



## DESCRIPTION

The SM15KPAN Series are high-powered surface mount transient voltage suppression components designed to protect equipment and systems from the damaging effects of high voltage spikes. The surface mount package configuration provides a lower profile compared to legacy axial lead package configurations.

These devices provide 15,000 Watts of peak pulse power dissipation for an 10/1000 $\mu$ s waveform. Applications include AC and DC power line protection, terrestrial base station protection as well as module lightning protection.

## FEATURES

- RTCA DO-160G COMPLIANT PRODUCT
- Compatible with IEC 61000-4-5 (Surge): 48A, 8/20 $\mu$ s - L3(Line-Ground), L4(Line-Line) & L1 (Power)
- 15,000 Watts Peak Pulse Power per Line (tp = 10/1000 $\mu$ s)
- Unidirectional and Bidirectional Configurations
- Easy Mounting to Printed Circuit Board
- Available in Multiple Voltages
- tClamping (0V to V<sub>(BR)</sub> Min) < 100ps, Theoretical for Unidirectional and 5ns for Bidirectional
- RoHS Complaint (Exemption #7)

## APPLICATIONS

- Relay Drives
- Motor (Start/Stop) Back EMF Protection
- Module Lightning Protection
- Secondary Lightning Protection for AC/DC

## MECHANICAL CHARACTERISTICS

- Approximate Weight: 1.2 grams
- Lead-Free Silver Plating
- Solder Reflow Temperature: 240-250°C
- Flammability Rating UL 94V-0
- Marking: Logo and Marking Code

## CIRCUIT DIAGRAMS

Unidirectional



Bidirectional



## TYPICAL DEVICE CHARACTERISTICS

## RTCA DO-160G COMPLIANT PRODUCT

## MAXIMUM RATINGS @ 25°C Unless Otherwise Specified

| PARAMETER  | SYMBOL           | VALUE      | UNITS |
|--|------------------|------------|-------|
| Peak Pulse Power (tp = 10/1000μs) - See Figure 1 | P <sub>PP</sub>  | 15,000     | Watts |
| Forward Surge Rating                             | I <sub>F</sub>   | 200        | Amps  |
| Steady State Power Dissipation                   | P <sub>P</sub>   | 1.0        | Watts |
| Storage Temperature                              | T <sub>STG</sub> | -55 to 150 | °C    |
| Operating Temperature                            | T <sub>L</sub>   | -55 to 150 | °C    |

## ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified

| PART NUMBER<br>(Notes 1 - 2) | MARKING CODE |     | RATED STAND-OFF VOLTAGE<br><br>V <sub>WM</sub><br>VOLTS | BREAKDOWN VOLTAGE              |                        | MAXIMUM LEAKAGE CURRENT<br><br>@V <sub>WM</sub><br>I <sub>D</sub><br>μA | MAXIMUM CLAMPING VOLTAGE<br>(Fig. 2)<br><br>@ 10/1000μs<br>V <sub>C</sub> @ I <sub>PP</sub> | TEMPERATURE COEFFICIENT OF V <sub>(BR)</sub><br><br>qV <sub>(BR)</sub><br>mV/°C |
|------------------------------|--------------|-----|---|--------------------------------|------------------------|---|---|---|
|                              | UNI          | BI  |   | MIN V <sub>(BR)</sub><br>VOLTS | @ I <sub>T</sub><br>mA |   |   |   |
| SM15KPA17AN                  | 17A          | 17C | 17.0  | 18.9                           | 50                     | 5000  | 29.3V @ 512.0A  | 17  |
| SM15KPA18AN                  | 18A          | 18C | 18.0  | 20.0                           | 50                     | 5000  | 30.9V @ 485.0A  | 18  |
| SM15KPA20AN                  | 20A          | 20C | 20.0  | 22.2                           | 20                     | 1500  | 34.3V @ 437.0A  | 21  |
| SM15KPA22AN                  | 22A          | 22C | 22.0  | 24.4                           | 10                     | 500   | 37.1V @ 404.0A  | 24  |
| SM15KPA24AN                  | 24A          | 24C | 24.0  | 26.7                           | 5                      | 150   | 40.7V @ 369.0A  | 27  |
| SM15KPA26AN                  | 26A          | 26C | 26.0  | 28.9                           | 5                      | 50  | 44.0V @ 341.0A  | 29  |
| SM15KPA28AN                  | 28A          | 28C | 28.0  | 31.1                           | 5                      | 25  | 47.5V @ 316.0A  | 31  |
| SM15KPA30AN                  | 30A          | 30C | 30.0  | 33.3                           | 5                      | 15  | 50.7V @ 296.0A  | 34  |
| SM15KPA33AN                  | 33A          | 33C | 33.0  | 36.7                           | 5                      | 10  | 54.8V @ 274.0A  | 38  |
| SM15KPA36AN                  | 36A          | 36C | 36.0  | 40.0                           | 5                      | 10  | 59.7V @ 251.0A  | 41  |
| SM15KPA40AN                  | 40A          | 40C | 40.0  | 44.4                           | 5                      | 10  | 65.8V @ 228.0A  | 46  |
| SM15KPA43AN                  | 43A          | 43C | 43.0  | 47.8                           | 5                      | 10  | 69.7V @ 215.0A  | 50  |
| SM15KPA45AN                  | 45A          | 45C | 45.0  | 50.0                           | 5                      | 10  | 73.0V @ 205.0A  | 52  |
| SM15KPA48AN                  | 48A          | 48C | 48.0  | 53.3                           | 5                      | 10  | 77.7V @ 193.0A  | 56  |
| SM15KPA51AN                  | 51A          | 51C | 51.0  | 56.7                           | 5                      | 10  | 82.8V @ 181.0A  | 60  |
| SM15KPA54AN                  | 54A          | 54C | 54.0  | 60.0                           | 5                      | 10  | 87.5V @ 171.0A  | 63  |
| SM15KPA58AN                  | 58A          | 58C | 58.0  | 64.4                           | 5                      | 10  | 94.0V @ 160.0A  | 68  |
| SM15KPA60AN                  | 60A          | 60C | 60.0  | 66.7                           | 5                      | 10  | 97.3V @ 154.0A  | 71  |
| SM15KPA64AN                  | 64A          | 64C | 64.0  | 71.1                           | 5                      | 10  | 104.0V @ 144.0A   | 76  |
| SM15KPA70AN                  | 70A          | 70C | 70.0  | 77.8                           | 5                      | 10  | 114.0V @ 132.0A   | 83  |
| SM15KPA75AN                  | 75A          | 75C | 75.0  | 83.3                           | 5                      | 10  | 122.0V @ 123.0A   | 89  |
| SM15KPA78AN                  | 78A          | 78C | 78.0  | 86.7                           | 5                      | 10  | 126.0V @ 119.0A   | 93  |
| SM15KPA85AN                  | 85A          | 85C | 85.0  | 94.4                           | 5                      | 10  | 137.0V @ 109.0A   | 102   |
| SM15KPA90AN                  | 90A          | 90C | 90.0  | 100.0                          | 5                      | 10  | 146.0V @ 103.0A   | 109   |
| SM15KPA100AN                 | A0A          | A0C | 100.0   | 111.0                          | 5                      | 10  | 162.0V @ 93.0A  | 121   |
| SM15KPA110AN                 | A1A          | A1C | 110.0   | 122.0                          | 5                      | 10  | 178.0V @ 84.0A  | 133   |

## TYPICAL DEVICE CHARACTERISTICS

## RTCA DO-160G COMPLIANT PRODUCT

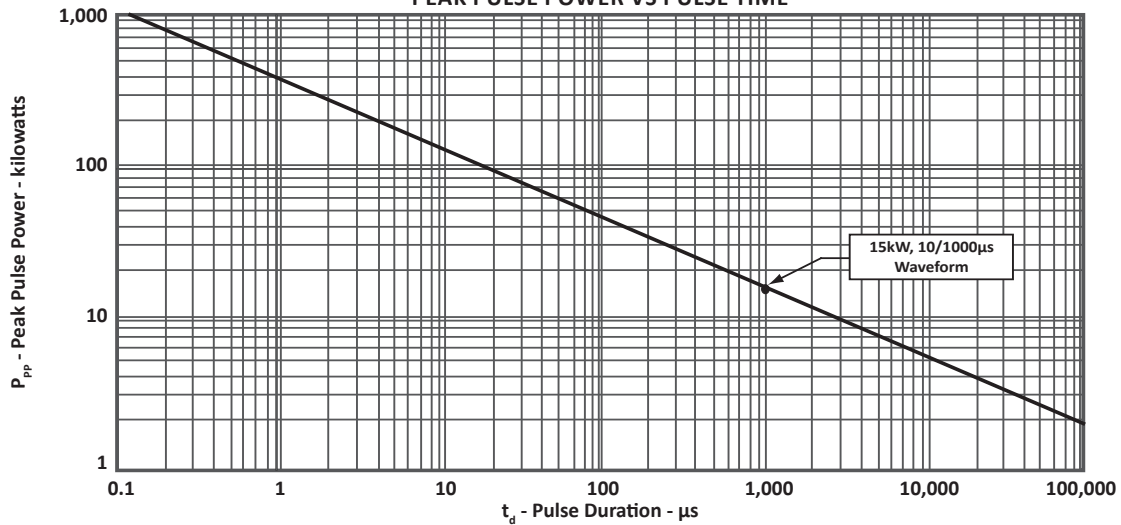
## ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified

| PART NUMBER<br>(Notes 1 - 2) | MARKING CODE |     | RATED STAND-OFF VOLTAGE<br><br>$V_{WM}$<br>VOLTS | BREAKDOWN VOLTAGE       |               | MAXIMUM LEAKAGE CURRENT<br><br>@ $V_{WM}$<br>$I_D$<br>$\mu A$ | MAXIMUM CLAMPING VOLTAGE<br>(Fig. 2)<br><br>@ 10/1000 $\mu s$<br>$V_C$ @ $I_{PP}$ | TEMPERATURE COEFFICIENT OF $V_{(BR)}$<br><br>$qV_{(BR)}$<br>mV/°C |
|------------------------------|--------------|-----|--|-------------------------|---------------|---|---|---|
|                              | UNI          | BI  |  | MIN $V_{(BR)}$<br>VOLTS | @ $I_T$<br>mA |   |   |   |
| SM15KPA120AN                 | A2A          | A2C | 120.0  | 133.0                   | 5             | 10  | 193.0V @ 78.0A  | 145   |
| SM15KPA130AN                 | A3A          | A3C | 130.0  | 144.0                   | 5             | 10  | 209.0V @ 72.0A  | 157   |
| SM15KPA150AN                 | A5A          | A5C | 150.0  | 167.0                   | 5             | 10  | 243.0V @ 62.0A  | 183   |
| SM15KPA160AN                 | A6A          | A6C | 160.0  | 178.0                   | 5             | 10  | 259.0V @ 58.0A  | 195   |
| SM15KPA170AN                 | A7A          | A7C | 170.0  | 189.0                   | 5             | 10  | 275.0V @ 55.0A  | 207   |
| SM15KPA180AN                 | A8A          | A8C | 180.0  | 200.0                   | 5             | 10  | 291.0V @ 52.0A  | 219   |
| SM15KPA200AN                 | B0A          | B0C | 200.0  | 222.0                   | 5             | 10  | 322.0V @ 47.0A  | 243   |
| SM15KPA220AN                 | B2A          | 2CC | 220.0  | 245.0                   | 5             | 10  | 356.0V @ 42.0A  | 269   |
| SM15KPA240AN                 | B4A          | B4C | 240.0  | 267.0                   | 5             | 10  | 388.0V @ 39.0A  | 293   |
| SM15KPA260AN                 | B6A          | B6C | 260.0  | 289.0                   | 5             | 10  | 419.0V @ 36.0A  | 317   |
| SM15KPA280AN                 | B8A          | B8C | 280.0  | 311.0                   | 5             | 10  | 452.0V @ 33.0A  | 342   |
| SM15KPA480AN                 | D8A          | D8C | 480.0  | 528.0                   | 5             | 10  | 791.0V @ 18.9A  | 460   |

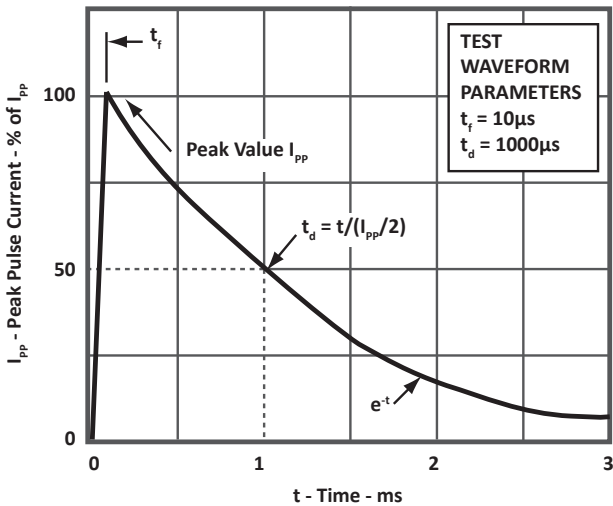
## NOTES

- Part numbers shown are unidirectional devices. Add a "C" suffix to specify bidirectional devices, such as SM15KPA20CAN.
- $V_{F(MAX)}$  = 15 Volts @ 200A, 8.3ms(1/2 Sine Wave) - *Unidirectional devices only*.

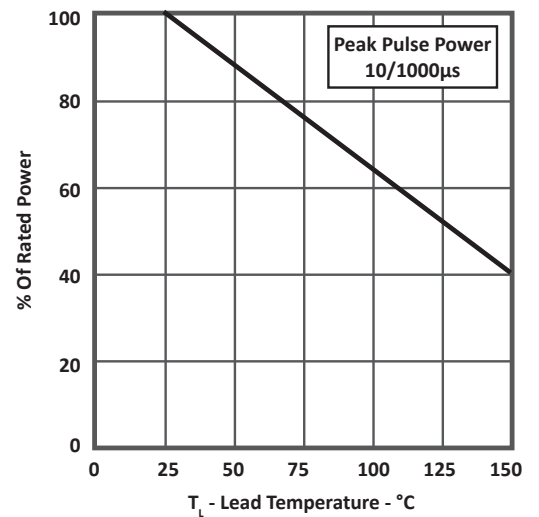
**FIGURE 1  
PEAK PULSE POWER VS PULSE TIME**



**FIGURE 2  
PULSE WAVEFORM**



**FIGURE 3  
POWER DERATING CURVE**

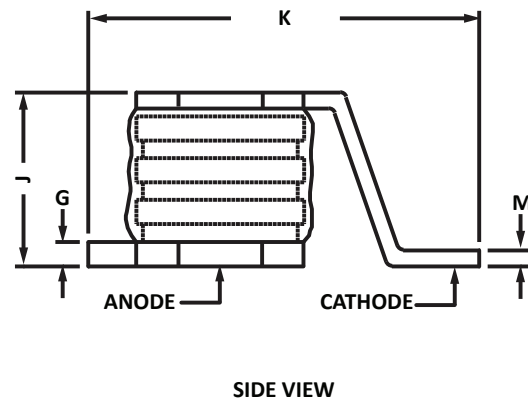
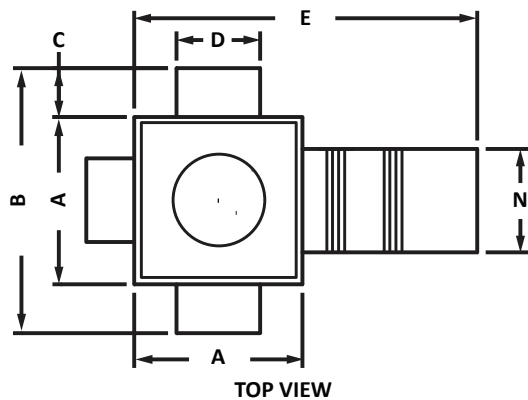


## SMD-15 PACKAGE INFORMATION

## RTCA DO-160G COMPLIANT PRODUCT

## PACKAGE OUTLINE DIMENSIONS

| DIM | MILLIMETERS |       | INCHES |       |
|-----|-------------|-------|--------|-------|
|     | MIN         | MAX   | MIN    | MAX   |
| A   | 5.15        | 5.50  | 0.197  | 0.217 |
| B   | 8.10        | 8.25  | 0.319  | 0.325 |
| C   | 1.40        | 1.55  | 0.055  | 0.061 |
| D   | 2.45        | 2.65  | 0.096  | 0.104 |
| E   | 10.25       | 11.05 | 0.405  | 0.435 |
| G   | 0.70        | 0.80  | 0.026  | 0.034 |
| J   | 5.08        | 5.59  | 0.200  | 0.220 |
| K   | 11.75       | 12.62 | 0.463  | 0.497 |
| M   | 0.42        | 0.58  | 0.017  | 0.023 |
| N   | 3.15        | 3.45  | 0.124  | 0.136 |



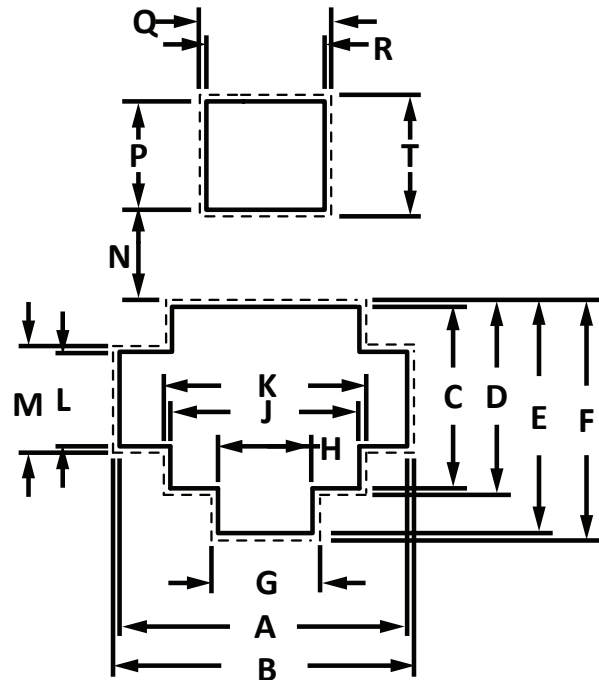
## SMD-15 PACKAGE INFORMATION

## RTCA DO-160G COMPLIANT PRODUCT

## SOLDER PAD OUTLINE DIMENSIONS

| DIM | MILLIMETERS |      | INCHES |       |
|-----|-------------|------|--------|-------|
|     | MIN         | MAX  | MIN    | MAX   |
| A   | 8.35        | 8.45 | 0.329  | 0.333 |
| B   | 8.55        | 8.65 | 0.337  | 0.341 |
| C   | 5.35        | 5.45 | 0.211  | 0.215 |
| D   | 5.55        | 5.65 | 0.219  | 0.222 |
| E   | 6.85        | 6.95 | 0.270  | 0.274 |
| F   | 7.05        | 7.15 | 0.278  | 0.281 |
| G   | 2.95        | 3.05 | 0.116  | 0.120 |
| H   | 2.75        | 2.85 | 0.108  | 0.112 |
| J   | 5.35        | 5.45 | 0.211  | 0.215 |
| K   | 5.55        | 5.65 | 0.219  | 0.222 |
| L   | 2.75        | 2.85 | 0.108  | 0.112 |
| M   | 2.95        | 3.05 | 0.116  | 0.120 |
| N   | 2.45        | 2.55 | 0.096  | 0.100 |
| P   | 3.63        | 3.73 | 0.143  | 0.147 |
| Q   | 3.95        | 4.05 | 0.156  | 0.159 |
| R   | 3.55        | 3.65 | 0.140  | 0.144 |
| T   | 4.06        | 4.19 | 0.160  | 0.165 |

## Suggested Solder Pad



**COMPANY INFORMATION****RTCA DO-160G COMPLIANT PRODUCT****COMPANY PROFILE**

In business more than 20 years, ProTek Devices™ is a privately held semiconductor company. The company offers a product line of overvoltage protection and overcurrent protection components. These include transient voltage suppressor array (TVS arrays) avalanche breakdown diode, steering diode TVS array and electronics SMD chip fuses. These components deliver circuit protection in electronic systems from numerous overvoltage and overcurrent events. They include lightning; electrostatic discharge (ESD); nuclear electromagnetic pulses (NEMP); inductive switching; and electromagnetic interference (EMI) / radio frequency interference (RFI). ProTek Devices also offers LED wafer die for ESD protection and related high frequency products.

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