1)  | T256C277K010(2)S          |
| 10            | 390.0             | D              | 2.0                          | 10             | 0.070                 | 2517(1)                            | 3517(1)  | T256D397K010(2)S          |
| 10            | 470.0             | D              | 4.0                          | 10             | 0.065                 | 2518(1)                            | 3518(1)  | T256D477K010(2)S          |
| 10            | 560.0             | D              | 4.0                          | 10             | 0.060                 | 2519(1)                            | 3519(1)  | T256D567K010(2)S          |
| 15            | 4.7               | A              | 0.5                          | 4              | 0.90                  | 2520(1)                            | 3520(1)  | T256A475K015(2)S          |
| 15            | 5.6               | A              | 0.5                          | 4              | 0.80                  | 2521(1)                            | 3521(1)  | T256A565K015(2)S          |
| 15            | 33.0              | B              | 1.0                          | 6              | 0.24                  | 2522(1)                            | 3522(1)  | T256B336K015(2)S          |
| 15            | 39.0              | B              | 1.0                          | 6              | 0.22                  | 2523(1)                            | 3523(1)  | T256B396K015(2)S          |
| 15            | 150.0             | C              | 1.0                          | 8              | 0.10                  | 2524(1)                            | 3524(1)  | T256C157K015(2)S          |
| 15            | 180.0             | C              | 2.0                          | 8              | 0.09                  | 2525(1)                            | 3525(1)  | T256C187K015(2)S          |
| 15            | 220.0             | D              | 2.0                          | 8              | 0.07                  | 2526(1)                            | 3526(1)  | T256D227K015(2)S          |
| 15            | 270.0             | D              | 2.0                          | 8              | 0.065                 | 2527(1)                            | 3527(1)  | T256D277K015(2)S          |
| 15            | 330.0             | D              | 2.0                          | 8              | 0.060                 | 2528(1)                            | 3528(1)  | T256D337K015(2)S          |
| 20            | 2.7               | A              | 0.5                          | 4              | 1.15                  | 2529(1)                            | 3529(1)  | T256A275K020(2)S          |
| 20            | 3.3               | A              | 0.5                          | 4              | 0.95                  | 2530(1)                            | 3530(1)  | T256A335K020(2)S          |
| 20            | 3.9               | A              | 0.5                          | 4              | 0.90                  | 2531(1)                            | 3531(1)  | T256A395K020(2)S          |
| 20            | 18.0              | B              | 1.0                          | 6              | 0.27                  | 2532(1)                            | 3532(1)  | T256B186K020(2)S          |
| 20            | 22.0              | B              | 1.0                          | 6              | 0.26                  | 2533(1)                            | 3533(1)  | T256B226K020(2)S          |
| 20            | 27.0              | B              | 1.0                          | 6              | 0.24                  | 2534(1)                            | 3534(1)  | T256B276K020(2)S          |
| 20            | 56.0              | C              | 1.0                          | 6              | 0.15                  | 2535(1)                            | 3535(1)  | T256C566K020(2)S          |
| 20            | 68.0              | C              | 1.0                          | 6              | 0.14                  | 2536(1)                            | 3536(1)  | T256C686K020(2)S          |
| 20            | 82.0              | C              | 1.0                          | 6              | 0.12                  | 2537(1)                            | 3537(1)  | T256C826K020(2)S          |
| 20            | 100.0             | C              | 1.0                          | 6              | 0.10                  | 2538(1)                            | 3538(1)  | T256C107K020(2)S          |
| 20            | 120.0             | C              | 1.0                          | 6              | 0.09                  | 2539(1)                            | 3539(1)  | T256C127K020(2)S          |
| 20            | 150.0             | D              | 2.0                          | 8              | 0.08                  | 2540(1)                            | 3540(1)  | T256D157K020(2)S          |
| 20            | 180.0             | D              | 2.0                          | 8              | 0.07                  | 2541(1)                            | 3541(1)  | T256D187K020(2)S          |
| 35            | 1.8               | A              | 0.5                          | 4              | 0.20                  | 2542(1)                            | 3542(1)  | T256A185K035(2)S          |
| 35            | 8.2               | B              | 1.0                          | 6              | 0.40                  | 2543(1)                            | 3543(1)  | T256B825K035(2)S          |
| 35            | 10.0              | B              | 1.0                          | 6              | 0.35                  | 2544(1)                            | 3544(1)  | T256B106K035(2)S          |
| 35            | 33.0              | C              | 1.0                          | 6              | 0.19                  | 2545(1)                            | 3545(1)  | T256C336K035(2)S          |
| 35            | 39.0              | C              | 1.0                          | 6              | 0.17                  | 2546(1)                            | 3546(1)  | T256C396K035(2)S          |
| 35            | 47.0              | C              | 1.0                          | 6              | 0.15                  | 2547(1)                            | 3547(1)  | T256C476K035(2)S          |
| 35            | 56.0              | D              | 2.0                          | 6              | 0.13                  | 2548(1)                            | 3548(1)  | T256D566K035(2)S          |
| 35            | 68.0              | D              | 2.0                          | 6              | 0.12                  | 2549(1)                            | 3549(1)  | T256D686K035(2)S          |
| 50            | 1.2               | A              | 0.5                          | 4              | 1.30                  | 2550(1)                            | 3550(1)  | T256A125K050(2)S          |
| 50            | 1.5               | A              | 0.5                          | 4              | 1.20                  | 2551(1)                            | 3551(1)  | T256A155K050(2)S          |
| 50            | 5.6               | B              | 1.0                          | 4              | 0.47                  | 2552(1)                            | 3552(1)  | T256B565K050(2)S          |
| 50            | 6.8               | B              | 1.0                          | 6              | 0.43                  | 2553(1)                            | 3553(1)  | T256B685K050(2)S          |
| 50            | 22.0              | C              | 1.0                          | 6              | 0.22                  | 2554(1)                            | 3554(1)  | T256C226K050(2)S          |
| 50            | 27.0              | C              | 1.0                          | 6              | 0.20                  | 2555(1)                            | 3555(1)  | T256C276K050(2)S          |
| 50            | 33.0              | D              | 1.0                          | 6              | 0.18                  | 2556(1)                            | 3556(1)  | T256D336K050(2)S          |
| 50            | 39.0              | D              | 1.0                          | 6              | 0.16                  | 2557(1)                            | 3557(1)  | T256D396K050(2)S          |
| (V) 85°C      | µF                | Case Size Code | µA at 25°C Maximum/5 Minutes | 120 Hz Maximum | Q at 25°C 100 kHz Max | B (0.1)                            | C (0.01) | Part Number               |
| Rated Voltage | Rated Capacitance | Case Size Code | DC Leakage                   | DF % at 25°C   | ESR                   | MIL-PRF-39003 (CSS33 Style)        |          |                           |

(1) To complete MIL-PRF-39003 dash part number, insert S for sleeved or U for unsleeved. If "U" ordered also use C0100.

(2) To complete KEMET Part Number (T216, T256), insert Graded failure rate - B for .1%/k hours, C for .01%/k hours. Designates reliability level.

## Ripple Current/Ripple Voltage

Permissible AC ripple voltage is related to the ESR of the capacitor and the power dissipation capabilities of a particular case size.

Thermal capacities for the various case sizes have been determined empirically and are listed below.

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

T = Environmental Temperature

Permissible AC ripple current can be determined by the following:

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

P max = maximum watts

R = ESR at specified frequency (ohms)

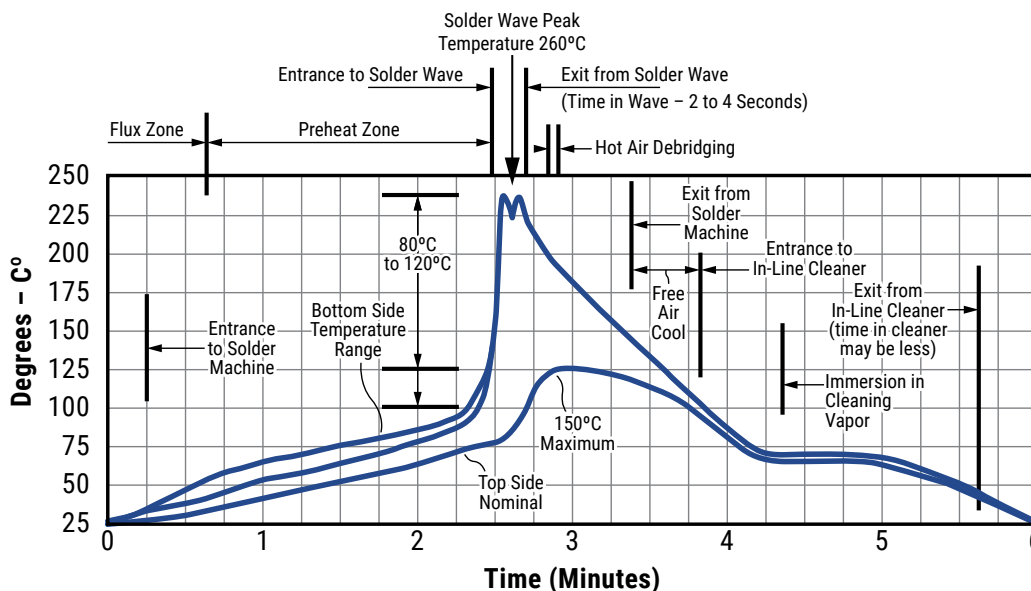
I = rms ripple current (amperes)

Z = capacitor impedance in ohms at the specified frequency

| Case Size | Maximum Power Dissipation (P max) | T2XX  |
|-----------|-----------------------------------|-------|
| A         | 0.09                              | 0.070 |
| B         | 0.100                             | 0.090 |
| C         | 0.125                             | -     |
| D         | 0.180                             | -     |

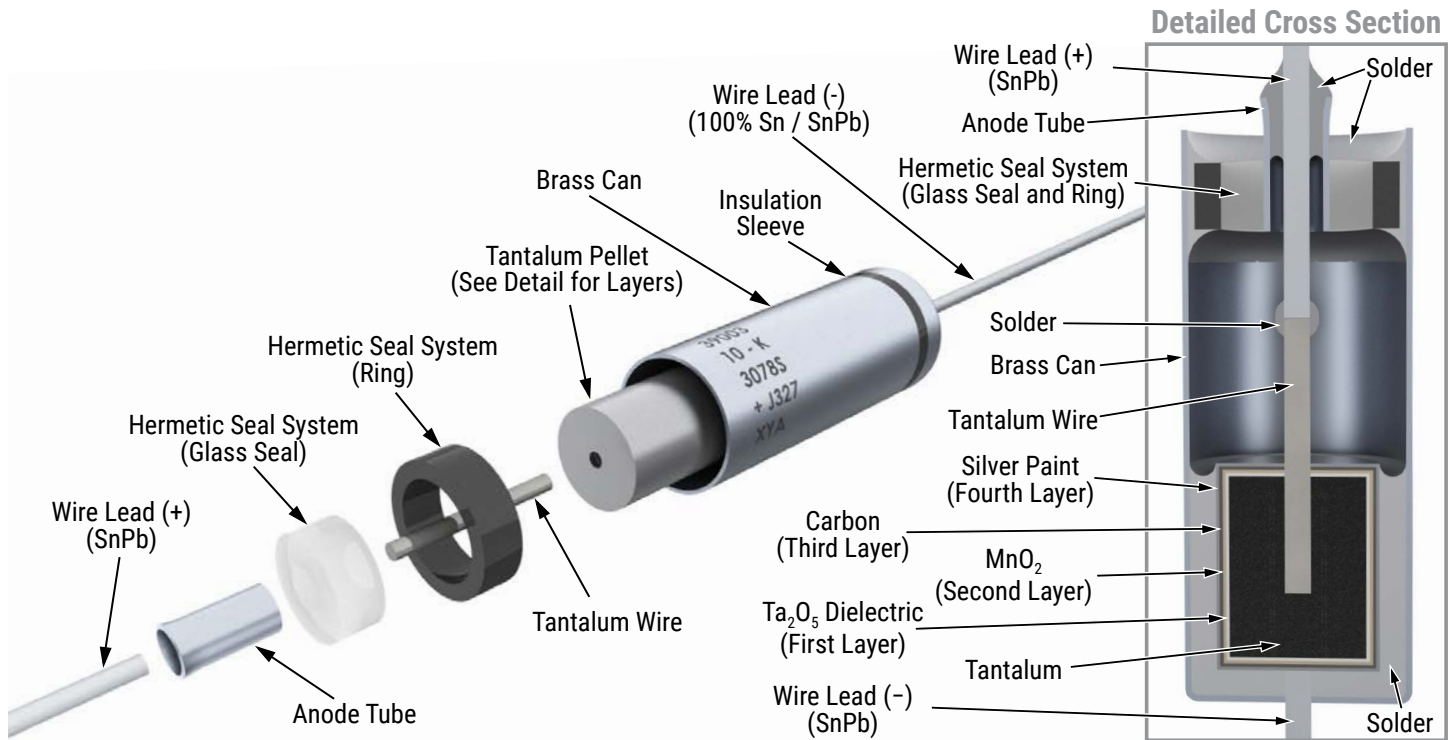
Maximum Power Dissipation: 25°C Ambient

## Optimum Solder Wave Profile



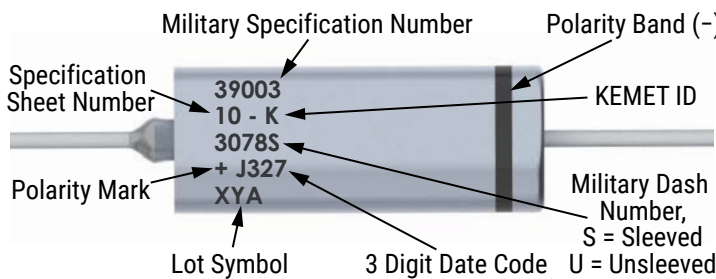


## Construction

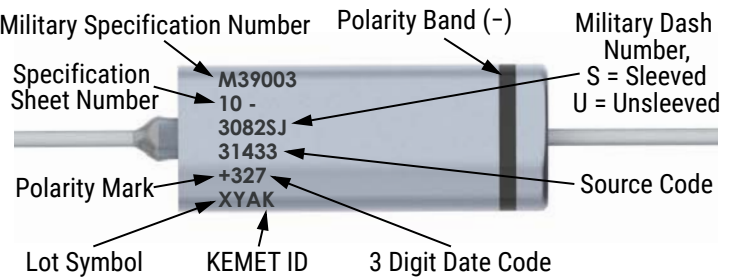


## Capacitor Marking

### A Case

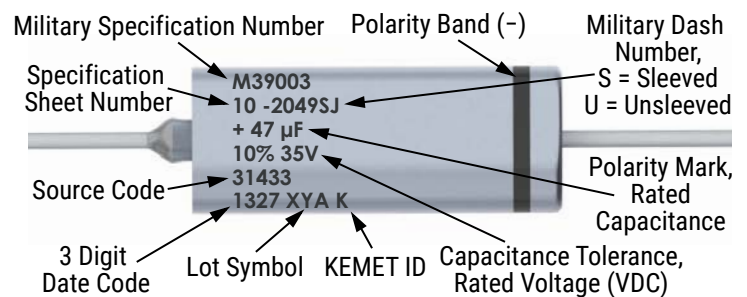


### B Case



| Date Code | 3 Digit  | 4 Digit   |
|-----------|--|-----------|
| Year      | 5 = 2015   | 15 = 2015 |
|           | 6 = 2016   | 16 = 2016 |
|           | 7 = 2017   | 17 = 2017 |
|           | 8 = 2018   | 18 = 2018 |
|           | 9 = 2019   | 19 = 2019 |
| Week      | 01 = 1 <sup>st</sup> week of the year to<br>52 = 52 <sup>nd</sup> week of the year |           |

### C & D Case



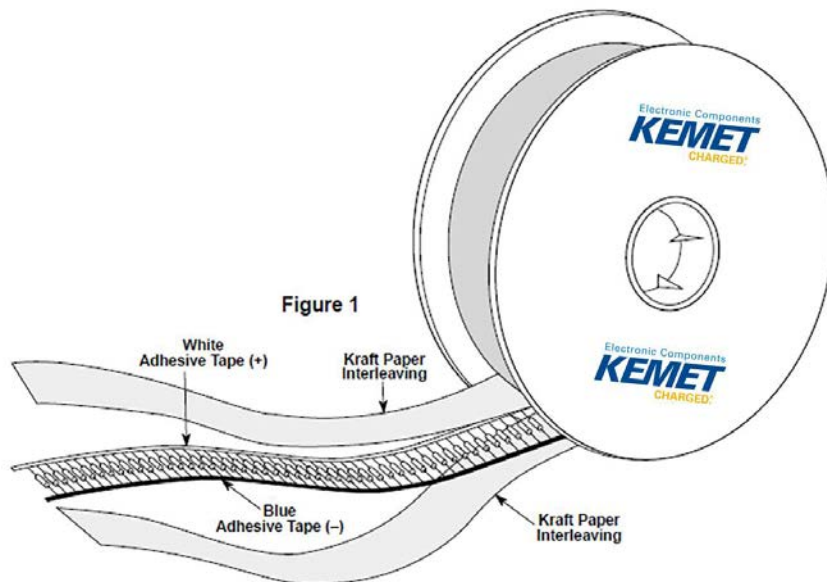


## Storage

Tantalum hermetically sealed capacitors should be stored in normal working environments. While the capacitors 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°C and maximum storage humidity not exceed 60% relative humidity. 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 capacitors stock should be used promptly, preferably within three years of receipt.

## Tape & Reel Packaging Information

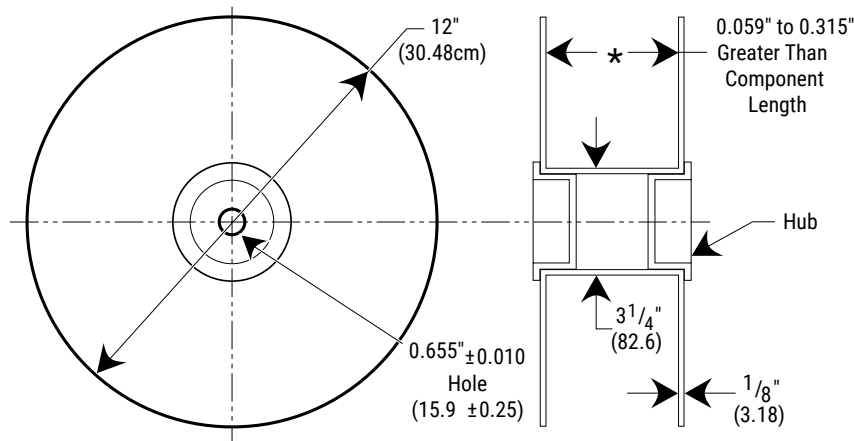
KEMET offers standard reeling of Solid Tantalum Capacitors for automatic insertion or lead forming machines per EIA Specification RS-296.



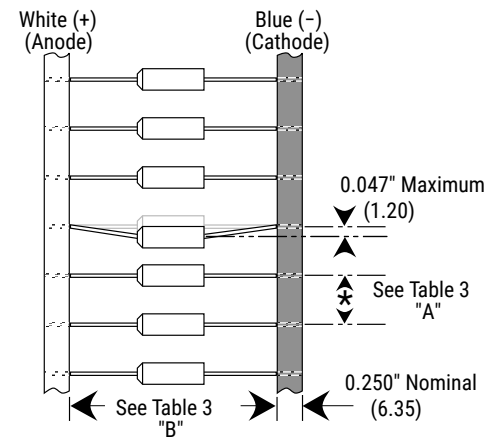
**Table 2 – Packaging Quantity**

| Case Size | Standard Bulk Quantity | Standard Reel Quantity | Reel C-Spec |
|-----------|------------------------|------------------------|-------------|
| A         | 40/Tray                | 3,500                  | C-7200      |
| B         | 30/Tray                | 2,500                  | C-7200      |
| C         | 20/Tray                | 500                    | C-7200      |
| D         | 20/Tray                | 400                    | C-7200      |

**Figure 2**



**Figure 3**



**Table 3 – Tape Dimensions**

Dimensions in Inches (& Millimeters)

| BODY DIAMETER               | A<br>PITCH<br>±0.020 (0.5) | B<br>INSIDE TAPE SPACING                    |
|-----------------------------|----------------------------|---|
| ≤ 0.197 (5.0)               | 0.200 (5.0)                | 2.063 (52.4)<br>+0.079, -0.039 (+2.0, -1.0) |
| 0.198 (5.0) to 0.394 (10.0) | 0.400 or (10.0)            | 2.874 (73)<br>+/-0.059                      |

Capacitors are reeled so that positive leads are oriented as shown in Figure 3. Kraft paper (50 lbs. test minimum) is inserted between the layers of capacitors wound on reels for component pitch ≤ 0.200" sizes and corrugated paper (70 lbs. test minimum), single faced is inserted for component pitch ≥ 0.400" sizes. Capacitor lead length may extend only a maximum of 0.031" (0.8 mm) beyond the tape's edges. Capacitors are centered in a row between the two tapes and will deviate only ±0.031" (0.79 mm) from the row center.

Figures 1 and 2 show the KEMET standard chipboard tape reel.

A minimum of 36" (91.5 cm) leader tape is provided at each end of the reeled capacitors.

Universal splicing clips are used to connect the tape.

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