

Hybrid Conductive Polymer Aluminum Capacitors SMD (Chip), Low Impedance



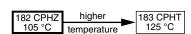


Fig. 1

QUICK REFERENCE DATA					
DESCRIPTION	VALUE				
Nominal case sizes (L x W x H in mm)	5.0 x 5.0 x 5.8 to 10.0 x 10.0 x 16.5				
Rated capacitance range, C _R	10 μF to 1500 μF				
Tolerance on C _R	± 20 %				
Rated voltage range, U _R	16 V to 80 V				
Category temperature range	-55 °C to +105 °C				
Endurance test at 105 °C	10 000 h				
Useful life at 105 °C	10 000 h				
Shelf life at 0 V, 105 °C	1000 h				
Based on sectional specification	IEC 60384-25 / CECC 32300				
Climatic category IEC 60068	55 / 105 / 56				

FEATURES

- Long useful life: up to 10 000 h at 105 °C
- · Very low ESR and high ripple current
- High voltages up to 80 V



- SMD-version with base plate, lead (Pb)-free reflow solderable
- Material categorization: for definitions of compliance please see <u>www.vishav.com/doc?99912</u>

APPLICATIONS

- Industrial and professional applications
- Telecommunications and IT
- · Portable and mobile equipment

MARKING

- Rated capacitance (in μF)
- Rated voltage (in V)
- Date code, in accordance with IEC 60062
- Black mark or "-" sign indicating the cathode (the anode is identified by beveled edges)
- Code indicating group number (82)

PACKAGING

Supplied in blister tape on reel

SELECTION	SELECTION CHART FOR C_R , U_R , and relevant nominal case sizes (L x W x H in mm)							
C _R			U _R (V)					
(μF)	16	25	35	50	63	80		
10	\rightarrow	\rightarrow	\rightarrow	5.0 x 5.0 x 5.8	6.3 x 6.3 x 5.8	-		
22	\rightarrow	\rightarrow	5.0 x 5.0 x 5.8	6.3 x 6.3 x 5.8	6.3 x 6.3 x 7.7	8.0 x 8.0 x 10.5		
27	\rightarrow	\rightarrow	6.3 x 6.3 x 5.8	=	=	-		
33	\rightarrow	5.0 x 5.0 x 5.8	\rightarrow	6.3 x 6.3 x 7.7	8.0 x 8.0 x 10.5	10.0 x 10.0 x 10.5		
47	\rightarrow	\rightarrow	6.3 x 6.3 x 5.8	-	-	-		
56	\rightarrow	6.3 x 6.3 x 5.8	\rightarrow	\rightarrow	10.0 x 10.0 x 10.5	-		
68	\rightarrow	\rightarrow	6.3 x 6.3 x 7.7	8.0 x 8.0 x 10.5	10.0 x 10.0 x 10.5	-		
82	\rightarrow	\rightarrow	\rightarrow	\rightarrow	10.0 x 10.0 x 12.4	-		
100	6.3 x 6.3 x 5.8	6.3 x 6.3 x 7.7	\rightarrow	10.0 x 10.0 x 10.5	-	-		
150	6.3 x 6.3 x 5.8	\rightarrow	8.0 x 8.0 x 10.5	=	10.0 x 10.0 x 16.5	-		
220	6.3 x 6.3 x 7.7	8.0 x 8.0 x 10.5	=	=	=	-		
270	6.3 x 6.3 x 7.7	\rightarrow	10.0 x 10.0 x 10.5	-	-	-		
330	10.0 x 10.0 x 10.5	10.0 x 10.0 x 10.5	=	=	=	=		
470	8.0 x 8.0 x 10.5	=	=	=	=	=		
560	10.0 x 10.0 x 10.5	=	=	=	-	=		
820	10.0 x 10.0 x 12.4	-	=	=	=	=		
1500	10.0 x 10.0 x 16.5	-	=	=	-	=		

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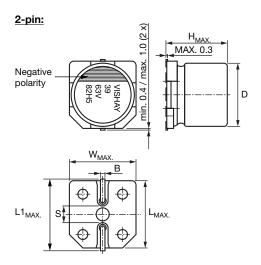


Fig. 2 - Dimensional outline

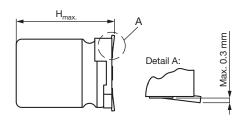


Fig. 3 - Coplanarity of pins

Table 1

DIMENSIONS in millimeters AND MASS									
NOMINAL CASE SIZE L x W x H	CASE CODE	L _{MAX.}	W _{MAX} .	H _{MAX.}	Ø D	B _{MAX.}	s	L1 _{MAX} .	MASS (g)
5.0 x 5.0 x 5.8	0506	5.5	5.5	6.1	5.0	0.8	1.4	6.1	0.2
6.3 x 6.3 x 5.8	0606	6.8	6.8	6.1	6.3	0.8	2.2	7.4	0.3
6.3 x 6.3 x 7.7	0608	6.8	6.8	8.0	6.3	0.8	2.2	7.4	0.4
8.0 x 8.0 x 10.5	0810	8.5	8.5	10.8	8.0	1.1	3.1	9.2	0.9
10.0 x 10.0 x 10.5	1010	10.5	10.5	10.8	10.0	1.1	4.5	11.2	1.2
10.0 x 10.0 x 12.4	1012	10.5	10.5	12.7	10.0	1.4	4.5	11.2	1.5
10.0 x 10.0 x 16.5	1016	10.5	10.5	16.8	10.0	1.4	4.5	11.2	1.8

Table 2

TAPE AND REEL	TAPE AND REEL DIMENSIONS in millimeters, PACKAGING QUANTITIES							
NOMINAL CASE SIZE L x W x H	CASE CODE	PITCH P ₁	TAPE WIDTH W	TAPE THICKNESS T ₂	REEL DIAMETER	PACKAGING QUANTITY PER REEL		
5.0 x 5.0 x 5.8	0506	12	12	6.1	380	1000		
6.3 x 6.3 x 5.8	0606	12	16	5.7	380	1000		
6.3 x 6.3 x 7.7	0608	12	16	8.0	380	900		
8.0 x 8.0 x 10.5	0810	16	24	11.0	380	500		
10.0 x 10.0 x 10.5	1010	16	24	11.0	380	500		
10.0 x 10.0 x 12.4	1012	16	24	12.9	380	400		
10.0 x 10.0 x 16.5	1016	16	24	17.5	380	250		

MOUNTING

The capacitors are designed for automatic placement on to printed-circuit boards.

Optimum dimensions of soldering pads depend amongst others on soldering method, mounting accuracy, print layout and / or adjacent components.

For recommended soldering pad dimensions, refer to Fig. 4 and Table 3.

SOLDERING

Soldering conditions are defined by the curve, temperature versus time, where the temperature is that measured on the component during processing.

For maximum conditions refer to Fig. 5.

Any temperature versus time curve which does not exceed the specified maximum curves may be applied.

As a general principle, temperature and duration shall be the **minimum** necessary required to ensure good soldering connections. However, the specified maximum curves should never be exceeded.



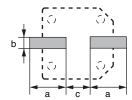


Fig. 4 - Recommended soldering pad dimensions

Table 3

RECOMMENDED SOLDERING PAD DIMENSIONS in millimeters					
NOMINAL CASE SIZE L x W x H	CASE CODE	а	b	С	
5.0 x 5.0 x 5.8	0506	3.0	1.6	1.4	
6.3 x 6.3 x 5.8	0606	3.5	1.6	2.1	
6.3 x 6.3 x 7.7	0608	3.5	1.6	2.1	
8.0 x 8.0 x 10.5	0810	4.2	1.9	2.8	
10.0 x 10.0 x 10.5	1010	4.4	1.9	4.3	
10.0 x 10.0 x 12.4	1012	4.4	1.9	4.3	
10.0 x 10.0 x 16.5	1016	4.4	1.9	4.3	

SOLDERING PROFILE FOR LEAD (Pb)-FREE REFLOW PROCESS

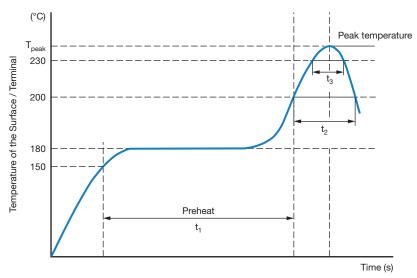


Fig. 5 - Maximum temperature load during reflow soldering

Table 4

REFLOW SOLDERING CONDITIONS for MAL2182xxxxxE3					
PROFILE FEATURES	Ø ≤ 6.3 mm	Ø ≥ 8	mm		
Maximum time between 150 °C to 200 °C (t ₁)	120 s	120) s		
Ramp up rate from 217 °C to Tpeak	0.5 K/s to 3 K/s				
Maximum time above 200 °C (t ₂)	70 s	70 s			
Maximum time above 230 °C (t ₃)	30 s	30	S		
Peak temperature T _{Peak}	260 °C	260 °C	245 °C		
Maximum reflow cycles	2	1	2		
Ramp down rate T _{peak} to 217 °C	6 K/s max.				
Time 25 °C to T _{Peak}	8 mir	max.			

Note

• Temperature measuring point on top of the case and on terminals



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ELECTRICAL DATA				
SYMBOL	DESCRIPTION			
C _R	Rated capacitance at 120 Hz, tolerance ± 20 %			
I _R 105 °C	Rated RMS ripple current at 100 kHz			
I _{L2}	Max. leakage current after 2 min at U _R			
tan δ	Max. dissipation factor at 120 Hz			
ESR	Max. ESR at 100 kHz			

ORDERING EXAMPLE

Hybrid conductive polymer 182 CPHZ series

100 μF / 25 V; \pm 20 %

Nominal case size: 6.3 mm x 6.3 mm x 7.7 mm;

taped on reel

Ordering code: MAL218297603E3

Note

 Unless otherwise specified, all electrical values in Table 5 apply at T_{amb} = 20 °C, P = 86 kPa to 106 kPa, RH = 45 % to 75 %

Table 5

ELECTR	ICAL DAT	A AND ORDERING	INFORMAT	TION	_		
U _R (V)	C _R (μF)	NOMINAL CASE SIZE L x W x H (mm)	I _R 105 °C 100 kHz (mA)	l _{L2} 2 min (μΑ)	tan δ 120 Hz	ESR 100 kHz 20 °C (mΩ)	ORDERING CODE MAL2182
	100	6.3 x 6.3 x 5.8	1300	16	0.16	50	97501E3
	150	6.3 x 6.3 x 5.8	1300	24	0.16	50	97502E3
	220	6.3 x 6.3 x 7.7	2000	35.2	0.16	30	97503E3
	270	6.3 x 6.3 x 7.7	2000	43.2	0.16	30	97504E3
16	330	10.0 x 10.0 x 10.5	2500	52.8	0.16	20	97505E3
	470	8.0 x 8.0 x 10.5	2300	75.2	0.16	27	97506E3
	560	10.0 x 10.0 x 10.5	2500	89.6	0.16	20	97507E3
	820	10.0 x 10.0 x 12.4	2800	131.2	0.16	16	97508E3
	1500	10.0 x 10.0 x 16.5	5000	240	0.16	11	97509E3
	33	5.0 x 5.0 x 5.8	900	8.3	0.14	80	97601E3
	56	6.3 x 6.3 x 5.8	1300	14	0.14	50	97602E3
25	100	6.3 x 6.3 x 7.7	2000	25	0.14	30	97603E3
	220	8.0 x 8.0 x 10.5	2300	55	0.14	27	97604E3
330	330	10.0 x 10.0 x 10.5	2500	82.5	0.14	20	97605E3
	22	5.0 x 5.0 x 5.8	900	7.7	0.12	100	97001E3
	27	6.3 x 6.3 x 5.8	1300	9.5	0.12	60	97002E3
0.5	47	6.3 x 6.3 x 5.8	1300	16.5	0.12	60	97003E3
35	68	6.3 x 6.3 x 7.7	2000	23.8	0.12	35	97004E3
	150	8.0 x 8.0 x 10.5	2300	52.5	0.12	27	97005E3
	270	10.0 x 10.0 x 10.5	2500	94.5	0.12	20	97006E3
	10	5.0 x 5.0 x 5.8	750	5	0.1	120	97101E3
	22	6.3 x 6.3 x 5.8	1100	11	0.1	80	97102E3
50	33	6.3 x 6.3 x 7.7	1600	16.5	0.1	40	97103E3
	68	8.0 x 8.0 x 10.5	1800	34	0.1	30	97104E3
	100	10.0 x 10.0 x 10.5	2000	50	0.1	28	97105E3
	10	6.3 x 6.3 x 5.8	1000	6.3	0.08	120	97801E3
	22	6.3 x 6.3 x 7.7	1500	13.9	0.08	80	97802E3
	33	8.0 x 8.0 x 10.5	1700	20.8	0.08	40	97803E3
63	56	10.0 x 10.0 x 10.5	1800	35.3	0.08	30	97804E3
	68	10.0 x 10.0 x 10.5	1800	42.8	0.08	30	97805E3
	82	10.0 x 10.0 x 12.4	2100	51.7	0.08	22	97806E3
	150	10.0 x 10.0 x 16.5	4350	94.5	0.08	15	97807E3
	22	8.0 x 8.0 x 10.5	1550	17.6	0.08	45	97701E3
80	33	10.0 x 10.0 x 10.5	1700	26.4	0.08	36	97702E3

Table 6

ADDITIONAL ELECTRICAL DATA					
PARAMETER	CONDITIONS	VALUE			
Voltage					
Surge voltage for short periods	IEC 60384-25, subclause 4.14	U _s ≤ 1.15 x U _R			

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USEFUL LIFE AND ENDURANCE

Table 7

ENDURANCE TEST AND USEFUL LIFE							
SERIES	CASE CODE	USEFUL LIFE AT 105 °C (h) ⁽¹⁾	ENDURANCE AT 105 °C (h)	ENDURANCE AT 95 °C (h)	ENDURANCE AT 85 °C (h)	ENDURANCE AT 75 °C (h)	ENDURANCE AT 65 °C (h)
182 CPHZ	0506 to 1016	10 000	10 000	20 000	40 000	80 000	160 000

Note

(1) Identical with endurance for this series

Endurance can be calculated by formula below:

$$L = L_{Tmax.} \times 2^{\frac{T_{max.} - T_{a}}{10}}$$

L: estimated lifetime (h)

L_{Tmax}: base lifetime specified at maximum operating temperature with applied DC voltage (h)

T_{max.}: rated maximum operating temperature (°C)

T_a: actual ambient temperature (°C)

Table 8

MULTIPLIER OF RIPPLE CURRENT (I _R) AS A FUNCTION OF FREQUENCY						
	FREQUENCY (Hz)					
120	120 1000 10 000 ≥ 100 000					
I _R MULTIPLIER						
0.1	.1 0.3 0.6 1					

Table 9

TEST PROCEDURES AND REQUIREMENTS					
TEST		PROCEDURE	REQUIREMENTS		
NAME OF TEST	REFERENCE	(quick reference)	NEQUINEMENTS		
Mounting	IEC 60384-25, subclause 4.3	Shall be performed prior to tests mentioned below; reflow soldering; for maximum temperature load refer to chapter "Mounting"	$\Delta C/C$: \pm 5 % tan δ \leq spec. limit $I_{L2} \leq$ spec. limit		
Endurance	IEC 60384-25 / CECC 32300, subclause 4.15	T _{amb} = 105 °C; U _R applied; for test duration see Table 7	Δ C/C: ± 30 % tan δ ≤ 2 x spec. limit I_{L2} ≤ spec. limit ESR ≤ 2 x spec. limit		
Useful life	CECC 30301, subclause 1.8.1	T_{amb} = 105 °C; U_R and I_R applied; for test duration see Table 7	Δ C/C: \pm 30 % tan δ \leq 2 x spec. limit I_{L2} \leq spec. limit ESR \leq 2 x spec. limit		
Shelf life (storage at high temperature)	IEC 60384-25 / CECC 32300, subclause 4.16	T _{amb} = 105 °C; no voltage applied; 1000 h after test: U _R to be applied for 30 min, 24 h to 48 h before measurement	For requirements see "Endurance test" above		

Statements about product lifetime are based on calculations and internal testing. They should only be interpreted as estimations. Also due to external factors, the lifetime in the field application may deviate from the calculated lifetime. In general, nothing stated herein shall be construed as a guarantee of durability.



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