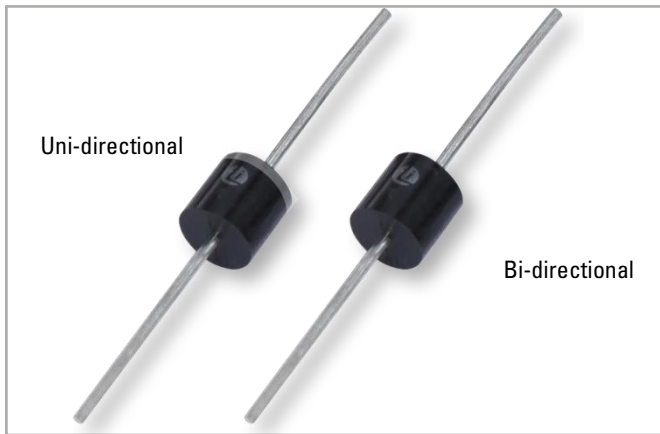


5KP Series

Axial Leaded – 5000W



Additional Information



Resources



Accessories



Samples

Maximum Ratings and Thermal Characteristics

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

| Parameter | Symbol | Value | Unit |
|---|-----------------|------------|---------------------------|
| Peak Pulse Power Dissipation by 10/1000 μs Waveform(Fig.1) (Note 1)-Single Die Parts | P_{PPM} | 5000 | W |
| Power Dissipation on Infinite Heat Sink at $T_L=75^\circ\text{C}$ | P_D | 8 | W |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 2) | I_{FSM} | 400 | A |
| Maximum Instantaneous Forward Voltage at 100A for Unidirectional Only (Note 3) | V_F | 3.5/5.0 | V |
| Operating Temperature Range | T_J | -55 to 150 | $^\circ\text{C}$ |
| Storage Temperature Range | T_{STG} | -55 to 150 | $^\circ\text{C}$ |
| Typical Thermal Resistance Junction to Lead | $R_{\theta JL}$ | 8 | $^\circ\text{C}/\text{W}$ |
| Typical Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 40 | $^\circ\text{C}/\text{W}$ |

Notes:

1. Non-repetitive current pulse, per Fig.3 and derated above T_J (initial) $=25^\circ\text{C}$ per Fig.2.
2. Measured on 8.3ms single half sine wave or equivalent square wave, duty cycle=4 per minute maximum.
3. $V_F < 3.5\text{V}$ for single die parts and $V_F < 5.0\text{V}$ for stacked-die parts.

Description

The 5KP series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

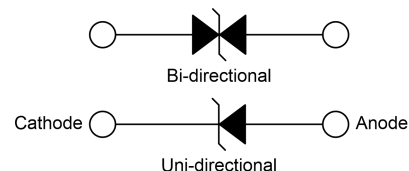
Features

- 5000W peak pulse power capability at 10/1000 μs waveform, repetition rate (duty cycles):0.01%
- Glass passivated chip junction in P600 package
- Fast response time:typically less than 1.0ps from 0 Volts to V_B min
- Excellent clamping capability
- Typical failure mode is a short circuit
- Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- ESD protection of data lines in accordance with IEC 61000-4-2, 30kV(Air), 30kV (Contact)
- EFT protection of data lines in accordance with IEC 61000-4-4
- Low incremental surge resistance
- Typical I_R less than 2 μA when V_B min>12V
- High temperature to reflow soldering guaranteed: 260 $^\circ\text{C}$ /20~40sec./ 0.375"(9.5mm) lead length, 5 lbs., (2.3kg) tension
- $V_B @ T_J = V_B @ 25^\circ\text{C} \times (1 + \alpha T \times (T_J - 25))$ (α T:Temperature Coefficient, typical value is 0.1%)
- UL Recognized compound meeting flammability rating V-0
- Matte tin lead-free plated
- Halogen free and RoHS compliant
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin(Sn) (IPC/JEDEC J-STD 609A.01)

Applications

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

Functional Diagram



5KP Series

Axial Leaded – 5000W

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

| Part Number | | Reverse Stand-Off Voltage | Breakdown Voltage @ I_T | | Test Current | Maximum Clamping Voltage @ I_{PP} | Peak Pulse Current | Reverse Leakage @ V_R |
|-------------|----------|---------------------------|---------------------------|-----------------|--------------|-------------------------------------|--------------------|-------------------------|
| Uni. | Bi. | $V_R(V)$ | $V_{B Min.}(V)$ | $V_{B Max.}(V)$ | $I_T(mA)$ | $V_C(V)$ | $I_{PP}(A)$ | $I_R(\mu A)$ |
| 5KP5.0A | 5KP5.0CA | 5.0 | 6.40 | 7.00 | 50 | 9.2 | 554.3 | 5000 |
| 5KP6.0A | 5KP6.0CA | 6.0 | 6.67 | 7.37 | 50 | 10.3 | 495.1 | 5000 |
| 5KP6.5A | 5KP6.5CA | 6.5 | 7.22 | 7.98 | 50 | 11.2 | 455.4 | 2000 |
| 5KP7.0A | 5KP7.0CA | 7.0 | 7.78 | 8.60 | 50 | 12.0 | 425.0 | 1000 |
| 5KP7.5A | 5KP7.5CA | 7.5 | 8.33 | 9.21 | 5 | 12.9 | 395.3 | 250 |
| 5KP8.0A | 5KP8.0CA | 8.0 | 8.89 | 9.83 | 5 | 13.6 | 375.0 | 150 |
| 5KP8.5A | 5KP8.5CA | 8.5 | 9.44 | 10.40 | 5 | 14.4 | 354.2 | 50 |
| 5KP9.0A | 5KP9.0CA | 9.0 | 10.00 | 11.10 | 5 | 15.4 | 331.2 | 20 |
| 5KP10A | 5KP10CA | 10.0 | 11.10 | 12.30 | 5 | 17.0 | 300.0 | 15 |
| 5KP11A | 5KP11CA | 11.0 | 12.20 | 13.50 | 5 | 18.2 | 280.2 | 2 |
| 5KP12A | 5KP12CA | 12.0 | 13.30 | 14.70 | 5 | 19.9 | 256.3 | 2 |
| 5KP13A | 5KP13CA | 13.0 | 14.40 | 15.90 | 5 | 21.5 | 237.2 | 2 |
| 5KP14A | 5KP14CA | 14.0 | 15.60 | 17.20 | 5 | 23.2 | 219.8 | 2 |
| 5KP15A | 5KP15CA | 15.0 | 16.70 | 18.50 | 5 | 24.4 | 209.0 | 2 |
| 5KP16A | 5KP16CA | 16.0 | 17.80 | 19.70 | 5 | 26.0 | 196.2 | 2 |
| 5KP17A | 5KP17CA | 17.0 | 18.90 | 20.90 | 5 | 27.6 | 184.8 | 2 |
| 5KP18A | 5KP18CA | 18.0 | 20.00 | 22.10 | 5 | 29.2 | 174.7 | 2 |
| 5KP20A | 5KP20CA | 20.0 | 22.20 | 24.50 | 5 | 32.4 | 157.4 | 2 |
| 5KP22A | 5KP22CA | 22.0 | 24.40 | 26.90 | 5 | 35.5 | 143.7 | 2 |
| 5KP24A | 5KP24CA | 24.0 | 26.70 | 29.50 | 5 | 38.9 | 131.1 | 2 |
| 5KP26A | 5KP26CA | 26.0 | 28.90 | 31.90 | 5 | 42.1 | 121.1 | 2 |
| 5KP28A | 5KP28CA | 28.0 | 31.10 | 34.40 | 5 | 45.4 | 112.3 | 2 |
| 5KP30A | 5KP30CA | 30.0 | 33.30 | 36.80 | 5 | 48.4 | 105.4 | 2 |
| 5KP33A | 5KP33CA | 33.0 | 36.70 | 40.60 | 5 | 53.3 | 95.7 | 2 |
| 5KP36A | 5KP36CA | 36.0 | 40.00 | 44.20 | 5 | 58.1 | 87.8 | 2 |
| 5KP40A | 5KP40CA | 40.0 | 44.40 | 49.10 | 5 | 64.5 | 79.1 | 2 |
| 5KP43A | 5KP43CA | 43.0 | 47.80 | 52.80 | 5 | 69.4 | 73.5 | 2 |
| 5KP45A | 5KP45CA | 45.0 | 50.00 | 55.30 | 5 | 72.7 | 70.2 | 2 |
| 5KP48A | 5KP48CA | 48.0 | 53.30 | 58.90 | 5 | 77.4 | 65.9 | 2 |
| 5KP51A | 5KP51CA | 51.0 | 56.70 | 62.70 | 5 | 82.4 | 61.9 | 2 |
| 5KP54A | 5KP54CA | 54.0 | 60.00 | 66.30 | 5 | 87.1 | 58.6 | 2 |
| 5KP58A | 5KP58CA | 58.0 | 64.40 | 71.20 | 5 | 93.6 | 54.5 | 2 |
| 5KP60A | 5KP60CA | 60.0 | 66.70 | 73.70 | 5 | 96.8 | 52.7 | 2 |
| 5KP64A | 5KP64CA | 64.0 | 71.10 | 78.60 | 5 | 103.0 | 49.5 | 2 |
| 5KP70A | 5KP70CA | 70.0 | 77.80 | 86.00 | 5 | 113.0 | 45.1 | 2 |
| 5KP75A | 5KP75CA | 75.0 | 83.30 | 92.10 | 5 | 121.0 | 42.1 | 2 |
| 5KP78A | 5KP78CA | 78.0 | 86.70 | 95.80 | 5 | 126.0 | 40.5 | 2 |
| 5KP85A | 5KP85CA | 85.0 | 94.40 | 104.00 | 5 | 137.0 | 37.2 | 2 |
| 5KP90A | 5KP90CA | 90.0 | 100.00 | 111.00 | 5 | 146.0 | 34.9 | 2 |
| 5KP100A | 5KP100CA | 100.0 | 110.00 | 123.00 | 5 | 162.0 | 31.5 | 2 |
| 5KP110A | 5KP110CA | 110.0 | 122.00 | 135.00 | 5 | 177.0 | 28.8 | 2 |
| 5KP120A | 5KP120CA | 120.0 | 133.00 | 147.00 | 5 | 193.0 | 26.4 | 2 |
| 5KP130A | 5KP130CA | 130.0 | 144.00 | 159.00 | 5 | 209.0 | 24.4 | 2 |
| 5KP150A | 5KP150CA | 150.0 | 167.00 | 185.00 | 5 | 243.0 | 21.0 | 2 |
| 5KP160A | 5KP160CA | 160.0 | 178.00 | 197.00 | 5 | 259.0 | 19.7 | 2 |
| 5KP170A | 5KP170CA | 170.0 | 189.00 | 209.00 | 5 | 275.0 | 18.5 | 2 |
| 5KP180A | 5KP180CA | 180.0 | 201.00 | 222.00 | 5 | 292.0 | 17.5 | 2 |
| 5KP190A | 5KP190CA | 190.0 | 211.00 | 233.00 | 5 | 310.0 | 16.5 | 2 |
| 5KP200A | 5KP200CA | 200.0 | 224.00 | 247.00 | 5 | 329.2 | 15.5 | 2 |
| 5KP210A | 5KP210CA | 210.0 | 237.00 | 263.00 | 5 | 349.5 | 14.6 | 2 |
| 5KP220A | 5KP220CA | 220.0 | 246.00 | 272.00 | 5 | 371.1 | 13.7 | 2 |

Notes:

For bidirectional type having V_R of 10 volts and less, the I_R limit is double.

5KP Series

Axial Leaded – 5000W

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

Figure 1:
Peak Pulse Power Rating Curve

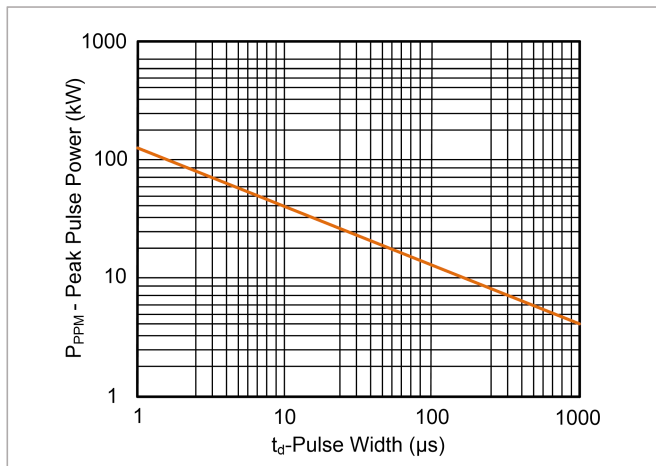


Figure 2:
Pulse Derating Curve

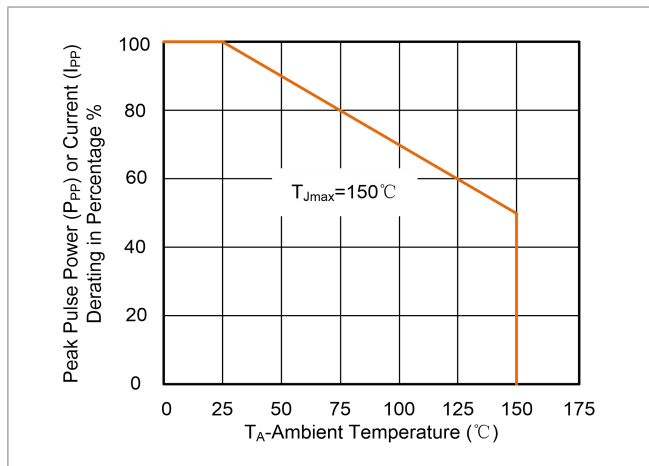


Figure 3:
Pulse Waveform

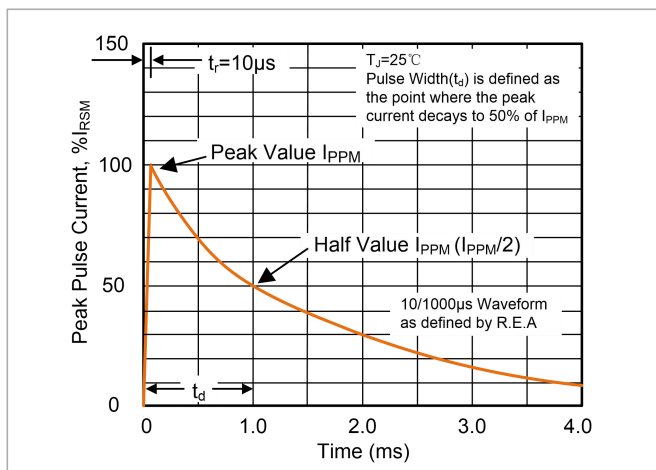


Figure 4:
Typical Junction Capacitance

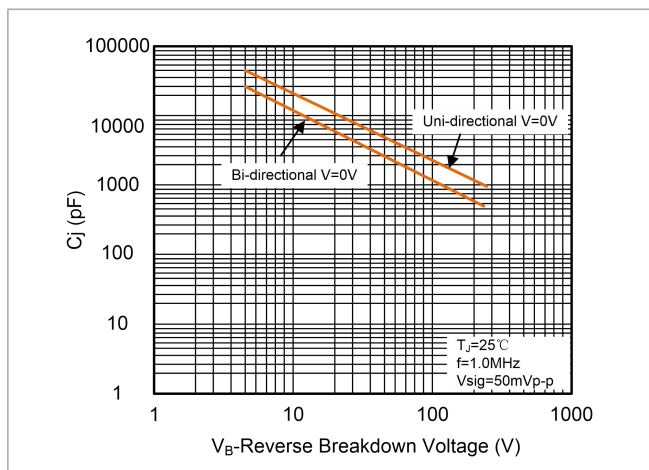


Figure 5:
Steady State Power Dissipation Derating Curve

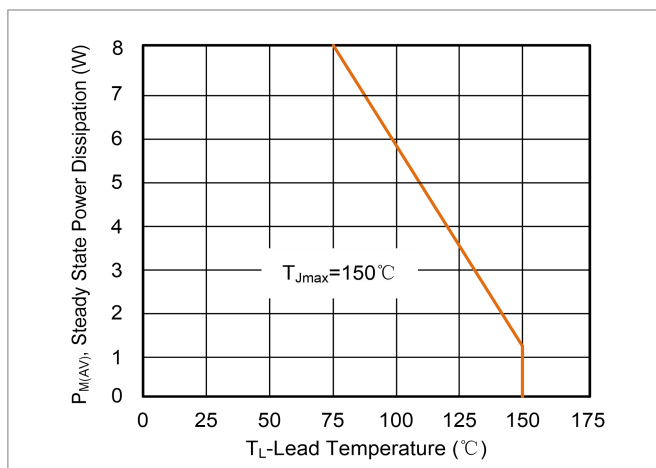
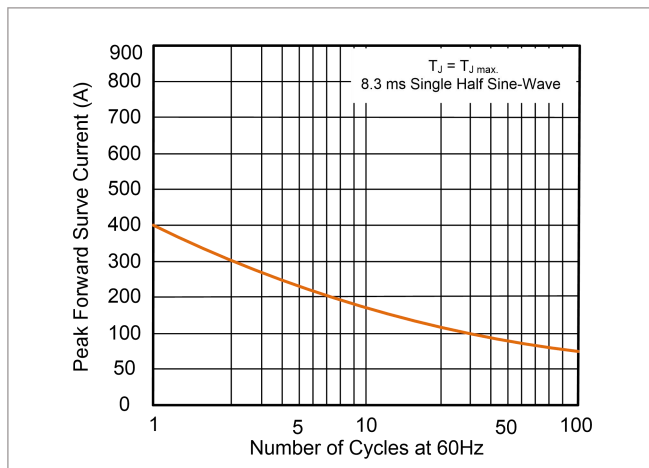


Figure 6:
Maximum Non-Repetitive Forward Surge Current Uni-Directional

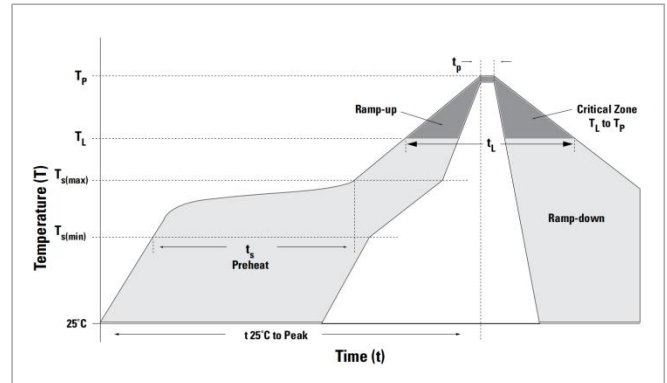


5KP Series

Axial Leaded – 5000W

Soldering Parameters

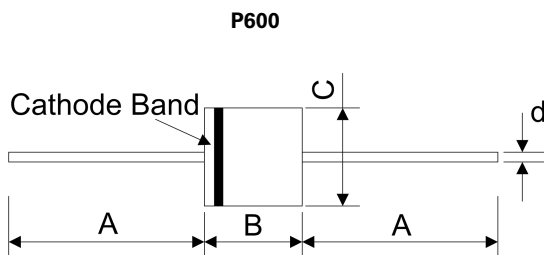
| | | |
|---|-----------------------------------|--------------------|
| Reflow Condition | | Lead-free assembly |
| Pre Heat | -Temperature Min ($T_{S\ min}$) | 150°C |
| | -Temperature Max ($T_{S\ max}$) | 200°C |
| | -Time (min to max) (t_s) | 60 – 180 secs |
| Average ramp-up rate(Liquidus Temp (T_L) to peak) | | 3°C/second max. |
| $T_{S\ (max)}$ to T_L-Ramp-up Rate | | 3°C/second max. |
| Reflow | -Temperature (T_L) (Liquidus) | 217°C |
| | -Time (min to max) (t_L) | 60-150 seconds |
| Peak Temperature (T_P) | | 260°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 | | 8 minutes max. |
| Do not exceed | | 260°C |



Flow/Wave Soldering (Solder Dipping)

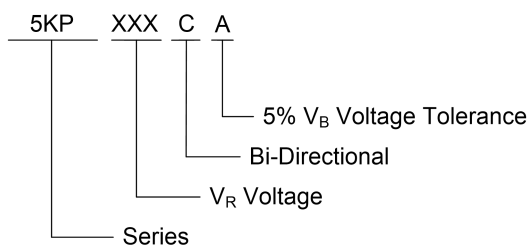
| | |
|---------------------------|-------------------|
| Peak Temperature : | 265°C |
| Dipping Time : | 10 seconds (max.) |
| Soldering : | 1 time |

Dimensions

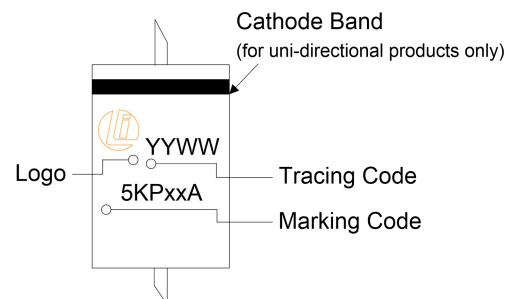


| Symbol | Millimeters | | Inches | |
|----------|-------------|------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 25.40 | - | 1.000 | - |
| B | 8.60 | 9.10 | 0.340 | 0.360 |
| C | 8.60 | 9.10 | 0.340 | 0.360 |
| d | 1.19 | 1.35 | 0.047 | 0.053 |

Part Numbering System



Part Marking System



5KP Series

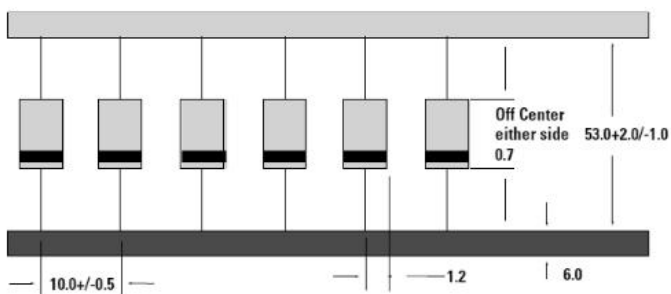
Axial Leaded – 5000W

Packaging

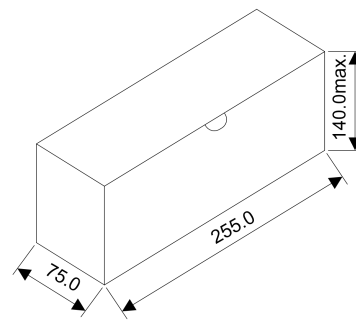
| Part number | Component Package | Quantity | Packaging Option | Packaging Specification |
|-----------------|-------------------|----------|------------------|-------------------------|
| 5KPxxxXX/L/BOX | P600 | 300 | Tape & Box | EIA STD RS-296 |
| 5KPxxxXX/L/TR13 | P600 | 800 | Tape & Reel | EIA STD RS-296 |

Tape/Box/Reel Specification

Tape (Unit: mm)

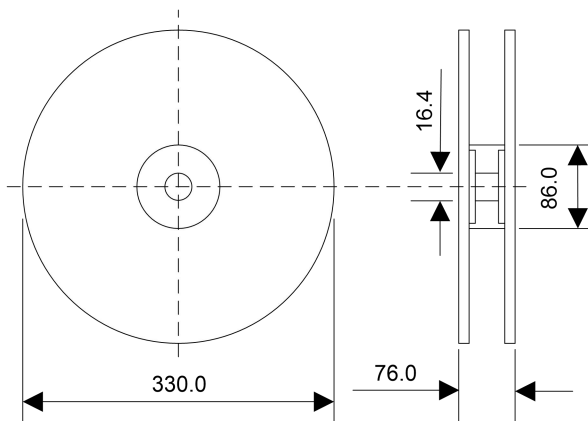


Box (Unit: mm)



Quantity: 300pcs/box

Reel (Unit: mm)



Quantity: 800pcs/reel

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