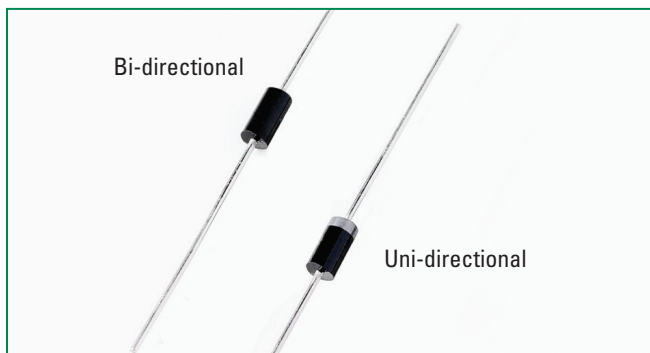


### TP6KE Series



#### Agency Approvals

| AGENCY                                                                            | AGENCY FILE NUMBER |
|-----------------------------------------------------------------------------------|--------------------|
|  | E230531            |

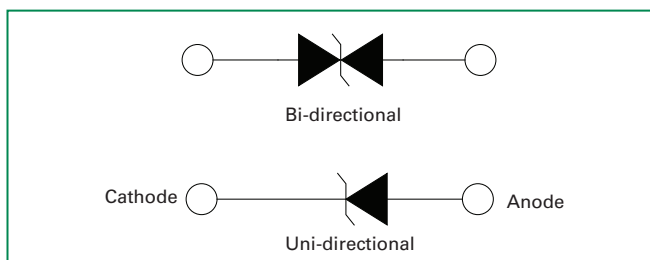
#### Maximum Ratings and Thermal Characteristics (T<sub>A</sub>=25°C unless otherwise noted)

| Parameter                                                                             | Symbol                            | Value      | Unit |
|---------------------------------------------------------------------------------------|-----------------------------------|------------|------|
| Peak Pulse Power Dissipation by 10/1000µs Test Waveform (Fig.2) (Note 1)              | P <sub>PPM</sub>                  | 600        | W    |
| Steady State Power Dissipation on Infinite Heat Sink at T <sub>L</sub> =75°C (Fig. 6) | P <sub>D</sub>                    | 5.0        | W    |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave Unidirectional Only (Note 2)  | I <sub>FSM</sub>                  | 100        | A    |
| Maximum Instantaneous Forward Voltage at 50A for Unidirectional Only                  | V <sub>F</sub>                    | 3.5        | V    |
| Operating Junction and Storage Temperature Range                                      | T <sub>J</sub> , T <sub>STG</sub> | -55 to 175 | °C   |
| Typical Thermal Resistance Junction to Lead                                           | R <sub>uJL</sub>                  | 20         | °C/W |
| Typical Thermal Resistance Junction to Ambient                                        | R <sub>uJA</sub>                  | 75         | °C/W |

#### Notes:

1. Non-repetitive current pulse, per Fig. 4 and derated above T<sub>J</sub> (initial) = 25°C per Fig. 3.
2. Measured on 8.3ms single half sine wave or equivalent square wave, duty cycle=4 per minute maximum.

#### Functional Diagram



#### Description

The AEC-Q101 qualified TP6KE Series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

#### Features

- Hi reliability application and automotive grade AEC-Q101 qualified
- Glass passivated chip junction in DO-15 Package
- 600W peak pulse capability at 10/1000µs waveform, repetition rate (duty cycles):0.01 %
- Fast response time: typically less than 1.0ps from 0 Volts to BV min
- Excellent clamping capability
- Typical failure mode is short from over-specified voltage or current
- Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- IEC-61000-4-2 ESD 30kV(Air), 30kV (Contact)
- ESD protection of data lines in accordance with IEC 61000-4-2 (IEC801-2)
- EFT protection of data lines in accordance with IEC 61000-4-4 (IEC801-4)
- Low incremental surge resistance
- High temperature to reflow soldering guaranteed: 260°C/40sec / 0.375"/(9.5mm) lead length, 5 lbs., (2.3kg) tension
- V<sub>BR</sub> @ T<sub>J</sub> = V<sub>BR</sub> @ 25°C x (1 + α T x (T<sub>J</sub> - 25)) (α T: Temperature Coefficient, typical value is 0.1 %)
- Plastic package has underwriters laboratory flammability classification 94V-0
- Lead-free matte tin plated package
- Halogen free and RoHS compliant

#### Applications

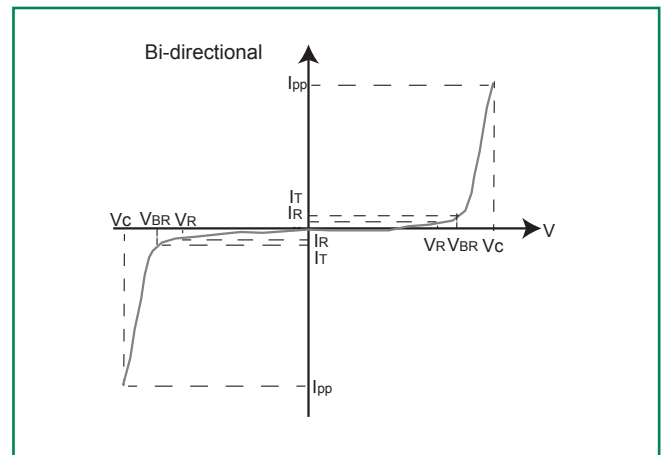
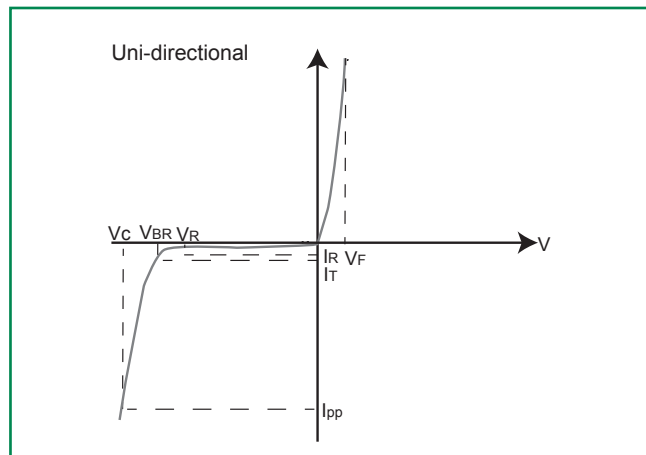
TVS devices are ideal for the protection of I/O interfaces, V<sub>CC</sub> bus and other vulnerable circuits used in telecom, computer, industrial and consumer electronic applications.

**Electrical Characteristics** ( $T_A=25^\circ\text{C}$  unless otherwise noted)

| Part Number (Uni) | Part Number (Bi) | Reverse Stand off Voltage $V_R$ (Volts) | Breakdown Voltage $V_{BR}$ (Volts) @ $I_T$ |       | Test Current $I_T$ (mA) | Maximum Clamping Voltage $V_C$ @ $I_{pp}$ (V) | Maximum Peak Pulse Current $I_{pp}$ (A) | Maximum Reverse Leakage $I_R$ @ $V_R$ ( $\mu\text{A}$ ) | Agency Approval  |
|-------------------|------------------|-----------------------------------------|--------------------------------------------|-------|-------------------------|-----------------------------------------------|-----------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
|                   |                  |                                         | MIN                                        | MAX   |                         |                                               |                                         |                                                         |                                                                                                     |
| TP6KE13A          | TP6KE13CA        | 11.10                                   | 12.40                                      | 13.70 | 1                       | 18.2                                          | 33.5                                    | 1                                                       | X                                                                                                   |
| TP6KE15A          | TP6KE15CA        | 12.80                                   | 14.30                                      | 15.80 | 1                       | 21.2                                          | 28.8                                    | 1                                                       | X                                                                                                   |
| TP6KE16A          | TP6KE16CA        | 13.60                                   | 15.20                                      | 16.80 | 1                       | 22.5                                          | 27.1                                    | 1                                                       | X                                                                                                   |
| TP6KE18A          | TP6KE18CA        | 15.30                                   | 17.10                                      | 18.90 | 1                       | 25.2                                          | 24.2                                    | 1                                                       | X                                                                                                   |
| TP6KE20A          | TP6KE20CA        | 17.10                                   | 19.00                                      | 21.00 | 1                       | 27.7                                          | 22.0                                    | 1                                                       | X                                                                                                   |
| TP6KE22A          | TP6KE22CA        | 18.80                                   | 20.90                                      | 23.10 | 1                       | 30.6                                          | 19.9                                    | 1                                                       | X                                                                                                   |
| TP6KE24A          | TP6KE24CA        | 20.50                                   | 22.80                                      | 25.20 | 1                       | 33.2                                          | 18.4                                    | 1                                                       | X                                                                                                   |
| TP6KE27A          | TP6KE27CA        | 23.10                                   | 25.70                                      | 28.40 | 1                       | 37.5                                          | 16.3                                    | 1                                                       | X                                                                                                   |
| TP6KE30A          | TP6KE30CA        | 25.60                                   | 28.50                                      | 31.50 | 1                       | 41.4                                          | 14.7                                    | 1                                                       | X                                                                                                   |
| TP6KE33A          | TP6KE33CA        | 28.20                                   | 31.40                                      | 34.70 | 1                       | 45.7                                          | 13.3                                    | 1                                                       | X                                                                                                   |
| TP6KE36A          | TP6KE36CA        | 30.80                                   | 34.20                                      | 37.80 | 1                       | 49.9                                          | 12.2                                    | 1                                                       | X                                                                                                   |
| TP6KE39A          | TP6KE39CA        | 33.30                                   | 37.10                                      | 41.00 | 1                       | 53.9                                          | 11.3                                    | 1                                                       | X                                                                                                   |
| TP6KE43A          | TP6KE43CA        | 36.80                                   | 40.90                                      | 45.20 | 1                       | 59.3                                          | 10.3                                    | 1                                                       | X                                                                                                   |
| TP6KE47A          | TP6KE47CA        | 40.20                                   | 44.70                                      | 49.40 | 1                       | 64.8                                          | 9.4                                     | 1                                                       | X                                                                                                   |
| TP6KE51A          | TP6KE51CA        | 43.60                                   | 48.50                                      | 53.60 | 1                       | 70.1                                          | 8.7                                     | 1                                                       | X                                                                                                   |
| TP6KE56A          | TP6KE56CA        | 47.80                                   | 53.20                                      | 58.80 | 1                       | 77.0                                          | 7.9                                     | 1                                                       | X                                                                                                   |
| TP6KE62A          | TP6KE62CA        | 53.00                                   | 58.90                                      | 65.10 | 1                       | 85.0                                          | 7.2                                     | 1                                                       | X                                                                                                   |
| TP6KE68A          | TP6KE68CA        | 58.10                                   | 64.60                                      | 71.40 | 1                       | 92.0                                          | 6.6                                     | 1                                                       | X                                                                                                   |
| TP6KE75A          | TP6KE75CA        | 64.10                                   | 71.30                                      | 78.80 | 1                       | 103.0                                         | 5.9                                     | 1                                                       | X                                                                                                   |
| TP6KE82A          | TP6KE82CA        | 70.10                                   | 77.90                                      | 86.10 | 1                       | 113.0                                         | 5.4                                     | 1                                                       | X                                                                                                   |
| TP6KE91A          | TP6KE91CA        | 77.80                                   | 86.50                                      | 95.50 | 1                       | 125.0                                         | 4.9                                     | 1                                                       | X                                                                                                   |

For parts without A, the  $V_{BR}$  is  $\pm 10\%$  and  $V_C$  is 5% higher than with A parts

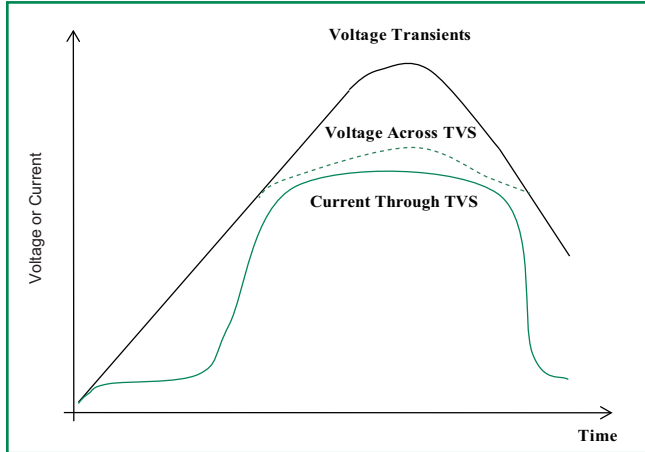
**I-V Curve Characteristics**



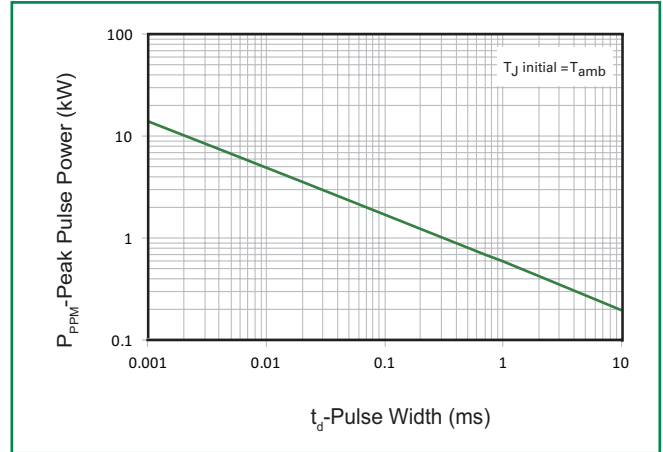
- $P_{PPM}$  Peak Pulse Power Dissipation** – Max power dissipation
- $V_R$  Stand-off Voltage** – Maximum voltage that can be applied to the TVS without operation
- $V_{BR}$  Breakdown Voltage** – Maximum voltage that flows through the TVS at a specified test current ( $I_T$ )
- $V_C$  Clamping Voltage** – Peak voltage measured across the TVS at a specified  $I_{ppm}$  (peak impulse current)
- $I_R$  Reverse Leakage Current** – Current measured at  $V_R$
- $V_F$  Forward Voltage Drop for Uni-directional**

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

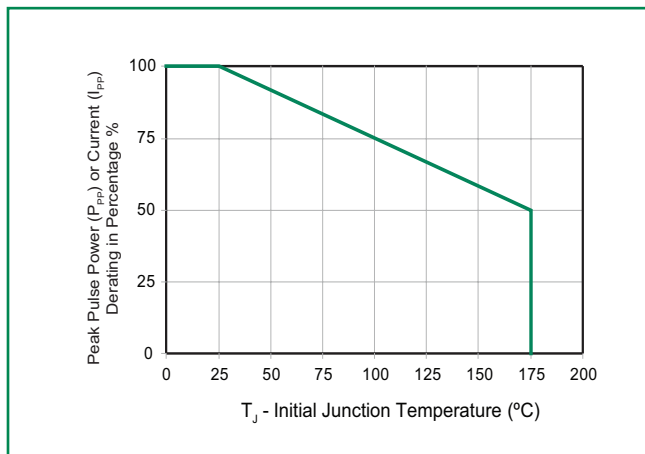
**Figure 1 - TVS Transients Clamping Waveform**



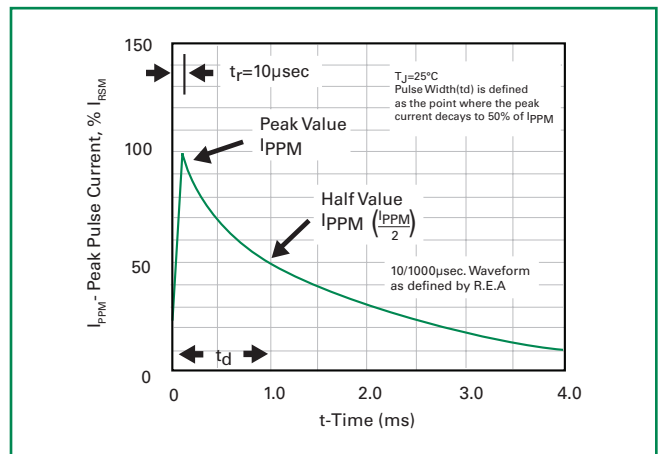
**Figure 2 - Peak Pulse Power Rating**



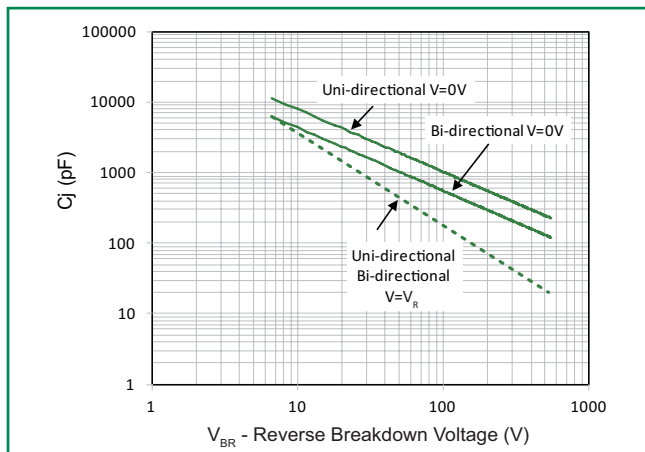
**Figure 3 - Peak Pulse Power Derating Curve**



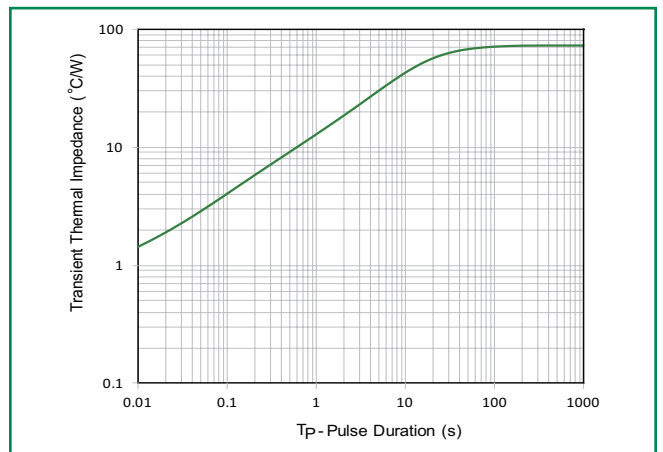
**Figure 4 - Pulse Waveform**



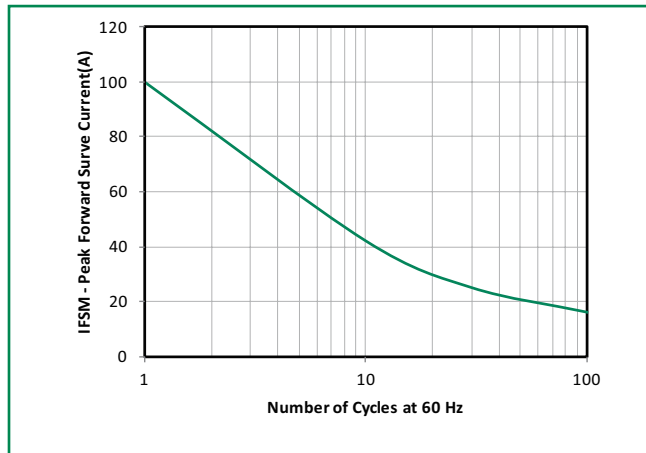
**Figure 5 - Typical Junction Capacitance**



**Figure 6 - Typical Transient Thermal Impedance**



**Figure 7 - Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only**



#### Flow/Wave Soldering (Solder Dipping)

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

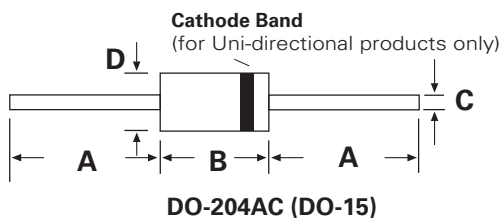
#### Physical Specificationst

|          |                                                                      |
|----------|----------------------------------------------------------------------|
| Weight   | 0.015oz., 0.4g                                                       |
| Case     | JEDEC DO-204AC (DO-15) molded plastic body over passivated junction. |
| Polarity | Color band denotes the cathode except Bipolar.                       |
| Terminal | Matte Tin axial leads, solderable per JESD22-B102.                   |

#### Environmental Specifications

|                     |             |
|---------------------|-------------|
| High Temp. Storage  | JESD22-A103 |
| HTRB                | JESD22-A108 |
| Temperature Cycling | JESD22-A104 |
| H3TRB               | JESD22-A101 |
| RSH                 | JESD22-B106 |

#### Dimensions



| Dimensions | Inches |       | Millimeters |      |
|------------|--------|-------|-------------|------|
|            | Min    | Max   | Min         | Max  |
| A          | 1.000  | -     | 25.40       | -    |
| B          | 0.230  | 0.300 | 5.80        | 7.60 |
| C          | 0.028  | 0.034 | 0.71        | 0.86 |
| D          | 0.104  | 0.140 | 2.60        | 3.60 |

### Part Numbering System

**TP6KE xxxXXX**

**OPTION CODE:**

**BLANK** Reel Tape  
**-B** Bulk Packaging

**TYPE CODE:**

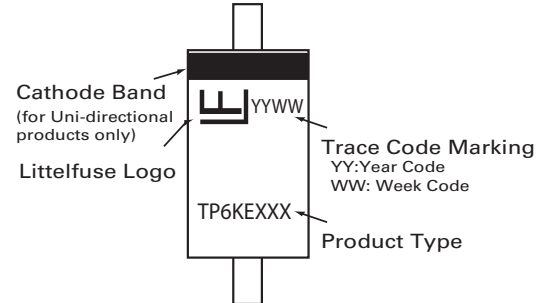
**A** Uni-Directional (5%  $V_{BR}$  Voltage Tolerance)  
**CA** Bi-Directional (5%  $V_{BR}$  Voltage Tolerance)

**V<sub>BR</sub> VOLTAGE CODE**

(Refer to the Electrical Characteristics table)

**SERIES CODE**

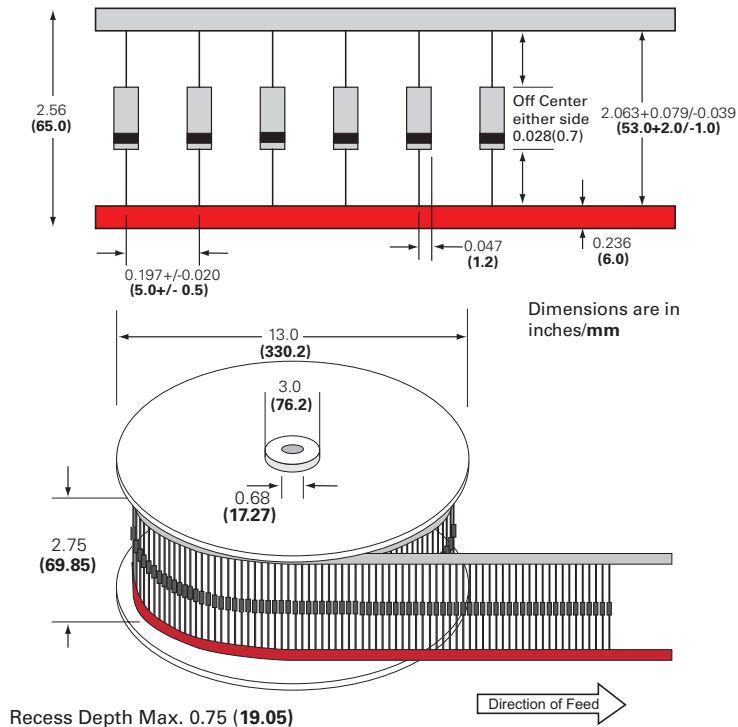
### Part Marking System



### Packaging

| Part Number  | Component Package | Quantity | Packaging Option | Packaging Specification |
|--------------|-------------------|----------|------------------|-------------------------|
| TP6KExxxXX   | DO-204AC          | 4000     | Tape & Reel      | EIA STD RS-296          |
| TP6KExxxXX-B | DO-204AC          | 1000     | BULK             | Littelfuse Spec.        |

### Tape and Reel Specification



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Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

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Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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