

# ULCE SERIES

**V<sub>BR</sub> : 6.5 - 90 Volts**

**P<sub>PK</sub> : 1500 Watts**

## FEATURES :

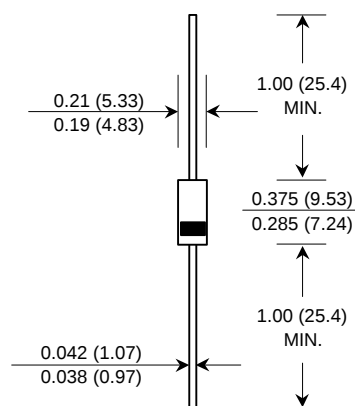
- \* 1500W Peak Pulse Surge reverse capability on 10/1000μs waveform
- \* Excellent clamping capability
- \* Low incremental surge resistance
- \* Fast response time : typically less than 5.0 ns from 0 volts to BV

## MECHANICAL DATA

- \* Case : DO-201 Molded plastic
- \* Epoxy : UL94V-O rate flame retardant
- \* Lead : Axial lead solderable per MIL-STD-202, method 208 guaranteed
- \* Polarity : Color band denotes positive end on the Transorb (cathode)
- \* Mounting position : Any
- \* Weight : 0.93 gram

# ULTRA LOW CAPACITANCE TRANSIENT VOLTAGE SUPPRESSOR

## DO-201



**Dimensions in inches and (millimeters)**

## MAXIMUM RATINGS

Rating at 25 °C ambient temperature unless otherwise specified.

| Rating                                                                                         | Symbol                            | Value         | Unit  |
|------------------------------------------------------------------------------------------------|-----------------------------------|---------------|-------|
| Peak Pulse Power Dissipation on 10/1000μs waveform (Note 1, Figure 1)                          | PPPM                              | Minimum 1500  | Watts |
| Steady State Power Dissipation at T <sub>L</sub> = 75 °C Lead Lengths 0.375", (9.5mm) (Note 2) | P <sub>D</sub>                    | 5.0           | Watts |
| Peak Pulse Power Surge Current on 10/1000 μs Waveform (Fig. 3, Note 1)                         | I <sub>RSM</sub>                  | See Table 1.  | Amps. |
| Operating and Storage Temperature Range                                                        | T <sub>J</sub> , T <sub>STG</sub> | - 65 to + 175 | °C    |

## Note :

- (1) Non-repetitive Current pulse, per Fig. 3 and derated above Ta = 25 °C per Fig. 2
- (2) 8.3 ms single half sine-wave, duty cycle = 4 pulses per minutes maximum.

**UPDATE : APRIL 6, 2002**



Certificate Number: Q10561



Certificate Number: E17276

## ELECTRICAL CHARACTERISTICS

Rating at 25 °C ambient temperature unless otherwise specified

| TYPE<br>NUMBER | Breakdown Voltage @ It |      |      | Reverse<br>Stand-off<br>Voltage | Maximum<br>Reverse<br>Leakage<br>@ VRWM | Maximum<br>Clamping<br>Voltage<br>@ IRSM | Maximum<br>Reverse<br>Current | Maximum<br>Junction<br>Capacitance<br>@ 0 Volt | Working<br>Inverse<br>Blocking<br>Voltage | Max. Inverse<br>Blocking<br>Current<br>@ VWIB | Peak Inverse<br>Blocking<br>Voltage |
|----------------|------------------------|------|------|---------------------------------|-----------------------------------------|------------------------------------------|-------------------------------|------------------------------------------------|-------------------------------------------|-----------------------------------------------|-------------------------------------|
|                | VBR (V)                |      | It   | VRWM                            | IR                                      | VRSM                                     | IRSM                          | pF                                             | VWIB                                      | IIB                                           | VPIB                                |
|                | Min.                   | Max. | (mA) | (V)                             | (μA)                                    | (V)                                      | (A)                           |                                                | (V)                                       | mA                                            | (V)                                 |
| ULCE6.5        | 7.22                   | 8.82 | 10   | 6.5                             | 1000                                    | 12.3                                     | 100                           | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE6.5A       | 7.22                   | 7.98 | 10   | 6.5                             | 1000                                    | 11.2                                     | 100                           | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE7.0        | 7.78                   | 9.51 | 10   | 7.0                             | 500                                     | 13.3                                     | 100                           | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE7.0A       | 7.78                   | 8.60 | 10   | 7.0                             | 500                                     | 12.0                                     | 100                           | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE7.5        | 8.33                   | 10.2 | 10   | 7.5                             | 250                                     | 14.3                                     | 100                           | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE7.5A       | 8.33                   | 9.21 | 10   | 7.5                             | 250                                     | 12.9                                     | 100                           | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE8.0        | 8.89                   | 10.9 | 10   | 8.0                             | 100                                     | 15.0                                     | 100                           | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE8.0A       | 8.89                   | 9.83 | 10   | 8.0                             | 100                                     | 13.6                                     | 100                           | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE8.5        | 9.44                   | 11.5 | 1.0  | 8.5                             | 50                                      | 15.9                                     | 94                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE8.5A       | 9.44                   | 10.4 | 1.0  | 8.5                             | 50                                      | 14.4                                     | 100                           | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE9.0        | 10.0                   | 12.2 | 1.0  | 9.0                             | 10.0                                    | 16.9                                     | 89                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE9.0A       | 10.0                   | 11.1 | 1.0  | 9.0                             | 10.0                                    | 15.4                                     | 97                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE10         | 11.1                   | 13.6 | 1.0  | 10                              | 5.0                                     | 18.8                                     | 80                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE10A        | 11.1                   | 12.3 | 1.0  | 10                              | 5.0                                     | 17.0                                     | 88                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE11         | 12.2                   | 14.9 | 1.0  | 11                              | 5.0                                     | 20.1                                     | 74                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE11A        | 12.2                   | 13.5 | 1.0  | 11                              | 5.0                                     | 18.2                                     | 82                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE12         | 13.3                   | 16.3 | 1.0  | 12                              | 5.0                                     | 22.0                                     | 68                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE12A        | 13.3                   | 14.7 | 1.0  | 12                              | 5.0                                     | 19.9                                     | 75                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE13         | 14.4                   | 17.6 | 1.0  | 13                              | 5.0                                     | 23.8                                     | 63                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE13A        | 14.4                   | 15.9 | 1.0  | 13                              | 5.0                                     | 21.5                                     | 70                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE14         | 15.6                   | 19.1 | 1.0  | 14                              | 5.0                                     | 25.8                                     | 58                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE14A        | 15.6                   | 17.2 | 1.0  | 14                              | 5.0                                     | 23.2                                     | 65                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE15         | 16.7                   | 20.4 | 1.0  | 15                              | 5.0                                     | 26.9                                     | 56                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE15A        | 16.7                   | 18.5 | 1.0  | 15                              | 5.0                                     | 24.4                                     | 61                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE16         | 17.8                   | 21.8 | 1.0  | 16                              | 5.0                                     | 28.8                                     | 52                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE16A        | 17.8                   | 19.7 | 1.0  | 16                              | 5.0                                     | 26.0                                     | 57                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE17         | 18.9                   | 23.1 | 1.0  | 17                              | 5.0                                     | 30.5                                     | 49                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE17A        | 18.9                   | 20.9 | 1.0  | 17                              | 5.0                                     | 27.6                                     | 54                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE18         | 20                     | 24.4 | 1.0  | 18                              | 5.0                                     | 32.2                                     | 46                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE18A        | 20                     | 22.1 | 1.0  | 18                              | 5.0                                     | 29.2                                     | 51                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE20         | 22.2                   | 27.1 | 1.0  | 20                              | 5.0                                     | 35.8                                     | 42                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE20A        | 22.2                   | 24.5 | 1.0  | 20                              | 5.0                                     | 32.4                                     | 46                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE22         | 24.4                   | 29.8 | 1.0  | 22                              | 5.0                                     | 39.4                                     | 38                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE22A        | 24.4                   | 26.9 | 1.0  | 22                              | 5.0                                     | 35.5                                     | 42                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE24         | 26.7                   | 32.6 | 1.0  | 24                              | 5.0                                     | 43.0                                     | 35                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE24A        | 26.7                   | 29.5 | 1.0  | 24                              | 5.0                                     | 38.9                                     | 39                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE26         | 28.9                   | 35.3 | 1.0  | 26                              | 5.0                                     | 46.6                                     | 32                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE26A        | 28.9                   | 31.9 | 1.0  | 26                              | 5.0                                     | 42.1                                     | 36                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE28         | 31.1                   | 38.0 | 1.0  | 28                              | 5.0                                     | 50.1                                     | 30                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE28A        | 31.1                   | 34.4 | 1.0  | 28                              | 5.0                                     | 45.5                                     | 33                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE30         | 33.3                   | 40.7 | 1.0  | 30                              | 5.0                                     | 53.5                                     | 28                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE30A        | 33.3                   | 36.8 | 1.0  | 30                              | 5.0                                     | 48.4                                     | 31                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE33         | 36.7                   | 44.9 | 1.0  | 33                              | 5.0                                     | 59.0                                     | 25.4                          | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE33A        | 36.7                   | 40.6 | 1.0  | 33                              | 5.0                                     | 53.3                                     | 28.1                          | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE36         | 40.0                   | 48.9 | 1.0  | 36                              | 5.0                                     | 64.3                                     | 23.3                          | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE36A        | 40.0                   | 44.2 | 1.0  | 36                              | 5.0                                     | 58.1                                     | 25.8                          | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE40         | 44.4                   | 54.3 | 1.0  | 40                              | 5.0                                     | 71.4                                     | 21                            | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE40A        | 44.4                   | 49.1 | 1.0  | 40                              | 5.0                                     | 64.5                                     | 23.3                          | 35                                             | 75                                        | 1.0                                           | 100                                 |
| ULCE43         | 47.8                   | 58.4 | 1.0  | 43                              | 5.0                                     | 76.7                                     | 19.5                          | 35                                             | 150                                       | 1.0                                           | 200                                 |
| ULCE43A        | 47.8                   | 52.8 | 1.0  | 43                              | 5.0                                     | 69.4                                     | 21.6                          | 35                                             | 150                                       | 1.0                                           | 200                                 |

## ELECTRICAL CHARACTERISTICS

Rating at 25 °C ambient temperature unless otherwise specified

| TYPE<br>NUMBER | Breakdown Voltage @ It |      |      | Reverse<br>Stand-off<br>Voltage | Maximum<br>Reverse<br>Leakage<br>@ VRWM | Maximum<br>Clamping<br>Voltage<br>@ IRSM | Maximum<br>Reverse<br>Current | Maximum<br>Junction<br>Capacitance<br>@ 0 Volt | Working<br>Inverse<br>Blocking<br>Voltage | Max. Inverse<br>Blocking<br>Current<br>@ VWIB | Peak Inverse<br>Blocking<br>Voltage |
|----------------|------------------------|------|------|---------------------------------|-----------------------------------------|------------------------------------------|-------------------------------|------------------------------------------------|-------------------------------------------|-----------------------------------------------|-------------------------------------|
|                | VBR (V)                |      | It   | VRWM                            | IR                                      | VRSM                                     | IRSM                          | pF                                             | VWIB                                      | IIB                                           | VPIB                                |
|                | Min.                   | Max. | (mA) | (V)                             | (μA)                                    | (V)                                      | (A)                           |                                                |                                           |                                               |                                     |
| ULCE45         | 50.0                   | 61.1 | 1.0  | 45                              | 5.0                                     | 80.3                                     | 18.7                          | 35                                             | 150                                       | 1.0                                           | 200                                 |
| ULCE45A        | 50.0                   | 55.3 | 1.0  | 45                              | 5.0                                     | 72.7                                     | 20.6                          | 35                                             | 150                                       | 1.0                                           | 200                                 |
| ULCE48         | 53.3                   | 65.1 | 1.0  | 48                              | 5.0                                     | 85.5                                     | 17.5                          | 35                                             | 150                                       | 1.0                                           | 200                                 |
| ULCE48A        | 53.3                   | 58.9 | 1.0  | 48                              | 5.0                                     | 77.4                                     | 19.4                          | 35                                             | 150                                       | 1.0                                           | 200                                 |
| ULCE51         | 56.7                   | 69.3 | 1.0  | 51                              | 5.0                                     | 91.1                                     | 16.5                          | 35                                             | 150                                       | 1.0                                           | 200                                 |
| ULCE51A        | 56.7                   | 62.7 | 1.0  | 51                              | 5.0                                     | 82.4                                     | 18.2                          | 35                                             | 150                                       | 1.0                                           | 200                                 |
| ULCE54         | 60.0                   | 73.3 | 1.0  | 54                              | 5.0                                     | 96.3                                     | 15.6                          | 35                                             | 150                                       | 1.0                                           | 200                                 |
| ULCE54A        | 60.0                   | 66.3 | 1.0  | 54                              | 5.0                                     | 87.1                                     | 17.2                          | 35                                             | 150                                       | 1.0                                           | 200                                 |
| ULCE58         | 64.4                   | 78.7 | 1.0  | 58                              | 5.0                                     | 103                                      | 14.6                          | 35                                             | 150                                       | 1.0                                           | 200                                 |
| ULCE58A        | 64.4                   | 71.2 | 1.0  | 58                              | 5.0                                     | 93.6                                     | 16                            | 35                                             | 150                                       | 1.0                                           | 200                                 |
| ULCE60         | 66.7                   | 81.5 | 1.0  | 60                              | 5.0                                     | 107                                      | 14                            | 35                                             | 150                                       | 1.0                                           | 200                                 |
| ULCE60A        | 66.7                   | 73.7 | 1.0  | 60                              | 5.0                                     | 96.8                                     | 15.5                          | 35                                             | 150                                       | 1.0                                           | 200                                 |
| ULCE64         | 71.1                   | 86.9 | 1.0  | 64                              | 5.0                                     | 114                                      | 13.2                          | 35                                             | 150                                       | 1.0                                           | 200                                 |
| ULCE64A        | 71.1                   | 78.6 | 1.0  | 64                              | 5.0                                     | 103                                      | 14.6                          | 35                                             | 150                                       | 1.0                                           | 200                                 |
| ULCE70         | 77.8                   | 95.1 | 1.0  | 70                              | 5.0                                     | 125                                      | 12.0                          | 35                                             | 150                                       | 1.0                                           | 200                                 |
| ULCE70A        | 77.8                   | 86.0 | 1.0  | 70                              | 5.0                                     | 113                                      | 13.3                          | 35                                             | 150                                       | 1.0                                           | 200                                 |
| ULCE75         | 83.3                   | 102  | 1.0  | 75                              | 5.0                                     | 134                                      | 11.2                          | 35                                             | 150                                       | 1.0                                           | 200                                 |
| ULCE75A        | 83.3                   | 92.1 | 1.0  | 75                              | 5.0                                     | 121                                      | 12.4                          | 35                                             | 150                                       | 1.0                                           | 200                                 |
| ULCE80         | 88.7                   | 108  | 1.0  | 80                              | 5.0                                     | 142                                      | 10.6                          | 35                                             | 150                                       | 1.0                                           | 200                                 |
| ULCE80A        | 88.7                   | 98.0 | 1.0  | 80                              | 5.0                                     | 129                                      | 11.6                          | 35                                             | 150                                       | 1.0                                           | 200                                 |
| ULCE90         | 100                    | 122  | 1.0  | 90                              | 5.0                                     | 160                                      | 9.4                           | 35                                             | 300                                       | 1.0                                           | 200                                 |
| ULCE90A        | 100                    | 111  | 1.0  | 90                              | 5.0                                     | 146                                      | 10.3                          | 35                                             | 300                                       | 1.0                                           | 200                                 |

FIG.1 - PEAK PULSE POWER RATING CURVE

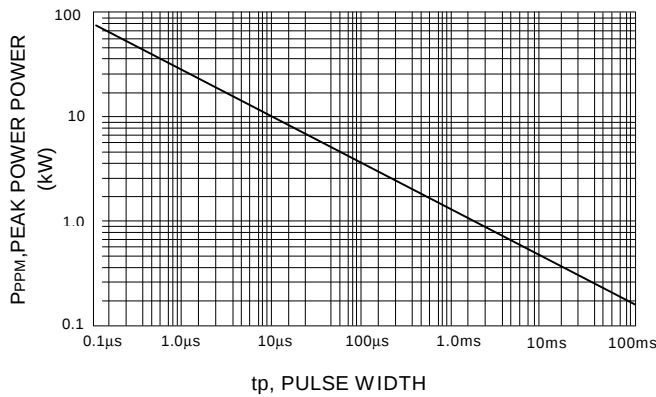


FIG.2 - PULSE DERATING CURVE

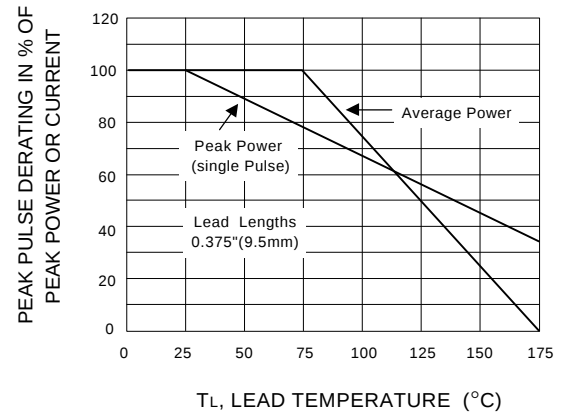


FIG.3 - PULSE WAVEFORM

