

Conductive Polymer Aluminum Capacitors SMD (Chip), Low Impedance

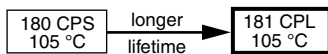


Fig. 1



FEATURES

- Long useful life: up to 5000 h at 105 °C
- Very low ESR and highest ripple current
- SMD-version with base plate, lead (Pb)-free reflow solderable
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

APPLICATIONS

- SMD technology, for high temperature reflow soldering
- 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
- Blue mark or “-” sign indicating the cathode (the anode is identified by bevelled edges)
- Code indicating group number (L)

PACKAGING

Supplied in blister tape on reel

| QUICK REFERENCE DATA | |
|---|--|
| DESCRIPTION | VALUE |
| Nominal case sizes (L x W x H in mm) | 6.6 x 6.6 x 5.9 to 10.4 x 10.4 x 12.6 |
| Rated capacitance range, C_R | 18 μF to 820 μF |
| Tolerance on C_R | $\pm 20 \%$ |
| Rated voltage range, U_R | 4.0 V to 35 V |
| Category temperature range | -55 °C to +105 °C |
| Endurance test at 105 °C | 5000 h |
| Useful life at 105 °C | 5000 h |
| Shelf life at 0 V, 105 °C | 1000 h |
| Based on sectional specification | IEC 60384-18 / CECC 32300 |
| Climatic category IEC 60068 | 55/105/56 |

| SELECTION CHART FOR C_R , U_R , AND RELEVANT NOMINAL CASE SIZES (L x W x H in mm) | | | | | | | |
|---|-------------------|-------------------|-------------------|--------------------|--------------------|--------------------|--------------------|
| C_R (μF) | U_R (V) | | | | | | |
| | 4.0 | 6.3 | 10 | 16 | 20 | 25 | 35 |
| 18 | → | → | → | → | → | → | 6.6 x 6.6 x 5.9 |
| 39 | → | → | → | 6.6 x 6.6 x 5.9 | - | - | - |
| 47 | → | → | → | → | → | 6.6 x 6.6 x 5.9 | - |
| 56 | → | → | 6.6 x 6.6 x 5.9 | → | 6.6 x 6.6 x 5.9 | - | - |
| 68 | → | → | 6.6 x 6.6 x 5.9 | 6.6 x 6.6 x 5.9 | - | - | - |
| 82 | → | → | → | 8.4 x 8.4 x 6.7 | → | → | 8.4 x 8.4 x 12 |
| 100 | → | 6.6 x 6.6 x 5.9 | → | 10.4 x 10.4 x 7.7 | - | - | - |
| 120 | → | 6.6 x 6.6 x 5.9 | 6.6 x 6.6 x 5.9 | 8.4 x 8.4 x 6.7 | - | - | - |
| 150 | 6.6 x 6.6 x 5.9 | → | 8.4 x 8.4 x 6.7 | 8.4 x 8.4 x 6.7 | → | 8.4 x 8.4 x 12 | 10.4 x 10.4 x 12.6 |
| | | | 10.4 x 10.4 x 7.7 | | | | |
| 180 | → | → | → | 10.4 x 10.4 x 7.7 | - | - | - |
| 220 | → | 6.6 x 6.6 x 5.9 | - | - | - | - | - |
| | | 8.4 x 8.4 x 6.7 | | | | | |
| 270 | 8.4 x 8.4 x 6.7 | → | 8.4 x 8.4 x 6.7 | → | 8.4 x 8.4 x 12 | 10.4 x 10.4 x 12.6 | - |
| 330 | 6.6 x 6.6 x 5.9 | → | 10.4 x 10.4 x 7.7 | - | - | - | - |
| | 8.4 x 8.4 x 6.7 | | | | | | |
| 390 | → | 8.4 x 8.4 x 6.7 | → | → | 8.4 x 8.4 x 12 | - | - |
| 470 | → | 10.4 x 10.4 x 7.7 | → | → | 10.4 x 10.4 x 12.6 | - | - |
| 560 | 8.4 x 8.4 x 6.7 | - | - | - | - | - | - |
| 680 | 10.4 x 10.4 x 7.7 | - | - | - | - | - | - |
| 820 | → | → | → | 10.4 x 10.4 x 12.6 | - | - | - |

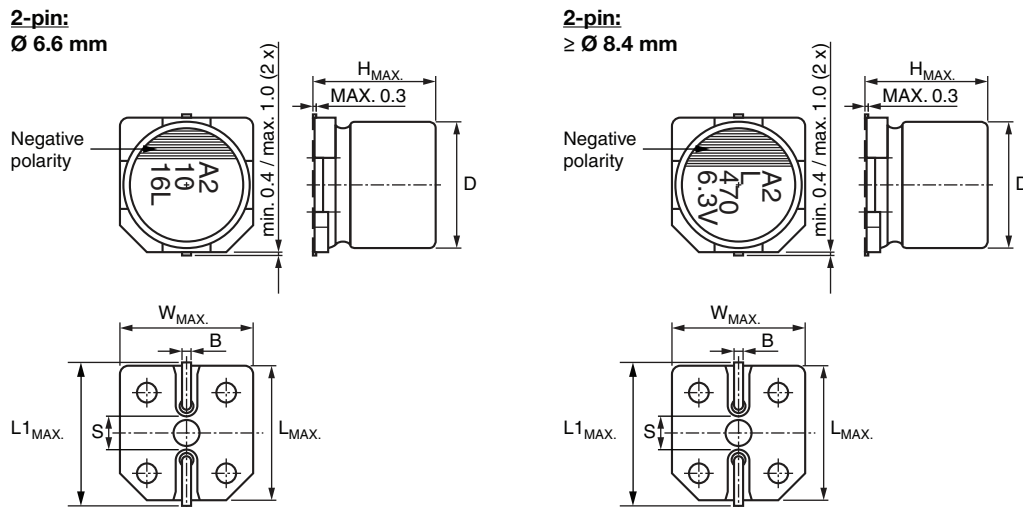


Fig. 2 - Dimensional outline

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) |
| 6.6 x 6.6 x 5.9 | 0606 | 6.8 | 6.8 | 6 | 6.3 | 0.8 | 2.0 | 7.4 | ~ 0.25 |
| 8.4 x 8.4 x 6.7 | 0807 | 8.6 | 8.6 | 7 | 8 | 1.1 | 3.1 | 9.2 | ~ 0.5 |
| 8.4 x 8.4 x 12 | 0812 | 8.6 | 8.6 | 12.5 | 8 | 1.1 | 3.1 | 9.2 | ~ 0.8 |
| 10.4 x 10.4 x 7.7 | 1008 | 10.6 | 10.6 | 8 | 10 | 1.3 | 4.7 | 11.2 | ~ 0.9 |
| 10.4 x 10.4 x 12.6 | 1013 | 10.6 | 10.6 | 12.7 | 10 | 1.3 | 4.7 | 11.2 | ~ 1.3 |

Table 2

| 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 |
| 6.6 x 6.6 x 5.9 | 0606 | 12 | 16 | 6.2 | 380 | 1000 |
| 8.4 x 8.4 x 6.7 | 0807 | 12 | 16 | 6.8 | 380 | 1000 |
| 8.4 x 8.4 x 12 | 0812 | 16 | 16 | 13.0 | 380 | 400 |
| 10.4 x 10.4 x 7.7 | 1008 | 16 | 24 | 10.0 | 380 | 500 |
| 10.4 x 10.4 x 12.6 | 1013 | 16 | 24 | 14.0 | 380 | 400 |

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. 3 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. 4.

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. 3 - Recommended soldering pad dimensions

Table 3

| RECOMMENDED SOLDERING PAD DIMENSIONS in millimeters | | | |
|--|-----|-----|-----|
| CASE CODE | a | b | c |
| 0606 | 1.9 | 3.5 | 1.6 |
| 0807 | 3.0 | 3.5 | 2.5 |
| 0812 | 3.0 | 3.5 | 2.5 |
| 1008 | 4.0 | 4.0 | 2.5 |
| 1013 | 4.0 | 4.0 | 2.5 |

ADVANCED SOLDERING PROFILE FOR LEAD (Pb)-FREE REFLOW PROCESS


Fig. 4 - Maximum temperature load during reflow soldering

Table 4

| REFLOW SOLDERING CONDITIONS for MAL2181xxxxxE3 | |
|---|---------------------------|
| PROFILE FEATURES | CASE CODE 0606 TO 1013 |
| Max. time from 25 °C to T_{Peak} | 300 s |
| Max. ramp-up rate to 150 °C | 3 K/s |
| Max. time from 150 °C to 200 °C (t_1) | 150 s |
| Max. time from 190 °C to 200 °C (t_2) | 110 s |
| Ramp up rate from 200 °C to T_{Peak} | 0.5 K/s to 3 K/s |
| Max. time above $T_{Liquidus}$ (217 °C) (t_3) | 90 s |
| Max. time above 230 °C (t_4) | 70 s |
| Peak temperature T_{Peak} | 260 °C |
| Max. time above T_{Peak} minus 5 °C | 40 s |
| Ramp-down rate from $T_{Liquidus}$ | 3 K/s to 6 K/s |

Note

- Temperature measuring point on top of the case and on terminals.



| ELECTRICAL DATA | |
|-----------------|---|
| SYMBOL | DESCRIPTION |
| C_R | Rated capacitance at 100 Hz, tolerance $\pm 20\%$ |
| I_R | Rated RMS ripple current at 100 kHz, 105 °C |
| I_{L2} | Max. leakage current after 2 min at U_R |
| $\tan \delta$ | Max. dissipation factor at 100 Hz |
| Z | Max. impedance at 100 kHz |

ORDERING EXAMPLE

Conductive polymer 181 CPL series

100 μ F / 16 V; $\pm 20\%$

Nominal case size: 10.4 mm x 10.4 mm x 7.7 mm; taped on reel

Ordering code: MAL218197504E3

Note

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

Table 5

| ELECTRICAL DATA AND ORDERING INFORMATION | | | | | | | |
|--|---------------------|--|------------------------------------|---------------------------------|-------------------------|---------------------------------------|-----------------------------|
| U_R (V) | C_R (μ F) | NOMINAL CASE SIZE L x W x H (mm) | I_R 105 °C 100 kHz (mA) | I_{L2} 2 min (μ A) | $\tan \delta$ 100 Hz | Z 100 kHz 20 °C (Ω) | ORDERING CODE MAL2181... |
| 4.0 | 150 | 6.6 x 6.6 x 5.9 | 2570 | 120 | 0.12 | 0.022 | 97701E3 |
| | 270 | 8.4 x 8.4 x 6.7 | 3220 | 216 | 0.12 | 0.022 | 97702E3 |
| | 330 | 6.6 x 6.6 x 5.9 | 2800 | 264 | 0.12 | 0.020 | 97703E3 |
| | 330 | 8.4 x 8.4 x 6.7 | 3220 | 264 | 0.12 | 0.022 | 97704E3 |
| | 560 | 8.4 x 8.4 x 6.7 | 3600 | 448 | 0.12 | 0.018 | 97705E3 |
| | 680 | 10.4 x 10.4 x 7.7 | 4130 | 544 | 0.12 | 0.020 | 97706E3 |
| 6.3 | 100 | 6.6 x 6.6 x 5.9 | 2800 | 126 | 0.12 | 0.022 | 97301E3 |
| | 120 | 6.6 x 6.6 x 5.9 | 2800 | 151 | 0.12 | 0.022 | 97302E3 |
| | 220 | 6.6 x 6.6 x 5.9 | 2800 | 277 | 0.12 | 0.020 | 97303E3 |
| | 220 | 8.4 x 8.4 x 6.7 | 3220 | 277 | 0.12 | 0.022 | 97306E3 |
| | 390 | 8.4 x 8.4 x 6.7 | 3220 | 491 | 0.12 | 0.022 | 97307E3 |
| | 470 | 10.4 x 10.4 x 7.7 | 4130 | 592 | 0.12 | 0.020 | 97308E3 |
| 10 | 56 | 6.6 x 6.6 x 5.9 | 2300 | 112 | 0.12 | 0.027 | 97401E3 |
| | 68 | 6.6 x 6.6 x 5.9 | 2300 | 136 | 0.12 | 0.027 | 97402E3 |
| | 120 | 6.6 x 6.6 x 5.9 | 2300 | 240 | 0.12 | 0.027 | 97403E3 |
| | 150 | 8.4 x 8.4 x 6.7 | 2760 | 300 | 0.12 | 0.030 | 97404E3 |
| | 150 | 10.4 x 10.4 x 7.7 | 3020 | 300 | 0.12 | 0.030 | 97405E3 |
| | 270 | 8.4 x 8.4 x 6.7 | 3200 | 540 | 0.12 | 0.022 | 97406E3 |
| | 330 | 10.4 x 10.4 x 7.7 | 3770 | 660 | 0.12 | 0.024 | 97407E3 |
| 16 | 39 | 6.6 x 6.6 x 5.9 | 2200 | 125 | 0.12 | 0.030 | 97501E3 |
| | 68 | 6.6 x 6.6 x 5.9 | 2200 | 218 | 0.12 | 0.030 | 97502E3 |
| | 82 | 8.4 x 8.4 x 6.7 | 2800 | 262 | 0.12 | 0.028 | 97503E3 |
| | 100 | 10.4 x 10.4 x 7.7 | 2670 | 320 | 0.12 | 0.035 | 97504E3 |
| | 120 | 8.4 x 8.4 x 6.7 | 2800 | 384 | 0.12 | 0.028 | 97505E3 |
| | 180 | 10.4 x 10.4 x 7.7 | 3430 | 576 | 0.12 | 0.029 | 97506E3 |
| | 820 | 10.4 x 10.4 x 12.6 | 5400 | 2624 | 0.12 | 0.012 | 97507E3 |
| 20 | 56 | 6.6 x 6.6 x 5.9 | 1300 | 224 | 0.12 | 0.048 | 97201E3 |
| | 270 | 8.4 x 8.4 x 12 | 4000 | 1080 | 0.12 | 0.021 | 97202E3 |
| | 390 | 8.4 x 8.4 x 12 | 4950 | 1560 | 0.12 | 0.014 | 97203E3 |
| | 470 | 10.4 x 10.4 x 12.6 | 4300 | 1880 | 0.12 | 0.020 | 97204E3 |
| 25 | 47 | 6.6 x 6.6 x 5.9 | 1300 | 235 | 0.12 | 0.049 | 97601E3 |
| | 150 | 8.4 x 8.4 x 12 | 2200 | 750 | 0.12 | 0.028 | 97602E3 |
| | 270 | 10.4 x 10.4 x 12.6 | 2700 | 1350 | 0.12 | 0.027 | 97603E3 |
| 35 | 18 | 6.6 x 6.6 x 5.9 | 900 | 126 | 0.12 | 0.064 | 97001E3 |
| | 82 | 8.4 x 8.4 x 12 | 2200 | 574 | 0.12 | 0.029 | 97002E3 |
| | 150 | 10.4 x 10.4 x 12.6 | 2600 | 1050 | 0.12 | 0.028 | 97003E3 |

Table 6

| ADDITIONAL ELECTRICAL DATA | | |
|-----------------------------------|---|----------------------------|
| PARAMETER | CONDITIONS | VALUE |
| Voltage | | |
| Surge voltage for short periods | IEC 60384-18, subclause 4.14 | $U_S \leq 1.15 \times U_R$ |
| Reverse voltage for short periods | IEC 60384-18, subclause 4.16; $T_A \leq 105 \text{ }^\circ\text{C}$ | $U_{rev} \leq 1 \text{ V}$ |

USEFUL LIFE AND ENDURANCE
Table 7

| ENDURANCE TEST AND USEFUL LIFE | | | | |
|---------------------------------------|--------------|---------------------------|-------------------------|------------------------|
| SERIES | CASE CODE | USEFUL LIFE AT 105 °C (h) | ENDURANCE AT 105 °C (h) | ENDURANCE AT 85 °C (h) |
| 181 CPL | 0606 to 1013 | 5000 | 5000 | 50 000 |

Endurance can be calculated by formula below:

$$L_r = L_0 \times 10^{\frac{T_0 - T_r}{20}}$$

 L_r : estimated lifetime (h)

 L_0 : base lifetime specified at maximum operating temperature with applied the DC voltage (h)

 T_0 : rated maximum operating temperature (°C)

 T_r : actual ambient temperature (°C)

Table 8

| TEST PROCEDURES AND REQUIREMENTS | | | |
|---|---|---|---|
| TEST | | PROCEDURE (quick reference) | REQUIREMENTS |
| NAME OF TEST | REFERENCE | | |
| Mounting | IEC 60384-18, subclause 4.3 | Shall be performed prior to tests mentioned below; reflow soldering; for maximum temperature load refer to chapter "Mounting" | $\Delta C/C: \pm 5 \%$ $\tan \delta \leq \text{spec. limit}$ $I_{L2} \leq \text{spec. limit}$ |
| Endurance | IEC 60384-18 / CECC 32300, subclause 4.15 | $T_{amb} = 105 \text{ }^\circ\text{C}$; U_R applied; for test duration see Table 7 | $\Delta C/C: \pm 20 \%$ $\tan \delta \leq 2 \times \text{spec. limit}$ $I_{L2} \leq \text{spec. limit}$ |
| Useful life | CECC 30301, subclause 1.8.1 | $T_{amb} = 105 \text{ }^\circ\text{C}$; U_R and I_R applied; for test duration see Table 7 | $\Delta C/C: \pm 20 \%$ $\tan \delta \leq 2 \times \text{spec. limit}$ $I_{L2} \leq \text{spec. limit}$ |
| Shelf life (storage at high temperature) | IEC 60384-18 / CECC 32300, subclause 4.17 | $T_{amb} = 105 \text{ }^\circ\text{C}$; 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 |



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

Material Category Policy

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: ocean@oceanchips.ru

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А