HE series Hybrid(16V~100V)

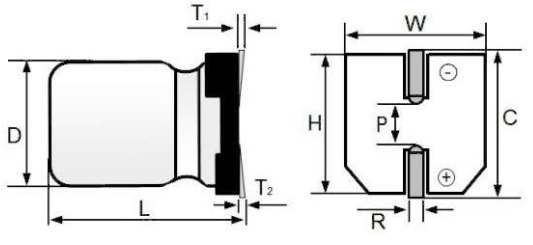
- SMD Type, Conductive Polymer Hybrid Aluminum Electrolytic Capacitor
- Load life of 5000 hours at 105℃
- Compliant to the RoHS2.0 directive
- Suitable for Automotive Application.

SMD型混合铝电容器，产品满足 RoHS2.0 指令，适用于汽车应用。

✧ Specifications

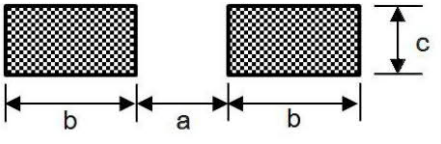
Items	Characteristics	
Operating Temp. Range	-55℃～+105℃	
Capacitance Range	10～1200μF	
Capacitance Tolerance	M：±20%	
Rated Voltage Range	16V ～100V DC	
Dissipation Factor	Not to exceed the value specified	
Leakage Current	Not to exceed the value specified (after 2 minutes)	
ESR（100K~300KHz）	Not to exceed the value specified	
Endurance 105℃，5000h，at rated voltage	Capacitance Change	Within ±20% of the value before test
	Dissipation Factor	Not to exceed 150% of the value specified
	ESR	Not to exceed 150% of the value specified
	Leakage current	Not to exceed the value specified
Moisture Resistance Stored at 85℃，RH85%，1000h	Capacitance Change	Within ±20% of the value before test
	Dissipation Factor	Not to exceed 150% of the value specified
	ESR	Not to exceed 150% of the value specified
	Leakage Current	Not to exceed the value specified

✧ Dimensions (Unit:mm)



ΦD+0.5max.	6.3			8		10	
L±0.3	5.8	9	10	9.2	12.2	10.5	12.7
W±0.2	6.6			8.3		10.3	
H±0.2	6.6			8.3		10.3	
C±0.2	7.2			9.0		11.0	
P±0.2	2.1			3.2		4.6	
R	0.5～0.8			0.8～1.1		0.8～1.1	
T1、T2	0.2Max			0.2Max		0.2Max	

Recommended land pattern



ΦD	6.3.	8	10
a	2.1	2.8	4.3
b	3.5	4.2	4.4
c	1.6	1.9	1.9

✧ Capacitance List

W.V (S.V) / SIZE	16 (18)	25 (29)	35 (40)	50 (58)	63 (72)	80 (92)	100 (115)
6.3×5.8	120 ~ 180μF	68 ~ 100μF	33 ~ 68μF	15 ~ 27μF	10 ~ 18μF		
6.3×9	220 ~ 330μF	100 ~ 180μF	56 ~ 120μF	27 ~ 47μF	10 ~ 27μF		
6.3×10	270 ~ 390μF	180 ~ 220μF	68 ~ 150μF	33 ~ 56μF	22 ~ 33μF		
8×9.2	270 ~ 560μF	180 ~ 330μF	82 ~ 220μF	39 ~ 68μF	27 ~ 47μF	15 ~ 27μF	12 ~ 18μF
8×12.2	390 ~ 680μF	220 ~ 470μF	100 ~ 270μF	56 ~ 100μF	39 ~ 68μF	22 ~ 39μF	15 ~ 22μF
10×10.5	470 ~ 820μF	270 ~ 470μF	120 ~ 330μF	68 ~ 120μF	47 ~ 82μF	27 ~ 56μF	18 ~ 33μF
10×12.7	680 ~ 1200μF	330 ~ 680μF	180 ~ 470μF	82 ~ 180μF	68 ~ 120μF	33 ~ 68μF	22 ~ 47μF

✧ Characteristics List

W.V. (V)	Capacitance (μF)	L.C. (μA,2min)	tgδ (120Hz,20℃)	ESR (mΩ,100kHz)	Rated Ripple Current(mA,r.m.s)	Size ΦD×L(mm)	Part Number
16	100	100	0.10	28	2200	6.3×5.8	PHE101M016E58TR□□□□
	220	176	0.10	18	3000	6.3×9	PHE221M016E09TR□□□□
	330	264	0.10	18	3100	6.3×10	PHE331M016E10TR□□□□
	470	300	0.10	15	3700	8×9.2	PHE471M016F92TR□□□□
	680	300	0.10	15	4400	8×12.2	PHE681M016F1CTR□□□□
	820	300	0.12	15	4700	10×10.5	PHE821M016G1ETR□□□□
	1000	300	0.12	12	5000	10×12.7	PHE102M016G1DTR□□□□
25	100	125	0.10	30	1700	6.3×5.8	PHE101M025E58TR□□□□
	100	125	0.10	22	2800	6.3×9	PHE101M025E09TR□□□□
	220	275	0.10	22	2900	6.3×10	PHE221M025E10TR□□□□
	330	300	0.10	18	3500	8×9.2	PHE331M025F92TR□□□□
	470	300	0.10	18	4200	8×12.2	PHE471M025F1CTR□□□□
	470	300	0.10	18	4500	10×10.5	PHE471M025G1ETR□□□□
	680	300	0.10	15	4800	10×12.7	PHE681M025G1DTR□□□□
35	56	100	0.10	40	1700	6.3×5.8	PHE560M035E58TR□□□□
	100	175	0.10	35	2100	6.3×9	PHE101M035E09TR□□□□
	150	262.5	0.10	35	2200	6.3×10	PHE151M035E10TR□□□□
	100	175	0.10	25	2700	8×9.2	PHE101M035F92TR□□□□
	220	300	0.10	22	2900	8×12.2	PHE221M035F1CTR□□□□
	220	300	0.10	25	2900	10×10.5	PHE221M035G1ETR□□□□
	330	300	0.10	22	3100	10×12.7	PHE331M035G1DTR□□□□
50	22	100	0.10	45	1700	6.3×5.8	PHE220M050E58TR□□□□
	33	100	0.10	35	2000	6.3×9	PHE330M050E09TR□□□□
	47	117.5	0.10	35	2200	6.3×10	PHE470M050E10TR□□□□
	68	170	0.10	25	2500	8×9.2	PHE680M050F92TR□□□□
	100	250	0.10	22	2700	8×12.2	PHE101M050F1CTR□□□□
	100	250	0.10	25	2700	10×10.5	PHE101M050G1ETR□□□□
	150	300	0.10	22	2900	10×12.7	PHE151M050G1DTR□□□□
63	10	100	0.10	45	1700	6.3×5.8	PHE100M063E58TR□□□□
	10	100	0.10	35	2000	6.3×9	PHE330M063E09TR□□□□
	22	100	0.10	35	2200	6.3×10	PHE390M063E10TR□□□□
	47	148	0.10	25	2500	8×9.2	PHE560M063F92TR□□□□
	56	176.4	0.10	22	2700	8×12.2	PHE820M063F1CTR□□□□
	82	258.3	0.10	25	2700	10×10.5	PHE121M063G1ETR□□□□

W.V. (V)	Capacitance (μF)	L.C. (μA,2min)	tgδ (120Hz,20℃)	ESR (mΩ,100kHz)	Rated Ripple Current(mA,r.m.s)	Size ΦD×L(mm)	Part Number
63	100	300	0.10	22	2900	10×12.7	PHE101M063G1DTR□□□□
80	22	100	0.10	28	2300	8×9.2	PHE220M080F92TR□□□□
	33	132	0.10	25	2500	8×12.2	PHE330M080F1CTR□□□□
	56	224	0.10	28	2500	10×10.5	PHE560M080G1ETR□□□□
	68	272	0.10	25	2700	10×12.7	PHE680M080G1DTR□□□□
100	15	100	0.10	30	2100	8×9.2	PHE150M100F92TR□□□□
	22	110	0.10	25	2300	8×12.2	PHE220M100F1CTR□□□□
	22	110	0.10	28	2700	10×10.5	PHE220M100G1ETR□□□□
	47	235	0.10	25	2500	10×12.7	PHE470M100G1DTR□□□□

* For the last 4 digits of the part number, please refer to the part number system on page 125.

✧ Frequency Coefficient for Ripple Current

Frequency	120Hz≤freq.<1KHz	1KHz≤freq.<10KHz	10KHz≤freq.<50KHz	50KHz≤freq.<100KHz	100KHz≤freq.<300KHz
Coefficient (C≤1000μF)	0.05	0.3	0.7	0.85	1
Coefficient (C>1000μF)	0.1	0.33	0.85	1	1