

WH series

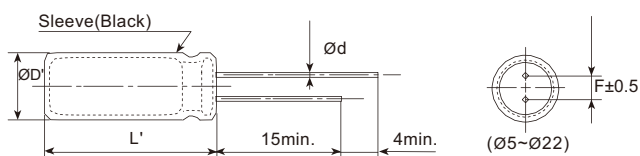
- Standard series for general purpose
- Wide temperature range from -40 °C to +105 °C
- Endurance: 2,000 hours at 105 °C
- RoHS Compliant



SPECIFICATIONS

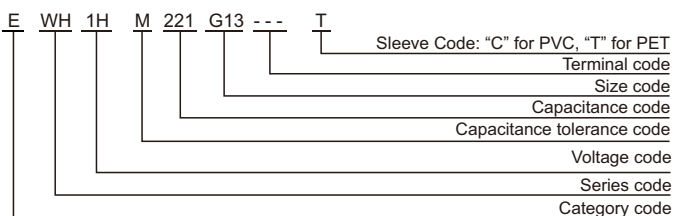
Items	Characteristics	
Category Temperature Range	-40~+105 °C (6.3~100 V _{dc})	-25~+105°C(160~500 V _{dc})
Rated Voltage Range	6.3~500 V _{dc}	
Capacitance Tolerance	±20%(M) (at 20°C, 120Hz)	
Leakage Current	6.3~100 V _{dc}	
	160~500 V _{dc}	
	I: leakage current(μA), C: Nominal capacitance(μF) V: Rated voltage(V) (at 20°C)	
	I≤0.03CV or 4μA (at 1 minute) I≤0.01CV or 3μA (at 2 minutes) Whichever is greater	CV After 1 minute After 5 minutes CV≤1,000: I≤0.1CV+40μA I≤0.03CV+15μA 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 63 100 160~250 350~500
	Dissipation Factor (Max.)	0.28 0.24 0.20 0.16 0.14 0.12 0.10 0.08 0.20 0.24
	When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20°C, 120Hz)	
Low Temperature Characteristics (Max. Impedance Ratio)	Rated Voltage(V _{dc})	6.3 10 16 25 35 50 63 100 160~250 350~450 500
	Z(-25°C)/Z(+20°C)	5 4 3 2 3 6 8
	Z(-40°C)/Z(+20°C)	12 10 8 5 4 3 - (at 120Hz)
Endurance	The specifications listed below shall be satisfied when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for 2,000 hours at 105°C.	
	Capacitance Change	≤±20% of the initial value
	Dissipation Factor	≤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 leaving them under no load at 105°C for 1,000 hours.	
	Capacitance Change	≤±20% of the initial value
	Dissipation Factor	≤200% of the initial specified value
	Leakage Current	≤200% of the initial specified value

DIMENSIONS[mm]



ØD	5	6.3	8	10	12.5/13	16/18	22
Ød	0.5	0.5	0.5 0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	7.5	10.0
ØD'	ØD+0.5max.						
L'	L+2max.						

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

Cap.(μF)	Freq.(Hz)					
	50	120	300	1k	10k	100k
Cap.<10	0.65	1.00	1.35	1.75	2.30	2.50
10≤Cap.<100	0.75	1.00	1.25	1.50	1.75	1.80
100≤Cap.<1000	0.80	1.00	1.15	1.30	1.40	1.50
Cap.≥1000	0.85	1.00	1.03	1.05	1.08	1.08

WH series

■ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	Rated ripple current (mA _{rms} /105°C, 120Hz)	Part Number
6.3	33	5×11	54	EWHOJM330D11---T
	47	5×11	64	EWHOJM470D11---T
	100	5×11	94	EWHOJM101D11---T
	220	5×11	140	EWHOJM221D11---T
	330	6.3×11	190	EWHOJM331E11---T
	470	6.3×11	230	EWHOJM471E11---T
	1000	8×12	380	EWHOJM102F12---T
	2200	10×20	710	EWHOJM222G20---T
	3300	10×20	840	EWHOJM332G20---T
	4700	12.5×20	1090	EWHOJM472W20---T
	6800	12.5×25	1350	EWHOJM682W25---T
	10000	16×25	1650	EWHOJM103L25---T
	15000	16×35	2010	EWHOJM153L35---T
	22000	18×40	2350	EWHOJM223M40---T
10	22	5×11	46	EWHA1AM220D11---T
	33	5×11	57	EWHA1AM330D11---T
	47	5×11	68	EWHA1AM470D11---T
	100	5×11	100	EWHA1AM101D11---T
	220	6.3×11	170	EWHA1AM221E11---T
	330	6.3×11	200	EWHA1AM331E11---T
	470	8×11	250	EWHA1AM471F11---T
	1000	10×13	460	EWHA1AM102G13---T
	2200	10×20	760	EWHA1AM222G20---T
	3300	12.5×20	1000	EWHA1AM332W20---T
	4700	12.5×25	1260	EWHA1AM472W25---T
	6800	16×25	1570	EWHA1AM682L25---T
	10000	16×35	1890	EWHA1AM103L35---T
	15000	18×35	2180	EWHA1AM153M35---T
16	10	5×11	34	EWHA1CM100D11---T
	22	5×11	51	EWHA1CM220D11---T
	33	5×11	63	EWHA1CM330D11---T
	47	5×11	75	EWHA1CM470D11---T
	100	5×11	110	EWHA1CM101D11---T
	220	6.3×11	180	EWHA1CM221E11---T
	330	8×11	260	EWHA1CM331F11---T
	470	8×12	310	EWHA1CM471F12---T
	1000	10×16	560	EWHA1CM102G16---T
	2200	12.5×20	920	EWHA1CM222W20---T
	3300	12.5×25	1170	EWHA1CM332W25---T
	4700	16×25	1480	EWHA1CM472L25---T
	6800	16×30	1780	EWHA1CM682L30---T
	10000	18×35	2060	EWHA1CM103M35---T
25	4.7	5×11	25	EWHA1EM47R7D11---T
	10	5×11	36	EWHA1EM100D11---T
	22	5×11	54	EWHA1EM220D11---T
	33	5×11	67	EWHA1EM330D11---T
	47	5×11	80	EWHA1EM470D11---T
	100	6.3×11	130	EWHA1EM101E11---T
	220	8×11	230	EWHA1EM221F11---T
	330	8×12	310	EWHA1EM331F12---T
	470	10×13	380	EWHA1EM471G13---T
	1000	10×20	680	EWHA1EM102G20---T
	2200	12.5×25	1090	EWHA1EM222W25---T
	3300	16×25	1400	EWHA1EM332L25---T
	4700	16×30	1710	EWHA1EM472L30---T
	6800	18×35	2040	EWHA1EM682M35---T
35	4.7	5×11	28	EWHA1VM47R7D11---T
	10	5×11	41	EWHA1VM100D11---T
	22	5×11	61	EWHA1VM220D11---T
	33	5×11	75	EWHA1VM330D11---T
	47	5×11	90	EWHA1VM470D11---T
	100	6.3×11	150	EWHA1VM101E11---T
	220	8×12	270	EWHA1VM221F12---T
	330	10×13	350	EWHA1VM331G13---T
	470	10×16	460	EWHA1VM471G16---T
	1000	12.5×20	810	EWHA1VM102W20---T
	2200	16×25	1260	EWHA1VM222L25---T
	3300	16×35	1610	EWHA1VM332L35---T
	4700	18×35	1910	EWHA1VM472M35---T

WV (Vdc)	Cap (μF)	Size ΦDxL(mm)	Rated ripple current (mA _{rms} /105°C, 120Hz)	Part Number
50	0.1	5×11	1.3	EWHA1HMR10D11---T
	0.22	5×11	2.9	EWHA1HMR22D11---T
	0.33	5×11	4.3	EWHA1HMR33D11---T
	0.47	5×11	6.2	EWHA1HMR47D11---T
	1	5×11	13	EWHA1HM010D11---T
	2.2	5×11	20	EWHA1HM2R2D11---T
	3.3	5×11	25	EWHA1HM3R3D11---T
	4.7	5×11	30	EWHA1HM4R7D11---T
	10	5×11	40	EWHA1HM100D11---T
	22	5×11	65	EWHA1HM220D11---T
	33	6.3×11	90	EWHA1HM330E11---T
	47	6.3×11	110	EWHA1HM470E11---T
	100	8×11	180	EWHA1HM101F11---T
	220	10×13	300	EWHA1HM221G13---T
63	330	10×16	410	EWHA1HM331G16---T
	470	10×20	530	EWHA1HM471G20---T
	1000	12.5×25	950	EWHA1HM102W25---T
	2200	16×35	1470	EWHA1HM222L35---T
	3300	18×35	1770	EWHA1HM332M35---T
	10	5×11	46	EWHA1JM100D11---T
	22	5×11	71	EWHA1JM220D11---T
	33	6.3×11	100	EWHA1JM330E11---T
	47	6.3×11	120	EWHA1JM470E11---T
	100	10×13	215	EWHA1JM101G13---T
	220	10×16	335	EWHA1JM221G16---T
	330	10×20	510	EWHA1JM331G20---T
	470	12.5×20	640	EWHA1JM471W20---T
	1000	16×25	930	EWHA1JM102L25---T
100	0.1	5×11	1.5	EWHA1KMR10D11---T
	0.22	5×11	3.4	EWHA1KMR22D11---T
	0.33	5×11	5	EWHA1KMR33D11---T
	0.47	5×11	7.1	EWHA1KMR47D11---T
	1	5×11	15	EWHA1KM010D11---T
	2.2	5×11	21	EWHA1KM2R2D11---T
	3.3	5×11	29	EWHA1KM3R3D11---T
	4.7	5×11	32	EWHA1KM4R7D11---T
	10	6.3×11	54	EWHA1KM100E11---T
	22	8×11	93	EWHA1KM220F11---T
	33	8×12	130	EWHA1KM330F12---T
	47	10×13	165	EWHA1KM470G13---T
	100	10×20	265	EWHA1KM101G20---T
	220	12.5×25	440	EWHA1KM221W25---T
160	330	16×25	540	EWHA1KM331L25---T
	470	16×30	715	EWHA1KM471L30---T
	1000	18×40	985	EWHA1KM102M40---T
	3.3	6.3×9	28	EWHA2CM3R3E09---T
	4.7	6.3×9	34	EWHA2CM4R7E09---T
	10	6.3×12	60	EWHA2CM100E12---T
	10	8×9	60	EWHA2CM100F09---T
	22	8×12	88	EWHA2CM220F12---T
	22	10×12	98	EWHA2CM220G12---T
	33	10×12	140	EWHA2CM330G12---T
	33	10×16	158	EWHA2CM330G16---T
	47	10×14	142	EWHA2CM470G14---T
	47	10×20	182	EWHA2CM470G20---T
	68	10×20	240	EWHA2CM680G20---T
200	100	12.5×20	300	EWHA2CM101W20---T
	100	16×20	316	EWHA2CM101L20---T
	220	16×25	530	EWHA2CM221L25---T
	330	18×25	600	EWHA2CM331M25---T
	470	18×35	820	EWHA2CM471M35---T
	1	6.3×7	12	EWHA2DM010E07---T
	2.2	6.3×7	18	EWHA2DM2R2E07---T
	3.3	6.3×9	28	EWHA2DM3R3E09---T
	4.7	6.3×9	40	EWHA2DM4R7E09---T
	10	8×12	78	EWHA2DM100F12---T
	22	8×16	110	EWHA2DM220F16---T
	22	10×12	110	EWHA2DM220G12---T
	33	10×16	166	EWHA2DM330G16---T

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■ STANDARD RATINGS

WV (V _{dc})	Cap (μF)	Size ΦDxL(mm)	Rated ripple current (mA _{RMS} /105°C, 120Hz)	Part Number
200	33	10×20	185	EWH2DM330G20---T
	47	10×20	200	EWH2DM470G20---T
	68	12.5×20	290	EWH2DM680W20---T
	82	12.5×20	300	EWH2DM820W20---T
	100	13×20	305	EWH2DM101K20---T
	100	16×20	325	EWH2DM101L20---T
	150	16×25	446	EWH2DM151L25---T
	180	16×25	530	EWH2DM181L25---T
	220	18×25	620	EWH2DM221M25---T
	330	18×30	720	EWH2DM331M30---T
470	18×40	840	EWH2DM471M40---T	
250	2.2	6.3×9	21	EWH2EM2R2E09---T
	3.3	6.3×9	30	EWH2EM3R3E09---T
	4.7	6.3×12	38	EWH2EM4R7E12---T
	4.7	8×9	45	EWH2EM4R7F09---T
	10	8×12	70	EWH2EM100F12---T
	10	10×12	75	EWH2EM100G12---T
	22	8×16	100	EWH2EM220F16---T
	22	10×16	116	EWH2EM220G16---T
	33	10×20	150	EWH2EM330G20---T
	33	12.5×16	165	EWH2EM330W16---T
	47	12.5×20	232	EWH2EM470W20---T
	100	16×25	370	EWH2EM101L25---T
	150	18×25	455	EWH2EM151M25---T
	220	18×30	600	EWH2EM221M30---T
	330	18×35	705	EWH2EM331M35---T
350	1	6.3×9	13	EWH2VM010E09---T
	2.2	6.3×9	23	EWH2VM2R2E09---T
	3.3	8×9	31	EWH2VM3R3F09---T
	4.7	8×9	45	EWH2VM4R7F09---T
	10	10×12	68	EWH2VM100G12---T
	22	10×20	135	EWH2VM220G20---T
	33	12.5×20	184	EWH2VM330W20---T
	47	16×20	225	EWH2VM470L20---T
	68	16×25	336	EWH2VM680L25---T
	100	18×30	398	EWH2VM101M30---T
400	1	6.3×9	14	EWH2GM010E09---T
	2.2	6.3×9	25	EWH2GM2R2E09---T
	2.2	8×9	30	EWH2GM2R2F09---T
	3.3	6.3×12	33	EWH2GM3R3E12---T
	3.3	8×9	34	EWH2GM3R3F09---T
	4.7	8×9	45	EWH2GM4R7F09---T
	4.7	8×12	48	EWH2GM4R7F12---T
	10	8×16	92	EWH2GM100F16---T
	10	10×12	92	EWH2GM100G12---T
	22	10×20	160	EWH2GM220G20---T
	33	16×20	258	EWH2GM330L20---T
	47	16×20	290	EWH2GM470L20---T
	68	16×25	420	EWH2GM680L25---T
	68	18×20	420	EWH2GM680M20---T
	82	18×25	474	EWH2GM820M25---T
	100	18×30	532	EWH2GM101M30---T
	120	18×35	588	EWH2GM121M35---T
150	18×35	610	EWH2GM151M35---T	
450	1	6.3×9	14	EWH2WM010E09---T
	1	6.3×12	16	EWH2WM010E12---T
	2.2	8×9	22	EWH2WM2R2F09---T
	2.2	8×12	25	EWH2WM2R2F12---T
	3.3	8×12	32	EWH2WM3R3F12---T
	4.7	10×12	48	EWH2WM4R7G12---T
	10	10×16	85	EWH2WM100G16---T
	10	10×20	90	EWH2WM100G20---T
	22	12.5×20	150	EWH2WM220W20---T
	22	16×20	185	EWH2WM220L20---T
	33	16×20	200	EWH2WM330L20---T
	47	16×25	335	EWH2WM470L25---T
	68	18×25	400	EWH2WM680M25---T
	82	18×30	472	EWH2WM820M30---T

WV (V _{dc})	Cap (μF)	Size ΦDxL(mm)	Rated ripple current (mA _{RMS} /105°C, 120Hz)	Part Number
450	100	18×35	530	EWH2WM101M35---T
	120	18×40	582	EWH2WM121M40---T
	150	18×45	610	EWH2WM151M45---T
500	4.7	10×16	50	EWH2HM4R7G16---T
	10	12.5×20	115	EWH2HM100W20---T
	15	12.5×25	140	EWH2HM150W25---T
	22	16×25	185	EWH2HM220L25---T
	33	18×25	215	EWH2HM330M25---T
	47	18×35	345	EWH2HM470M35---T
	68	18×35	390	EWH2HM680M35---T
	82	18×40	490	EWH2HM820M40---T
	100	22×35	535	EWH2HM101O35---T
	120	22×40	550	EWH2HM121O40---T

※ Specifications subject to change without notice.

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