



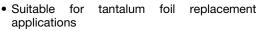
Aluminum Capacitors +125 °C, Miniature, Radial Lead



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	$6.3~\mathrm{WV}_\mathrm{DC}$ to $63~\mathrm{WV}_\mathrm{DC}$					
Termination	2 and 3 radial leads					
Life validation test at 125 °C	$\begin{array}{c} 2000 \text{ h: } \Delta \text{CAP} \leq 15 \text{ \%} \\ \text{(6.3 WV}_{DC} \text{ to } 10 \text{ WV}_{DC}), \\ \leq 10 \text{ \% (16 WV}_{DC} \text{ to } 63 \text{ WV}_{DC}) \\ \text{from initial measurement.} \\ \Delta DF \leq 1.25 \text{ x initial specified limit.} \\ \Delta DCL \leq \text{initial specified limit.} \end{array}$					
Shelf life at 105 °C	500 h: $\Delta CAP \le 12$ % from initial measurement. $\Delta DF \le 1.25$ x initial specified limit. $\Delta DCL \le 2.0$ x initial specified limit.					
DC leakage current (after 2 min charge)	I = 0.01 CV I in μA, C in μF, V in Volts					

FEATURES

• +125 °C performance





- 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 <u>www.vishay.com/doc?99912</u>

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						
	FREC	UENC	Y (Hz)						
FREQUENCY (Hz) 50 TO 60 100 TO 120 300 TO 400 1K AND									
MULTIPLIERS	0.85	1.00		1.05	1.10				
WIOLTIFLIERS	0.80	1.0	00 1.30		1.40				

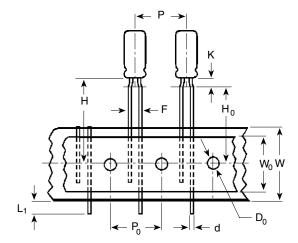
LOW TEMPERATURE PERFORMANCE								
CAPACITANCE RATIO C-55 °C / C+25 °C MINIMUM AT 120 Hz								
RATED VOLTAGE (WV _{DC})	CAPACITANCE REMAINING							
6.3 to 10	75 %							
16 to 25	80 %							
36 to 63	85 %							
ESR RATIO ESR-55 °C / ESR+25 °C MAXIMUM AT 120 Hz								
RATED VOLTAGE (WV _{DC})	MULTIPLIER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

DIME	DIMENSIONS in inches [millimeters]										
CASE	NOMINAL		STYLES 2 AND 4		STYLES 3 AND 5		LEAD SPACING		LEAD DIAMETER		
CASE	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	



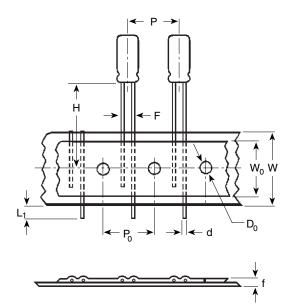
DIMENSIONS in inches [millimeters] **AND AVAILABLE FORMS**

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						

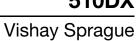
Unformed (Straight) Leads



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.





DIMENSIONS in inches [millimeters]								
	CASE SIZE (Diameter x Length)							
ITEM	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

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

ELECTRICA	ELECTRICAL DATA AND ORDERING INFORMATION									
CAPACITANCE (µF)	PART NUMBER (1)	NOMINAL CASE SIZE D x L	MAX. ESR AT +25 °C (mΩ)		MAX. RIPPLE AT +105 °C (A)		MAX. Z AT +25 °C (mΩ)			
		IN INCHES (mm)	120 Hz	20 kHz TO 40 kHz	120 Hz	20 kHz TO 40 kHz	100 Hz			
	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, SUR	GE = 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			

[•] Positive leader is standard. Negative leader is available by special order.



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CAPACITANCE	PART NUMBER (1)	NOMINAL CASE SIZE D x L	A.	MAX. ESR Γ +25 °C (mΩ)	N A	MAX. Z AT +25 °C (mΩ) 100 Hz	
(μF) . ATT NOMBER	IN INCHES (mm)	120 Hz	20 kHz TO 40 kHz	120 Hz	20 kHz TO 40 kHz		
		25 WV _{DC} AT 125	°C, SUR	GE = 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, SUR	GE = 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, SUR	GE = 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, SUR	GE = 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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