

SiT3822

220-625 MHz High Performance Differential VCXO



Features

- Any frequency between 220 MHz and 625 MHz accurate to 6 decimal places
- Widest pull range options: ± 25 , ± 50 , ± 100 , ± 150 , ± 200 , ± 400 , ± 800 , ± 1600 ppm
- Superior pull range linearity of $\leq 1\%$, 10 times better than quartz
- < 1 ps RMS phase jitter (random) over 12 kHz to 20 MHz bandwidth
- Industrial and extended commercial temperature ranges
- Industry-standard packages: 3.2 mm x 2.5 mm, 5.0 mm x 3.2 mm and 7.0 mm x 5.0 mm
- For frequencies higher than 220 MHz, refer to SiT3821 datasheet

Applications

- Ideal for SONET, Video, Instrumentation, Satellite applications
- Telecom, networking, broadband



Electrical Characteristics

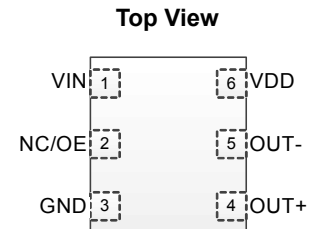
| Parameter and Conditions | Symbol | Min. | Typ. | Max. | Unit | Condition |
|---|---------------------------------|--|------|----------------------|------|--|
| LVPECL and LVDS, Common AC Characteristics | | | | | | |
| Output Frequency Range | f | 220 | – | 625 | MHz | For frequency coverage see last page |
| Frequency Stability | F _{stab} | -10 | – | +10 | ppm | Inclusive of initial tolerance, operating temperature, rated power, supply voltage and load change |
| | | -25 | – | +25 | ppm | |
| | | -50 | – | +50 | ppm | |
| Operating Temperature Range | T _{use} | -40 | – | +85 | °C | Industrial |
| | | -20 | – | +70 | °C | Extended Commercial |
| Start-up Time | T _{start} | – | – | 10 | ms | |
| Duty Cycle | DC | 45 | – | 55 | % | f = 220 to 312.5 MHz and f = 525 to 625 MHz |
| | | 40 | – | 60 | % | f = 420 to 500 MHz |
| Pull Range | PR | ± 25 , ± 50 , ± 100 , ± 150 , ± 200 , ± 400 , ± 800 , ± 1600 | | | ppm | See the last page for Absolute Pull Range, APR table |
| Upper Control Voltage | VC _U | 3 | – | 3.1 | V | V _{dd} = 3.3V, Voltage at which maximum deviation is guaranteed |
| | | 2.25 | – | 2.3 | V | V _{dd} = 2.5V, Voltage at which maximum deviation is guaranteed |
| Lower Control Voltage | VC _L | 0 | – | 0.1 | V | Voltage at which maximum deviation is guaranteed |
| Linearity | Lin | – | 0.2 | 1 | % | |
| Frequency Change Polarity | – | Positive Slope | | | – | |
| Control Voltage Bandwidth (-3dB) | V _{BW} | – | 8 | – | kHz | Contact SiTime for 16 kHz bandwidth |
| 1-year Aging | | -1 | – | +1 | ppm | First year @25°C |
| 10-year Aging | | -5 | – | +5 | ppm | |
| LVPECL, DC and AC Characteristics | | | | | | |
| Supply Voltage | V _{dd} | 2.97 | 3.3 | 3.63 | V | |
| | | 2.25 | 2.5 | 2.75 | V | |
| Current Consumption | I _{dd} | – | 61 | 69 | mA | Excluding Load Termination Current, V _{dd} = 3.3V or 2.5V |
| OE Disable Supply Current | I _{OE} | – | – | 35 | mA | OE = GND |
| Output Disable Leakage Current | I _{leak} | – | – | 1 | μA | OE = GND |
| Maximum Output Current | I _{driver} | – | – | 30 | mA | Maximum average current drawn from OUT+ or OUT- |
| Output High Voltage | VOH | V _{dd} -1.1 | – | V _{dd} -0.7 | V | See Figure 1 |
| Output Low Voltage | VOL | V _{dd} -1.9 | – | V _{dd} -1.5 | V | See Figure 1 |
| Pk-Pk Output Voltage Swing | V _{Swing} | 600 | 800 | 1000 | mV | See Figure 1 |
| Rise/Fall Time | T _r , T _f | 100 | 300 | 500 | ps | 20% to 80% |
| OE Enable/Disable Time | T _{oe} | – | – | 105 | ns | f = 220 MHz - For other frequencies, T _{oe} = 100ns + 3 period |
| RMS Period Jitter | T _{jitt} | – | 1 | 1.7 | ps | f = 100 MHz, V _{dd} = 3.3V or 2.5V |
| | | – | 1 | 1.7 | ps | f = 156.25 MHz, V _{dd} = 3.3V or 2.5V |
| | | – | 1 | 1.7 | ps | f = 212.5 MHz, V _{dd} = 3.3V or 2.5V |
| RMS Phase Jitter (random) | T _{phj} | – | 0.5 | 0.75 | ps | f = 156.25 MHz, Integration bandwidth = 12 kHz to 20 MHz, all V _{dds} |

Electrical Characteristics

| Parameter and Conditions | Symbol | Min. | Typ. | Max. | Unit | Condition |
|---|---------------------------------|-------|------|-------|------|--|
| LVDS, DC, and AC Characteristics | | | | | | |
| Supply Voltage | V _{dd} | 2.97 | 3.3 | 3.63 | V | |
| | | 2.25 | 2.5 | 2.75 | V | |
| Current Consumption | I _{dd} | – | 47 | 55 | mA | Excluding Load Termination Current, V _{dd} = 3.3V or 2.5V |
| OE Disable Current | I _{OE} | – | – | 35 | mA | OE = V _{dd} |
| Output Disable Leakage Current | I _{leak} | – | – | 1 | μA | OE = V _{dd} |
| Differential Output Voltage | V _{OD} | 200 | 350 | 500 | mV | See Figure 4 |
| V _{OD} Magnitude Change | ΔV _{OD} | – | – | 50 | mV | See Figure 4 |
| Offset Voltage | V _{OS} | 1.125 | 1.2 | 1.375 | V | See Figure 4 |
| V _{OS} Magnitude Change | ΔV _{OS} | – | – | 50 | mV | See Figure 4 |
| Rise/Fall Time | T _r , T _f | 360 | 495 | 380 | ps | 20% to 80% |
| OE Enable/Disable Time | T _{oe} | – | – | 105 | ns | f = 220 MHz - For other frequencies, T _{oe} = 100ns + 3 period |
| RMS Period Jitter | T _{jitt} | – | 1.2 | 1.7 | ps | f = 100 MHz, V _{dd} = 3.3V or 2.5V |
| | | – | 1.2 | 1.7 | ps | f = 156.25 MHz, V _{dd} = 3.3V or 2.5V |
| | | – | 1.2 | 1.7 | ps | f = 212.5 MHz, V _{dd} = 3.3V or 2.5V |
| RMS Phase Jitter (random) | T _{phj} | – | 0.5 | 0.75 | ps | f = 156.25 MHz, Integration bandwidth = 12 kHz to 20 MHz, all V _{dds} |

Pin Description

| Pin | Map | Functionality |
|-----|------|---|
| 1 | VIN | Input Control Voltage |
| 2 | NC | Input No Connect (only for 3225 package) |
| | OE | Input H or Open: specified frequency output L: output is high impedance (only for 7050 and 5032 packages) |
| 3 | GND | Power VDD Power Supply Ground |
| 4 | OUT+ | Output Oscillator Output |
| 5 | OUT- | Output Complementary Oscillator Output |
| 6 | VDD | Power Power Supply Voltage |



Absolute Maximum

Attempted operation outside the absolute maximum ratings may cause permanent damage to the part. Actual performance of the IC is only guaranteed within the operational specifications, not at absolute maximum ratings.

| Parameter | Min. | Max. | Unit |
|--|--------|------|-------|
| Storage Temperature | -65 | 150 | °C |
| VDD | -0.5 | 4 | V |
| Electrostatic Discharge | – | 2000 | V |
| Soldering Temperature (follow standard Pb free soldering guidelines) | – | 260 | °C |
| Program Retention over -40 to 125°C, Process, VDD (0 to 3.65V) | 1,000+ | – | years |

Thermal Consideration

| Package | θ _{JA} , 4 Layer Board (°C/W) | θ _{JC} , Bottom (°C/W) |
|-------------|--|---------------------------------|
| 7050, 6-pin | 142 | 27 |
| 5032, 6-pin | 97 | 20 |
| 3225, 6-pin | 109 | 20 |

Environmental Compliance

| Parameter | Condition/Test Method |
|----------------------------|---------------------------|
| Mechanical Shock | MIL-STD-883F, Method 2002 |
| Mechanical Vibration | MIL-STD-883F, Method 2007 |
| Temperature Cycle | JESD22, Method A104 |
| Solderability | MIL-STD-883F, Method 2003 |
| Moisture Sensitivity Level | MSL1 @ 260°C |

Termination Diagrams

LVPECL:

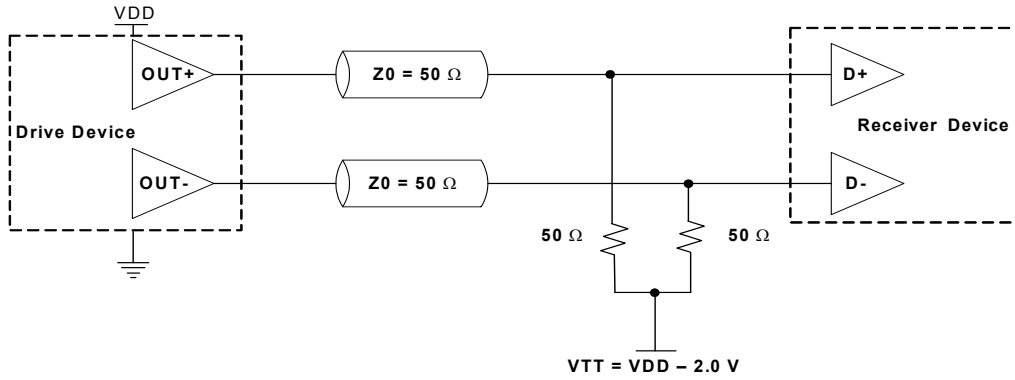


Figure 1. LVPECL Typical Termination

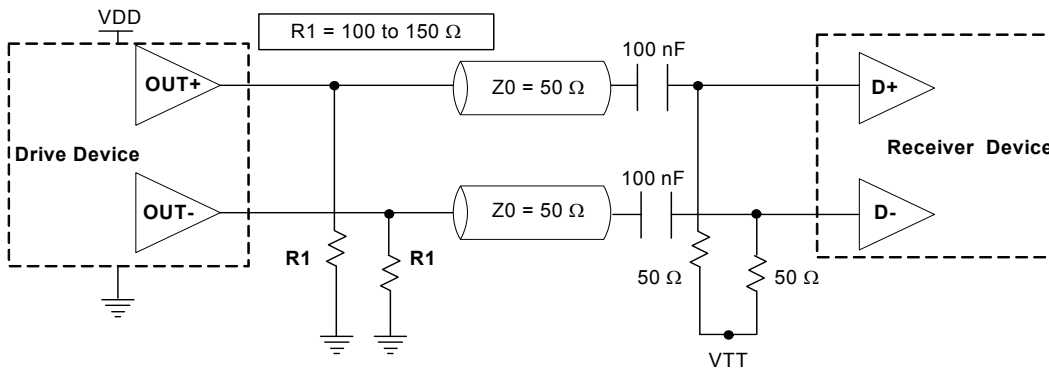


Figure 2. LVPECL AC Coupled Termination

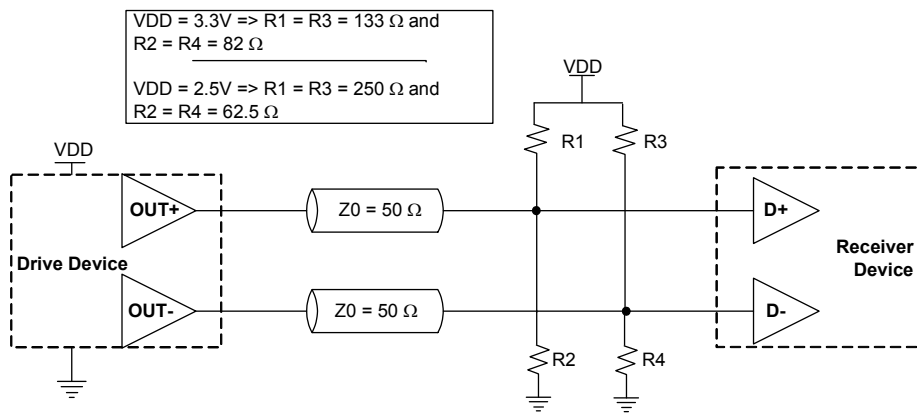


Figure 3. LVPECL with Thevenin Typical Termination

LVDS:

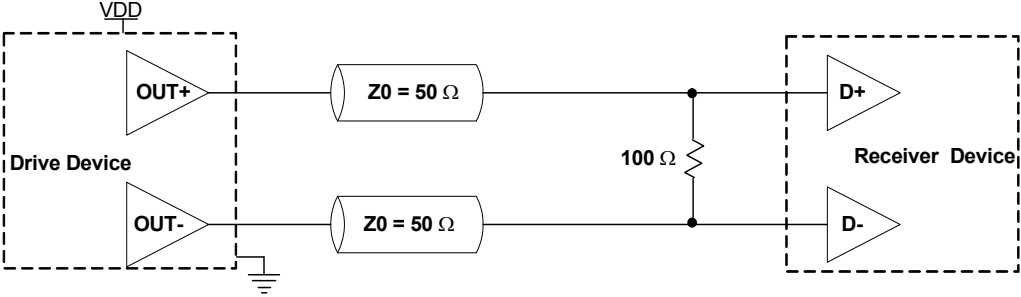
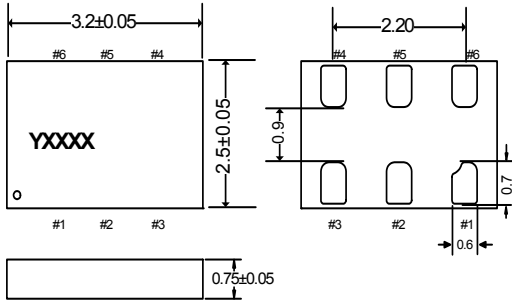
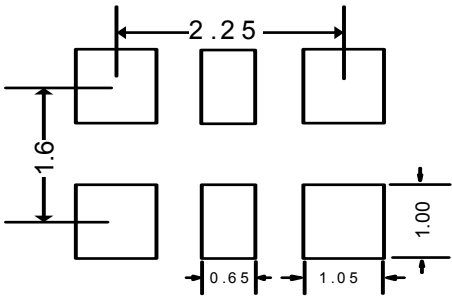
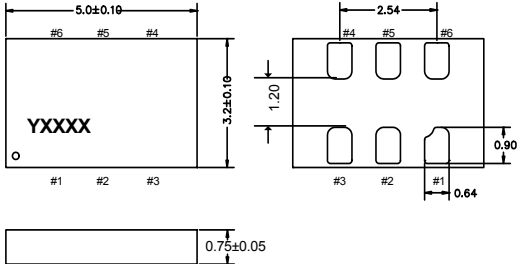
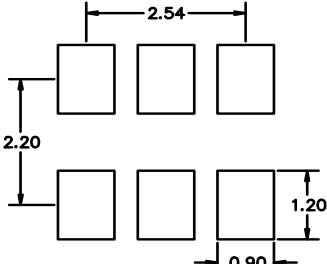
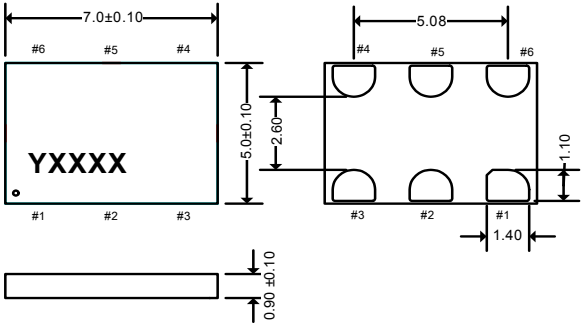
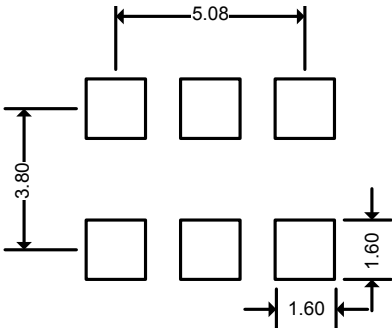


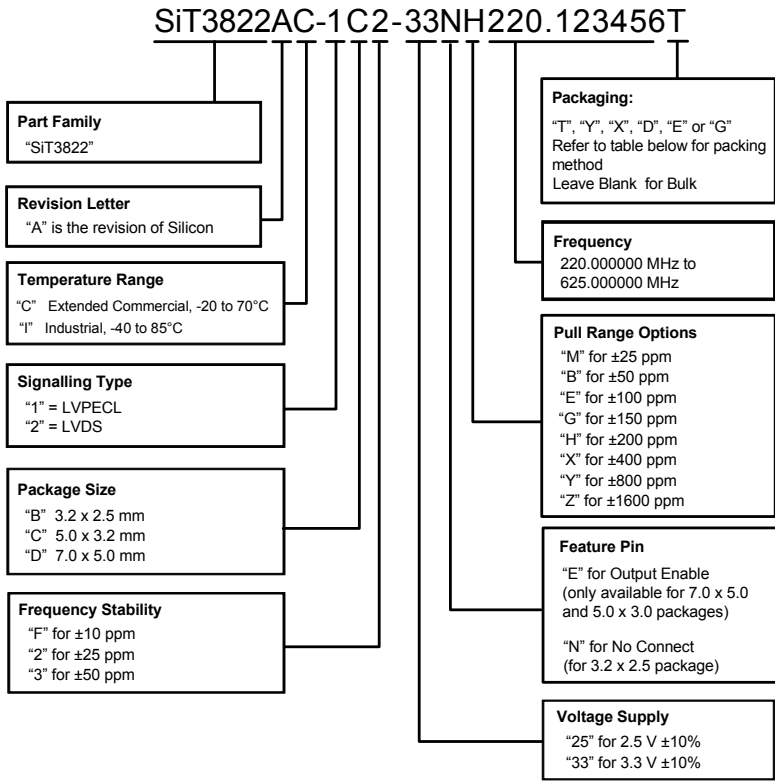
Figure 4. LVDS Single Termination (Load Terminated)

Dimensions and Patterns

| Package Size – Dimensions (Unit: mm) ^[1] | Recommended Land Pattern (Unit: mm) ^[2] |
|---|--|
| <p>3.2 x 2.5x 0.75 mm</p>  |  |
| <p>5.0 x 3.2 x 0.75 mm</p>  |  |
| <p>7.0 x 5.0 x 0.90 mm</p>  |  |

1. Top Marking: Y denotes manufacturing origin and XXXX denotes manufacturing lot number. The value of "Y" will depend on the assembly location of the device.
 2. A capacitor of value 0.1 μ F between Vdd and GND is recommended.

Ordering Information



Frequencies Not Supported

| |
|--|
| Range 1: From 209.000001 MHz to 210.999999 MHz |
| Range 2: From 251.000001 MHz to 263.999999 MHz |
| Range 3: From 314.000001 MHz to 422.999999 MHz |
| Range 4: From 502.000001 MHz to 527.999999 MHz |

APR Definition

Absolute pull range (APR) = Nominal pull range (PR) - frequency stability (F_stab) - Aging (F_aging)

APR Table

| Nominal Pull Range | Frequency Stability | | |
|--------------------|---------------------|--------|--------|
| | ± 10 | ± 25 | ±50 |
| | APR (ppm) | | |
| ± 25 | ± 10 | — | — |
| ± 50 | ± 35 | ± 20 | — |
| ± 100 | ± 85 | ± 70 | ± 45 |
| ± 150 | ± 135 | ± 120 | ± 95 |
| ± 200 | ± 185 | ± 170 | ± 145 |
| ± 400 | ± 385 | ± 370 | ± 345 |
| ± 800 | ± 785 | ± 770 | ± 745 |
| ± 1600 | ± 1585 | ± 1570 | ± 1545 |

Ordering Codes for Supported Tape & Reel Packing Method

| Device Size | 8 mm T&R (3ku) | 8 mm T&R (1ku) | 8 mm T&R (250u) | 12 mm T&R (3ku) | 12 mm T&R (1ku) | 12 mm T&R (250u) | 16 mm T&R (3ku) | 16 mm T&R (1ku) | 16 mm T&R (250u) |
|--------------|----------------|----------------|-----------------|-----------------|-----------------|------------------|-----------------|-----------------|------------------|
| 7.0 x 5.0 mm | — | — | — | — | — | — | T | Y | X |
| 5.0 x 3.2 mm | — | — | — | T | Y | X | — | — | — |
| 3.2 x 2.5 mm | D | E | G | T | Y | X | — | — | — |

Revision History

| Version | Release Date | Change Summary |
|---------|--------------|---|
| 1.0 | 6/12/12 | Original |
| 1.1 | 6/6/14 | Included 3225 package |
| 1.2 | 9/12/14 | Corrected the "Frequencies Not Supported" section |
| 1.3 | 10/6/14 | Modified Thermal Consideration values |

© SiTime Corporation 2014. The information contained herein is subject to change at any time without notice. SiTime assumes no responsibility or liability for any loss, damage or defect of a Product which is caused in whole or in part by (i) use of any circuitry other than circuitry embodied in a SiTime product, (ii) misuse or abuse including static discharge, neglect or accident, (iii) unauthorized modification or repairs which have been soldered or altered during assembly and are not capable of being tested by SiTime under its normal test conditions, or (iv) improper installation, storage, handling, warehousing or transportation, or (v) being subjected to unusual physical, thermal, or electrical stress.

Disclaimer: SiTime makes no warranty of any kind, express or implied, with regard to this material, and specifically disclaims any and all express or implied warranties, either in fact or by operation of law, statutory or otherwise, including the implied warranties of merchantability and fitness for use or a particular purpose, and any implied warranty arising from course of dealing or usage of trade, as well as any common-law duties relating to accuracy or lack of negligence, with respect to this material, any SiTime product and any product documentation. Products sold by SiTime are not suitable or intended to be used in a life support application or component, to operate nuclear facilities, or in other mission critical applications where human life may be involved or at stake. All sales are made conditioned upon compliance with the critical uses policy set forth below.

CRITICAL USE EXCLUSION POLICY

BUYER AGREES NOT TO USE SITIME'S PRODUCTS FOR ANY APPLICATION OR IN ANY COMPONENTS USED IN LIFE SUPPORT DEVICES OR TO OPERATE NUCLEAR FACILITIES OR FOR USE IN OTHER MISSION-CRITICAL APPLICATIONS OR COMPONENTS WHERE HUMAN LIFE OR PROPERTY MAY BE AT STAKE.

SiTime owns all rights, title and interest to the intellectual property related to SiTime's products, including any software, firmware, copyright, patent, or trademark. The sale of SiTime products does not convey or imply any license under patent or other rights. SiTime retains the copyright and trademark rights in all documents, catalogs and plans supplied pursuant to or ancillary to the sale of products or services by SiTime. Unless otherwise agreed to in writing by SiTime, any reproduction, modification, translation, compilation, or representation of this material shall be strictly prohibited.



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

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.