



# SOLID STATE INC.

46 FARRAND STREET  
BLOOMFIELD, NEW JERSEY 07003

www.solidstateinc.com

## 1N5629 thru 1N5665

### FEATURES

- PROTECTS CIRCUITS FROM HARMFUL TRANSIENTS
- ABSORBS 1 MS TRANSIENTS UP TO 1500 WATTS
- CLAMPS TRANSIENT IN 1 PICO SEC
- 1 WATT CONTINUOUS POWER DISSIPATION
- WORKING VOLTAGE RANGE 5V TO 171V
- HERMETIC DO-13 METAL PACKAGE

### MAXIMUM RATINGS

1500 watts for 1 ms at lead temp ( $T_A$ ) 25°C  
 See rating curves Figs. 1 thru 4  
 Operating and storage temp -65° to 175°C  
 DC power dissipation 1 watt at  $T_A = 25^\circ\text{C}$ , 3/8" from body.  
 Derate at 6.67 mW/°C  
 Forward surge current 200 amps for 8.3 ms at  $T_A = 25^\circ\text{C}$

### ELECTRICAL CHARACTERISTICS

See following table  
 No suffix 10% tolerance  
 Suffix A 5% tolerance

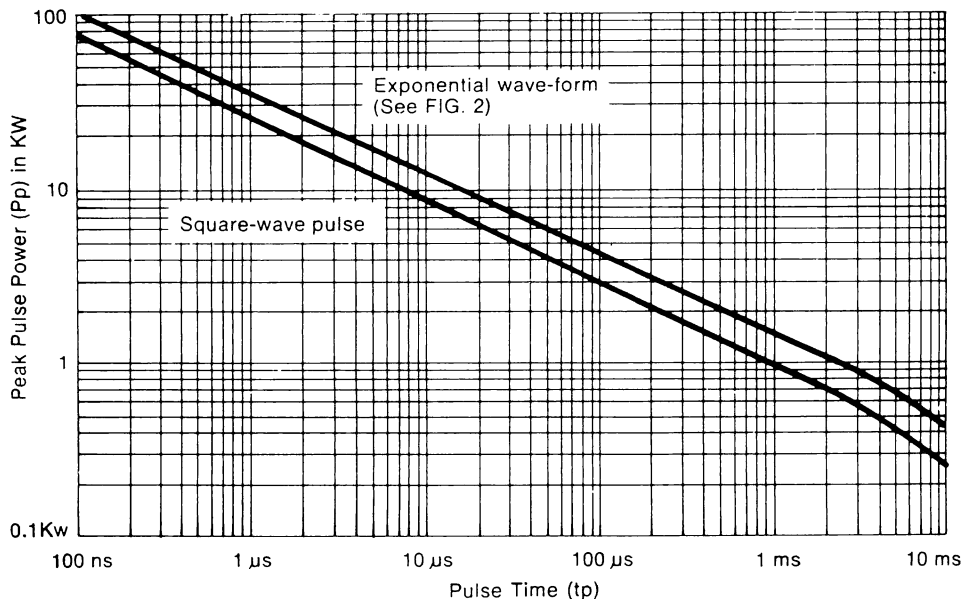
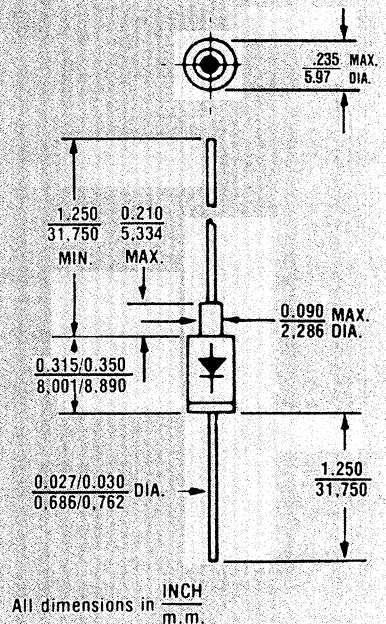


FIG. 1. Non-repetitive peak pulse power rating curve

Note: Peak power defined as peak voltage times peak current

### TRANSIENT ABSORPTION ZENER



### MECHANICAL CHARACTERISTICS

CASE: DO-13, welded, hermetically sealed metal and glass.

FINISH: All external surfaces are corrosion resistant and leads solderable.

THERMAL RESISTANCE: 100°C/W (Typical) junction to lead at 0.375-inches from body.

POLARITY: Cathode connected to case and marked.

WEIGHT: 1.4 grams (Appx.)

MOUNTING POSITION: Any.

# 1N5629 thru 1N5665

## \*ELECTRICAL CHARACTERISTICS at $T_A = 25^\circ\text{C}$

| Type No. | Breakdown Voltage ( $V_{BR}$ ) |       | Test Current ( $I_T$ ) | Rated Standoff Voltage ( $V_{WM}$ ) | Maximum Reverse Leakage Current ( $I_D$ at $V_{WM}$ ) | Maximum Peak Reverse Voltage ( $V_C$ max. at $I_{pp}$ ) | Maximum Peak Pulse Current ( $I_{pp}$ ) | Maximum Temperature Coefficient of $V_{(BR)}$ $\alpha V_Z$ ( $T_A$ ) $-55^\circ\text{C}$ to $100^\circ\text{C}$ |
|----------|--------------------------------|-------|------------------------|-------------------------------------|---|---|---|---|
|          | Min.                           | Max.  |                        |                                     |   |   |   |   |
|          | Vdc                            | Vdc   | mAdc                   | V                                   | $\mu\text{Adc}$                                       | V   | A                                       | % $^\circ\text{C}$  |
| 1N5629   | 6.12                           | 7.48  | 10                     | 5.50                                | 1000  | 10.8  | 139                                     | .057  |
| 1N5629A  | 6.45                           | 7.14  | 10                     | 5.80                                | 1000  | 10.5  | 143                                     | .057  |
| 1N5630   | 6.75                           | 8.25  | 10                     | 6.05                                | 500   | 11.7  | 128                                     | .061  |
| 1N5630A  | 7.13                           | 7.88  | 10                     | 6.40                                | 500   | 11.3  | 132                                     | .061  |
| 1N5631   | 7.38                           | 9.02  | 10                     | 6.63                                | 200   | 12.5  | 120                                     | .065  |
| 1N5631A  | 7.79                           | 8.61  | 10                     | 7.02                                | 200   | 12.1  | 124                                     | .065  |
| 1N5632   | 8.19                           | 10.0  | 1                      | 7.37                                | 50  | 13.8  | 109                                     | .068  |
| 1N5632A  | 8.65                           | 9.55  | 1                      | 7.78                                | 50  | 13.4  | 112                                     | .068  |
| 1N5633   | 9.00                           | 11.0  | 1                      | 8.10                                | 10  | 15.0  | 100                                     | .073  |
| 1N5633A  | 9.5                            | 10.5  | 1                      | 8.55                                | 10  | 14.5  | 103                                     | .073  |
| 1N5634   | 9.9                            | 12.1  | 1                      | 8.92                                | 5   | 16.2  | 93                                      | .075  |
| 1N5634A  | 10.5                           | 11.6  | 1                      | 9.40                                | 5   | 15.6  | 96                                      | .075  |
| 1N5635   | 10.8                           | 13.2  | 1                      | 9.72                                | 5   | 17.3  | 87                                      | .078  |
| 1N5635A  | 11.4                           | 12.6  | 1                      | 10.2                                | 5   | 16.7  | 90                                      | .078  |
| 1N5636   | 11.7                           | 14.3  | 1                      | 10.5                                | 5   | 19.0  | 79                                      | .081  |
| 1N5636A  | 12.4                           | 13.7  | 1                      | 11.1                                | 5   | 18.2  | 82                                      | .081  |
| 1N5637   | 13.5                           | 16.5  | 1                      | 12.1                                | 5   | 22.0  | 68                                      | .084  |
| 1N5637A  | 14.3                           | 15.8  | 1                      | 12.8                                | 5   | 21.2  | 71                                      | .084  |
| 1N5638   | 14.4                           | 17.6  | 1                      | 12.9                                | 5   | 23.5  | 64                                      | .086  |
| 1N5638A  | 15.2                           | 16.8  | 1                      | 13.6                                | 5   | 22.5  | 67                                      | .086  |
| 1N5639   | 16.2                           | 19.8  | 1                      | 14.5                                | 5   | 26.5  | 56.5                                    | .088  |
| 1N5639A  | 17.1                           | 18.9  | 1                      | 15.3                                | 5   | 25.2  | 59.5                                    | .088  |
| 1N5640   | 18.0                           | 22.0  | 1                      | 16.2                                | 5   | 29.1  | 51.5                                    | .090  |
| 1N5640A  | 19.0                           | 21.0  | 1                      | 17.1                                | 5   | 27.7  | 54                                      | .090  |
| 1N5641   | 19.8                           | 24.2  | 1                      | 17.8                                | 5   | 31.9  | 47                                      | .092  |
| 1N5641A  | 20.9                           | 23.1  | 1                      | 18.8                                | 5   | 30.6  | 49                                      | .092  |
| 1N5642   | 21.6                           | 26.4  | 1                      | 19.4                                | 5   | 34.7  | 43                                      | .094  |
| 1N5642A  | 22.8                           | 25.2  | 1                      | 20.5                                | 5   | 33.2  | 45                                      | .094  |
| 1N5643   | 24.3                           | 29.7  | 1                      | 21.8                                | 5   | 39.1  | 38.5                                    | .096  |
| 1N5643A  | 25.7                           | 28.4  | 1                      | 23.1                                | 5   | 37.5  | 40                                      | .096  |
| 1N5644   | 27.0                           | 33.0  | 1                      | 24.3                                | 5   | 43.5  | 34.5                                    | .097  |
| 1N5644A  | 28.5                           | 31.5  | 1                      | 25.6                                | 5   | 41.4  | 36                                      | .097  |
| 1N5645   | 29.7                           | 36.3  | 1                      | 26.8                                | 5   | 47.7  | 31.5                                    | .098  |
| 1N5645A  | 31.4                           | 34.7  | 1                      | 28.2                                | 5   | 45.7  | 33                                      | .098  |
| 1N5646   | 32.4                           | 39.6  | 1                      | 29.1                                | 5   | 52.0  | 29                                      | .099  |
| 1N5646A  | 34.2                           | 37.8  | 1                      | 30.8                                | 5   | 49.9  | 30                                      | .099  |
| 1N5647   | 35.1                           | 42.9  | 1                      | 31.6                                | 5   | 56.4  | 26.5                                    | .100  |
| 1N5647A  | 37.1                           | 41.0  | 1                      | 33.3                                | 5   | 53.9  | 28                                      | .100  |
| 1N5648   | 38.7                           | 47.3  | 1                      | 34.8                                | 5   | 61.9  | 24                                      | .101  |
| 1N5648A  | 40.9                           | 45.2  | 1                      | 36.8                                | 5   | 59.3  | 25.3                                    | .101  |
| 1N5649   | 42.3                           | 51.7  | 1                      | 38.1                                | 5   | 67.8  | 22.2                                    | .101  |
| 1N5649A  | 44.7                           | 49.4  | 1                      | 40.2                                | 5   | 64.8  | 23.2                                    | .101  |
| 1N5650   | 45.9                           | 56.1  | 1                      | 41.3                                | 5   | 73.5  | 20.4                                    | .102  |
| 1N5650A  | 48.5                           | 53.6  | 1                      | 43.6                                | 5   | 70.1  | 21.4                                    | .102  |
| 1N5651   | 50.4                           | 61.6  | 1                      | 45.4                                | 5   | 80.5  | 18.6                                    | .103  |
| 1N5651A  | 53.2                           | 58.8  | 1                      | 47.8                                | 5   | 77.0  | 19.5                                    | .103  |
| 1N5652   | 55.8                           | 68.2  | 1                      | 50.2                                | 5   | 89.0  | 16.9                                    | .104  |
| 1N5652A  | 58.9                           | 65.1  | 1                      | 53.0                                | 5   | 85.0  | 17.7                                    | .104  |
| 1N5653   | 61.2                           | 74.8  | 1                      | 55.1                                | 5   | 98.0  | 15.3                                    | .104  |
| 1N5653A  | 64.6                           | 71.4  | 1                      | 58.1                                | 5   | 92.0  | 16.3                                    | .104  |
| 1N5654   | 67.5                           | 82.5  | 1                      | 60.7                                | 5   | 108   | 13.9                                    | .105  |
| 1N5654A  | 71.3                           | 78.8  | 1                      | 64.1                                | 5   | 103   | 14.6                                    | .105  |
| 1N5655   | 73.8                           | 90.2  | 1                      | 66.4                                | 5   | 118   | 12.7                                    | .105  |
| 1N5655A  | 77.9                           | 86.1  | 1                      | 70.1                                | 5   | 113   | 13.3                                    | .105  |
| 1N5656   | 81.9                           | 100.0 | 1                      | 73.7                                | 5   | 131   | 11.4                                    | .106  |
| 1N5656A  | 86.5                           | 95.5  | 1                      | 77.8                                | 5   | 125   | 12.0                                    | .106  |
| 1N5657   | 90                             | 110   | 1                      | 81.0                                | 5   | 144   | 10.4                                    | .106  |
| 1N5657A  | 95                             | 105   | 1                      | 85.5                                | 5   | 137   | 11.0                                    | .106  |
| 1N5658   | 99                             | 121   | 1                      | 89.2                                | 5   | 158   | 9.5                                     | .107  |
| 1N5658A  | 105                            | 116   | 1                      | 94.0                                | 5   | 152   | 9.9                                     | .107  |
| 1N5659   | 108                            | 132   | 1                      | 97.2                                | 5   | 173   | 8.7                                     | .107  |
| 1N5659A  | 114                            | 126   | 1                      | 102                                 | 5   | 165   | 9.1                                     | .107  |
| 1N5660   | 117                            | 143   | 1                      | 105                                 | 5   | 187   | 8.0                                     | .107  |
| 1N5660A  | 124                            | 137   | 1                      | 111                                 | 5   | 179   | 8.4                                     | .107  |
| 1N5661   | 135                            | 165   | 1                      | 121                                 | 5   | 215   | 7.0                                     | .108  |
| 1N5661A  | 143                            | 158   | 1                      | 128                                 | 5   | 207   | 7.2                                     | .108  |
| 1N5662   | 144                            | 176   | 1                      | 130                                 | 5   | 230   | 6.5                                     | .108  |
| 1N5662A  | 152                            | 168   | 1                      | 136                                 | 5   | 219   | 6.8                                     | .108  |
| 1N5663   | 153                            | 187   | 1                      | 138                                 | 5   | 244   | 6.2                                     | .108  |
| 1N5663A  | 162                            | 179   | 1                      | 145                                 | 5   | 234   | 6.4                                     | .108  |
| 1N5664   | 162                            | 198   | 1                      | 146                                 | 5   | 258   | 5.8                                     | .108  |
| 1N5664A  | 171                            | 189   | 1                      | 154                                 | 5   | 246   | 6.1                                     | .108  |
| 1N5665   | 180                            | 220   | 1                      | 162                                 | 5   | 287   | 5.2                                     | .108  |
| 1N5665A  | 190                            | 210   | 1                      | 171                                 | 5   | 274   | 5.5                                     | .108  |

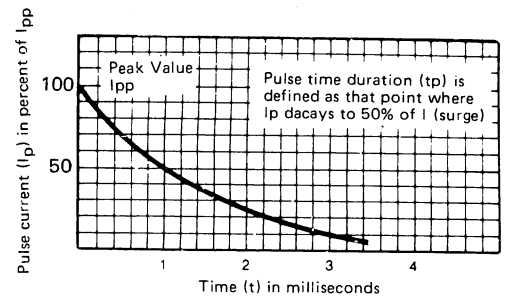


FIG. 2. Pulse wave form for exponential surge

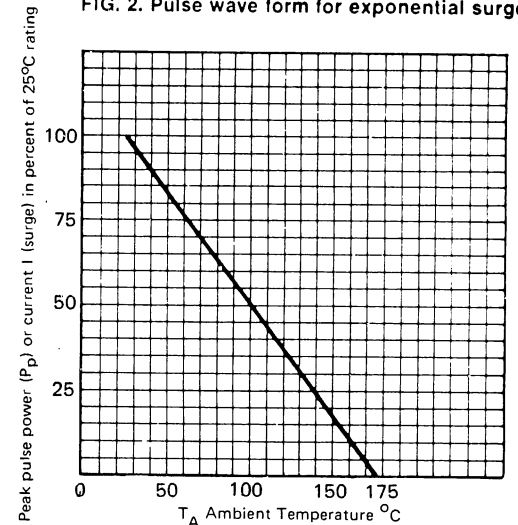


FIG. 3. Derating curve

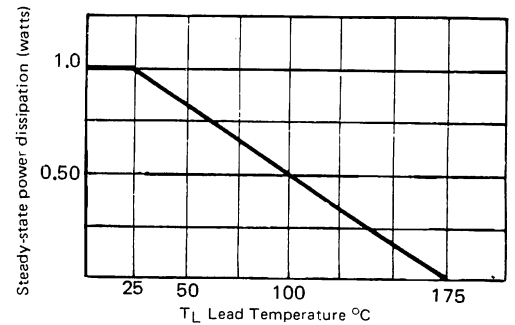


FIG. 4. Steady-state power derating curve

### ABBREVIATIONS AND SYMBOLS

$V_{WM}$  Stand Off Voltage: Applied Reverse Voltage to assure a nonconductive condition. (See Note 1.)

$V_{(BR)}$  This is the Breakdown Voltage the device will exhibit and is used to assure that conduction does not occur prior to this voltage level at  $25^\circ\text{C}$ .

$V_C$  Maximum Clamping Voltage. The maximum peak voltage appearing across the Zener when subjected to the peak pulse current in a one millisecond time interval. The peak pulse voltages are the combi-

nation of voltage rise due to both the series resistance and thermal rise.

Figure 2.  
 $I_{pp}$  Peak Pulse Current—See Figure 2.  
 $P_{pp}$ —Peak Pulse Power.  
 $I_D$ —Reverse Leakage.  
 $I_T$ —Current that  $V_{(BR)}$  is measured at.

Note 1:  
A TAZ is normally selected according to the rated "Stand Off Voltage"  $V_{WM}$  which should be equal to or greater than the DC or continuous peak operating voltage level.

\* $V_{(BR)}$  is measured after  $I_T$  has been applied for  $\leq 300$  ms  
Forward voltage  $V_F$ , at  $I_F = 1$  AMP, 1.2V max.  
Forward current  $I_F$  shall be applied for 30 secs. before  $V_F$  is measured.