

## HIGH CURRENT THRU-HOLE DISCRETE TVS DIODE

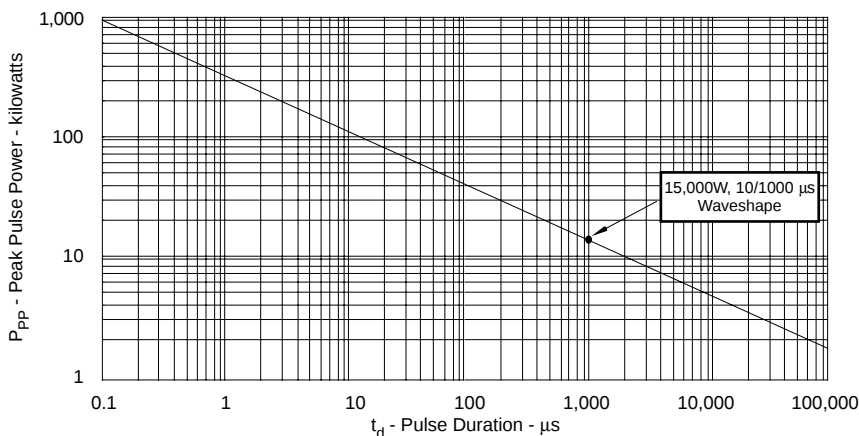
### APPLICATIONS

- Relay Drives
- Motor (Start/Stop) Back EMF Protection
- Module Lightning Protection

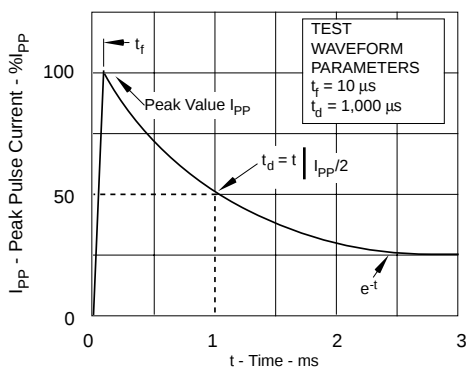
### FEATURES

- 15,000 Watts Peak Pulse Power Dissipation (10/1000  $\mu$ s)
- Available in Numerous Voltage Types Ranging from 17.0V to 280V
- Easy Mounting to Printed Circuit Boards
- UL 94V-0 Flammability Classification

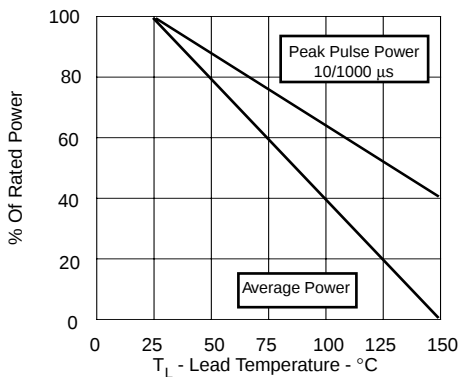
**FIGURE 1  
PEAK PULSE POWER VS PULSE TIME**



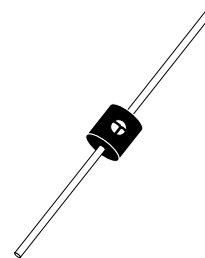
**FIGURE 2  
PULSE WAVE FORM**



**FIGURE 3  
POWER DERATING CURVE**



### 15,000 WATTS



### MAXIMUM RATINGS

- 15,000 Watts Peak Pulse Dissipation @25°C (See Figure 1)
- Operating & Storage Temperature: -55°C to +150°C
- Forward Surge Rating: 100A, 1/20 second @25°C
- Steady State Power Dissipation: 7.0W T<sub>A</sub> = 25°C
- Repetition Rate (Duty Cycle): 0.05%
- t<sub>clamping</sub> (0 Volts to V<sub>(BR)</sub> min):  
Unidirectional < 1 x 10<sup>-12</sup> seconds  
Bidirectional < 10 x 10<sup>-9</sup> seconds

### MECHANICAL CHARACTERISTICS

- Package: Molded Case
- Approximate Weight: 13 grams
- Positive Terminal Marked with Band (Unidirectional)
- Body Marked with Logo & Part No.

### DESCRIPTION

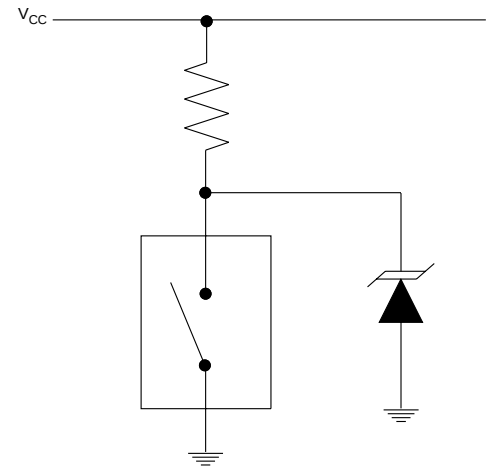
The 15KPA family is a series of discrete 15,000 Watt, silicon transient voltage suppressor diodes designed for use in applications where large voltage transients can permanently damage voltage sensitive components and equipment.

The 15KPA series has a peak pulse power (P<sub>PP</sub>) rating of 15,000 Watts for an 10/1000  $\mu$ s waveshape. This series is available in voltages ranging from 17.0 Volts to 280 Volts with 5 percent and 10 percent tolerances. Both tolerances are referenced to the power supply output or operating voltage level.

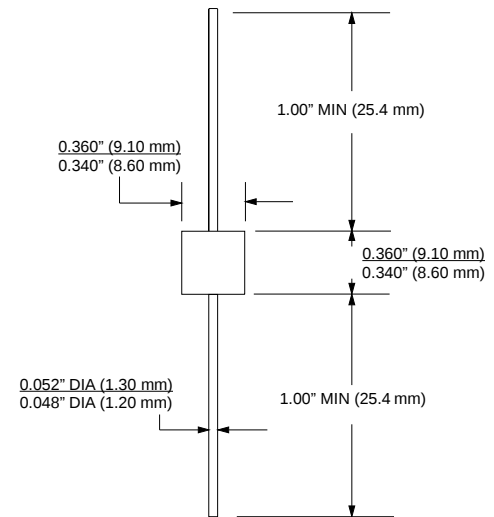
# **ELECTRICAL CHARACTERISTICS @ 25° C Ambient Temperature**

| PROTEK<br>PART<br>NUMBER<br>(See Note 1<br>& Note 2) | RATED<br>STAND-OFF<br>VOLTAGE<br><br>$V_{WM}$<br>VOLTS | BREAKDOWN<br>VOLTAGE       |               | MAXIMUM<br>LEAKAGE<br>CURRENT<br><br>@ $V_{WM}$<br>$I_b$<br>$\mu A$ | MAXIMUM<br>CLAMPING<br>VOLTAGE<br>(See Fig. 2)<br><br>$V_C$<br>VOLTS | MAXIMUM<br>PEAK PULSE<br>CURRENT<br>(See Fig. 2)<br><br>@ $I_{PP}$<br>$I_{PPM}$<br>AMPS | MAXIMUM<br>TEMPERATURE<br>COEFFICIENT<br>OF $V_{(BR)}$<br><br>$\Theta V_{(BR)}$<br>mV/°C |
|------------------------------------------------------|--------------------------------------------------------|----------------------------|---------------|---------------------------------------------------------------------|----------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
|                                                      |                                                        | MIN<br>$V_{(BR)}$<br>VOLTS | @ $I_T$<br>mA |                                                                     |                                                                      |                                                                                         |                                                                                          |
| 15KPA17                                              | 17.0                                                   | 18.9                       | 50            | 5000                                                                | 32.3                                                                 | 464.0                                                                                   | 19                                                                                       |
| 15KPA17A                                             | 17.0                                                   | 18.9                       | 50            | 5000                                                                | 29.3                                                                 | 512.0                                                                                   | 17                                                                                       |
| 15KPA18                                              | 18.0                                                   | 20.0                       | 50            | 5000                                                                | 34.2                                                                 | 439.0                                                                                   | 20                                                                                       |
| 15KPA18A                                             | 18.0                                                   | 20.0                       | 50            | 5000                                                                | 30.9                                                                 | 485.0                                                                                   | 18                                                                                       |
| P 15KPA20                                            | 20.0                                                   | 22.2                       | 20            | 1500                                                                | 37.9                                                                 | 396.0                                                                                   | 24                                                                                       |
| P 15KPA20A                                           | 20.0                                                   | 22.2                       | 20            | 1500                                                                | 34.3                                                                 | 437.0                                                                                   | 21                                                                                       |
| 15KPA22                                              | 22.0                                                   | 24.4                       | 10            | 500                                                                 | 41.1                                                                 | 365.0                                                                                   | 27                                                                                       |
| 15KPA22A                                             | 22.0                                                   | 24.4                       | 10            | 500                                                                 | 37.1                                                                 | 404.0                                                                                   | 24                                                                                       |
| P 15KPA24                                            | 24.0                                                   | 26.7                       | 5             | 150                                                                 | 45.0                                                                 | 333.0                                                                                   | 30                                                                                       |
| P 15KPA24A                                           | 24.0                                                   | 26.7                       | 5             | 150                                                                 | 40.7                                                                 | 369.0                                                                                   | 27                                                                                       |
| P 15KPA26                                            | 26.0                                                   | 28.9                       | 5             | 50                                                                  | 48.7                                                                 | 308.0                                                                                   | 32                                                                                       |
| P 15KPA26A                                           | 26.0                                                   | 28.9                       | 5             | 50                                                                  | 44.0                                                                 | 341.0                                                                                   | 29                                                                                       |
| P 15KPA28                                            | 28.0                                                   | 31.1                       | 5             | 25                                                                  | 52.4                                                                 | 286.0                                                                                   | 35                                                                                       |
| P 15KPA28A                                           | 28.0                                                   | 31.1                       | 5             | 25                                                                  | 47.5                                                                 | 316.0                                                                                   | 31                                                                                       |
| 15KPA30                                              | 30.0                                                   | 33.3                       | 5             | 15                                                                  | 56.2                                                                 | 267.0                                                                                   | 27                                                                                       |
| 15KPA30A                                             | 30.0                                                   | 33.3                       | 5             | 15                                                                  | 50.7                                                                 | 296.0                                                                                   | 34                                                                                       |
| 15KPA33                                              | 33.0                                                   | 36.7                       | 5             | 10                                                                  | 60.6                                                                 | 248.0                                                                                   | 42                                                                                       |
| 15KPA33A                                             | 33.0                                                   | 36.7                       | 5             | 10                                                                  | 54.8                                                                 | 274.0                                                                                   | 38                                                                                       |
| P 15KPA36                                            | 36.0                                                   | 40.0                       | 5             | 10                                                                  | 66.0                                                                 | 227.0                                                                                   | 46                                                                                       |
| P 15KPA36A                                           | 36.0                                                   | 40.0                       | 5             | 10                                                                  | 59.7                                                                 | 251.0                                                                                   | 41                                                                                       |
| 15KPA40                                              | 40.0                                                   | 44.4                       | 5             | 10                                                                  | 72.8                                                                 | 206.0                                                                                   | 51                                                                                       |
| 15KPA40A                                             | 40.0                                                   | 44.4                       | 5             | 10                                                                  | 65.8                                                                 | 228.0                                                                                   | 46                                                                                       |
| 15KPA43                                              | 43.0                                                   | 47.8                       | 5             | 10                                                                  | 77.1                                                                 | 195.0                                                                                   | 55                                                                                       |
| 15KPA43A                                             | 43.0                                                   | 47.8                       | 5             | 10                                                                  | 69.7                                                                 | 215.0                                                                                   | 50                                                                                       |
| 15KPA45                                              | 45.0                                                   | 50.0                       | 5             | 10                                                                  | 80.7                                                                 | 186.0                                                                                   | 57                                                                                       |
| 15KPA45A                                             | 45.0                                                   | 50.0                       | 5             | 10                                                                  | 73.0                                                                 | 205.0                                                                                   | 52                                                                                       |
| 15KPA48                                              | 48.0                                                   | 53.3                       | 5             | 10                                                                  | 85.9                                                                 | 175.0                                                                                   | 62                                                                                       |
| 15KPA48A                                             | 48.0                                                   | 53.3                       | 5             | 10                                                                  | 77.7                                                                 | 193.0                                                                                   | 56                                                                                       |
| 15KPA51                                              | 51.0                                                   | 56.7                       | 5             | 10                                                                  | 91.5                                                                 | 164.0                                                                                   | 66                                                                                       |
| 15KPA51A                                             | 51.0                                                   | 56.7                       | 5             | 10                                                                  | 82.8                                                                 | 181.0                                                                                   | 60                                                                                       |
| 15KPA54                                              | 54.0                                                   | 60.0                       | 5             | 10                                                                  | 96.8                                                                 | 155.0                                                                                   | 70                                                                                       |
| 15KPA54A                                             | 54.0                                                   | 60.0                       | 5             | 10                                                                  | 87.5                                                                 | 171.0                                                                                   | 63                                                                                       |
| P 15KPA58                                            | 58.0                                                   | 64.4                       | 5             | 10                                                                  | 104.0                                                                | 144.0                                                                                   | 76                                                                                       |
| P 15KPA58A                                           | 58.0                                                   | 64.4                       | 5             | 10                                                                  | 94.0                                                                 | 160.0                                                                                   | 68                                                                                       |
| 15KPA60                                              | 60.0                                                   | 66.7                       | 5             | 10                                                                  | 107.0                                                                | 140.0                                                                                   | 78                                                                                       |
| 15KPA60A                                             | 60.0                                                   | 66.7                       | 5             | 10                                                                  | 97.3                                                                 | 154.0                                                                                   | 71                                                                                       |
| 15KPA64                                              | 64.0                                                   | 71.1                       | 5             | 10                                                                  | 115.0                                                                | 130.0                                                                                   | 84                                                                                       |
| 15KPA64A                                             | 64.0                                                   | 71.1                       | 5             | 10                                                                  | 104.0                                                                | 144.0                                                                                   | 76                                                                                       |
| 15KPA70                                              | 70.0                                                   | 77.8                       | 5             | 10                                                                  | 126.0                                                                | 119.0                                                                                   | 92                                                                                       |
| 15KPA70A                                             | 70.0                                                   | 77.8                       | 5             | 10                                                                  | 114.0                                                                | 132.0                                                                                   | 83                                                                                       |
| 15KPA75                                              | 75.0                                                   | 83.3                       | 5             | 10                                                                  | 135.0                                                                | 111.0                                                                                   | 100                                                                                      |
| 15KPA75A                                             | 75.0                                                   | 83.3                       | 5             | 10                                                                  | 122.0                                                                | 123.0                                                                                   | 89                                                                                       |
| 15KPA78                                              | 78.0                                                   | 86.7                       | 5             | 10                                                                  | 140.0                                                                | 107.0                                                                                   | 104                                                                                      |
| 15KPA78A                                             | 78.0                                                   | 86.7                       | 5             | 10                                                                  | 126.0                                                                | 119.0                                                                                   | 93                                                                                       |
| 15KPA85                                              | 85.0                                                   | 94.4                       | 5             | 10                                                                  | 152.0                                                                | 99.0                                                                                    | 113                                                                                      |
| 15KPA85A                                             | 85.0                                                   | 94.4                       | 5             | 10                                                                  | 137.0                                                                | 109.0                                                                                   | 102                                                                                      |
| P 15KPA90                                            | 90.0                                                   | 100.0                      | 5             | 10                                                                  | 160.0                                                                | 94.0                                                                                    | 120                                                                                      |
| P 15KPA90A                                           | 90.0                                                   | 100.0                      | 5             | 10                                                                  | 146.0                                                                | 103.0                                                                                   | 109                                                                                      |
| 15KPA100                                             | 100.0                                                  | 111.0                      | 5             | 10                                                                  | 179.0                                                                | 84.0                                                                                    | 134                                                                                      |
| 15KPA100A                                            | 100.0                                                  | 111.0                      | 5             | 10                                                                  | 162.0                                                                | 93.0                                                                                    | 121                                                                                      |
| 15KPA110                                             | 110.0                                                  | 122.0                      | 5             | 10                                                                  | 196.0                                                                | 77.0                                                                                    | 147                                                                                      |
| 15KPA110A                                            | 110.0                                                  | 122.0                      | 5             | 10                                                                  | 178.0                                                                | 84.0                                                                                    | 133                                                                                      |
| 15KPA120                                             | 120.0                                                  | 133.0                      | 5             | 10                                                                  | 214.0                                                                | 70.0                                                                                    | 161                                                                                      |
| 15KPA120A                                            | 120.0                                                  | 133.0                      | 5             | 10                                                                  | 193.0                                                                | 78.0                                                                                    | 145                                                                                      |
| P 15KPA130                                           | 130.0                                                  | 144.0                      | 5             | 10                                                                  | 231.0                                                                | 65.0                                                                                    | 174                                                                                      |
| P 15KPA130A                                          | 130.0                                                  | 144.0                      | 5             | 10                                                                  | 209.0                                                                | 72.0                                                                                    | 157                                                                                      |
| 15KPA150                                             | 150.0                                                  | 167.0                      | 5             | 10                                                                  | 268.0                                                                | 56.0                                                                                    | 202                                                                                      |
| 15KPA150A                                            | 150.0                                                  | 167.0                      | 5             | 10                                                                  | 243.0                                                                | 62.0                                                                                    | 183                                                                                      |
| P 15KPA160                                           | 160.0                                                  | 178.0                      | 5             | 10                                                                  | 287.0                                                                | 52.0                                                                                    | 216                                                                                      |
| P 15KPA160A                                          | 160.0                                                  | 178.0                      | 5             | 10                                                                  | 259.0                                                                | 58.0                                                                                    | 195                                                                                      |
| P 15KPA170                                           | 170.0                                                  | 189.0                      | 5             | 10                                                                  | 304.0                                                                | 49.0                                                                                    | 229                                                                                      |
| P 15KPA170A                                          | 170.0                                                  | 189.0                      | 5             | 10                                                                  | 275.0                                                                | 55.0                                                                                    | 207                                                                                      |
| 15KPA180                                             | 180.0                                                  | 200.0                      | 5             | 10                                                                  | 321.0                                                                | 47.0                                                                                    | 242                                                                                      |
| 15KPA180A                                            | 180.0                                                  | 200.0                      | 5             | 10                                                                  | 291.0                                                                | 52.0                                                                                    | 219                                                                                      |
| 15KPA200                                             | 200.0                                                  | 222.0                      | 5             | 10                                                                  | 356.0                                                                | 42.0                                                                                    | 269                                                                                      |
| 15KPA200A                                            | 200.0                                                  | 222.0                      | 5             | 10                                                                  | 322.0                                                                | 47.0                                                                                    | 243                                                                                      |
| 15KPA220                                             | 220.0                                                  | 245.0                      | 5             | 10                                                                  | 393.0                                                                | 38.0                                                                                    | 297                                                                                      |
| 15KPA220A                                            | 220.0                                                  | 245.0                      | 5             | 10                                                                  | 356.0                                                                | 42.0                                                                                    | 269                                                                                      |
| 15KPA240                                             | 240.0                                                  | 267.0                      | 5             | 10                                                                  | 428.0                                                                | 35.0                                                                                    | 324                                                                                      |
| 15KPA240A                                            | 240.0                                                  | 267.0                      | 5             | 10                                                                  | 388.0                                                                | 39.0                                                                                    | 293                                                                                      |
| 15KPA260                                             | 260.0                                                  | 289.0                      | 5             | 10                                                                  | 464.0                                                                | 32.0                                                                                    | 352                                                                                      |
| 15KPA260A                                            | 260.0                                                  | 289.0                      | 5             | 10                                                                  | 419.0                                                                | 36.0                                                                                    | 317                                                                                      |
| 15KPA280                                             | 280.0                                                  | 311.0                      | 5             | 10                                                                  | 500.0                                                                | 30.0                                                                                    | 378                                                                                      |
| 15KPA280A                                            | 280.0                                                  | 311.0                      | 5             | 10                                                                  | 452.0                                                                | 33.0                                                                                    | 342                                                                                      |

## TYPICAL RELAY DRIVE PROTECTION APPLICATION



## 15KPA SERIES PACKAGE DIMENSIONS



## NOTES

**Note 1:** P = Preferred part. For preferred parts and bidirectional devices, consult factory for minimum order quantity and delivery. Part numbers shown are unidirectional devices. Add "C" or "CA" suffix to specify bidirectional devices, such as 15KPA17C or 15KPA17CA.

**Note 2:**  $V_F = 7.5V$  @ 200A, 8.3 ms - 1/2 sine wave (Unidirectional).

