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: $\frac{\text{(rated cap. [µF] - 33000)}}{1000}$

Leakage Current: $3\sqrt{CV}$ (µA) max. after 5 minutes; *C = Capacitance in µF, V = WV*

Ripple Current Multipliers:

Frequency(Hz):	50	60	100~120	500	1k	10k
16~100WV:	0.93	0.95	1.0	1.05	1.08	1.15
160~450WV:	0.75	0.8	1.0	1.2	1.25	1.4

Ripple Current Ambient Temperature Factors**

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

E C E T | □ □ | A | □ □ □ | □ | □

Series Code: A

Capacitance Code: □ □ □

RoHS compliant PVC sleeve and top plate is standard.

Terminals	
Prefix	No. of Pins
ECET	4
ECEP	5

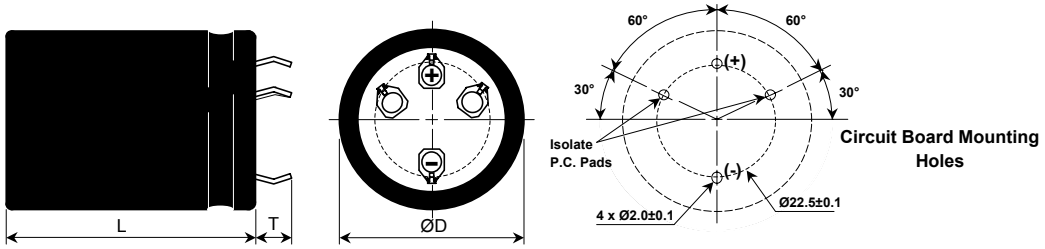
Voltage Code											
1C	1E	1V	1H	1J	1K	2A	2D	2E	2V	2G	2W
16	25	35	50	63	80	100	200	250	350	400	450

Diameter Code	
Dia.	Code
35	E
40	F
50	H

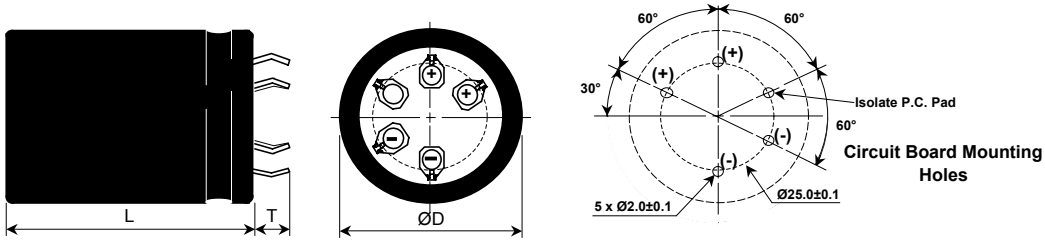
Terminal Suffix Code		
Terminal Length & Type	Standard Ratings	Extended Ratings
6.3mm Snap-in (Standard):	A	X
4.0mm Snap-in (4 pin only):	4	5
4.0mm Straight with Standoff:	E	Y

Dimensions in millimeters

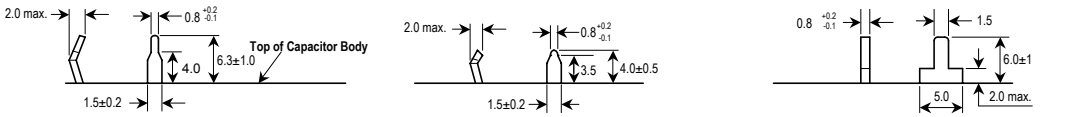
4 Pin Mounting Style



5 Pin Mounting Style



Pin Dimensions



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

T-HA Standard Ratings

Part numbers shown with 6.3mm Length Snap-in Terminals

Cap. (µF)	Size (mm) D x L	Max 105°C R.C. (A_{rms}) 120Hz	Max 105°C R.C. (A_{rms}) 10kHz~	20°C ESR (Ω, max.) 120Hz	20°C ESR (Ω, max.) 20kHz	Panasonic Part Number 4 Pin Style	Panasonic Part Number 5 Pin Style
16 VDC Working, 20 VDC Surge							
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**
25 VDC Working, 32 VDC Surge							
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**
35 VDC Working, 44 VDC Surge							
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**
50 VDC Working, 63 VDC Surge							
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**

T-HA Standard Ratings (continued)

Part numbers shown with 6.3mm Length Snap-in Terminals

Cap. (µF)	Size (mm) D x L	Max 105°C R.C. (A_{rms}) 120Hz	Max 105°C R.C. (A_{rms}) 10kHz~	20°C ESR (Ω, max.) 120Hz	20°C ESR (Ω, max.) 20kHz	Panasonic Part Number 4 Pin Style	Panasonic Part Number 5 Pin Style
50 VDC Working, 63 VDC Surge (continued)							
68000	50 x 105	10.42	11.98	0.011	0.009		ECEP1HA683HA
63 VDC Working, 79 VDC Surge							
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
80 VDC Working, 105 VDC Surge							
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
100 VDC Working, 125 VDC Surge							
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
200 VDC Working, 250 VDC Surge							
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. (µF)	Size (mm) D x L	Max 105°C R.C. (A_{rms}) 120Hz	Max 105°C R.C. (A_{rms}) 10kHz~	20°C ESR (Ω, max.) 120Hz	20°C ESR (Ω, max.) 20kHz	Panasonic Part Number 4 Pin Style	Panasonic Part Number 5 Pin Style
200 VDC Working, 250 VDC Surge (continued)							
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
250 VDC Working, 300 VDC Surge							
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
350 VDC Working, 400 VDC Surge							
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
400 VDC Working, 450 VDC Surge							
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

T-HA Standard Ratings (continued)

Part numbers shown with 6.3mm Length Snap-in Terminals

Cap. (µF)	Size (mm) D x L	Max 105°C R.C. (A_{rms}) 120Hz	Max 105°C R.C. (A_{rms}) 10kHz~	20°C ESR (Ω, max.) 120Hz	20°C ESR (Ω, max.) 20kHz	Panasonic Part Number 4 Pin Style	Panasonic Part Number 5 Pin Style
400 VDC Working, 450 VDC Surge (continued)							
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**
450 VDC Working, 500 VDC Surge							
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**

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