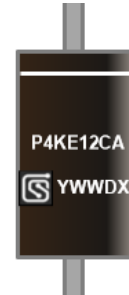


## Features

- 400W peak pulse power capability at 10/1000µs waveform, repetition rate (duty cycles):0.01%
- Excellent clamping capability
- Typical failure mode is a short circuit condition for current events exceeding component rating
- Plastic package is flammability rated V-0 per UL-94
- IEC61000-4-2 +/-30kV both contact and air
- IEC61000-4-4 50A(5/50nS)

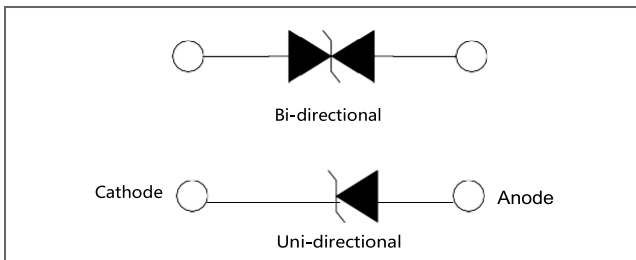
**RoHS**  
Compliant



## Applications

TVS components are ideal for the protection of I/O interfaces, VCC bus and other vulnerable circuits used in telecom, computer, industrial ICT equipment and consumer electronic applications.

## Function Diagram




| Maximum Ratings and Thermal Characteristics<br>(T <sub>A</sub> = 25°C unless otherwise noted)   |                  |            |      |
|---|------------------|------------|------|
| Parameter   | Symbol           | Value      | Unit |
| Peak Pulse Power Dissipation at T <sub>A</sub> =25°C by 10/1000µs Waveform (Fig.3)-- single die | P <sub>PPM</sub> | 400        | W    |
| Peak Pulse Power Dissipation at T <sub>A</sub> =25°C by 10/1000µs Waveform (Fig.3)-- stack die  | P <sub>PPM</sub> | 600        | W    |
| Power Dissipation on Infinite Heat Sink at T <sub>L</sub> =50°C                                 | P <sub>D</sub>   | 1.5        | W    |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 1)                                | I <sub>FSM</sub> | 60         | A    |
| Maximum Instantaneous Forward Voltage at 50A for Unidirectional Only(Note 2)                    | V <sub>F</sub>   | 3.5/5      | V    |
| Operating Temperature Range   | T <sub>J</sub>   | -55 to 150 | °C   |
| Storage Temperature Range   | T <sub>STG</sub> | -55 to 150 | °C   |

| AGENCY | AGENCY FILE NUMBER |
|--------|--------------------|
|        | Pending            |

### Notes:

1. Measured on 8.3ms single half sine wave or equivalent square wave for unidirectional device only, duty cycle=4 per minute maximum.
2. 3.5V for single die, 5V for stack die

**Characteristics (T = 25°C unless otherwise noted)**

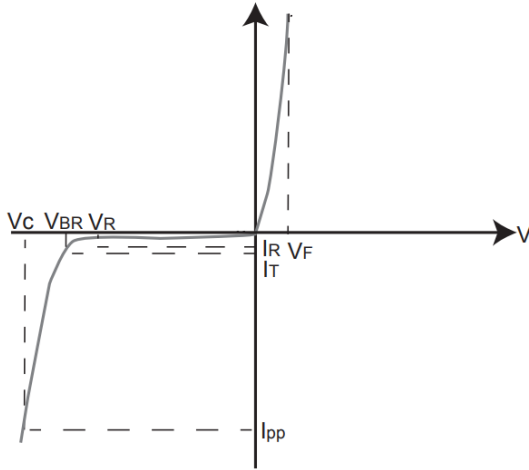
| Part Number<br>(Uni) | Part Number<br>(Bi) | Reverse<br>Stand off<br>Voltage V <sub>R</sub><br>(Volts) | Breakdown Voltage<br>V <sub>BR</sub> (Volts) @ I <sub>T</sub> |        | Test Current<br>I <sub>T</sub><br>(mA) | Maximum<br>Clamping<br>Voltage V <sub>C</sub><br>@ I <sub>nn</sub><br>(V) | Maximum<br>Peak<br>Pulse Current<br>I <sub>pp</sub> (A) | Maximum<br>Reverse Leakage<br>I <sub>R</sub> @ V <sub>R</sub><br>(μA) | Agency<br>Approval<br> |
|----------------------|---------------------|---|---|--------|--|---|---|---|---|
|                      |                     |   | MIN   | MAX    |  |   |   |   |   |
| P4KE6.8A             | P4KE6.8CA           | 5.80  | 6.45  | 7.14   | 10                                     | 10.5  | 39.00   | 1000  |   |
| P4KE7.5A             | P4KE7.5CA           | 6.40  | 7.13  | 7.88   | 10                                     | 11.3  | 36.30   | 500   |   |
| P4KE8.2A             | P4KE8.2CA           | 7.02  | 7.79  | 8.61   | 10                                     | 12.1  | 33.90   | 200   |   |
| P4KE9.1A             | P4KE9.1CA           | 7.78  | 8.65  | 9.55   | 1                                      | 13.4  | 30.60   | 50  |   |
| P4KE10A              | P4KE10CA            | 8.55  | 9.50  | 10.50  | 1                                      | 14.5  | 28.30   | 10  |   |
| P4KE11A              | P4KE11CA            | 9.40  | 10.50   | 11.60  | 1                                      | 15.6  | 26.30   | 5   |   |
| P4KE12A              | P4KE12CA            | 10.20   | 11.40   | 12.60  | 1                                      | 16.7  | 24.60   | 5   |   |
| P4KE13A              | P4KE13CA            | 11.10   | 12.40   | 13.70  | 1                                      | 18.2  | 22.50   | 1   |   |
| P4KE15A              | P4KE15CA            | 12.80   | 14.30   | 15.80  | 1                                      | 21.2  | 19.30   | 1   |   |
| P4KE16A              | P4KE16CA            | 13.60   | 15.20   | 16.80  | 1                                      | 22.5  | 18.20   | 1   |   |
| P4KE18A              | P4KE18CA            | 15.30   | 17.10   | 18.90  | 1                                      | 25.5  | 16.10   | 1   |   |
| P4KE20A              | P4KE20CA            | 17.10   | 19.00   | 21.00  | 1                                      | 27.7  | 14.80   | 1   |   |
| P4KE22A              | P4KE22CA            | 18.80   | 20.90   | 23.10  | 1                                      | 30.6  | 13.40   | 1   |   |
| P4KE24A              | P4KE24CA            | 20.50   | 22.80   | 25.20  | 1                                      | 33.2  | 12.30   | 1   |   |
| P4KE27A              | P4KE27CA            | 23.10   | 25.70   | 28.40  | 1                                      | 37.5  | 10.90   | 1   |   |
| P4KE30A              | P4KE30CA            | 25.60   | 28.50   | 31.50  | 1                                      | 41.4  | 9.90  | 1   |   |
| P4KE33A              | P4KE33CA            | 28.20   | 31.40   | 34.70  | 1                                      | 45.7  | 9.00  | 1   |   |
| P4KE36A              | P4KE36CA            | 30.80   | 34.20   | 37.80  | 1                                      | 49.9  | 8.20  | 1   |   |
| P4KE39A              | P4KE39CA            | 33.30   | 37.10   | 41.00  | 1                                      | 53.9  | 7.60  | 1   |   |
| P4KE43A              | P4KE43CA            | 36.80   | 40.90   | 45.20  | 1                                      | 59.3  | 6.90  | 1   |   |
| P4KE47A              | P4KE47CA            | 40.20   | 44.70   | 49.40  | 1                                      | 64.8  | 6.30  | 1   |   |
| P4KE51A              | P4KE51CA            | 43.60   | 48.50   | 53.60  | 1                                      | 70.1  | 5.80  | 1   |   |
| P4KE56A              | P4KE56CA            | 47.80   | 53.20   | 58.80  | 1                                      | 77.0  | 5.30  | 1   |   |
| P4KE62A              | P4KE62CA            | 53.00   | 58.90   | 65.10  | 1                                      | 85.0  | 4.80  | 1   |   |
| P4KE68A              | P4KE68CA            | 58.10   | 64.60   | 71.40  | 1                                      | 92.0  | 4.50  | 1   |   |
| P4KE75A              | P4KE75CA            | 64.10   | 71.30   | 78.80  | 1                                      | 103.0   | 4.00  | 1   |   |
| P4KE82A              | P4KE82CA            | 70.10   | 77.90   | 86.10  | 1                                      | 113.0   | 3.60  | 1   |   |
| P4KE91A              | P4KE91CA            | 77.80   | 86.50   | 95.50  | 1                                      | 125.0   | 3.30  | 1   |   |
| P4KE100A             | P4KE100CA           | 85.50   | 95.00   | 105.00 | 1                                      | 137.0   | 3.00  | 1   |   |
| P4KE110A             | -                   | 94.00   | 105.00  | 116.00 | 1                                      | 152.0   | 2.70  | 1   |   |
| -                    | P4KE110CA*          | 94.00   | 105.00  | 116.00 | 1                                      | 152.0   | 4.00  | 1   |   |
| P4KE120A             | -                   | 102.00  | 114.00  | 126.00 | 1                                      | 165.0   | 2.50  | 1   |   |
| -                    | P4KE120CA*          | 102.00  | 114.00  | 126.00 | 1                                      | 165.0   | 3.70  | 1   |   |
| P4KE130A             | -                   | 111.00  | 124.00  | 137.00 | 1                                      | 179.0   | 2.30  | 1   |   |
| -                    | P4KE130CA*          | 111.00  | 124.00  | 137.00 | 1                                      | 179.0   | 3.40  | 1   |   |
| P4KE150A             | -                   | 128.00  | 143.00  | 158.00 | 1                                      | 207.0   | 2.00  | 1   |   |
| -                    | P4KE150CA*          | 128.00  | 143.00  | 158.00 | 1                                      | 207.0   | 2.90  | 1   |   |
| P4KE160A             | -                   | 136.00  | 152.00  | 168.00 | 1                                      | 219.0   | 1.90  | 1   |   |
| -                    | P4KE160CA*          | 136.00  | 152.00  | 168.00 | 1                                      | 219.0   | 2.80  | 1   |   |
| P4KE170A             | -                   | 145.00  | 162.00  | 179.00 | 1                                      | 234.0   | 1.80  | 1   |   |
| -                    | P4KE170CA*          | 145.00  | 162.00  | 179.00 | 1                                      | 234.0   | 2.60  | 1   |   |
| P4KE180A             | -                   | 154.00  | 171.00  | 189.00 | 1                                      | 246.0   | 1.70  | 1   |   |
| -                    | P4KE180CA*          | 154.00  | 171.00  | 189.00 | 1                                      | 246.0   | 2.50  | 1   |   |
| P4KE200A             | -                   | 171.00  | 190.00  | 210.00 | 1                                      | 274.0   | 1.50  | 1   |   |
| -                    | P4KE200CA*          | 171.00  | 190.00  | 210.00 | 1                                      | 274.0   | 2.20  | 1   |   |
| P4KE220A             | -                   | 185.00  | 209.00  | 231.00 | 1                                      | 328.0   | 1.30  | 1   |   |
| -                    | P4KE220CA*          | 185.00  | 209.00  | 231.00 | 1                                      | 328.0   | 1.90  | 1   |   |
| P4KE250A             | -                   | 214.00  | 237.00  | 263.00 | 1                                      | 344.0   | 1.20  | 1   |   |
| -                    | P4KE250CA*          | 214.00  | 237.00  | 263.00 | 1                                      | 344.0   | 1.80  | 1   |   |
| P4KE300A             | -                   | 256.00  | 285.00  | 315.00 | 1                                      | 414.0   | 1.00  | 1   |   |
| -                    | P4KE300CA*          | 256.00  | 285.00  | 315.00 | 1                                      | 414.0   | 1.50  | 1   |   |
| P4KE350A*            | P4KE350CA*          | 300.00  | 332.00  | 368.00 | 1                                      | 482.0   | 1.30  | 1   |   |
| P4KE400A*            | P4KE400CA*          | 342.00  | 380.00  | 420.00 | 1                                      | 548.0   | 1.10  | 1   |   |
| P4KE440A*            | P4KE440CA*          | 376.00  | 418.00  | 462.00 | 1                                      | 602.0   | 1.00  | 1   |   |

| 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 $I_R$ @ $V_R$ ( $\mu$ A) | Agency Approval |
|-------------------|------------------|---|--|--------|-------------------------|---|---|--|-----------------|
|                   |                  |   | MIN  | MAX    |                         |   |   |  |                 |
| P4KE480A*         | P4KE480CA*       | 408.00                                  | 456.00                                     | 504.00 | 1                       | 658.0   | 0.92                                    | 1  |                 |
| P4KE510A*         | P4KE510CA*       | 434.00                                  | 485.00                                     | 535.00 | 1                       | 698.0   | 0.86                                    | 1  |                 |
| P4KE530A*         | P4KE530CA*       | 451.00                                  | 503.50                                     | 556.50 | 1                       | 725.0   | 0.83                                    | 1  |                 |
| P4KE540A*         | P4KE540CA*       | 460.00                                  | 513.00                                     | 567.00 | 1                       | 740.0   | 0.82                                    | 1  |                 |
| P4KE550A*         | P4KE550CA*       | 468.00                                  | 522.50                                     | 577.50 | 1                       | 760.0   | 0.79                                    | 1  |                 |

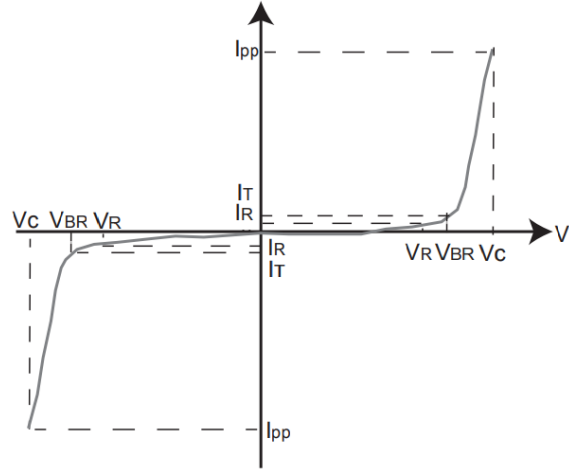
For stacked-die parts, use \* to label the part number.

### I-V Curve Characteristics

Uni-directional

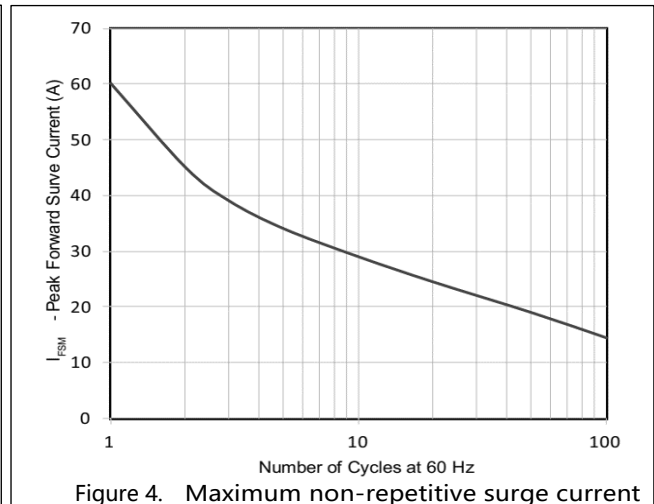
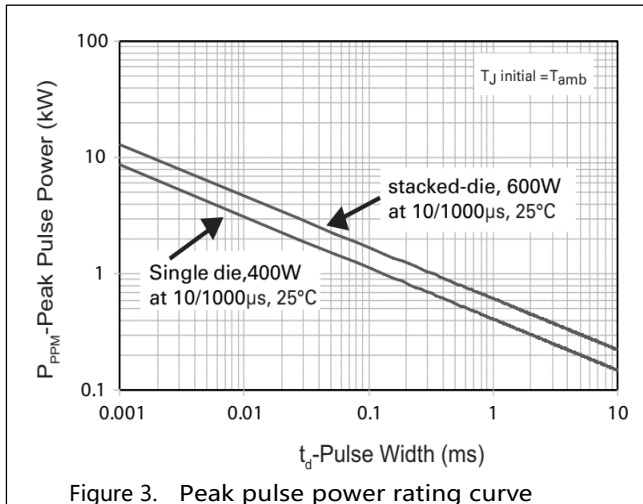
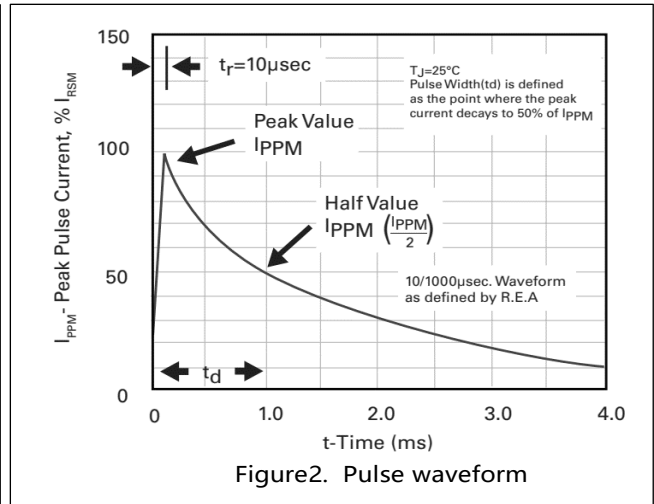
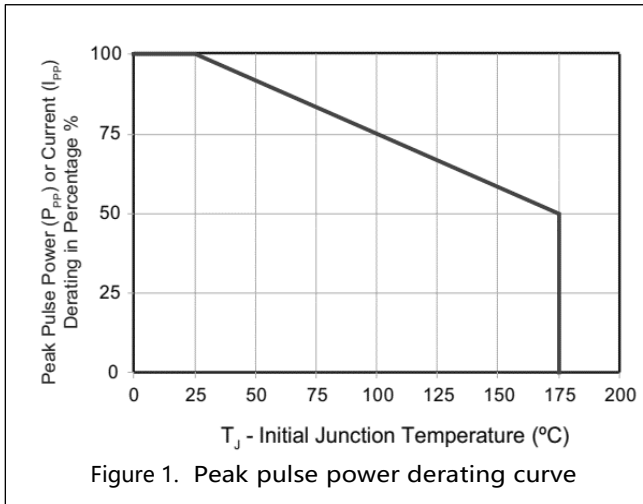


Bi-directional



- $P_{PPM}$  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

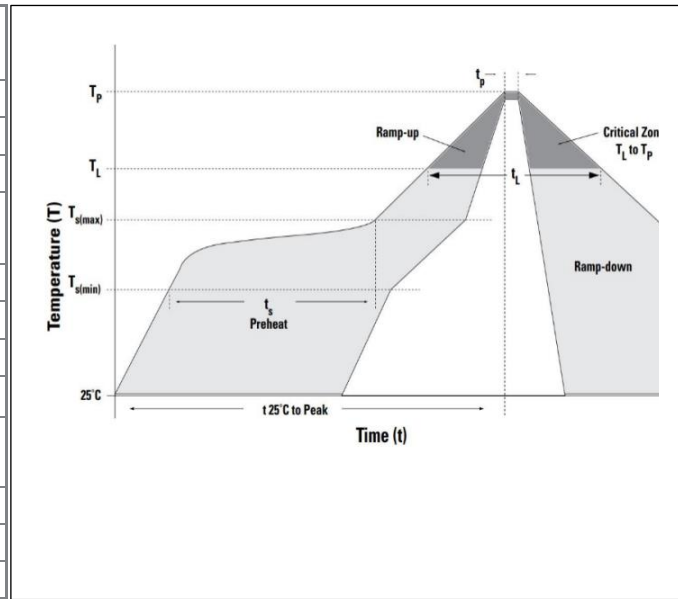
**Ratings and Characteristic Curves (T = 25°C unless otherwise noted)**



Soldering Parameters

Soldering profile

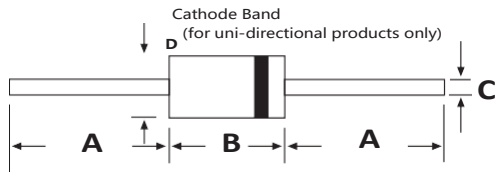
|  |                                    |                    |
|--|------------------------------------|--------------------|
| Reflow Condition                                       |                                    | Lead-free assembly |
| Pre Heat   | - Temperature Min ( $T_{S(min)}$ ) | 150°C              |
|  | - Temperature Max ( $T_{S(max)}$ ) | 200°C              |
|  | - Time (min to max) ( $t_S$ )      | 60 – 120 secs      |
| Average ramp up rate (Liquidus Temp ( $T_A$ ) to peak) |                                    | 3°C/second max     |
| $T_{S(max)}$ to $T_A$ - Ramp-up Rate                   |                                    | 3°C/second max     |
| Reflow   | - Temperature ( $T_A$ ) (Liquidus) | 217°C              |
|  | - Time (min to max) ( $t_S$ )      | 60 – 150 seconds   |
| Peak Temperature ( $T_P$ )                             |                                    | 260+0/-5 °C        |
| Time within 5°C of actual peak Temperature ( $t_P$ )   |                                    | 20 – 40 seconds    |
| Ramp-down Rate   |                                    | 6°C/second max     |
| Time 25°C to peak Temperature ( $T_P$ )                |                                    | 8 minutes Max.     |
| Do not exceed  |                                    | 260°C              |



Flow/Wave Soldering (Solder Dipping)

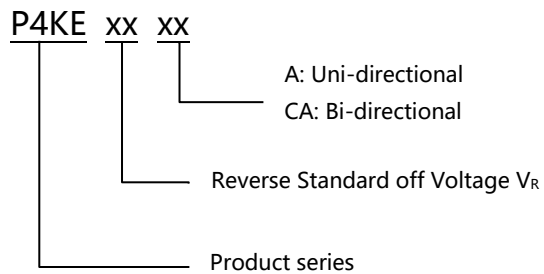
|                   |           |
|-------------------|-----------|
| Peak Temperature: | 260°C     |
| Dipping Time:     | 5 seconds |
| Soldering:        | 1 time    |

## Dimensions

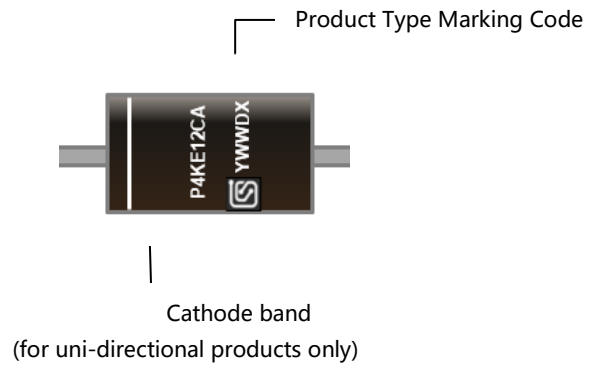


| Dimensions | Inches |       | Millimeters |      |
|------------|--------|-------|-------------|------|
|            | Min    | Max   | Min         | Max  |
| <b>A</b>   | 1.000  | -     | 25.40       | -    |
| <b>B</b>   | 0.230  | 0.300 | 5.80        | 7.60 |
| <b>C</b>   | 0.028  | 0.034 | 0.71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

## Part Numbering



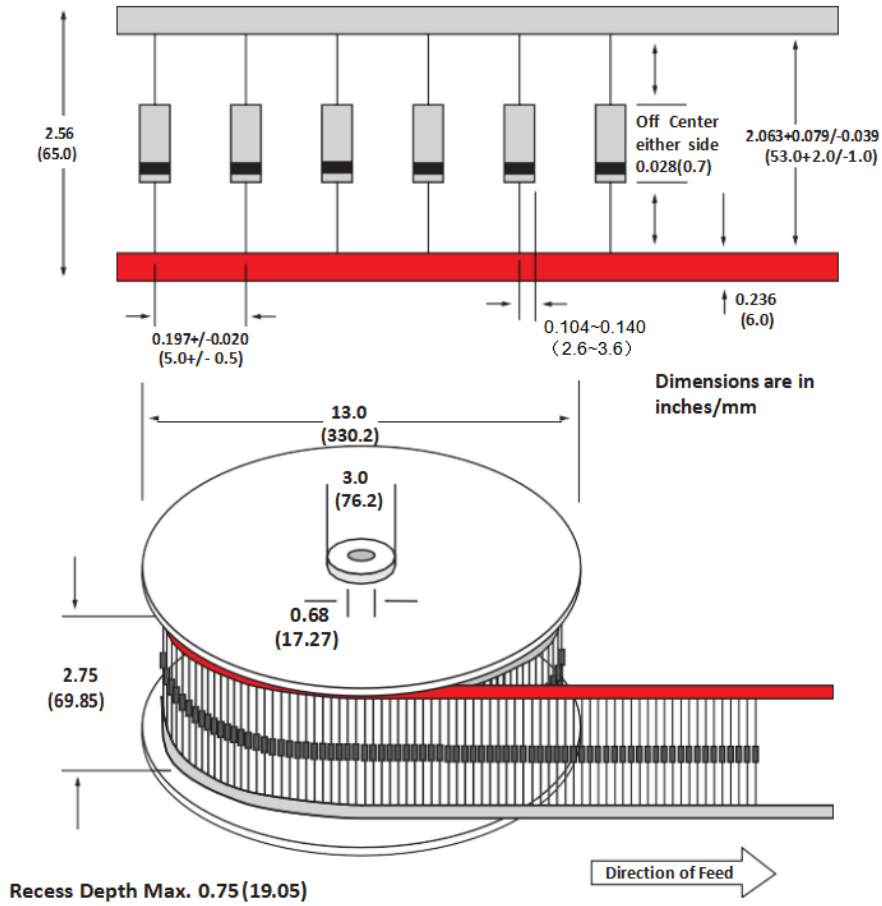
## Part Marking



## Packing

| Part number | Package name | Small packing quantity | Packing method |
|-------------|--------------|------------------------|----------------|
| P4KEXXXX    | DO-41        | 5000                   | Tape & Reel    |

Tape and Reel Specification



Revision history of Specification

| Version | Change Items                 | Effective Date |
|---------|------------------------------|----------------|
| 1.0     | Initial Release              | 14-July-2021   |
| 1.1     | Change marking logo location | 27-May-2021    |

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[P6KE13CA](#) [P6KE43CA](#) [P6KE6.8CA](#) [P6KE8.2](#) [P6SMBJ20CA](#) [JANTX1N6072A](#) [SR2835ESKG](#) [SA90CA](#)