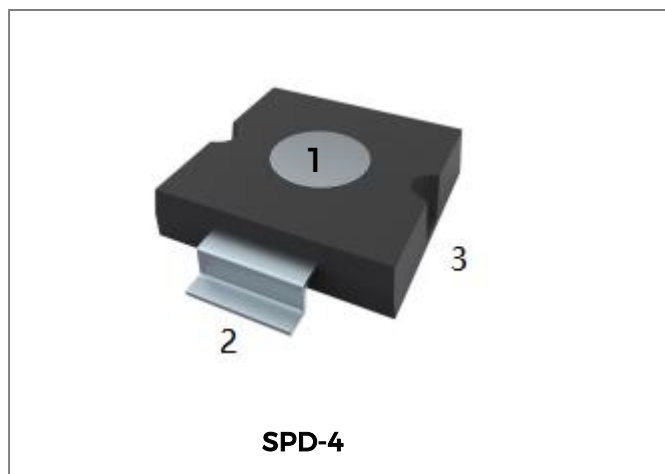


TPK15KPXX TVS Rectifier



Features

- Low profile surface mount
- Unidirectional and Bidirectional
- Fast response
- Suppresses transients up to 15kW @ 10/1000 μ s
- This is a Pb - Free Device
- Open top for heat dissipation and different connection options
- Base plate: Pure Sn plated; Terminals: Pure Sn plated
- Base plate is cathode, Terminal is anode
- "A" Suffix designates unidirectional,
- "CA" Suffix designates bidirectional
- All SMC parts are traceable to the wafer lot
- All part are 100% tested: electrical, 1x surge test, visual inspection
- Additional testing can be offered upon request

Applications

- Protection from switching transients and induced RF

Maximum Ratings@T_A=25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-----------------------------|------|
| Junction and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |
| Thermal Resistance Junction to Ambient (Note 1) | R _{θJA} | 50 | °C/W |
| Thermal Resistance Junction to Case | R _{θJC} | 0.7 | °C/W |
| Peak Pulse Power (with 10/1000 μ s waveform) (Note 2) | P _{PPM} | 15000 | W |
| Steady-State Power dissipation (Note 5) @T _A = 25°C @T _C = 100°C | P _D | 2.5 (Note 1) 71 (Note 4) | W |
| Peak Forward Surge Current(JEDEC Method)(Note 3) | I _{FSM} | 1500 | A |

- Note: 1. When mounted on FR4 board with recommended mounting pad(see pad layout).
 2. With impulse repetition rate (duty factor) of 0.05% or less.
 3. At 8.3ms Single half sine-wave (unidirectional devices only)
 4. Case temperature controlled heat sink as specified.
 5. Derating when P_{PP} also applying steady-state power.

Electrical Characteristics@T_A=25°C unless otherwise specified

| Part Number (Unidirectional) | Part Number (Bidirectional) | Stand-off Voltage V _{wm} (Note 1) (V) | Breakdown Voltage V _{BR} @ I _{BR} (mA) (V) | | Test Current I _{BR} (mA) | Clamping Voltage V _c (10*1000) @ I _{pp} (V) Max | Stand By Current I _R @ V _{wm} (μA) Max | Peak Pulse Current I _{pp} (A) Max | Temperatu re Coefficient Of V _{BR} mV/°C Max |
|---------------------------------|--------------------------------|--|--|------|---|--|---|--|--|
| | | | Min | Max | | | | | |
| TPK15KP7.0A | TPK15KP7.0CA | 7 | 7.78 | 8.60 | 150 | 12 | 3000 | 1251* | 5.0 |
| TPK15KP7.5A | TPK15KP7.5CA | 7.5 | 8.33 | 9.21 | 5 | 12.9 | 750 | 1164* | 6.0 |
| TPK15KP8.0A | TPK15KP8.0CA | 8 | 8.89 | 9.83 | 5 | 13.6 | 450 | 1101* | 6.0 |
| TPK15KP8.5A | TPK15KP8.5CA | 8.5 | 9.44 | 10.4 | 5 | 14.4 | 150 | 1141* | 7.0 |
| TPK15KP9.0A | TPK15KP9.0CA | 9 | 10 | 11.1 | 5 | 15.4 | 60 | 975 | 8.0 |
| TPK15KP10A | TPK15KP10CA | 10 | 11.1 | 12.3 | 5 | 17 | 45 | 882 | 9.0 |
| TPK15KP11A | TPK15KP11CA | 11 | 12.2 | 13.5 | 5 | 18.2 | 10 | 822 | 10 |
| TPK15KP12A | TPK15KP12CA | 12 | 13.3 | 14.7 | 5 | 19.9 | 10 | 753 | 11 |
| TPK15KP13A | TPK15KP13CA | 13 | 14.4 | 15.9 | 5 | 21.5 | 10 | 696 | 12 |
| TPK15KP14A | TPK15KP14CA | 14 | 15.6 | 17.2 | 5 | 23.2 | 10 | 645 | 13 |
| TPK15KP15A | TPK15KP15CA | 15 | 16.7 | 18.5 | 5 | 24.4 | 10 | 618 | 15 |
| TPK15KP16A | TPK15KP16CA | 16 | 17.8 | 19.7 | 5 | 26 | 10 | 576 | 16 |
| TPK15KP17A | TPK15KP17CA | 17 | 18.9 | 20.9 | 5 | 27.6 | 10 | 543 | 18 |
| TPK15KP18A | TPK15KP18CA | 18 | 20 | 22.1 | 5 | 29.2 | 10 | 516 | 19 |
| TPK15KP20A | TPK15KP20CA | 20 | 22.2 | 24.5 | 5 | 32.4 | 10 | 462 | 22 |
| TPK15KP22A | TPK15KP22CA | 22 | 24.4 | 26.9 | 5 | 35.5 | 10 | 423 | 24 |
| TPK15KP24A | TPK15KP24CA | 24 | 26.7 | 29.5 | 5 | 38.9 | 10 | 384 | 27 |
| TPK15KP26A | TPK15KP26CA | 26 | 28.9 | 31.9 | 5 | 42.1 | 10 | 357 | 29 |
| TPK15KP28A | TPK15KP28CA | 28 | 31.1 | 34.4 | 5 | 45.5 | 10 | 330 | 30 |
| TPK15KP30A | TPK15KP30CA | 30 | 33.3 | 36.8 | 5 | 48.4 | 10 | 309 | 35 |
| TPK15KP33A | TPK15KP33CA | 33 | 36.7 | 40.6 | 5 | 53.3 | 10 | 282 | 38 |
| TPK15KP36A | TPK15KP36CA | 36 | 40 | 44.2 | 5 | 58.1 | 10 | 258 | 40 |
| TPK15KP40A | TPK15KP40CA | 40 | 44.4 | 49.1 | 5 | 64.5 | 10 | 234 | 45 |
| TPK15KP43A | TPK15KP43CA | 43 | 47.8 | 52.8 | 5 | 69.4 | 10 | 216 | 49 |
| TPK15KP45A | TPK15KP45CA | 45 | 50 | 55.3 | 5 | 72.7 | 10 | 207 | 51 |
| TPK15KP48A | TPK15KP48CA | 48 | 53.3 | 58.9 | 5 | 77.4 | 10 | 195 | 55 |
| TPK15KP51A | TPK15KP51CA | 51 | 56.7 | 62.7 | 5 | 82.4 | 10 | 183 | 60 |
| TPK15KP54A | TPK15KP54CA | 54 | 60 | 66.3 | 5 | 87.1 | 10 | 171 | 64 |
| TPK15KP58A | TPK15KP58CA | 58 | 64.4 | 71.2 | 5 | 93.6 | 10 | 159 | 69 |
| TPK15KP60A | TPK15KP60CA | 60 | 66.7 | 73.7 | 5 | 96.8 | 10 | 156 | 70 |
| TPK15KP64A | TPK15KP64CA | 64 | 71.1 | 78.6 | 5 | 103 | 10 | 147 | 75 |

Electrical Characteristics@T_A=25°C unless otherwise specified

| Part Number (Unidirectional) | Part Number (Bidirectional) | Stand-off Voltage V _{WM} (Note 1) (V) | Breakdown Voltage V _{BR} @ I _{BR} (mA) (V) | | Test Current I _{BR} (mA) | Clamping Voltage V _C (10*1000) @ I _{PP} (V) Max | Stand By Current I _R @ V _{WM} (μA) Max | Peak Pulse Current I _{PP} (A) Max | Temperatur e Coefficient Of V _{BR} mV/°C Max |
|---------------------------------|--------------------------------|--|--|------|---|--|---|--|--|
| | | | Min | Max | | | | | |
| TPK15KP70A | TPK15KP70CA | 70 | 77.8 | 86 | 5 | 113 | 10 | 132 | 84 |
| TPK15KP75A | TPK15KP75CA | 75 | 83.3 | 92.1 | 5 | 121 | 10 | 123 | 90 |
| TPK15KP78A | TPK15KP78CA | 78 | 86.7 | 95.8 | 5 | 126 | 10 | 120 | 94 |
| TPK15KP85A | TPK15KP85CA | 85 | 94.4 | 104 | 5 | 137 | 10 | 108 | 102 |
| TPK15KP90A | TPK15KP90CA | 90 | 100 | 111 | 5 | 146 | 10 | 402 | 109 |
| TPK15KP100A | TPK15KP100CA | 100 | 111 | 123 | 5 | 162 | 10 | 93 | 122 |
| TPK15KP110A | TPK15KP110CA | 110 | 122 | 135 | 5 | 177 | 10 | 84 | 132 |
| TPK15KP120A | TPK15KP120CA | 120 | 133 | 147 | 5 | 193 | 10 | 78 | 145 |
| TPK15KP130A | TPK15KP130CA | 130 | 144 | 159 | 5 | 209 | 10 | 71 | 157 |
| TPK15KP150A | TPK15KP150CA | 150 | 167 | 185 | 5 | 243 | 10 | 62 | 183 |
| TPK15KP160A | TPK15KP160CA | 160 | 178 | 197 | 5 | 259 | 10 | 58 | 195 |
| TPK15KP170A | TPK15KP170CA | 170 | 189 | 209 | 5 | 275 | 10 | 55 | 207 |
| TPK15KP180A | TPK15KP180CA | 180 | 200 | 221 | 5 | 291 | 10 | 52 | 219 |
| TPK15KP200A | TPK15KP200CA | 200 | 222 | 245 | 5 | 322 | 10 | 47 | 243 |

Note: 1. Transient Voltage Suppressors are normally selected with reverse standoff voltage V_{WM}, which should be equal to or greater than the peak operating voltage.
 2. TPK15KPXXXXA, "A" Suffix Designates Unidirectional Devices; TPK15KPXXXXCA, "CA" Suffix Designates Bidirectional Devices.
 * Surge Testing is performed to 1000Amps due to Equipment limitations.

| SYMBOLS & DEFINITIONS | | | |
|-----------------------|--------------------------------|-------------------|---|
| Symbol | Definition | Symbol | Definition |
| V _{WM} | Working Peak(Standoff) Voltage | I _{PP} | Peak Pulse Current |
| V _(BR) | Breakdown Voltage | V _C | Claming Voltage |
| I _R | Standby Current | I _(BR) | Breakdown Current for V _(BR) |

Ratings and Characteristics Curves

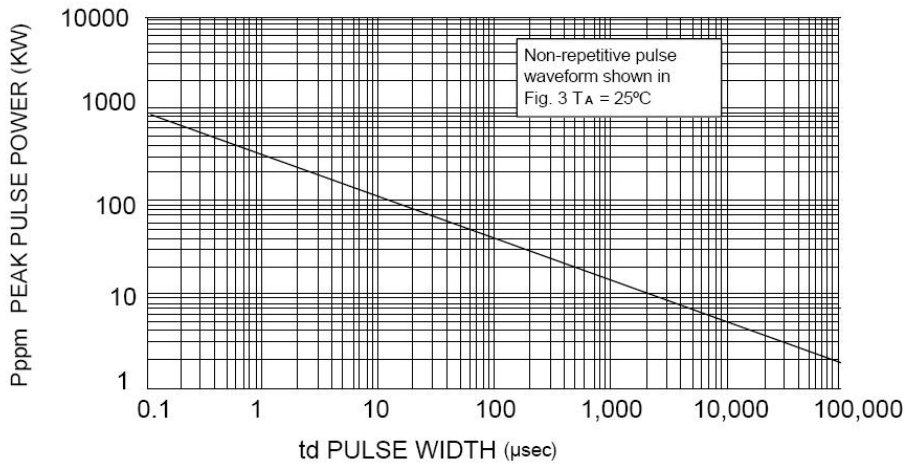


FIG. 1 PEAK PULSE POWER RATING

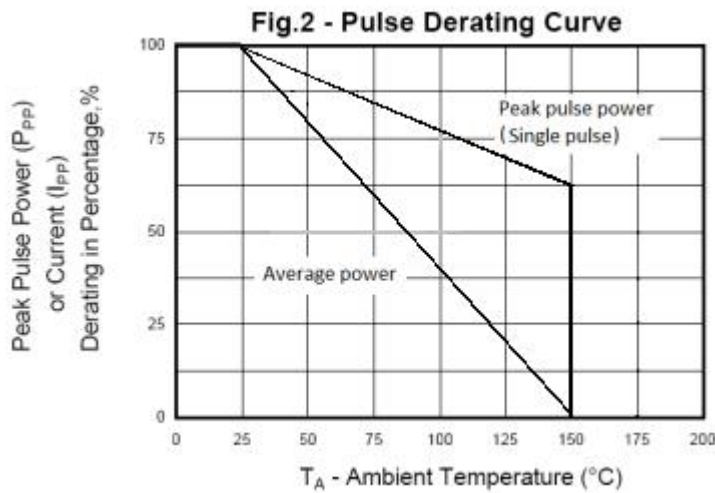
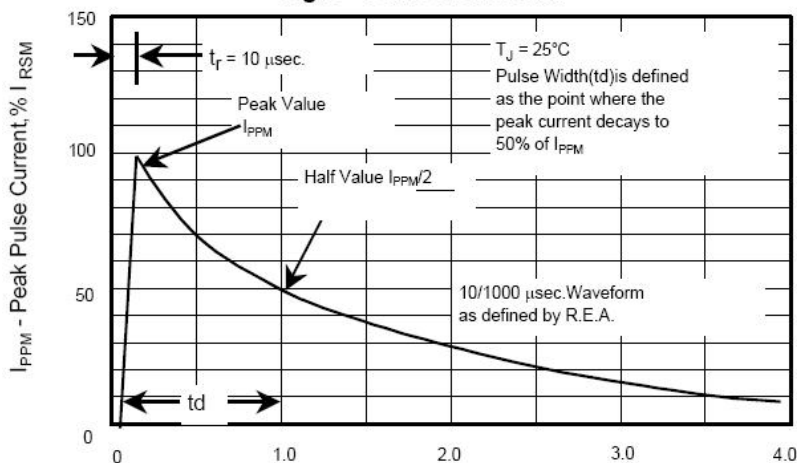
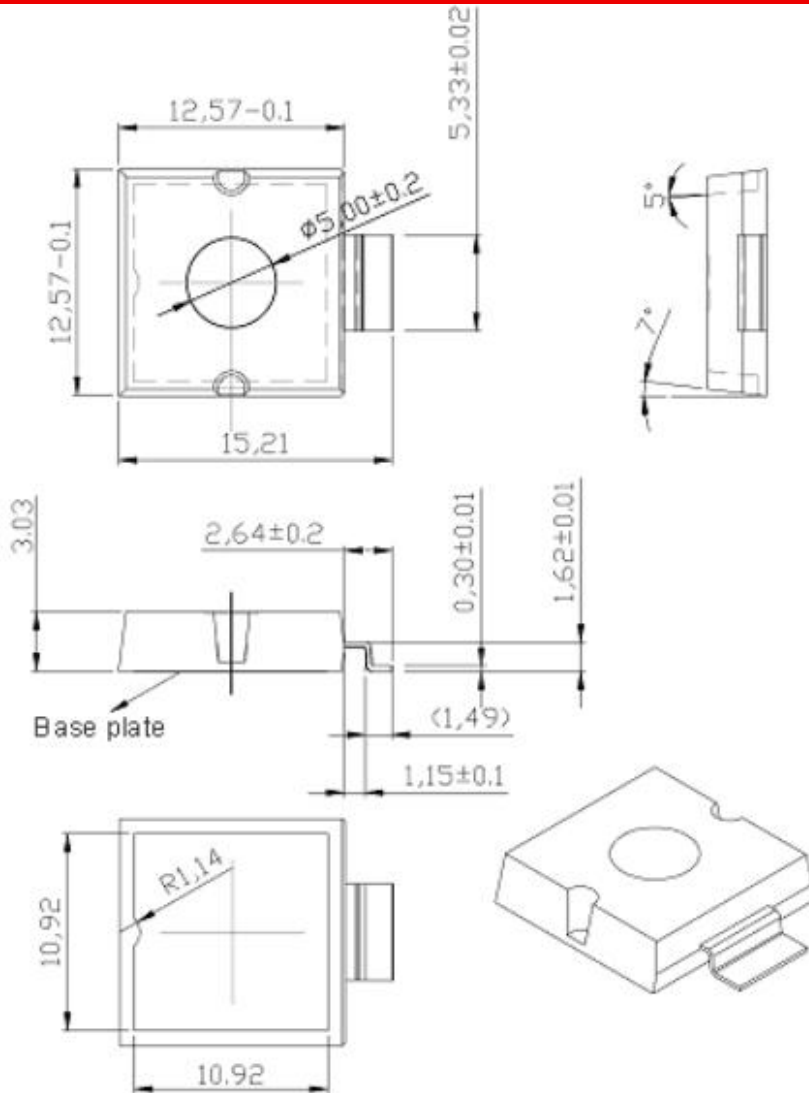


Fig.3 - Pulse waveform



Mechanical Dimensions SPD-4(Millimeters)

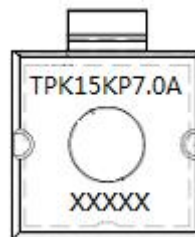


Ordering Information

| Device | Package | Shipping |
|-------------|----------------|--------------|
| TPK15KPXX | SPD-4(Pb-Free) | 64pcs/ bag |
| TPK15KPXXTR | SPD-4(Pb-Free) | 500pcs/ reel |

For information on tape and reel specifications, including part orientation and tape sizes, please refer to our tape and reel packaging specification.

Marking Diagram



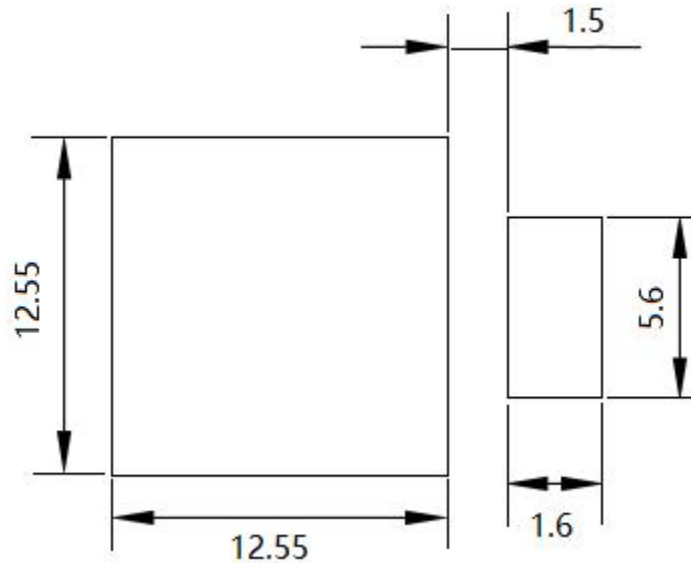
Where XXXXX is YYWWL
Part number's example like this

TPK15KP7.0A = Part Number
YY = Year
WW = Week
L = Lot Number

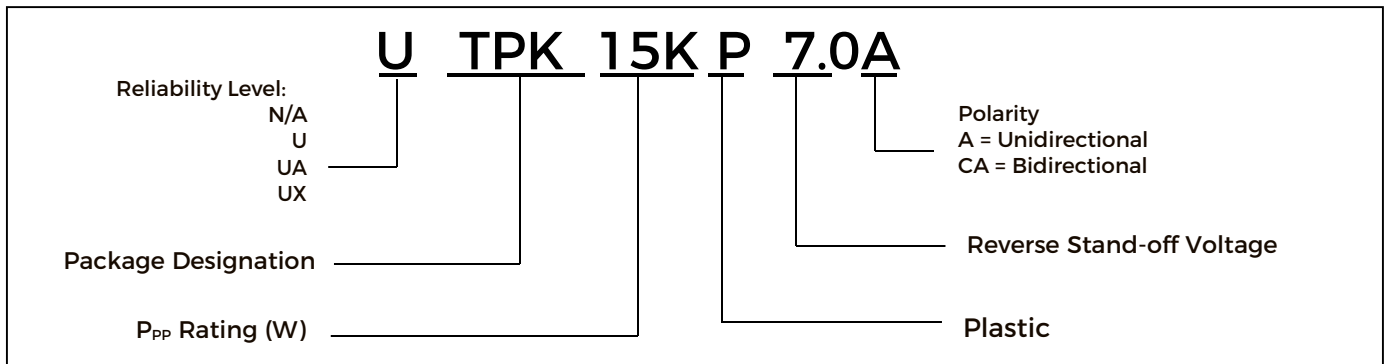
Notes : Reliability Level will Marking.

Date code "XXXXX" was added in marking from April 1, 2019.

PAD Layout Recommend Size(Millimeters)



Part Number Naming Rule





| SMC TVS Screening Options | | | | | |
|-----------------------------------|-------------------|----------|--------------|-----------|-----------|
| Screen or Test Description | Screening Options | | | | |
| | Prefix | 1) | U | UA | UX |
| 100% Wafer Probe | | R | R | R | R |
| 3-Sigma lot norm determination 2) | | | R | R | R |
| Surge Test | | 1x | 1x | 1x | 1x |
| 100% DC Electrical Test Go-No-Go | | | R | R | R |
| Temperature Cycling | | | 10 Cycles 3) | 10 Cycles | 20 Cycles |
| Post TC Surge Test | | | 1x 3) | 3x | 10x |
| 100% Thermal Impedance 4) | | | R | R | R |
| 100% DC Electrical Test | | | | go-no-go | R |
| HTRB | | | | 24 hrs 5) | 96 hrs 6) |
| 100% DC Electrical Test | | go-no-go | go-no-go | go-no-go | R |
| Delta Calculation | | | | | R |
| PDA Calculation | | | | | R |
| 100% Visual Inspection | | R | R | R | R |
| Certificate of Conformance | | R | R | R | R |
| Group A Inspection | | | | | O |
| Group B Inspection | | | | | O |
| Group C Inspection | | | | | O |

Notes:

R = to be performed. Electrical testing per datasheet limits
O = optional

- 1) Commercial flow
- 2) 3-Sigma lot norm to remove atypical devices. For detailed requirements see below.
- 3) Test to be performed on TPK & STPK Series only. The condition is below:
High temp. side: 150 °C; Low temp. side: -55 °C; Duration time: HT 15min, LT 15 min
- 4) To be performed any time before completion of screening for unidirectional devices only.
- 5) 24 hours for unidirectional, 24 hours each side for bidirectional
- 6) 96 hours for unidirectional, 48 hours each side for bidirectional

Test Procedure to remove Atypical Devices

This procedure will be used in the production testing and applied for each assembly lot when required by the screening option.

- read and record VBR and IR of 200 random samples of a particular assembly lot.
- calculate the average (μ) and standard deviation (σ) for each parameter.
- the testing limit will then be as follows:
 - $VBR\ min = \mu(VBR) - 3\sigma(VBR)$
 - $VBR\ max = \mu(VBR) + 3\sigma(VBR)$
 - $IR\ max = \mu(IR) + 3\sigma(IR)$

Once the testing limit is established for this assembly lot, the 100% production testing will be done based on the tighter limit for the parts of the same assembly lot.



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