Aluminum Capacitors
+125 °C, Miniature, Radial Lead



FEATURES

- +125 °C performance
- Suitable for tantalum foil replacement applications
- Low DC leakage currents
- Very stable, long life
- Case sizes through 0.709" x 1.417" [18.0 mm x 36.0 mm]
- Optional third lead on diameters ≥ 0.492" [12.5 mm]
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free Available

QUICK REFERENCE DATA

DESCRIPTION	VALUE
Nominal case size Ø D x L in mm	0.236" x 0.433" [6.0 x 11.0] to 0.709" x 1.417" [18.0 x 36.0]
Operating temperature	-40 °C to +125 °C
Rated capacitance range, C_R	1.0 µF to 6800 µF
Tolerance on C_R	± 20 %
Rated voltage range, U_R	6.3 WV_{DC} to 63 WV_{DC}
Termination	2 and 3 radial leads
Life validation test at 125 °C	2000 h: ΔCAP ≤ 15 % (6.3 WV_{DC} to 10 WV_{DC}), ≤ 10 % (16 WV_{DC} to 63 WV_{DC}) from initial measurement. ΔDF ≤ 1.25 x initial specified limit. ΔDCL ≤ initial specified limit.
Shelf life at 105 °C	500 h: ΔCAP ≤ 12 % from initial measurement. ΔDF ≤ 1.25 x initial specified limit. ΔDCL ≤ 2.0 x initial specified limit.
DC leakage current (after 2 min charge)	I = 0.01 CV I in µA, C in µF, V in Volts

RIPPLE CURRENT MULTIPLIERS

TEMPERATURE				
AMBIENT TEMPERATURE	MULTIPLIERS			
+125 °C	0.4			
+105 °C	1.0			
+85 °C	1.41			
+75 °C	1.58			
≤ +65 °C	,1.73			
FREQUENCY (Hz)				
FREQUENCY (Hz)	50 TO 60	100 TO 120	300 TO 400	1K AND UP
MULTIPLIERS	0.85	1.00	1.05	1.10
	0.80	1.00	1.30	1.40

LOW TEMPERATURE PERFORMANCE

CAPACITANCE RATIO $C^{-55\ °C}$ / $C^{+25\ °C}$ MINIMUM AT 120 Hz	
RATED VOLTAGE (WV_{DC})	CAPACITANCE REMAINING
6.3 to 10	75 %
16 to 25	80 %
36 to 63	85 %
ESR RATIO $ESR^{-55\ °C}$ / $ESR^{+25\ °C}$ MAXIMUM AT 120 Hz	
RATED VOLTAGE (WV_{DC})	MULTIPLIER
6.3 to 10	35
16 to 25	30
36 to 63	25

DIMENSIONS in inches [millimeters]

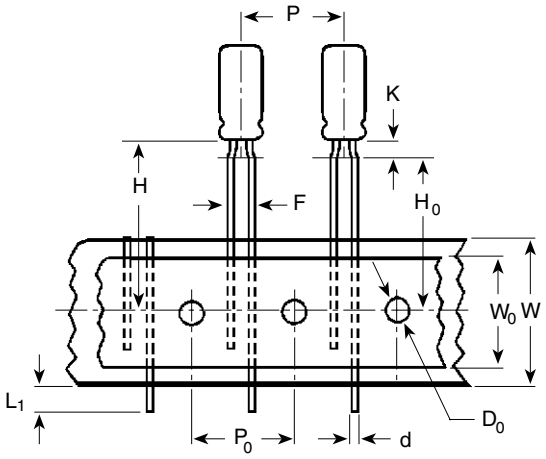
CASE CODE	NOMINAL		STYLES 2 AND 4		STYLES 3 AND 5		LEAD SPACING		LEAD DIAMETER	
	D	L	D (max.)	L (max.)	D (max.)	L (max.)	S ± 0.024 [0.60]	T ± 0.020 [0.50]	NOMINAL	AWG NO.
BB	0.315 [8.0]	0.472 [12.0]	0.335 [8.5]	0.512 [13.0]	0.335 [8.5]	0.551 [14.0]	0.138 [3.5]	n/a	0.025 [0.63]	22
BD	0.315 [8.0]	0.630 [16.0]	0.335 [8.5]	0.669 [17.0]	0.335 [8.5]	0.709 [18.0]	0.138 [3.5]	n/a	0.025 [0.63]	22
CC	0.394 [10.0]	0.512 [13.0]	0.413 [10.5]	0.563 [14.3]	0.413 [10.5]	0.630 [16.0]	0.197 [5.0]	n/a	0.025 [0.63]	22
CG	0.394 [10.0]	0.787 [20.0]	0.413 [10.5]	0.846 [21.5]	0.413 [10.5]	0.906 [23.0]	0.197 [5.0]	n/a	0.025 [0.63]	22
DG	0.492 [12.5]	0.787 [20.0]	0.512 [13.0]	0.846 [21.5]	0.512 [13.0]	0.906 [23.0]	0.197 [5.0]	0.098 [2.5]	0.028 [0.71]	20
DK	0.492 [12.5]	0.984 [25.0]	0.512 [13.0]	1.043 [26.5]	0.512 [13.0]	1.142 [29.0]	0.197 [5.0]	0.098 [2.5]	0.032 [0.81]	20
EN	0.630 [16.0]	1.260 [32.0]	0.650 [16.5]	1.319 [33.5]	0.650 [16.5]	1.417 [36.0]	0.295 [7.5]	0.150 [3.8]	0.032 [0.81]	20
ER	0.630 [16.0]	1.417 [36.0]	0.650 [16.5]	1.476 [37.5]	0.650 [16.5]	1.575 [40.0]	0.295 [7.5]	0.150 [3.8]	0.032 [0.81]	20
FR	0.709 [18.0]	1.417 [36.0]	0.728 [18.5]	1.476 [37.5]	0.728 [18.5]	1.575 [40.0]	0.295 [7.5]	0.150 [3.8]	0.032 [0.81]	20

For technical questions, contact: aluminumcaps4@vishay.com

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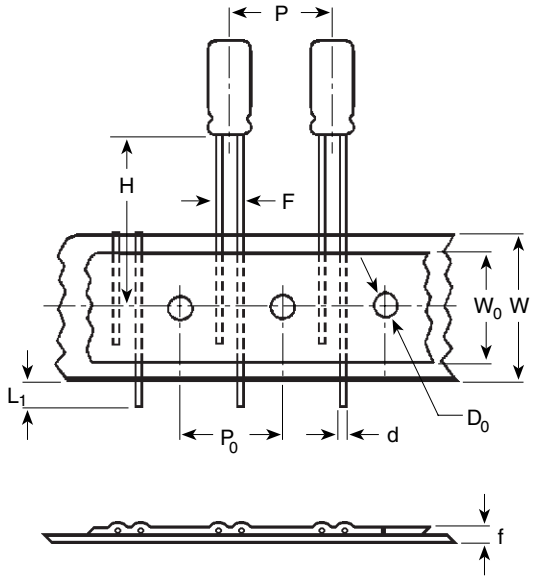
DIMENSIONS in inches [millimeters] **AND AVAILABLE FORMS**

Formed Leads



DIMENSIONS in inches [millimeters] **AND PACKAGING QUANTITIES**		
CASE SIZE	**F LEAD SPACING**	**STD. QTY/REEL**
0.236 x 0.433 [6.0 x 11.0]	0.197 [5.0]	800
0.315 x 0.472 [8.0 x 12.0]	0.197 [5.0]	700

Unformed (Straight) Leads



DIMENSIONS in inches [millimeters] **AND PACKAGING QUANTITIES**		
CASE SIZE	**F LEAD SPACING**	**STD. QTY/REEL**
0.236 x 0.433 [6.0 x 11.0]	0.098 [2.5] (1)	800
0.315 x 0.472 [8.0 x 12.0]	0.140 [3.5] (1)	700
0.394 x 0.512 [10.0 x 13.0]	0.197 [5.0]	500
0.394 x 0.630 [10.0 x 16.0]	0.197 [5.0]	500
0.394 x 0.787 [10.0 x 20.0]	0.197 [5.0]	500

Note

(1) Available as special order.

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DIMENSIONS in inches [millimeters]					
ITEM	CASE SIZE (Diameter x Length)				
	0.236 x 0.433 [6.0 x 11.0]	0.315 x 0.472 [8.0 x 12.0]	0.394 x 0.512 [10.0 x 13.0]	0.394 x 0.630 [10.0 x 16.0]	0.394 x 0.787 [10.0 x 20.0]
d - Lead-wire diameter	0.025 [0.63]	0.025 [0.63]	0.025 [0.63]	0.025 [0.63]	0.025 [0.63]
P - Pitch of component	0.500 [12.7]	0.500 [12.7]	0.500 [12.7]	0.500 [12.7]	0.500 [12.7]
P_0 - Feed hole pitch	0.500 [12.7]	0.500 [12.7]	0.500 [12.7]	0.500 [12.7]	0.500 [12.7]
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]	0.157 [4.0]	n/a	n/a	n/a
H - Height of component from tape center	0.728 [18.5]	0.787 [20.0]	0.906 [23.0]	0.906 [23.0]	0.906 [23.0]
H_0 - Lead-wire clinch height	0.630 [16.0]	0.630 [16.0]	n/a	n/a	n/a
W - Tape width	0.709 [18.0]	0.709 [18.0]	0.709 [18.0]	0.709 [18.0]	0.709 [18.0]
W_0 - Hold down tape width	0.591 [15.0]	0.591 [15.0]	0.591 [15.0]	0.591 [15.0]	0.591 [15.0]
D_0 - 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]
L_1 - Maximum lead protrusion	0.118 [3.0]	0.118 [3.0]	0.118 [3.0]	0.118 [3.0]	0.118 [3.0]

Note

- Positive leader is standard. Negative leader is available by special order.

ORDERING EXAMPLE

Electrolytic capacitor 510DX series: 510DX 227 M 050 DG 2 D

DESCRIPTION	
CODE	EXPLANATION
510DX	Product type
227	Capacitance value (220 µF)
M	Tolerance (M = ± 20 %)
050	Voltage rating at 105 °C (050 = 50 V)
DG	Can size (see “Dimensions” table)
2	Sleeve and sealing (2 = polyester sleeve)
D	Packaging (D = bulk; straight leads)

Note

- For lead (Pb)-free / RoHS compliant products add suffix “E3” to part number.
  Example: 510DX227M050DG2DE3

ELECTRICAL DATA AND ORDERING INFORMATION							
CAPACITANCE (µF)	PART NUMBER (1)	NOMINAL CASE SIZE D x L IN INCHES (mm)	MAX. ESR AT +25 °C (mΩ)		MAX. RIPPLE AT +105 °C (A)		MAX. Z AT +25 °C (mΩ) 100 Hz
			120 Hz	20 kHz TO 40 kHz	120 Hz	20 kHz TO 40 kHz	
6.3 WV_{DC} AT 125 °C, SURGE = 8 V							
330.0	510DX337M6R3CC2D	0.394 x 0.512 [10.0 x 13.0]	1206.0	507.0	0.294	0.454	457.0
1000.0	510DX108M6R3DG2D	0.492 x 0.787 [12.5 x 20.0]	398.0	201.0	0.697	0.984	181.0
1500.0	510DX158M6R3DK2D	0.492 x 0.984 [12.5 x 25.0]	265.0	133.0	0.931	1.313	121.0
4700.0	510DX478M6R3ER2D	0.630 x 1.417 [16.0 x 36.0]	85.0	40.0	2.193	3.193	36.0
10 WV_{DC} AT 125 °C, SURGE = 13 V							
150.0	510DX157M010BB2D	0.315 x 0.472 [8.0 x 12.0]	2210.0	948.0	0.182	0.278	854.0
220.0	510DX227M010BD2D	0.315 x 0.630 [8.0 x 16.0]	1507.0	528.0	0.247	0.417	475.0
1200.0	510DX128M010DK2D	0.492 x 0.984 [12.5 x 25.0]	276.0	138.0	0.911	1.287	124.0
4700.0	510DX478M010FR2D	0.709 x 1.417[18.0 x 36.0]	71.0	37.0	2.582	3.576	33.0
16 WV_{DC} AT 125 °C, SURGE = 20 V							
150.0	510DX157M016BD2D	0.315 x 0.630 [8.0 x 16.0]	1415.0	549.0	0.255	0.409	494.0
470.0	510DX477M016DG2D	0.492 x 0.787 [12.5 x 20.0]	451.0	216.0	0.654	0.946	194.0
2200.0	510DX228M016ER2D	0.630 x 1.417 [16.0 x 36.0]	96.0	43.0	2.060	3.078	39.0

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ELECTRICAL DATA AND ORDERING INFORMATION

CAPACITANCE (µF)	PART NUMBER (1)	NOMINAL CASE SIZE D x L IN INCHES (mm)	MAX. ESR AT +25 °C (mΩ)		MAX. RIPPLE AT +105 °C (A)		MAX. Z AT +25 °C (mΩ) 100 Hz
			120 Hz	20 kHz TO 40 kHz	120 Hz	20 kHz TO 40 kHz	
25 WV_{DC} AT 125 °C, SURGE = 32 V							
100.0	510DX107M025BD2D	0.315 x 0.630 [8.0 x 16.0]	1459.0	571.0	0.251	0.401	514.0
100.0	510DX107M025CC2D	0.394 x 0.512 [10.0 x 13.0]	1459.0	571.0	0.268	0.428	514.0
330.0	510DX337M025DG2D	0.492 x 0.787 [12.5 x 20.0]	442.0	224.0	0.661	0.927	202.0
470.0	510DX477M025DK2D	0.492 x 0.984 [12.5 x 25.0]	310.0	150.0	0.859	1.238	135.0
1500.0	510DX158M025ER2D	0.630 x 1.417 [16.0 x 36.0]	97.0	45.0	2.049	3.009	40.0
35 WV_{DC} AT 125 °C, SURGE = 44 V							
47.0	510DX476M035BB2D	0.315 x 0.472 [8.0 x 12.0]	2822.0	1067.0	0.161	0.262	960.0
100.0	510DX107M035CC2D	0.394 x 0.512 [10.0 x 13.0]	1326.0	593.0	0.281	0.421	534.0
220.0	510DX227M035CG2D	0.394 x 0.787 [10.0 x 20.0]	603.0	248.0	0.496	0.774	223.0
470.0	510DX477M035DK2D	0.492 x 0.984 [12.5 x 25.0]	282.0	156.0	0.901	1.214	140.0
1200.0	510DX128M035EN2D	0.630 x 1.260 [16.0 x 32.0]	111.0	58.0	1.826	2.527	52.0
1500.0	510DX158M035ER2D	0.630 x 1.417 [16.0 x 36.0]	88.0	47.0	2.151	2.944	42.0
50 WV_{DC} AT 125 °C, SURGE = 63 V							
220.0	510DX227M050DG2D	0.492 x 0.787 [12.5 x 20.0]	543.0	243.0	0.597	0.892	218.0
330.0	510DX337M050DK2D	0.492 x 0.984 [12.5 x 25.0]	362.0	162.0	0.796	1.191	146.0
1000.0	510DX108M050ER2D	0.630 x 1.417 [16.0 x 36.0]	119.0	49.0	1.847	2.883	44.0
63 WV_{DC} AT 125 °C, SURGE = 79 V							
47.0	510DX476M063BD2D	0.315 x 0.630 [8.0 x 16.0]	1975.0	642.0	0.215	0.378	578.0
47.0	510DX476M063CC2D	0.394 x 0.512 [10.0 x 13.0]	1975.0	642.0	0.231	0.404	578.0
220.0	510DX227M063DK2D	0.492 x 0.984 [12.5 x 25.0]	422.0	168.0	0.737	1.167	151.0
1000.0	510DX108M063FR2D	0.709 x 1.417 [18.0 x 36.0]	93.0	45.0	2.256	3.243	41.0

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