

# 1N6267L - 1N6303AL

## TRANSIENT VOLTAGE SUPPRESSOR

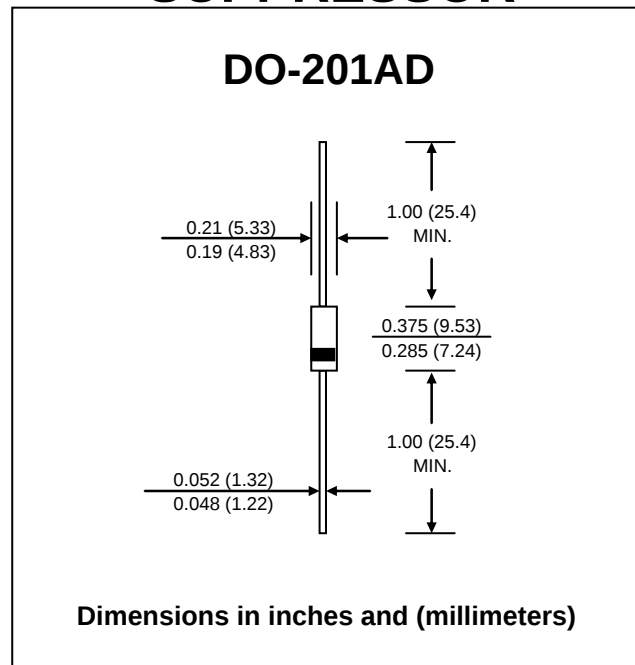
**V<sub>BR</sub> : 6.8 - 200 Volts**  
**P<sub>PK</sub> : 1500 Watts**

### FEATURES :

- \* 1500W surge capability at 1ms
- \* Excellent clamping capability
- \* Low zener impedance
- \* Fast response time : typically less than 1.0 ps from 0 volt to V<sub>BR(min.)</sub>
- \* Typical I<sub>R</sub> less than 1μA above 10V
- \* **Pb / RoHS Free**

### MECHANICAL DATA

- \* Case : DO-201AD Molded plastic
- \* Epoxy : UL94V-O rate flame retardant
- \* Lead : Axial lead solderable per MIL-STD-202, method 208 guaranteed
- \* Polarity : Color band denotes cathode end except Bipolar.
- \* Mounting position : Any
- \* Weight : 1.21 grams



### DEVICES FOR BIPOLAR APPLICATIONS

For bi-directional use C or CA Suffix  
 Electrical characteristics apply in both directions

### MAXIMUM RATINGS

Rating at 25 °C ambient temperature unless otherwise specified

| Rating                                                                                                           | Symbol                            | Value         | Unit |
|------------------------------------------------------------------------------------------------------------------|-----------------------------------|---------------|------|
| Peak Power Dissipation at T <sub>a</sub> = 25 °C, T <sub>p</sub> =1ms (Note1)                                    | P <sub>PK</sub>                   | 1500          | W    |
| Steady State Power Dissipation at T <sub>L</sub> = 75 °C<br>Lead Lengths 0.375", (9.5mm) (Note 2)                | P <sub>D</sub>                    | 5.0           | W    |
| Peak Forward Surge Current, 8.3ms Single Half<br>Sine-Wave Superimposed on Rated Load<br>(JEDEC Method) (Note 3) | I <sub>FSM</sub>                  | 200           | A    |
| Operating and Storage Temperature Range                                                                          | T <sub>J</sub> , T <sub>STG</sub> | - 65 to + 175 | °C   |

### Notes :

- (1) Non-repetitive Current pulse per Fig. 5 and derated above T<sub>a</sub> = 25 °C per Fig. 1
- (2) Mounted on Copper Lead area of 1.57 in<sup>2</sup>(40mm<sup>2</sup>).
- (3) 8.3 ms single half sine-wave, duty cycle = 4 pulses per minutes maximum.

## ELECTRICAL CHARACTERISTICS

Rating at 25 °C ambient temperature unless otherwise specified

| TYPE     | Breakdown Voltage @ It<br>( Note 1 ) |      |      | Working Peak<br>Reverse<br>Voltage | Maximum<br>Reverse Leakage<br>@ VRWM | Maximum<br>Reverse<br>Current | Maximum<br>Clamping<br>Voltage @ IRSM | Maximum<br>Temperature<br>Co-efficient<br>of VBR |
|----------|--------------------------------------|------|------|------------------------------------|--------------------------------------|-------------------------------|---------------------------------------|--------------------------------------------------|
|          | VBR (V)                              |      | It   | VRWM                               | IR                                   | IRSM                          | VRSM                                  | of VBR                                           |
|          | Min.                                 | Max. | (mA) | (V)                                | (μA)                                 | (A)                           | (V)                                   |                                                  |
| 1N6267L  | 6.12                                 | 7.48 | 10   | 5.50                               | 1000                                 | 139                           | 10.8                                  | 0.057                                            |
| 1N6267AL | 6.45                                 | 7.14 | 10   | 5.80                               | 1000                                 | 143                           | 10.5                                  | 0.057                                            |
| 1N6268L  | 6.75                                 | 8.25 | 10   | 6.05                               | 500                                  | 128                           | 11.7                                  | 0.061                                            |
| 1N6268AL | 7.13                                 | 7.88 | 10   | 6.40                               | 500                                  | 132                           | 11.3                                  | 0.061                                            |
| 1N6269L  | 7.38                                 | 9.02 | 10   | 6.63                               | 200                                  | 120                           | 12.5                                  | 0.065                                            |
| 1N6269AL | 7.79                                 | 8.61 | 10   | 7.02                               | 200                                  | 124                           | 12.1                                  | 0.065                                            |
| 1N6270L  | 8.19                                 | 10.0 | 1.0  | 7.37                               | 50                                   | 109                           | 13.8                                  | 0.068                                            |
| 1N6270AL | 8.65                                 | 9.55 | 1.0  | 7.78                               | 50                                   | 112                           | 13.4                                  | 0.068                                            |
| 1N6271L  | 9.00                                 | 11.0 | 1.0  | 8.10                               | 10                                   | 100                           | 15.0                                  | 0.073                                            |
| 1N6271AL | 9.50                                 | 10.5 | 1.0  | 8.55                               | 10                                   | 103                           | 14.5                                  | 0.073                                            |
| 1N6272L  | 9.90                                 | 12.1 | 1.0  | 8.92                               | 5.0                                  | 93.0                          | 16.2                                  | 0.075                                            |
| 1N6272AL | 10.5                                 | 11.6 | 1.0  | 9.40                               | 5.0                                  | 96.0                          | 15.6                                  | 0.075                                            |
| 1N6273L  | 10.8                                 | 13.2 | 1.0  | 9.72                               | 5.0                                  | 87.0                          | 17.3                                  | 0.078                                            |
| 1N6273AL | 11.4                                 | 12.6 | 1.0  | 10.2                               | 5.0                                  | 90.0                          | 16.7                                  | 0.078                                            |
| 1N6274L  | 11.7                                 | 14.3 | 1.0  | 10.5                               | 5.0                                  | 79.0                          | 19.0                                  | 0.081                                            |
| 1N6274AL | 12.4                                 | 13.7 | 1.0  | 11.1                               | 5.0                                  | 82.0                          | 18.2                                  | 0.081                                            |
| 1N6275L  | 13.5                                 | 16.5 | 1.0  | 12.1                               | 5.0                                  | 68.0                          | 22.0                                  | 0.084                                            |
| 1N6275AL | 14.3                                 | 15.8 | 1.0  | 12.8                               | 5.0                                  | 71.0                          | 21.2                                  | 0.084                                            |
| 1N6276L  | 14.4                                 | 17.6 | 1.0  | 12.9                               | 5.0                                  | 64.0                          | 23.5                                  | 0.086                                            |
| 1N6276AL | 15.2                                 | 16.8 | 1.0  | 13.6                               | 5.0                                  | 67.0                          | 22.5                                  | 0.086                                            |
| 1N6277L  | 16.2                                 | 19.8 | 1.0  | 14.5                               | 5.0                                  | 56.5                          | 26.5                                  | 0.088                                            |
| 1N6277AL | 17.1                                 | 18.9 | 1.0  | 15.3                               | 5.0                                  | 59.5                          | 25.2                                  | 0.088                                            |
| 1N6278L  | 18.0                                 | 22.0 | 1.0  | 16.2                               | 5.0                                  | 51.5                          | 29.1                                  | 0.090                                            |
| 1N6278AL | 19.0                                 | 21.0 | 1.0  | 17.1                               | 5.0                                  | 54.0                          | 27.7                                  | 0.090                                            |
| 1N6279L  | 19.8                                 | 24.2 | 1.0  | 17.8                               | 5.0                                  | 47.0                          | 31.9                                  | 0.092                                            |
| 1N6279AL | 20.9                                 | 23.1 | 1.0  | 18.8                               | 5.0                                  | 49.0                          | 30.6                                  | 0.092                                            |
| 1N6280L  | 21.6                                 | 26.4 | 1.0  | 19.4                               | 5.0                                  | 43.0                          | 34.7                                  | 0.094                                            |
| 1N6280AL | 22.8                                 | 25.2 | 1.0  | 20.5                               | 5.0                                  | 45.0                          | 33.2                                  | 0.094                                            |
| 1N6281L  | 24.3                                 | 29.7 | 1.0  | 21.8                               | 5.0                                  | 38.5                          | 39.1                                  | 0.096                                            |
| 1N6281AL | 25.7                                 | 28.4 | 1.0  | 23.1                               | 5.0                                  | 40.0                          | 37.5                                  | 0.096                                            |
| 1N6282L  | 27.0                                 | 33.0 | 1.0  | 24.3                               | 5.0                                  | 34.5                          | 43.5                                  | 0.097                                            |
| 1N6282AL | 28.5                                 | 31.5 | 1.0  | 25.6                               | 5.0                                  | 36.0                          | 41.4                                  | 0.097                                            |
| 1N6283L  | 29.7                                 | 36.3 | 1.0  | 26.8                               | 5.0                                  | 31.5                          | 47.7                                  | 0.098                                            |
| 1N6283AL | 31.4                                 | 34.7 | 1.0  | 28.2                               | 5.0                                  | 33.0                          | 45.7                                  | 0.098                                            |
| 1N6284L  | 32.4                                 | 39.6 | 1.0  | 29.1                               | 5.0                                  | 29.0                          | 52.0                                  | 0.099                                            |
| 1N6284AL | 34.2                                 | 37.8 | 1.0  | 30.8                               | 5.0                                  | 30.0                          | 49.9                                  | 0.099                                            |
| 1N6285L  | 35.1                                 | 42.9 | 1.0  | 31.6                               | 5.0                                  | 26.5                          | 56.4                                  | 0.100                                            |
| 1N6285AL | 37.1                                 | 41.0 | 1.0  | 33.3                               | 5.0                                  | 28.0                          | 53.9                                  | 0.100                                            |
| 1N6286L  | 38.7                                 | 47.3 | 1.0  | 34.8                               | 5.0                                  | 24.0                          | 61.9                                  | 0.101                                            |
| 1N6286AL | 40.9                                 | 45.2 | 1.0  | 36.8                               | 5.0                                  | 25.3                          | 59.3                                  | 0.101                                            |
| 1N6287L  | 42.3                                 | 51.7 | 1.0  | 38.1                               | 5.0                                  | 22.2                          | 67.8                                  | 0.101                                            |
| 1N6287AL | 44.7                                 | 49.4 | 1.0  | 40.2                               | 5.0                                  | 23.2                          | 64.8                                  | 0.101                                            |
| 1N6288L  | 45.9                                 | 56.1 | 1.0  | 41.3                               | 5.0                                  | 20.4                          | 73.5                                  | 0.102                                            |
| 1N6288AL | 48.5                                 | 53.6 | 1.0  | 43.6                               | 5.0                                  | 21.4                          | 70.1                                  | 0.102                                            |

## ELECTRICAL CHARACTERISTICS

Rating at 25 °C ambient temperature unless otherwise specified

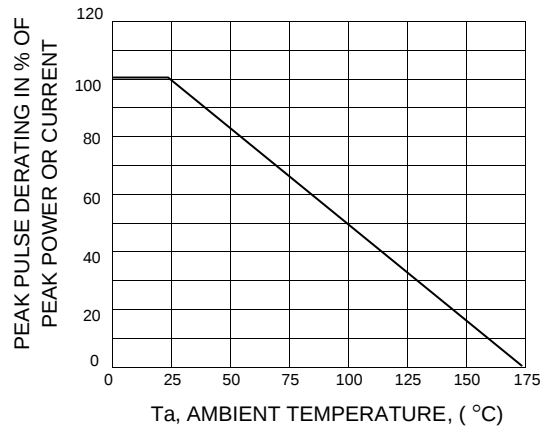
| TYPE     | Breakdown Voltage @ $I_t$<br>( Note 1 ) |      |       | Working Peak<br>Reverse<br>Voltage | Maximum<br>Reverse Leakage<br>@ $V_{RWM}$ | Maximum<br>Reverse<br>Current | Maximum<br>Clamping<br>Voltage @ $I_{RSM}$ | Maximum<br>Temperature<br>Co-efficient<br>of $V_{BR}$ |
|----------|-----------------------------------------|------|-------|------------------------------------|-------------------------------------------|-------------------------------|--------------------------------------------|-------------------------------------------------------|
|          | $V_{BR}$ (V)                            |      | $I_t$ | $V_{RWM}$                          | $I_R$                                     | $I_{RSM}$                     | $V_{RSM}$                                  | of $V_{BR}$                                           |
|          | Min.                                    | Max. | (mA)  | (V)                                | ( $\mu$ A)                                | (A)                           | (V)                                        |                                                       |
| 1N6289L  | 50.4                                    | 61.6 | 1.0   | 45.4                               | 5.0                                       | 18.6                          | 80.5                                       | 0.103                                                 |
| 1N6289AL | 53.2                                    | 58.8 | 1.0   | 47.8                               | 5.0                                       | 19.5                          | 77.0                                       | 0.103                                                 |
| 1N6290L  | 55.8                                    | 68.2 | 1.0   | 50.2                               | 5.0                                       | 16.9                          | 89.0                                       | 0.104                                                 |
| 1N6290AL | 58.9                                    | 65.1 | 1.0   | 53.0                               | 5.0                                       | 17.7                          | 85.0                                       | 0.104                                                 |
| 1N6291L  | 61.2                                    | 74.8 | 1.0   | 55.1                               | 5.0                                       | 15.3                          | 98.0                                       | 0.104                                                 |
| 1N6291AL | 64.6                                    | 71.4 | 1.0   | 58.1                               | 5.0                                       | 16.3                          | 92.0                                       | 0.104                                                 |
| 1N6292L  | 67.5                                    | 82.5 | 1.0   | 60.7                               | 5.0                                       | 13.9                          | 108                                        | 0.105                                                 |
| 1N6292AL | 71.3                                    | 78.8 | 1.0   | 64.1                               | 5.0                                       | 14.6                          | 103                                        | 0.105                                                 |
| 1N6293L  | 73.8                                    | 90.2 | 1.0   | 66.4                               | 5.0                                       | 12.7                          | 118                                        | 0.105                                                 |
| 1N6293AL | 77.9                                    | 86.1 | 1.0   | 70.1                               | 5.0                                       | 13.3                          | 113                                        | 0.105                                                 |
| 1N6294L  | 81.9                                    | 100  | 1.0   | 73.7                               | 5.0                                       | 11.4                          | 131                                        | 0.106                                                 |
| 1N6294AL | 86.5                                    | 95.5 | 1.0   | 77.8                               | 5.0                                       | 12.0                          | 125                                        | 0.106                                                 |
| 1N6295L  | 90.0                                    | 110  | 1.0   | 81.0                               | 5.0                                       | 10.4                          | 144                                        | 0.106                                                 |
| 1N6295AL | 95.0                                    | 105  | 1.0   | 85.5                               | 5.0                                       | 11.0                          | 137                                        | 0.106                                                 |
| 1N6296L  | 99.0                                    | 121  | 1.0   | 89.2                               | 5.0                                       | 9.5                           | 158                                        | 0.107                                                 |
| 1N6296AL | 105                                     | 116  | 1.0   | 94.0                               | 5.0                                       | 9.9                           | 152                                        | 0.107                                                 |
| 1N6297L  | 108                                     | 132  | 1.0   | 97.2                               | 5.0                                       | 8.7                           | 173                                        | 0.107                                                 |
| 1N6297AL | 114                                     | 126  | 1.0   | 102                                | 5.0                                       | 9.1                           | 165                                        | 0.107                                                 |
| 1N6298L  | 117                                     | 143  | 1.0   | 105                                | 5.0                                       | 8.0                           | 187                                        | 0.107                                                 |
| 1N6298AL | 124                                     | 137  | 1.0   | 111                                | 5.0                                       | 8.4                           | 179                                        | 0.107                                                 |
| 1N6299L  | 135                                     | 165  | 1.0   | 121                                | 5.0                                       | 7.0                           | 215                                        | 0.108                                                 |
| 1N6299AL | 143                                     | 158  | 1.0   | 128                                | 5.0                                       | 7.2                           | 207                                        | 0.108                                                 |
| 1N6300L  | 144                                     | 176  | 1.0   | 130                                | 5.0                                       | 6.5                           | 230                                        | 0.108                                                 |
| 1N6300AL | 152                                     | 168  | 1.0   | 136                                | 5.0                                       | 6.8                           | 219                                        | 0.108                                                 |
| 1N6301L  | 153                                     | 187  | 1.0   | 138                                | 5.0                                       | 6.2                           | 244                                        | 0.108                                                 |
| 1N6301AL | 162                                     | 179  | 1.0   | 145                                | 5.0                                       | 6.4                           | 234                                        | 0.108                                                 |
| 1N6302L  | 162                                     | 198  | 1.0   | 146                                | 5.0                                       | 5.8                           | 258                                        | 0.108                                                 |
| 1N6302AL | 171                                     | 189  | 1.0   | 154                                | 5.0                                       | 6.1                           | 246                                        | 0.108                                                 |
| 1N6303L  | 180                                     | 220  | 1.0   | 162                                | 5.0                                       | 5.2                           | 287                                        | 0.108                                                 |
| 1N6303AL | 190                                     | 210  | 1.0   | 171                                | 5.0                                       | 5.5                           | 274                                        | 0.108                                                 |

### Note:

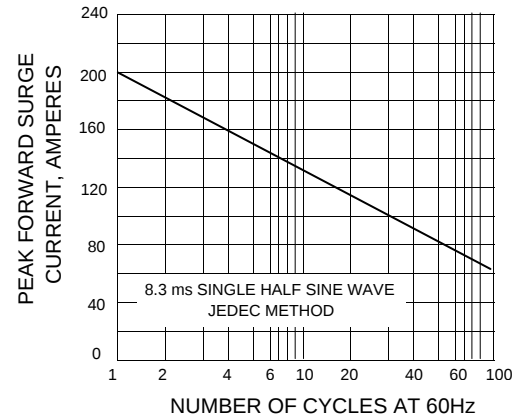
- ( 1 )  $V_{BR}$  measured after  $I_t$  applied for 300 $\mu$ s.,  $I_t$  = square wave pulse or equivalent
- ( 2 )  $V_F$  = 3.5  $V_{max.}$ ,  $f$  = 100 Amps. ( 6.8 Volts thru 91 Volts )  
 $V_F$  = 5.0  $V_{max.}$ ,  $f$  = 100 Amps. ( 100 Volts thru 200 Volts ) per 1/square or equivalent sine wave  
 PW = 8.3 ms, duty cycle = 4 pulses per minute maximum

## RATING AND CHARACTERISTIC CURVES ( 1N6267L - 1N6303AL )

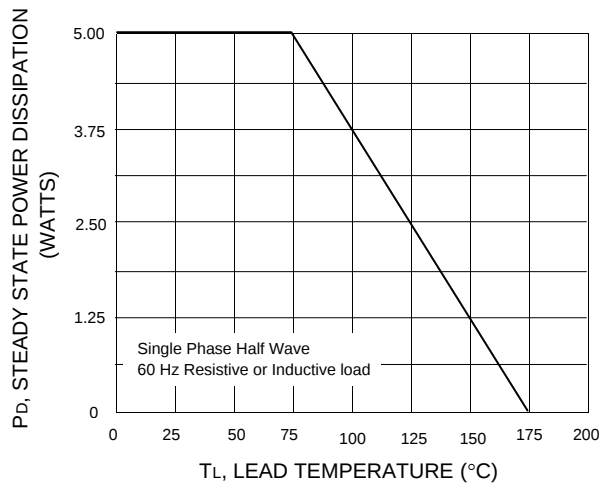
**FIG.1 - PULSE DERATING CURVE**



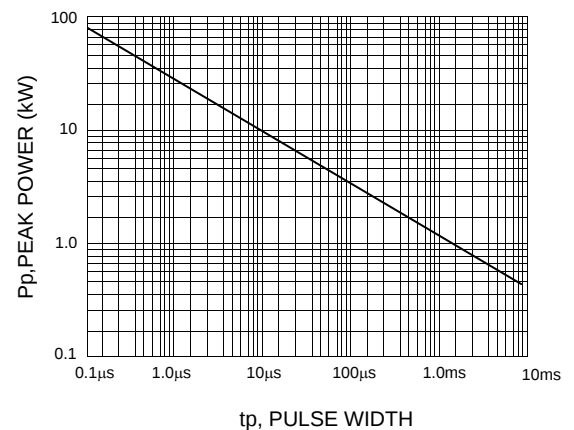
**FIG.2 - MAXIMUM NON-REPETITIVE SURGE CURRENT**



**FIG.3 - STEADY STATE POWER DERATING**



**FIG.4 - PULSE RATING CURVE**



**FIG.5 - PULSE WAVEFORM**

