

T-HA Series 105°C, 3000 hours

- Long Life - endurance rating of 3000 hours at 105°C
- 4 or 5 terminal mounting provides stability and keyed polarity
- Extended higher CV ratings



Rated Working Voltage:	16 ~ 250 VDC	350 ~ 450 VDC
Operating Temperature:	-40 ~ +105°C	-25 ~ +105°C
Nominal Capacitance:	820~250000µF	330~2200µF
Capacitance Tolerance:	± 20%	
Dissipation Factor: (120 Hz, +20°C)	Working Voltage [V]:	16    25    35    50    63    80    100    160 ~ 450
	Max. D.F. (%):	50    40    35    30    25    20    20    15
For capacitance values > 33000µF, add the value of: $\frac{(\text{rated cap. } [\mu\text{F}] - 33000)}{1000}$		
Leakage Current:	3√CV (µA) max. after 5 minutes; C = Capacitance in µF, V = WV	
Ripple Current Multipliers:	Frequency(Hz):	50    60    100-120    500    1k    10k
	Temperature (°C):	105°C    85°C    70°C    60°C    ≤45°C
		Multiplier: 1.0    1.7    2.0    2.2    2.35
Endurance:	3000 hours at +105°C with maximum specified ripple current (see page 4)	

\*\*Use of temperature ripple current multipliers may limit life to the hours specified for the maximum operating temperature.

Part Number System

RoHS compliant PVC sleeve and top plate is standard.

Terminals	
Prefix	No. of Pins
ECET	4
ECEP	5

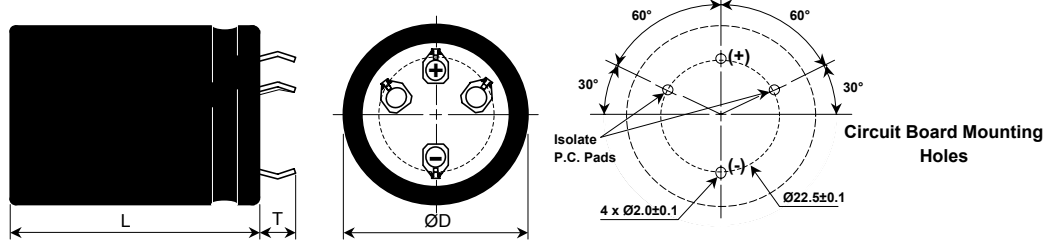
Voltage Code											
1C	1E	1V	1H	1J	1K	2A	2D	2E	2V	2G	2W
16	25	35	50	63	80	100	200	250	350	400	450

Diameter Code	
Dia.	Code
35	E
40	F
50	H

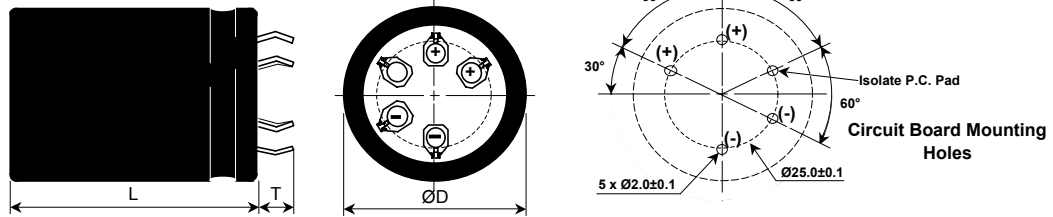
Terminal Suffix Code		
Terminal Length & Type	Standard Ratings	Extended Ratings
6.3mm Snap-in (Standard):	A	X
4.0mm Snap-in (4 pin only):	4	5
4.0mm Straight with Standoff:	E	Y

Dimensions in millimeters

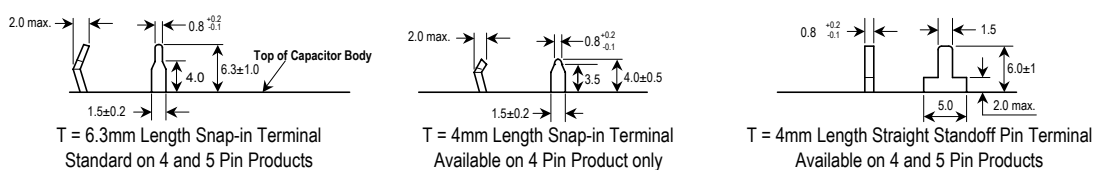
4 Pin Mounting Style



5 Pin Mounting Style



Pin Dimensions



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## T-HA Standard Ratings

Part numbers shown with 6.3mm Length Snap-in Terminals

Cap. ( $\mu$ F)	Size (mm) D x L	Max 105°C R.C. ( $A_{rms}$ )		20°C ESR ( $\Omega$ , max.)		Panasonic Part Number	
		120Hz	10kHz~	120Hz	20kHz	4 Pin Style	5 Pin Style
<b>16 VDC Working, 20 VDC Surge</b>							
39000	35 x 40	5.10	5.87	0.022	0.020	ECET1CA393EA	
47000	40 x 40	5.50	6.33	0.020	0.018	ECET1CA473FA	ECEP1CA473FA
56000	35 x 50	6.00	6.90	0.019	0.017	ECET1CA563EA	
68000	35 x 63	6.62	7.61	0.017	0.015	ECET1CA683EA	
	40 x 50	7.29	8.38	0.015	0.014	ECET1CA683FA	ECEP1CA683FA
82000	40 x 63	7.66	8.81	0.017	0.015	ECET1CA823FA	ECEP1CA823FA
100000	35 x 80	8.03	9.23	0.015	0.013	ECET1CA104EA	
120000	35 x 105	8.71	10.02	0.014	0.012	ECET1CA124EA	
	40 x 80	8.79	10.11	0.014	0.012	ECET1CA124FA	ECEP1CA124FA
	50 x 50	9.02	10.37	0.015	0.014		ECEP1CA124HA
150000	40 x 105	9.88	11.36	0.013	0.012	ECET1CA154FA	ECEP1CA154FA
	50 x 63	10.15	11.67	0.014	0.013		ECEP1CA154HA
180000	50 x 80	11.02	12.67	0.013	0.012		ECEP1CA184HA
220000	50 x 92	11.71	13.47	0.012	0.011		ECEP1CA224HA
250000	50 x 105	12.31	14.16	0.011	0.010		ECEP1CA254HA
<b>25 VDC Working, 32 VDC Surge</b>							
27000	35 x 40	4.80	5.52	0.018	0.017	ECET1EA273EA	
33000	35 x 50	5.50	6.33	0.018	0.016	ECET1EA333EA	
	40 x 40	5.50	6.33	0.018	0.016	ECET1EA333FA	ECEP1EA333FA
47000	35 x 63	6.56	7.54	0.017	0.015	ECET1EA473EA	
	40 x 50	6.47	7.44	0.015	0.014	ECET1EA473FA	ECEP1EA473FA
56000	35 x 80	7.25	8.34	0.015	0.013	ECET1EA563EA	
	40 x 63	7.17	8.25	0.014	0.013	ECET1EA563FA	ECEP1EA563FA
82000	35 x 105	8.58	9.87	0.013	0.012	ECET1EA823EA	
	40 x 80	8.68	9.98	0.013	0.012	ECET1EA823FA	ECEP1EA823FA
	50 x 50	9.20	10.58	0.016	0.015		ECEP1EA823HA
100000	40 x 105	9.76	11.22	0.012	0.010	ECET1EA104FA	ECEP1EA104FA
	50 x 63	10.02	11.52	0.015	0.013		ECEP1EA104HA
120000	50 x 80	10.93	12.57	0.013	0.012		ECEP1EA124HA
150000	50 x 92	11.70	13.46	0.012	0.011		ECEP1EA154HA
180000	50 x 105	12.42	14.28	0.010	0.009		ECEP1EA184HA
<b>35 VDC Working, 44 VDC Surge</b>							
18000	35 x 40	4.30	4.95	0.028	0.021	ECET1VA183EA	
22000	35 x 50	5.00	5.75	0.023	0.017	ECET1VA223EA	
	40 x 40	5.00	5.75	0.023	0.017	ECET1VA223FA	ECEP1VA223FA
27000	35 x 63	5.53	6.36	0.025	0.018	ECET1VA273EA	
	40 x 50	5.44	6.26	0.020	0.015	ECET1VA273FA	ECEP1VA273FA
33000	40 x 63	6.61	7.60	0.019	0.014	ECET1VA333FA	ECEP1VA333FA
39000	35 x 80	6.52	7.50	0.019	0.014	ECET1VA393EA	
47000	35 x 105	8.07	9.28	0.017	0.013	ECET1VA473EA	
	40 x 80	7.79	8.96	0.018	0.013	ECET1VA473FA	ECEP1VA473FA
	50 x 50	8.25	9.49	0.021	0.016		ECEP1VA473HA
56000	50 x 63	9.07	10.43	0.019	0.014		ECEP1VA563HA
68000	40 x 105	9.27	10.66	0.016	0.012	ECET1VA683FA	ECEP1VA683FA
	50 x 80	10.07	11.58	0.017	0.013		ECEP1VA683HA
82000	50 x 92	10.89	12.52	0.015	0.011		ECEP1VA823HA
100000	50 x 105	11.75	13.51	0.013	0.010		ECEP1VA104HA
<b>50 VDC Working, 63 VDC Surge</b>							
10000	35 x 40	4.00	4.60	0.033	0.025	ECET1HA103EA	
15000	35 x 50	4.80	5.52	0.022	0.018	ECET1HA153EA	
	40 x 40	4.80	5.52	0.022	0.018	ECET1HA153FA	ECEP1HA153FA
18000	35 x 63	5.27	6.06	0.020	0.016	ECET1HA183EA	
22000	40 x 50	5.15	5.92	0.016	0.013	ECET1HA223FA	ECEP1HA223FA
27000	35 x 80	6.16	7.08	0.015	0.012	ECET1HA273EA	
	40 x 63	6.05	6.96	0.015	0.012	ECET1HA273FA	ECEP1HA273FA
33000	35 x 105	7.23	8.31	0.013	0.010	ECET1HA333EA	
	50 x 50	7.75	8.91	0.018	0.014		ECEP1HA333HA
39000	40 x 80	7.55	8.68	0.014	0.011	ECET1HA393FA	ECEP1HA393FA
	50 x 63	8.40	9.66	0.016	0.013		ECEP1HA393HA
47000	40 x 105	8.18	9.41	0.012	0.010	ECET1HA473FA	ECEP1HA473FA
	50 x 80	9.19	10.57	0.014	0.011		ECEP1HA473HA
56000	50 x 92	9.79	11.26	0.012	0.009		ECEP1HA563HA

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## T-HA Standard Ratings (continued)

Part numbers shown with 6.3mm Length Snap-in Terminals

Cap. ( $\mu$ F)	Size (mm) D x L	Max 105°C R.C. ( $A_{rms}$ )		20°C ESR ( $\Omega$ , max.)		Panasonic Part Number	
		120Hz	10kHz~	120Hz	20kHz	4 Pin Style	5 Pin Style
<b>50 VDC Working, 63 VDC Surge (continued)</b>							
68000	50 x 105	10.42	11.98	0.011	0.009		ECEP1HA683HA
<b>63 VDC Working, 79 VDC Surge</b>							
6800	35 x 40	3.60	4.14	0.049	0.037	ECET1JA682EA	
12000	35 x 50	4.40	5.06	0.028	0.023	ECET1JA123EA	
	40 x 40	4.52	5.20	0.030	0.026	ECET1JA123FA	ECEP1JA123FA
15000	35 x 63	4.92	5.66	0.024	0.021	ECET1JA153EA	
	40 x 50	4.80	5.52	0.027	0.023	ECET1JA153FA	ECEP1JA153FA
18000	35 x 80	5.79	6.66	0.022	0.019	ECET1JA183EA	
	40 x 63	5.39	6.20	0.023	0.020	ECET1JA183FA	ECEP1JA183FA
22000	50 x 50	6.76	7.77	0.019	0.016		ECEP1JA223HA
27000	35 x 105	6.53	7.51	0.017	0.014	ECET1JA273EA	
	40 x 80	6.59	7.58	0.017	0.014	ECET1JA273FA	ECEP1JA273FA
	50 x 63	7.34	8.44	0.017	0.014		ECEP1JA273HA
33000	50 x 80	8.00	9.20	0.015	0.013		ECEP1JA333HA
39000	40 x 105	7.53	8.66	0.014	0.012	ECET1JA393FA	ECEP1JA393FA
	50 x 92	8.48	9.75	0.014	0.012		ECEP1JA393HA
47000	50 x 105	8.99	10.34	0.012	0.010		ECEP1JA473HA
<b>80 VDC Working, 105 VDC Surge</b>							
4700	35 x 40	3.30	3.80	0.049	0.037	ECET1KA472EA	
6800	35 x 50	3.90	4.49	0.041	0.031	ECET1KA682EA	
	40 x 40	3.90	4.49	0.041	0.031	ECET1KA682FA	ECEP1KA682FA
8200	35 x 63	4.39	5.05	0.036	0.027	ECET1KA822EA	
	40 x 50	4.29	4.93	0.036	0.027	ECET1KA822FA	ECEP1KA822FA
10000	35 x 80	4.88	5.61	0.031	0.024	ECET1KA103EA	
	40 x 63	4.73	5.44	0.033	0.025	ECET1KA103FA	ECEP1KA103FA
12000	50 x 50	6.03	6.93	0.035	0.026		ECEP1KA123HA
15000	35 x 105	6.13	7.05	0.024	0.018	ECET1KA153EA	
	40 x 80	5.97	6.87	0.025	0.019	ECET1KA153FA	ECEP1KA153FA
	50 x 63	6.65	7.65	0.028	0.021		ECEP1KA153HA
18000	50 x 80	7.29	8.38	0.026	0.019		ECEP1KA183HA
22000	40 x 105	6.95	7.99	0.019	0.014	ECET1KA223FA	ECEP1KA223FA
	50 x 92	7.83	9.00	0.022	0.016		ECEP1KA223HA
27000	50 x 105	8.38	9.64	0.018	0.014		ECEP1KA273HA
<b>100 VDC Working, 125 VDC Surge</b>							
3300	35 x 40	3.20	3.68	0.075	0.053	ECET2AA332EA	
4700	35 x 50	3.80	4.37	0.053	0.040	ECET2AA472EA	
	40 x 40	3.80	4.37	0.053	0.040	ECET2AA472FA	ECEP2AA472FA
5600	35 x 63	4.06	4.67	0.044	0.033	ECET2AA562EA	
6800	40 x 50	4.57	5.26	0.037	0.027	ECET2AA682FA	ECEP2AA682FA
8200	35 x 80	5.15	5.92	0.030	0.023	ECET2AA822EA	
	40 x 63	5.02	5.77	0.030	0.023	ECET2AA822FA	ECEP2AA822FA
	50 x 50	6.14	7.06	0.030	0.023		ECEP2AA822HA
10000	35 x 105	6.38	7.34	0.025	0.019	ECET2AA103EA	
12000	40 x 80	6.44	7.41	0.021	0.016	ECET2AA123FA	ECEP2AA123FA
	50 x 63	7.17	8.25	0.022	0.017		ECEP2AA123HA
15000	40 x 105	7.37	8.48	0.017	0.012	ECET2AA153FA	ECEP2AA153FA
	50 x 80	8.01	9.21	0.019	0.014		ECEP2AA153HA
18000	50 x 92	8.64	9.94	0.017	0.012		ECEP2AA183HA
22000	50 x 105	9.32	10.72	0.015	0.011		ECEP2AA223HA
<b>200 VDC Working, 250 VDC Surge</b>							
1200	35 x 40	2.50	3.50	0.133	0.066	ECET2DA122EA	
1800	40 x 40	2.70	3.78	0.129	0.077	ECET2DA182FA	ECEP2DA182FA
2200	35 x 50	2.90	4.06	0.098	0.059	ECET2DA222EA	
2700	35 x 63	3.65	5.11	0.080	0.048	ECET2DA272EA	
	40 x 50	3.55	4.97	0.086	0.052	ECET2DA272FA	ECEP2DA272FA
3300	35 x 80	4.52	6.33	0.065	0.039	ECET2DA332EA	
	40 x 63	4.40	6.16	0.070	0.042	ECET2DA332FA	ECEP2DA332FA
	50 x 50	5.20	7.28	0.075	0.045		ECEP2DA332HA
3900	50 x 50	5.65	7.91	0.064	0.038		ECEP2DA392HX
	50 x 63	5.90	8.26	0.064	0.038		ECEP2DA392HA
4700	35 x 105	5.70	7.98	0.046	0.028	ECET2DA472EA	
	40 x 80	5.76	8.06	0.049	0.030	ECET2DA472FA	ECEP2DA472FA
	50 x 63	6.48	9.07	0.053	0.032		ECEP2DA472HX

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## T-HA Standard Ratings (continued)

Part numbers shown with 6.3mm Length Snap-in Terminals

Cap. ( $\mu$ F)	Size (mm) D x L	Max 105°C R.C. ( $A_{rms}$ )		20°C ESR ( $\Omega$ , max.)		Panasonic Part Number	
		120Hz	10kHz~	120Hz	20kHz	4 Pin Style	5 Pin Style
<b>200 VDC Working, 250 VDC Surge (continued)</b>							
4700	50 x 80	6.82	9.55	0.053	0.032		ECEP2DA472HA
5600	40 x 105	6.76	9.46	0.041	0.025	ECET2DA562FA	ECEP2DA562FA
	50 x 92	7.68	10.75	0.044	0.027		ECEP2DA562HA
6800	50 x 92	8.46	11.84	0.034	0.020		ECEP2DA682HX
	50 x 105	8.71	12.19	0.034	0.020		ECEP2DA682HA
8200	50 x 105	9.56	13.38	0.028	0.016		ECEP2DA822HA
<b>250 VDC Working, 300 VDC Surge</b>							
820	35 x 40	2.20	3.08	0.243	0.133	ECET2EA821EA	
1200	35 x 50	2.30	3.22	0.180	0.117	ECET2EA122EA	
	40 x 40	2.66	3.72	0.180	0.117	ECET2EA122FA	ECEP2EA122FA
1500	35 x 63	2.57	3.60	0.144	0.093	ECET2EA152EA	
1800	40 x 50	3.15	4.41	0.120	0.078	ECET2EA182FA	ECEP2EA182FA
2200	35 x 80	3.75	5.25	0.098	0.064	ECET2EA222EA	
	40 x 63	3.68	5.15	0.098	0.064	ECET2EA222FA	ECEP2EA222FA
	50 x 50	4.35	6.09	0.098	0.064		ECEP2EA222HA
2700	35 x 105	4.80	6.72	0.080	0.052	ECET2EA272EA	
	50 x 50	4.80	6.72	0.080	0.052		ECEP2EA272HX
	50 x 63	4.98	6.97	0.080	0.052		ECEP2EA272HA
3300	35 x 105	4.86	6.80	0.065	0.042	ECET2EA332EA	
	40 x 80	4.86	6.80	0.065	0.042	ECET2EA332FA	ECEP2EA332FA
	50 x 63	5.48	7.67	0.065	0.042		ECEP2EA332HA
3900	40 x 105	5.61	7.85	0.055	0.036	ECET2EA392FA	ECEP2EA392FA
	50 x 80	6.10	8.54	0.055	0.036		ECEP2EA392HA
4300	50 x 92	6.67	9.34	0.050	0.033		ECEP2EA432HA
4700	50 x 92	6.93	9.70	0.046	0.030		ECEP2EA472HX
	50 x 105	7.03	9.84	0.046	0.030		ECEP2EA472HA
5600	50 x 105	7.67	10.74	0.039	0.025		ECEP2EA562HA
<b>350 VDC Working, 400 VDC Surge</b>							
470	35 x 40	2.00	2.80	0.459	0.183	ECET2VA471EA	
680	35 x 50	2.15	3.01	0.317	0.127	ECET2VA681EA	
	40 x 40	2.30	3.22	0.317	0.127	ECET2VA681FA	ECEP2VA681FA
820	35 x 63	2.65	3.71	0.263	0.105	ECET2VA821EA	
	40 x 50	2.65	3.71	0.263	0.105	ECET2VA821FA	ECEP2VA821FA
1000	50 x 50	3.56	4.98	0.216	0.086		ECEP2VA102HA
1200	35 x 80	3.22	4.51	0.180	0.072	ECET2VA122EA	
	40 x 63	3.22	4.51	0.180	0.072	ECET2VA122FA	ECEP2VA122FA
1500	35 x 105	4.78	6.69	0.144	0.057	ECET2VA152EA	
	40 x 80	3.75	5.25	0.144	0.057	ECET2VA152FA	ECEP2VA152FA
	50 x 63	4.16	5.82	0.144	0.057		ECEP2VA152HA
1800	40 x 105	5.23	7.32	0.120	0.048	ECET2VA182FA	ECEP2VA182FA
	50 x 80	5.69	7.97	0.120	0.048		ECEP2VA182HA
2000	50 x 92	6.34	8.88	0.108	0.043		ECEP2VA202HA
2200	50 x 105	7.03	9.84	0.098	0.039		ECEP2VA222HA
<b>400 VDC Working, 450 VDC Surge</b>							
390	35 x 45	1.55	2.17	0.425	0.170	ECET2GA391EA	
470	40 x 40	1.75	2.45	0.353	0.141	ECET2GA471FA	ECEP2GA471FA
560	35 x 50	1.80	2.52	0.296	0.118	ECET2GA561EA	
680	40 x 50	2.17	3.04	0.244	0.098	ECET2GA681FA	ECEP2GA681FA
820	35 x 63	2.44	3.42	0.202	0.081	ECET2GA821EA	
	40 x 50	2.58	3.61	0.202	0.081	ECET2GA821FA	ECEP2GA821FA
	50 x 50	3.15	4.41	0.202	0.081		ECEP2GA821HA
1000	35 x 80	3.00	4.20	0.166	0.066	ECET2GA102EA	
	40 x 63	3.00	4.20	0.166	0.066	ECET2GA102FA	ECEP2GA102FA
	50 x 50	3.45	4.83	0.166	0.066		ECEP2GA102HA
1200	35 x 105	3.75	5.25	0.138	0.055	ECET2GA122EA	
	40 x 80	3.79	5.31	0.138	0.055	ECET2GA122FA	ECEP2GA122FA
	50 x 63	4.22	5.91	0.152	0.061		ECEP2GA122HA
1500	40 x 105	4.81	6.73	0.111	0.044	ECET2GA152FA	ECEP2GA152FA
	50 x 80	5.22	7.31	0.122	0.049		ECEP2GA152HA
1600	50 x 92	5.69	7.97	0.114	0.046		ECEP2GA162HA

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## T-HA Standard Ratings (continued)

Part numbers shown with 6.3mm Length Snap-in Terminals

Cap. ( $\mu$ F)	Size (mm) D x L	Max 105°C R.C. ( $A_{rms}$ )		20°C ESR ( $\Omega$ , max.)		Panasonic Part Number	
		120Hz	10kHz~	120Hz	20kHz	4 Pin Style	5 Pin Style
<b>400 VDC Working, 450 VDC Surge (continued)</b>							
1800	40 x 105	5.06	7.08	0.101	0.041	ECET2GA182FA	ECEP2GA182FA
	50 x 80	5.50	7.70	0.101	0.041		ECEP2GA182HX
	50 x 105	6.48	9.07	0.101	0.041		ECEP2GA182HA
2200	50 x 92	6.55	9.17	0.082	0.033		ECEP2GA222HA
<b>450 VDC Working, 500 VDC Surge</b>							
330	35 x 40	1.37	1.92	0.502	0.176	ECET2WA331EA	
470	35 x 50	1.74	2.44	0.353	0.123	ECET2WA471EA	
	40 x 40	1.68	2.35	0.353	0.123	ECET2WA471FA	ECEP2WA471FA
560	35 x 63	2.15	3.01	0.296	0.104	ECET2WA561EA	
	40 x 50	2.10	2.94	0.296	0.104	ECET2WA561FA	ECEP2WA561FA
680	40 x 63	2.50	3.50	0.244	0.085	ECET2WA681FA	ECEP2WA681FA
	50 x 50	2.90	4.06	0.244	0.085		ECEP2WA681HA
820	35 x 80	2.70	3.78	0.202	0.071	ECET2WA821EA	
	50 x 50	3.42	4.79	0.222	0.079		ECEP2WA821HX
	50 x 63	3.42	4.79	0.222	0.078		ECEP2WA821HA
1000	35 x 105	3.47	4.86	0.166	0.058	ECET2WA102EA	
	40 x 80	3.50	4.90	0.166	0.058	ECET2WA102FA	ECEP2WA102FA
	50 x 63	3.74	5.24	0.172	0.065		ECEP2WA102HA
1200	40 x 105	4.33	6.06	0.138	0.048	ECET2WA122FA	ECEP2WA122FA
	50 x 80	4.70	6.58	0.152	0.053		ECEP2WA122HA
1300	50 x 92	5.18	7.25	0.140	0.049		ECEP2WA132HA
1500	50 x 105	6.03	8.44	0.122	0.043		ECEP2WA152HA
1800	50 x 105	6.23	8.72	0.101	0.036		ECEP2WA182HA

Design and specifications are subject to change without notice.

Contact the factory or your sales representative for technical specifications before purchase and/or use.

When safety concerns arise, please contact Panasonic immediately for technical consultation.