

KEMET

ESH Aluminium Electrolytic Capacitors

SINGLE-ENDED LEADS - General purpose 105°C / 2000 h

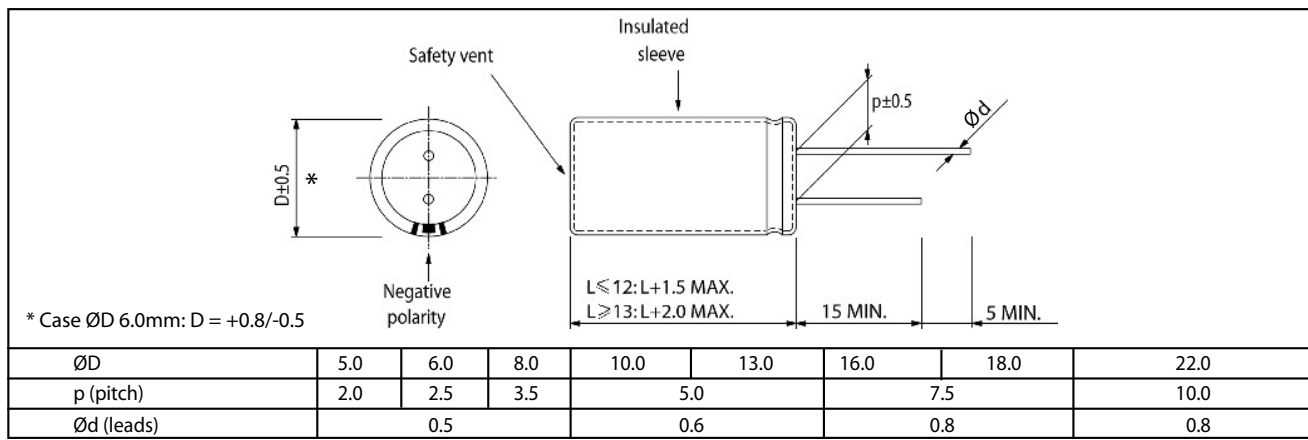
Description
Long life for 2000 hours at 105°C, ideally suited for high quality and high reliability applications.

Applications
Coupling, decoupling, by-pass, filtering.

Features
Case with ØD 6.0 mm has the safety vent at the bottom.

Marking
Kemet logo
Series: (ESH), Operating temperature: (105°C)
Rated capacitance (mF), Rated voltage (Vdc),
Negative polarity: (white line), Date code.

Diagram of dimensions (Units=mm)



Electrical characteristics

Rated voltage	6.3 to 100 Vdc	160 to 450 Vdc
Operating temperature	-40 to +105°C	-25 to +105°C
Capacitance range	0.47 mF to 15000mF	0.47mF to 470mF.
Capacitance tolerance	± 20% at 120Hz / 20°C	
Endurance test	2000 hours (see conditions in Test method and performance)	
Leakage current	I = 0.01 CV (mA)	I = 0.03 CV (mA) + 10mA
	C = rated capacitance (mF); V = rated voltage (Vdc) (after that DC rated voltage at 20°C has been applied for 2 min)	

Compensation factor of ripple current (R.C.) vs. frequency

Rated voltage	Capacitance range	50 Hz	120 Hz	300 Hz	1 kHz	10 to 100 kHz
6.3 to 100 Vdc	0.47 to 68mF	0.75	1.00	1.30	1.57	2.00
6.3 to 100 Vdc	100 to 470mF	0.75	1.00	1.23	1.34	1.50
6.3 to 100 Vdc	680 to 15 000mF	0.75	1.00	1.10	1.13	1.15
160 to 450 Vdc	0.47 to 470mF	0.80	1.00	1.25	1.40	1.60

Compensation factor of ripple current (R.C.) vs. temperature

Temperature	65°C	85°C	105°C
Multiplier factors	1.70	1.40	1.00

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Test method and performance

Conditions	Load life test	Shelf life test
Temperature: Test duration: Ripple current:	105°C 2000 hours max ripple current at 120Hz 105°C specified in the table. the sum of D.C. voltage and the peak A.C. voltage must not exceed the rated voltage of capacitor.	105°C 1000 hours no ripple current applied.
Voltage:		no voltage applied.
Performance	The following specifications will be satisfied when the capacitors are restored at 20°C	
Capacitance change: Dissipation factor: Leakage current:	within 20% of initial value. not exceed 200% of the initial requirement. not exceed initial requirement.	within 20% of initial value. not exceed 200% of the initial requirement. not exceed initial requirement.

Technical data and ordering codes

6.3 Vdc Rated voltage - 8 Vdc Surge voltage					
Rated cap. 120 Hz 20°C (mF)	Case size DxL (mm)	D.F. 120 Hz 25°C (tgd %)	R.C. 120 Hz 105°C (mA _{rms})	L.C. 20°C 2 min. (mA)	Part Number
100	5 x 11	26	100	4	ESH107M6R3AC3AA
150	5 x 11	26	120	12	ESH157M6R3AC3AA
220	6 x 11	26	165	17	ESH227M6R3AE3AA
330	6 x 11	26	200	24	ESH337M6R3AE3AA
330	8 x 11	26	200	24	ESH337M6R3AG3AA
470	8 x 11	26	280	33	ESH477M6R3AG3AA
680	10 x 12	26	320	46	ESH687M6R3AH1AA
1000	10 x 12	26	470	66	ESH108M6R3AH1AA
1500	10 x 15	26	600	97	ESH158M6R3AH2AA
2200	13 x 20	26	930	142	ESH228M6R3AL3AA
3300	13 x 20	26	1100	211	ESH338M6R3AL3AA
4700	16 x 25	26	1320	299	ESH478M6R3AM7AA
6800	16 x 25	26	1490	431	ESH688M6R3AM7AA
10000	16 x 32	26	1830	633	ESH109M6R3AM2AA
15000	16 x 36	26	2280	948	ESH159M6R3AM3AA

10 Vdc Rated voltage - 13 Vdc Surge voltage					
Rated cap. 120 Hz 20°C (mF)	Case size DxL (mm)	D.F. 120 Hz 25°C (tgd %)	R.C. 120 Hz 105°C (mA _{rms})	L.C. 20°C 2 min. (mA)	Part Number
47	5 x 11	22	75	8	ESH476M010AC3AA
68	5 x 11	22	80	10	ESH686M010AC3AA
100	5 x 11	22	110	13	ESH107M010AC3AA
150	6 x 11	22	130	18	ESH157M010AE3AA
220	6 x 11	22	180	25	ESH227M010AE3AA
330	8 x 11	22	255	36	ESH337M010AG3AA
470	8 x 11	22	305	50	ESH477M010AG3AA
680	10 x 12	22	420	71	ESH687M010AH1AA
1000	10 x 15	22	570	103	ESH108M010AH2AA
1500	10 x 19	22	750	153	ESH158M010AH4AA
2200	13 x 20	22	1010	223	ESH228M010AL3AA
3300	13 x 25	22	1220	333	ESH338M010AL4AA
4700	16 x 25	22	1410	473	ESH478M010AM7AA
6800	16 x 32	22	1610	683	ESH688M010AM2AA
10000	18 x 36	22	1980	1003	ESH109M010AN2AA

16 Vdc Rated voltage - 20 Vdc Surge voltage					
Rated cap. 120 Hz 20°C (mF)	Case size DxL (mm)	D.F. 120 Hz 25°C (tgd %)	R.C. 120 Hz 105°C (mA _{rms})	L.C. 20°C 2 min. (mA)	Part Number
33	5 x 11	18	70	8	ESH336M016AC3AA
47	5 x 11	18	85	10	ESH476M016AC3AA
68	5 x 11	18	100	14	ESH686M016AC3AA
100	6 x 11	18	135	19	ESH107M016AE3AA
150	8 x 11	18	180	27	ESH157M016AG3AA
220	8 x 11	18	235	38	ESH227M016AG3AA
330	10 x 12	18	285	56	ESH337M016AH1AA
470	10 x 12	18	395	78	ESH477M016AH1AA
680	10 x 15	18	530	112	ESH687M016AH2AA
1000	10 x 19	18	700	163	ESH108M016AH4AA
1500	13 x 20	18	860	243	ESH158M016AL3AA
2200	13 x 25	18	1150	355	ESH228M016AL4AA
3300	16 x 25	18	1350	531	ESH338M016AM7AA
4700	16 x 32	18	1560	755	ESH478M016AM2AA
6800	18 x 36	18	1790	1091	ESH688M016AN2AA

25 Vdc Rated voltage - 32 Vdc Surge voltage					
Rated cap. 120 Hz 20°C (mF)	Case size DxL (mm)	D.F. 120 Hz 25°C (tgd %)	R.C. 120 Hz 105°C (mA _{rms})	L.C. 20°C 2 min. (mA)	Part Number
22	5 x 11	16	60	8	ESH226M025AC3AA
33	5 x 11	16	75	11	ESH336M025AC3AA
47	5 x 11	16	90	15	ESH476M025AC3AA
68	6 x 11	16	125	20	ESH686M025AE3AA
100	6 x 11	16	145	28	ESH107M025AE3AA
150	8 x 11	16	200	40	ESH157M025AG3AA
220	8 x 11	16	250	58	ESH227M025AG3AA
220	10 x 12	16	250	58	ESH227M025AH1AA
330	10 x 12	16	355	85	ESH337M025AH1AA
470	10 x 12	16	405	120	ESH477M025AH1AA
470	10 x 15	16	470	120	ESH477M025AH2AA
680	10 x 19	16	650	173	ESH687M025AH4AA
1000	13 x 20	16	855	253	ESH108M025AL3AA
1500	13 x 25	16	1020	378	ESH158M025AL4AA
2200	16 x 25	16	1230	553	ESH228M025AM7AA
3300	16 x 32	16	1450	828	ESH338M025AM2AA
4700	18 x 36	16	1690	1178	ESH478M025AN2AA

For capacitor whose capacitance exceeds 1000 mF the value of D.F. (%) is increased by 2% for every addition of 1000 mF

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35 Vdc Rated voltage - 44 Vdc Surge voltage					
Rated cap. 120 Hz 20°C (mF)	Case size DxL (mm)	D.F. 120 Hz 25°C (tgd %)	R.C. 120 Hz 105°C (mA _{rms})	L.C. 20°C 2 min. (mA)	Part Number
10	5 x 11	14	44	6	ESH106M035AC3AA
15	5 x 11	14	50	8	ESH156M035AC3AA
22	5 x 11	14	65	11	ESH226M035AC3AA
33	5 x 11	14	85	14	ESH336M035AC3AA
47	6 x 11	14	115	19	ESH476M035AE3AA
68	8 x 11	14	130	27	ESH686M035AG3AA
100	8 x 11	14	190	38	ESH107M035AG3AA
150	10 x 12	14	240	55	ESH157M035AH1AA
220	10 x 12	14	315	80	ESH227M035AH1AA
330	10 x 15	14	440	118	ESH337M035AH2AA
470	10 x 19	14	580	167	ESH477M035AH4AA
470	13 x 20	14	580	167	ESH477M035AL3AA
680	13 x 20	14	730	241	ESH687M035AL3AA
1000	13 x 25	14	995	353	ESH108M035AL4AA
1500	16 x 25	14	1110	528	ESH158M035AM7AA
2200	16 x 32	14	1450	773	ESH228M035AM2AA
3300	18 x 36	14	1660	1158	ESH338M035AN2AA

50 Vdc Rated voltage - 63 Vdc Surge voltage					
Rated cap. 120 Hz 20°C (mF)	Case size DxL (mm)	D.F. 120 Hz 25°C (tgd %)	R.C. 120 Hz 105°C (mA _{rms})	L.C. 20°C 2 min. (mA)	Part Number
0.47	5 x 11	12	7	3	ESH474M050AC3AA
1.0	5 x 11	12	12	3	ESH105M050AC3AA
2.2	5 x 11	12	18	4	ESH225M050AC3AA
3.3	5 x 11	12	25	5	ESH335M050AC3AA
4.7	5 x 11	12	30	5	ESH475M050AC3AA
6.8	5 x 11	12	30	6	ESH685M050AC3AA
10	5 x 11	12	50	8	ESH106M050AC3AA
15	5 x 11	12	50	10	ESH156M050AC3AA
22	5 x 11	12	75	14	ESH226M050AC3AA
33	6 x 11	12	105	19	ESH336M050AE3AA
47	8 x 11	12	125	26	ESH476M050AG3AA
68	8 x 11	12	159	37	ESH686M050AG3AA
100	10 x 12	12	210	53	ESH107M050AH1AA
150	10 x 12	12	289	78	ESH157M050AH1AA
220	10 x 15	12	400	113	ESH227M050AH2AA
330	10 x 19	12	535	168	ESH337M050AH4AA
470	13 x 20	12	730	238	ESH477M050AL3AA
680	13 x 25	12	860	343	ESH687M050AL4AA
1000	16 x 25	12	1110	503	ESH108M050AM7AA
1500	16 x 32	12	1350	753	ESH158M050AM2AA
2200	18 x 36	12	1530	1103	ESH228M050AN2AA

63 Vdc Rated voltage - 79 Vdc Surge voltage					
Rated cap. 120 Hz 20°C (mF)	Case size DxL (mm)	D.F. 120 Hz 25°C (tgd %)	R.C. 120 Hz 105°C (mA _{rms})	L.C. 20°C 2 min. (mA)	Part Number
0.47	5 x 11	10	8	3	ESH474M063AC3AA
1.0	5 x 11	10	12	4	ESH105M063AC3AA
2.2	5 x 11	10	20	4	ESH225M063AC3AA
3.3	5 x 11	10	27	5	ESH335M063AC3AA
4.7	5 x 11	10	34	6	ESH475M063AC3AA
6.8	5 x 11	10	37	7	ESH685M063AC3AA
10	5 x 11	10	55	9	ESH106M063AC3AA
15	5 x 11	10	65	12	ESH156M063AC3AA
22	6 x 11	10	90	17	ESH226M063AE3AA
33	8 x 11	10	110	24	ESH336M063AG3AA
47	8 x 11	10	155	33	ESH476M063AG3AA
68	10 x 12	10	198	46	ESH686M063AH1AA
100	10 x 12	10	260	66	ESH107M063AH1AA
150	10 x 15	10	330	97	ESH157M063AH2AA
220	10 x 19	10	465	142	ESH227M063AH4AA
330	13 x 20	10	650	211	ESH337M063AL3AA
470	13 x 25	10	800	299	ESH477M063AL4AA
680	16 x 25	10	1000	431	ESH687M063AM7AA
1000	16 x 32	10	1200	633	ESH108M063AM2AA
1500	16 x 36	10	1450	948	ESH158M063AM3AA

100 Vdc Rated voltage - 125 Vdc Surge voltage					
Rated cap. 120 Hz 20°C (mF)	Case size DxL (mm)	D.F. 120 Hz 25°C (tgd %)	R.C. 120 Hz 105°C (mA _{rms})	L.C. 20°C 2 min. (mA)	Part Number
0.47	5 x 11	10	10	3	ESH474M100AC3AA
1.0	5 x 11	10	15	4	ESH105M100AC3AA
2.2	5 x 11	10	22	5	ESH225M100AC3AA
3.3	5 x 11	10	29	6	ESH335M100AC3AA
4.7	5 x 11	10	37	8	ESH475M100AC3AA
6.8	5 x 11	10	46	10	ESH685M100AC3AA
10	6 x 11	10	65	13	ESH106M100AE3AA
15	8 x 11	10	82	18	ESH156M100AG3AA
22	8 x 11	10	115	25	ESH226M100AG3AA
33	10 x 12	10	160	36	ESH336M100AH1AA
47	10 x 15	10	210	50	ESH476M100AH2AA
68	10 x 19	10	241	71	ESH686M100AH4AA
100	13 x 20	10	385	103	ESH107M100AL3AA
150	13 x 25	10	414	153	ESH157M100AL4AA
220	16 x 25	10	590	223	ESH227M100AM7AA
330	16 x 25	10	720	333	ESH337M100AM7AA
470	16 x 32	10	875	473	ESH477M100AM2AA
680	16 x 36	10	1200	683	ESH687M100AM3AA

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160 Vdc Rated voltage - 200 Vdc Surge voltage					
Rated cap. 120 Hz 20°C (mF)	Case size DxL (mm)	D.F. 120 Hz 25°C (tgd %)	R.C. 120 Hz 105°C (mA _{rms})	L.C. 20°C 2 min. (mA)	Part Number
0.47	5 x 11	15	12	12	ESH474M160AC3AA
1.0	5 x 11	15	17	15	ESH105M160AC3AA
2.2	6 x 11	15	25	20	ESH225M160AE3AA
3.3	8 x 11	15	36	26	ESH335M160AG3AA
4.7	8 x 11	15	43	32	ESH475M160AG3AA
6.8	10 x 12	15	54	43	ESH685M160AH1AA
10	10 x 12	15	70	58	ESH106M160AH1AA
15	10 x 15	15	90	82	ESH156M160AH2AA
22	10 x 19	15	130	116	ESH226M160AH4AA
33	13 x 20	15	180	168	ESH336M160AL3AA
47	13 x 25	15	250	236	ESH476M160AL4AA
68	13 x 25	15	270	336	ESH686M160AL4AA
100	16 x 25	15	390	490	ESH107M160AM7AA
150	16 x 32	15	435	730	ESH157M160AM2AA
220	16 x 36	15	700	1066	ESH227M160AM3AA
330	18 x 40	15	850	1594	ESH337M160AN3AA
470	22 x 40	15	980	2266	ESH477M160AQ4AA

200 Vdc Rated voltage - 250 Vdc Surge voltage					
Rated cap. 120 Hz 20°C (mF)	Case size DxL (mm)	D.F. 120 Hz 25°C (tgd %)	R.C. 120 Hz 105°C (mA _{rms})	L.C. 20°C 2 min. (mA)	Part Number
0.47	5 x 11	15	12	13	ESH474M200AC3AA
1.0	6 x 11	15	17	16	ESH105M200AE3AA
2.2	6 x 11	15	25	23	ESH225M200AE3AA
3.3	8 x 11	15	36	30	ESH335M200AG3AA
4.7	10 x 12	15	50	38	ESH475M200AH1AA
6.8	10 x 12	15	60	51	ESH685M200AH1AA
10	10 x 15	15	80	70	ESH106M200AH2AA
15	10 x 19	15	110	100	ESH156M200AH4AA
22	10 x 19	15	140	142	ESH226M200AH4AA
33	13 x 20	15	190	208	ESH336M200AL3AA
33	13 x 25	15	190	208	ESH336M200AL4AA
47	13 x 20	15	260	292	ESH476M200AL3AA
47	13 x 25	15	260	292	ESH476M200AL4AA
68	16 x 25	15	280	418	ESH686M200AM7AA
100	16 x 32	15	400	610	ESH107M200AM2AA
150	16 x 36	15	450	910	ESH157M200AM3AA
220	18 x 36	15	750	1330	ESH227M200AN2AA
220	18 x 40	15	750	1330	ESH227M200AN3AA
330	18 x 40	15	920	1990	ESH337M200AN3AA
330	22 x 40	15	920	1990	ESH337M200AQ4AA

250 Vdc Rated voltage - 300 Vdc Surge voltage					
Rated cap. 120 Hz 20°C (mF)	Case size DxL (mm)	D.F. 120 Hz 25°C (tgd %)	R.C. 120 Hz 105°C (mA _{rms})	L.C. 20°C 2 min. (mA)	Part Number
0.47	5 x 11	15	12	13	ESH474M250AC3AA
1.0	6 x 11	15	17	17	ESH105M250AE3AA
2.2	8 x 11	15	29	26	ESH225M250AG3AA
3.3	10 x 12	15	42	35	ESH335M250AH1AA
4.7	10 x 12	15	52	45	ESH475M250AH1AA
6.8	10 x 12	15	62	61	ESH685M250AH1AA
10	10 x 15	15	75	85	ESH106M250AH2AA
10	10 x 19	15	88	85	ESH106M250AH4AA
15	13 x 20	15	120	122	ESH156M250AL3AA
22	13 x 20	15	155	175	ESH226M250AL3AA
22	13 x 25	15	155	175	ESH226M250AL4AA
33	13 x 25	15	200	257	ESH336M250AL4AA
47	16 x 25	15	270	362	ESH476M250AM7AA
68	16 x 32	15	300	520	ESH686M250AM2AA
100	18 x 36	15	440	760	ESH107M250AN2AA
150	18 x 40	15	600	1135	ESH157M250AN3AA
220	22 x 40	15	800	1660	ESH227M250AQ4AA

350 Vdc Rated voltage - 400 Vdc Surge voltage					
Rated cap. 120 Hz 20°C (mF)	Case size DxL (mm)	D.F. 120 Hz 25°C (tgd %)	R.C. 120 Hz 105°C (mA _{rms})	L.C. 20°C 2 min. (mA)	Part Number
0.47	6 x 11	20	14	15	ESH474M350AE3AA
1.0	8 x 11	20	20	20	ESH105M350AG3AA
2.2	10 x 12	20	35	33	ESH225M350AH1AA
3.3	10 x 15	20	47	45	ESH335M350AH2AA
4.7	10 x 15	20	55	59	ESH475M350AH2AA
6.8	10 x 19	20	65	81	ESH685M350AH4AA
10	13 x 20	20	95	115	ESH106M350AL3AA
15	13 x 20	20	140	167	ESH156M350AL3AA
22	16 x 25	20	165	241	ESH226M350AM7AA
33	16 x 32	20	195	356	ESH336M350AM2AA
47	16 x 36	20	210	503	ESH476M350AM3AA
47	18 x 36	20	240	503	ESH476M350AN2AA
68	18 x 36	20	320	724	ESH686M350AN2AA
100	18 x 40	20	300	1060	ESH107M350AN3AA
100	22 x 40	20	360	1060	ESH107M350AQ4AA
150	22 x 40	20	480	1585	ESH157M350AQ4AA

400 Vdc Rated voltage - 450 Vdc Surge voltage					
Rated cap. 120 Hz 20°C (mF)	Case size DxL (mm)	D.F. 120 Hz 25°C (tgd %)	R.C. 120 Hz 105°C (mA _{rms})	L.C. 20°C 2 min. (mA)	Part Number
0.47	6 x 11	20	14	16	ESH474M400AE3AA
1.0	8 x 11	20	20	22	ESH105M400AG3AA
2.2	10 x 12	20	35	36	ESH225M400AH1AA
3.3	10 x 12	20	42	50	ESH335M400AH1AA
3.3	10 x 15	20	49	50	ESH335M400AH2AA
4.7	10 x 15	20	57	66	ESH475M400AH2AA
6.8	10 x 19	20	67	92	ESH685M400AH4AA
10	10 x 19	20	75	130	ESH106M400AH4AA
10	13 x 20	20	97	130	ESH106M400AL3AA
15	13 x 25	20	145	190	ESH156M400AL4AA
22	13 x 25	20	140	274	ESH226M400AL4AA
22	16 x 25	20	170	274	ESH226M400AM7AA
33	16 x 25	20	190	406	ESH336M400AM7AA
33	16 x 32	20	230	406	ESH336M400AM2AA
47	16 x 32	20	250	574	ESH476M400AM2AA
47	18 x 36	20	300	574	ESH476M400AN2AA
68	18 x 36	20	325	826	ESH686M400AN2AA
100	18 x 36	20	290	1210	ESH107M400AN2AA
100	22 x 40	20	365	1210	ESH107M400AQ4AA
150	22 x 40	20	465	1810	ESH157M400AQ4AA

450 Vdc Rated voltage - 500 Vdc Surge voltage					
Rated cap. 120 Hz 20°C (mF)	Case size DxL (mm)	D.F. 120 Hz 25°C (tgd %)	R.C. 120 Hz 105°C (mA _{rms})	L.C. 20°C 2 min. (mA)	Part Number
0.47	6 x 11	20	16	16	ESH474M450AE3AA
1.0	8 x 11	20	22	23	ESH105M450AG3AA
2.2	10 x 12	20	37	40	ESH225M450AH1AA
3.3	10 x 15	20	51	54	ESH335M450AH2AA
4.7	10 x 15	20	59	73	ESH475M450AH2AA
6.8	13 x 20	20	69	102	ESH685M450AL3AA
10	13 x 25	20	99	145	ESH106M450AL4AA
15	16 x 25	20	150	212	ESH156M450AM7AA
22	16 x 25	20	145	307	ESH226M450AM7AA
22	16 x 32	20	175	307	ESH226M450AM2AA
33	18 x 36	20	250	455	ESH336M450AN2AA
47	18 x 40	20	350	644	ESH476M450AN3AA
68	22 x 40	20	380	928	ESH686M450AQ4AA