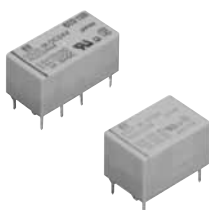




**1 Form C / 2 Form C, 2 A,  
200 mW Nominal operating  
power relays**

## DS RELAYS



**RoHS compliant**

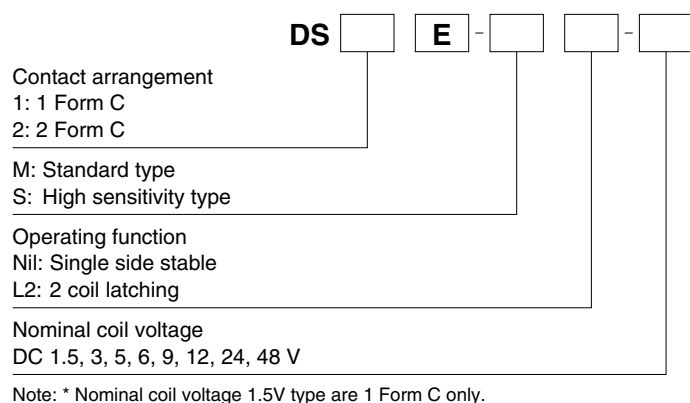
### FEATURES

1. 1 Form C / 2 Form C contact
2. Available 2 coil latching type
3. DIL terminal array enables use of IC sockets

### TYPICAL APPLICATIONS

1. Telecommunications and measuring devices
2. Office equipment
3. Computers and related equipment
4. Industrial equipment

### ORDERING INFORMATION



## TYPES

| Contact arrangement | Nominal coil voltage | High sensitivity type   |                      | Standard type           |                      |
|---------------------|----------------------|-------------------------|----------------------|-------------------------|----------------------|
|                     |                      | Single side stable type | 2 coil latching type | Single side stable type | 2 coil latching type |
|                     |                      | Part No.                | Part No.             | Part No.                | Part No.             |
| 1 Form C            | 1.5 V DC             | DS1E-S-DC1.5V           | DS1E-SL2-DC1.5V      | DS1E-M-DC1.5V           | DS1E-ML2-DC1.5V      |
|                     | 3 V DC               | DS1E-S-DC3V             | DS1E-SL2-DC3V        | DS1E-M-DC3V             | DS1E-ML2-DC3V        |
|                     | 5 V DC               | DS1E-S-DC5V             | DS1E-SL2-DC5V        | DS1E-M-DC5V             | DS1E-ML2-DC5V        |
|                     | 6 V DC               | DS1E-S-DC6V             | DS1E-SL2-DC6V        | DS1E-M-DC6V             | DS1E-ML2-DC6V        |
|                     | 9 V DC               | DS1E-S-DC9V             | DS1E-SL2-DC9V        | DS1E-M-DC9V             | DS1E-ML2-DC9V        |
|                     | 12 V DC              | DS1E-S-DC12V            | DS1E-SL2-DC12V       | DS1E-M-DC12V            | DS1E-ML2-DC12V       |
|                     | 24 V DC              | DS1E-S-DC24V            | DS1E-SL2-DC24V       | DS1E-M-DC24V            | DS1E-ML2-DC24V       |
| 2 Form C            | 48 V DC              | DS1E-S-DC48V            | DS1E-SL2-DC48V       | DS1E-M-DC48V            | DS1E-ML2-DC48V       |
|                     | 3 V DC               | DS2E-S-DC3V             | DS2E-SL2-DC3V        | —                       | —                    |
|                     | 5 V DC               | DS2E-S-DC5V             | DS2E-SL2-DC5V        | —                       | —                    |
|                     | 6 V DC               | DS2E-S-DC6V             | DS2E-SL2-DC6V        | —                       | —                    |
|                     | 9 V DC               | DS2E-S-DC9V             | DS2E-SL2-DC9V        | —                       | —                    |
|                     | 12 V DC              | DS2E-S-DC12V            | DS2E-SL2-DC12V       | —                       | —                    |
|                     | 24 V DC              | DS2E-S-DC24V            | DS2E-SL2-DC24V       | —                       | —                    |
|                     | 48 V DC              | DS2E-S-DC48V            | DS2E-SL2-DC48V       | —                       | —                    |

Standard packing: Carton: 50 pcs.; Case: 500 pcs.

## RATING

### 1. Coil data

#### 1) Single side stable type

| Type                         | Nominal coil voltage | Pick-up voltage<br>(at 20°C 68°F)                                                                             | Drop-out voltage<br>(at 20°C 68°F)           | Nominal operating current<br>[±10%]<br>(at 20°C 68°F) | Coil resistance [±10%]<br>(at 20°C 68°F) | Nominal operating power | Max. applied voltage<br>(at 50°C 122°F)                                            |
|------------------------------|----------------------|---------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------------------|------------------------------------------|-------------------------|------------------------------------------------------------------------------------|
| Standard<br>(M) type         | 1.5 V DC             | 70%V or less of nominal voltage<br>(Initial)                                                                  | 10%V or more of nominal voltage<br>(Initial) | 266.7 mA                                              | 5.63 Ω                                   | 400 mW                  | 1 Form C:<br>120%V of nominal voltage                                              |
|                              | 3 V DC               |                                                                                                               |                                              | 133.3 mA                                              | 22.5 Ω                                   |                         |                                                                                    |
|                              | 5 V DC               |                                                                                                               |                                              | 80.0 mA                                               | 62.5 Ω                                   |                         |                                                                                    |
|                              | 6 V DC               |                                                                                                               |                                              | 66.7 mA                                               | 90 Ω                                     |                         |                                                                                    |
|                              | 9 V DC               |                                                                                                               |                                              | 44.4 mA                                               | 203 Ω                                    |                         |                                                                                    |
|                              | 12 V DC              |                                                                                                               |                                              | 33.3 mA                                               | 360 Ω                                    |                         |                                                                                    |
|                              | 24 V DC              |                                                                                                               |                                              | 16.7 mA                                               | 1,440 Ω                                  |                         |                                                                                    |
| High sensitivity<br>(S) type | 48 V DC              |                                                                                                               |                                              | 8.3 mA                                                | 5,760 Ω                                  |                         |                                                                                    |
|                              | 1.5 V DC             | 1 Form C:<br>80%V or less of nominal voltage<br><br>2 Form C:<br>70%V or less of nominal voltage<br>(Initial) | 10%V or more of nominal voltage<br>(Initial) | 133.3 mA                                              | 11.3 Ω                                   | 200 mW                  | 1 Form C:<br>160%V of nominal voltage<br><br>2 Form C:<br>220%V of nominal voltage |
|                              | 3 V DC               |                                                                                                               |                                              | 66.7 mA                                               | 45 Ω                                     |                         |                                                                                    |
|                              | 5 V DC               |                                                                                                               |                                              | 40.0 mA                                               | 125 Ω                                    |                         |                                                                                    |
|                              | 6 V DC               |                                                                                                               |                                              | 33.3 mA                                               | 180 Ω                                    |                         |                                                                                    |
|                              | 9 V DC               |                                                                                                               |                                              | 22.2 mA                                               | 405 Ω                                    |                         |                                                                                    |
|                              | 12 V DC              |                                                                                                               |                                              | 16.7 mA                                               | 720 Ω                                    |                         |                                                                                    |
|                              | 24 V DC              |                                                                                                               |                                              | 8.3 mA                                                | 2,880 Ω                                  |                         |                                                                                    |
|                              | 48 V DC              |                                                                                                               |                                              | 4.2 mA                                                | 11,520 Ω                                 |                         |                                                                                    |

#### 2) 2 coil latching type

| Type                         | Nominal coil voltage | Set voltage<br>(at 20°C 68°F)                                                                                 | Reset voltage<br>(at 20°C 68°F)                                                                               | Nominal operating current<br>[±10%]<br>(at 20°C 68°F) |            | Coil resistance [±10%]<br>(at 20°C 68°F) |            | Nominal operating power |            | Max. applied voltage<br>(at 50°C 122°F)                                            |
|------------------------------|----------------------|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|------------|------------------------------------------|------------|-------------------------|------------|------------------------------------------------------------------------------------|
|                              |                      |                                                                                                               |                                                                                                               | Set coil                                              | Reset coil | Set coil                                 | Reset coil | Set coil                | Reset coil |                                                                                    |
| Standard<br>(M) type         | 1.5 V DC             | 70%V or less of nominal voltage<br>(Initial)                                                                  | 70%V or less of nominal voltage<br>(Initial)                                                                  | 240 mA                                                | 240 mA     | 6.25 Ω                                   | 6.25 Ω     | 360 mW                  | 360 mW     | 1 Form C:<br>120%V of nominal voltage                                              |
|                              | 3 V DC               |                                                                                                               |                                                                                                               | 120 mA                                                | 120 mA     | 25 Ω                                     | 25 Ω       |                         |            |                                                                                    |
|                              | 5 V DC               |                                                                                                               |                                                                                                               | 72 mA                                                 | 72 mA      | 69.4 Ω                                   | 69.4 Ω     |                         |            |                                                                                    |
|                              | 6 V DC               |                                                                                                               |                                                                                                               | 60 mA                                                 | 60 mA      | 100 Ω                                    | 100 Ω      |                         |            |                                                                                    |
|                              | 9 V DC               |                                                                                                               |                                                                                                               | 40 mA                                                 | 40 mA      | 225 Ω                                    | 225 Ω      |                         |            |                                                                                    |
|                              | 12 V DC              |                                                                                                               |                                                                                                               | 30 mA                                                 | 30 mA      | 400 Ω                                    | 400 Ω      |                         |            |                                                                                    |
|                              | 24 V DC              |                                                                                                               |                                                                                                               | 15 mA                                                 | 15 mA      | 1,600 Ω                                  | 1,600 Ω    |                         |            |                                                                                    |
| High sensitivity<br>(S) type | 48 V DC              |                                                                                                               |                                                                                                               | 7.5 mA                                                | 7.5 mA     | 6,400 Ω                                  | 6,400 Ω    |                         |            |                                                                                    |
|                              | 1.5 V DC             | 1 Form C:<br>80%V or less of nominal voltage<br><br>2 Form C:<br>70%V or less of nominal voltage<br>(Initial) | 1 Form C:<br>80%V or less of nominal voltage<br><br>2 Form C:<br>70%V or less of nominal voltage<br>(Initial) | 120 mA                                                | 120 mA     | 12.5 Ω                                   | 12.5 Ω     | 180 mW                  | 180 mW     | 1 Form C:<br>160%V of nominal voltage<br><br>2 Form C:<br>220%V of nominal voltage |
|                              | 3 V DC               |                                                                                                               |                                                                                                               | 60 mA                                                 | 60 mA      | 50 Ω                                     | 50 Ω       |                         |            |                                                                                    |
|                              | 5 V DC               |                                                                                                               |                                                                                                               | 36 mA                                                 | 36 mA      | 139 Ω                                    | 139 Ω      |                         |            |                                                                                    |
|                              | 6 V DC               |                                                                                                               |                                                                                                               | 30 mA                                                 | 30 mA      | 200 Ω                                    | 200 Ω      |                         |            |                                                                                    |
|                              | 9 V DC               |                                                                                                               |                                                                                                               | 20 mA                                                 | 20 mA      | 450 Ω                                    | 450 Ω      |                         |            |                                                                                    |
|                              | 12 V DC              |                                                                                                               |                                                                                                               | 15 mA                                                 | 15 mA      | 800 Ω                                    | 800 Ω      |                         |            |                                                                                    |
|                              | 24 V DC              |                                                                                                               |                                                                                                               | 7.5 mA                                                | 7.5 mA     | 3,200 Ω                                  | 3,200 Ω    |                         |            |                                                                                    |
|                              | 48 V DC              |                                                                                                               |                                                                                                               | 3.75 mA                                               | 3.75 mA    | 12,800 Ω                                 | 12,800 Ω   |                         |            |                                                                                    |

## 2. Specifications

| Characteristics            | Item                                              |                          | Specifications                                                                                                                  |                           |
|----------------------------|---------------------------------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| Contact                    | Arrangement                                       |                          | 1 Form C                                                                                                                        | 2 Form C                  |
|                            | Initial contact resistance, max.                  |                          | Max. 50 mΩ (By voltage drop 6 V DC 1A)                                                                                          |                           |
|                            | Contact material                                  |                          | Ag+Au clad                                                                                                                      |                           |
| Rating                     | Nominal switching capacity                        |                          | 2 A 30 V DC (resistive load)                                                                                                    |                           |
|                            | Max. switching power                              |                          | 60 W, 125 VA (resistive load)                                                                                                   |                           |
|                            | Max. switching voltage                            |                          | 220 V DC, 250 V AC                                                                                                              |                           |
|                            | Max. carrying current                             |                          | 3 A                                                                                                                             |                           |
|                            | Min. switching capacity (Reference value)*1       |                          | 10μA 10m V DC                                                                                                                   |                           |
|                            | Nominal operating power                           |                          | Single side stable (M type: 400 mW, S type: 200 mW);<br>latching (M type: 360 mW, S type: 180 mW)                               |                           |
| Electrical characteristics | Insulation resistance (Initial)                   |                          | Min. 100MΩ (at 500V DC)<br>Measurement at same location as "Initial breakdown voltage" section.                                 |                           |
|                            | Breakdown voltage (Initial)                       | Between open contacts    | 1,000 Vrms for 1min.<br>(500 Vrms for 1min: 1 Form C type) (Detection current: 10mA.)                                           |                           |
|                            |                                                   | Between contact and coil | 1,500 Vrms for 1min.<br>(1,000 Vrms for 1min: 1 Form C type) (Detection current: 10mA.)                                         |                           |
|                            | Temperature rise                                  |                          | Max. 65°C<br>(By resistive method, nominal coil voltage applied to the coil, contact carrying current: 2A.)                     |                           |
|                            | Operate time [Set time] (at 20°C 68°F)            |                          | Max. 10 ms [10 ms] (Nominal coil voltage applied to the coil, excluding contact bounce time.)                                   |                           |
|                            | Release time [Reset time] (at 20°C 68°F)          |                          | Max. 5 ms [10 ms] (Nominal coil voltage applied to the coil, excluding contact bounce time.)<br>(without diode)                 |                           |
| Mechanical characteristics | Shock resistance                                  | Functional*2             | Min. 490 m/s <sup>2</sup>                                                                                                       | Min. 490 m/s <sup>2</sup> |
|                            |                                                   | Destructive              | Min. 980 m/s <sup>2</sup> (Half-wave pulse of sine wave: 6 ms.)                                                                 |                           |
|                            | Vibration resistance                              | Functional               | 10 to 55 Hz at double amplitude of 3.3 mm (Detection time: 10μs.)                                                               |                           |
|                            |                                                   | Destructive              | 10 to 55 Hz at double amplitude of 5 mm                                                                                         |                           |
| Expected life              | Mechanical                                        |                          | Min. 10 <sup>8</sup> (10 <sup>7</sup> : 1 Form C latching type) (at 600 cpm)                                                    |                           |
|                            | Electrical                                        |                          | Min. 5×10 <sup>5</sup> rated load (at 60 cpm)                                                                                   |                           |
| Conditions                 | Conditions for operation, transport and storage*3 |                          | Ambient temperature: -40°C to +70°C -40°F to +158°F<br>Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature) |                           |
|                            | Max. operating speed (at rated load)              |                          | 60 cpm                                                                                                                          |                           |
| Unit weight                |                                                   |                          | Approx. 3 g .11 oz                                                                                                              | Approx. 4g .14oz          |

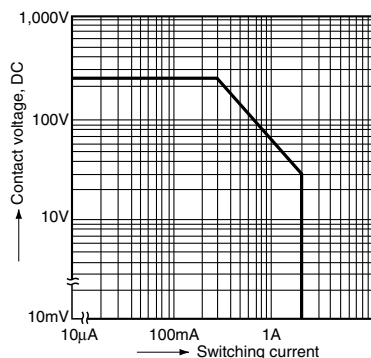
Notes: \*1 This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load. TX/TX-S/TX-D relay AgPd contact type are available for low level load switching (10V DC, 10mA max. level).

\*2 Half-wave pulse of sine wave: 11ms; detection time: 10μs

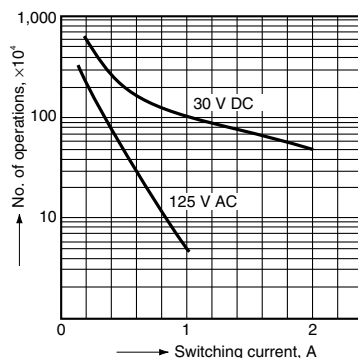
\*3 Refer to "AMBIENT ENVIRONMENT" in GENERAL APPLICATION GUIDELINES.

## REFERENCE DATA

### 1. Maximum switching capacity

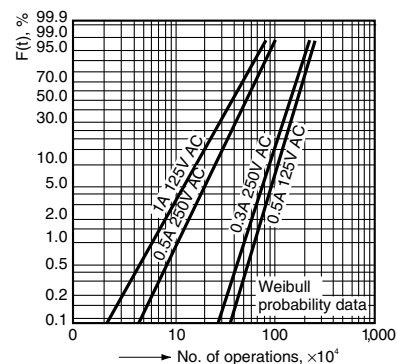


### 2. Life curve (Resistive load)



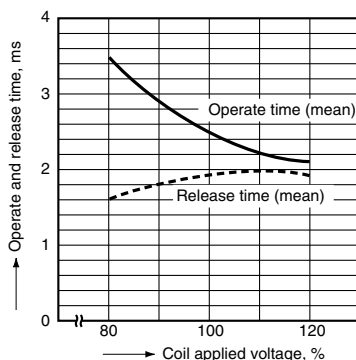
### 3. Contact reliability for AC loads

Tested sample: DS2E-S-DC24V 10 pcs.  
Operating speed: 20 cpm.  
Detection level: 200 mΩ

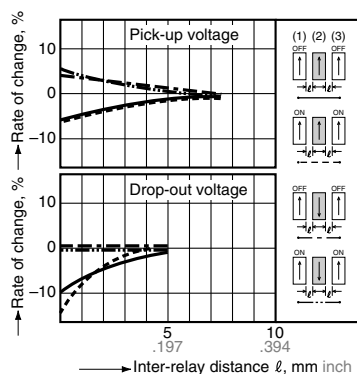


### 4. Operate and release time characteristics (2 Form C single side stable type)

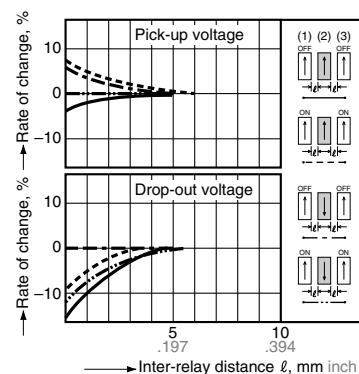
Test condition: Without diode connected to coil in parallel



### 5-(1). Influence of adjacent mounting (1 Form C)



### 5-(2). Influence of adjacent mounting (2 Form C)



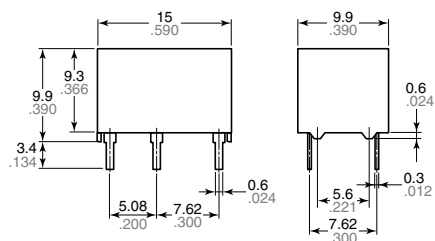
## DIMENSIONS (mm inch)

### DS (1 Form C)

Single side stable, 2 coil latching

**CAD Data**

External dimensions

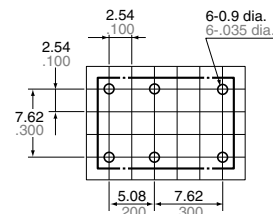
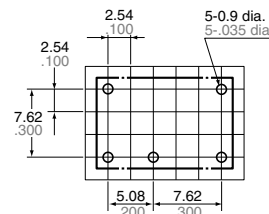


The CAD data of the products with a **CAD Data** mark can be downloaded from: <http://industrial.panasonic.com/ac/e/>

### PC board pattern (Bottom view)

Single side stable

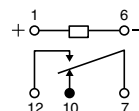
2 coil latching



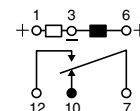
### Schematic (Bottom view)

Single side stable

2 coil latching



(Deenergized condition)



(Reset condition)

Tolerance:  $\pm 0.1 \pm 0.004$

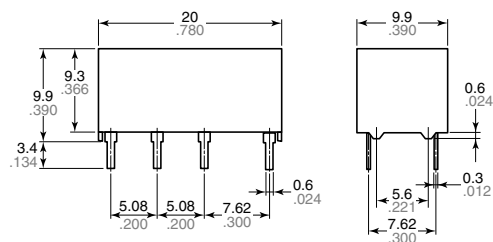
General tolerance:  $\pm 0.3 \pm 0.012$

## DS (2 Form C)

Single side stable

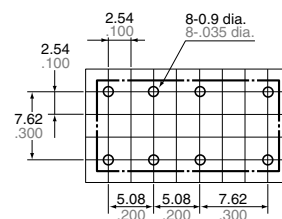
### CAD Data

### External dimensions

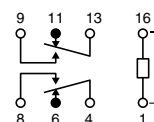


General tolerance:  $\pm 0.3 \pm .012$

### PC board pattern (Bottom view)



### Schematic (Bottom view)



(Deenergized condition)

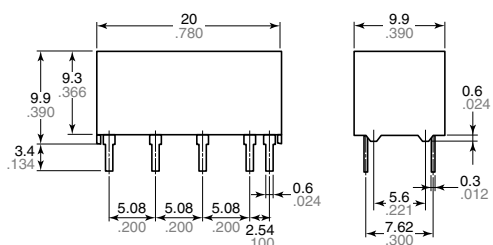
Tolerance:  $\pm 0.1 \pm .004$

## DS (2 Form C)

2 coil latching

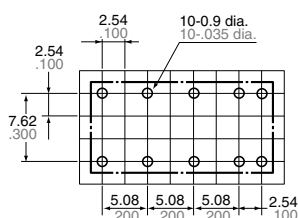
### CAD Data

### External dimensions

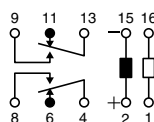


General tolerance:  $\pm 0.3 \pm .012$

### PC board pattern (Bottom view)



### Schematic (Bottom view)



(Reset condition)

Tolerance:  $\pm 0.1 \pm .004$

## NOTES

### 1. Coil connection

When connecting coils, refer to the wiring diagram to prevent mis-operation or malfunction.

**For general cautions for use, please refer to the "Cautions for use of Signal Relays" or "General Application Guidelines".**

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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);
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- 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).



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