Powering Business Worldwide

Engineering Product Specification

EHBSA Series

Automotive Hybrid Aluminum Electrolytic Capacitor, V-Chip

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TITLE: **Hybrid Aluminum Electrolytic Capacitor, V-Chip** **Rev. 06**

REV.	DESCRIPTION	ECN	DATE	DRAWN	APPROVED
01	Draft	--	05/20/2024	Crux Lou	Jason Yang
02	Update marking allocation Add 0506 case Add new parts 27uF/35V and 10uF/50V Add general information	--	06/14/2024	Crux Lou	Jason Yang
03	Add 105°C characteristics for specified parts	--	06/18/2024	Crux Lou	Jason Yang
04	Add new part 820uF/16V	--	06/25/2024	Crux Lou	Jason Yang
05	Remove 0506 size Add layout info, package info Add 270uF/25V, 56uF/80V Change 100uF/63V parameters	--	09/18/2024	Crux Lou	Jason Yang
06	Adjust EPS format Add application info Add coplanar Update marking and 2D drawing Update clause 5 information	--	11/04/2024	Crux Lou	Jason Yang

CONTENTS

1 Product features and environmental data

Product features

Surface mount package
High ripple current for smaller case sizes and higher voltages
Endurance with ripple current: 4,000 hours at 125°C
Low leakage current
Operation temperature range: -40°C ~ +125°C
AEC-Q200

Applications

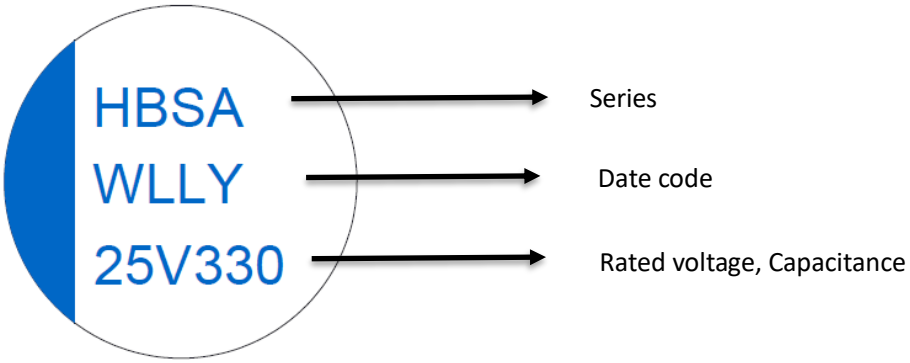
High temperature and high reliability applications
LED headlight,OBC,ADAS,BMS,48V system, ECU(Engine control Unit),EPS(Electric Power Steering),etc.

Environmental data

RoHS & lead-free
REACH
PFOS & PFOA
Halogen free, Sb2O3 free and Red Phosphorus free

2 Specification

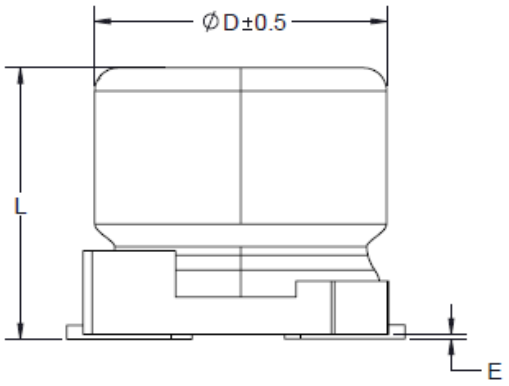
2.1 Marking

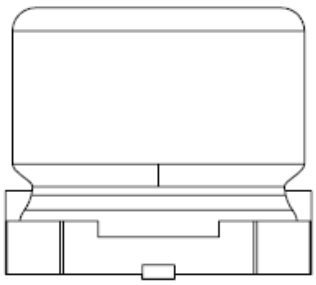


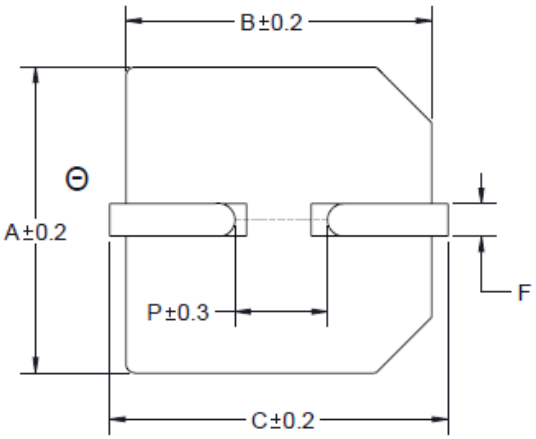
2.2 Part Number System

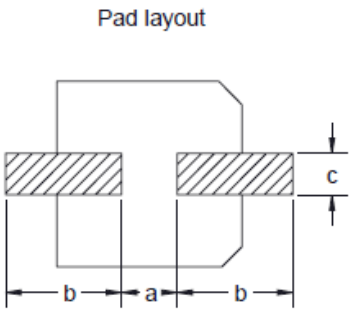
EHB	S	A	35	M	331	0606	T
Family	**Type**	**Grade**	**Voltage (V)**	**Tolerance**	**Capacitance (µF)**	**Size Code**	**Package Code**
EHB	S=SMD	A=auto	016=16 025=25 035=35 050=50 063=63 080=80	M=±20%	First two digits = significant figures. Third digit = Number of zeros. ex: 331 = 330 µF	Refer to Size Code Table	T=T&R 15”

2.3 Dimension (mm)









Size Code Table (mm)

Size Code	ØD	L	L Tol	A	B	C	F	E	P	a ref	b ref	c ref
0606	6.3	5.8	±0.2	6.6	6.6	7.3	0.5~0.8	0.3Max	2.1	2.1	3.5	1.6
0608	6.3	7.5	±0.5	6.6	6.6	7.3	0.5~0.8	0.3Max	2.1	2.1	3.5	1.6
0810	8.0	9.7	±0.3	8.3	8.3	9.0	0.8~1.1	0.3Max	2.9	2.8	4.2	1.9
1010	10	10.2	±0.3	10.3	10.3	11	0.8~1.1	0.3Max	4.6	4.3	4.4	1.9
1012	10	12.3	±0.2	10.3	10.3	11	0.8~1.1	0.3Max	4.6	4.3	4.4	1.9
1016	10	16.5	±0.3	10.3	10.3	11	0.8~1.1	0.3Max	4.6	4.3	4.4	1.9

All soldering surfaces to be coplanar within 0.1 millimeters

2.4 Rating and Part Number

Rated Voltage (V)	Surge Voltage (V)	Cap Value @120 Hz (µF)	Leakage Current (µA)	Tanδ @120 Hz	ESR @100 kHz (mΩ)	Ripple Current @100 kHz, +125°C (A)	Size code	Eaton PN
16	20	820	131.2	0.16	18	2.80	1010	EHBSA016M8211010T
25	31.3	47	11.8	0.14	50	0.90	0606	EHBSA025M4700606T
		56	14.0	0.14	50	0.90	0606	EHBSA025M5600606T
		68	17.0	0.14	50	1.10	0606	EHBSA025M6800606T
		100	25.0	0.14	50	1.30	0606	EHBSA025M1010606T
		100	25.0	0.14	30	1.40	0608	EHBSA025M1010608T
		150	37.5	0.14	30	1.80	0608	EHBSA025M1510608T
		180	45.0	0.14	30	1.80	0608	EHBSA025M1810608T
		220	55.0	0.14	27	2.90	0810	EHBSA025M2210810T
		270	67.5	0.14	27	2.90	0810	EHBSA025M2710810T
		330	82.5	0.14	20	3.50	1010	EHBSA025M3311010T
		470	117.5	0.14	20	3.50	1010	EHBSA025M4711010T
		470	117.5	0.14	14	3.50	1012	EHBSA025M4711012T
35	43.8	27	9.5	0.12	60	0.90	0606	EHBSA035M2700606T
		47	16.5	0.12	60	0.90	0606	EHBSA035M4700606T
		47	16.5	0.12	35	1.40	0608	EHBSA035M4700608T
		68	23.8	0.12	35	1.40	0608	EHBSA035M6800608T
		100	35.0	0.12	35	1.70	0608	EHBSA035M1010608T
		100	35.0	0.12	27	1.90	0810	EHBSA035M1010810T
		120	42.0	0.12	35	1.70	0608	EHBSA035M1210608T
		150	52.5	0.12	27	2.90	0810	EHBSA035M1510810T
		180	63.0	0.12	27	2.90	0810	EHBSA035M1810810T
		220	77.0	0.12	20	2.80	1010	EHBSA035M2211010T
		270	94.5	0.12	20	3.50	1010	EHBSA035M2711010T
		330	115.5	0.12	20	3.50	1010	EHBSA035M3311010T
		330	115.5	0.12	14	3.50	1012	EHBSA035M3311012T
		390	136.5	0.12	20	3.50	1010	EHBSA035M3911010T
		470	164.5	0.12	14	3.50	1012	EHBSA035M4711012T
		470	164.5	0.12	11	4.00	1016	EHBSA035M4711016T
50	62.5	22	11.0	0.10	80	0.75	0606	EHBSA050M2200606T
		33	16.5	0.10	40	1.10	0608	EHBSA050M3300608T
		47	23.5	0.10	30	1.25	0810	EHBSA050M4700810T
		68	34.0	0.10	30	2.70	0810	EHBSA050M6800810T
		100	50.0	0.10	23	2.90	1010	EHBSA050M1011010T
		120	60.0	0.10	25	2.90	1010	EHBSA050M1211010T
		150	75.0	0.10	17	2.00	1012	EHBSA050M1511012T
		180	90.0	0.10	17	3.20	1012	EHBSA050M1811012T
		220	110.0	0.10	13	3.70	1016	EHBSA050M2211016T
63	78.8	10	6.3	0.08	120	0.70	0606	EHBSA063M1000606T
		22	13.9	0.08	80	0.90	0608	EHBSA063M2200608T
		33	20.8	0.08	40	1.10	0810	EHBSA063M3300810T
		47	29.6	0.08	32	2.40	0810	EHBSA063M4700810T
		56	35.3	0.08	30	2.80	1010	EHBSA063M5601010T
		68	42.8	0.08	30	2.80	1010	EHBSA063M6801010T
		82	51.7	0.08	30	2.80	1010	EHBSA063M8201010T

Rated Voltage (V)	Surge Voltage (V)	Cap Value @120 Hz (µF)	Leakage Current (µA)	Tanδ @120 Hz	ESR @100 kHz (mΩ)	Ripple Current @100 kHz, +125°C (A)	Size code	Eaton PN
		100	63.0	0.08	30	2.80	1010	EHBSA063M1011010T
		120	75.6	0.08	19	3.00	1012	EHBSA063M1211012T
		150	94.5	0.08	15	3.50	1016	EHBSA063M1511016T
80	100.0	22	17.6	0.08	45	1.05	0810	EHBSA080M2200810T
		47	37.6	0.08	33	1.36	1010	EHBSA080M4701010T
		56	44.8	0.08	33	1.36	1010	EHBSA080M5601010T

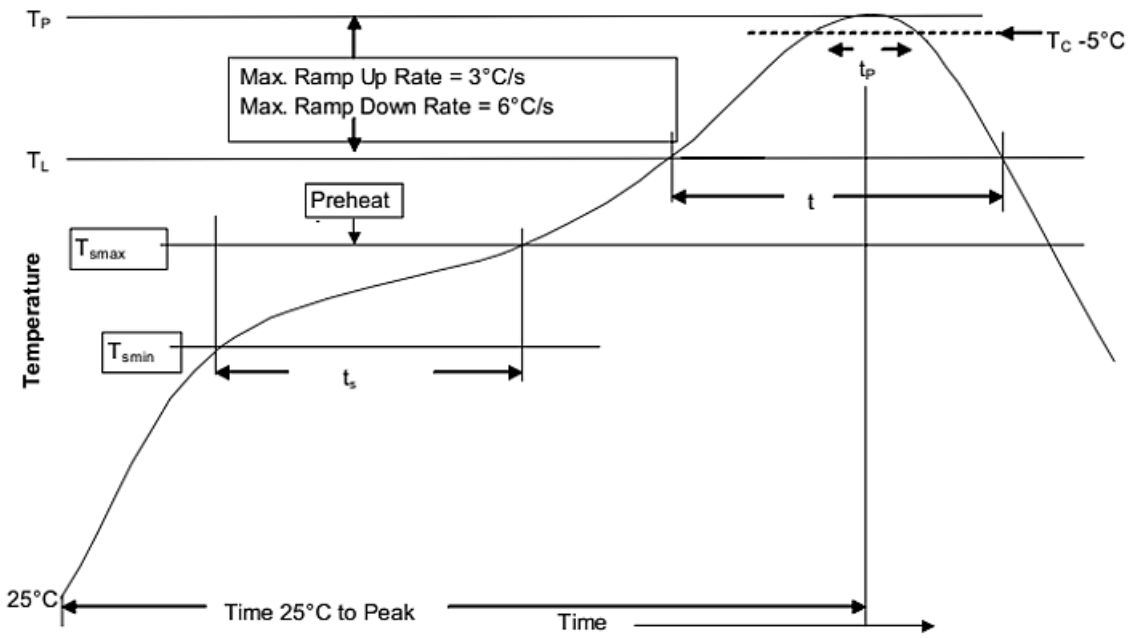
2.5 Frequency coefficient of rated ripple current

Frequency	120Hz	1kHz	10kHz	50kHz	100kHz to 300kHz
Coefficient	0.05	0.3	0.7	0.85	1.0

2.6 Characteristics @105°C for specified parts

Rated Voltage (VDC)	Capacitance (uF)	Ambient Temperature 125°C		Ambient Temperature 105°C		Eaton PN
		Ripple Current @100 kHz (mA)	Load Life (Hr)	Ripple Current @100 kHz (mA)	Load Life (Hr)	
25	47	900	4,000	1,270	10,000	EHBSA025M4700606T
50	10	500	4,000	750	10,000	EHBSA050M1000506T
50	22	750	4,000	1,100	10,000	EHBSA050M2200606T
50	33	1,100	4,000	1,600	10,000	EHBSA050M3300608T

3 Reflow soldering curve



Preheat	**Ts $_{min}$**	150°C
	Ts $_{max}$	200°C
	Time from Ts $_{min}$ to Ts $_{max}$ (ts)	60~120 seconds
Ramp-up rate (T_L to Tp)		3°C / second max.
Time maintained above	**T_L**	217°C
	Time(tL)	60~150 seconds
Soldering	**Tp**	260°C
	Time within ±5°C of Peak Temperature (tp)	10 seconds
	Ramp-down Rate	6°C /second max.

4 General information

4.1 Impedance at low temperature

Impedance at 100kHz at -55±3°C or -40±2°C shall meet the values listed in below table

Impedance at low or high temperature

Impedance ratio	Performance
Z(-55°C)/Z(+20°C)	≤ 2.0
Z(-40°C)/Z(+20°C)	≤ 1.5

4.2 Endurance

125°C, 4000hr, apply the rated ripple current without exceeding the rated voltage

Characteristics	Performance
Appearance	No significant damage
Capacitance change	≤ ±30% of the initial value
tanδ	≤ 200% of the initial specified value
ESR	≤ 200% of the initial specified value
Leakage current	≤ the initial specified value

5 Packaging information- mm

Drawing not to scale

Supplied in tape and reel packaging, 1200 parts for 0606 per 15” (381mm) diameter reel

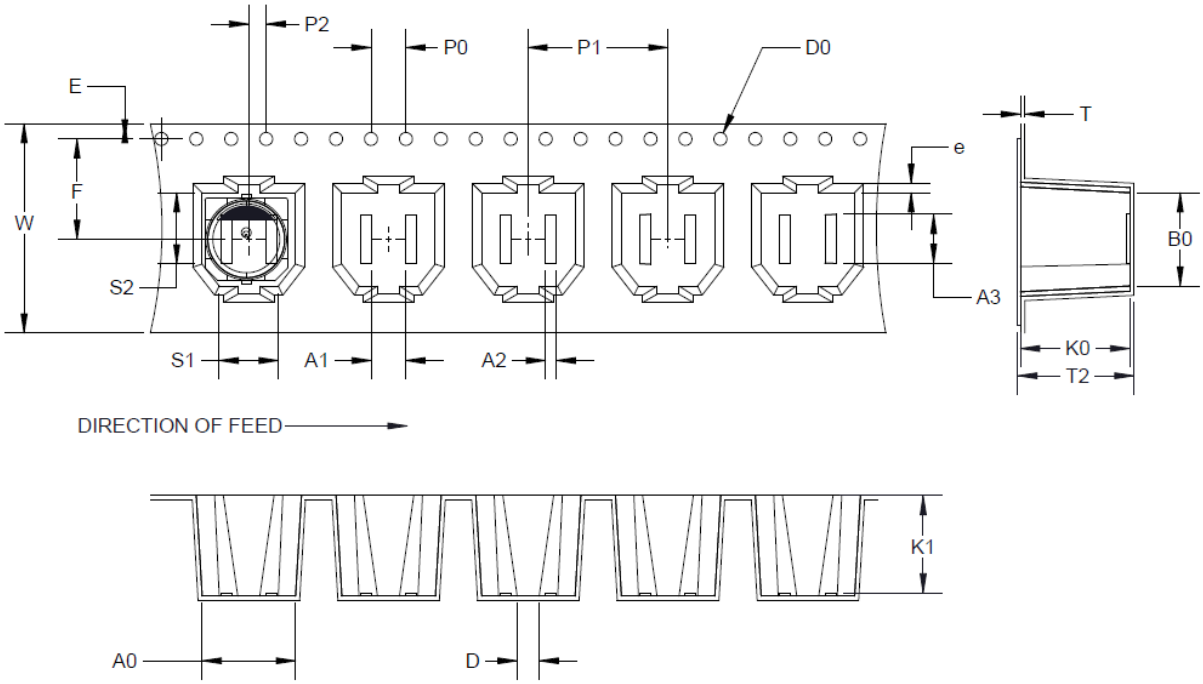
Supplied in tape and reel packaging, 900 parts for 0608 per 15” (381mm) diameter reel

Supplied in tape and reel packaging, 500 parts for 0810 per 15” (381mm) diameter reel

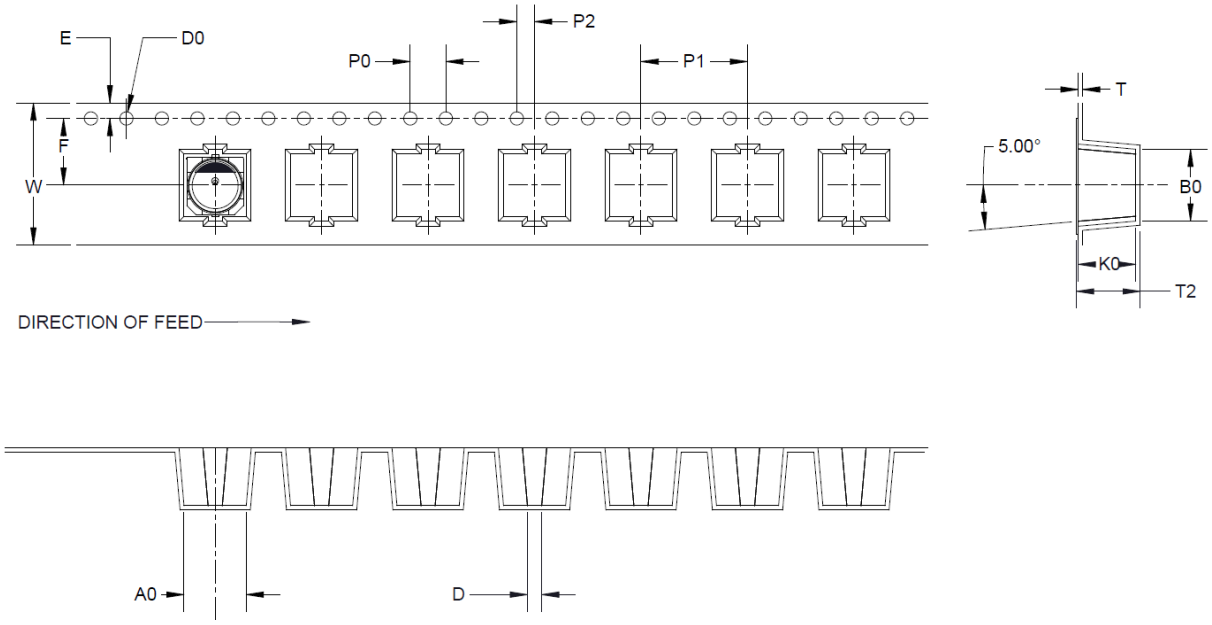
Supplied in tape and reel packaging, 500 parts for 1010 per 15” (381mm) diameter reel

Supplied in tape and reel packaging, 450 parts for 1012 per 15” (381mm) diameter reel

Supplied in tape and reel packaging, 200 parts for 1016 per 15” (381mm) diameter reel



	0606	1016
W±0.30	16	32
F	7.5±0.15	14.25±0.10
E	1.75±0.15	1.75±0.10
P0	4.0±0.05	4.0±0.10
P1±0.10	12	24
P2	2.0±0.05	2.0±0.10
D0+0.10/-0	1.5	1.5
D±0.10	1.6	1.6
A0±0.10	7.0	10.5
B0±0.10	7.0	10.5
K0±0.10	6.5	16.95
K1±0.05	6.25	16.85
T±0.05	0.4	0.5
T2 max	7.07	17.62



	0608	0810	1010	1012
W±0.30	16	24	24	24
F±0.10	7.5	11.5	11.5	11.5
E±0.10	1.75	1.75	1.75	1.75
P0±0.10	4.0	4.0	4.0	4.0
P1±0.10	12	16	16	16
P2±0.10	2.0	2.0	2.0	2.0
D0+0.10/-0	1.5	1.5	1.5	1.5
D±0.10	1.6	1.6	1.6	1.6
A0±0.10	7.0	8.7	10.7	10.7
B0±0.10	7.0	8.7	10.7	10.7
K0	8.2±0.10	10+0.10/-0	11±0.10	13±0.10
T±0.05	0.5	0.5	0.5	0.5
T2 max	8.87	10.67	11.67	13.67

6 Storage condition and Shelf life

The minimum shelf life is Two (2) years from date code manufactured provided product is maintained in its original packaging and stored in a controlled environment under the conditions of <35°C / 75% relative humidity.