

# Aluminum Capacitors

## + 105 °C, General Purpose Miniature, Radial Lead

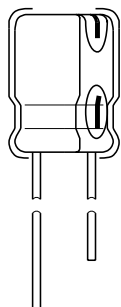


Fig.1 Component outline

### FEATURES

- High CV per case size
- Low cost
- Solvent resistant construction  
(through 100 WVDC)
- High temperature operation
- Life test to 2000 hours at + 105 °C


RoHS  
COMPLIANT

| QUICK REFERENCE DATA                    |                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DESCRIPTION                             | VALUE                                                                                                                                                                                                                                                                                                                                                                              |
| Nominal case size<br>Ø D x L in mm      | 0.197" x 0.433" [5.0 x 11.0]<br>to 0.709" x 1.575" [18.0 x 40.0]                                                                                                                                                                                                                                                                                                                   |
| Operating temperature                   | - 55 °C to + 105 °C (6.3 WVDC<br>to 100 WVDC)<br>- 40 °C to + 105 °C (160 WVDC<br>to 250 WVDC)                                                                                                                                                                                                                                                                                     |
| Rated Capacitance range, C <sub>R</sub> | 0.47 µF to 15 000 µF                                                                                                                                                                                                                                                                                                                                                               |
| Tolerance on C <sub>R</sub>             | ± 20 %                                                                                                                                                                                                                                                                                                                                                                             |
| Rated voltage range, U <sub>R</sub>     | 6.3 WVDC to 250 WVDC                                                                                                                                                                                                                                                                                                                                                               |
| Termination                             | 2 radial leads                                                                                                                                                                                                                                                                                                                                                                     |
| Life validation test at 105 °C          | 2000 hours: Δ CAP ± 20 % from<br>initial measurement.<br>Δ DF 2 x initial specified limit.<br>Δ DCL ≤ initial specified limit.                                                                                                                                                                                                                                                     |
| Shelf life at 105 °C                    | 1000 hours: Δ CAP ± 20 % from<br>initial measurement.<br>Δ DF 2 x initial specified limit.<br>Δ DCL ≤ initial specified limit                                                                                                                                                                                                                                                      |
| DC leakage current                      | Rated voltage for 1 minute for<br>6.3 WVDC to 100 WVDC units:<br>I < 0.03 CV or 4 µA<br>(whichever is greater).<br>Rated voltage for 2 minutes for<br>6.3 WVDC to 100 WVDC units:<br>I < 0.04 CV or 3 µA<br>(whichever is greater).<br>rated voltage for 1 minute for<br>160 WVDC to 250 WVDC units:<br>I < 0.1 CV + 40 µA and CV > 1000;<br>I < 0.04 CV + 100 µA<br>and CV > 1000 |

| RIPPLE CURRENT MULTIPLIERS |               |         |           |             |       |          |
|----------------------------|---------------|---------|-----------|-------------|-------|----------|
| TEMPERATURE                |               |         |           |             |       |          |
| Ambient Temperature        |               |         |           | Multipliers |       |          |
| + 70 °C                    |               |         |           | 1.78        |       |          |
| + 85 °C                    |               |         |           | 1.4         |       |          |
| + 105 °C                   |               |         |           | 1.0         |       |          |
| FREQUENCY (Hz)             |               |         |           |             |       |          |
| WVDC                       | Cap. (µF)     | 50 - 60 | 100 - 120 | 300 - 400   | 1 kHz | ≤ 10 kHz |
| 6.3 - 100                  | 0 - 47        | 0.75    | 1         | 1.35        | 1.57  | 2.00     |
|                            | 100 - 470     | 0.80    | 1         | 1.23        | 1.34  | 1.50     |
|                            | 1000 - 22 000 | 0.85    | 1         | 1.10        | 1.13  | 1.15     |
| 160 - 250                  | 0.47 - 100    | 0.80    | 1         | 1.25        | 1.40  | 1.60     |

| LOW TEMPERATURE PERFORMANCE                          |                     |                     |
|------------------------------------------------------|---------------------|---------------------|
| MAXIMUM IMPEDANCE RATIO Z <sup>(T)</sup> /Z(+ 20 °C) |                     |                     |
| MAXIMUM AT 120 Hz                                    |                     |                     |
| Rated Voltage<br>(WVDC)                              | Z - 25 °C/Z + 20 °C | Z - 40 °C/Z + 20 °C |
| 6.3                                                  | 4.0                 | 8.0                 |
| 10.0                                                 | 3.0                 | 6.0                 |
| 16.0                                                 | 2.0                 | 4.0                 |
| 25.0 - 100.0                                         | 2.0                 | 3.0                 |
| 160.0 - 200.0                                        | 2.0                 | 4.0                 |
| 250.0                                                | 4.0                 | 6.0                 |

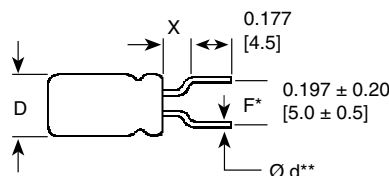
| DIMENSIONS in inches [millimeters] |                             |                   |                            |                           |
|------------------------------------|-----------------------------|-------------------|----------------------------|---------------------------|
| CASE CODE                          | NOMINAL CASE SIZE<br>D x L  | LEAD SPACING<br>S | NOMINAL LEAD DIAMETER<br>D | TYPICAL WEIGHT<br>(GRAMS) |
| JA                                 | 0.197 x .433 [5.0 x 11.0]   | 0.079 [2.0]       | 0.020 [0.50]               | 0.44                      |
| AA                                 | 0.248 x .433 [6.3 x 11.0]   | 0.098 [2.5]       | 0.020 [0.50]               | 0.63                      |
| BB                                 | 0.315 x .453 [8.0 x 11.5]   | 0.138 [3.5]       | 0.024 [0.60]               | 1.03                      |
| CC                                 | 0.394 x .492 [10.0 x 12.5]  | 0.197 [5.0]       | 0.024 [0.60]               | 1.53                      |
| CD                                 | 0.394 x .630 [10.0 x 16.0]  | 0.197 [5.0]       | 0.024 [0.60]               | 1.86                      |
| CG                                 | 0.394 x .787 [10.0 x 20.0]  | 0.197 [5.0]       | 0.024 [0.60]               | 2.48                      |
| DG                                 | 0.492 x 0.787 [12.5 x 20.0] | 0.197 [5.0]       | 0.024 [0.60]               | 3.98                      |

**DIMENSIONS** in inches [millimeters]

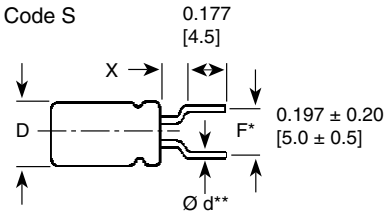
| CASE CODE | NOMINAL CASE SIZE<br>D X L  | LEAD SPACING<br>S | NOMINAL LEAD DIAMETER<br>D | TYPICAL WEIGHT<br>(GRAMS) |
|-----------|-----------------------------|-------------------|----------------------------|---------------------------|
| DK        | 0.492 x 0.984 [12.5 x 25.0] | 0.197 [5.0]       | 0.024 [0.60]               | 5.27                      |
| EK        | 0.630 x 0.984 [16.0 x 25.0] | 0.295 [7.5]       | 0.031 [0.80]               | 7.72                      |
| EN        | 0.630 x 1.24 [16.0 x 31.5]  | 0.295 [7.5]       | 0.031 [0.80]               | 9.90                      |
| ER        | 0.630 x 1.40 [16.0 x 35.5]  | 0.295 [7.5]       | 0.031 [0.80]               | 11.10                     |
| FR        | 0.709 x 1.40 [18.0 x 35.5]  | 0.295 [7.5]       | 0.031 [0.80]               | 13.04                     |
| FV        | 0.709 x 1.575 [18.0 x 40.0] | 0.295 [7.5]       | 0.031 [0.80]               | 15.74                     |

**ELECTROLYTIC CAPACITOR WITH CUT OR FORMED LEADS** in inches [millimeters]

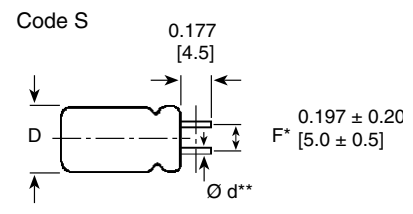
Code F



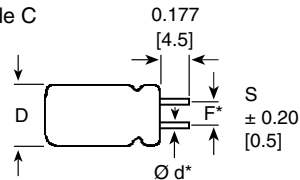
Code S



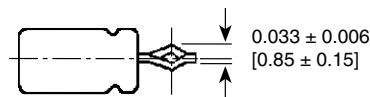
Code S



Code C

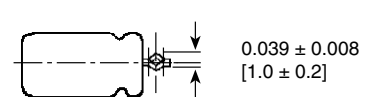


Code S



(4, 5, 6.3, 8)

Code S



(10, 12.5, 16, 18)

**DIMENSIONS** in inches [millimeters]

| FORMING METHOD | FORMED LEAD CODE | DIMENSIONS   |             |             |             |             |
|----------------|------------------|--------------|-------------|-------------|-------------|-------------|
|                |                  | D            | L.S.        | P           | e***        | X (Max.)    |
| Formed and Cut | F                | 0.197 [5.0]  | 0.197 [5.0] | 0.079 [2.0] | -           | 0.059 [1.5] |
|                |                  | 0.248 [6.3]  | 0.197 [5.0] | 0.098 [2.5] | -           | 0.098 [2.5] |
|                |                  | 0.315 [8.0]  | 0.197 [5.0] | 0.138 [3.5] | -           | 0.098 [2.5] |
| Cut            | C                | 0.394 [10.0] | 0.197 [5.0] | -           | -           | -           |
|                |                  | 0.492 [12.5] | 0.197 [5.0] | -           | -           | -           |
|                |                  | 0.630 [16.0] | 0.295 [7.5] | -           | -           | -           |
|                |                  | 0.709 [18.0] | 0.295 [7.5] | -           | -           | -           |
| Snap-in        | S                | 0.197 [5.0]  | 0.197 [5.0] | 0.079 [2.0] | 0.043 [1.1] | 0.059 [1.5] |
|                |                  | 0.248 [6.3]  | 0.197 [5.0] | 0.098 [2.5] | 0.043 [1.1] | 0.059 [1.5] |
|                |                  | 0.315 [8.0]  | 0.197 [5.0] | 0.138 [3.5] | 0.051 [1.3] | 0.059 [1.5] |
|                |                  | 0.394 [10.0] | 0.197 [5.0] | -           | 0.051 [1.3] | -           |
|                |                  | 0.492 [12.5] | 0.197 [5.0] | -           | 0.051 [1.3] | -           |
|                |                  | 0.630 [16.0] | 0.295 [7.5] | -           | 0.051 [1.3] | -           |
|                |                  | 0.709 [18.0] | 0.295 [7.5] | -           | 0.051 [1.3] | -           |

**Note:** The cut or formed code is to be added to the end of type number in 15<sup>th</sup> position (with position 14 coded "6").

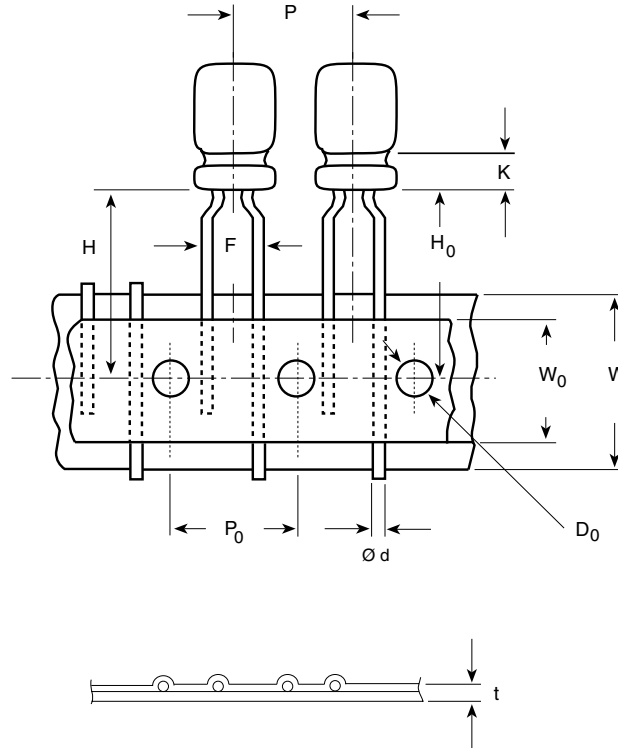
\* Formed lead. \*\* Lead thickness Ø d depends on capacitor specification. \*\*\* Lead protrusion at bottom of tape.

**TAPED CAPACITORS FOR AUTOMATIC INSERTION SYSTEMS** in inches [millimeters]

| PACKAGING | LEAD CODE | SPECIFICATION |          | LEAD SPACE  | CAPACITOR SIZES AVAILABLE                                |
|-----------|-----------|---------------|----------|-------------|----------------------------------------------------------|
|           |           | LEAD STYLE    | + LEADER |             |                                                          |
| Ammo Pack | P         | Formed Lead** | -        | 0.197 [5.0] | 0.197 x 0.433 [5.0 x 11.0] - 0.492 x 0.787 [12.5 x 20.0] |

**Note:** The ammo pack code is to be added to the end of type number in the 15<sup>th</sup> position (with position 14 coded as "8" as appropriate.)

\*\* Except 0.394 [10.0 mm] and 0.492 [12.5 mm] diameter have straight unformed leads.

**TAPING SPECIFICATIONS** in inches [millimeters]**Formed Lead Type****DIMENSIONS** in inches [millimeters]

| ITEM                                     | CASE SIZE<br>(Diameter x Length) |                               |                               |                        |                        |
|------------------------------------------|----------------------------------|-------------------------------|-------------------------------|------------------------|------------------------|
|                                          | FORMED LEAD TYPE                 |                               |                               | STRAIGHT LEAD TYPE     |                        |
|                                          | 0.197 x 0.433<br>[5.0 x 11.0]    | 0.248 x 0.433<br>[6.3 x 11.0] | 0.315 x 0.452<br>[8.0 x 11.5] | 0.394 [10.0]<br>(Dia.) | 0.492 [12.5]<br>(Dia.) |
| Ø d - Lead-wire Diameter                 | 0.020 [0.5]                      | 0.020 [0.5]                   | 0.024 [0.6]                   | 0.024 [0.6]            | 0.024 [0.6]            |
| P - Pitch of Component                   | 0.500 [12.7]                     | 0.500 [12.7]                  | 0.500 [12.7]                  | 0.500 [12.7]           | 0.591 [15.0]           |
| P <sub>0</sub> - Feed Hole Pitch         | 0.500 [12.7]                     | 0.500 [12.7]                  | 0.500 [12.7]                  | 0.500 [12.7]           | 0.591 [15.0]           |
| F - Lead-to-lead Distance                | 0.197 [5.0]                      | 0.197 [5.0]                   | 0.197 [5.0]                   | 0.197 [5.0]            | 0.197 [5.0]            |
| K - Clinch Height                        | 0.098 [2.5]                      | 0.098 [2.5]                   | 0.157 [4.0]                   | —                      | —                      |
| H - Height of Component from Tape Center | 0.728 [18.5]                     | 0.728 [18.5]                  | 0.787 [20.0]                  | 0.728 [18.5]           | 0.630 [16.0]           |
| H <sub>0</sub> - Lead-wire Clinch Height | 0.630 [16.0]                     | 0.630 [16.0]                  | 0.630 [16.0]                  | —                      | —                      |
| W - Tape Width                           | 0.709 [18.0]                     | 0.709 [18.0]                  | 0.709 [18.0]                  | 0.709 [18.0]           | 0.709 [18.0]           |
| W <sub>0</sub> - Hold Down Tape Width    | 0.512 [13.0]                     | 0.512 [13.0]                  | 0.512 [13.0]                  | 0.512 [13.0]           | 0.512 [13.0]           |
| D <sub>0</sub> - Feed Hole Diameter      | 0.157 [4.0]                      | 0.157 [4.0]                   | 0.157 [4.0]                   | 0.157 [4.0]            | 0.157 [4.0]            |
| t - Total Tape Thickness                 | 0.028 [0.7]                      | 0.028 [0.7]                   | 0.028 [0.7]                   | 0.028 [0.7]            | 0.028 [0.7]            |

**ELECTRICAL DATA**

| SYMBOL | DESCRIPTION                         |
|--------|-------------------------------------|
| μF     | rated capacitance                   |
| ± %    | M = ± 20 %                          |
| DC     | voltage rating at 105 °C            |
| JA     | see dimensions in millimeters table |
| 6      | packaging code                      |
| A      | termination                         |

**ORDERING EXAMPLE\***

Electrolytic capacitor 517D series

517D 107M 6R3 JA 6A E3

6A = Bulk, Uncut leads.

6C = Cut leads (not stocked).

6F = Formed and cut leads (not stocked).

6S = Snap-in leads (not stocked).

For Cases Codes JA, AA, BB, CC, CD, CG, and DG only:  
8P = Ammo-Pack.

All items stating "not stocked" are items that are not generally stocked unless a Purchase Order is placed. Lead time is 16 weeks for these items unless there is excess inventory.

\* Suffix E3 denotes lead (Pb)-free/RoHS compliant products.

**ELECTRICAL DATA AND ORDERING INFORMATION**

| CAPACITANCE<br>(μF)                      | PART NUMBER       | NOMINAL CASE SIZE<br>D x L  | Max. RIPPLE<br>at + 105 °C<br>120 Hz (mA) | Max. DF<br>at + 20 °C<br>120 Hz |
|------------------------------------------|-------------------|-----------------------------|-------------------------------------------|---------------------------------|
| <b>6.3 WVDC at + 105 °C, SURGE = 8 V</b> |                   |                             |                                           |                                 |
| 22.0                                     | 517D226M6R3JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 34.0                                      | 0.26                            |
| 33.0                                     | 517D336M6R3JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 50.0                                      | 0.26                            |
| 47.0                                     | 517D476M6R3JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 65.0                                      | 0.26                            |
| 100.0                                    | 517D107M6R3JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 100.0                                     | 0.26                            |
| 220.0                                    | 517D227M6R3AA6AE3 | 0.248 x 0.433 [6.3 x 11.0]  | 165.0                                     | 0.26                            |
| 330.0                                    | 517D337M6R3AA6AE3 | 0.248 x 0.433 [6.3 x 11.0]  | 200.0                                     | 0.26                            |
| 470.0                                    | 517D477M6R3BB6AE3 | 0.315 x 0.453 [8.0 x 11.5]  | 280.0                                     | 0.26                            |
| 1000.0                                   | 517D108M6R3CC6AE3 | 0.394 x 0.492 [10.0 x 12.5] | 470.0                                     | 0.26                            |
| 2200.0                                   | 517D228M6R3DG6AE3 | 0.492 x 0.787 [12.5 x 20.0] | 930.0                                     | 0.26                            |
| 3300.0                                   | 517D338M6R3DG6AE3 | 0.492 x 0.787 [12.5 x 20.0] | 1100.0                                    | 0.26                            |
| 4700.0                                   | 517D478M6R3EK6AE3 | 0.630 x 0.984 [16.0 x 25.0] | 1320.0                                    | 0.26                            |
| 6800.0                                   | 517D688M6R3EK6AE3 | 0.630 x 0.984 [16.0 x 25.0] | 1490.0                                    | 0.26                            |
| 10 000.0                                 | 517D109M6R3EN6AE3 | 0.630 x 1.240 [16.0 x 31.5] | 1830.0                                    | 0.26                            |
| 15 000.0                                 | 517D159M6R3FR6AE3 | 0.709 x 1.398 [18.0 x 35.5] | 2280.0                                    | 0.26                            |
| <b>10 WVDC at + 105 °C, SURGE = 13 V</b> |                   |                             |                                           |                                 |
| 22.0                                     | 517D226M010JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 45.0                                      | 0.22                            |
| 33.0                                     | 517D336M010JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 60.0                                      | 0.22                            |
| 47.0                                     | 517D476M010JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 75.0                                      | 0.22                            |
| 100.0                                    | 517D107M010JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 110.0                                     | 0.22                            |
| 220.0                                    | 517D227M010AA6AE3 | 0.248 x 0.433 [6.3 x 11.0]  | 180.0                                     | 0.22                            |
| 330.0                                    | 517D337M010BB6AE3 | 0.315 x 0.453 [8.0 x 11.5]  | 255.0                                     | 0.22                            |
| 470.0                                    | 517D477M010BB6AE3 | 0.315 x 0.453 [8.0 x 11.5]  | 305.0                                     | 0.22                            |
| 1000.0                                   | 517D108M010CD6AE3 | 0.394 x 0.630 [10.0 x 16.0] | 570.0                                     | 0.22                            |
| 2200.0                                   | 517D228M010DG6AE3 | 0.492 x 0.787 [12.5 x 20.0] | 1010.0                                    | 0.22                            |
| 3300.0                                   | 517D338M010DK6AE3 | 0.492 x 0.984 [12.5 x 25.0] | 1220.0                                    | 0.22                            |
| 4700.0                                   | 517D478M010EK6AE3 | 0.630 x 0.984 [16.0 x 25.0] | 1410.0                                    | 0.22                            |
| 6800.0                                   | 517D688M010EN6AE3 | 0.630 x 1.240 [16.0 x 31.5] | 1610.0                                    | 0.22                            |
| 10 000.0                                 | 517D109M010FR6AE3 | 0.709 x 1.398 [18.0 x 35.5] | 1980.0                                    | 0.22                            |
| 15 000.0                                 | 517D159M010FV6AE3 | 0.709 x 1.575 [18.0 x 40.0] | 2470.0                                    | 0.22                            |

Aluminum Capacitors  
+ 105 °C, General Purpose Miniature, Radial Lead

Vishay Sprague

**ELECTRICAL DATA AND ORDERING INFORMATION**

| CAPACITANCE<br>( $\mu$ F)                | PART NUMBER       | NOMINAL CASE SIZE<br>D x L  | Max. RIPPLE<br>at + 105 °C<br>120 Hz (mA) | Max. DF<br>at + 20 °C<br>120 Hz |
|------------------------------------------|-------------------|-----------------------------|-------------------------------------------|---------------------------------|
| <b>16 WVDC at + 105 °C, SURGE = 20 V</b> |                   |                             |                                           |                                 |
| 10.0                                     | 517D106M016JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 35.0                                      | 0.18                            |
| 22.0                                     | 517D226M016JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 55.0                                      | 0.18                            |
| 33.0                                     | 517D336M016JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 70.0                                      | 0.18                            |
| 47.0                                     | 517D476M016JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 85.0                                      | 0.18                            |
| 100.0                                    | 517D107M016AA6AE3 | 0.248 x 0.433 [6.3 x 11.0]  | 135.0                                     | 0.18                            |
| 220.0                                    | 517D227M016BB6AE3 | 0.315 x 0.453 [8.0 x 11.5]  | 235.0                                     | 0.18                            |
| 330.0                                    | 517D337M016BB6AE3 | 0.315 x 0.453 [8.0 x 11.5]  | 285.0                                     | 0.18                            |
| 470.0                                    | 517D477M016CC6AE3 | 0.394 x .0492 [10.0 x 12.5] | 395.0                                     | 0.18                            |
| 1000.0                                   | 517D108M016CG6AE3 | 0.394 x 0.787 [10.0 x 20.0] | 700.0                                     | 0.18                            |
| 2200.0                                   | 517D228M016DK6AE3 | 0.492 x 0.984 [12.5 x 25.0] | 1150.0                                    | 0.18                            |
| 3300.0                                   | 517D338M016EK6AE3 | 0.630 x 0.984 [16.0 x 25.0] | 1350.0                                    | 0.18                            |
| 4700.0                                   | 517D478M016EN6AE3 | 0.630 x 1.240 [16.0 x 31.5] | 1560.0                                    | 0.18                            |
| 6800.0                                   | 517D688M016FR6AE3 | 0.709 x 1.398 [18.0 x 35.5] | 1750.0                                    | 0.18                            |
| 10 000.0                                 | 517D109M016FV6AE3 | 0.709 x 1.575 [18.0 x 40.0] | 2170.0                                    | 0.18                            |
| <b>25 WVDC at + 105 °C, SURGE = 32V</b>  |                   |                             |                                           |                                 |
| 4.7                                      | 517D475M025JA6AE3 | 0.197 x .0433 [5.0 x 11.0]  | 24.0                                      | 0.16                            |
| 10.0                                     | 517D106M025JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 39.0                                      | 0.16                            |
| 22.0                                     | 517D226M025JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 60.0                                      | 0.16                            |
| 33.0                                     | 517D336M025JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 75.0                                      | 0.16                            |
| 47.0                                     | 517D476M025JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 90.0                                      | 0.16                            |
| 100.0                                    | 517D107M025AA6AE3 | 0.248 x 0.433 [6.3 x 11.0]  | 145.0                                     | 0.16                            |
| 220.0                                    | 517D227M025BB6AE3 | 0.315 x 0.453 [8.0 x 11.5]  | 250.0                                     | 0.16                            |
| 330.0                                    | 517D337M025CC6AE3 | 0.394 x 0.492 [10.0 x 12.5] | 355.0                                     | 0.16                            |
| 470.0                                    | 517D477M025CD6AE3 | 0.394 x 0.630 [10.0 x 16.0] | 470.0                                     | 0.16                            |
| 1000.0                                   | 517D108M025DG6AE3 | 0.492 x 0.787 [12.5 x 20.0] | 855.0                                     | 0.16                            |
| 2200.0                                   | 517D228M025EK6AE3 | 0.630 x 0.984 [16.0 x 25.0] | 1230.0                                    | 0.16                            |
| 3300.0                                   | 517D338M025EN6AE3 | 0.630 x 1.240 [16.0 x 31.5] | 1450.0                                    | 0.16                            |
| 4700.0                                   | 517D478M025FR6AE3 | 0.709 x 1.398 [18.0 x 35.5] | 1660.0                                    | 0.16                            |
| <b>35 WVDC at + 105 °C, SURGE = 44 V</b> |                   |                             |                                           |                                 |
| 4.7                                      | 517D475M035JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 27.0                                      | 0.13                            |
| 10.0                                     | 517D106M035JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 44.0                                      | 0.13                            |
| 22.0                                     | 517D226M035JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 65.0                                      | 0.13                            |
| 33.0                                     | 517D336M035JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 85.0                                      | 0.13                            |
| 47.0                                     | 517D476M035AA6AE3 | 0.248 x 0.433 [6.3 x 11.0]  | 115.0                                     | 0.13                            |
| 100.0                                    | 517D107M035BB6AE3 | 0.315 x 0.453 [8.0 x 11.5]  | 190.0                                     | 0.13                            |
| 220.0                                    | 517D227M035CC6AE3 | 0.394 x 0.492 [10.0 x 12.5] | 325.0                                     | 0.13                            |
| 330.0                                    | 517D337M035CD6AE3 | 0.394 x 0.630 [10.0 x 16.0] | 440.0                                     | 0.13                            |
| 470.0                                    | 517D477M035CG6AE3 | 0.394 x 0.787 [10.0 x 20.0] | 580.0                                     | 0.13                            |
| 1000.0                                   | 517D108M035DK6AE3 | 0.492 x 0.984 [12.5 x 25.0] | 995.0                                     | 0.13                            |
| 2200.0                                   | 517D228M035EN6AE3 | 0.630 x 1.240 [16.0 x 31.5] | 1450.0                                    | 0.13                            |
| 3300.0                                   | 517D338M035FR6AE3 | 0.709 x 1.398 [18.0 x 35.5] | 1660.0                                    | 0.13                            |
| 4700.0                                   | 517D478M035FV6AE3 | 0.709 x 1.575 [18.0 x 40.0] | 2030.0                                    | 0.13                            |

**ELECTRICAL DATA AND ORDERING INFORMATION**

| CAPACITANCE<br>( $\mu$ F)                  | PART NUMBER       | NOMINAL CASE SIZE<br>D x L  | Max. RIPPLE<br>at + 105 °C<br>120 Hz (mA) | Max. DF<br>at + 20 °C<br>120 Hz |
|--------------------------------------------|-------------------|-----------------------------|-------------------------------------------|---------------------------------|
| <b>50 WVDC at + 105 °C, SURGE = 63 V</b>   |                   |                             |                                           |                                 |
| 0.47                                       | 517D474M050JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 7.0                                       | 0.10                            |
| 1.0                                        | 517D105M050JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 12.0                                      | 0.10                            |
| 2.2                                        | 517D225M050JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 18.0                                      | 0.10                            |
| 3.3                                        | 517D335M050JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 25.0                                      | 0.10                            |
| 4.7                                        | 517D475M050JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 30.0                                      | 0.10                            |
| 10.0                                       | 517D106M050JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 50.0                                      | 0.10                            |
| 22.0                                       | 517D226M050JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 75.0                                      | 0.10                            |
| 33.0                                       | 517D336M050M6AE3  | 0.248 x 0.433 [6.3 x 11.0]  | 105.0                                     | 0.10                            |
| 47.0                                       | 517D476M050AA6AE3 | 0.248 x 0.433 [6.3 x 11.0]  | 125.0                                     | 0.10                            |
| 100.0                                      | 517D107M050BB6AE3 | 0.315 x 0.453 [8.0 x 11.5]  | 210.0                                     | 0.10                            |
| 220.0                                      | 517D227M050CD6AE3 | 0.394 x 0.630 [10.0 x 16.0] | 400.0                                     | 0.10                            |
| 330.0                                      | 517D337M050CG6AE3 | 0.394 x 0.787 [10.0 x 20.0] | 535.0                                     | 0.10                            |
| 470.0                                      | 517D477M050DG6AE3 | 0.492 x 0.787 [12.5 x 20.0] | 730.0                                     | 0.10                            |
| 1000.0                                     | 517D108M050EK6AE3 | 0.630 x 0.984 [16.0 x 25.0] | 1110.0                                    | 0.10                            |
| 2200.0                                     | 517D228M050FR6AE3 | 0.709 x 1.398 [18.0 x 35.5] | 1530.0                                    | 0.10                            |
| <b>63 WVDC at + 105 °C, SURGE = 79 V</b>   |                   |                             |                                           |                                 |
| 4.7                                        | 517D475M063JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 34.0                                      | 0.09                            |
| 10.0                                       | 517D106M063JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 55.0                                      | 0.09                            |
| 22.0                                       | 517D226M063AA6AE3 | 0.248 x 0.433 [6.3 x 11.0]  | 90.0                                      | 0.09                            |
| 33.0                                       | 517D336M063AA6AE3 | 0.248 x 0.433 [6.3 x 11.0]  | 110.0                                     | 0.09                            |
| 47.0                                       | 517D476M063BB6AE3 | 0.315 x 0.453 [8.0 x 11.5]  | 155.0                                     | 0.09                            |
| 100.0                                      | 517D107M063CC6AE3 | 0.394 x .0492 [10.0 x 12.5] | 260.0                                     | 0.09                            |
| 220.0                                      | 517D227M063CG6AE3 | 0.394 x 0.787 [10.0 x 20.0] | 465.0                                     | 0.09                            |
| 330.0                                      | 517D337M063DG6AE3 | 0.492 x 0.787 [12.5 x 20.0] | 650.0                                     | 0.09                            |
| 4700.0                                     | 517D477M063DK6AE3 | 0.492 x 0.984 [12.5 x 25.0] | 800.0                                     | 0.09                            |
| 1000.0                                     | 517D108M063EN6AE3 | 0.630 x 1.240 [16.0 x 31.5] | 1200.0                                    | 0.09                            |
| 2200.0                                     | 517D228M063FV6AE3 | 0.709 x 1.575 [18.0 x 40.0] | 1840.0                                    | 0.09                            |
| <b>100 WVDC at + 105 °C, SURGE = 125 V</b> |                   |                             |                                           |                                 |
| 0.47                                       | 517D474M100JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 10.0                                      | 0.08                            |
| 1.0                                        | 517D105M100JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 15.0                                      | 0.08                            |
| 2.2                                        | 517D225M100JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 22.0                                      | 0.08                            |
| 3.3                                        | 517D335M100JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 29.0                                      | 0.08                            |
| 4.7                                        | 517D475M100JA6AE3 | 0.197 x 0.433 [5.0 x 11.0]  | 37.0                                      | 0.08                            |
| 10.0                                       | 517D106M100AA6AE3 | 0.248 x 0.433 [6.3 x 11.0]  | 65.0                                      | 0.08                            |
| 22.0                                       | 517D226M100BB6AE3 | 0.315 x 0.453 [8.0 x 11.5]  | 115.0                                     | 0.08                            |
| 33.0                                       | 517D336M100CC6AE3 | 0.394 x 0.492 [10.0 x 12.5] | 160.0                                     | 0.08                            |
| 47.0                                       | 517D476M100CD6AE3 | 0.394 x 0.630 [10.0 x 16.0] | 220.0                                     | 0.08                            |
| 100.0                                      | 517D107M100DG6AE3 | 0.492 x 0.787 [12.5 x 20.0] | 385.0                                     | 0.08                            |
| 220.0                                      | 517D227M100EK6AE3 | 0.630 x 0.984 [16.0 x 25.0] | 590.0                                     | 0.08                            |
| 330.0                                      | 517D337M100EK6AE3 | 0.630 x 0.984 [16.0 x 25.0] | 720.0                                     | 0.08                            |
| 470.0                                      | 517D477M100EN6AE3 | 0.630 x 1.240 [16.0 x 31.5] | 875.0                                     | 0.08                            |
| 1000.0                                     | 517D108M100FV6AE3 | 0.709 x 1.575 [18.0 x 40.0] | 1320.0                                    | 0.08                            |

**ELECTRICAL DATA AND ORDERING INFORMATION**

| CAPACITANCE<br>( $\mu$ F)                  | PART NUMBER       | NOMINAL CASE SIZE<br>D x L  | Max. RIPPLE<br>at + 105 °C<br>120 Hz (mA) | Max. DF<br>at + 20 °C<br>120 Hz |
|--------------------------------------------|-------------------|-----------------------------|-------------------------------------------|---------------------------------|
| <b>160 WVDC at + 105 °C, SURGE = 200 V</b> |                   |                             |                                           |                                 |
| 0.47                                       | 517D474M160AA6AE3 | 0.248 x 0.433 [6.3 x 11.0]  | 12.0                                      | 0.15                            |
| 1.0                                        | 517D105M160AA6AE3 | 0.248 x 0.433 [6.3 x 11.0]  | 17.0                                      | 0.15                            |
| 2.2                                        | 517D225M160AA6AE3 | 0.248 x 0.433 [6.3 x 11.0]  | 25.0                                      | 0.15                            |
| 3.3                                        | 517D335M160BB6AE3 | 0.315 x 0.453 [8.0 x 11.5]  | 36.0                                      | 0.15                            |
| 4.7                                        | 517D475M160BB6AE3 | 0.315 x 0.453 [8.0 x 11.5]  | 43.0                                      | 0.15                            |
| 10.0                                       | 517D106M160CC6AE3 | 0.394 x 0.492 [10.0 x 12.5] | 70.0                                      | 0.15                            |
| 22.0                                       | 517D226M160CG6AE3 | 0.394 x 0.787 [10.0 x 20.0] | 130.0                                     | 0.15                            |
| 33.0                                       | 517D336M160DG6AE3 | 0.492 x 0.787 [12.5 x 20.0] | 180.0                                     | 0.15                            |
| 47.0                                       | 517D476M160DK6AE3 | 0.492 x 0.984 [12.5 x 25.0] | 220.0                                     | 0.15                            |
| 100.0                                      | 517D107M160EK6AE3 | 0.630 x 0.984 [16.0 x 25.0] | 330.0                                     | 0.15                            |
| 220.0                                      | 517D227M160FR6AE3 | 0.709 x 1.398 [18.0 x 35.5] | 500.0                                     | 0.15                            |
| <b>200 WVDC at + 105 °C, SURGE = 250 V</b> |                   |                             |                                           |                                 |
| 0.47                                       | 517D474M200AA6AE3 | 0.248 x 0.433 [6.3 x 11.0]  | 12.0                                      | 0.15                            |
| 1.0                                        | 517D105M200AA6AE3 | 0.248 x 0.433 [6.3 x 11.0]  | 17.0                                      | 0.15                            |
| 2.2                                        | 517D225M200AA6AE3 | 0.248 x 0.433 [6.3 x 11.0]  | 25.0                                      | 0.15                            |
| 3.3                                        | 517D335M200BB6AE3 | 0.315 x 0.453 [8.0 x 11.5]  | 36.0                                      | 0.15                            |
| 4.7                                        | 517D475M200CC6AE3 | 0.394 x 0.492 [10.0 x 12.5] | 50.0                                      | 0.15                            |
| 10.0                                       | 517D106M200CD6AE3 | 0.394 x 0.630 [10.0 x 16.0] | 80.0                                      | 0.15                            |
| 22.0                                       | 517D226M200CG6AE3 | 0.394 x 0.787 [10.0 x 20.0] | 140.0                                     | 0.15                            |
| 33.0                                       | 517D336M200DK6AE3 | 0.492 x 0.984 [12.5 x 25.0] | 198.0                                     | 0.15                            |
| 47.0                                       | 517D476M200DK6AE3 | 0.492 x 0.984 [12.5 x 25.0] | 220.0                                     | 0.15                            |
| 100.0                                      | 517D107M200EN6AE3 | 0.630 x 1.240 [16.0 x 31.5] | 335.0                                     | 0.15                            |
| 220.0                                      | 517D227M200FV6AE3 | 0.709 x 1.575 [18.0 x 40.0] | 515.0                                     | 0.15                            |
| <b>250 WVDC at + 105 °C, SURGE = 300 V</b> |                   |                             |                                           |                                 |
| 0.47                                       | 517D474M250AA6AE3 | 0.248 x 0.433 [6.3 x 11.0]  | 12.0                                      | 0.15                            |
| 1.0                                        | 517D105M250AA6AE3 | 0.248 x 0.433 [6.3 x 11.0]  | 17.0                                      | 0.15                            |
| 2.2                                        | 517D225M250BB6AE3 | 0.315 x 0.453 [8.0 x 11.5]  | 29.0                                      | 0.15                            |
| 3.3                                        | 517D335M250CC6AE3 | 0.394 x 0.492 [10.0 x 12.5] | 42.0                                      | 0.15                            |
| 4.7                                        | 517D475M250CC6AE3 | 0.394 x 0.492 [10.0 x 12.5] | 50.0                                      | 0.15                            |
| 10.0                                       | 517D106M250CG6AE3 | 0.394 x 0.787 [10.0 x 20.0] | 88.0                                      | 0.15                            |
| 22.0                                       | 517D226M250DK6AE3 | 0.492 x 0.984 [12.5 x 25.0] | 155.0                                     | 0.15                            |
| 33.0                                       | 517D336M250DK6AE3 | 0.492 x 0.984 [12.5 x 25.0] | 190.0                                     | 0.15                            |
| 47.0                                       | 517D476M250EK6AE3 | 0.630 x 0.984 [16.0 x 25.0] | 230.0                                     | 0.15                            |
| 100.0                                      | 517D107M250FR6AE3 | 0.709 x 1.398 [18.0 x 35.5] | 340.0                                     | 0.15                            |



### Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.