

Type CPF Series

Key Features

- Thin film precision resistors with TC's of 15ppm, 25ppm and 50ppm and tolerances to 0.1%. Applications in measurement, telemetry and for sensing circuits.
- Wide range of case sizes from 0201 to 2512
- CPF chip resistors are suitable for all applications where close accuracy and stability are essential
- Terminal finish - electroplated 100% matte Sn



Applications

- Communications
- Industrial Controls
- Instrumentation
- Medical

The CPF series is a high stability precision chip resistor range offering various power dissipations relating to a wide range of chip sizes. The CPF series offers TCR's down to 15ppm/°C and resistance tolerances to 0.1%. Standard values are within the IEC 63 E96 and E24 value grids. The CPF has accurate and uniform physical dimensions to facilitate placement.

Characteristics - Electrical

| | 0201 | | | | 0402 | | | | 0402 | | | | | |
|--------------------------------|---------------|------|------|------|---------------|-----|------|------|---------------|------|------|-----|------|------|
| Rated Power @ 70°C: | 0.03125W | | | | 0.063W | | | | 0.063W | | | | | |
| Resistance Range (Ohms) | Min: | 49R9 | 49R9 | 49R9 | 49R9 | 10R | 10R | 49R9 | 10R | 1R0 | 49R9 | 10R | 1R0 | |
| | Max: | 5K0 | 33K | 5K0 | 33K | 70K | 255K | 205K | 70K | 255K | 205K | 70K | 255K | 205K |
| Tolerance (%): | 0.5 | | 1 | | 0.1 | | 0.5 | | 1 | | | | | |
| Code letter: | D | | F | | B | | D | | F | | | | | |
| Selection Series: | E24 & E96 | | | | E24 & E96 | | | | E24 & E96 | | | | | |
| Temp. Coefficient (ppm/°C): | 25 | 50 | 25 | 50 | 15 | 25 | 50 | 15 | 25 | 50 | 15 | 25 | 50 | |
| Code Letter: | E | C | E | C | D | E | C | D | E | C | D | E | C | |
| Limiting Element Voltage: | 15V | | | | 25V | | | | 25V | | | | | |
| Max. Overload Voltage: | 30V | | | | 50V | | | | 50V | | | | | |
| Operating Temp. Range: | -55 to +155°C | | | | -55 to +155°C | | | | -55 to +155°C | | | | | |
| Climatic Category (°C): | 55/125/55 | | | | 55/125/55 | | | | 55/125/55 | | | | | |
| Insulation Resistance Dry Min: | 1000MΩ | | | | 1000MΩ | | | | 1000MΩ | | | | | |
| Stability: | 0.5% | | | | 0.5% | | | | 0.5% | | | | | |

| | 0603 | | | | | | 0805 | | | | | | |
|--------------------------------|---------------|------|-----|------|-----|------|---------------|------|-----|------|-----|------|-----|
| Rated Power @ 70°C: | 0.063W | | | | | | 0.1W | | | | | | |
| Resistance Range (Ohms) | Min: | 4R7 | 4R7 | 4R7 | 2R0 | 4R7 | 2R0 | 4R3 | 4R7 | 4R3 | 1R0 | 4R3 | 1R0 |
| | Max: | 332K | 1M0 | 332K | 1M0 | 332K | 1M0 | 511K | 2M0 | 511K | 2M0 | 511K | 2M0 |
| Tolerance (%): | 0.1 | | 0.5 | | 1 | | 0.1 | | 0.5 | | 1 | | |
| Code letter: | B | | D | | F | | B | | D | | F | | |
| Selection Series: | E24 & E96 | | | | | | E24 & E96 | | | | | | |
| Temp. Coefficient (ppm/°C): | 15 | 25 | 50 | 15 | 25 | 50 | 15 | 25 | 50 | 15 | 25 | 50 | |
| Code Letter: | D | E | C | D | E | C | D | E | C | D | E | C | |
| Limiting Element Voltage: | 50V | | | | | | 100V | | | | | | |
| Max. Overload Voltage: | 100V | | | | | | 200V | | | | | | |
| Operating Temp. Range: | -55 to +155°C | | | | | | -55 to +155°C | | | | | | |
| Climatic Category (°C): | 55/125/55 | | | | | | 55/125/55 | | | | | | |
| Insulation Resistance Dry Min: | 1000MΩ | | | | | | 1000MΩ | | | | | | |
| Stability: | 0.5% | | | | | | 0.5% | | | | | | |

Type CPF Series

| | 1206 | | | | | | 1210 | | | | | | | | |
|--------------------------------|---------------|-----|-----|-----|-----|-----|---------------|-----|-----|-----|-----|-----|-----|----|----|
| Rated Power @ 70°C: | 0.125W | | | | | | 0.2W | | | | | | | | |
| Resistance Range (Ohms) | Min: | 4R7 | 4R7 | 4R7 | 1R0 | 4R7 | 1R0 | 4R7 | 4R7 | 4R7 | 1R0 | 4R7 | 1R0 | | |
| | Max: | 1M0 | 2M5 | 1M0 | 2M5 | 1M0 | 2M5 | 1M0 | 2M5 | 1M0 | 2M5 | 1M0 | 2M5 | | |
| Tolerance (%): | 0.1 | | 0.5 | | 1 | | 0.1 | | 0.5 | | 1 | | | | |
| Code Letter: | B | | D | | F | | B | | D | | F | | | | |
| Selection Series: | E24 & E96 | | | | | | E24 & E96 | | | | | | | | |
| Temp. Coefficient (ppm/°C): | 15 | 25 | 50 | 15 | 25 | 50 | 15 | 25 | 50 | 15 | 25 | 50 | 15 | 25 | 50 |
| Code Letter: | D | E | C | D | E | C | D | E | C | D | E | C | D | E | C |
| Limiting Element Voltage: | 150V | | | | | | 150V | | | | | | | | |
| Max. Overload Voltage: | 300V | | | | | | 300V | | | | | | | | |
| Operating Temp. Range: | -55 to +155°C | | | | | | -55 to +155°C | | | | | | | | |
| Climatic Category (°C): | 55/125/55 | | | | | | 55/125/55 | | | | | | | | |
| Insulation Resistance Dry Min: | 1000MΩ | | | | | | 1000MΩ | | | | | | | | |
| Stability: | 0.5% | | | | | | 0.5% | | | | | | | | |

| | 2010 | | | | | | 2512 | | | | | | | | |
|--------------------------------|---------------|-----|-----|-----|-----|-----|---------------|-----|-----|-----|-----|-----|-----|----|----|
| Rated Power @ 70°C: | 0.25W | | | | | | 0.5W | | | | | | | | |
| Resistance Range (Ohms) | Min: | 4R7 | 4R7 | 4R7 | 1R0 | 4R7 | 1R0 | 4R7 | 4R7 | 4R7 | 1R0 | 4R7 | 1R0 | | |
| | Max: | 1M0 | 3M0 | 1M0 | 3M0 | 1M0 | 3M0 | 1M0 | 3M0 | 1M0 | 3M0 | 1M0 | 3M0 | | |
| Tolerance (%): | 0.1 | | 0.5 | | 1 | | 0.1 | | 0.5 | | 1 | | | | |
| Code letter: | B | | D | | F | | B | | D | | F | | | | |
| Selection Series: | E24 & E96 | | | | | | E24 & E96 | | | | | | | | |
| Temp. Coefficient (ppm/°C): | 15 | 25 | 50 | 15 | 25 | 50 | 15 | 25 | 50 | 15 | 25 | 50 | 15 | 25 | 50 |
| Code Letter: | D | E | C | D | E | C | D | E | C | D | E | C | D | E | C |
| Limiting Element Voltage: | 150V | | | | | | 150V | | | | | | | | |
| Max. Overload Voltage: | 300V | | | | | | 300V | | | | | | | | |
| Operating Temp. Range: | -55 to +155°C | | | | | | -55 to +155°C | | | | | | | | |
| Climatic Category (°C): | 55/125/55 | | | | | | 55/125/55 | | | | | | | | |
| Insulation Resistance Dry Min: | 1000MΩ | | | | | | 1000MΩ | | | | | | | | |
| Stability: | 0.5% | | | | | | 0.5% | | | | | | | | |

Characteristics - Environmental

| Item | Requirement | | Test Method |
|--|--|--------------|---|
| | Tol. ≤ 0.05% | Tol. > 0.05% | |
| Temperature Coefficient of Resistance (TCR): | AS per TCRs specified in value range table on page 1 | | +25/-55/+25/+125/+25°C |
| Short Time Overload: | ΔR ±0.05% | ΔR ±0.2% | RCWV* 2.5 or max. overload voltage for 5 seconds |
| Insulation Resistance: | ΔR ±0.2% for high power rating >1000MΩ | | Apply 100VDC for 1 minute |
| Endurance: | ΔR ±0.05% | ΔR ±0.2% | 70 ±2°C, max. working voltage for 1000hrs with 1.5hrs "ON" and 0.5 hrs "OFF" |
| Damp Heat with Load: | ΔR ±0.05% | ΔR ±0.3% | 40 ±2°C, 90 - 95% R.H. max. working voltage hrs with 1.5hrs "ON" and 0.5hrs "OFF" |
| Bending Strength: | ΔR ±0.05% | ΔR ±0.2% | Bending amplitude 3mm for 10 seconds |
| Solderability: | 95% min. coverage | | 245 ±5°C for 3 seconds |
| Resistance to Soldering Heat: | ΔR ±0.05% | ΔR ±0.2% | 260 ±5°C for 10 seconds |
| Dielectric Withstand Voltage: | By Type | | Max. overload voltage for 1 minute |
| Thermal Shock: | ΔR ±0.05% | ΔR ±0.25% | -55°C to +150°C, 100 cycles |
| Low Temperature Operation: | ΔR ±0.05% | ΔR ±0.2% | 1 hour, -65°C, followed by 45 minutes of RCWV |
| | ΔR ±0.5% for high power rating | | |

Reference Standards: MIL-STD-202, JIS-C 5201-1

Storage Temperature: 25±3°C; Humidity < 80%RH

Type CPF Series

Marking Codes - Case Sizes 0805 to 2512

IEC 4 Digit Marking

| | | | | | |
|---------------|------|-------|------|--------|-------|
| Resistance: | 100Ω | 2.2KΩ | 10KΩ | 49.9KΩ | 100KΩ |
| Marking Code: | 1000 | 2201 | 1002 | 4992 | 1003 |

Case Sizes 0603

E24 3 Digit Marking - Example: 101=100Ω 102=1KΩ

| | | | | | | | | | | | | |
|-----|----|----|----|----|----|----|----|----|----|----|----|----|
| E24 | 10 | 11 | 12 | 13 | 15 | 16 | 18 | 20 | 22 | 24 | 27 | 30 |
| | 33 | 36 | 39 | 43 | 47 | 51 | 56 | 62 | 68 | 75 | 82 | 91 |

E96 3 Digit Marking - Examples: 14C=13K7Ω, 13C=13K3Ω, 68B=4K99Ω, 68X=49.9Ω



0603 E96 Marking Code Table

| Code | E96 | Code | E96 | Code | E96 | Code | E96 | | | | |
|------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|------------------|
| 01 | 100 | 25 | 178 | 49 | 316 | 73 | 562 | | | | |
| 02 | 102 | 26 | 182 | 50 | 324 | 74 | 576 | | | | |
| 03 | 105 | 27 | 187 | 51 | 332 | 75 | 590 | | | | |
| 04 | 107 | 28 | 191 | 52 | 340 | 76 | 604 | | | | |
| 05 | 110 | 29 | 196 | 53 | 348 | 77 | 619 | | | | |
| 06 | 113 | 30 | 200 | 54 | 357 | 78 | 634 | | | | |
| 07 | 115 | 31 | 205 | 55 | 365 | 79 | 649 | | | | |
| 08 | 118 | 32 | 210 | 56 | 374 | 80 | 665 | | | | |
| 09 | 121 | 33 | 215 | 57 | 383 | 81 | 681 | | | | |
| 10 | 124 | 34 | 221 | 58 | 392 | 82 | 698 | | | | |
| 11 | 127 | 35 | 226 | 59 | 402 | 83 | 715 | | | | |
| 12 | 130 | 36 | 232 | 60 | 412 | 84 | 732 | | | | |
| 13 | 133 | 37 | 237 | 61 | 422 | 85 | 750 | | | | |
| 14 | 137 | 38 | 243 | 62 | 432 | 86 | 768 | | | | |
| 15 | 140 | 39 | 249 | 63 | 442 | 87 | 787 | | | | |
| 16 | 143 | 40 | 255 | 64 | 453 | 88 | 806 | | | | |
| 17 | 147 | 41 | 261 | 65 | 464 | 89 | 825 | | | | |
| 18 | 150 | 42 | 267 | 66 | 475 | 90 | 845 | | | | |
| 19 | 154 | 43 | 274 | 67 | 487 | 91 | 866 | | | | |
| 20 | 158 | 44 | 280 | 68 | 499 | 92 | 887 | | | | |
| 21 | 162 | 45 | 287 | 69 | 511 | 93 | 909 | | | | |
| 22 | 165 | 46 | 294 | 70 | 523 | 94 | 931 | | | | |
| 23 | 169 | 47 | 301 | 71 | 536 | 95 | 953 | | | | |
| 24 | 174 | 48 | 309 | 72 | 549 | 96 | 976 | | | | |
| Code | A | B | C | D | E | F | G | H | X | Y | Z |
| Multiplier | 10 ⁰ | 10 ¹ | 10 ² | 10 ³ | 10 ⁴ | 10 ⁵ | 10 ⁶ | 10 ⁷ | 10 ⁻¹ | 10 ⁻² | 10 ⁻³ |

Type CPF Series

Power Derating Curve



For resistors operated in ambient temperatures above 70°C, power rating must be derated in accordance with this curve.

Dimensions



- | | | |
|--------------------------|----------------------------|--------------------------|
| 1. Alumina Substrate | 4. Edge Electrode (NiCr) | 7. Resistor Layer (NiCr) |
| 2. Bottom Electrode (Ag) | 5. Barrier Layer (Ni) | 8. Overcoat (Epoxy) |
| 3. Top Electrode (Ag-Pd) | 6. External Electrode (Sn) | 9. Marking |

| Part Number | L | W | H | a | b | Weight (g) 1000 pieces |
|-------------|------------|------------|------------|------------|------------|---------------------------|
| CPF0201 | 0.58 ±0.05 | 0.29 ±0.05 | 0.23 ±0.05 | 0.12 ±0.05 | 0.15 ±0.05 | 0.14 |
| CPF0402 | 1.00 ±0.05 | 0.50 ±0.05 | 0.30 ±0.05 | 0.20 ±0.10 | 0.20 ±0.10 | 0.54 |
| CPF0603 | 1.55 ±0.10 | 0.80 ±0.10 | 0.45 ±0.10 | 0.30 ±0.20 | 0.30 ±0.20 | 1.83 |
| CPF0805 | 2.00 ±0.15 | 1.25 ±0.15 | 0.55 ±0.10 | 0.30 ±0.20 | 0.40 ±0.25 | 4.71 |
| CPF1206 | 3.05 ±0.15 | 1.55 ±0.15 | 0.55 ±0.10 | 0.42 ±0.20 | 0.35 ±0.25 | 9.02 |
| CPF1210 | 3.10 ±0.15 | 2.40 ±0.15 | 0.55 ±0.10 | 0.40 ±0.20 | 0.55 ±0.25 | 10.00 |
| CPF2010 | 4.90 ±0.15 | 2.40 ±0.15 | 0.55 ±0.10 | 0.60 ±0.30 | 0.50 ±0.25 | 23.61 |
| CPF2512 | 6.30 ±0.15 | 3.10 ±0.15 | 0.55 ±0.10 | 0.60 ±0.30 | 0.50 ±0.25 | 38.08 |

Recommend Land Pattern



| Type | A | B | C |
|---------|------|------|-----------|
| CPF0201 | 0.25 | 0.3 | 0.40 ±0.2 |
| CPF0402 | 0.5 | 0.5 | 0.60 ±0.2 |
| CPF0603 | 0.8 | 1.0 | 0.90 ±0.2 |
| CPF0805 | 1.0 | 1.0 | 1.35 ±0.2 |
| CPF1206 | 2.0 | 1.15 | 1.70 ±0.2 |
| CPF1210 | 2.0 | 1.15 | 2.50 ±0.2 |
| CPF2010 | 3.6 | 1.4 | 2.50 ±0.2 |
| CPF2512 | 4.9 | 1.6 | 3.10 ±0.2 |

Type CPF Series

Packaging Quantity & Reel Specifications



| Type | øA | øB | øC | W | T | Paper Tape (EA) | Embossed Plastic Tape (EA) |
|---------|------------|-----------|-----------|-----------|-----------|-----------------|----------------------------|
| CPF0201 | 178.0 ±1.0 | 60.0 +1.0 | 13.5 ±0.7 | 9.5 ±1.0 | 11.5 ±1.0 | 1000 / 5000 | - |
| CPF0402 | 178.0 ±1.0 | 60.0 +1.0 | 13.5 ±0.7 | 9.5 ±1.0 | 11.5 ±1.0 | 1000 / 5000 | - |
| CPF0603 | 178.0 ±1.0 | 60.0 +1.0 | 13.5 ±0.7 | 9.5 ±1.0 | 11.5 ±1.0 | 1000 / 5000 | - |
| CPF0805 | 178.0 ±1.0 | 60.0 +1.0 | 13.5 ±0.7 | 9.5 ±1.0 | 11.5 ±1.0 | 1000 / 5000 | - |
| CPF1206 | 178.0 ±1.0 | 60.0 +1.0 | 13.5 ±0.7 | 9.5 ±1.0 | 11.5 ±1.0 | 1000 / 5000 | - |
| CPF1210 | 178.0 ±1.0 | 60.0 +1.0 | 13.5 ±0.7 | 9.5 ±1.0 | 11.5 ±1.0 | 1000 / 5000 | - |
| CPF2010 | 178.0 ±1.0 | 60.0 +1.0 | 13.5 ±0.7 | 13.5 ±1.0 | 15.5 ±1.0 | - | 4000 |
| CPF2512 | 178.0 ±1.0 | 60.0 +1.0 | 13.5 ±0.7 | 13.5 ±1.0 | 15.5 ±1.0 | - | 4000 |

Paper Tape Specification



| Type | A | B | W | E | F | P ₀ | P ₁ | P ₂ | øD ₀ | T |
|---------|------------|------------|------------|------------|-----------|----------------|----------------|----------------|-----------------|------------|
| CPF0201 | 0.40 ±0.05 | 0.70 ±0.05 | 8.00 ±0.10 | 1.75 ±0.05 | 3.5 ±0.05 | 4.00 ±0.10 | 2.00 ±0.05 | 2.00 ±0.05 | 1.55 ±0.03 | 0.42 ±0.02 |
| CPF0402 | 0.70 ±0.05 | 1.16 ±0.05 | 8.00 ±0.10 | 1.75 ±0.05 | 3.5 ±0.05 | 4.00 ±0.10 | 2.00 ±0.05 | 2.00 ±0.05 | 1.55 ±0.05 | 0.40 ±0.03 |
| CPF0603 | 1.10 ±0.05 | 1.90 ±0.05 | 8.00 ±0.10 | 1.75 ±0.05 | 3.5 ±0.05 | 4.00 ±0.10 | 4.00 ±0.10 | 2.00 ±0.05 | 1.55 ±0.05 | 0.60 ±0.03 |
| CPF0805 | 1.60 ±0.05 | 2.37 ±0.05 | 8.00 ±0.10 | 1.75 ±0.05 | 3.5 ±0.05 | 4.00 ±0.10 | 4.00 ±0.10 | 2.00 ±0.05 | 1.55 ±0.05 | 0.75 ±0.05 |
| CPF1206 | 2.00 ±0.05 | 3.55 ±0.05 | 8.00 ±0.10 | 1.75 ±0.05 | 3.5 ±0.05 | 4.00 ±0.10 | 4.00 ±0.10 | 2.00 ±0.05 | 1.55 ±0.05 | 0.75 ±0.05 |
| CPF1210 | 2.75 ±0.05 | 3.40 ±0.05 | 8.00 ±0.10 | 1.75 ±0.05 | 3.5 ±0.05 | 4.00 ±0.05 | 4.00 ±0.10 | 2.00 ±0.05 | 1.60 ±0.10 | 0.75 ±0.05 |

Type CPF Series

Embossed Plastic Tape Specifications



| Type | A | B | W | E | F | P ₀ | P ₁ | P ₂ | øD ₀ | T |
|---------|------------|------------|------------|------------|-----------|----------------|----------------|----------------|-----------------|------------|
| CPF2010 | 2.85 ±0.10 | 5.45 ±0.10 | 12.0 ±0.10 | 1.75 ±0.10 | 5.5 ±0.05 | 4.00 ±0.05 | 4.00 ±0.10 | 2.00 ±0.05 | 1.50 +0.10 | 1.00 ±0.20 |
| CPF2512 | 3.40 ±0.10 | 6.65 ±0.10 | 12.0 ±0.10 | 1.75 ±0.10 | 5.5 ±0.05 | 4.00 ±0.05 | 4.00 ±0.10 | 2.00 ±0.05 | 1.50 +0.10 | 1.00 ±0.20 |

How to Order

| CPF | 0603 | B | 100R | E | 1 |
|------------------------------------|--|-----------------------------------|---|-------------------------------------|--------------------------------|
| Common Part | Package Size | Tolerance | Value | TCR | Packaging |
| CPF - Chip precision film resistor | 0201 1206 0402 1210 0603 2010 0805 2512 | B - ±0.1% D - ±0.5% F - ±1% | 100R (100 Ohms) 1K0 (1000 Ohms) 100K (100,000 Ohms) | D - 15ppm E - 25ppm C - 50ppm | 1 - 1K REEL Blank - 5K REEL |

TE Connectivity, TE connectivity (logo) and TE (logo) are trademarks.
Other logos, product and Company names mentioned herein may be trademarks of their respective owners.

While TE has made every reasonable effort to ensure the accuracy of the information in this datasheet, TE does not guarantee that it is error-free, nor does TE make any other representation, warranty or guarantee that the information is accurate, correct, reliable or current. TE reserves the right to make any adjustments to the information contained herein at any time without notice. TE expressly disclaims all implied warranties regarding the information contained herein, including, but not limited to, any implied warranties of merchantability or fitness for a particular purpose. The dimensions in this datasheet are for reference purposes only and are subject to change without notice. Specifications are subject to change without notice. Consult TE for the latest dimensions and design specifications.

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