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## Aluminum Capacitors 4-Terminal, Tubular, Axial Lead


**FEATURES**

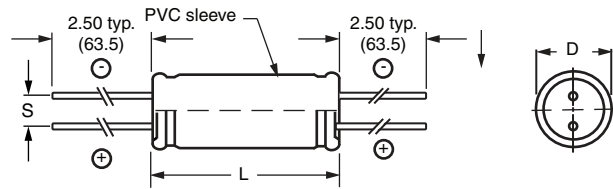
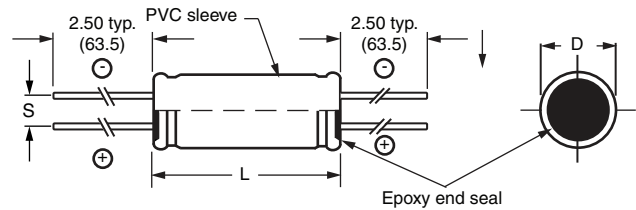
- 4-terminal construction
- Very low impedance
- Inductance limit 2 nH
- Wide temperature range
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



QUICK REFERENCE DATA	
DESCRIPTION	VALUE
Nominal case size Ø D x L in mm	19.050 x 41.275 to 25.400 x 92.075
Operating temperature	- 55 °C to + 105 °C
Rated capacitance range, C <sub>R</sub>	47 µF to 22 000 µF
Tolerance on C <sub>R</sub>	- 10 %, + 50 %
Rated voltage range, U <sub>R</sub>	5 WV <sub>DC</sub> to 200 WV <sub>DC</sub>
Termination	4-terminal
Life validation test 2000 h at 105 °C	ΔCAP < 15 % from initial measurement. ΔESR < 1.5 x initial specified limit. ΔDCL < initial specified limit.
Shelf life 500 h at 105 °C	ΔCAP < 10 % from initial measurement. ΔESR < 1.2 x initial specified limit. ΔDCL < 2.0 x initial specified limit.
DC leakage current I = K./CV	K is a constant: 0.5 at - 25 °C, 3.0 at + 105 °C I in µA, C in µF, V in Volts

LOW TEMPERATURE PERFORMANCE	
CAPACITANCE RATIO C <sup>-55 °C</sup> /C <sup>+25 °C</sup> MINIMUM AT 120 Hz	
RATED VOLTAGE WV <sub>DC</sub>	CAPACITANCE REMAINING
5 to 50	75 %
51 and up	80 %
ESR RATIO ESR <sup>-55 °C</sup> /ESR <sup>+25 °C</sup> MAXIMUM AT 120 Hz	
RATED VOLTAGE WV <sub>DC</sub>	MULTIPLIER
5 to 50	12
51 and up	18

DIMENSIONS in millimeters					
CASE CODE	BARE CASE		OUTER INSULATION WITH POLYMER COATED END SEALS		LEAD SPACING S
	D	L	D	L (max.)	
GJ	19.050 ± 0.787	41.275 ± 1.575	20.625 ± 0.787	46.812	6.350 ± 0.381
GL	19.050 ± 0.787	53.975 ± 1.575	20.625 ± 0.787	59.512	6.350 ± 0.381
GP	19.050 ± 0.787	66.675 ± 1.575	20.625 ± 0.787	72.212	6.350 ± 0.381
GS	19.050 ± 0.787	79.375 ± 1.575	20.625 ± 0.787	84.912	6.350 ± 0.381
GT	19.050 ± 0.787	92.075 ± 1.575	20.625 ± 0.787	97.612	6.350 ± 0.381
HJ	22.225 ± 0.787	28.575 ± 1.575	23.800 ± 0.787	34.112	7.620 ± 0.381
HL	22.225 ± 0.787	66.675 ± 1.575	23.800 ± 0.787	72.212	7.620 ± 0.381
HP	22.225 ± 0.787	53.975 ± 1.575	23.800 ± 0.787	59.512	7.620 ± 0.381
HS	22.225 ± 0.787	92.075 ± 1.575	23.800 ± 0.787	97.612	7.620 ± 0.381
HT	22.225 ± 0.787	79.375 ± 1.575	23.800 ± 0.787	84.912	7.620 ± 0.381
JJ	25.400 ± 0.787	41.275 ± 1.575	26.975 ± 0.787	46.812	10.160 ± 0.381
JL	25.400 ± 0.787	53.975 ± 1.575	26.975 ± 0.787	59.512	10.160 ± 0.381
JP	25.400 ± 0.787	66.675 ± 1.575	26.975 ± 0.787	72.212	10.160 ± 0.381
JS	25.400 ± 0.787	79.375 ± 1.575	26.975 ± 0.787	84.912	10.160 ± 0.381
JT	25.400 ± 0.787	92.075 ± 1.575	26.975 ± 0.787	97.612	10.160 ± 0.381

**DIMENSIONS AND AVAILABLE FORMS**
**Styles 1 and 2**

**Styles 5 and 7**

**PART NUMBER INFORMATION**

604D TYPE	272 CAPACITANCE	F CAPACITANCE TOLERANCE	005 DC VOLTAGE RATING	GJ CASE CODE	2 CASE STYLE
Identifies the series name.	Expressed in $\mu\text{F}$ . The first two digits are significant figures. The third is the number of zeros.	F = - 10 %/+ 50 % (std.)	Expressed in volts. The letter "R" signifies a decimal point (i.e. 7R5 = 7.5 V).	See table Dimensions	1 = PVC sleeve 2 = Polyester sleeve (std.) 5 = Polyester sleeve with epoxy end seal (required for exposure to halogenated cleaning solvents) 7 = PVC sleeve with epoxy end seal (required for exposure to halogenated cleaning solvents)

**ORDERING EXAMPLE (1)**

Electrolytic capacitor 604D series: 604D272F005GJ2

**Note**

(1) For lead (Pb)-free/RoHS compliant products add suffix "E3" to part number. Example: 604D272F005GJ2E3

**ELECTRICAL DATA AND ORDERING INFORMATION**

CAPACITANCE ( $\mu\text{F}$ )	PART NUMBER	NOMINAL CASE SIZE D x L (mm)	MAX. ESR AT 100 kHz/25 °C ( $\Omega$ )	MAX. Z AT 100 kHz/25 °C ( $\Omega$ )	MAX. RIPPLE CURRENT AT 100 kHz/85 °C (A)
<b>5 WV<sub>DC</sub> AT + 85 °C, SURGE = 7 V</b>					
2700	604D272F005GJ2	19.05 x 41.28	0.146	0.110	1.50
3300	604D332F005GL2	19.05 x 53.98	0.106	0.080	1.80
4700	604D472F005GP2	19.05 x 66.68	0.080	0.060	2.50
6800	604D682F005GS2	19.05 x 79.38	0.062	0.047	3.10
3900	604D392F005HJ2	22.23 x 41.28	0.095	0.071	1.90
5600	604D562F005HL2	22.23 x 53.98	0.070	0.053	2.50
6800	604D682F005HP2	22.23 x 66.68	0.052	0.039	3.20
10 000	604D103F005HS2	22.23 x 79.38	0.040	0.030	4.00
8200	604D822F005JL2	25.04 x 53.98	0.049	0.037	3.50
15 000	604D153F005JP2	25.04 x 66.68	0.035	0.026	4.60
18 000	604D183F005JS2	25.04 x 79.38	0.027	0.020	5.60
22 000	604D223F005JT2	25.04 x 92.08	0.022	0.017	7.00





<b>ELECTRICAL DATA AND ORDERING INFORMATION</b>					
<b>CAPACITANCE (<math>\mu</math>F)</b>	<b>PART NUMBER</b>	<b>NOMINAL CASE SIZE D x L (mm)</b>	<b>MAX. ESR AT 100 kHz/25 °C (<math>\Omega</math>)</b>	<b>MAX. Z AT 100 kHz/25 °C (<math>\Omega</math>)</b>	<b>MAX. RIPPLE CURRENT AT 100 kHz/85 °C (A)</b>
<b>7.5 WV<sub>DC</sub> AT + 85 °C, SURGE = 10 V</b>					
2200	604D222F7R5GJ2	19.05 x 41.28	0.175	0.130	1.40
3900	604D392F7R5GP2	19.05 x 66.68	0.093	0.070	2.40
5600	604D562F7R5GS2	19.05 x 79.38	0.070	0.053	3.00
3300	604D332F7R5HJ2	22.23 x 41.28	0.117	0.087	1.80
4700	604D472F7R5HL2	22.23 x 53.98	0.080	0.059	2.40
6200	604D622F7R5HP2	22.23 x 66.68	0.061	0.046	3.10
8200	604D822F7R5HS2	22.23 x 79.38	0.047	0.035	3.80
5600	604D562F7R5JJ2	25.04 x 41.28	0.073	0.055	2.40
6800	604D682F7R5JL2	25.04 x 53.98	0.057	0.043	3.30
12 000	604D123F7R5JP2	25.04 x 66.68	0.039	0.029	4.40
15 000	604D153F7R5JS2	25.04 x 79.38	0.032	0.024	5.30
18 000	604D183F7R5JT2	25.04 x 92.08	0.025	0.019	6.60
<b>10 WV<sub>DC</sub> AT + 85 °C, SURGE = 15 V</b>					
1800	604D182F010GJ2	19.05 x 41.28	0.195	0.144	1.30
2700	604D272F010GL2	19.05 x 53.98	0.144	0.107	1.70
3300	604D332F010GP2	19.05 x 66.68	0.110	0.082	2.20
4700	604D472F010GS2	19.05 x 79.38	0.081	0.060	2.80
2700	604D272F010HJ2	22.23 x 41.28	0.127	0.094	1.70
3900	604D392F010HL2	22.23 x 53.98	0.092	0.068	2.20
5600	604D562F010HP2	22.23 x 66.68	0.069	0.051	2.90
6800	604D682F010HS2	22.23 x 79.38	0.053	0.039	3.60
5600	604D562F010JL2	25.04 x 53.98	0.065	0.048	3.20
8200	604D822F010JP2	25.04 x 66.68	0.044	0.033	4.10
10 000	604D103F010JS2	25.04 x 79.38	0.034	0.025	5.00
15 000	604D153F010JT2	25.04 x 92.08	0.028	0.021	6.20
<b>16 WV<sub>DC</sub> AT + 85 °C, SURGE = 20 V</b>					
1500	604D152F016GJ2	19.05 x 41.28	0.207	0.149	1.20
2200	604D222F016GL2	19.05 x 53.98	0.153	0.110	1.60
3900	604D392F016GS2	19.05 x 79.38	0.085	0.061	2.60
2200	604D223F016HJ2	22.23 x 41.28	0.138	0.100	1.60
3300	604D332F016HL2	22.23 x 53.98	0.107	0.077	2.00
5600	604D562F016HS2	22.23 x 79.38	0.056	0.041	3.30
8200	604D822F016HT2	22.23 x 92.08	0.046	0.033	4.10
4700	604D472F016JL2	25.04 x 53.98	0.069	0.050	2.90
6800	604D682F016JP2	25.04 x 66.68	0.048	0.035	3.90
10 000	604D103F016JS2	25.04 x 79.38	0.036	0.026	4.70
<b>20 WV<sub>DC</sub> AT + 85 °C, SURGE = 25 V</b>					
1200	604D122F020GJ2	19.05 x 41.28	0.240	0.170	1.20
2200	604D222F020GP2	19.05 x 66.68	0.132	0.092	2.00
3300	604D332F020GS2	19.05 x 79.38	0.100	0.070	2.50
1800	604D182F020HJ2	22.23 x 41.28	0.160	0.110	1.50
2700	604D272F020HL2	22.23 x 53.98	0.120	0.084	1.90
3900	604D392F020HP2	22.23 x 66.68	0.085	0.060	2.60
5600	604D562F020HS2	22.23 x 79.38	0.064	0.045	3.80
4700	604D472F020JL2	25.04 x 53.98	0.078	0.055	2.70
6800	604D682F020JP2	25.04 x 66.68	0.055	0.039	3.50
8200	604D822F020JS2	25.04 x 79.38	0.042	0.030	4.50
10 000	604D103F020JT2	25.04 x 92.08	0.034	0.024	5.50



<b>ELECTRICAL DATA AND ORDERING INFORMATION</b>					
<b>CAPACITANCE (<math>\mu</math>F)</b>	<b>PART NUMBER</b>	<b>NOMINAL CASE SIZE D x L (mm)</b>	<b>MAX. ESR AT 100 kHz/25 °C (<math>\Omega</math>)</b>	<b>MAX. Z AT 100 kHz/25 °C (<math>\Omega</math>)</b>	<b>MAX. RIPPLE CURRENT AT 100 kHz/85 °C (A)</b>
<b>25 WV<sub>DC</sub> AT + 85 °C, SURGE = 30 V</b>					
1000	604D102F025GJ2	19.05 x 41.28	0.320	0.224	1.05
1200	604D122F025GL2	19.05 x 53.98	0.240	0.168	1.40
1800	604D182F025GP2	19.05 x 66.68	0.180	0.126	1.75
2200	604D222F025HL2	22.23 x 53.98	0.145	0.102	1.90
3300	604D332F025HP2	22.23 x 66.68	0.108	0.072	3.00
2700	604D272F025JL2	25.04 x 53.98	0.116	0.081	2.40
4700	604D472F025JP2	25.04 x 66.68	0.080	0.056	3.25
6800	604D682F025JS2	25.04 x 79.38	0.062	0.043	4.00
8200	604D822F025JT2	25.04 x 92.08	0.051	0.036	4.65
<b>30 WV<sub>DC</sub> AT + 85 °C, SURGE = 40 V</b>					
820	604D821F030GJ2	19.05 x 41.28	0.380	0.262	1.00
1000	604D102F030GL2	19.05 x 53.98	0.295	0.204	1.25
1500	604D152F030GP2	19.05 x 66.68	0.204	0.141	1.70
1800	604D182F030HL2	22.23 x 53.98	0.165	0.114	1.75
2700	604D272F030HP2	22.23 x 66.68	0.120	0.083	2.35
3900	604D392F030HS2	22.23 x 79.38	0.088	0.061	2.90
2200	604D222F030JL2	25.04 x 53.98	0.133	0.092	2.25
3300	604D332F030JP2	25.04 x 66.68	0.095	0.056	3.00
4700	604D472F030JS2	25.04 x 79.38	0.074	0.051	3.60
5600	604D562F030JT2	25.04 x 92.08	0.059	0.041	4.40
<b>40 WV<sub>DC</sub> AT + 85 °C, SURGE = 50 V</b>					
680	604D681F040GJ2	19.05 x 41.28	0.480	0.322	0.90
820	604D821F040GL2	19.05 x 53.98	0.380	0.255	1.15
1000	604D102F040HJ2	22.23 x 41.28	0.295	0.197	1.20
1500	604D152F040HL2	22.23 x 53.98	0.220	0.147	1.55
2200	604D222F040HP2	22.23 x 66.68	0.155	0.104	2.15
3300	604D332F040HS2	22.23 x 79.38	0.115	0.077	2.60
1800	604D182F040JL2	25.04 x 53.98	0.175	0.117	2.05
3900	604D392F040JS2	25.04 x 79.38	0.091	0.061	3.40
4700	604D472F040JT2	25.04 x 92.08	0.074	0.050	4.10
<b>50 WV<sub>DC</sub> AT + 85 °C, SURGE = 75 V</b>					
470	604D471F050GJ2	19.05 x 41.28	0.430	0.280	0.93
560	604D561F050GL2	19.05 x 53.98	0.325	0.212	1.15
680	604D681F050HJ2	22.23 x 41.28	0.245	0.160	1.25
820	604D821F050HL2	22.23 x 53.98	0.185	0.120	1.60
1200	604D122F050HP2	22.23 x 66.68	0.130	0.085	2.15
1000	604D102F050JL2	25.04 x 53.98	0.150	0.098	2.10
1500	604D152F050JP2	25.04 x 66.68	0.108	0.070	2.80
2200	604D222F050JS2	25.04 x 79.38	0.081	0.053	3.40
3300	604D332F050JT2	25.04 x 92.08	0.065	0.042	4.25



<b>ELECTRICAL DATA AND ORDERING INFORMATION</b>					
<b>CAPACITANCE (<math>\mu</math>F)</b>	<b>PART NUMBER</b>	<b>NOMINAL CASE SIZE D x L (mm)</b>	<b>MAX. ESR AT 100 kHz/25 °C (<math>\Omega</math>)</b>	<b>MAX. Z AT 100 kHz/25 °C (<math>\Omega</math>)</b>	<b>MAX. RIPPLE CURRENT AT 100 kHz/85 °C (A)</b>
<b>75 WV<sub>DC</sub> AT + 85 °C, SURGE = 100 V</b>					
220	604D221F075GJ2	19.05 x 41.28	0.650	0.384	0.78
270	604D271F075GL2	19.05 x 53.98	0.500	0.295	1.00
390	604D391F075HJ2	22.23 x 41.28	0.370	0.218	1.10
560	604D561F075HL2	22.23 x 53.98	0.290	0.171	1.40
820	604D821F075HP2	22.23 x 66.68	0.200	0.118	1.95
1000	604D102F075HS2	22.23 x 79.38	0.153	0.090	2.25
680	604D681F075JL2	25.04 x 53.98	0.230	0.136	1.85
1500	604D152F075JS2	25.04 x 79.38	0.130	0.077	2.95
1800	604D182F075JT2	25.04 x 92.08	0.100	0.059	3.55
<b>100 WV<sub>DC</sub> AT + 85 °C, SURGE = 125 V</b>					
150	604D151F100GJ2	19.05 x 41.28	1.000	0.530	0.70
180	604D181F100GL2	19.05 x 53.98	0.765	0.405	0.90
270	604D271F100HJ2	22.23 x 41.28	0.565	0.300	0.93
390	604D391F100HL2	22.23 x 53.98	0.435	0.230	1.20
560	604D561F100HP2	22.23 x 66.68	0.300	0.159	1.60
470	604D471F100JL2	25.04 x 53.98	0.340	0.180	1.55
820	604D821F100JP2	25.04 x 66.68	0.235	0.125	2.10
1000	604D102F100JS2	25.04 x 79.38	0.185	0.098	2.65
1200	604D122F100JT2	25.04 x 92.08	0.150	0.080	3.15
<b>200 WV<sub>DC</sub> AT + 85 °C, SURGE = 250 V</b>					
47	604D470F200GJ2	19.05 x 41.28	2.600	0.780	0.60
82	604D820F200GJ2	19.05 x 41.28	1.530	0.460	0.75
120	604D121F200HL2	22.23 x 53.98	1.300	0.390	0.95
180	604D181F200HP2	22.23 x 66.68	0.865	0.259	1.25
270	604D271F200HT2	22.23 x 92.08	0.520	0.156	1.90
220	604D221F200JP2	25.04 x 66.68	0.650	0.195	1.67
390	604D391F200JT2	25.04 x 92.08	0.405	0.122	2.50



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