

## Wirewound Resistors, Industrial Power, Silicone Coated, Fixed Edgewound Tubular


**FEATURES**

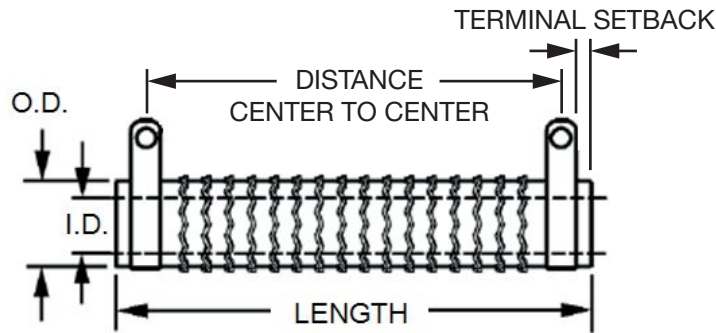
- High temperature silicone coating
- Complete welded construction
- Excellent stability in operation (< 3 % change in resistance)
- Material categorization:  
for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



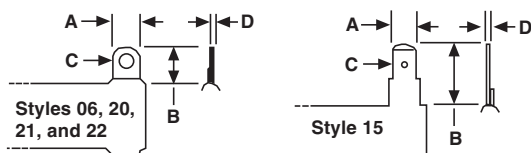
**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

| STANDARD ELECTRICAL SPECIFICATIONS |                  |   |   |  |                          |
|------------------------------------|------------------|---|---|--|--------------------------|
| GLOBAL MODEL                       | HISTORICAL MODEL | POWER RATING<br>$P_{25\text{ }^\circ\text{C}}$<br>W | RESISTANCE RANGE<br>$\Omega$<br>$\pm 5\%$ | RESISTANCE RANGE<br>$\Omega$<br>$\pm 10\%$ | WEIGHT<br>(typical)<br>g |
| FSE0050                            | FSE-50           | 50  | 1.0 to 3.8                                | 1.0 to 3.8                                 | 18                       |
| FSE0090                            | FSE-90           | 90  | 0.10 to 5.7                               | 0.10 to 5.7                                | 36                       |
| FSE0100                            | FSE-100          | 100   | 1.0 to 6.1                                | 0.15 to 6.1                                | 41                       |
| FSE0110                            | FSE-110          | 110   | 1.0 to 7.4                                | 0.20 to 7.4                                | 49                       |
| FSE0120                            | FSE-120          | 120   | 1.0 to 8.6                                | 0.1 to 8.6                                 | 54                       |
| FSE0155                            | FSE-155          | 155   | 1.0 to 12.5                               | 0.1 to 12.5                                | 129                      |
| FSE0240                            | FSE-240          | 240   | 1.0 to 18                                 | 0.1 to 18                                  | 186                      |
| FSE0300                            | FSE-300          | 300   | 1.0 to 25                                 | 0.15 to 25                                 | 236                      |
| FSE0375                            | FSE-375          | 375   | 1.0 to 32                                 | 0.20 to 32                                 | 286                      |
| FSE0420                            | FSE-420          | 420   | 1.0 to 35.8                               | 0.25 to 35.8                               | 320                      |
| FSE0500                            | FSE-500          | 500   | 1.0 to 46.2                               | 0.30 to 46.2                               | 381                      |
| FSE0750                            | FSE-750          | 750   | 1.0 to 81.3                               | 0.35 to 81.3                               | 654                      |
| FSE1000                            | FSE-1000         | 1000  | 1.0 to 101.6                              | 0.40 to 101.6                              | 817                      |
| FSE1500                            | FSE-1500         | 1500  | 1.0 to 135.5                              | 0.15 to 135.5                              | 1090                     |

| GLOBAL PART NUMBER INFORMATION   |   |                              |  |   |  |   |         |   |   |   |   |   |   |   |   |  |  |
|--|---|------------------------------|--|---|--|---|---------|---|---|---|---|---|---|---|---|--|--|
| Global Part Numbering example: <b>FSE050021E15R0JE</b> (visit <a href="http://www.vishay.net">www.vishay.net</a> Vishay Dale parts numbering manual for all options) |   |                              |  |   |  |   |         |   |   |   |   |   |   |   |   |  |  |
| F  | S   | E                            | 0  | 5   | 0  | 0   | 2       | 1 | E | 1 | 5 | R | 0 | J | E |  |  |
| GLOBAL MODEL<br>(7 digits)   | TERMINAL DESIGNATION<br>(2 digits)                            | TERMINAL FINISH<br>(1 digit) | VALUE<br>(4 digits)                              | TOLERANCE<br>(1 digit)                        | PACKAGING CODE<br>(1 digit)                  | SPECIAL<br>(up to 2 digits)   |         |   |   |   |   |   |   |   |   |  |  |
| (See Standard Electrical Specifications Global Model column for options)   | <b>06</b><br><b>15</b><br><b>20</b><br><b>21</b><br><b>22</b> | <b>E</b> = Lead (Pb)-free    | <b>R</b> = Decimal<br><b>1R50</b> = 1.5 $\Omega$ | <b>J</b> = $\pm 5\%$<br><b>K</b> = $\pm 10\%$ | <b>E</b> = Lead (Pb)-free cell and bulk pack | (Dash number) From <b>1</b> to <b>99</b> as applicable<br><b>91</b> = 100 style BKT<br><b>92</b> = 200 style BKT<br><b>93</b> = 300 style BKT |         |   |   |   |   |   |   |   |   |  |  |
| Historical Part Number example: <b>FSE-500-15-5 %</b>  |   |                              |  |   |  |   |         |   |   |   |   |   |   |   |   |  |  |
| FSE-500  | 15 $\Omega$   | 5 %                          |  |   |  |   |         |   |   |   |   |   |   |   |   |  |  |
| HISTORICAL MODEL   | RESISTANCE VALUE  | TOLERANCE                    |  |   |  |   | SPECIAL |   |   |   |   |   |   |   |   |  |  |

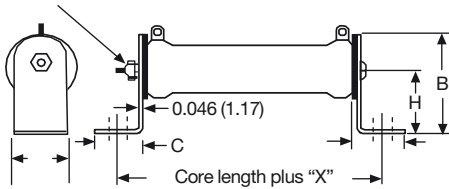
**DIMENSIONS** in inches [millimeters]


| MODEL   | CORE DIMENSIONS               |                             |                             | TERMINAL SETBACK | DISTANCE CENTER TO CENTER (REF.) | TERMINAL DESIGNATION |                          |
|---------|-------------------------------|-----------------------------|-----------------------------|------------------|----------------------------------|----------------------|--------------------------|
|         | LENGTH<br>± 0.062<br>[± 1.57] | O.D.<br>± 0.031<br>[± 0.79] | I.D.<br>± 0.031<br>[± 0.79] |                  |                                  | STANDARD             | OPTIONAL (QUICK CONNECT) |
| FSE0050 | 2.000<br>[50.8]               | 0.750<br>[19.05]            | 0.500<br>[12.70]            | 0.094<br>[2.39]  | 1.562<br>[39.67]                 | 06                   | 15                       |
| FSE0090 | 4.000<br>[101.6]              | 0.563<br>[14.30]            | 0.313<br>[7.95]             | 0.094<br>[2.39]  | 3.562<br>[90.47]                 | 06                   | 15                       |
| FSE0100 | 3.500<br>[88.90]              | 0.750<br>[19.05]            | 0.500<br>[12.70]            | 0.079<br>[2.01]  | 3.092<br>[78.54]                 | 06                   | 15                       |
| FSE0110 | 4.000<br>[101.6]              | 0.750<br>[19.05]            | 0.500<br>[12.70]            | 0.125<br>[3.18]  | 3.500<br>[88.90]                 | 06                   | 15                       |
| FSE0120 | 4.500<br>[114.3]              | 0.750<br>[19.05]            | 0.547<br>[13.89]            | 0.125<br>[3.18]  | 4.000<br>[101.60]                | 06                   | 15                       |
| FSE0155 | 4.500<br>[114.3]              | 1.125<br>[28.58]            | 0.750<br>[19.05]            | 0.282<br>[7.16]  | 3.311<br>[84.10]                 | 20                   | 15                       |
| FSE0240 | 6.500<br>[165.1]              | 1.125<br>[28.58]            | 0.750<br>[19.05]            | 0.250<br>[6.35]  | 5.561<br>[141.25]                | 20                   | 15                       |
| FSE0300 | 8.500<br>[215.9]              | 1.125<br>[28.58]            | 0.750<br>[19.05]            | 0.267<br>[6.78]  | 7.591<br>[192.81]                | 20                   | 15                       |
| FSE0375 | 10.500<br>[266.7]             | 1.125<br>[28.58]            | 0.750<br>[19.05]            | 0.266<br>[6.76]  | 9.591<br>[243.61]                | 20                   | 15                       |
| FSE0420 | 11.750<br>[288.9]             | 1.125<br>[28.58]            | 0.750<br>[19.05]            | 0.266<br>[6.76]  | 10.843<br>[275.41]               | 20                   | 15                       |
| FSE0500 | 10.500<br>[266.7]             | 1.625<br>[41.275]           | 1.125<br>[28.58]            | 0.266<br>[6.76]  | 9.468<br>[240.49]                | 21                   | -                        |
| FSE0750 | 12.000<br>[304.8]             | 2.500<br>[63.50]            | 1.750<br>[44.45]            | 0.508<br>[12.90] | 10.484<br>[266.29]               | 22                   | -                        |
| FSE1000 | 15.000<br>[381.0]             | 2.500<br>[63.50]            | 1.750<br>[44.45]            | 0.508<br>[12.90] | 13.484<br>[342.49]               | 22                   | -                        |
| FSE1500 | 20.000<br>[508.0]             | 2.500<br>[63.50]            | 1.750<br>[44.45]            | 0.508<br>[12.90] | 18.484<br>[469.49]               | 22                   | -                        |

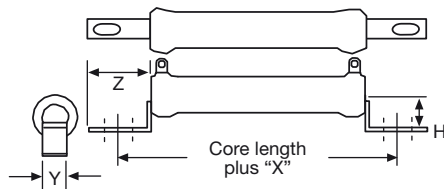
**TERMINAL DIMENSIONS** in inches [millimeters]


| DIMENSIONS        | TERMINAL STYLE   |                  |                   |                  |                  |
|-------------------|------------------|------------------|-------------------|------------------|------------------|
|                   | 06               | 15               | 20                | 21               | 22               |
| A                 | 0.250<br>[6.35]  | 0.250<br>[6.35]  | 0.375<br>[9.53]   | 0.500<br>[12.70] | 0.500<br>[12.70] |
| B                 | 0.500<br>[12.70] | 0.594<br>[15.08] | 0.5625<br>[14.28] | 0.625<br>[15.87] | 0.925<br>[23.49] |
| C (HOLE DIAMETER) | 0.173<br>[4.39]  | 0.065<br>[1.65]  | 0.204<br>[5.18]   | 0.264<br>[6.70]  | 0.264<br>[6.70]  |
| D                 | 0.020<br>[0.51]  | 0.031<br>[0.79]  | 0.032<br>[0.812]  | 0.025<br>[0.64]  | 0.025<br>[0.64]  |

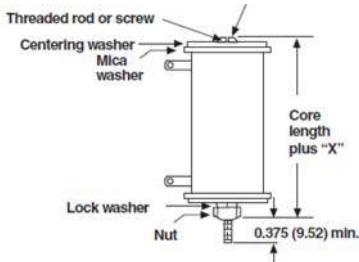
**MOUNTING HARDWARE FOR AVT PRODUCTS** - Dimensions in inches [millimeters]

**91 = 100 Style Horizontal 1 High Bracket**


| BRACKET TYPE | X                | Y                | Z                | H                | MOUNTING SLOT                   | C                | B                |
|--------------|------------------|------------------|------------------|------------------|---------------------------------|------------------|------------------|
| 102          | 1.063<br>[26.99] | 0.750<br>[19.05] | 0.859<br>[21.83] | 1.250<br>[31.75] | 0.219 x 0.438<br>[5.56 x 11.11] | 0.750<br>[19.05] | 1.750<br>[44.75] |
| 103          | 1.063<br>[26.99] | 1.250<br>[31.75] | 1.000<br>[25.40] | 1.500<br>[38.10] | 0.281 x 0.563<br>[7.14 x 14.29] | 0.927<br>[23.55] | 2.125<br>[53.98] |
| 104          | 1.952<br>[49.58] | 2.500<br>[63.50] | 1.478<br>[37.54] | 3.000<br>[76.20] | open slot x<br>0.406<br>[10.31] | 1.375<br>[34.93] | 4.25<br>[107.25] |

**92 = 200 Style Push-In Bracket**


| BRACKET TYPE | X                | H                | Y                | Z                | HOLE (DIA.)                    |
|--------------|------------------|------------------|------------------|------------------|--------------------------------|
| 204          | 0.700<br>[17.78] | 0.578<br>[14.68] | 0.250<br>[6.35]  | 0.500<br>[12.70] | 0.156<br>[3.96]                |
| 206          | 0.846<br>[21.49] | 0.800<br>[20.62] | 0.375<br>[9.53]  | 0.600<br>[15.24] | 0.343 x 0.213<br>[8.71 x 5.46] |
| 207          | 0.700<br>[17.78] | 1.125<br>[28.58] | 0.500<br>[12.70] | 0.687<br>[17.45] | 0.250 x 0.188<br>[6.35 x 4.78] |

**93 = 300 Style Thru-Bolt Bracket**


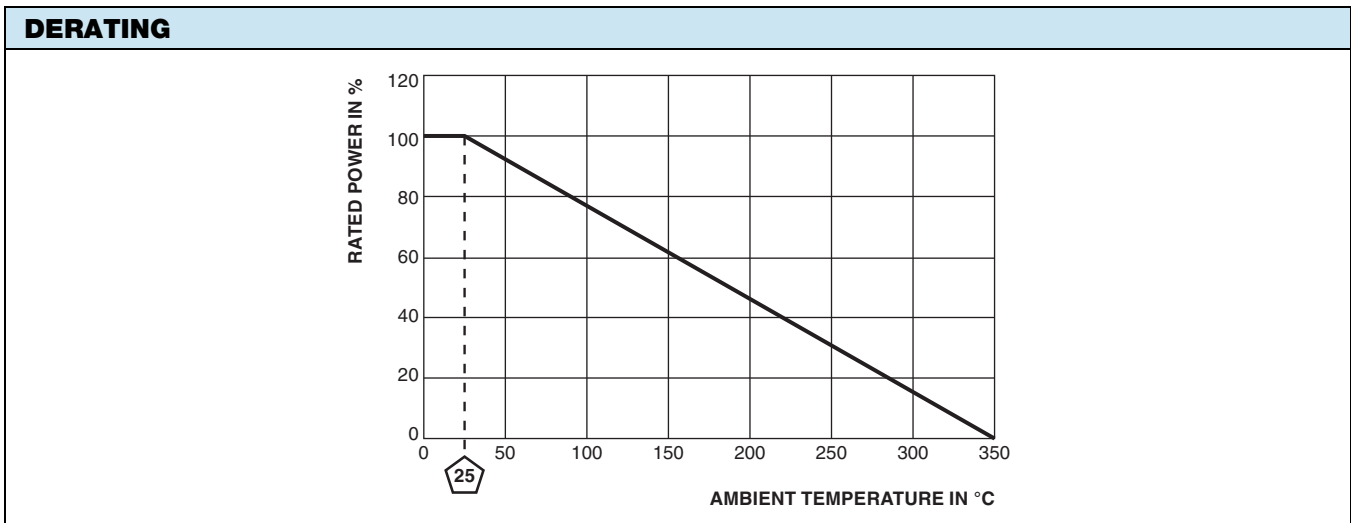
| BRACKET TYPE | X (APPROXIMATE) | THREAD |
|--------------|-----------------|--------|
| 302          | 0.271 [6.88]    | 10-32  |
| 303          | 0.463 [11.76]   | 1/4-20 |

| MOUNTING HARDWARE |  |                                |                                  |
|-------------------|--|--------------------------------|----------------------------------|
| GLOBAL MODEL      | AVAILABLE BRACKET TYPES BY MODEL         |                                |                                  |
|                   | 91 = 100 STYLE HORIZONTAL 1 HIGH BRACKET | 92 = 200 STYLE PUSH-IN BRACKET | 93 = 300 STYLE THRU-BOLT BRACKET |
| FSE0050           | 102                                      | 206                            | 302                              |
| FSE0090           | 102                                      | 204                            | 302                              |
| FSE0100           | 102                                      | 206                            | 302                              |
| FSE0110           | 102                                      | 206                            | 302                              |
| FSE0120           | 102                                      | 206                            | 302                              |
| FSE0155           | 103                                      | 207                            | 302                              |
| FSE0240           | 103                                      | 207                            | 302                              |
| FSE0300           | 103                                      | 207                            | 303                              |
| FSE0375           | 103                                      | 207                            | 303                              |
| FSE0420           | 103                                      | 207                            | 303                              |
| FSE0500           | 103                                      | -                              | 302                              |
| FSE0750           | 104                                      | -                              | 302                              |
| FSE1000           | 104                                      | -                              | 302                              |
| FSE1500           | 104                                      | -                              | 303                              |



| TECHNICAL SPECIFICATIONS               |                   |   |
|--|-------------------|---|
| PARAMETER                              | UNIT              | RESISTOR CHARACTERISTICS  |
| Power Rating                           | W                 | 50 to 1500  |
| Resistance Range                       | $\Omega$          | 0.10 to 135.5   |
| Resistance Tolerance                   | %                 | 10  |
| Temperature Coefficient                | ppm/ $^{\circ}$ C | $\pm 260$ for 20 $\Omega$ and above, $\pm 400$ for 1 $\Omega$ to 19.99 $\Omega$         |
| Operating Temperature                  | $^{\circ}$ C      | -55 $^{\circ}$ C to 350 $^{\circ}$ C  |
| Temperature Rise                       | $^{\circ}$ C      | 325 $^{\circ}$ C above an ambient of 25 $^{\circ}$ C                                    |
| Maximum Altitude                       | f.a.s.l.          | 10 000  |
| Short-Term Overload                    | -                 | 10x rated power for 5 s   |
| Surge Windings                         | -                 | Available   |
| Maximum Working Voltage                | -                 | $(P \times R)^{0.5}$  |
| Insulation Resistance                  | $\Omega$          | 1M  |
| Dielectric Voltage                     | V <sub>RMS</sub>  | 1000 V <sub>AC</sub>  |
| Creepage                               | -                 | Varies by wattage, see "Terminal Setback" in Dimensions table                           |
| Terminal Sleeves                       | -                 | n/a   |
| Inductance                             | $\mu$ H           | Varies by wattage and resistance  |
| Non-Inductive Winding                  | -                 | n/a   |
| Terminal Strength                      | lb                | 10 lbs  |
| Electrical or Mechanical Customization | -                 | Contact factory: <a href="mailto:ww2dresistors@vishay.com">ww2dresistors@vishay.com</a> |

| MATERIAL SPECIFICATIONS |   |
|-------------------------|---|
| Element                 | Copper-nickel alloy or nickel-chrome alloy, depending on resistance value |
| Core                    | Cordierite, steatite  |
| Coating                 | Special high temperature silicone   |
| Standard Terminals      | Tinned alloy 42   |
| Optional Terminals      | Alloy 42  |
| Terminal Bands          | Alloy 42  |
| Part Marking            | HEI, model, wattage, value, tolerance, date code                          |





## 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](mailto:ocean@oceanchips.ru)

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

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