

# ALC10 Series 85°C

RoHS  
Compliant

- Compact size
- Long Life, 18000 hours at 85°C (U<sub>r</sub>, I<sub>r</sub> applied)
- High ripple current
- Excellent surge voltage capability
- Optimized designs available on request

## APPLICATION

They are ideally suited for industrial and commercial applications demanding high reliability and long life expectancy such as frequency converters, UPS systems and switch mode power supplies.

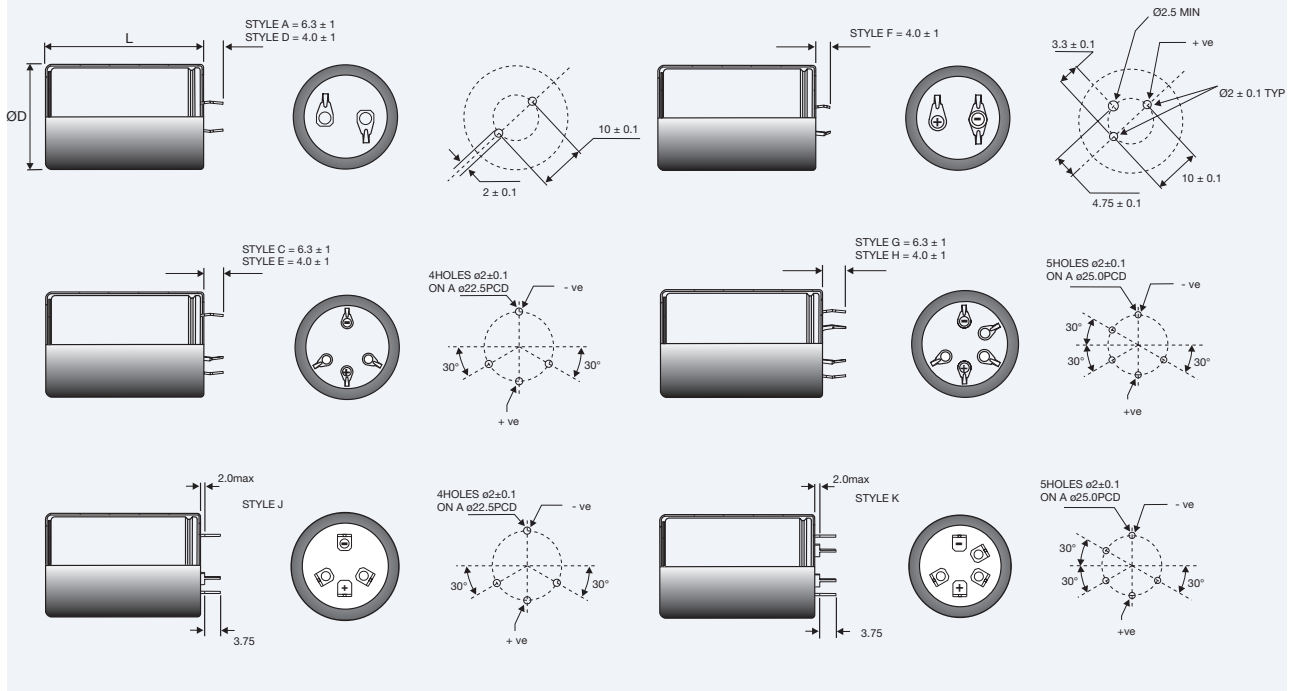
## BASIC DESIGN

The ALC10 series of snap-in capacitors cover a wide range of case sizes and voltage ratings featuring high ripple current and surge voltage capability and very long life performance.

## SPECIFICATION

<b>Standards</b>	IEC 60384-4 Long Life Grade 40/85/56,																	
<b>Capacitance range</b>	56 – 82000 µF																	
<b>Capacitance tolerance</b>	-20 to +20%																	
<b>Rated voltage U<sub>R</sub></b>	40–500 VDC																	
<b>Surge voltage U<sub>S</sub></b>	1.15 x U <sub>R</sub> (for U <sub>R</sub> ≤ 250 VDC) 1.10 x U <sub>R</sub> (for U <sub>R</sub> ≥ 350 VDC)	Test Condition: ≤ 30s surge, 1000 cycles @ 85°C																
<b>Surge voltage U<sub>SS</sub> (Short duration)</b>	<table border="1"> <thead> <tr> <th>U<sub>R</sub></th> <th>U<sub>SS</sub></th> </tr> </thead> <tbody> <tr><td>200</td><td>350</td></tr> <tr><td>250</td><td>400</td></tr> <tr><td>350</td><td>500</td></tr> <tr><td>400</td><td>520</td></tr> <tr><td>415</td><td>530</td></tr> <tr><td>450</td><td>550</td></tr> <tr><td>500</td><td>600</td></tr> </tbody> </table>	U <sub>R</sub>	U <sub>SS</sub>	200	350	250	400	350	500	400	520	415	530	450	550	500	600	Test Condition: ≤ 500ms surge, 100 cycles @ 20°C
U <sub>R</sub>	U <sub>SS</sub>																	
200	350																	
250	400																	
350	500																	
400	520																	
415	530																	
450	550																	
500	600																	
<b>Leakage current I<sub>L</sub></b>	= 0.006 x C <sub>R</sub> x U <sub>R</sub> (µA) or 6mA whichever is the smaller. Note, C <sub>R</sub> is in µF.	Test Condition: U <sub>R</sub> , 5mins., 20°C																
<b>Operational life time +85°C, U<sub>R</sub>, I<sub>R</sub></b>	<table border="1"> <thead> <tr> <th>Can Diameter</th> <th>Life (hrs)</th> </tr> </thead> <tbody> <tr><td>25</td><td>10000</td></tr> <tr><td>30</td><td>13000</td></tr> <tr><td>35</td><td>15000</td></tr> <tr><td>40, 45, 50</td><td>18000</td></tr> </tbody> </table>	Can Diameter	Life (hrs)	25	10000	30	13000	35	15000	40, 45, 50	18000	End of Life requirement:  ΔC/C ≤ ±10% ESR ≤ 2 x initial ESR value I <sub>L</sub> ≤ initial specified limit						
Can Diameter	Life (hrs)																	
25	10000																	
30	13000																	
35	15000																	
40, 45, 50	18000																	
<b>+85°C, U<sub>R</sub></b>	<table border="1"> <thead> <tr> <th>Can Diameter</th> <th>Life (hrs)</th> </tr> </thead> <tbody> <tr><td>25</td><td>16000</td></tr> <tr><td>30</td><td>21000</td></tr> <tr><td>35</td><td>24000</td></tr> <tr><td>40, 45, 50</td><td>29000</td></tr> </tbody> </table>	Can Diameter	Life (hrs)	25	16000	30	21000	35	24000	40, 45, 50	29000							
Can Diameter	Life (hrs)																	
25	16000																	
30	21000																	
35	24000																	
40, 45, 50	29000																	
<b>Shelf Life</b>	2000 hrs at 0V +85°C, or 30000 hrs at 0V +40°C																	
<b>Temperature range</b>	-40 to +85°C (Operating) -55°C to +85°C (Storage)																	

SPECIFICATION



Mounting

These capacitors are designed to be mounted by their terminations alone, and may be used in any position. Dummy pins must be isolated on 4 and 5 pin styles.

Terminal Style

Description	2 pin	2 pin	3 pin	4 pin	4 pin	5 pin	5 pin	4 pin	5 pin
Pin length	6.3±1	4.0±1	4.0±1	6.3±1	4.0±1	6.3±1	4.0±1	5.75	5.75
Code	A	D	F	C	E	G	H	J	K
DIA. mm -0+1									
25	•	•	•						
30	•	•	•						
35	•	•	•	•	•			•	
40	•	•	•	•	•	•	•		•
45				•	•	•	•		
50				•	•	•	•		•

Case Code (Component weight, grams - nominal)

Length mm ±2	30	35	40	45	50	55	60	80	105
Dia. mm -0+1									
25	BB (28)	BC (30)	BD (35)						
30	CB (35)	CC (40)	CD (45)	CE (50)	CF (55)				
35	DB (42)	DC (50)	DD (55)	DE (65)	DF (70)	DG (75)	DH (80)	DL (105)	
40	EB (49)	EC (57)	ED (65)	EE (80)	EF (82)	EG (95)	EH (98)	EL (131)	EP (170)
45	FB (62)	FC (72)	FD (82)	FE (92)	FF (103)	FG (113)	FH (123)	FL (164)	FP (215)
50	KB (75)	KC (88)	KD (100)	KE (113)	KF (126)	KG (138)	KH (151)	KL (201)	KP (264)

Other sizes available upon request

## ARTICLE TABLE ALC10 (85°C)

Cap ( $\mu$ F)	Case Size (mm)	ESR ( $m\Omega$ ) at 20°C 100Hz (max)	Impedance ( $m\Omega$ ) at 20°C 10 KHz (max)	Ripple current(A) at 85°C		Type number
				100 Hz	10 KHz	
<b>40 VDC (<math>U_R</math>)</b>						
3900	25x30	125	103	2.33	2.53	ALC10A392BB040
4700	25x35	99	81	2.77	3.01	ALC10A472BC040
5600	30x30	115	94	2.74	2.98	ALC10A562CB040
5600	25x40	85	70	3.14	3.42	ALC10A562BD040
6800	30x35	90	74	3.26	3.55	ALC10A682CC040
8200	30x40	77	63	3.70	4.03	ALC10A822CD040
10000	35x35	86	71	3.69	4.01	ALC10A103DC040
12000	30x50	59	48	4.59	4.99	ALC10A123CF040
12000	35x40	75	62	4.14	4.50	ALC10A123DD040
15000	40x30	89	79	4.42	4.51	ALC10A153EB040
18000	35x50	55	45	5.23	5.69	ALC10A183DF040
18000	40x35	78	70	4.88	4.97	ALC10A183EC040
22000	40x40	62	56	5.81	5.92	ALC10A223ED040
27000	40x50	43	38	7.23	7.36	ALC10A273EF040
33000	40x60	33	30	8.74	8.91	ALC10A333EH040
47000	40x80	23	21	10.96	11.17	ALC10A473EL040
82000	40x105	18	17	12.63	13.44	ALC10A823EP040
<b>63 VDC (<math>U_R</math>)</b>						
2200	25x30	149	118	2.13	2.37	ALC10A222BB063
2700	25x35	128	101	2.43	2.70	ALC10A272BC063
3300	30x30	112	88	2.77	3.08	ALC10A332CB063
3300	25x40	112	88	2.73	3.04	ALC10A332BD063
4700	30x35	91	72	3.24	3.61	ALC10A472CC063
5600	30x40	83	66	3.56	3.96	ALC10A562CD063
6800	35x35	75	59	3.95	4.40	ALC10A682DC063
6800	30x50	75	59	4.07	4.53	ALC10A682CF063
8200	35x40	69	55	4.31	4.80	ALC10A822DD063
8200	40x30	82	72	3.95	4.03	ALC10A822EB063
10000	35x50	64	51	4.85	5.40	ALC10A103DF063
10000	40x35	80	72	4.58	4.67	ALC10A103EC063
12000	40x40	64	57	5.42	5.55	ALC10A123ED063
15000	40x50	44	39	7.02	7.18	ALC10A153EF063
18000	40x60	35	31	8.54	8.75	ALC10A183EH063
27000	40x80	24	21	10.53	10.78	ALC10A273EL063
39000	40x105	19	17	12.23	13.51	ALC10A393EP063
<b>100 VDC (<math>U_R</math>)</b>						
1000	25x30	243	182	1.67	2.04	ALC10A102BB100
1200	25x35	203	152	1.93	2.36	ALC10A122BC100
1500	30x40	163	122	2.30	2.81	ALC10A152CB100
1500	25x40	163	122	2.27	2.78	ALC10A152BD100
1800	30x35	137	103	2.64	3.23	ALC10A182CC100
2200	30x40	113	85	3.05	3.73	ALC10A222CD100
2700	35x35	92	69	3.57	4.37	ALC10A272DC100
2700	40x30	121	104	3.72	3.88	ALC10A272EB100
3300	30x50	76	57	4.05	4.95	ALC10A332CF100
3300	35x40	76	57	4.11	5.03	ALC10A332DD100
3300	40x35	106	92	4.09	4.24	ALC10A332EC100
3900	40x40	85	74	4.88	5.08	ALC10A392ED100
4700	35x50	55	41	5.23	6.40	ALC10A472DF100

Termination Style A,C,D,E,F,G,H,J or K 

## ARTICLE TABLE ALC10 (85°C)

Cap ( $\mu$ F)	Case Size (mm)	ESR ( $m\Omega$ ) at 20°C 100Hz (max)	Impedance ( $m\Omega$ ) at 20°C 10 KHz (max)	Ripple current(A) at 85°C		Type number
				100 Hz	10 KHz	
<b>100 VDC (<math>U_R</math>)</b>						
4700	40x45	70	61	5.60	5.83	ALC10A472EE100
5600	40x50	59	51	6.41	6.68	ALC10A562EF100
6800	40x55	53	46	6.61	6.84	ALC10A682EG100
8200	40x60	44	39	7.36	7.61	ALC10A822EH100
12000	40x80	31	27	9.14	9.45	ALC10A123EL100
18000	40x105	19	17	11.34	12.61	ALC10A183EP100
<b>200 VDC (<math>U_R</math>)</b>						
330	25x30	486	340	1.18	1.63	ALC10A331BB200
390	25x35	412	288	1.36	1.87	ALC10A391BC200
470	30x30	343	240	1.58	2.18	ALC10A471CB200
470	25x40	343	240	1.56	2.15	ALC10A471BD200
560	30x35	288	202	1.82	2.51	ALC10A561CC200
680	30x40	238	167	2.10	2.89	ALC10A681CD200
820	35x35	198	139	2.43	3.35	ALC10A821DC200
820	40x30	178	142	3.06	3.63	ALC10A821EB200
1000	30x50	163	114	2.76	3.80	ALC10A102CF200
1000	35x40	163	114	2.81	3.87	ALC10A102DD200
1000	40x35	153	124	3.43	3.99	ALC10A102EC200
1200	35x50	135	82	3.06	4.01	ALC10A122DF200
1200	40x40	124	99	4.02	4.69	ALC10A122ED200
1500	35x50	110	77	3.70	5.10	ALC10A152DF200
1500	40x45	101	81	4.61	5.38	ALC10A152EE200
1800	40x50	84	68	5.27	6.15	ALC10A182EF200
2200	40x60	67	53	6.29	7.43	ALC10A222EH200
3300	40x80	46	37	7.83	9.17	ALC10A332EL200
4700	40x105	45	32	8.08	11.73	ALC10A472EP200
5600	45x105	42	29	8.51	12.16	ALC10G562FP200
8200	50x105	33	25	9.17	11.76	ALC10G822KP200
<b>250 VDC (<math>U_R</math>)</b>						
220	25x30	727	473	0.97	1.41	ALC10A221BB250
270	25x35	593	385	1.13	1.65	ALC10A271BC250
330	30x30	486	316	1.33	1.94	ALC10A331CB250
330	25x35	490	320	1.34	1.95	ALC10A331BC250
330	25x40	486	316	1.31	1.91	ALC10A331BD250
470	30x35	343	223	1.67	2.43	ALC10A471CC250
560	30x40	288	187	1.91	2.78	ALC10A561CD250
680	35x35	238	155	2.22	3.23	ALC10A681DC250
680	30x50	238	155	2.29	3.34	ALC10A681CF250
680	40x30	187	144	2.79	3.56	ALC10A681EB250
820	35x40	198	129	2.55	3.72	ALC10A821DD250
820	40x40	153	116	3.80	4.91	ALC10A821ED250
1000	35x50	163	106	3.26	4.75	ALC10A102DF250
1000	40x45	126	96	4.33	5.58	ALC10A102EE250
1200	35x60	140	100	3.76	5.48	ALC10A122DH250
1200	40x50	104	80	4.94	6.37	ALC10A122EF250
1500	40x55	89	69	5.29	6.58	ALC10A152EG250
1800	35x80	100	82	4.60	6.69	ALC10A182DL250
1800	40x60	74	58	5.92	7.34	ALC10A182EH250
2200	40x80	57	43	7.33	9.49	ALC10A222EL250
3900	40x105	46	32	7.78	11.71	ALC10A392EP250
4700	45x105	42	29	8.22	12.11	ALC10G472FP250
5600	50x105	38	27	8.63	12.03	ALC10G562KP250

Termination Style A,C,D,E,F,G,H,J or K 

## ARTICLE TABLE ALC10 (85°C)

Cap ( $\mu$ F)	Case Size (mm)	ESR ( $m\Omega$ ) at 20°C 100Hz (max)	Impedance ( $m\Omega$ ) at 20°C 10 KHz (max)	Ripple current(A) at 85°C		Type number
				100 Hz	10 KHz	
<b>350 VDC (<math>U_r</math>)</b>						
120	25x30	1139	736	0.83	1.75	ALC10A121BB350
150	25x35	912	589	0.99	2.07	ALC10A151BC350
180	25x40	761	492	1.13	2.37	ALC10A181BD350
180	30x30	776	506	1.11	2.19	ALC10A181CB350
270	30x35	527	346	1.41	2.65	ALC10A271CC350
330	30x40	432	284	1.65	3.07	ALC10A331CD350
330	40x30	424	277	2.02	3.97	ALC10A331EB350
390	30x50	364	238	1.92	3.65	ALC10A391CF350
390	35x35	386	259	1.82	3.07	ALC10A391DC350
390	40x35	361	236	2.33	4.50	ALC10A391EC350
470	35x40	321	216	2.07	3.47	ALC10A471DD350
470	40x40	299	195	2.69	5.22	ALC10A471ED350
560	35x50	268	180	2.80	4.80	ALC10A561DF350
560	40x45	251	164	3.04	5.88	ALC10A561EE350
680	40x50	207	136	3.46	6.65	ALC10A681EF350
820	35x60	190	130	3.40	5.50	ALC10A821DH350
820	40x55	174	114	3.84	7.16	ALC10A821EG350
820	40x60	172	112	3.99	7.67	ALC10A821EH350
1000	35x80	154	104	3.90	6.40	ALC10A102DL350
1200	40x80	119	78	4.95	9.20	ALC10A122EL350
1800	40x105	81	54	6.14	10.73	ALC10A182EP350
2700	45x105	63	42	7.00	11.44	ALC10G272FP350
3300	50x105	54	36	7.54	11.57	ALC10G332KP350

**400 VDC ( $U_r$ )**

100	25x30	1400	943	0.77	1.60	ALC10A101BB400
120	25x35	1166	785	0.90	1.87	ALC10A121BC400
150	30x30	950	645	1.04	2.03	ALC10A151CB400
150	25x40	935	630	1.06	2.18	ALC10A151BD400
180	30x35	791	536	1.20	2.36	ALC10A181CC400
220	30x35	650	400	1.31	2.47	ALC10A221CC400
220	30x40	648	440	1.41	2.74	ALC10A221CD400
270	35x35	547	376	1.61	2.88	ALC10A271DC400
270	40x30	441	284	1.85	3.67	ALC10A271EB400
330	35x35	461	320	1.73	2.92	ALC10A331DC400
330	30x50	438	299	1.82	3.42	ALC10A331CF400
330	35x40	449	309	1.84	3.27	ALC10A331DD400
330	40x35	378	252	2.29	4.21	ALC10A331EC400
390	35x50	377	226	2.19	3.96	ALC10A391DF400
390	40x40	312	203	2.62	4.86	ALC10A391ED400
470	35x50	321	223	2.62	4.41	ALC10A471DF400
470	40x40	230	156	2.74	5.21	ALC10A471ED400
470	40x45	258	168	3.00	5.49	ALC10A471EE400
560	35x50	278	180	2.57	4.04	ALC10A561DF400
560	35x60	264	184	3.01	5.11	ALC10A561DH400
560	40x50	216	141	3.41	6.19	ALC10A561EF400
680	35x60	232	142	2.90	4.73	ALC10A681DH400
680	40x60	177	114	3.99	7.14	ALC10A681EH400
820	35x80	181	127	3.70	6.09	ALC10A821DL400
1000	35x80	112	77	3.98	6.32	ALC10A102DL400
1000	40x80	120	78	5.00	8.82	ALC10A102EL400
1500	40x105	99	68	5.79	10.16	ALC10A152EP400
2200	45x105	77	53	6.56	10.90	ALC10G222FP400
2700	50x105	66	45	7.11	11.13	ALC10G272KP400

Termination Style A,C,D,E,F,G,H,J or K 

## ARTICLE TABLE ALC10 (85°C)

Cap ( $\mu$ F)	Case Size (mm)	ESR ( $m\Omega$ ) at 20°C 100Hz (max)	Impedance ( $m\Omega$ ) at 20°C 10 KHz (max)	Ripple current(A) at 85°C		Type number
				100 Hz	10 KHz	
<b>450 VDC (<math>U_R</math>)</b>						
68	25x30	1708	1135	0.69	1.50	ALC10A680BB450
100	25x35	1167	777	0.88	1.90	ALC10A101BC450
120	30x30	989	663	1.00	2.03	ALC10A121CB450
120	25x40	973	648	1.01	2.18	ALC10A121BD450
150	25x40	785	524	1.12	2.35	ALC10A151BD450
150	30x30	805	543	1.10	2.12	ALC10A151CB450
150	30x35	792	531	1.17	2.38	ALC10A151CC450
180	30x40	661	443	1.36	2.76	ALC10A181CD450
220	35x35	559	379	1.56	2.89	ALC10A221DC450
220	30x50	540	362	1.61	3.27	ALC10A221CF450
220	40x30	517	311	1.77	3.68	ALC10A221EB450
270	30x50	446	301	1.76	3.43	ALC10A271CF450
270	35x35	470	322	1.68	2.91	ALC10A271DC450
270	35x40	458	311	1.78	3.27	ALC10A271DD450
270	40x35	427	259	2.07	4.22	ALC10A271EC450
330	30x50	373	253	1.91	3.54	ALC10A331CF450
330	35x50	373	253	2.41	4.38	ALC10A331DF450
330	40x40	348	210	2.47	4.91	ALC10A331ED450
390	35x50	240	166	2.60	4.41	ALC10A391DF450
390	40x45	293	177	2.70	5.53	ALC10A391EE450
470	35x50	252	155	2.43	4.03	ALC10A471DF450
470	35x60	270	185	2.95	5.12	ALC10A471DH450
470	40x50	243	147	3.08	6.25	ALC10A471EF450
560	40x60	202	121	3.56	7.04	ALC10A561EH450
680	35x80	190	131	3.61	6.09	ALC10A681DL450
820	40x80	138	83	4.47	8.78	ALC10A821EL450
1000	40x80	114	75	4.95	9.32	ALC10A102EL450
1200	40x105	103	70	5.57	10.15	ALC10A122EP450
1800	45x105	82	55	6.27	10.87	ALC10G182FP450
2200	50x105	70	47	6.81	11.12	ALC10G222KP450
<b>500 VDC (<math>U_R</math>)</b>						
56	25x30	2207	1642	0.74	1.44	ALC10A560BB500
68	25x35	1816	1351	0.87	1.70	ALC10A680BC500
82	25x40	1507	1120	1.00	1.95	ALC10A820BD500
82	30x30	1527	1140	0.99	1.84	ALC10A820CB500
100	30x30	1000	765	1.08	1.94	ALC10A101CB500
100	30x35	1220	840	1.15	2.16	ALC10A101CC500
120	30x35	1052	786	1.25	2.28	ALC10A121CC500
150	30x40	843	631	1.48	2.67	ALC10A151CD500
180	30x50	699	522	1.78	3.27	ALC10A181CF500
180	35x35	728	549	1.70	2.84	ALC10A181DC500
180	40x30	699	522	1.76	3.22	ALC10A181EB500
220	35x40	596	450	1.96	3.26	ALC10A221DD500
220	40x35	571	426	2.07	3.82	ALC10A221EC500
270	35x50	481	362	2.34	3.97	ALC10A271DF500
270	40x40	466	348	2.41	4.42	ALC10A271ED500
330	40x45	382	286	2.74	5.00	ALC10A331EE500
390	35x60	340	258	2.87	4.67	ALC10A391DH500
390	40x50	324	242	3.09	5.59	ALC10A391EF500
470	40x60	269	201	3.56	6.43	ALC10A471EH500
560	35x80	240	182	3.50	5.57	ALC10A561DL500
680	40x80	187	140	4.40	7.77	ALC10A681EL500
1000	40x105	130	98	5.43	9.18	ALC10A102EP500
1500	45x105	110	82	5.97	9.76	ALC10G152FP500
1800	50x105	94	70	6.45	10.09	ALC10G182KP500

Termination Style A,C,D,E,F,G,H,J or K 

## OPERATIONAL DATA

**Operational Lifetime**

Please see separate application notes TD003 for calculating operational life expectancy under customer specific conditions.

## RELIABILITY

The failure rate is derived from our periodic test results. The failure rate ( $\lambda_f$ ) is therefore only given at test temperature for life tests. An estimation is also given at 40°C. The expected failure rate for this capacitor range is based on our periodic test results for capacitors with structural similarity. Failure rate is frequently quoted in FIT (Failures In Time) where 1 FIT =  $1 \times 10^{-9}$  failures per hour.

$T_a$	Failure rate per hour
85°C	250 FIT
40°C	12 FIT

Failure rate per hour for catastrophic plus parametric failures.

## MECHANICAL DATA

**Mounting position**

The capacitor can be mounted upright or inclined to a horizontal position.

**Vibration**

10Hz to 500Hz at 0.75mm or 10g for 3x2hrs duration. 10Hz to 55Hz at 0.35mm or 5g for 3x0.5hrs duration (45/50mm diameter cans).

**Insulating resistance**

$\geq 100$  Mohms at 100V d.c., across insulating sleeve.

**Voltage Proof**

$\geq 2500$ V d.c., across insulating sleeve.

**Safety vent**

A safety vent for over pressure is featured on either the base (opposing end to the terminals) or on the the side of the can. This is in the form of a grooved section on the surface of the can which is a weakened area and is designed to relieve build up of internal pressure due to over stress or catastrophic failure.