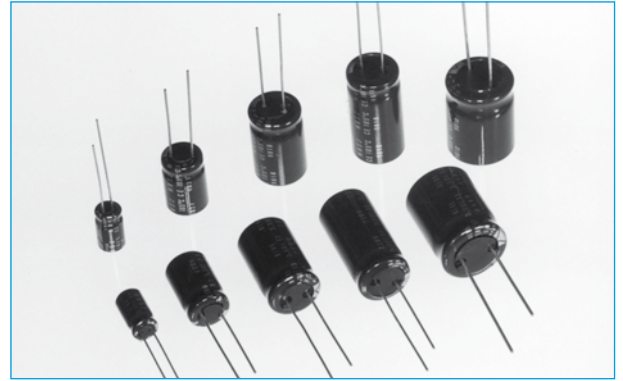


## CAPACITORS

## ULTRA LOW IMPEDANCE DSH

SECTION 1

- Very low impedance
- 6.3V - 100V
- 55°C - 105°C
- Long life up to 5000 hrs
- Suitable for PSU applications



### SPECIFICATION

Operating temperature range	-55°C +105°C		
Rated Working Voltage Range	6.3 ~ 100Vdc		
Rated Capacitance Range	0.47 ~ 12,000µF		
Capacitance Tolerance	±20% (M)		
Maximum Leakage Current At 20°C	0.03CV, or 4µA, whichever is greater (after 1 minute) 0.01CV or 3µA, whichever is greater (after 2 minutes)		
Surge Voltage (S.V.)	W.V. (Vdc)	6.3 10 16 25 35 50 63 100	
	S.V. (Vdc)	8 13 20 32 44 63 79 125	
Maximum Tan δ At 20°C & 120Hz	Tan δ C ≤ 1200µF	0.22 0.19 0.16 0.14 0.12 0.10 0.08 0.07	
	Tan δ C = 1500µF	0.23 0.20 0.17 0.15 0.13 0.11	
	Tan δ C = 1800µF	0.23 0.20 0.17 0.15 0.13 0.11	
	Tan δ C = 2200µF	0.24 0.21 0.18 0.16 0.14	
	Tan δ C = 2700µF	0.25 0.22 0.19 0.17 0.15	
	Tan δ C = 3300µF	0.26 0.23 0.20 0.18 0.16	
	Tan δ C = 3900µF	0.28 0.25 0.22 0.20	
	Tan δ C = 4700µF	0.29 0.26 0.23 0.21	
	Tan δ C = 5600µF	0.31 0.28 0.25	
	Tan δ C = 6800µF	0.33 0.30 0.27	
	Tan δ C = 8200µF	0.36 0.33	
	Tan δ C = 10000µF	0.40	
Tan δ C = 12000µF	0.44		
Low Temperature Stability (Impedance Ratio at 120Hz)	W.V. (Vdc)	6.3 10 ~ 100	
	Z-40°C/Z+20°C	3 2	
	Z-55°C/Z+20°C	4 3	
Capacitance Change at -55°C	ΔC/C(-55/+20°C)(%)	±30% ±20%	
Load Life Test at 105°C	5,000 hrs : 12.5Ø~ 3,000 hrs : 8 ~ 10Ø 2,000 hrs : 5 ~ 6.3Ø	Capacitance Change Tan δ Leakage current	Within ±20% of initial value Less than 200% of specified maximum value Less than specified maximum value
Shelf Life Test 1,000 hours at 105°C without load	Capacitance Change Tan δ Leakage current		Within ±20% of initial value Less than 200% of specified maximum value Less than specified maximum value

### ORDERING INFORMATION

DSH	330	10	/TA
Series DSH or DSHS for small size	Capacitance µF	Voltage	Options Blank = Loose TA = Tape Ammo TR = Tape Reel
TA, TR = 5mm pitch For others add pitch e.g. TA2MM = 2mm pitch			

### RANGE AND CASE SIZE DØ x Lmm

W.V Cap µF	6.3	10	16	25	35	50	63	100
0.47						5x11	-	-
0.68						5x11	-	-
1						5x11	-	-
2.2						5x11	-	-
3.3						5x11	-	-
4.7						5x11	-	-
5.6						5x11	-	5x11
6.8						5x11	-	-
10						5x11	-	6.3x11
12						5x11	-	6.3x11
15						5x11	-	8x11.5
18						5x11	5x11	-
22					5x11	5x11	-	8x11.5
27					5x11	6.3x11	-	8x15
33				5x11	6.3x11	6.3x11	6.3x11	-
39				5x11	5x11	6.3x11	6.3x11	8x20
47			5x11	5x11	6.3x11	6.3x11	8x11.5	10x16
56			5x11	-	-	-	8x11.5	-
68	5x11	-	-	6.3x11	6.3x11	8x11.5	8x12.5 (S)	10x20
	-	-	-	-	-	-	10x12.5	-
82		5x11	-	6.3x11	6.3x11	8x12.5	-	-
100	5x11	5x11	6.3x11	6.3x11	8x11.5	8x15 (S)	10x12.5	12.5x20
	-	-	-	-	-	-	-	-
120	-	-	6.3x11	8x11.5	8x12.5 (S)	8x20	8x20 (S)	-
	-	-	-	-	10x12.5	-	10x12.5	-
150	-	6.3x11	6.3x11 (S)	8x11.5	8x15 (S)	8x20 (S)	10x16 (S)	12.5x25
	-	-	8x11.5	-	10x12.5	10x16	12.5x16	-
180	-	6.3x11	-	8x12.5	10x16	10x20	10x20	-
220	6.3x11	6.3x11 (S)	8x11.5	8x15 (S)	8x20 (S)	10x20	10x20	16x25
	-	8x11.5	-	10x12.5	10x16	-	-	-
270	-	-	8x12.5	10x12.5	-	-	10x22	-
330	6.3x11 (S)	8x11.5	8x15 (S)	8x20 (S)	10x20 (S)	10x22	12.5x20	16x31.5
	8x11.5	-	10x12.5	10x16	12.5x16	-	-	-
390	-	-	10x16	-	10x20	-	-	16x35.5
470	8x11.5	8x15 (S)	8x20 (S)	10x16 (S)	10x20	12.5x20	12.5x25	16x35.5
	-	10x12.5	10x16	10x20	-	-	-	-
560	-	10x16	-	10x20	12.5x20	12.5x25	-	-
680	8x15 (S)	8x20 (S)	10x20 (S)	10x22	12.5x20	16x21	16x25	-
	10x12.5	10x16	12.5x16	-	-	-	-	-
820	10x12.5	-	10x20	12.5x20	-	16x25	-	-
1000	8x20 (S)	10x20 (S)	10x22	12.5x20 (S)	12.5x25 (S)	16x25	16x31.5	-
	10x16	12.5x16	16x16	16x21	-	-	-	-
1200	10x16 (S)	10x20	16x16 (S)	12.5x25 (S)	16x25	16x31.5	-	-
	12.5x16	-	12.5x20	16x21	-	-	-	-
1500	10x20 (S)	10x22	12.5x25 (S)	16x21	16x25	16x35.5 (S)	-	-
	12.5x16	-	16x21	-	-	18x31.5	-	-
1800	-	12.5x20 (S)	12.5x25	16x25	16x31.5	18x35.5	-	-
	-	16x16	-	-	-	-	-	-
2200	12.5x20	12.5x20 (S)	12.5x25 (S)	16x25	16x35.5 (S)	-	-	-
	-	12.5x25	16x21	-	18x31.5	-	-	-
2700	12.5x25 (S)	12.5x25 (S)	16x25	16x31.5	18x31.5	-	-	-
	16x16	16x21	-	-	-	-	-	-
3300	-	12.5x25 (S)	16x31.5	16x35.5 (S)	18x35.5	-	-	-
	-	16x21	-	18x31.5	-	-	-	-
3900	12.5x25 (S)	16x25	16x31.5	18x31.5	-	-	-	-
	16x21	-	-	-	-	-	-	-
4700	12.5x25	16x31.5	16x35.5 (S)	18x35.5	-	-	-	-
	-	-	18x31.5	-	-	-	-	-
5600	16x25	16x31.5	18x35.5	-	-	-	-	-
6800	16x31.5	16x35.5 (S)	-	-	-	-	-	-
	-	18x31.5	-	-	-	-	-	-
8200	16x31.5	18x35.5	-	-	-	-	-	-
10000	18x31.5	-	-	-	-	-	-	-
12000	18x35.5	-	-	-	-	-	-	-

### RIPPLE CURRENT

#### CORRECTION FACTOR

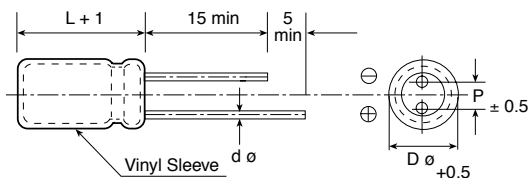
Freq Hz Cap µF	120	1K	10K	100K
0.47 - 4.7	0.4	0.68	0.78	1
5.6 - 47	0.5	0.76	0.87	1
56 - 270	0.7	0.85	0.9	1
330 - 1000	0.8	0.93	0.98	1
1200 - 12000	0.9	0.95	1	1

#### TEMPERATURE FACTOR

Ambient Temp	≤+70°C	+85°C	+105°C
Correction Factor	1.96	1.68	1.0

SECTION 1

### OUTLINE DRAWING



Case Size (D)	5	6.3	8	10	12.5	16	18
Lead Space (P)	2	2.5	3.5	5		7.5	
Lead Dia (d)	0.5	0.6				0.8	

Dimensions in mm

### MAX IMPEDANCE @ 100 KHz 20 °C (-10 °C)

SECTION 1

WV Cap/μF	6.3 Max. Imp. (Ω)	10 Max. Imp. (Ω)	16 Max. Imp. (Ω)	25 Max. Imp. (Ω)	35 Max. Imp. (Ω)	50 Max. Imp. (Ω)	63 Max. Imp. (Ω)	100 Max. Imp. (Ω)-
0.47	-	-	-	-	-	5.5 (11.0)	-	-
0.68	-	-	-	-	-	4.5 (9.0)	-	-
1	-	-	-	-	-	3.3 (6.6)	-	-
1.5	-	-	-	-	-	3.2 (6.4)	-	-
2.2	-	-	-	-	-	3.0 (6.0)	-	-
3.3	-	-	-	-	-	2.7 (5.4)	-	-
4.7	-	-	-	-	-	2.0 (4.0)	-	-
5.6	-	-	-	-	-	-	-	2.7 (5.4)
6.8	-	-	-	-	-	1.9 (3.8)	-	-
10	-	-	-	-	-	1.7 (3.4)	-	1.3 (2.8)
12	-	-	-	-	-	1.4 (2.8)	-	1.4 (2.8)
15	-	-	-	-	-	1.2 (2.4)	-	0.81 (1.62)
18	-	-	-	-	-	1.0 (2.0)	1.6 (3.2)	-
22	-	-	-	-	0.90 (1.8)	1.0 (2.0)	-	0.79 (1.6)
27	-	-	-	-	0.65 (1.3)	0.74 (1.48)	-	0.64 (1.3)
33	-	-	-	0.90 (1.8)	0.45 (0.90)	0.55 (1.10)	0.70 (1.8)	-
39	-	-	-	0.65 (1.3)	-	0.55 (1.10)	0.90 (1.80)	0.36 (0.72)
47	-	-	0.90 (1.8)	0.55 (1.1)	0.32 (0.64)	0.55 (1.10)	0.32 (0.96)	0.35 (0.70)
56	-	-	0.90 (1.8)	-	-	-	0.47 (0.94)	-
68	-	0.9 (1.8)	-	0.32 (0.64)	0.24 (0.48)	0.34 (0.68)	(S) 0.47 (0.94)	0.24 (0.48)
68	-	-	-	-	-	-	0.47 (0.94)	-
82	-	0.65 (1.3)	-	0.30 (0.60)	0.24 (0.48)	0.32 (0.64)	0.34 (0.68)	-
100	0.90 (1.8)	0.55 (1.1)	0.32 (0.64)	0.24 (0.48)	0.16 (0.32)	(S) 0.25 (0.50)	-	0.15 (0.30)
100	-	-	-	-	-	0.25 (0.50)	-	-
120	-	-	0.31 (0.62)	0.19 (0.38)	(S) 0.13 (0.26)	0.16 (0.32)	(S) 0.21 (0.42)	-
120	-	-	-	-	0.14 (0.28)	-	0.26 (0.52)	-
150	-	0.31 (0.62)	(S) 0.22 (0.44)	0.14 (0.28)	(S) 0.11 (0.22)	(S) 0.16 (0.32)	(S) 0.20 (0.40)	0.11 (0.22)
150	-	-	0.19 (0.38)	-	0.12 (0.24)	0.18 (0.36)	0.14 (0.28)	-
180	-	0.31 (0.62)	0.24 (0.48)	0.13 (0.26)	0.080 (0.16)	0.11 (0.22)	0.15 (0.30)	-
220	0.30 (0.60)	(S) 0.22 (0.44)	0.16 (0.32)	(S) 0.10 (0.20)	(S) 0.080 (0.16)	0.10 (0.20)	0.15 (0.30)	0.071 (0.15)
220	-	0.19 (0.38)	-	0.12 (0.24)	0.085 (0.17)	-	-	-
270	-	-	0.14 (0.28)	0.09 (0.18)	-	-	0.12 (0.24)	-
330	0.22 (0.44)	0.14 (0.28)	(S) 0.10 (0.20)	(S) 0.08 (0.16)	(S) 0.056 (0.12)	0.075 (0.15)	0.10 (0.20)	0.049 (0.10)
330	0.19 (0.38)	-	0.10 (0.20)	0.09 (0.18)	0.063 (0.12)	-	-	-
390	-	-	0.090 (0.18)	-	0.054 (0.11)	-	-	0.043 (0.09)
470	0.14 (0.28)	(S) 0.12 (0.24)	(S) 0.080 (0.16)	(S) 0.065 (0.13)	0.054 (0.11)	0.059 (0.12)	0.064 (0.13)	0.038 (0.08)
470	-	0.12 (0.24)	0.090 (0.18)	0.06 (0.12)	-	-	-	-
560	-	0.095 (0.19)	-	0.044 (0.088)	0.042 (0.084)	0.046 (0.092)	-	-
680	(S) 0.10 (0.20)	(S) 0.069 (0.14)	(S) 0.054 (0.11)	0.044 (0.088)	0.038 (0.076)	0.068 (0.13)	0.052 (0.11)	-
680	0.10 (0.20)	0.080 (0.16)	0.063 (0.12)	-	-	-	-	-
820	0.085 (0.17)	-	0.044 (0.09)	0.048 (0.096)	-	0.053 (0.11)	-	-
1000	(S) 0.069 (0.14)	(S) 0.050 (0.10)	0.039 (0.78)	0.038 (0.076)	(S) 0.029 (0.058)	0.039 (0.078)	0.042 (0.09)	-
1000	0.080 (0.16)	0.063 (0.12)	-	0.050 (0.10)	0.037 (0.074)	-	-	-
1200	(S) 0.064 (0.13)	0.044 (0.09)	0.038 (0.076)	0.032 (0.064)	0.029 (0.058)	0.029 (0.058)	-	-
1200	0.063 (0.12)	-	0.050 (0.10)	0.037 (0.074)	-	-	-	-
1500	(S) 0.044 (0.09)	0.039 (0.08)	(S) 0.037 (0.074)	0.037 (0.074)	0.029 (0.058)	(S) 0.029 (0.058)	-	-
1500	0.063 (0.12)	-	0.040 (0.08)	-	-	0.041 (0.082)	-	-
1800	-	(S) 0.038 (0.076)	0.037 (0.074)	0.026 (0.052)	0.025 (0.05)	0.029 (0.058)	-	-
1800	-	0.050 (0.10)	-	-	-	-	-	-
2200	0.048 (0.096)	(S) 0.038 (0.076)	0.037 (0.074)	0.029 (0.058)	(S) 0.020 (0.040)	-	-	-
2200	-	0.037 (0.074)	0.040 (0.08)	-	0.023 (0.046)	-	-	-
2700	(S) 0.037 (0.074)	(S) 0.032 (0.064)	0.028 (0.056)	0.020 (0.04)	0.023 (0.046)	-	-	-
2700	0.050 (0.10)	0.037 (0.074)	-	-	-	-	-	-
3300	-	(S) 0.035 (0.070)	0.026 (0.052)	(S) 0.019 (0.038)	0.022 (0.044)	-	-	-
3300	-	0.034 (0.068)	-	0.023 (0.046)	-	-	-	-
3900	(S) 0.029 (0.058)	0.028 (0.056)	0.025 (0.050)	0.023 (0.046)	-	-	-	-
3900	0.037 (0.074)	-	-	-	-	-	-	-
4700	0.037 (0.074)	0.024 (0.048)	(S) 0.022 (0.044)	0.022 (0.044)	-	-	-	-
4700	-	-	0.023 (0.046)	-	-	-	-	-
5600	0.029 (0.054)	0.024 (0.048)	0.020 (0.040)	-	-	-	-	-
6800	0.025 (0.050)	(S) 0.022 (0.044)	-	-	-	-	-	-
6800	-	0.023 (0.046)	-	-	-	-	-	-
8200	0.022 (0.044)	0.020 (0.040)	-	-	-	-	-	-
10000	0.023 (0.046)	-	-	-	-	-	-	-
12000	0.020 (0.040)	-	-	-	-	-	-	-

MAXIMUM RIPPLE CURRENT @ 100 KHz/105 ° C (mA rms)

VV Cap/μF	6.3 Max. Rip. (Ω)	10 Max. Rip. (Ω)	16 Max. Rip. (Ω)	25 Max. Rip. (Ω)	35 Max. Rip. (Ω)	50 Max. Rip. (Ω)	63 Max. Rip. (Ω)	100 Max. Rip. (Ω)
0.47	-	-	-	-	-	20	-	-
0.68	-	-	-	-	-	24	-	-
1	-	-	-	-	-	30	-	-
1.5	-	-	-	-	-	35	-	-
2.2	-	-	-	-	-	45	-	-
3.3	-	-	-	-	-	55	-	-
4.7	-	-	-	-	-	90	-	-
5.6	-	-	-	-	-	-	-	120
6.8	-	-	-	-	-	95	-	-
10	-	-	-	-	-	110	-	120
12	-	-	-	-	-	120	-	170
15	-	-	-	-	-	130	-	230
18	-	-	-	-	-	150	140	-
22	-	-	-	-	180	150	-	250
27	-	-	-	-	180	190	-	295
33	-	-	-	160	260	200	200	-
39	-	-	-	175	-	200	200	400
47	-	-	180	190	280	200	360	420
56	-	-	180	-	-	-	300	-
68	-	160	-	280	300	380	(S) 300	630
68	-	-	-	-	-	-	300	-
82	-	175	-	290	280	400	510	-
100	100	190	280	300	520	(S) 500	-	800
100	-	-	-	-	-	520	-	-
120	-	-	290	410	(S) 570	600	(S) 510	-
120	-	-	-	-	560	-	420	-
150	-	280	(S) 300	560	(S) 650	(S) 600	(S) 525	920
150	-	-	410	-	635	670	700	-
180	-	280	280	570	950	820	765	-
220	280	(S) 300	520	(S) 650	(S) 800	850	765	1100
220	-	410	-	630	950	-	-	-
270	-	-	570	750	-	-	840	-
330	(S) 300	560	(S) 650	(S) 800	(S) 1100	1000	960	1490
330	410	-	650	830	1050	-	-	-
390	-	-	950	-	1190	-	-	1630
470	560	(S) 610	(S) 800	(S) 1010	1250	1200	1200	1700
470	-	620	950	1250	-	-	-	-
560	-	735	-	1250	1400	1250	-	-
680	(S) 650	(S) 800	1250	1300	1400	1300	1500	-
680	710	950	1150	-	-	-	-	-
820	750	-	1250	1400	-	1490	-	-
1000	(S) 800	(S) 1200	1300	(S) 1400	(S) 1700	1600	1750	-
1000	900	1150	-	1400	1700	-	-	-
1200	(S) 950	1250	1400	(S) 1700	2000	1900	-	-
1200	1150	-	(S) 1400	1700	-	-	-	-
1500	(S) 1100	1300	(S) 1800	1700	2000	(S) 2100	-	-
1500	1150	-	1700	-	-	2000	-	-
1800	-	(S) 1400	1700	2100	2200	2300	-	-
1800	-	1400	-	-	-	-	-	-
2200	1400	(S) 1400	(S) 1700	2000	(S) 2550	-	-	-
2200	-	1700	1700	-	2350	-	-	-
2700	(S) 1700	(S) 1700	2200	2350	2500	-	-	-
2700	1400	1700	-	-	-	-	-	-
3300	-	(S) 1700	2250	(S) 2550	2700	-	-	-
3300	-	1660	-	2470	-	-	-	-
3900	(S) 1700	2070	2350	2500	-	-	-	-
3900	1700	-	-	-	-	-	-	-
4700	1700	2350	(S) 2550	2700	-	-	-	-
4700	-	-	2450	-	-	-	-	-
5600	2000	2350	2900	-	-	-	-	-
6800	2200	(S) 2550	-	-	-	-	-	-
6800	-	2410	-	-	-	-	-	-
8200	2350	2970	-	-	-	-	-	-
10000	2410	-	-	-	-	-	-	-
12000	2700	-	-	-	-	-	-	-