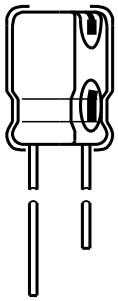
Aluminum Electrolytic Capacitors



FEATURES

- Polarized aluminum electrolytic capacitors, non-solid electrolyte
- Radial leads, cylindrical aluminum case
- High CV per unit volume
- Ø 10 mm to Ø 18 mm, 105 °C, up to 10 000 h endurance
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

Pb-free
RoHS COMPLIANT

APPLICATIONS

- Decoupling, smoothing, filtering, buffering in SMPS
- Power supplies in industrial equipment, UPS
- Specially suitable for lighting ballasts

QUICK REFERENCE DATA

DESCRIPTION	UNIT	VALUE	
Nominal case sizes (Ø D x L)	mm	10 x 16 to 18 x 40	
Rated capacitance range	µF	6.8 to 330	
Capacitance tolerance	%	± 20 (at 120 Hz, 20 °C)	
Rated voltage range	V_{DC}	160 to 400	450
Category temperature range	°C	- 40 to + 105	- 25 to + 105
Endurance	h	8000 to 10 000	
Shelf life	h	1000	

ORDERING INFORMATION

Part number example: HRC00FE1021VTFL

HRC	00	KG	101	2V	00	L
SERIES NAME	DESIGN/ FORMING	DIMENSIONS	CAPACITANCE	VOLTAGE	PACKING	INTERNAL CODE
		See "Dimensions" table	See "Selection Chart"	See "Selection Chart"	00 = Bulk TF = Ammopack, formed lead (1) TN = Ammopack, straight lead (1)	

Note

(1) See "Taping Specifications"

ADDITIONAL ELECTRICAL DATA

LEAKAGE CURRENT (Test conditions: U_R, 20 °C)			
RATED VOLTAGE	**TIME**	**CV**	**VALUE**
160 V to 450 V	After 5 min	≤ 1000	I = 0.03 CV + 15 (μA)
		> 1000	I = 0.02 CV + 25 (μA)

Notes
- Where, C = Rated capacitance in μF
- V = Rated DC working voltage in V

DISSIPATION FACTOR (tan δ at 120 Hz, 20 °C)						
RATED VOLTAGE	**160**	**200**	**250**	**350**	**400**	**450**
tan δ (max.)	0.20	0.20	0.20	0.24	0.24	0.24

LOW TEMPERATURE BEHAVIOR (at 120 Hz)						
IMPEDANCE RATIO	**RATED VOLTAGE**					
	160	**200**	**250**	**350**	**400**	**450**
$\frac{Z_{(-25\ °C)}}{Z_{(+20\ °C)}}$	3	3	3	5	5	6
$\frac{Z_{(-40\ °C)}}{Z_{(+20\ °C)}}$	6	6	6	6	6	-

Note
- Impedance ratio shall not exceed the values given in the table.

MULTIPLIER OF RIPPLE CURRENT AS A FUNCTION OF FREQUENCY		
FREQUENCY (Hz)	**CAPACITANCE (μF)**	
	6.8 TO 82	**100 AND UP**
120	1.00	1.00
1000	1.75	1.67
10 000	2.25	2.05
100 000 and up	2.50	2.25

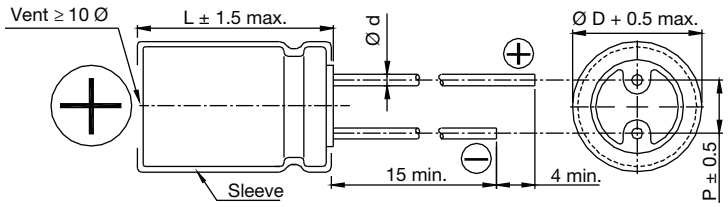
TEST PROCEDURES AND REQUIREMENTS				
TEST	**TEST TIME**	**CAPACITANCE CHANGE**	**DISSIPATION FACTOR**	**LEAKAGE CURRENT**
Endurance (1)	8000 h (for Ø D = 10 mm)	Within ± 20 % of initial value	Less than 200 % of specified value	Within specified value
	10 000 h (for Ø D ≥ 12.5 mm)			
Shelf life (2)	1000 h	Within ± 20 % of initial value	Less than 200 % of specified value	Less than 500 % of specified value

Notes

(1) The specifications shall be satisfied when the capacitors are restored to 20 °C after the rated voltage applied with rated ripple current for 8000 h/10 000 h at 105 °C.

(2) The above specifications shall be satisfied when the capacitors are restored to 20 °C after exposing them for 1000 h at 105 °C without voltage applied. The rated voltage shall be applied to the capacitors before the measurements (refer to JIS C 5101-4 4.1).

DIMENSIONS in millimeters



CASE SIZE CODE		Ø D + 0.5	L ± 1.5	Ø d	P ± 0.5
DC	10 x 12.5	10	12.5	0.6	5.0
DD	10 x 16	10	16	0.6	5.0
DE	10 x 20	10	20	0.6	5.0
FE	12.5 x 20	12.5	20	0.6	5.0
FG	12.5 x 25	12.5	25	0.6	5.0
JE	16 x 20	16	20	0.8	7.5
JG	16 x 25	16	25	0.8	7.5
KE	18 x 20	18	20	0.8	7.5
KG	18 x 25	18	25	0.8	7.5
KS	18 x 31.5	18	31.5	0.8	7.5
KL	18 x 35.5	18	35.5	0.8	7.5
KK	18 x 40	18	40	0.8	7.5

Note

- Please see “Taping Specifications” for details on taped products

SELECTION CHART, DIMENSIONS, AND PERMISSIBLE RIPPLE CURRENT (mA/RMS at 105 °C)										
V_{DC}		160 V (2C)			200 V (2D)			250 V (2E)		
CAP.	CODE	Ø D x L	RIPPLE CURRENT		Ø D x L	RIPPLE CURRENT		Ø D x L	RIPPLE CURRENT	
			120 Hz	100 kHz		120 Hz	100 kHz		120 Hz	100 kHz
6.8	6R8	-	-	-	-	-	-	-	-	-
10	100	10 x 12.5	100	250	10 x 16	125	313	10 x 20	140	350
22	220	10 x 16 10 x 20	170 200	425 500	10 x 20	200	500	10 x 20	200	500
33	330	10 x 20	250	625	10 x 20	260	650	12.5 x 20	320	800
47	470	10 x 20	300	750	12.5 x 20	390	975	12.5 x 20	390	975
68	680	12.5 x 20	470	1175	12.5 x 20	470	1175	16 x 20	520	1300
82	820	12.5 x 20	510	1275	16 x 20	550	1375	16 x 20	550	1375
100	101	12.5 x 25 16 x 20	620 630	1395 1418	16 x 20	630	1418	16 x 25	680	1530
120	121	-	-	-	-	-	-	-	-	-
150	151	16 x 25	770	1733	16 x 25	840	1890	18 x 25	860	1935
220	221	16 x 31.5	1020	2295	18 x 25	1050	2363	18 x 31.5	1130	2543
330	331	18 x 35.5	1390	3128	18 x 35.5	1430	3218	-	-	-

SELECTION CHART, DIMENSIONS, AND PERMISSIBLE RIPPLE CURRENT (mA/RMS at 105 °C)										
V_{DC}		350 V (2V)			400 V (2G)			450 V (2W)		
CAP.	CODE	Ø D x L	RIPPLE CURRENT		Ø D x L	RIPPLE CURRENT		Ø D x L	RIPPLE CURRENT	
			120 Hz	100 kHz		120 Hz	100 kHz		120 Hz	100 kHz
6.8	6R8	10 x 16	110	275	10 x 16	110	275	10 x 20	110	275
10	100	10 x 20	140	350	10 x 20	140	350	12.5 x 20	180	450
22	220	12.5 x 20	260	650	12.5 x 20	260	650	16 x 20	290	725
33	330	16 x 20	360	900	16 x 20	360	900	16 x 25 18 x 20	390 380	975 950
47	470	16 x 20	430	1075	16 x 25 18 x 20	470 450	1175 1125	18 x 25	480	1200
68	680	16 x 25 18 x 20	560 550	1400 1375	18 x 25	585	1463	18 x 31.5	630	1575
82	820	18 x 25	610	1525	18 x 25	610	1525	18 x 35.5	715	1788
100	101	18 x 25	700	1575	18 x 31.5	765	1721	18 x 40	800	1800
120	121	18 x 31.5	830	1868	18 x 35.5	865	1946	-	-	-
150	151	18 x 35.5	960	2160	18 x 40	985	2216	-	-	-
220	221	-	-	-	-	-	-	-	-	-
330	331	-	-	-	-	-	-	-	-	-

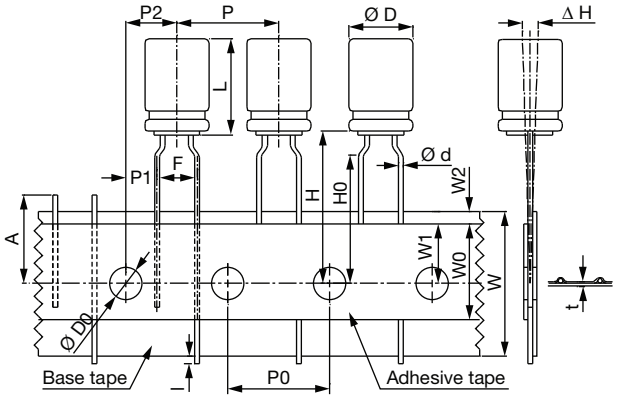


Fig. 1

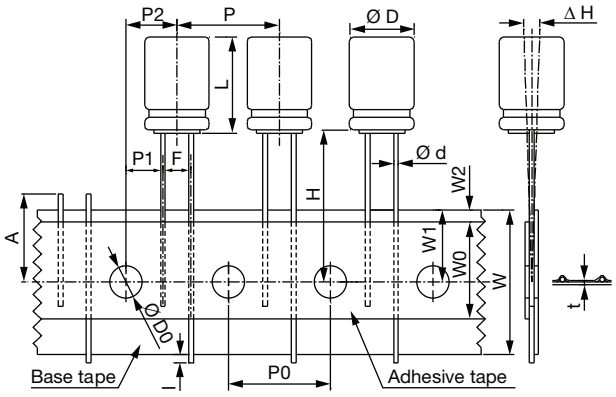


Fig. 3

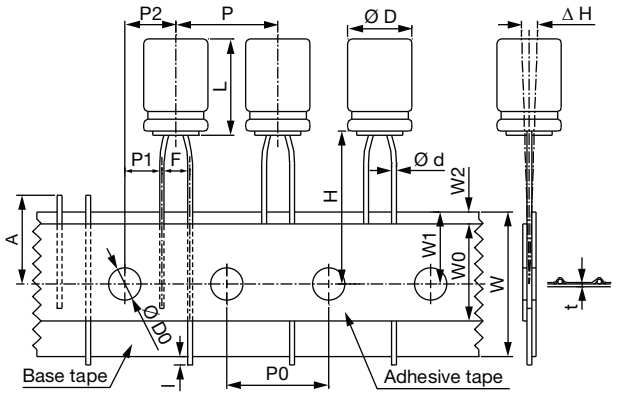


Fig. 2

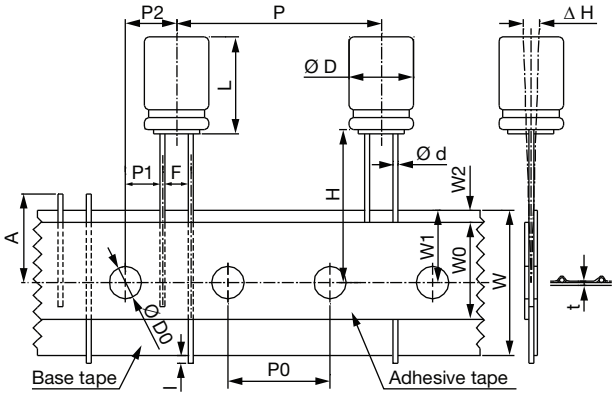


Fig. 4

TAPE SPECIFICATIONS in millimeters

PACKING	TF											TN													
L	5					7 to 9			≥ 11			5					≥ 7		7 to 9	11.5 to 20		9 to 25		
Ø D	3	4*	5	6.3	8	5	6.3	8*	5	6.3	8	3	4*	5	6.3	8	5	6.3	8	8	TOL.	10	12.5	TOL.
SYMBOL																								
Ø d	0.4	0.45				0.5			0.5		0.6	0.4	0.45				0.5		0.5	0.6	± 0.05	0.6		± 0.05
F	5.0					5.0			5.0			2.5					2.5		3.5	3.5	+ 0.8/- 0.2	5.0		+ 0.8/- 0.2
H	17.5					17.5			18.5		20.0	17.5					17.5		17.5	18.5	± 0.75	18.5		± 0.75
H0	16.0					16.0			16.0			-					-		-	-	± 0.5	-		± 0.5
P	12.7					12.7			12.7			12.7					12.7		12.7	12.7	± 1.0	12.7	25.4	± 1.0
P0	12.7					12.7			12.7			12.7					12.7		12.7	12.7	± 0.2	12.7		± 0.2
P1	3.85					3.85			3.85			5.1					5.1		4.6	4.6	± 0.5	3.85		± 0.7
P2	6.35					6.35			6.35			6.35					6.35		6.35	6.35	± 1.0	6.35		± 1.3
W	18.0					18.0			18.0			18.0					18.0		18.0	18.0	± 0.5	18.0		± 0.5
W0	6.0					10.0			10.0		12	6.0					10.0		10.0	12.0	Min.	12.0		Min.
W1	9.0					9.0			9.0			9.0					9.0		9.0	9.0	± 0.5	9.0		± 0.5
W2	1.5					1.5			1.5			1.5					1.5		1.5	1.5	Max.	1.5		Max.
A	11.0					11.0			11.0			11.0					11.0		11.0	11.0	Max.	11.0		Max.
Ø D0	4.0					4.0			4.0			4.0					4.0		4.0	4.0	± 0.2	4.0		± 0.2
ΔH	0					0			0			0					0		0	0	± 1.0	0		± 1.0
l	1.0					1.0			1.0			1.0					1.0		1.0	1.0	Max.	1.0		Max.
t	0.7					0.7			0.7			0.7					0.7		0.7	0.7	± 0.2	0.7		± 0.2
Fig. No.	1											2			3		2	3		3		4		

Notes

- For Ø D = 10, H = 20.0 ± 0.5 is available, in this case, the dimensions of H is not specified
- 4 Ø in mark of "*" is 4 Ø x 7 L the same spec. "TN" packing: 5 to 6.3 Ø x 11 L in H is 18.5
- For 3 to 8 Ø x 5 L, W0 = 10.0 is available

PACKAGING

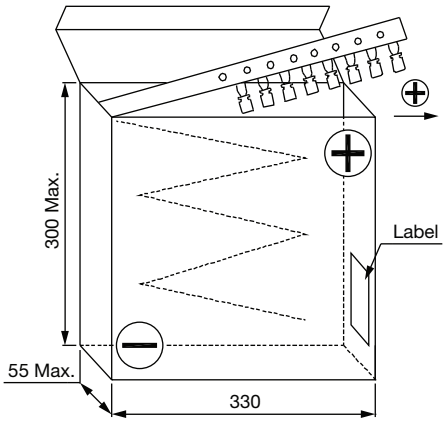


Fig. 5 - Ammopack box

PACKAGING QUANTITY (pcs per box)							
Ø D (mm)	**3**	**4**	**5**	**6.3**	**8**	**10**	**12.5**
TF, TN	3000	2000	2000	2000	1000	500	300

Note

- The component shall be oriented on the tape as such that the positive lead is leading or the negative lead is leading with customer's request