

# POWER RELAY

## 1 POLE—3, 5, 10 A (Medium Load Control)

## FBR160 SERIES

### ■ FEATURES

- Compact with high power (3 A to 10 A)
- 6 types of contact materials available for home electronics and automobile applications
- Design conforms to the following safety standards
  - UL1449 No. E63615
  - UL508 No. E3614
  - CSA No. LR64026
  - Japan Electric Appliance Control Law (150–300 V)
- For automatic assembly
  - Tube packaging suitable for automatic insertion equipment is available



### ■ ORDERING INFORMATION

[Example]      FBR16   1   S   E   D   012   UH   -CSA   -\*\*\*   -S  
                   (a)    (b)   (c)   (d)   (e)   (f)   (g)   (h)   (i)   (j)

|     |                                  |                                                                               |                                   |                                                                                                                                                                               |
|-----|----------------------------------|-------------------------------------------------------------------------------|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (a) | Series Name                      | FBR160 Series                                                                 |                                   |                                                                                                                                                                               |
| (b) | Contact Arrangement              | 1 : 1 form C (SPDT)<br>3 : 1 form A (SPST-NC)                                 |                                   |                                                                                                                                                                               |
| (c) | Enclosure                        | S : Flux free<br>N : Plastic sealed                                           |                                   |                                                                                                                                                                               |
| (d) | Coil Rating                      | E : 360 mW type<br>C : 500 mW type (refer to the SPECIFICATIONS)              |                                   |                                                                                                                                                                               |
| (e) | Coil                             | D : DC Coil                                                                   |                                   |                                                                                                                                                                               |
| (f) | Nominal Voltage                  | (Example) 012: 12 VDC coil<br>024: 24 VDC coil (refer to the COIL DATA CHART) |                                   |                                                                                                                                                                               |
| (g) | UL Standard and Contact Material | UL 114 recognized                                                             | UL508 recognized                  | Material / Rating                                                                                                                                                             |
|     |                                  | U<br>UK<br>UH<br>UW<br>UHB<br>UWB                                             | R<br>RK<br>RH<br>RW<br>RHB<br>RWB | Silver (3A)<br>Silver-cadmium oxide (3 A)<br>Silver-cadmium oxide (5 A)<br>Silver tin oxide alloy (5 A)<br>Silver-cadmium oxide (AC 10 A)<br>Silver tin oxide alloy (DC 10 A) |

(Continued)

|     |                    |                                                                         |
|-----|--------------------|-------------------------------------------------------------------------|
| (h) | CSA Standard       | Nil : Non- CSA<br>-CSA: CSA recognized, but only UL 114 or UL 508 types |
| (i) | Custom Designation | Suffix number for custom design                                         |
| (j) | Package Style      | Nil : Standard tray<br>-S : Tube carrier                                |

Note: The designation name is stamped on the top of the relay case as follows:  
 Example: Designation ordered: FBR161NED012-H  
 Stamp: 161NED012-H

## COIL RATINGS

### 1. E (360 mW Coil type)

| MODEL          |                |                |                | Nominal voltage | Coil resistance (±10%) | Nominal current (at nominal voltage) approx. | Must operate voltage*       | Must release voltage*       | Maximum allowable voltage | Nominal power                       | Coil temperature rise               |
|----------------|----------------|----------------|----------------|-----------------|------------------------|----------------------------------------------|-----------------------------|-----------------------------|---------------------------|-------------------------------------|-------------------------------------|
| 1 Form C type  |                | 1 Form A type  |                |                 |                        |                                              |                             |                             |                           |                                     |                                     |
| Flux free      | Plastic sealed | Flux free      | Plastic sealed |                 |                        |                                              |                             |                             |                           |                                     |                                     |
| FBR161SED005 □ | FBR161NED005 □ | FBR163SED005 □ | FBR163SED005 □ | 5 VDC           | 70 Ω                   | 71 mA                                        | 80% max. of nominal voltage | 10% min. of nominal voltage | 210% of nominal voltage   | Approx. 360 mW (at nominal voltage) | Approx. 30 deg (at nominal voltage) |
| FBR161SED006 □ | FBR161NED006 □ | FBR163SED006 □ | FBR163SED006 □ | 6 VDC           | 100 Ω                  | 60 mA                                        |                             |                             |                           |                                     |                                     |
| FBR161SED009 □ | FBR161NED009 □ | FBR163SED009 □ | FBR163SED009 □ | 9 VDC           | 150 Ω                  | 50 mA                                        |                             |                             |                           |                                     |                                     |
| FBR161SED012 □ | FBR161NED012 □ | FBR163SED012 □ | FBR163SED012 □ | 12 VDC          | 400 Ω                  | 30 mA                                        |                             |                             |                           |                                     |                                     |
| FBR161SED024 □ | FBR161NED024 □ | FBR163SED024 □ | FBR163SED024 □ | 24 VDC          | 1,600 Ω                | 15 mA                                        |                             |                             |                           |                                     |                                     |

Note: All values in the table are measured at 20°C.  
 \*: Specified values are subject to puls wave voltage.

### 2. C (50 mW Coil type)

| MODEL          |                |                |                | Nominal voltage | Coil resistance (±10%) | Nominal current (at nominal voltage) approx. | Must operate voltage*       | Must release voltage*       | Maximum allowable voltage | Nominal power                      | Coil temperature rise               |
|----------------|----------------|----------------|----------------|-----------------|------------------------|----------------------------------------------|-----------------------------|-----------------------------|---------------------------|------------------------------------|-------------------------------------|
| 1 Form C type  |                | 1 Form A type  |                |                 |                        |                                              |                             |                             |                           |                                    |                                     |
| Flux free      | Plastic sealed | Flux free      | Plastic sealed |                 |                        |                                              |                             |                             |                           |                                    |                                     |
| FBR161SCD005 □ | FBR161NCD005 □ | FBR163SCD005 □ | FBR163SCD005 □ | 5 VDC           | 50 Ω                   | 100 mA                                       | 75% max. of nominal voltage | 10% min. of nominal voltage | 210% or nominal voltage   | Approx. 50 mW (at nominal voltage) | Approx. 35 deg (at nominal voltage) |
| FBR161SCD006 □ | FBR161NCD006 □ | FBR163SCD006 □ | FBR163SCD006 □ | 6 VDC           | 72 Ω                   | 83 mA                                        |                             |                             |                           |                                    |                                     |
| FBR161SCD009 □ | FBR161NCD009 □ | FBR163SCD009 □ | FBR163SCD009 □ | 9 VDC           | 162 Ω                  | 56 mA                                        |                             |                             |                           |                                    |                                     |
| FBR161SCD012 □ | FBR161NCD012 □ | FBR163SCD012 □ | FBR163SCD012 □ | 12 VDC          | 288 Ω                  | 42 mA                                        |                             |                             |                           |                                    |                                     |
| FBR161SCD024 □ | FBR161NCD024 □ | FBR163SCD024 □ | FBR163SCD024 □ | 24 VDC          | 1,152 Ω                | 21 mA                                        |                             |                             |                           |                                    |                                     |
| FBR161SCD048 □ | FBR161NCD048 □ | FBR163SCD048 □ | FBR163SCD048 □ | 48 VDC          | 4,600 Ω                | 10 mA                                        |                             |                             |                           |                                    |                                     |

Note: All values in the table are measured at 20°C.  
 \*: Specified values are subject to puls wave voltage.

# FBR160 SERIES

## ■ SPECIFICATIONS

| Item       |                                          |                    | —                                                                          | -K                   | -H              | -W                     | -HB                                       | -WB                    |
|------------|------------------------------------------|--------------------|----------------------------------------------------------------------------|----------------------|-----------------|------------------------|-------------------------------------------|------------------------|
| Contact    | Arrangement and Style                    |                    | 1 form C or 1 form A, single contact                                       |                      |                 |                        |                                           |                        |
|            | Material                                 |                    | Silver                                                                     | Silver-cadmium oxide |                 | Silver tin oxide alloy | Silver-cadmium oxide                      | Silver tin oxide alloy |
|            | Resistance (initial)                     |                    | Maximum 100 mΩ (silver contact at 0.5 A 6 VDC/other contacts at 1 A 6 VDC) |                      |                 |                        |                                           |                        |
|            | Ratings (resistive load)                 |                    | 3 A 120 VAC                                                                |                      | 5 A 120 VAC     |                        | 10 A 120 VAC (N.O.)<br>7 A 120 VAC (N.C.) |                        |
|            |                                          |                    | 3 A 28 VDC                                                                 |                      | 5 A 28 VDC      | 5 A 28 VDC             |                                           | 10 A 28 VDC            |
|            | Maximum Carrying Current                 |                    | 5 A                                                                        |                      |                 |                        | 10 A                                      |                        |
|            | Maximum Switching Power                  |                    | 360 VA or 84 W                                                             |                      | 600 VA or 140 W | 140 W                  | 1,200 VA                                  | 280 W                  |
|            | Max. Switching Voltage* <sup>1</sup>     |                    | 250 VAC or 125 VDC                                                         |                      |                 |                        |                                           |                        |
|            | Minimum Switching Load* <sup>2</sup>     |                    | 0.3 W (30 mA 5 V)                                                          |                      |                 | 0.3 W (50 mA 5 VDC)    | 0.5 W (10 mA 5 VDC)                       | 0.5 W (10 mA 5 VDC)    |
| Coil       | Nominal Power                            |                    | Approx. 360 mW (E coil type)/0.5 W (C coil type) (at 20°C)                 |                      |                 |                        |                                           |                        |
|            | Operating Temperature                    |                    | -30°C to +80°C (no frost) * <sup>3</sup>                                   |                      |                 |                        |                                           |                        |
|            | Operate Humidity                         |                    | 45 to 85% RH                                                               |                      |                 |                        |                                           |                        |
| Time Value | Operate (at nominal voltage)             |                    | Maximum 10 msec                                                            |                      |                 |                        |                                           |                        |
|            | Release (at nominal voltage)             |                    | Maximum 5 msec                                                             |                      |                 |                        |                                           |                        |
| Life       | Mechanical                               |                    | 1 × 10 <sup>7</sup> operations minimum                                     |                      |                 |                        |                                           |                        |
|            | Electrical (refer to the REFERENCE DATA) | DC                 | 1 × 10 <sup>5</sup> operations minimum (at contact rating)                 |                      |                 |                        |                                           |                        |
|            |                                          | AC                 | 1 × 10 <sup>5</sup> operations minimum (at contact rating)                 |                      |                 |                        |                                           |                        |
| Other      | Vibration Resistance                     |                    | 10 to 55 Hz (double amplitude of 1.5mm)                                    |                      |                 |                        |                                           |                        |
|            | Shock Resistance                         | No contact opening | 100 m/s <sup>2</sup> (11 ±1ms)                                             |                      |                 |                        |                                           |                        |
|            |                                          | No damage          | 1,000 m/s <sup>2</sup> (6 ±1ms)                                            |                      |                 |                        |                                           |                        |
|            | Weight                                   |                    | Approximately 11 g                                                         |                      |                 |                        |                                           |                        |

\*<sup>1</sup> If the switching voltage exceeds the rated contact voltage, reduce the current. The current values vary according to the type of load.

\*<sup>2</sup> Values when switching a resistive load at normal room temperature and humidity, and in a clean environment.  
The minimum switching load varies with the switching frequency and operation environment.

\*<sup>3</sup> Based on UL Class A coil insulation system.

## ■ INSULATION

|                     |                                                                    |
|---------------------|--------------------------------------------------------------------|
| Item                | FBR160 Series                                                      |
| Resistance (500VDC) | Min. 100MΩ                                                         |
| Dielectric Strength | Open contacts: 500VAC 1 min.<br>Coil and contacts: 1,500VAC 1 min. |

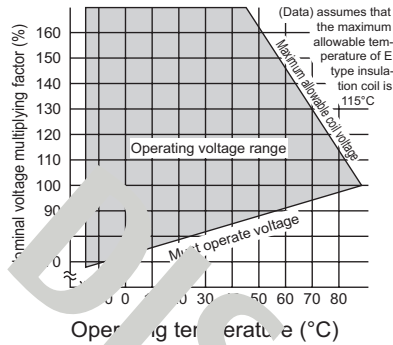
## ■ SAFETY STANDARD AND FILE NUMBERS

| Type | Compliance                                                                                              | Contact rating                                                                                                                                                                                        |
|------|---------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UL   | UL 114<br>E 63615<br>(U, UK, UH, UW, UHB, UWB)<br><br>UL 508<br>E 63614<br>(R, UK, RH, RW, RHB, RWB)    | Flammability: UL 94-V0 (plastics)<br>[U, UK, R, RK]<br>3A, 120VAC/30VDC (resistive)<br>1/10 HP, 120VAC<br>[UH, UW, RH, RW]<br>5A, 120 VAC/30VDC (resistive)<br>1/6 HP, 120VAC<br>[UHB, UWB, RHB, RWB] |
| CSA  | CSA 2 No. 14<br>LR 40004, LR 61320 or LR 64026<br>(U, UK, UH, UW, UHB, UWB, R,<br>RK, RH, RW, RHB, RWB) | 10A, 250 VAC/125VAC (N.O. resistive)<br>7A, 250 VAC / 125VAC (N.C. resistive)<br>10A, 30 VDC (resistive)<br>1/8HP, 250VAC/125VAC                                                                      |

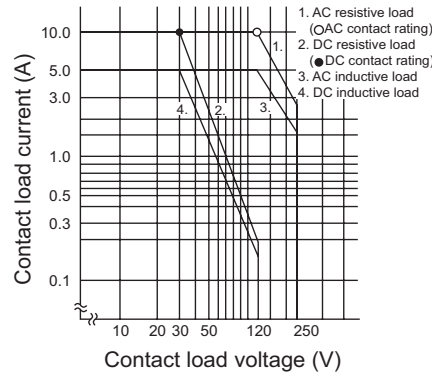
Also complies with VDE

## CHARACTERISTIC DATA

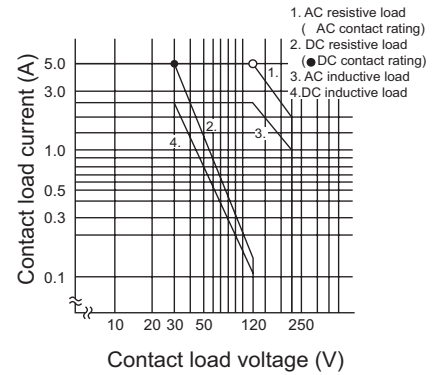
Range of operation temperature and voltage  
E type [0.36 W type]



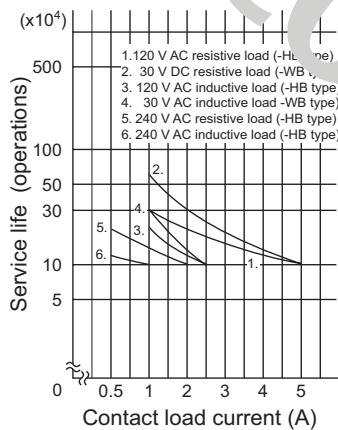
Maximum switching capacity (10 A type)



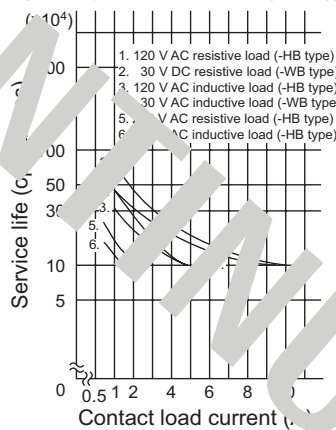
Maximum switching capacity (5 A type)



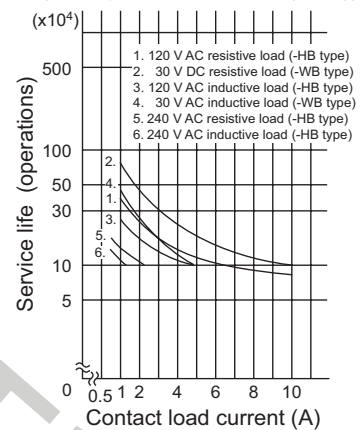
Life curve (5 A type)



Life curve  
(10 A type, make side (N.O.))

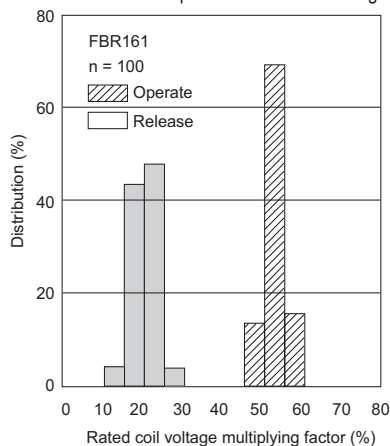


Life curve  
(10 A type, break side (N.C.))

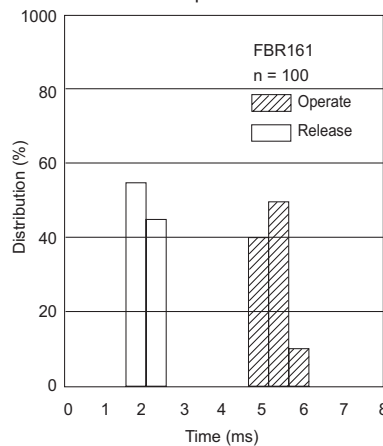


## REFERENCE DATA

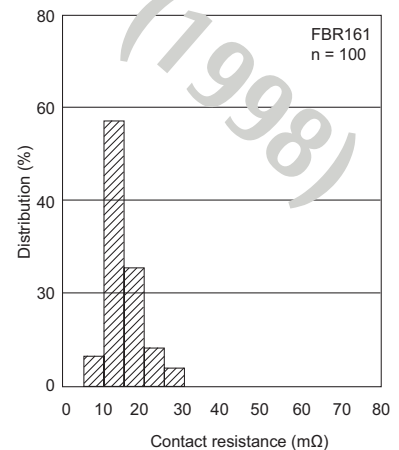
Distribution of operate and release voltage



Distribution of operate and release time

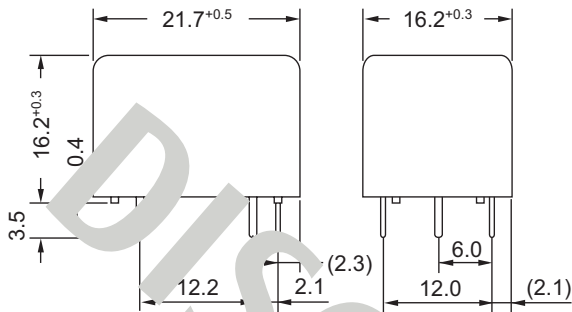


Distribution of contact resistance

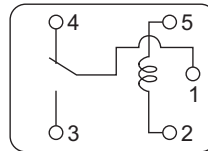


## ■ DIMENSIONS

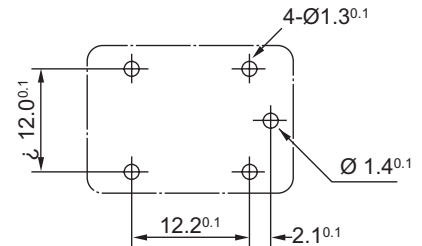
### ● Dimensions



### ● Schematic (BOTTOM VIEW)

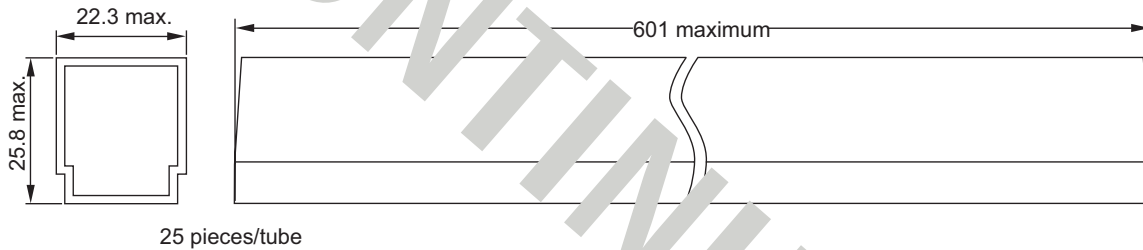


### ● PC board mounting hole layout (BOTTOM VIEW)



Note : For 1 form A type, terminal No.4 is removed.

### ● Tube carrier



Unit: mm

## Fujitsu Components International Headquarter Offices

### Japan

Fujitsu Component Limited  
Gotanda-Chuo Building  
3-5, Higashigotanda 2-chome, Shinagawa-ku  
Tokyo 141 8630, Japan  
Tel: (81-3) 5449-7010  
Fax: (81-3) 5449-2626  
Email: [promothq@fcl.fujitsu.com](mailto:promothq@fcl.fujitsu.com)  
Web: [www.fcl.fujitsu.com](http://www.fcl.fujitsu.com)

### North and South America

Fujitsu Components America, Inc.  
250 E. Caribbean Drive  
Sunnyvale, CA 94089 U.S.A.  
Tel: (1-408) 745-4900  
Fax: (1-408) 745-4970  
Email: [components@us.fujitsu.com](mailto:components@us.fujitsu.com)  
Web: <http://us.fujitsu.com/components/>

### Europe

Fujitsu Components Europe B.V.  
Diamantlaan 25  
2132 WV Hoofddorp  
Netherlands  
Tel: (31-23) 5560910  
Fax: (31-23) 5560950  
Email: [info@fceu.fujitsu.com](mailto:info@fceu.fujitsu.com)  
Web: [emea.fujitsu.com/components/](http://emea.fujitsu.com/components/)

### Asia Pacific

Fujitsu Components Asia Ltd.  
102E Pasir Panjang Road  
#01-01 Citilink Warehouse Complex  
Singapore 118529  
Tel: (65) 6375-8560  
Fax: (65) 6273-3021  
Email: [fcal@fcal.fujitsu.com](mailto:fcal@fcal.fujitsu.com)  
Web: <http://www.fujitsu.com/sg/services/micro/components/>

©2007 Fujitsu Components America, Inc. All rights reserved. All trademarks or registered trademarks are the property of their respective owners.

Fujitsu Components America or its affiliates do not warrant that the content of datasheet is error free. In a continuing effort to improve our products Fujitsu Components America, Inc. or its affiliates reserve the right to change specifications/datasheets without prior notice.  
Rev. November 30, 2007.

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