



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



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 _R	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_R, U_R, AND RELEVANT NOMINAL CASE SIZES (Ø D x L in mm)

C _R (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	-	-	-	-	-	-



SELECTION CHART FOR C _R , U _R AND RELEVANT NOMINAL CASE SIZES (Ø D x L in mm)						
C _R (µF)	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	-	-	-	-	-

RADIAL STYLE: DIMENSIONS in millimeters									
Ø 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
Ø d	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0	1.0
β	1.5			2.0					
α	0.5							1.0	

DIMENSIONS in millimeters AND AVAILABLE FORMS	
<p>Ø D ≤ 18 long leads MALREKA00...</p>	<p>Ø D ≤ 18 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 $T_a = 20^\circ\text{C}$, $P = 80\text{ kPa}$ to 120 kPa , $RH = 45\%$ to 75% .

ORDERING EXAMPLEEKA 3300 μF / 16 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 (μF)	NOMINAL CASE SIZE $\varnothing D \times L$ (mm)	$\tan \delta$ 120 Hz	R_{ESR} 120 Hz (Ω)	I_R 120 Hz / 85°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_R (V)	C_R 120 Hz (μ F)	NOMINAL CASE SIZE $\varnothing D \times L$ (mm)	$\tan \delta$ 120 Hz	R_{ESR} 120 Hz (Ω)	I_R 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_R (V)	C_R 120 Hz (μ F)	NOMINAL CASE SIZE \varnothing D x L (mm)	$\tan \delta$ 120 Hz	R_{ESR} 120 Hz (Ω)	I_R 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 (μ F)	NOMINAL CASE SIZE \varnothing D x L (mm)	$\tan \delta$ 120 Hz	R_{ESR} 120 Hz (Ω)	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 °C / +20 °C	5	4	3	2	2	2	4	6	12
-40 °C / +20 °C	12	10	8	5	4	3	6	8	-

ADDITIONAL ELECTRICAL DATA			
PARAMETER	CONDITIONS		VALUE
Current			
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 μ A
	After 2 min at U_R		$I_{L2} \leq 0.01 \times C_R \times U_R$ or 3 μ A
	After 5 min at U_R		$I_{L5} \leq 0.02 \times C_R \times U_R$ or 15 μ A
Resistance			
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 μ 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	$T_{\text{amb}} = 85 \text{ }^\circ\text{C}$ 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	$T_{\text{amb}} = 85 \text{ }^\circ\text{C}$ 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 $I_L \leq \text{spec. limit}$ $\tan \delta \leq 2 \times \text{spec. limit}$

Statements about product lifetime are based on calculations and internal testing. They should only be interpreted as estimations. Also due to external factors, the lifetime in the field application may deviate from the calculated lifetime. In general, nothing stated herein shall be construed as a guarantee of durability.



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.