

WS Series**Features**

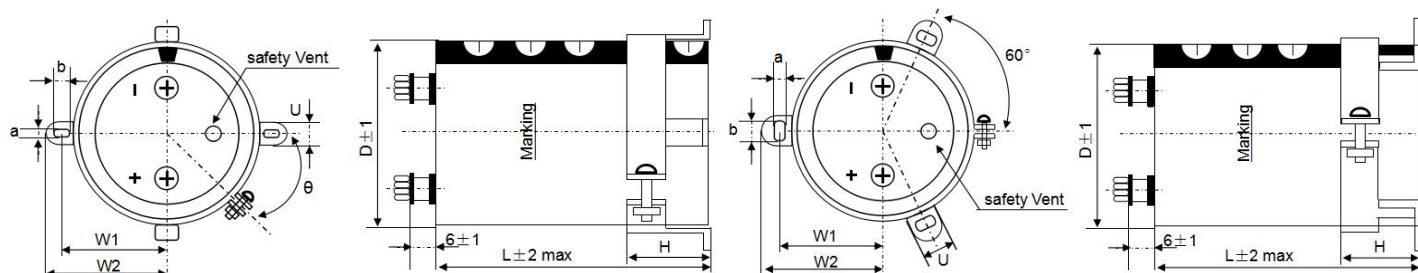
- Screw-mount terminal type
- Endurance with ripple current: 85℃ 2000 hours
- High ripple current capability
- Safety vent designed on aluminum case
- RoHS2.0 Compliant

Applications

- Professional power supply
- Inverter
- UPS
- Air conditioner, general purpose inverter
- Professional arena power amplifier
- Frequency converters
- Medical power supply
- New energy
- And others

规格表 Specifications

项目 Items	特性参数 Characteristics
使用温度范围 Category Temperature Range	-25 ~ +85℃ (160 ~ 500V.DC)
额定工作电压范围 Rated Voltage Range	10 ~ 500V.DC
电容量允许偏差 Capacitance Tolerance	±20%(M) (at 20℃, 120Hz)
漏电流 Leakage Current	≤0.02CV or 5mA, 二者取最小值 (施加额定工作电压5分钟后) Whichever is smaller (After 5 minutes application of rated Voltage) Note: I=Max.leakage current (μA), C=Nominal capacitance(μF), V=Rated voltage(V) (at 20℃)
损耗角正切值 tanδ Dissipation Factor	不能超过规格表所规定的标准值 Shall not exceed the values shown in the STANDARD RATINGS. (at 20℃, 120Hz)
低温特性 Low Temperature Characteristics (Max.Capacitance Ratio)	容量比值不得超过下表中列出的值 The Capacitance ratio shall not exceed the values listed as below.(at 120Hz) Capacitance change : $C(-25^{\circ}\text{C})/C(+20^{\circ}\text{C}) \geq 0.7$
绝缘阻抗 Insulation Resistance	在螺丝端子与固定架之间施加直流电压 500V, 测量其绝缘阻抗值不低于 100MΩ。 The insulation resistance shall be more than 100MΩ at DC 500V application between terminal and bracket.
绝缘耐电压 Voltage proof	在螺丝端子与固定架之间施加交流电压 2000V, 1分钟, 无电气性能异常。 There is no abnormality during AC 2000V 1 minute's application of voltage between terminal and bracket .
耐久性 Endurance	在85℃环境中, 不超过额定电压的范围内叠加最大允许纹波电流, 连续2000小时, 经恢复到20℃后, 电容器满足以下各项要求。 The following specifications shall be satisfied when the capacitors are restored to 20℃ after applied within maximum allowable ripple current and not over rated voltage range for 2000 hours at 85℃.
	Capacitance change ≤ ±20% of the initial value
	D F (tanδ) ≤ 200% of the initial specified value
	Leakage current ≤ The initial specified value
高温储存特性 Shelf Life	在85℃环境中, 不施加电压条件下储存500小时, 经恢复到20℃后, 电容器满足以下各项要求。 The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 500 hours at 85℃ without voltage applied.
	Capacitance change ≤ ±20% of the initial value
	D F (tanδ) ≤ 150% of the initial specified value
	Leakage current ≤ 200% of the initial specified value

尺寸图 (单位: mm) DIMENSIONS (Unit:mm)

*θ is optional for 45° or 30°

ΦD	W1	W2	U	a	b	H
36.0	24.0	29.0	10.0	3.8	7.0	15.0
51.0	34.0	40.0	14.0	5.0	7.0	30.0
64.0	40.5	46.5	14.0	5.0	7.0	30.0
77.0	46.8	53.0	14.0	5.0	7.0	30.0
90.0	54.0	60.3	14.0	5.0	7.0	30.0

ΦD	W1	W2	U	a	b	H
51.0	31.8	36.5	14.0	5.0	7.0	30.0
64.0	38.1	42.6	14.0	5.0	7.0	30.0
77.0	44.5	49.2	14.0	5.0	7.0	30.0
90.0	50.8	55.6	14.0	5.0	7.0	30.0
101.0	57.5	63.5	20.0	5.5	8.0	35.0

WS Series◆ 纹波电流修正系数 **Rated Ripple Current Coefficient**● 频率系数 **Frequency Coefficient**

Rated Voltage (V)	Frequency(Hz)				
	50/60	120	300	1K	>10K
10~50	0.95	1	1.04	1.1	1.15
63~100	0.95	1	1.06	1.16	1.3
160~500	0.8	1	1.1	1.25	1.5

◆ 尺寸&最大允许纹波电流一览表 **Dimensions & Maximum allowable ripple current**

UR.DC (Surge Voltage) Code (v)	Cap (μF)	maximum Dissipation Factor at 20℃ /120Hz	Maximum ESR at 20℃/ 120Hz (mΩ)	Maximum allowable Ripple Current at 85℃/120Hz (A.r.m.s)	Size ΦDxL (mm)	UR.DC (Surge Voltage) Code	Cap (μF)	maximum Dissipation Factor at 20℃/120Hz	Maximum ESR at 20℃/ 120Hz (mΩ)	Maximum allowable Ripple Current at 85℃/120Hz (A.r.m.s)	Size ΦDxL (mm)
10 (13) 1A	33,000	0.80	42.0	4.9	36X53	35 (44) 1V	10,000	0.40	60.0	4.0	36X53
	39,000	0.80	36.0	5.3	36X53		12,000	0.40	50.0	4.3	36X53
	47,000	0.80	30.0	5.8	36X65		15,000	0.40	42.5	4.8	36X65
	56,000	0.80	26.0	6.7	36X83		18,000	0.40	35.0	5.5	36X83
	68,000	0.80	20.0	7.3	36X83		22,000	0.40	30.0	6.3	36X83
	82,000	0.80	18.0	8.3	36X100		27,000	0.40	22.5	6.9	36X100
	100,000	0.80	16.0	9.4	36X100		33,000	0.40	22.5	7.8	36X100
	120,000	0.80	14.0	10.6	36X121		39,000	0.50	20.0	7.9	36X121
	150,000	1.00	14.0	11.4	36X121		47,000	0.50	20.0	9.3	51X96
	180,000	1.00	12.0	12.6	51X96		56,000	0.60	20.0	9.2	51X96
	220,000	1.50	10.0	11.8	51X121		68,000	0.60	15.0	10.4	51X115
	270,000	1.50	8.0	13.4	51X121		82,000	0.60	12.5	12.2	64X96
	330,000	1.50	8.0	15.9	64X96		100,000	0.60	10.0	13.9	64X115
	390,000	1.50	6.0	17.9	64X115		120,000	0.60	10.0	15.4	64X121
	470,000	2.00	6.0	17.3	64X130		150,000	0.80	10.0	15.5	64X130
	560,000	2.00	6.0	19.6	77X115		180,000	0.80	7.5	17.6	77X115
	680,000	2.00	6.0	22.3	77X130		220,000	0.80	7.5	20.6	77X130
	820,000	2.00	4.0	25.3	77X155		270,000	1.00	7.5	20.5	77x155
16 (20) 1C	22,000	0.60	44.0	4.7	36X53	50 (63) 1H	330,000	1.00	5.0	23.7	90x131
	27,000	0.60	38.0	5.1	36X53		390,000	1.00	5.0	26.6	90x157
	33,000	0.60	32.0	5.6	36X53		470,000	1.00	5.0	29.8	90X157
	39,000	0.60	26.0	6.5	36X65		5,600	0.30	92.0	3.2	36X53
	47,000	0.60	22.0	7.0	36X83		6,800	0.30	76.0	3.5	36X53
	56,000	0.60	20.0	7.9	36X83		8,200	0.30	62.0	3.8	36X53
	68,000	0.60	16.0	9.0	36X100		10,000	0.30	52.0	4.2	36X65
	82,000	0.80	14.0	8.9	36X100		12,000	0.30	44.0	4.9	36X83
	100,000	0.80	12.0	10.1	36X121		15,000	0.30	30.0	5.7	36x83
	120,000	0.80	10.0	11.5	36X121		18,000	0.30	24.0	6.4	36X100
	150,000	1.00	8.0	11.9	51X96		22,000	0.40	22.0	6.5	36x121
	180,000	1.00	6.0	13.4	51X115		27,000	0.40	20.0	7.3	36x121
	220,000	1.00	6.0	15.9	51X130		33,000	0.40	18.0	8.4	51X96
	270,000	1.00	6.0	18.2	64X96		39,000	0.50	16.0	8.3	51X96
	330,000	1.50	6.0	17.4	64X115		47,000	0.50	16.0	9.5	51x115
	390,000	1.50	6.0	18.9	64X130		56,000	0.50	12.0	10.7	64X96
	470,000	1.50	4.0	21.9	77X115		68,000	0.50	10.0	12.2	64X96
	560,000	1.50	4.0	24.2	77X130		82,000	0.50	8.0	13.9	64x115
25 (32) 1E	680,000	1.50	4.0	28.2	77X155	\$63.00 (79) 1J	10,000	0.60	8.0	14.9	77x115
	820,000	2.00	4.0	27.7	90X157		120,000	0.60	6.0	16.9	77X115
	15,000	0.50	49.5	4.3	36X53		150,000	0.60	6.0	19.5	77X130
	18,000	0.50	40.5	4.7	36X53		180,000	0.60	6.0	22.1	77x155
	22,000	0.50	36.0	5.1	36X53		220,000	0.60	4.0	21.6	90x131
	27,000	0.50	29.3	5.6	36X65		270,000	0.60	4.0	24.8	90X157
	33,000	0.50	24.8	6.5	36X83		3,900	0.25	94.0	2.9	36X53
	39,000	0.50	20.3	7.3	36X83		4,700	0.25	78.0	3.2	36X53
	47,000	0.50	18.0	8.3	36X100		5,600	0.25	76.0	3.5	36X53
	56,000	0.60	15.8	8.5	36X100		6,800	0.25	64.0	3.8	36X65
	68,000	0.60	13.5	9.7	36X121		8,200	0.25	52.0	4.5	36X83
	82,000	0.60	11.3	11.0	36X121		10,000	0.25	46.0	5.1	36X83
	100,000	0.80	9.0	10.9	51X96		12,000	0.25	36.0	5.8	36x100
	120,000	0.80	9.0	12.3	51X115		15,000	0.30	32.0	6.1	36x100
	150,000	0.80	6.8	14.7	51X130		18,000	0.30	30.0	6.9	36x121
	180,000	0.80	6.8	16.3	64X96		22,000	0.30	26.0	8.0	36x121
	220,000	1.00	6.8	16.7	64X115		27,000	0.40	24.0	7.6	51X96
	270,000	1.00	6.8	19.2	64X130		33,000	0.40	16.0	8.6	51X96
	330,000	1.00	4.5	22.5	64X155		39,000	0.40	14.0	9.7	51x115
	390,000	1.20	4.5	22.6	77X115		47,000	0.40	12.0	11.5	51x130
	470,000	1.20	4.5	26.2	77X155		56,000	0.40	12.0	13.0	64x115
	560,000	1.20	4.5	28.5	90X131		68,000	0.50	10.0	12.9	64x121
	680,000	1.20	4.5	33.1	90X157		82,000	0.50	8.0	14.7	64x130
							100,000	0.50	8.0	16.9	77x115
							120,000	0.50	6.0	19.1	77x130
							150,000	0.50	4.0	22.6	77X155
							180,000	0.60	4.0	22.6	90x131
							220,000	0.60	4.0	26.4	90X157

※铝电解电容器由于在纹波电流叠加时自我发热、温度上升而老化，中心温度每升温5℃寿命减少一半。要想保持长寿命请在使用过程中降低纹波
The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5℃ rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

WS Series

◆ 尺寸&最大允许纹波电流一览表Dimensions & maximum allowable ripple current

UR.DC (Surge Voltage) Code (v)	Cap (μF)	maximum Dissipation Factor at 20°C/120Hz	Maximum ESR at 20°C/ 120Hz (mΩ)	Maximum allowable Ripple Current at 85°C/120Hz (A.r.m.s)	Size ΦDxL (mm)	UR.DC (Surge Voltage) Code	Cap (μF)	maximum Dissipation Factor at 20°C/120Hz	Maximum ESR at 20°C/ 120Hz (mΩ)	Maximum allowable Ripple Current at 85°C/120Hz (A.r.m.s)	Size ΦDxL (mm)
80 (100) 1K	3,300	0.25	108.0	2.7	36X53	350 (400) 2V	470	0.2	798.0	2.4	36X83
	3,900	0.25	92.0	3.0	36X53		680	0.2	532.0	2.8	36X83
	4,700	0.25	76.0	3.2	36X65		1000	0.2	364.0	3.6	36X100
	5,600	0.25	64.0	3.8	36X83		1500	0.2	252.0	4.5	51X75
	6,800	0.25	52.0	4.1	36X83		1800	0.2	203.0	5.3	51X96
	8,200	0.25	44.0	4.7	36X83		2200	0.2	168.0	5.9	51X96
	10,000	0.25	34.0	5.4	36X100		2700	0.2	136.5	7.3	51X130
	12,000	0.25	30.0	6.1	36X100		3300	0.2	112.0	8.1	51X130
	15,000	0.25	24.0	7.0	36X121		3900	0.2	98.0	9.2	64X115
	18,000	0.25	20.0	8.0	36X121		4700	0.2	87.5	10.5	64X130
	22,000	0.30	20.0	8.2	51X96		5600	0.2	77.0	11.6	77X115
	27,000	0.30	16.0	9.4	51X96		6800	0.2	59.5	13.3	77X130
	33,000	0.30	14.0	10.7	51X115		8200	0.2	49.0	15.6	77X155
	39,000	0.30	12.0	12.2	51X130		10000	0.2	42.0	18.3	90X157
	47,000	0.30	10.0	13.8	64X115		12000	0.2	35.0	20.2	90X157
	56,000	0.40	8.0	13.6	64X130		15000	0.2	28.0	24.7	90X196
	68,000	0.40	8.0	15.6	77X115		18000	0.2	21.0	29.0	90X236
	82,000	0.40	8.0	17.7	77X130	\$400.00 (450) 2G	470	0.2	712.0	2.4	36X83
	100,000	0.40	6.0	20.7	77X155		680	0.2	476.0	3.0	36X100
	120,000	0.40	4.0	22.6	90X131		1000	0.2	328.0	3.7	51X75
	150,000	0.40	4.0	26.7	90X157		1200	0.2	272.0	4.0	51X75
100 (125) 2A	1,800	0.25	192.0	2.1	36X53		1500	0.2	232.0	4.9	51X96
	2,200	0.25	176.0	2.3	36X53		1800	0.2	188.0	5.4	51X96
	2,700	0.25	156.0	2.5	36X53		2200	0.2	140.0	6.6	51X120
	3,300	0.25	140.0	2.8	36X65		2700	0.2	132.0	7.2	64X96
	3,900	0.25	112.0	3.2	36X83		3300	0.2	124.0	8.4	64X115
	4,700	0.25	104.0	3.7	36X83		3900	0.2	100.0	9.6	64X130
	5,600	0.25	92.0	4.1	36X100		4700	0.2	96.0	10.6	77X115
	6,800	0.25	88.0	4.7	36X100		5600	0.2	76.0	12.1	77X130
	8,200	0.25	80.0	5.3	36X121		6800	0.2	64.0	14.3	77X155
	10,000	0.25	76.0	6.1	36X121		8200	0.2	56.0	16.6	90X157
	12,000	0.25	64.0	6.6	51X75		10000	0.2	44.0	18.5	90X157
	15,000	0.25	48.0	7.2	51X96		12000	0.2	40.0	22.0	90X196
	18,000	0.25	40.0	8.5	51X115		15000	0.2	32.0	26.5	90X236
	22,000	0.25	32.0	10.2	51X130	\$450.00 (500) 2W	470	0.2	600.0	2.4	36X83
	27,000	0.25	28.0	11.7	64X115		680	0.2	420.0	3.0	36X100
	33,000	0.25	24.0	12.1	64X130		820	0.2	288.0	3.4	51X75
	39,000	0.25	20.0	13.6	77X115		1000	0.2	246.0	3.7	51X75
	47,000	0.35	20.0	14.4	77X130		1200	0.2	216.0	4.4	51X96
	56,000	0.35	16.0	16.2	77X155		1500	0.2	174.0	5.3	51X115
	68,000	0.35	12.0	19.0	90X131		1800	0.2	138.0	6.1	51X130
	82,000	0.35	12.0	20.7	90X157		2200	0.2	99.0	6.5	64X96
	100,000	0.35	12.0	24.2	90X171		2700	0.2	96.0	7.7	64X115
\$160.00 (200) 2C	3300	0.25	124.0	5.4	36X121		3300	0.2	90.0	8.9	64X130
	4700	0.25	84.0	6.1	51X75		3900	0.2	87.0	9.7	77X115
	5600	0.25	76.0	7.2	51X96		4700	0.2	72.0	11.1	77X130
	6800	0.25	64.0	8.0	51X96		5600	0.2	48.0	13.0	77X155
	10000	0.25	52.0	10.6	64X96		6800	0.2	42.0	15.2	90X157
	12000	0.25	40.0	11.5	51X120		8200	0.2	36.0	16.7	90X157
	15000	0.25	36.0	14.5	64X130		10000	0.2	30.0	20.2	90X196
	18000	0.25	32.0	15.8	64X130		12000	0.2	24.0	23.8	90X236
	22000	0.25	24.0	18.5	77X130	\$500.00 (550) 2H	1000	0.25	340.0	4.8	51X115
	33000	0.25	16.0	24.0	90X131		1500	0.25	240.0	5.9	64X96
\$200.00 (250) 2D	39000	0.25	8.0	28.1	90X157		2200	0.25	164.0	7.1	64X130
	2200	0.25	190.0	4.1	36X100		2700	0.25	144.0	8.3	77X115
	3300	0.25	120.0	5.1	51X75		3300	0.25	128.0	9.8	77X130
	4700	0.25	100.0	6.6	51X96		3900	0.25	120.0	11.0	77X130
	5600	0.25	90.0	7.8	51X115		4700	0.25	108.0	12.3	77X155
	6800	0.25	70.0	9.0	51X130		5600	0.25	84.0	14.0	90X157
	8200	0.25	55.0	9.6	64X96		6800	0.25	72.0	16.0	90X171
	10000	0.25	45.0	10.6	64X96		8200	0.25	56.0	17.4	77X220
	15000	0.25	35.0	14.6	77X96		10000	0.25	40.0	22.3	90X236
	18000	0.25	30.0	16.7	77X130	\$250.00 (300) 2E	2200	0.25	165.0	4.2	51X75
\$250.00 (300) 2E	22000	0.25	20.0	19.8	77X155		3300	0.25	115.0	5.6	51X96
	33000	0.25	15.0	25.5	90X157		4700	0.25	85.0	7.3	64X96
	1500	0.25	245.0	3.4	36X100		6800	0.25	60.0	9.3	64X115
	2200	0.25	165.0	4.2	51X75		8200	0.25	55.0	10.2	64X115
	3300	0.25	115.0	5.6	51X96		10000	0.25	55.0	11.9	64X130
	4700	0.25	85.0	7.3	64X96		15000	0.25	35.0	15.3	77X130
	6800	0.25	60.0	9.3	64X115		18000	0.25	30.0	17.9	77X155
	8200	0.25	55.0	10.2	64X115		22000	0.25	15.0	21.1	90X157
	10000	0.25	55.0	11.9	64X130						
	15000	0.25	35.0	15.3	77X130						
	18000	0.25	30.0	17.9	77X155						
	22000	0.25	15.0	21.1	90X157						

※铝电解电容器由于在纹波电流叠加时自我发热、温度上升而老化，中心温度每升温5℃寿命减少一半。要想保持长寿命请在使用过程中降低纹波电流。

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5℃ rise. When long life performance is required in actual use, the rms ripple current has to be