

# Aluminum Capacitors

## + 85 °C, Tubular, Axial Lead, General Purpose



Fig.1 Component outlines

### FEATURES

- General purpose capacitor
- Rugged construction
- Largest CV ratings in axial lead capacitor



| QUICK REFERENCE DATA                    |                                                                                                                                |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| DESCRIPTION                             | VALUE                                                                                                                          |
| Nominal case size<br>Ø D x L in mm      | 0.75" x 1.125"<br>[19.05 x 28.575]<br>to<br>1.375" x 4.125"<br>[34.925 x 104.775]                                              |
| Operating temperature                   | - 40 °C to + 85 °C                                                                                                             |
| Rated capacitance range, C <sub>R</sub> | 15 µF to 220 000 µF                                                                                                            |
| Tolerance on C <sub>R</sub>             | - 10 %, + 50 %; - 10 %, + 75 %                                                                                                 |
| Rated voltage range, U <sub>R</sub>     | 6.3 WV <sub>DC</sub> to 450 WV <sub>DC</sub>                                                                                   |
| Termination                             | Axial leads                                                                                                                    |
| Life validation test at 85 °C           | 1000 h: Δ CAP ≤ 15 % from initial measurement. Δ ESR ≤ 1.5 x initial specified limit.<br>Δ DCL ≤ initial specified limit       |
| Shelf life at 85 °C                     | 500 h: Δ CAP ≤ 10 % from initial measurement. Δ ESR ≤ 1.3 x initial specified limit.<br>Δ DCL ≤ 2.0 x initial specified limit. |
| DC leakage current                      | $I = K \sqrt{C \cdot V}$<br>K = 6.0 at + 25 °C;<br>36.0 at + 85 °C<br>I in µA, C in µF, V in Volts                             |

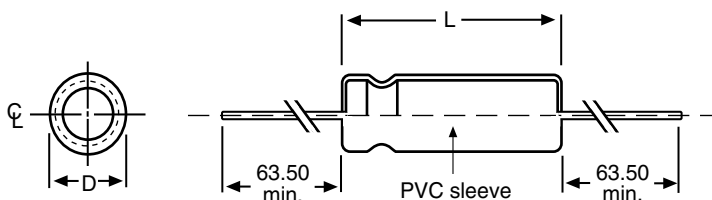
| RIPPLE CURRENT MULTIPLIERS |          |             |             |
|----------------------------|----------|-------------|-------------|
| TEMPERATURE                |          |             |             |
| AMBIENT TEMPERATURE        |          | MULTIPLIERS |             |
| + 75 °C                    |          | 1.4         |             |
| + 65 °C                    |          | 1.7         |             |
| + 45 °C and below          |          | 2.0         |             |
| FREQUENCY (Hz)             |          |             |             |
| WV <sub>DC</sub>           | 50 to 60 | 300 to 400  | 1000 AND UP |
| 0 to 50                    | 0.85     | 1.10        | 1.15        |
| 51 to 299                  | 0.85     | 1.15        | 1.20        |
| 300 to up                  | 0.80     | 1.30        | 1.40        |

| LOW TEMPERATURE PERFORMANCE                               |                       |
|-----------------------------------------------------------|-----------------------|
| CAPACITANCE RATIO C - 40 °C / C + 25 °C MINIMUM at 120 Hz |                       |
| Rated Voltage (WV <sub>DC</sub> )                         | Capacitance Remaining |
| 0 to 40                                                   | 35                    |
| 41 to 63                                                  | 45                    |
| 64 to 100                                                 | 60                    |
| 101 to 350                                                | 20                    |
| 351 to 450                                                | 15                    |
| ESR RATIO ESR - 40 °C / ESR + 25 °C MAXIMUM at 120 Hz     |                       |
| Rated Voltage (WV <sub>DC</sub> )                         | Multiplier            |
| 0 to 40                                                   | 60                    |
| 41 to 63                                                  | 55                    |
| 64 to 100                                                 | 65                    |
| 101 to 350                                                | 180                   |
| 351 to 450                                                | 190                   |

| DIMENSIONS in inches [millimeters] |                                |                                |                    |           |                                |                                 |                    |
|------------------------------------|--------------------------------|--------------------------------|--------------------|-----------|--------------------------------|---------------------------------|--------------------|
| CASE CODE                          | STYLE 6 AND 7                  |                                | TYPICAL WEIGHT     | CASE CODE | STYLE 6 AND 7                  |                                 | TYPICAL WEIGHT     |
|                                    | D                              | L                              |                    |           | D                              | L                               |                    |
| GE                                 | 0.760 ± 0.020<br>[19.3 ± 0.51] | 1.141 ± 0.062<br>[29.0 ± 1.58] | 0.46 oz.<br>(13 g) | GL        | 0.760 ± 0.020<br>[19.3 ± 0.51] | 2.141 ± 0.062<br>[54.4 ± 1.58]  | 0.74 oz.<br>(21 g) |
| GJ                                 | 0.760 ± 0.020<br>[19.3 ± 0.51] | 1.641 ± 0.062<br>[41.7 ± 1.58] | 0.67 oz.<br>(19 g) | GP        | 0.760 ± 0.020<br>[19.3 ± 0.51] | 2.641 ± 0.062<br>[67.1 ± 1.58]  | 0.88 oz.<br>(25 g) |
| GS                                 | 0.760 ± 0.020<br>[19.3 ± 0.51] | 3.141 ± 0.062<br>[79.8 ± 1.58] | 1.16 oz.<br>(33 g) | KS        | 1.135 ± 0.020<br>[28.8 ± 0.51] | 3.141 ± 0.062<br>[79.8 ± 1.58]  | 2.54 oz.<br>(72 g) |
| GT                                 | 0.760 ± 0.020<br>[19.3 ± 0.51] | 3.641 ± 0.062<br>[92.5 ± 1.58] | 1.34 oz.<br>(38 g) | KT        | 1.135 ± 0.020<br>[28.8 ± 0.51] | 3.641 ± 0.062<br>[92.5 ± 1.58]  | 2.96 oz.<br>(84 g) |
| HE                                 | 0.885 ± 0.020<br>[22.5 ± 0.51] | 1.141 ± 0.062<br>[29.0 ± 1.58] | 0.63 oz.<br>(18 g) | KD        | 1.135 ± 0.020<br>[28.8 ± 0.51] | 4.141 ± 0.062<br>[105.2 ± 1.58] | 3.35 oz.<br>(95 g) |

| DIMENSIONS in inches [millimeters] |                                |                                |                    |           |                                |                                 |                     |
|------------------------------------|--------------------------------|--------------------------------|--------------------|-----------|--------------------------------|---------------------------------|---------------------|
| CASE CODE                          | STYLE 6 AND 7                  |                                | TYPICAL WEIGHT     | CASE CODE | STYLE 6 AND 7                  |                                 | TYPICAL WEIGHT      |
|                                    | D                              | L                              |                    |           | D                              | L                               |                     |
| HJ                                 | 0.885 ± 0.020<br>[22.5 ± 0.51] | 1.641 ± 0.062<br>[41.7 ± 1.58] | 0.95 oz.<br>(27 g) | LE        | 1.260 ± 0.020<br>[32.0 ± 0.51] | 1.141 ± 0.062<br>[29.0 ± 1.58]  | 1.13 oz.<br>(32 g)  |
| HL                                 | 0.885 ± 0.020<br>[22.5 ± 0.51] | 2.141 ± 0.062<br>[54.4 ± 1.58] | 1.02 oz.<br>(29 g) | LJ        | 1.260 ± 0.020<br>[32.0 ± 0.51] | 1.641 ± 0.062<br>[41.7 ± 1.58]  | 1.62 oz.<br>(46 g)  |
| HP                                 | 0.885 ± 0.020<br>[22.5 ± 0.51] | 2.641 ± 0.062<br>[67.1 ± 1.58] | 1.38 oz.<br>(39 g) | LL        | 1.260 ± 0.020<br>[32.0 ± 0.51] | 2.141 ± 0.062<br>[54.4 ± 1.58]  | 2.11 oz.<br>(60 g)  |
| HS                                 | 0.885 ± 0.020<br>[22.5 ± 0.51] | 3.141 ± 0.062<br>[79.8 ± 1.58] | 1.73 oz.<br>(49 g) | LP        | 1.260 ± 0.020<br>[32.0 ± 0.51] | 2.641 ± 0.062<br>[67.1 ± 1.58]  | 2.65 oz.<br>(75 g)  |
| HT                                 | 0.885 ± 0.020<br>[22.5 ± 0.51] | 3.641 ± 0.062<br>[92.5 ± 1.58] | 2.08 oz.<br>(59 g) | LS        | 1.260 ± 0.020<br>[32.0 ± 0.51] | 3.141 ± 0.062<br>[79.8 ± 1.58]  | 3.14 oz.<br>(89 g)  |
| JE                                 | 1.010 ± 0.020<br>[25.7 ± 0.51] | 1.141 ± 0.062<br>[29.0 ± 1.58] | 0.81 oz.<br>(23 g) | LT        | 1.260 ± 0.020<br>[32.0 ± 0.51] | 3.641 ± 0.062<br>[92.5 ± 1.58]  | 3.63 oz.<br>(103 g) |
| JJ                                 | 1.010 ± 0.020<br>[25.7 ± 0.51] | 1.641 ± 0.062<br>[41.7 ± 1.58] | 1.02 oz.<br>(29 g) | LD        | 1.260 ± 0.020<br>[32.0 ± 0.51] | 4.141 ± 0.062<br>[105.2 ± 1.58] | 4.16 oz.<br>(118 g) |
| JL                                 | 1.010 ± 0.020<br>[25.7 ± 0.51] | 2.141 ± 0.062<br>[54.4 ± 1.58] | 1.55 oz.<br>(44 g) | ME        | 1.375 ± 0.020<br>[34.9 ± 0.51] | 1.141 ± 0.062<br>[29.0 ± 1.58]  | 1.38 oz.<br>(39 g)  |
| JP                                 | 1.010 ± 0.020<br>[25.7 ± 0.51] | 2.641 ± 0.062<br>[67.1 ± 1.58] | 1.87 oz.<br>(53 g) | MJ        | 1.375 ± 0.020<br>[34.9 ± 0.51] | 1.641 ± 0.062<br>[41.7 ± 1.58]  | 1.98 oz.<br>(56 g)  |
| JS                                 | 1.010 ± 0.020<br>[25.7 ± 0.51] | 3.141 ± 0.062<br>[79.8 ± 1.58] | 2.22 oz.<br>(63 g) | ML        | 1.375 ± 0.020<br>[34.9 ± 0.51] | 2.141 ± 0.062<br>[54.4 ± 1.58]  | 2.57 oz.<br>(73 g)  |
| JT                                 | 1.010 ± 0.020<br>[25.7 ± 0.51] | 3.641 ± 0.062<br>[92.5 ± 1.58] | 2.54 oz.<br>(72 g) | MP        | 1.375 ± 0.020<br>[34.9 ± 0.51] | 2.641 ± 0.062<br>[67.1 ± 1.58]  | 3.21 oz.<br>(91 g)  |
| KE                                 | 1.135 ± 0.020<br>[28.8 ± 0.51] | 1.141 ± 0.062<br>[29.0 ± 1.58] | 0.92 oz.<br>(26 g) | MS        | 1.375 ± 0.020<br>[34.9 ± 0.51] | 3.141 ± 0.062<br>[79.8 ± 1.58]  | 3.81 oz.<br>(108 g) |
| KJ                                 | 1.135 ± 0.020<br>[28.8 ± 0.51] | 1.641 ± 0.062<br>[41.7 ± 1.58] | 1.31 oz.<br>(37 g) | MT        | 1.375 ± 0.020<br>[34.9 ± 0.51] | 3.641 ± 0.062<br>[92.5 ± 1.58]  | 4.44 oz.<br>(126 g) |
| KL                                 | 1.135 ± 0.020<br>[28.8 ± 0.51] | 2.141 ± 0.062<br>[54.4 ± 1.58] | 1.73 oz.<br>(49 g) | MD        | 1.375 ± 0.020<br>[34.9 ± 0.51] | 4.141 ± 0.062<br>[105.2 ± 1.58] | 5.04 oz.<br>(143 g) |
| KP                                 | 1.135 ± 0.020<br>[28.8 ± 0.51] | 2.641 ± 0.062<br>[67.1 ± 1.58] | 2.15 oz.<br>(61 g) | -         | -                              | -                               | -                   |

## DIMENSIONS AND AVAILABLE FORMS





Aluminum Capacitors  
+ 85 °C, Tubular, Axial Lead, General Purpose

Vishay Sprague

**ORDERING EXAMPLE**

Electrolytic capacitor 53D series: 53D 282 G 025 GJ 6

| DESCRIPTION |                                                  |
|-------------|--------------------------------------------------|
| CODE        | EXPLANATION                                      |
| 53D         | Product type                                     |
| 282         | Capacitance value (2800 µF)                      |
| G           | Tolerance (G = - 10 %/+ 75 %; F = - 10 %/+ 50 %) |
| 025         | Voltage rating at 85 °C (025 = 25 V)             |
| GJ          | Can size (see dimensions table)                  |
| 6           | Sleeve and sealing (6 = P.V.C. sleeve)           |

**Note**

- For lead (Pb)-free/RoHS compliant products add suffix "E3" to part number.

Example: 53D282G025GJ6E3

| ELECTRICAL DATA AND ORDERING INFORMATION       |              |               |                                       |                                              |
|------------------------------------------------|--------------|---------------|---------------------------------------|----------------------------------------------|
| CAPACITANCE<br>(µF)                            | CASE<br>CODE | PART NUMBER   | MAX. ESR at + 25 °C<br>120 Hz<br>(mΩ) | MAX. RMS RIPPLE at + 85 °C<br>120 Hz<br>(mA) |
| 16 WV <sub>DC</sub> at + 85 °C, SURGE = 18 V   |              |               |                                       |                                              |
| 6900.0                                         | HJ           | 53D692G016HJ6 | 73                                    | 2150                                         |
| 10000.0                                        | HL           | 53D103G016HL6 | 52                                    | 2840                                         |
| 25 WV <sub>DC</sub> at + 85 °C, SURGE = 35 V   |              |               |                                       |                                              |
| 2800.0                                         | GJ           | 53D282G025GJ6 | 103                                   | 1650                                         |
| 4300.0                                         | HJ           | 53D432G025HJ6 | 72                                    | 2170                                         |
| 6200.0                                         | HL           | 53D622G025HL6 | 51                                    | 2870                                         |
| 11000.0                                        | JP           | 53D113G025JP6 | 33                                    | 4230                                         |
| 35 WV <sub>DC</sub> at + 85 °C, SURGE = 45 V   |              |               |                                       |                                              |
| 1100.0                                         | GE           | 53D112G035GE6 | 219                                   | 980                                          |
| 2100.0                                         | GJ           | 53D212G035GJ6 | 111                                   | 1590                                         |
| 3200.0                                         | HJ           | 53D322G035HJ6 | 77                                    | 2090                                         |
| 4700.0                                         | HL           | 53D472G035HL6 | 54                                    | 2780                                         |
| 8300.0                                         | JP           | 53D832G035JP6 | 34                                    | 4110                                         |
| 50 WV <sub>DC</sub> at + 85 °C, SURGE = 70 V   |              |               |                                       |                                              |
| 1000.0                                         | GE           | 53D102G050GE6 | 231                                   | 950                                          |
| 1300.0                                         | GJ           | 53D132G050GJ6 | 131                                   | 1470                                         |
| 1900.0                                         | HJ           | 53D192G050HJ6 | 94                                    | 1900                                         |
| 2800.0                                         | HL           | 53D282G050HL6 | 65                                    | 2540                                         |
| 3800.0                                         | JL           | 53D382G050JL6 | 51                                    | 3090                                         |
| 5000.0                                         | JP           | 53D502G050JP6 | 40                                    | 3810                                         |
| 63 WV <sub>DC</sub> at + 85 °C, SURGE = 80 V   |              |               |                                       |                                              |
| 1000.0                                         | GJ           | 53D102G063GJ6 | 145                                   | 1400                                         |
| 2200.0                                         | HL           | 53D222G063HL6 | 86                                    | 2210                                         |
| 200 WV <sub>DC</sub> at + 85 °C, SURGE = 250 V |              |               |                                       |                                              |
| 350.0                                          | JL           | 53D351F200JL6 | 499                                   | 1000                                         |
| 460.0                                          | JP           | 53D461F200JP6 | 379                                   | 1250                                         |
| 250 WV <sub>DC</sub> at + 85 °C, SURGE = 300 V |              |               |                                       |                                              |
| 56.0                                           | GE           | 53D560F250GE6 | 3035                                  | 263                                          |
| 100.0                                          | GJ           | 53D101F250GJ6 | 1593                                  | 420                                          |
| 130.0                                          | HJ           | 53D131F250HJ6 | 1238                                  | 520                                          |
| 400 WV <sub>DC</sub> at + 85 °C, SURGE = 450 V |              |               |                                       |                                              |
| 100.0                                          | JL           | 53D101F400JL6 | 1524                                  | 560                                          |
| 140.0                                          | JS           | 53D141F400JS6 | 1084                                  | 790                                          |
| 150.0                                          | JS           | 53D151F400JS6 | 1011                                  | 820                                          |



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