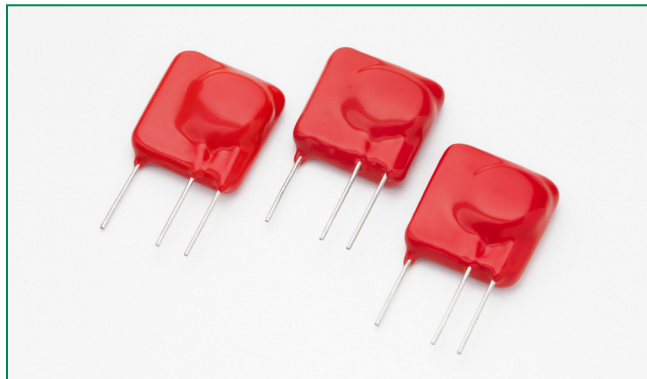


TMOV®25S Varistor Series



Description

Metal Oxide Varistors (MOVs) are rated for specific AC line operating voltages, and exceeding these limits through the application of a sustained abnormal over-voltage condition could result in overheating and damage to the MOV.

The Littelfuse TMOV®25S Varistor Series was designed to address this condition in a single integrated package.

The TMOV®25S Varistor Series incorporates a patented integrated thermally responsive element within the body of the device which will open-circuit the varistor in case of overheating due to the abnormal over-voltage events.

The TMOV®25S Varistor Series meets the surge suppressor component recognition requirements of UL1449 3rd edition for both cord connected and permanently connected SPD end products.

Agency Approvals

| Agency | Agency Approval | Agency File Number |
|--------|---|--------------------|
| | UL1449 | E320116 |
| | IEC-CECC Spec: QC42201-C001, QC42201-A001, IEC 60950-1 (Annex Q) | E1274/F |
| | IEC 61051-1, IEC 61051-2, IEC 60950-1 (Annex Q) | 40021525 |

Features

- RoHS Compliant and Lead-free
- Wave solderable
- Standard Operating Voltage Range Compatible with Common AC Line Voltages (115VAC to 750VAC)
- High peak surge current rating up to 20kA at single 8/20µS impulse
- Standard lead form and spacing option
- -55°C to +85°C operating temperature range

Additional Information



Datasheet



Resources



Samples

Applications

- SPD Products
- AC Panel Protection Modules
- AC/DC power supplies
- UPS (Uninterruptible Power Supply)

Absolute Maximum Ratings

• For ratings of individual members of a series, see Device Ratings and Specifications chart.

| | TMOV®25S Varistor Series | Units |
|--|--------------------------|-------|
| Continuous: | | |
| AC Voltage Range ($V_{MIACIRMS}$) | 115 to 750 | V |
| Transient: | | |
| Peak Pulse Current (I_{TM}) | | |
| For 8x20µs Current Wave, single pulse | 20,000 | A |
| Single-Pulse Energy Capability | | |
| For 2ms Current Wave | 170 to 670 | J |
| Operating Ambient Temperature Range (T_A) | -55 to +85 | °C |
| Storage Temperature Range (T_{STG}) | -55 to +125 | °C |
| Temperature Coefficient (α_V) of Clamping Voltage (V_C) at Specified Test Current | <0.01 | %/°C |
| Hi-Pot Encapsulation (COATING Isolation Voltage Capability) | 2,500 | V |
| Thermal Protection Isolation Voltage Capability (when operated) | 600* | V |
| *See notes under Device Ratings & Specifications section for more information | | |
| COATING Insulation Resistance | 1,000 | MΩ |

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

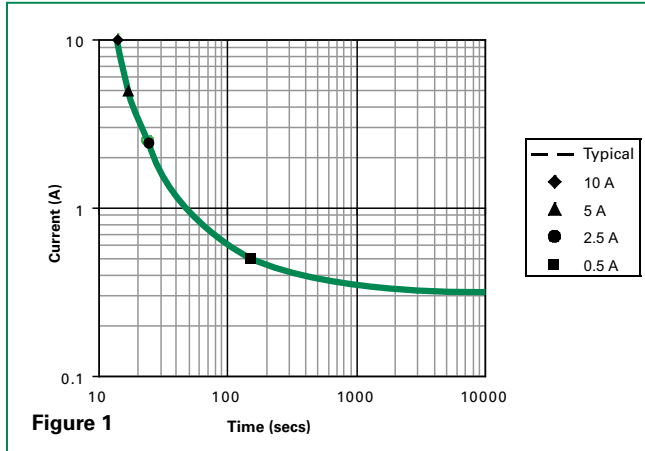
Device Ratings & Specifications

| 2 Leaded Device - Without Indicator Lead | | 3 Leaded Device - With Indicator Lead Option | | Model Size Disc Diameter (mm) | Maximum Rating (85°C) | | | | Specifications (25 °C) | | | |
|---|----------|---|----------|--|-------------------------------|---------------------------|---------------------------|---|---|------------------|--|------------------------------------|
| | | | | | Continuous | | Transient | | Varistor Voltage at 1mA Test Current | | Clamping Voltage at 100A Current 8/20µs | Typical Capacitance (f=1MHz) |
| Part Number | Branding | Part Number | Branding | | AC Volts $V_{MIACIRMS}$ | DC Volts V_{MIDC} | Energy 2ms W_{TM} | Peak Current 8/20µs $I_{TM} \times 1$ Pulse | V_{NDC} Min | V_{NDC} Max | V_C | C |
| | | | | | (V) | (V) | (J) | (A) | (V) | (V) | (V) | (pF) |
| TMOV25SP115E | P25T115E | TMOV25SP115M | P25T115M | 25 | 115 | 150 | 170 | 20000 | 162 | 198 | 295 | 3200 |
| TMOV25SP130E | P25T130E | TMOV25SP130M | P25T130M | 25 | 130 | 170 | 190 | 20000 | 184.5 | 225.5 | 335 | 2800 |
| TMOV25SP140E | P25T140E | TMOV25SP140M | P25T140M | 25 | 140 | 180 | 210 | 20000 | 198 | 242 | 355 | 2500 |
| TMOV25SP150E | P25T150E | TMOV25SP150M | P25T150M | 25 | 150 | 200 | 220 | 20000 | 216 | 264 | 390 | 2300 |
| TMOV25SP175E | P25T175E | TMOV25SP175M | P25T175M | 25 | 175 | 225 | 250 | 20000 | 243 | 297 | 450 | 1900 |
| TMOV25SP200E | P25T200E | TMOV25SP200M | P25T200M | 25 | 200 | 265 | 270 | 20000 | 283 | 345 | 530 | 1700 |
| TMOV25SP230E | P25T230E | TMOV25SP230M | P25T230M | 25 | 230 | 300 | 300 | 20000 | 324 | 396 | 585 | 1500 |
| TMOV25SP250E | P25T250E | TMOV25SP250M | P25T250M | 25 | 250 | 320 | 330 | 20000 | 351 | 429 | 640 | 1400 |
| TMOV25SP275E | P25T275E | TMOV25SP275M | P25T275M | 25 | 275 | 350 | 350 | 20000 | 387 | 473 | 700 | 1250 |
| TMOV25SP300E | P25T300E | TMOV25SP300M | P25T300M | 25 | 300 | 385 | 370 | 20000 | 423 | 517 | 765 | 1150 |
| TMOV25SP320E | P25T320E | TMOV25SP320M | P25T320M | 25 | 320 | 420 | 390 | 20000 | 459 | 561 | 825 | 1080 |
| TMOV25SP385E | P25T385E | TMOV25SP385M | P25T385M | 25 | 385 | 505 | 430 | 20000 | 558 | 682 | 1010 | 900 |
| TMOV25SP420E | P25T420E | TMOV25SP420M | P25T420M | 25 | 420 | 560 | 460 | 20000 | 612 | 748 | 1100 | 820 |
| TMOV25SP440E | P25T440E | TMOV25SP440M | P25T440M | 25 | 440 | 585 | 470 | 20000 | 643.5 | 786.5 | 1160 | 790 |
| TMOV25SP460E | P25T460E | TMOV25SP460M | P25T460M | 25 | 460 | 615 | 490 | 20000 | 675 | 825 | 1220 | 750 |
| TMOV25SP510E | P25T510E | TMOV25SP510M | P25T510M | 25 | 510 | 670 | 520 | 20000 | 738 | 902 | 1335 | 680 |
| TMOV25SP550E | P25T550E | TMOV25SP550M | P25T550M | 25 | 550 | 745 | 550 | 20000 | 819 | 1001 | 1475 | 630 |
| TMOV25SP625E | P25T625E | TMOV25SP625M | P25T625M | 25 | 625 | 825 | 600 | 20000 | 900 | 1100 | 1625 | 550 |
| TMOV25SP750E | P25T750E | TMOV25SP750M | P25T750M | 25 | 750 | 970 | 670 | 20000 | 1080 | 1320 | 1950 | 460 |

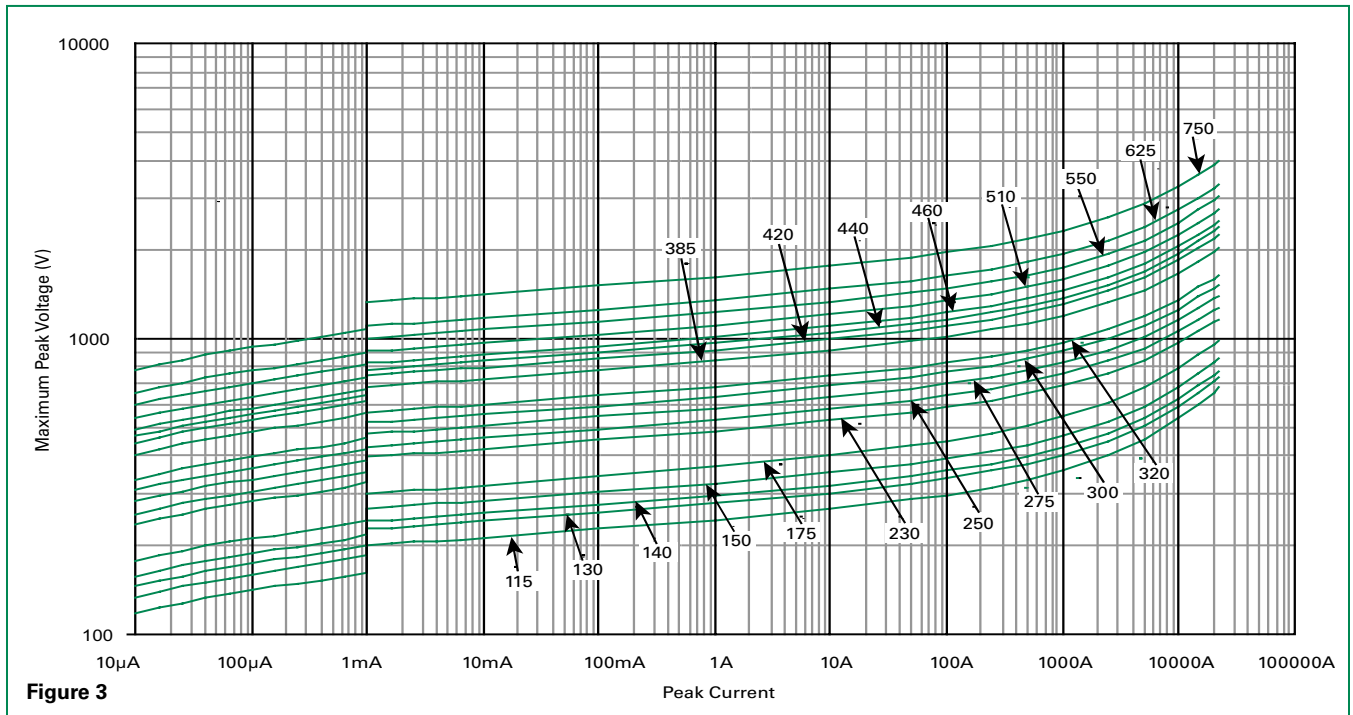
Notes:
Average power dissipation of transients should not exceed 1.5 watts.

Thermal Characteristics

Typical time to open circuit under UL 1449 Abnormal Overvoltage Limited Current Test:



Transient V-I Characteristic Curves



Pulse Rating Curve

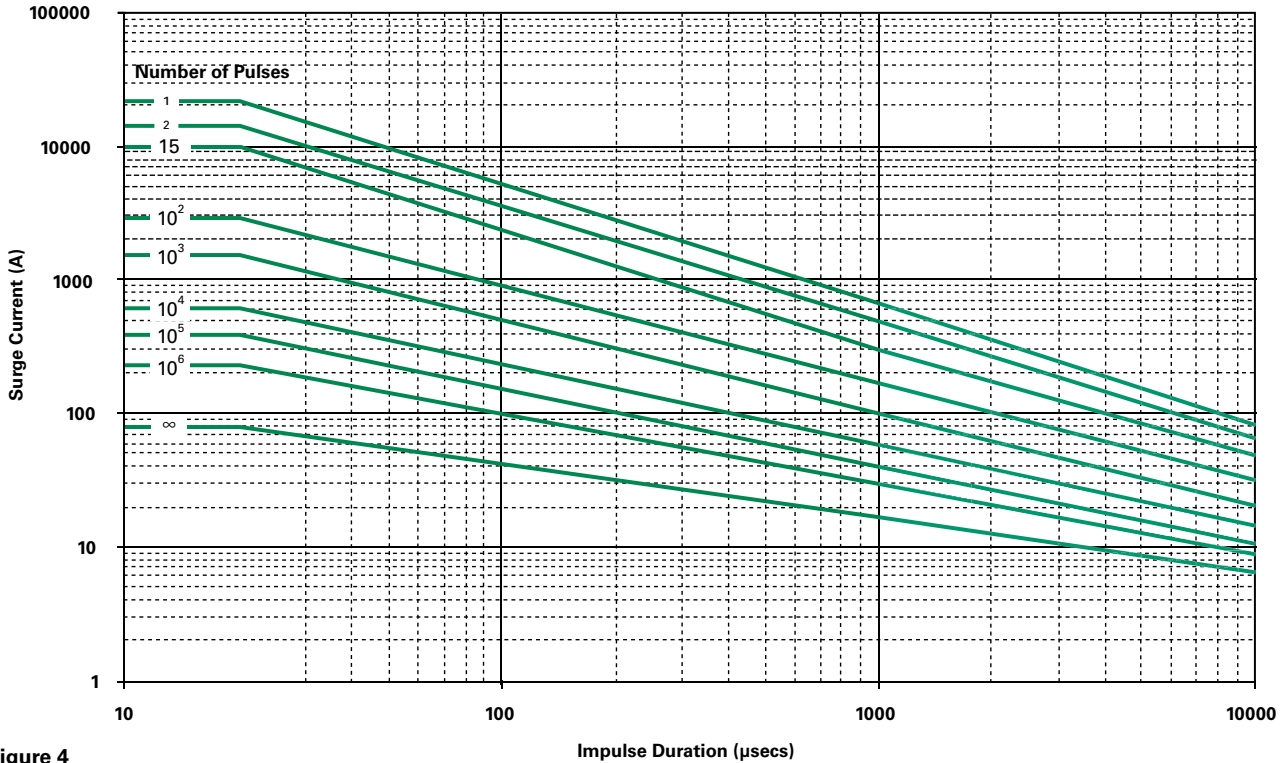


Figure 4

Wave Solder Profile

Because the TMOV[®]25S Varistor Series contains a thermally responsive device, care must be taken when soldering the device into place. Two soldering methods are possible. Firstly, hand soldering: We recommend the use of pliers to heat-sink the leads of the device. Secondly, wave-soldering: This is a strenuous process requiring pre-heat stages to reduce the stresses on devices.

It is critically important that all preheat stage and the solder bath temperatures are rigidly controlled. The recommended solder for the TMOV[®] Varistor Series is a 62/36/2 (Sn/Pb/Ag), 60/40 (Sn/Pb) or 63/37 (Sn/Pb). Littelfuse also recommends an RMA solder flux. SAC solders (SnAgCu) are recommended for Lead-free

Soldering Profile

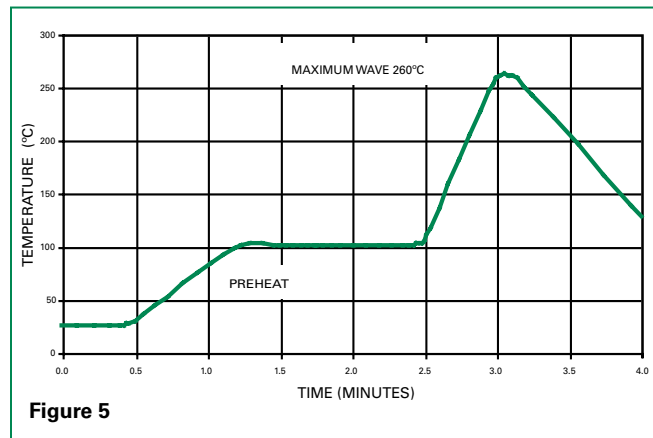


Figure 5

Physical Specifications

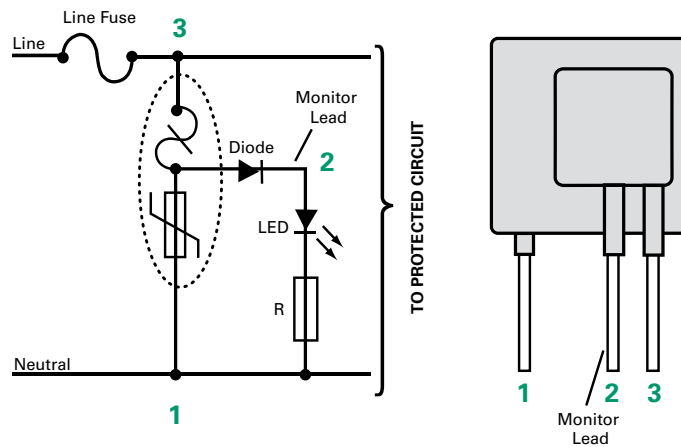
| | |
|----------------------------------|---|
| Lead Material | Tin-coated Copper wire |
| Soldering Characteristics | Solderability per MIL-STD-202, Method 208 |
| Insulating Material | Cured, flame retardant epoxy polymer meets UL94V-0 requirements |
| Device Labeling | Marked with LF, voltage, UL logos, and date code |

Environmental Specifications

| | |
|--------------------------------------|--|
| Operating/Storage Temperature | -55°C to +85°C |
| Humidity Aging | +85°C, 85% R.H., 1000 hours -/+10% typical voltage change |
| Thermal Shock | +85°C to -40°C 5 times -/+10% typical voltage change |
| Solvent Resistance | MIL-STD-202, Method 215 |
| Moisture Sensitivity | Level 1, J-STD-020 |

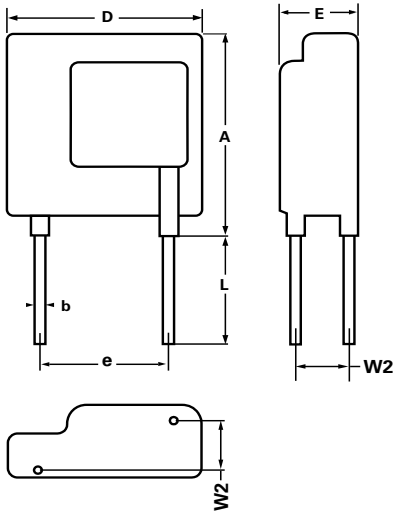
Application Example

The application example left shows how the indicator lead on the TMOV® Varistor can be used to indicate that thermal element has been opened. This signifies that the circuit is no longer protected from transients by the MOV.

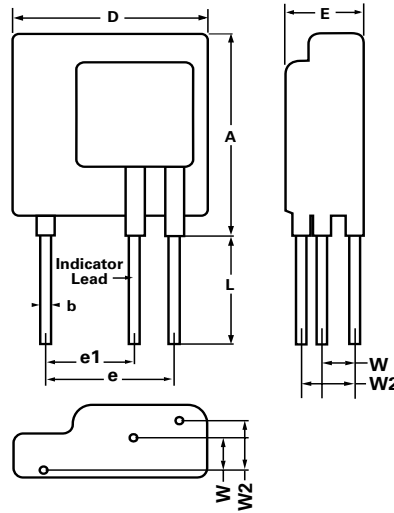


Dimensions

2 Leaded Device
 Without Indicator Lead
 (E part number suffix)



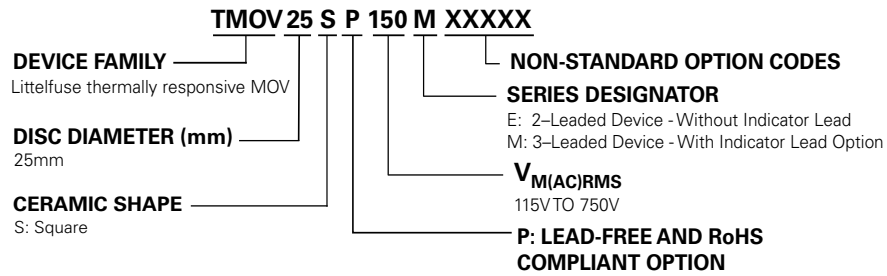
3 Leaded Device
 With Indicator Lead Option
 (M part number suffix)



Product Dimensions (mm)

| Part Number | Part Number | W _{MIN} | W _{MAX} | W2 | E _{MAX} | A _{MAX} | b _{MIN} | b _{MAX} | D _{MAX} | e | e1 | L |
|--------------|--------------|------------------|------------------|---------|------------------|------------------|------------------|------------------|------------------|-----------|-----------|-----------|
| TMOV25SP115E | TMOV25SP115M | 1.5 | 2.7 | 3.6+/-1 | 11.7 | 34.5 | 0.95 | 1.05 | 28 | 19.2 +/-1 | 12.7 +/-1 | 12.7 Min. |
| TMOV25SP130E | TMOV25SP130M | 1.6 | 2.9 | 3.7+/-1 | 11.9 | | | | | | | |
| TMOV25SP140E | TMOV25SP140M | 1.7 | 3.0 | 3.8+/-1 | 12.0 | | | | | | | |
| TMOV25SP150E | TMOV25SP150M | 1.8 | 3.1 | 3.9+/-1 | 12.1 | | | | | | | |
| TMOV25SP175E | TMOV25SP175M | 1.9 | 3.3 | 4.1+/-1 | 12.3 | | | | | | | |
| TMOV25SP200E | TMOV25SP200M | 1.9 | 3.3 | 4.1+/-1 | 12.3 | | | | | | | |
| TMOV25SP230E | TMOV25SP230M | 2.0 | 3.4 | 4.2+/-1 | 12.4 | | | | | | | |
| TMOV25SP250E | TMOV25SP250M | 2.1 | 3.5 | 4.3+/-1 | 12.5 | | | | | | | |
| TMOV25SP275E | TMOV25SP275M | 2.3 | 3.7 | 4.5+/-1 | 12.7 | | | | | | | |
| TMOV25SP300E | TMOV25SP300M | 2.4 | 3.9 | 4.6+/-1 | 12.9 | | | | | | | |
| TMOV25SP320E | TMOV25SP320M | 2.6 | 4.1 | 4.8+/-1 | 13.1 | | | | | | | |
| TMOV25SP385E | TMOV25SP385M | 3.0 | 4.7 | 5.3+/-1 | 13.7 | | | | | | | |
| TMOV25SP420E | TMOV25SP420M | 3.3 | 5.0 | 5.6+/-1 | 14.0 | | | | | | | |
| TMOV25SP440E | TMOV25SP440M | 3.4 | 5.2 | 5.8+/-1 | 14.2 | | | | | | | |
| TMOV25SP460E | TMOV25SP460M | 3.6 | 5.4 | 6+/-1 | 14.4 | | | | | | | |
| TMOV25SP510E | TMOV25SP510M | 3.9 | 5.7 | 6.3+/-1 | 14.7 | | | | | | | |
| TMOV25SP550E | TMOV25SP550M | 4.2 | 6.2 | 6.7+/-1 | 15.2 | | | | | | | |
| TMOV25SP625E | TMOV25SP625M | 4.6 | 6.6 | 7.1+/-1 | 15.6 | | | | | | | |
| TMOV25SP750E | TMOV25SP750M | 5.4 | 7.7 | 8.0+/-1 | 16.7 | | | | | | | |

Part Numbering System





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.