

## Aluminum Capacitors Radial Style



### FEATURES

- Polarized aluminum electrolytic capacitors, non-solid electrolyte
- Radial leads, cylindrical aluminum case
- High CV-product per unit volume
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS  
COMPLIANT**

### APPLICATIONS

- General purpose, industrial and audio-video
- Coupling, decoupling, timing, smoothing, filtering, buffering in SMPS
- Portable and mobile equipment

QUICK REFERENCE DATA		
DESCRIPTION	UNIT	VALUE
Nominal case size (Ø D x L)	mm	5 x 11 to 18 x 40
Rated capacitance range C <sub>R</sub>	µF	1 to 22 000
Capacitance tolerance	%	± 20
Rated voltage range	V	6.3 to 350      400 to 450
Category temperature range	°C	- 40 to + 85      - 25 to + 85
Load life	h	2000
Based on sectional specification		IEC 60384-4/EN 130300
Climatic category IEC 60068		40/085/56      25/085/56

SELECTION CHART FOR C <sub>R</sub> , U <sub>R</sub> , AND RELEVANT NOMINAL CASE SIZES (Ø D x L in mm)								
C <sub>R</sub> (µF)	RATED VOLTAGE (V) (> 100 V see next page)							
	6.3	10	16	25	35	50	63	100
1.0	→	→	→	→	→	→	5 x 11	5 x 11
1.5	→	→	→	→	→	→	5 x 11	5 x 11
2.2	→	→	→	→	→	→	5 x 11	5 x 11
3.3	→	→	→	→	→	→	5 x 11	5 x 11
4.7	→	→	→	→	→	→	5 x 11	5 x 11
6.8	→	→	→	→	→	→	5 x 11	5 x 11
10	→	→	→	→	→	→	5 x 11	5 x 11
15	→	→	→	→	→	→	5 x 11	6.3 x 11
22	→	→	→	→	→	→	5 x 11	6.3 x 11
33	→	→	→	→	→	5 x 11	6.3 x 11	8 x 11.5
47	→	→	→	→	5 x 11	→	6.3 x 11	8 x 11.5
68	→	→	→	5 x 11	→	6.3 x 11	8 x 11.5	10 x 12.5
100	→	→	→	5 x 11	6.3 x 11	→	8 x 11.5	10 x 16
150	→	→	5 x 11	6.3 x 11	8 x 11.5	→	10 x 12.5	10 x 20
220	→	5 x 11	→	6.3 x 11	8 x 11.5	10 x 12.5	10 x 16	12.5 x 20
330	→	→	6.3 x 11	8 x 11.5	10 x 12.5	10 x 16	10 x 20	12.5 x 25
470	→	6.3 x 11	8 x 11.5	10 x 12.5	10 x 16	10 x 20	12.5 x 20	16 x 25
680	→	→	8 x 11.5	10 x 16	10 x 20	12.5 x 20	12.5 x 25	16 x 31.5
1000	8 x 11.5	→	10 x 12.5	10 x 16	12.5 x 20	12.5 x 25	16 x 25	18 x 31.5
2200	→	10 x 16	10 x 20	12.5 x 20	16 x 25	16 x 31.5	18 x 31.5	-
3300	10 x 20	→	12.5 x 20	16 x 25	16 x 31.5	18 x 31.5	18 x 40	-
4700	12.5 x 20	→	12.5 x 25	16 x 25	16 x 35.5	18 x 40	-	-
6800	12.5 x 25	→	16 x 25	18 x 31.5	18 x 40	-	-	-
10 000	16 x 25	→	16 x 31.5	18 x 40	-	-	-	-
15 000	→	16 x 35.5	18 x 35.5	-	-	-	-	-
22 000	→	18 x 40	-	-	-	-	-	-

<b>SELECTION CHART FOR <math>C_R</math>, <math>U_R</math> AND RELEVANT NOMINAL CASE SIZES (<math>\varnothing D \times L</math> in mm)</b>						
$C_R$ ( $\mu F$ )	RATED VOLTAGE (V)					
	160	200	250	350	400	450
1.0	→	→	→	→	→	8 x 11.5
1.5	→	→	→	→	→	8 x 11.5
2.2	→	→	→	→	→	8 x 11.5
3.3	6.3 x 11	→	6.3 x 11	→	→	8 x 11.5
4.7	6.3 x 11	→	6.3 x 11	8 x 11.5	→	10 x 12.5
6.8	8 x 11.5	→	8 x 11.5	→	10 x 12.5	10 x 16
10	→	8 x 11.5	→	10 x 12.5	10 x 16	10 x 20
15	10 x 12.5	→	10 x 16	10 x 20	→	12.5 x 20
22	10 x 12.5	→	10 x 16	→	12.5 x 20	12.5 x 25
33	10 x 16	→	10 x 20	→	12.5 x 25	16 x 25
47	→	10 x 20	12.5 x 20	16 x 20	16 x 25	16 x 31.5
68	12.5 x 20	12.5 x 25	16 x 20	16 x 25	16 x 31.5	16 x 35.5
100	12.5 x 25	→	16 x 25	18 x 31.5	18 x 35.5	18 x 40
150	16 x 20	16 x 25	16 x 31.5	→	18 x 40	-
220	16 x 25	18 x 31.5	18 x 35.5	-	-	-
330	16 x 35.5	18 x 35.5	-	-	-	-
470	18 x 40	-	-	-	-	-

<b>RADIAL STYLE: DIMENSIONS</b> in millimeters									
$\varnothing D$	5	6.3	8	10	12.5	16	18	22	25
S	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	12.5
$\varnothing d$	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0	1.0
$\beta$	1.5			2.0					
$\alpha$	0.5						1.0		

<b>DIMENSIONS</b> in millimeters <b>AND AVAILABLE FORMS</b>	
<p><math>\varnothing D \leq 18</math> long leads MALREKA00...</p>	<p><math>\varnothing D \leq 18</math> shortened leads MALREKA05... (S = 2 mm/2.5 mm/3.5 mm/5 mm/7.5 mm)</p>

**GENERAL NOTE**

- For Minimum Package Quantity (MPQ) and Minimum Order Quantity (MOQ) please refer to our price list or contact customer service.
- For other packaging forms please refer to Vishay Roederstein General Information.



ELECTRICAL DATA	
SYMBOL	DESCRIPTION
$U_R$	Rated voltage
$C_R$	Rated capacitance at 120 Hz
$\tan \delta$	Max. dissipation factor at 120 Hz
$R_{ESR}$	Calculated equivalent series resistance at 120 Hz
$I_R$	Rated ripple current (rms) at 120 Hz and upper category temperature

**Note**

- Unless otherwise specified, all electrical values apply at  $T_a = 20\text{ }^\circ\text{C}$ ,  $P = 80\text{ kPa}$  to  $120\text{ kPa}$ ,  $RH = 45\%$  to  $75\%$ .

**ORDERING EXAMPLE**EKA 3300  $\mu\text{F}/16\text{ V}$ ,  $\pm 20\%$ , size: 12.5 mm x 20 mm

Leads: Long

Ordering code: MALREKA00FE433D00K

Leads: Short

Ordering code: MALREKA05...

ELECTRICAL DATA AND ORDERING INFORMATION							
$U_R$ (V)	$C_R$ 120 Hz ( $\mu\text{F}$ )	NOMINAL CASE SIZE $\varnothing D \times L$ (mm)	$\tan \delta$ 120 Hz	$R_{ESR}$ 120 Hz ( $\Omega$ )	$I_R$ 120 Hz/85 $^\circ\text{C}$ (mA)	WEIGHT (g)	CATALOG NUMBER (Long Leads)
6.3	1000	8 x 11.5	0.28	0.37	581	1.20	MALREKA00PB410B00K
	3300	10 x 20	0.34	0.14	1286	2.80	MALREKA00DE433B00K
	4700	12.5 x 20	0.36	0.10	1736	4.10	MALREKA00FE447B00K
	6800	12.5 x 25	0.40	0.08	2129	5.60	MALREKA00FG468B00K
	10 000	16 x 25	0.46	0.06	2629	7.50	MALREKA00JG510B00K
10	220	5 x 11	0.24	1.45	218	0.45	MALREKA00AA322C00K
	470	6.3 x 11	0.24	0.68	366	0.48	MALREKA00BA347C00K
	2200	10 x 16	0.28	0.17	1051	2.30	MALREKA00DD422C00K
	15 000	16 x 35.5	0.52	0.05	3284	10.5	MALREKA00JL515C00K
	22 000	18 x 40	0.70	0.04	3843	16.0	MALREKA00KK522C00K
16	150	5 x 11	0.20	1.77	198	0.45	MALREKA00AA315D00K
	330	6.3 x 11	0.20	0.80	359	0.48	MALREKA00BA333D00K
	470	8 x 11.5	0.20	0.56	476	1.20	MALREKA00PB347D00K
	680	8 x 11.5	0.20	0.39	600	1.20	MALREKA00PB368D00K
	1000	10 x 12.5	0.20	0.27	796	1.85	MALREKA00DC410D00K
	2200	10 x 20	0.24	0.14	1331	2.80	MALREKA00DE422D00K
	3300	12.5 x 20	0.26	0.10	1686	4.10	MALREKA00FE433D00K
	4700	12.5 x 25	0.28	0.08	2129	5.60	MALREKA00FG447D00K
	6800	16 x 25	0.32	0.06	2577	7.50	MALREKA00JG468D00K
	10 000	16 x 31.5	0.38	0.05	3176	9.50	MALREKA00JS510D00K
	15 000	18 x 35.5	0.48	0.04	3656	13.0	MALREKA00KL515D00K
25	68	5 x 11	0.16	3.12	144	0.45	MALREKA00AA268E00K
	100	5 x 11	0.16	2.12	181	0.45	MALREKA00AA310E00K
	150	6.3 x 11	0.16	1.42	246	0.48	MALREKA00BA315E00K
	220	6.3 x 11	0.16	0.97	327	0.48	MALREKA00BA322E00K
	330	8 x 11.5	0.16	0.64	431	1.20	MALREKA00PB333E00K
	470	10 x 12.5	0.16	0.45	550	1.85	MALREKA00DC347E00K
	680	10 x 16	0.16	0.31	754	2.30	MALREKA00DD368E00K
	1000	10 x 16	0.16	0.21	942	2.30	MALREKA00DD410E00K
	2200	12.5 x 20	0.20	0.12	1542	4.10	MALREKA00FE422E00K
	3300	16 x 25	0.22	0.09	2194	7.50	MALREKA00JG433E00K
	4700	16 x 25	0.24	0.07	2448	7.50	MALREKA00JG447E00K
	6800	18 x 31.5	0.28	0.05	3114	12.0	MALREKA00KS468E00K
	10 000	18 x 40	0.34	0.05	3544	16.0	MALREKA00KK510E00K



ELECTRICAL DATA AND ORDERING INFORMATION							
U <sub>R</sub> (V)	C <sub>R</sub> 120 Hz (μF)	NOMINAL CASE SIZE Ø D x L (mm)	tan δ 120 Hz	R <sub>ESR</sub> 120 Hz (Ω)	I <sub>R</sub> 120 Hz/85 °C (mA)	WEIGHT (g)	CATALOG NUMBER (Long Leads)
35	47	5 x 11	0.14	3.95	131	0.45	MALREKA00AA247F00K
	100	6.3 x 11	0.14	1.86	220	0.48	MALREKA00BA310F00K
	150	8 x 11.5	0.14	1.24	318	1.20	MALREKA00PB315F00K
	220	8 x 11.5	0.14	0.84	386	1.20	MALREKA00PB322F00K
	330	10 x 12.5	0.14	0.56	549	1.85	MALREKA00DC333F00K
	470	10 x 16	0.14	0.40	740	2.30	MALREKA00DD347F00K
	680	10 x 20	0.14	0.27	947	2.80	MALREKA00DE368F00K
	1000	12.5 x 20	0.14	0.19	1306	4.10	MALREKA00FE410F00K
	2200	16 x 25	0.18	0.11	2032	7.50	MALREKA00JG422F00K
	3300	16 x 31.5	0.20	0.08	2502	9.50	MALREKA00JS433F00K
	4700	16 x 35.5	0.22	0.06	2905	10.5	MALREKA00JL447F00K
	6800	18 x 40	0.26	0.05	3408	16.0	MALREKA00KK468F00K
	50	33	5 x 11	0.12	4.83	123	0.45
68		6.3 x 11	0.12	2.34	203	0.48	MALREKA00BA268H00K
220		10 x 12.5	0.12	0.72	501	1.85	MALREKA00DC322H00K
330		10 x 16	0.12	0.48	672	2.30	MALREKA00DD333H00K
50	470	10 x 20	0.12	0.34	875	2.80	MALREKA00DE347H00K
	680	12.5 x 20	0.12	0.23	1235	4.10	MALREKA00FE368H00K
	1000	12.5 x 25	0.12	0.16	1633	5.60	MALREKA00FG410H00K
	2200	16 x 31.5	0.16	0.10	2220	9.50	MALREKA00JS422H00K
	3300	18 x 31.5	0.18	0.07	2765	12.0	MALREKA00KS433H00K
	4700	18 x 40	0.20	0.06	3272	16.0	MALREKA00KK447H00K
63	1.0	5 x 11	0.10	133	23	0.45	MALREKA00AA110J00K
	1.5	5 x 11	0.10	88.5	28	0.45	MALREKA00AA115J00K
	2.2	5 x 11	0.10	60.3	34	0.45	MALREKA00AA122J00K
	3.3	5 x 11	0.10	40.2	42	0.45	MALREKA00AA133J00K
	4.7	5 x 11	0.10	28.2	50	0.45	MALREKA00AA147J00K
	6.8	5 x 11	0.10	19.5	60	0.45	MALREKA00AA168J00K
	10	5 x 11	0.10	13.3	72	0.45	MALREKA00AA210J00K
	15	5 x 11	0.10	8.85	89	0.45	MALREKA00AA215J00K
	22	5 x 11	0.10	6.03	108	0.45	MALREKA00AA222J00K
	33	6.3 x 11	0.10	4.02	151	0.48	MALREKA00BA233J00K
	47	6.3 x 11	0.10	2.82	181	0.48	MALREKA00BA247J00K
	68	8 x 11.5	0.10	1.95	256	1.20	MALREKA00PB268J00K
	100	8 x 11.5	0.10	1.33	311	1.20	MALREKA00PB310J00K
	150	10 x 12.5	0.10	0.88	422	1.85	MALREKA00DC315J00K
	220	10 x 16	0.10	0.60	586	2.30	MALREKA00DD322J00K
	330	10 x 20	0.10	0.40	784	2.80	MALREKA00DE333J00K
	470	12.5 x 20	0.10	0.28	1098	4.10	MALREKA00FE347J00K
	680	12.5 x 25	0.10	0.20	1440	5.60	MALREKA00FG368J00K
	1000	16 x 25	0.10	0.13	1937	7.50	MALREKA00JG410J00K
	2200	18 x 31.5	0.14	0.08	2445	12.0	MALREKA00KS422J00K
	3300	18 x 40	0.16	0.06	2987	16.0	MALREKA00KK433J00K



ELECTRICAL DATA AND ORDERING INFORMATION							
U <sub>R</sub> (V)	C <sub>R</sub> 120 Hz (μF)	NOMINAL CASE SIZE Ø D x L (mm)	tan δ 120 Hz	R <sub>ESR</sub> 120 Hz (Ω)	I <sub>R</sub> 120 Hz/85 °C (mA)	WEIGHT (g)	CATALOG NUMBER (Long Leads)
100	1.0	5 x 11	0.08	106	23	0.45	MALREKA00AA110L00K
	1.5	5 x 11	0.08	70.8	28	0.45	MALREKA00AA115L00K
	2.2	5 x 11	0.08	48.3	34	0.45	MALREKA00AA122L00K
	3.3	5 x 11	0.08	32.2	42	0.45	MALREKA00AA133L00K
	4.7	5 x 11	0.08	22.6	50	0.45	MALREKA00AA147L00K
	6.8	5 x 11	0.08	15.6	60	0.45	MALREKA00AA168L00K
	10	5 x 11	0.08	10.6	76	0.45	MALREKA00AA210L00K
	15	6.3 x 11	0.08	7.08	89	0.48	MALREKA00BA215L00K
	22	6.3 x 11	0.08	4.83	124	0.48	MALREKA00BA222L00K
	33	8 x 11.5	0.08	3.22	178	1.20	MALREKA00PB233L00K
	47	8 x 11.5	0.08	2.26	222	1.20	MALREKA00PB247L00K
	68	10 x 12.5	0.08	1.56	293	1.85	MALREKA00DC268L00K
	100	10 x 16	0.08	1.06	388	2.30	MALREKA00DD310L00K
	150	10 x 20	0.08	0.71	528	2.80	MALREKA00DE315L00K
	220	12.5 x 20	0.08	0.48	737	4.10	MALREKA00FE322L00K
330	12.5 x 25	0.08	0.32	1002	5.60	MALREKA00FG333L00K	
470	16 x 25	0.08	0.23	1328	7.50	MALREKA00JG347L00K	
680	16 x 31.5	0.08	0.16	1643	9.50	MALREKA00JS368L00K	
1000	18 x 31.5	0.08	0.11	1965	12.0	MALREKA00KS410L00K	
160	3.3	6.3 x 11	0.15	60.3	45	0.48	MALREKA00BA133M00K
	4.7	6.3 x 11	0.15	42.3	53	0.48	MALREKA00BA147M00K
	6.8	8 x 11.5	0.15	29.3	76	1.20	MALREKA00PB168M00K
	15	10 x 12.5	0.15	13.3	131	1.85	MALREKA00DC215M00K
	22	10 x 12.5	0.15	9.05	156	1.85	MALREKA00DC222M00K
160	33	10 x 16	0.15	6.03	209	2.30	MALREKA00DD233M00K
	68	12.5 x 20	0.15	2.93	391	4.10	MALREKA00FE268M00K
	100	12.5 x 25	0.15	1.99	516	5.60	MALREKA00FG310M00K
	150	16 x 20	0.15	1.33	632	5.70	MALREKA00JE315M00K
	220	16 x 25	0.15	0.90	873	7.50	MALREKA00JG322M00K
	330	16 x 35.5	0.15	0.60	1152	10.5	MALREKA00JL333M00K
	470	18 x 40	0.15	0.42	1434	16.0	MALREKA00KK347M00K
200	10	8 x 11.5	0.15	19.9	96	1.20	MALREKA00PB210S00K
	47	10 x 20	0.15	4.23	293	2.80	MALREKA00DE247S00K
	68	12.5 x 25	0.15	2.93	426	5.60	MALREKA00FG268S00K
	150	16 x 25	0.15	1.33	691	7.50	MALREKA00JG315S00K
	220	18 x 31.5	0.15	0.90	962	12.0	MALREKA00KS322S00K
	330	18 x 35.5	0.15	0.60	1206	13.0	MALREKA00KL333S00K
250	3.3	6.3 x 11	0.15	60.3	48	0.48	MALREKA00BA133N00K
	4.7	6.3 x 11	0.15	42.3	57	0.48	MALREKA00BA147N00K
	6.8	8 x 11.5	0.15	29.3	76	1.20	MALREKA00PB168N00K
	15	10 x 16	0.15	13.3	143	2.30	MALREKA00DD215N00K
	22	10 x 16	0.15	9.05	170	2.30	MALREKA00DD222N00K
	33	10 x 20	0.15	6.03	247	2.80	MALREKA00DE233N00K
	47	12.5 x 20	0.15	4.23	319	4.10	MALREKA00FE247N00K
	68	16 x 20	0.15	2.93	425	5.70	MALREKA00JE268N00K
	100	16 x 25	0.15	1.99	564	7.50	MALREKA00JG310N00K
	150	16 x 31.5	0.15	1.33	726	9.50	MALREKA00JS315N00K
	220	18 x 35.5	0.15	0.90	988	13.0	MALREKA00KL322N00K
350	4.7	8 x 11.5	0.20	56.5	66	1.20	MALREKA00PB147O00K
	10	10 x 12.5	0.20	26.5	107	1.85	MALREKA00DC210O00K
	15	10 x 20	0.20	17.7	156	2.80	MALREKA00DE215O00K
	47	16 x 20	0.20	5.65	353	5.70	MALREKA00JE247O00K
	68	16 x 25	0.20	3.90	465	7.50	MALREKA00JG268O00K
	100	18 x 31.5	0.20	2.65	592	12.0	MALREKA00KS310O00K



ELECTRICAL DATA AND ORDERING INFORMATION							
$U_R$ (V)	$C_R$ 120 Hz ( $\mu$ F)	NOMINAL CASE SIZE $\varnothing$ D x L (mm)	$\tan \delta$ 120 Hz	$R_{ESR}$ 120 Hz ( $\Omega$ )	$I_R$ 120 Hz/85 °C (mA)	WEIGHT (g)	CATALOG NUMBER (Long Leads)
400	6.8	10 x 12.5	0.20	39.0	87	1.85	MALREKA00DC168X00K
	10	10 x 16	0.20	26.5	115	2.30	MALREKA00DD210X00K
	22	12.5 x 20	0.20	12.1	218	4.10	MALREKA00FE222X00K
	33	12.5 x 25	0.20	8.04	296	5.60	MALREKA00FG233X00K
	47	16 x 25	0.20	5.65	387	7.50	MALREKA00JG247X00K
	68	16 x 31.5	0.20	3.90	488	9.50	MALREKA00JS268X00K
	100	18 x 35.5	0.20	2.65	667	13.0	MALREKA00KL310X00K
	150	18 x 40	0.20	1.77	863	16.0	MALREKA00KK315X00K
450	1.0	8 x 11.5	0.20	265	26	1.20	MALREKA00PB110P00K
	1.5	8 x 11.5	0.20	177	32	1.20	MALREKA00PB115P00K
	2.2	8 x 11.5	0.20	121	33	1.20	MALREKA00PB122P00K
	3.3	8 x 11.5	0.20	80.4	50	1.20	MALREKA00PB133P00K
	4.7	10 x 12.5	0.20	56.5	72	1.85	MALREKA00DC147P00K
	6.8	10 x 16	0.20	39.0	86	2.30	MALREKA00DD168P00K
	10	10 x 20	0.20	26.5	115	2.80	MALREKA00DE210P00K
	15	12.5 x 20	0.20	17.7	164	4.10	MALREKA00FE215P00K
	22	12.5 x 25	0.20	12.1	217	5.60	MALREKA00FG222P00K
	33	16 x 25	0.20	8.04	294	7.50	MALREKA00JG233P00K
	47	16 x 31.5	0.20	5.65	384	9.50	MALREKA00JS247P00K
	68	16 x 35.5	0.20	3.90	503	10.5	MALREKA00JL268P00K
	100	18 x 40	0.20	2.65	546	16.0	MALREKA00KK310P00K

LOW TEMPERATURE BEHAVIOR (at 120 Hz)									
IMPEDANCE RATIO $Z(T_2)/Z(T_1)$	RATED VOLTAGE (V)								
	6.3	10	16	25	35	50 ~ 100	160	200 ~ 350	400 ~ 450
T2/T1									
- 25/+ 20 °C	5	4	3	2	2	2	4	6	12
- 40/+ 20 °C	12	10	8	5	4	3	6	8	-

ADDITIONAL ELECTRICAL DATA			
PARAMETER	CONDITIONS		VALUE
<b>Current</b>			
Leakage current (test conditions: $U_R$ , 20 °C)	After 1 min at $U_R$		$I_{L1} \leq 0.03 \times C_R \times U_R$ or 4 $\mu$ A
	After 2 min at $U_R$		$I_{L2} \leq 0.01 \times C_R \times U_R$ or 3 $\mu$ A
	After 5 min at $U_R$		$I_{L5} \leq 0.02 \times C_R \times U_R$ or 15 $\mu$ A
<b>Resistance</b>			
Equivalent series resistance (ESR)	Calculated from $\tan \delta_{max.}$ and $C_R$		$ESR = \tan \delta / 2 \pi f C_R$

MULTIPLIER OF RIPPLE CURRENT ( $I_R$ ) AS A FUNCTION OF FREQUENCY			
FREQUENCY (Hz)	$I_R$ MULTIPLIER FOR $U_R \leq 100$ V		
	$C_R \leq 47 \mu$ F	$C_R = 68 \mu$ F to 680 $\mu$ F	$C_R \geq 1000 \mu$ F
50	0.75	0.80	0.85
120	1.00	1.00	1.00
300	1.35	1.25	1.10
1000	1.55	1.35	1.15
$\geq 10\ 000$	2.00	1.50	1.15



MULTIPLIER OF RIPPLE CURRENT ( $I_R$ ) AS A FUNCTION OF FREQUENCY		
FREQUENCY (Hz)	$I_R$ MULTIPLIER FOR $U_R$ 160 V to $\leq$ 450 V	
	$C_R = 47 \mu\text{F}$ to $220 \mu\text{F}$	$C_R \geq 330 \mu\text{F}$
50	0.80	0.90
120	1.00	1.00
300	1.25	1.10
1000	1.40	1.13
$\geq 10\,000$	1.60	1.15

TEST PROCEDURES AND REQUIREMENTS		
TEST	PROCEDURE (quick reference)	REQUIREMENTS
Load life	$T_{amb} = 85 \text{ }^\circ\text{C}$ $U_R$ and $I_R$ applied After 2000 h	$\Delta C/C: \pm 25 \%$ of initial value $I_L \leq \text{spec. limit}$ $\tan \delta \leq 2 \times \text{spec. limit}$
Shelf life	$T_{amb} = 85 \text{ }^\circ\text{C}$ No voltage applied After 1000 h After test: $U_R$ to be applied for 30 min 24 h to 48 h before measurement	$\Delta C/C: \pm 20 \%$ of initial value $I_L \leq \text{spec. limit}$ $\tan \delta \leq 2 \times \text{spec. limit}$



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