

# DATA SHEET

## TRANSIENT VOLTAGE SUPPRESSORS

### AC/DC POWER SUPPLY

P4KE series

RoHS compliant & Halogen free



Product specification— April 29, 2019 V.0



## Transient Voltage Suppressors (TVS) Data Sheet

### Features

- Glass passivated junction
- Low inductance
- Excellent clamping capability
- 400W peak pulse power capability at 10/1000 $\mu$ s waveform, repetition rate (duty cycle): 0.01%
- Fast response time
- Typical  $I_R$  less than 1 $\mu$ A above 12V
- High Temperature soldering guaranteed: 265 $^{\circ}$ C/10 seconds/.375", (9.5mm) lead length, 5lbs (2.3kg) tension
- Plastic package has underwriters laboratory flammability 94V-0
- Meets MSL level 1, per J-STD-020
- Safety certification: UL: E244458



### Mechanical Data

- Case: JEDEC DO-41 Moulded plastic
- Terminal: Axial leads, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denotes cathode except bi-directional models
- Mounting Position: Any
- Weight: 0.33g

### Applications

- I/O interface
- AC/DC power supply
- Low frequency signal transmission line (RS232, RS485, etc.)

### Maximum Ratings and Characteristics

Ratings at 25 $^{\circ}$ C ambient temperature unless otherwise specified.

| Rating  | Symbol          | Value       | Units          |
|---|-----------------|-------------|----------------|
| Peak pulse power dissipation at 10/1000 $\mu$ s waveform (Note1, Note2, Fig.1)                                    | $P_{PPM}$       | Minimum 400 | Watts          |
| Peak pulse current of at 10/1000 $\mu$ s waveform (Note 1, Fig.3)   | $I_{PPM}$       | See Table   | Amps           |
| Steady state power dissipation at $T_A=50^{\circ}$ C (Fig.5)  | $P_{M(AV)}$     | 1.5         | Watts          |
| Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load, (JEDEC Method) (Note3, Fig.6) | $I_{FSM}$       | 40          | Amps           |
| Operating junction and Storage Temperature Range.   | $T_J, T_{STG}$  | -65 to +150 | $^{\circ}$ C   |
| Typical thermal resistance junction to lead   | $R_{\theta JL}$ | 60          | $^{\circ}$ C/W |
| Typical thermal resistance junction to ambient  | $R_{\theta JA}$ | 100         | $^{\circ}$ C/W |

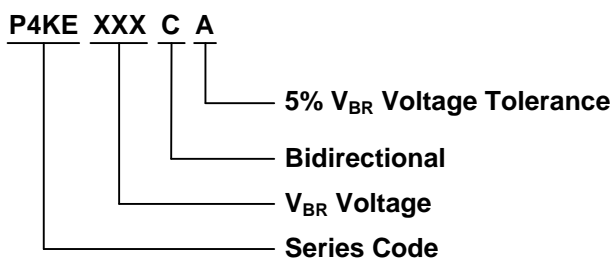
Notes: 1. Non-repetitive current pulse, per Fig.3 and derated above  $T_A=25^{\circ}$ C per Fig.2.

2. 8.3ms single half sine-wave, or equivalent square wave, duty cycle=4 pulses per minutes maximum.

**Dimensions (DO-204AL/DO-41)**

|   | Symbol | Millimeters |       | Inches |      |
|---|--------|-------------|-------|--------|------|
|   |        | Min.        | Max.  | Min.   | Max. |
| L | 25.40  | -           | 1.000 | -      |      |
| T | 4.10   | 5.20        | 0.160 | 0.205  |      |
| d | 2.00   | 2.70        | 0.080 | 0.107  |      |
| s | 0.71   | 0.86        | 0.028 | 0.034  |      |

**Part Number Code**



**Ordering Code for different package**

Box package: Add suffix “/B” at the end of the part number, such as P4KE10A/B

Reel package: Add suffix “/TR13” at the end of the part number, such as P4KE68CA/TR13

**Electrical Characteristics (T<sub>A</sub>=25°C)**

| Part Number    |               | Reverse Stand-Off Voltage | Breakdown Voltage @I <sub>T</sub> | Test Current        | Maximum Clamping Voltage @I <sub>PP</sub> | Peak Pulse Current  | Reverse Leakage @V <sub>RWM</sub> |
|----------------|---------------|---------------------------|-----------------------------------|---------------------|---|---------------------|-----------------------------------|
| Unidirectional | Bidirectional | V <sub>RWM</sub> (V)      | V <sub>BR</sub> (V)               | I <sub>T</sub> (mA) | V <sub>C</sub> (V)                        | I <sub>PP</sub> (A) | I <sub>R</sub> (µA)               |
| P4KE6.8A       | P4KE6.8CA     | 5.80                      | 6.45~7.14                         | 10                  | 10.5                                      | 39.0                | 1000                              |
| P4KE7.5A       | P4KE7.5CA     | 6.40                      | 7.13~7.88                         | 10                  | 11.3                                      | 36.3                | 500                               |
| P4KE8.2A       | P4KE8.2CA     | 7.02                      | 7.79~8.61                         | 10                  | 12.1                                      | 33.9                | 200                               |
| P4KE9.1A       | P4KE9.1CA     | 7.78                      | 8.65~9.55                         | 1                   | 13.4                                      | 30.6                | 50                                |
| P4KE10A        | P4KE10CA      | 8.55                      | 9.50~10.50                        | 1                   | 14.5                                      | 28.3                | 10                                |
| P4KE11A        | P4KE11CA      | 9.40                      | 10.50~11.60                       | 1                   | 15.6                                      | 26.3                | 5                                 |
| P4KE12A        | P4KE12CA      | 10.20                     | 11.40~12.60                       | 1                   | 16.7                                      | 24.6                | 5                                 |
| P4KE13A        | P4KE13CA      | 11.10                     | 12.40~13.70                       | 1                   | 18.2                                      | 22.5                | 1                                 |
| P4KE15A        | P4KE15CA      | 12.80                     | 14.30~15.80                       | 1                   | 21.2                                      | 19.3                | 1                                 |
| P4KE16A        | P4KE16CA      | 13.60                     | 15.20~16.80                       | 1                   | 22.5                                      | 18.2                | 1                                 |
| P4KE18A        | P4KE18CA      | 15.30                     | 17.10~18.90                       | 1                   | 25.2                                      | 16.1                | 1                                 |
| P4KE20A        | P4KE20CA      | 17.10                     | 19.00~21.00                       | 1                   | 27.7                                      | 14.8                | 1                                 |
| P4KE22A        | P4KE22CA      | 18.80                     | 20.90~23.10                       | 1                   | 30.6                                      | 13.4                | 1                                 |
| P4KE24A        | P4KE24CA      | 20.50                     | 22.80~25.20                       | 1                   | 33.2                                      | 12.3                | 1                                 |

## Transient Voltage Suppressors P4KE

| Part Number    |               | Reverse Stand-Off Voltage | Breakdown Voltage @ $I_T$ | Test Current | Maximum Clamping Voltage @ $I_{PP}$ | Peak Pulse Current | Reverse Leakage @ $V_{RWM}$ |
|----------------|---------------|---------------------------|---------------------------|--------------|-------------------------------------|--------------------|-----------------------------|
| Unidirectional | Bidirectional | $V_{RWM}(V)$              | $V_{BR}(V)$               | $I_T(mA)$    | $V_C(V)$                            | $I_{PP}(A)$        | $I_R(\mu A)$                |
| P4KE27A        | P4KE27CA      | 23.10                     | 25.70~28.40               | 1            | 37.5                                | 10.9               | 1                           |
| P4KE30A        | P4KE30CA      | 25.60                     | 28.50~31.50               | 1            | 41.4                                | 9.9                | 1                           |
| P4KE33A        | P4KE33CA      | 28.20                     | 31.40~34.70               | 1            | 45.7                                | 9.0                | 1                           |
| P4KE36A        | P4KE36CA      | 30.80                     | 34.20~37.80               | 1            | 49.9                                | 8.2                | 1                           |
| P4KE39A        | P4KE39CA      | 33.30                     | 37.10~41.00               | 1            | 53.9                                | 7.6                | 1                           |
| P4KE43A        | P4KE43CA      | 36.80                     | 40.90~45.20               | 1            | 59.3                                | 6.9                | 1                           |
| P4KE47A        | P4KE47CA      | 40.20                     | 44.70~49.40               | 1            | 64.8                                | 6.3                | 1                           |
| P4KE51A        | P4KE51CA      | 43.60                     | 48.50~53.60               | 1            | 70.1                                | 5.8                | 1                           |
| P4KE56A        | P4KE56CA      | 47.80                     | 53.20~58.80               | 1            | 77.0                                | 5.3                | 1                           |
| P4KE62A        | P4KE62CA      | 53.00                     | 58.90~65.10               | 1            | 85.0                                | 4.8                | 1                           |
| P4KE68A        | P4KE68CA      | 58.10                     | 64.60~71.40               | 1            | 92.0                                | 4.5                | 1                           |
| P4KE75A        | P4KE75CA      | 64.10                     | 71.30~78.80               | 1            | 103.0                               | 4.0                | 1                           |
| P4KE82A        | P4KE82CA      | 70.10                     | 77.90~86.10               | 1            | 113.0                               | 3.6                | 1                           |
| P4KE91A        | P4KE91CA      | 77.80                     | 86.50~95.50               | 1            | 125.0                               | 3.3                | 1                           |
| P4KE100A       | P4KE100CA     | 85.50                     | 95.00~105.00              | 1            | 137.0                               | 3.0                | 1                           |
| P4KE110A       | P4KE110CA     | 94.00                     | 105.00~116.00             | 1            | 152.0                               | 2.7                | 1                           |
| P4KE120A       | P4KE120CA     | 102.00                    | 114.00~126.00             | 1            | 165.0                               | 2.5                | 1                           |
| P4KE130A       | P4KE130CA     | 111.00                    | 124.00~137.00             | 1            | 179.0                               | 2.3                | 1                           |
| P4KE150A       | P4KE150CA     | 128.00                    | 143.00~158.00             | 1            | 207.0                               | 2.0                | 1                           |
| P4KE160A       | P4KE160CA     | 136.00                    | 152.00~168.00             | 1            | 219.0                               | 1.9                | 1                           |
| P4KE170A       | P4KE170CA     | 145.00                    | 162.00~179.00             | 1            | 234.0                               | 1.8                | 1                           |
| P4KE180A       | P4KE180CA     | 154.00                    | 171.00~189.00             | 1            | 246.0                               | 1.7                | 1                           |
| P4KE200A       | P4KE200CA     | 171.00                    | 190.00~210.00             | 1            | 274.0                               | 1.5                | 1                           |
| P4KE220A       | P4KE220CA     | 185.00                    | 209.00~231.00             | 1            | 328.0                               | 1.3                | 1                           |
| P4KE250A       | P4KE250CA     | 214.00                    | 237.00~263.00             | 1            | 344.0                               | 1.2                | 1                           |
| P4KE300A       | P4KE300CA     | 256.00                    | 285.00~315.00             | 1            | 414.0                               | 1.0                | 1                           |
| P4KE350A       | P4KE350CA     | 300.00                    | 332.00~368.00             | 1            | 482.0                               | 0.85               | 1                           |
| P4KE400A       | P4KE400CA     | 342.00                    | 380.00~420.00             | 1            | 548.0                               | 0.75               | 1                           |
| P4KE440A       | P4KE440CA     | 376.00                    | 418.00~462.00             | 1            | 602.0                               | 0.68               | 1                           |
| P4KE480A       | P4KE480CA     | 408.00                    | 456.00~504.00             | 1            | 658.0                               | 0.61               | 1                           |
| P4KE510A       | P4KE510CA     | 434.00                    | 485.00~535.00             | 1            | 698.0                               | 0.57               | 1                           |
| P4KE530A       | P4KE530CA     | 450.00                    | 503.50~556.50             | 1            | 725.0                               | 0.55               | 1                           |
| P4KE540A       | P4KE540CA     | 459.00                    | 513.00~567.00             | 1            | 740.0                               | 0.54               | 1                           |
| P4KE550A       | P4KE550CA     | 467.00                    | 522.50~577.50             | 1            | 760.0                               | 0.52               | 1                           |

Notes: For bidirectional type having  $V_{RWM}$  of 10V and less, the  $I_R$  limit is double.

Ratings and Characteristic Curves ( $T_A=25^\circ\text{C}$  unless otherwise noted)

Figure 1. Peak Pulse Power Rating Curve

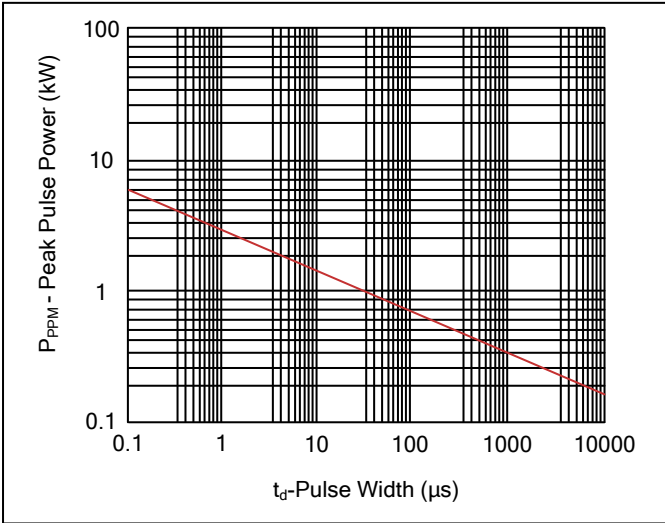


Figure 2. Pulse Derating Curve

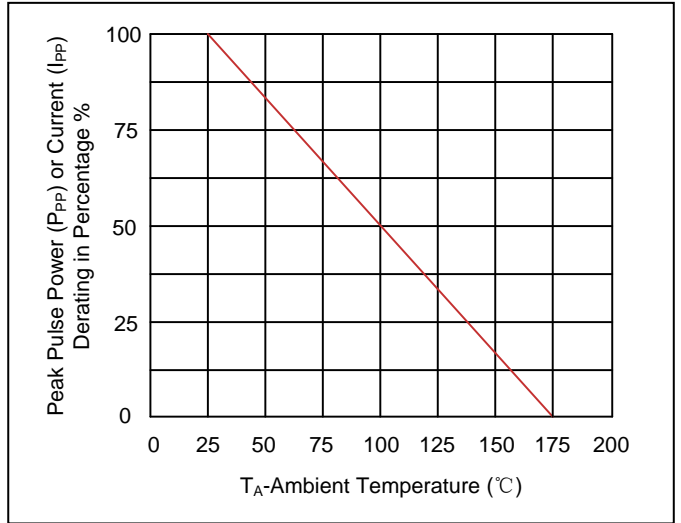


Figure 3. Pulse Waveform

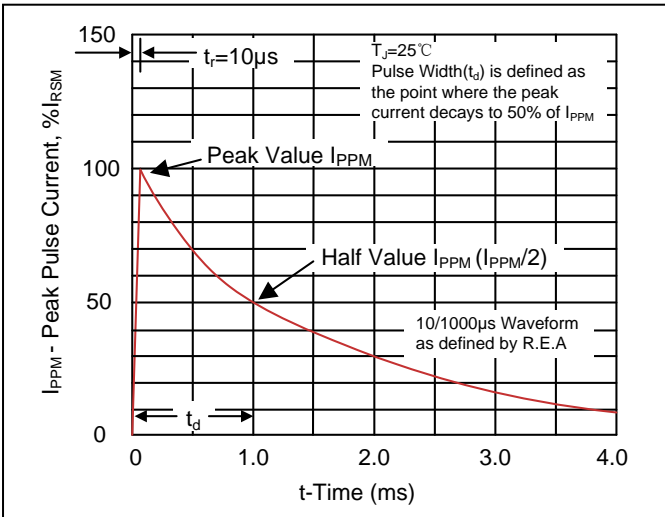


Figure 4. Typical Junction Capacitance

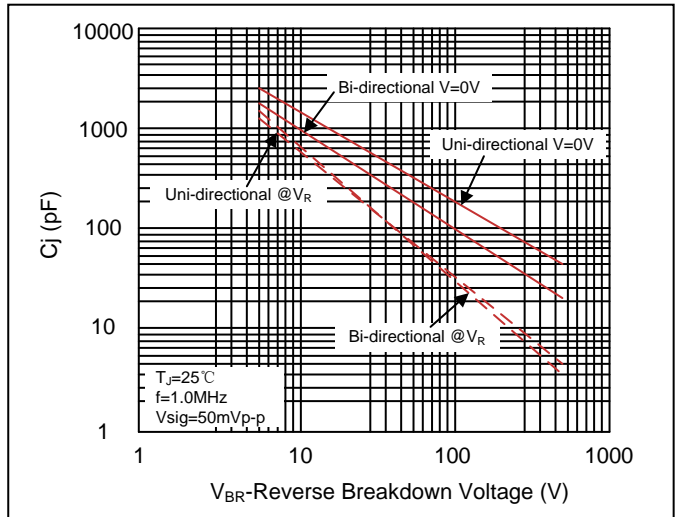


Figure 5. Steady State Power Dissipation Derating Curve

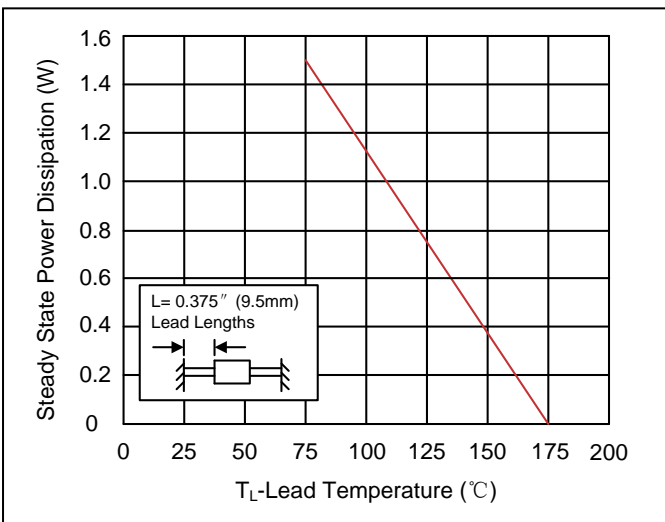
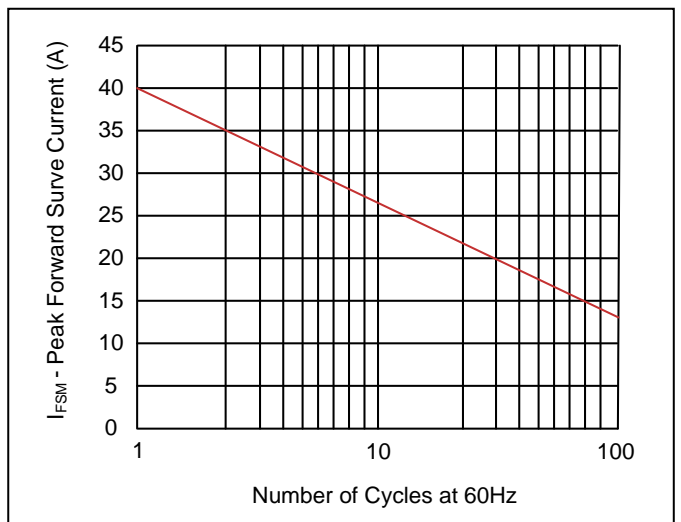
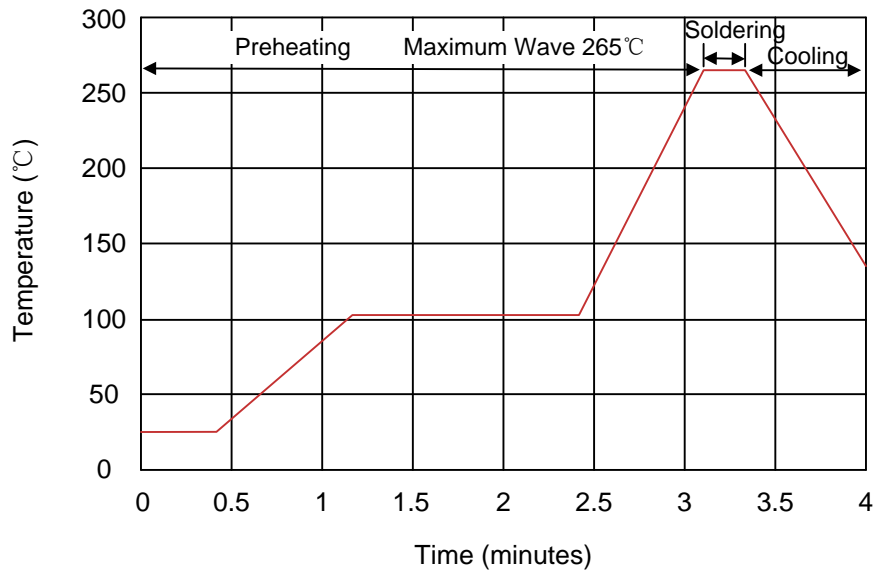


Figure 6. Maximum Non-Repetitive Forward Surge Current Uni-Directional Only



### Recommended Soldering Conditions

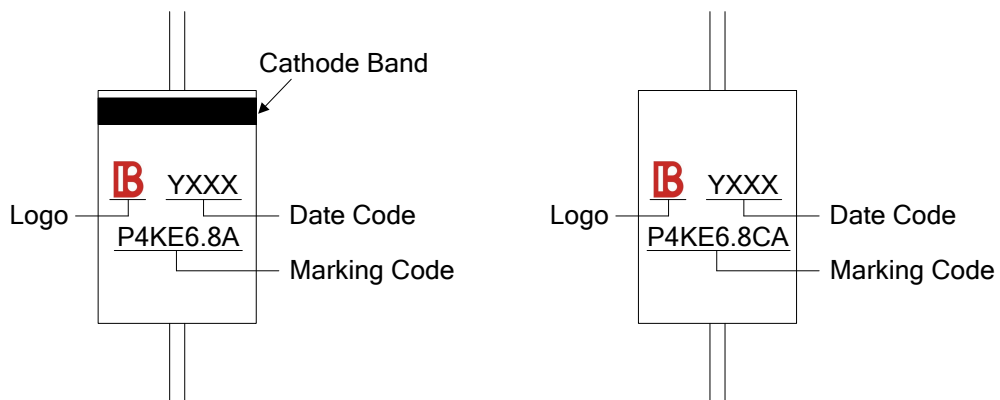
#### Wave Soldering



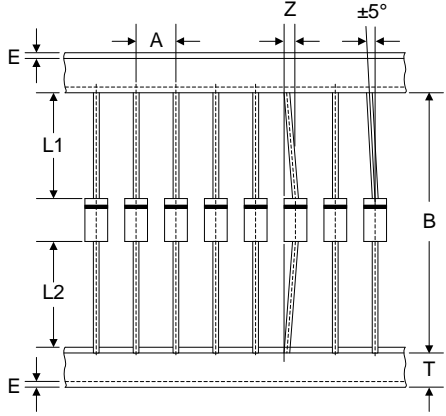
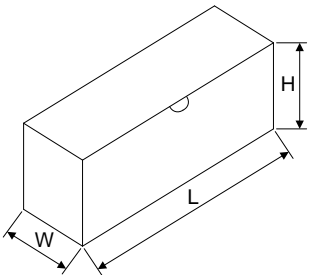
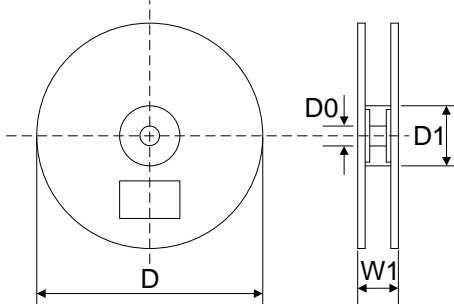
#### Recommended Conditions

| Item             | Conditions |
|------------------|------------|
| Peak Temperature | 265°C      |
| Dipping Time     | 10 seconds |
| Soldering        | 1 time     |

### Marking Code



**Packaging**

| Tape  | Symbol   | Dimension (mm) |
|---|--|----------------|
|    | A  | 5.0±0.5        |
|   | B  | 53.0±1.0       |
|   | Z  | 1.2Max.        |
|   | T  | 6.0±0.4        |
|   | E  | 0.8Max.        |
|   | L1-L2  | 1.0Max.        |
|   |  | L              |
| W   |  | 75.0±5.0       |
| H   |  | 114.0±5.0      |
| Quantity: 3000PCS   |  |                |
|  | D  | 330.0±3.0      |
|   | D0   | 16.4±2.0       |
|   | D1   | 86.0±2.0       |
|   | W1   | 76.0±3.0       |
|   | Quantity: 5000PCS  |                |



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- 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.);

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- Подбор аналогов;
- Консультации по применению компонента;
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- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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