

WH SERIES

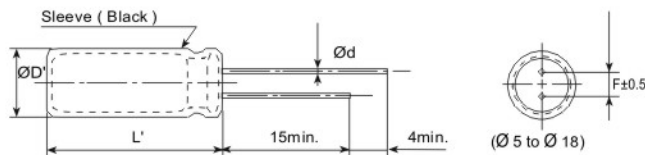
- Standard series for general purposes
- Wide temperature range from -40°C~+105°C
- Endurance: +105°C2,000hours
- RoHS Compliant



◆ SPECIFICATIONS

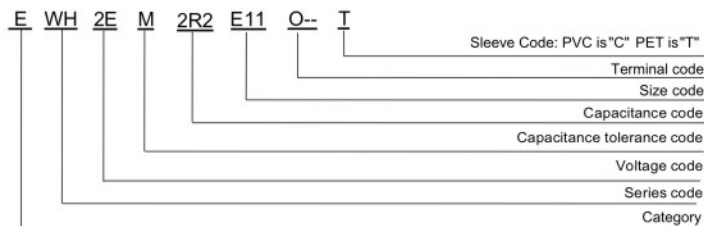
Items	Characteristics												
Category	-40 to +105°C(6.3 to 100Vdc) -25 to +105°C(160 to 450Vdc)												
Temperature Range													
Rated Voltage Range	6.3 to 450V _{dc}												
Capacitance Tolerance	±20%(M) (at 20°C, 120Hz)												
Leakage Current	6.3 to 100V _{dc}						160 to 450V _{dc}						Where, I : Max. leakage current (µA), C : Nominal capacitance (µF), V : Rated voltage (V) (at 20°C)
	I ≤ 0.03CV or 4µA (at 1 minute)						CV		After 1 minutes		After 5 minutes		
	I ≤ 0.01CV or 3µA (at 2 minute)						CV ≤ 1,000		I ≤ 0.1CV+40µA		I ≤ 0.03CV+15µA		
	Whichever is greater						CV > 1,000		I ≤ 0.04CV+100µA		I ≤ 0.02CV+25µA		
Dissipation Factor (tanδ)	Rated voltage (V _{dc})	6.3	10	16	25	35	50	63	100	160-250	350-400	450	(at 20°C, 120Hz)
	tanδ (Max.)	0.26	0.19	0.16	0.14	0.12	0.10	0.09	0.08	0.20	0.24	0.24	
	When nominal capacitance exceeds 1,000 µF, add 0.02 to the value above for each 1,000 µF increase.												
Low Temperature Characteristics (Max. Impedance Ratio)	Rated voltage (V _{dc})	6.3	10	16	25	35	50	63	100	160-250	350-400	450	(at 120Hz)
	Z(-25°C)/Z(+20°C)	5	4	3	2				3	6	6		
	Z(-40°C)/Z(+20°C)	12	10	8	5	4	3		-	-	-		
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple Current is applied for 2,000 hours at 105°C												
	Capacitance change	≤ ±20% of the initial value											
	D.F. (tanδ)	≤ 200% of the initial specified value											
	Leakage current	≤ The initial specified value											
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied												
	Capacitance change	≤ ±20% of the initial value											
	D.F. (tanδ)	≤ 200% of the initial specified value											
	Leakage current	≤ 200% of the initial specified value											

◆ DIMENSIONS [mm]



Ø D	5	6.3	8	10	12.5	16	18
Ø d	0.5	0.5	0.5	0.6	0.6	0.6	0.8
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
Ø D'	Ø D+0.5max.						
L'	L+2max.						

◆ PART NUMBERING SYSTEM



※ Sleeve Code and Terminal Code should follow the part number system

◆ RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Cap. (µF) \ Freq. (Hz)	50	120	300	1K	10K	100K
0.1 to 4.7	0.65	1.00	1.35	1.75	2.30	2.50
10 to 47	0.75	1.00	1.25	1.50	1.75	1.80
100 to 1000	0.80	1.00	1.15	1.30	1.40	1.50
2,200 to	0.85	1.00	1.03	1.05	1.08	1.08

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

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◆ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Case size ΦDxL(mm)	tanδ	Ripple current (mA _{rms} /105°C, 120Hz)
6.3(0J)	33	5×11	0.26	54
	47	5×11	0.26	64
	100	5×11	0.26	94
	220	5×11	0.26	140
	330	6.3×11	0.26	190
	470	6.3×11	0.26	230
	1000	8×11.5	0.26	380
	2200	10×20	0.28	710
	3300	10×20	0.30	840
	4700	12.5×20	0.32	1090
	6800	12.5×25	0.36	1350
	10000	16×25	0.44	1650
	15000	16×35	0.54	2010
	22000	18×40	0.68	2350
10(1A)	22	5×11	0.19	46
	33	5×11	0.19	57
	47	5×11	0.19	68
	100	5×11	0.19	100
	220	6.3×11	0.19	170
	330	6.3×11	0.19	200
	470	8×11.5	0.19	250
	1000	10×12	0.19	460
	2200	10×20	0.21	760
	3300	12.5×20	0.23	1000
	4700	12.5×25	0.25	1260
	6800	16×25	0.29	1570
	10000	16×35	0.37	1890
	15000	18×35	0.47	2180
16(1C)	10	5×11	0.16	34
	22	5×11	0.16	51
	33	5×11	0.16	63
	47	5×11	0.16	75
	100	5×11	0.16	110
	220	6.3×11	0.16	180
	330	8×11.5	0.16	260
	470	8×11.5	0.16	310
	1000	10×16	0.16	560
	2200	12.5×20	0.18	920
	3300	12.5×25	0.20	1170
	4700	16×25	0.22	1480
	6800	16×30	0.26	1780
	10000	18×35	0.34	2060
25(1E)	4.7	5×11	0.14	25
	10	5×11	0.14	36
	22	5×11	0.14	54
	33	5×11	0.14	67
	47	5×11	0.14	80
	100	6.3×11	0.14	130
	220	8×11.5	0.14	230
	330	8×11.5	0.14	310
	470	10×12	0.14	380
	1000	10×20	0.14	680
	2200	12.5×25	0.16	1090
	3300	16×25	0.18	1400
	4700	16×30	0.20	1710
	6800	18×35	0.24	2040

WV (Vdc)	Cap (μF)	Case size ΦDxL(mm)	tanδ	Ripple current (mA _{rms} /105°C, 120Hz)
35(1V)	4.7	5×11	0.12	28
	10	5×11	0.12	41
	22	5×11	0.12	61
	33	5×11	0.12	75
	47	5×11	0.12	90
	100	6.3×11	0.12	150
	220	8×11.5	0.12	270
	330	10×12	0.12	350
	470	10×16	0.12	460
	1000	12.5×20	0.12	810
	2200	16×25	0.14	1260
	3300	16×35	0.16	1610
	4700	18×35	0.18	1910
	50(1H)	0.10	5×11	0.10
0.22		5×11	0.10	2.9
0.33		5×11	0.10	4.3
0.47		5×11	0.10	6.2
1.0		5×11	0.10	13
2.2		5×11	0.10	20
3.3		5×11	0.10	25
4.7		5×11	0.10	30
10		5×11	0.10	40
22		5×11	0.10	65
33		6.3×11	0.10	90
47		6.3×11	0.10	110
100		8×11.5	0.10	180
220		10×12	0.10	300
330	10×16	0.10	410	
470	10×20	0.10	530	
1000	12.5×25	0.10	950	
2200	16×35	0.12	1470	
3300	18×35	0.14	1770	
63(1J)	10	5×11	0.09	46
	22	5×11	0.09	71
	33	6.3×11	0.09	100
	47	6.3×11	0.09	120
	100	10×12	0.09	215
	220	10×16	0.09	335
	330	10×20	0.09	510
	470	12.5×20	0.09	640
	1000	16×25	0.09	930
	100(1K)	0.10	5×11	0.08
0.22		5×11	0.08	3.4
0.33		5×11	0.08	5.0
0.47		5×11	0.08	7.1
1.0		5×11	0.08	15
2.2		5×11	0.08	21
3.3		5×11	0.08	29
4.7		5×11	0.08	62
10		6.3×11	0.08	54
22		8×11.5	0.08	93
33		8×11.5	0.08	130
47		10×12	0.08	165
100		10×20	0.08	265
220		12.5×25	0.08	440

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WV (Vdc)	Cap (μF)	Case size ΦDxL(mm)	tanδ	Ripple current (mA _{rms} /105°C, 120Hz)
100(1K)	330	16×25	0.08	540
	470	16×30	0.08	715
	1000	18×40	0.08	985
160(2C)	3.3	6.3×11	0.20	28
	4.7	6.3×11	0.20	34
	10	10×12	0.20	67
	22	10×20	0.20	120
	33	10×20	0.20	145
	47	12.5×20	0.20	195
	100	16×25	0.20	335
	220	16×30	0.20	540
	330	18×35	0.20	705
	200(2D)	3.3	6.3×11	0.20
4.7		8×11.5	0.20	39
10		10×16	0.20	74
22		10×20	0.20	120
33		12.5×20	0.20	160
47		12.5×20	0.20	195
68		12.5×25	0.20	250
82		12.5×25	0.20	300
100		16×25	0.20	335
150		16×25	0.20	390
180		16×30	0.20	450
220		18×30	0.20	575
330		18×35	0.20	650
470		18×45	0.20	700
250(2E)		2.2	6.3×11	0.20
	3.3	8×11.5	0.20	32
	4.7	8×11.5	0.20	39
	10	10×16	0.20	74
	22	12.5×20	0.20	130
	33	12.5×20	0.20	160
	47	12.5×25	0.20	210
	100	16×30	0.20	365
	150	16×35	0.20	460
	220	18×40	0.20	585
330	18×40	0.20	700	

WV (Vdc)	Cap (μF)	Case size ΦDxL(mm)	tanδ	Ripple current (mA _{rms} /105°C, 120Hz)
350(2V)	0.47	6.3×11	0.24	11
	1.0	6.3×11	0.24	15
	2.2	8×11.5	0.24	26
	3.3	10×12	0.24	38
	4.7	10×16	0.24	50
	10	10×20	0.24	80
	22	12.5×20	0.24	130
	33	16×20	0.24	195
	47	16×25	0.24	230
	100	18×30	0.24	375
400(2G)	1.0	6.3×11	0.24	15
	2.2	8×11.5	0.24	26
	3.3	10×12	0.24	38
	4.7	10×16	0.24	50
	10	10×20	0.24	80
	22	12.5×25	0.24	165
	33	16×20	0.24	215
	47	16×25	0.24	300
	68	18×25	0.24	310
	82	18×25	0.24	320
	100	16×40	0.24	350
	120	18×30	0.24	450
150	18×35	0.24	550	
450(2W)	0.47	10×12	0.24	9.0
	1.0	10×12	0.24	13
	2.2	10×12	0.24	23
	3.3	10×16	0.24	31
	4.7	10×20	0.24	40
	10	12.5×20	0.24	95
	22	16×20	0.24	185
	33	16×25	0.24	215
	47	16×30	0.24	320
	68	18×30	0.24	350
	82	18×30	0.24	400
	100	18×35	0.24	450
	120	18×40	0.24	550
	150	18×50	0.24	650