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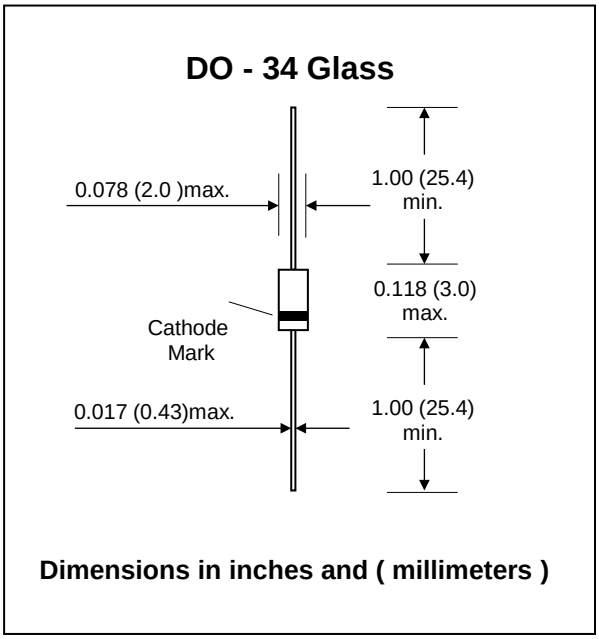
# RD2.0ES SERIES

# ZENER DIODES

## $V_Z$ : 2.0 - 37.5Volts
## $P_D$ : 400 mW




### FEATURES :

* High reliability
* Low leakage current
* Suitable for 5mm - pitch high speed automatical insertion
* Pb / RoHS Free

### MECHANICAL DATA

**Case:** DO-34 Glass Case
**Weight:** approx. 0.093g

### ORDERING INFORMATION

RD2.0ES to RD39ES with suffix "AB1", "AB2", or "AB3" should be applied for oders for suffix "AB"

### MAXIMUM RATINGS

Rating at 25 °C ambient temperature unless otherwise specified

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Forward Rectifier Current | $I_F$ | 150 | mA |
| Power Dissipation | $P_D$ | 400 | mW |
| Surge Reverse Power (t = 10μs) | $P_{RSM}$ | 100 | W |
| Junction Temperature | Tj | 175 | °C |
| Storage Temperature Range | Tstg | - 65 to + 175 | °C |

# ELECTRICAL CHARACTERISTICS

Rating at 25 °C ambient temperature unless otherwise specified

| Type | Suffix | Zener Voltage (1) Vz (V) at IZT | | Test Current IZT | Maximum Zener (2) Impedance ZZT @ IZT | Maximum Reverse Current IR | at VR |
|---|---|---|---|---|---|---|---|
| | | min. | max. | (mA) | (Ω) | (μA) | (V) |
| **RD2.0ES** | AB | 1.88 | 2.20 | 5 | 100 | 120 | 0.5 |
| | AB1 | 1.88 | 2.10 | | | | |
| | AB2 | 2.02 | 2.20 | | | | |
| **RD2.2ES** | AB | 2.12 | 2.41 | 5 | 100 | 120 | 0.7 |
| | AB1 | 2.12 | 2.30 | | | | |
| | AB2 | 2.22 | 2.41 | | | | |
| **RD2.4ES** | AB | 2.33 | 2.63 | 5 | 100 | 120 | 1.0 |
| | AB1 | 2.33 | 2.52 | | | | |
| | AB2 | 2.43 | 2.63 | | | | |
| **RD2.7ES** | AB | 2.54 | 2.91 | 5 | 110 | 100 | 1.0 |
| | AB1 | 2.54 | 2.75 | | | | |
| | AB2 | 2.69 | 2.91 | | | | |
| **RD3.0ES** | AB | 2.85 | 3.22 | 5 | 120 | 50 | 1.0 |
| | AB1 | 2.85 | 3.07 | | | | |
| | AB2 | 3.01 | 3.22 | | | | |
| **RD3.3ES** | AB | 3.16 | 3.53 | 5 | 120 | 20 | 1.0 |
| | AB1 | 3.16 | 3.38 | | | | |
| | AB2 | 3.32 | 3.53 | | | | |
| **RD3.6ES** | AB | 3.47 | 3.83 | 5 | 120 | 10 | 1.0 |
| | AB1 | 3.47 | 3.68 | | | | |
| | AB2 | 3.62 | 3.83 | | | | |
| **RD3.9ES** | AB | 3.77 | 4.14 | 5 | 120 | 5 | 1.0 |
| | AB1 | 3.77 | 3.98 | | | | |
| | AB2 | 3.92 | 4.14 | | | | |
| **RD4.3ES** | AB | 4.05 | 4.53 | 5 | 120 | 5 | 1.0 |
| | AB1 | 4.05 | 4.26 | | | | |
| | AB2 | 4.20 | 4.40 | | | | |
| | AB3 | 4.34 | 4.53 | | | | |
| **RD4.7ES** | AB | 4.47 | 4.91 | 5 | 100 | 5 | 1.0 |
| | AB1 | 4.47 | 4.65 | | | | |
| | AB2 | 4.59 | 4.77 | | | | |
| | AB3 | 4.71 | 4.91 | | | | |
| **RD5.1ES** | AB | 4.85 | 5.35 | 5 | 70 | 5 | 1.5 |
| | AB1 | 4.85 | 5.03 | | | | |
| | AB2 | 4.97 | 5.18 | | | | |
| | AB3 | 5.12 | 5.35 | | | | |
| **RD5.6ES** | AB | 5.29 | 5.88 | 5 | 40 | 5 | 2.5 |
| | AB1 | 5.29 | 5.52 | | | | |
| | AB2 | 5.46 | 5.70 | | | | |
| | AB3 | 5.64 | 5.88 | | | | |
| **RD6.2ES** | AB | 5.81 | 6.40 | 5 | 30 | 5 | 3.0 |
| | AB1 | 5.81 | 6.06 | | | | |
| | AB2 | 5.99 | 6.24 | | | | |
| | AB3 | 6.16 | 6.40 | | | | |
| **RD6.8ES** | AB | 6.32 | 6.97 | 5 | 25 | 2 | 3.5 |
| | AB1 | 6.32 | 6.59 | | | | |
| | AB2 | 6.52 | 6.79 | | | | |
| | AB3 | 6.70 | 6.97 | | | | |

# ELECTRICAL CHARACTERISTICS

Rating at 25 °C ambient temperature unless otherwise specified

| Type | Suffix | Zener Voltage (1) Vz (V) at IZT | | Test Current IZT | Maximum Zener (2) Impedance ZZT @ IZT | Maximum Reverse Current IR | at VR |
|---|---|---|---|---|---|---|---|
| | | min. | max. | (mA) | (Ω) | (μA) | (V) |
| **RD7.5ES** | AB | 6.88 | 7.64 | 5 | 25 | 0.5 | 4.0 |
| | AB1 | 6.88 | 7.19 | | | | |
| | AB2 | 7.11 | 7.41 | | | | |
| | AB3 | 7.33 | 7.64 | | | | |
| **RD8.2ES** | AB | 7.56 | 8.41 | 5 | 20 | 0.5 | 5.0 |
| | AB1 | 7.56 | 7.90 | | | | |
| | AB2 | 7.82 | 8.15 | | | | |
| | AB3 | 8.07 | 8.41 | | | | |
| **RD9.1ES** | AB | 8.33 | 9.29 | 5 | 20 | 0.5 | 6.0 |
| | AB1 | 8.33 | 8.70 | | | | |
| | AB2 | 8.61 | 8.99 | | | | |
| | AB3 | 8.89 | 9.29 | | | | |
| **RD10ES** | AB | 9.19 | 10.30 | 5 | 20 | 0.2 | 7.0 |
| | AB1 | 9.19 | 9.59 | | | | |
| | AB2 | 9.48 | 9.90 | | | | |
| | AB3 | 9.82 | 10.30 | | | | |
| **RD11ES** | AB | 10.18 | 11.26 | 5 | 20 | 0.2 | 8.0 |
| | AB1 | 10.18 | 10.63 | | | | |
| | AB2 | 10.50 | 10.95 | | | | |
| | AB3 | 10.82 | 11.26 | | | | |
| **RD12ES** | AB | 11.13 | 12.30 | 5 | 25 | 0.2 | 9.0 |
| | AB1 | 11.13 | 11.63 | | | | |
| | AB2 | 11.50 | 11.92 | | | | |
| | AB3 | 11.80 | 12.30 | | | | |
| **RD13ES** | AB | 12.18 | 13.62 | 5 | 25 | 0.2 | 10 |
| | AB1 | 12.18 | 12.71 | | | | |
| | AB2 | 12.59 | 13.16 | | | | |
| | AB3 | 13.03 | 13.62 | | | | |
| **RD15ES** | AB | 13.48 | 15.02 | 5 | 25 | 0.2 | 11 |
| | AB1 | 13.48 | 14.09 | | | | |
| | AB2 | 13.95 | 14.56 | | | | |
| | AB3 | 14.42 | 15.02 | | | | |
| **RD16ES** | AB | 14.87 | 16.50 | 5 | 25 | 0.2 | 12 |
| | AB1 | 14.87 | 15.50 | | | | |
| | AB2 | 15.33 | 15.96 | | | | |
| | AB3 | 15.79 | 16.50 | | | | |
| **RD18ES** | AB | 16.34 | 18.30 | 5 | 30 | 0.2 | 13 |
| | AB1 | 16.34 | 17.06 | | | | |
| | AB2 | 16.90 | 17.67 | | | | |
| | AB3 | 17.51 | 18.30 | | | | |
| **RD20ES** | AB | 18.14 | 20.45 | 5 | 30 | 0.2 | 15 |
| | AB1 | 18.14 | 18.96 | | | | |
| | AB2 | 18.80 | 19.68 | | | | |
| | AB3 | 19.52 | 20.45 | | | | |

# ELECTRICAL CHARACTERISTICS

Rating at 25 °C ambient temperature unless otherwise specified

| Type | Suffix | Zener Voltage (1) Vz (V) at IZT | | Test Current IZT | Maximum Zener (2) Impedance ZZT @ IZT | Maximum Reverse Current IR | at VR |
|---|---|---|---|---|---|---|---|
| | | min. | max. | (mA) | (Ω) | (μA) | (V) |
| **RD22ES** | AB | 20.23 | 22.61 | 5 | 30 | 0.2 | 17 |
| | AB1 | 20.23 | 21.08 | | | | |
| | AB2 | 20.76 | 21.65 | | | | |
| | AB3 | 21.22 | 22.09 | | | | |
| | AB4 | 21.68 | 22.61 | | | | |
| **RD24ES** | AB | 22.26 | 24.81 | 5 | 30 | 0.2 | 19 |
| | AB1 | 22.26 | 23.12 | | | | |
| | AB2 | 22.75 | 23.73 | | | | |
| | AB3 | 23.29 | 24.27 | | | | |
| | AB4 | 23.81 | 24.81 | | | | |
| **RD27ES** | AB | 24.26 | 27.64 | 5 | 45 | 0.2 | 21 |
| | AB1 | 24.26 | 25.52 | | | | |
| | AB2 | 24.97 | 26.26 | | | | |
| | AB3 | 25.63 | 26.95 | | | | |
| | AB4 | 26.29 | 27.64 | | | | |
| **RD30ES** | AB | 26.99 | 30.51 | 5 | 55 | 0.2 | 23 |
| | AB1 | 26.99 | 28.39 | | | | |
| | AB2 | 27.70 | 29.13 | | | | |
| | AB3 | 28.36 | 29.82 | | | | |
| | AB4 | 29.02 | 30.51 | | | | |
| **RD33ES** | AB | 29.68 | 33.11 | 5 | 65 | 0.2 | 25 |
| | AB1 | 29.68 | 31.22 | | | | |
| | AB2 | 30.32 | 31.88 | | | | |
| | AB3 | 30.90 | 32.50 | | | | |
| | AB4 | 31.49 | 33.11 | | | | |
| **RD36ES** | AB | 32.14 | 35.77 | 5 | 75 | 0.2 | 27 |
| | AB1 | 32.14 | 33.79 | | | | |
| | AB2 | 32.79 | 34.49 | | | | |
| | AB3 | 33.40 | 35.13 | | | | |
| | AB4 | 34.01 | 35.77 | | | | |
| **RD39ES** | AB | 34.68 | 38.52 | 5 | 85 | 0.2 | 30 |
| | AB1 | 34.68 | 36.47 | | | | |
| | AB2 | 35.36 | 37.19 | | | | |
| | AB3 | 36.00 | 37.85 | | | | |
| | AB4 | 36.63 | 38.52 | | | | |

**Notes :**

(1) Tested with pulse (40 ms )

(2) Zz is measured at Iz by given a very small A.C. current signal.

(3) Suffix AB is Suffix AB1, AB2, AB3, or AB4

## RATING AND CHARACTERISTIC CURVES ( RD2.0ES SERIES )

**FIG.1 - POWER DISSIPATION vs. AMBIENT TEMPERATURE**

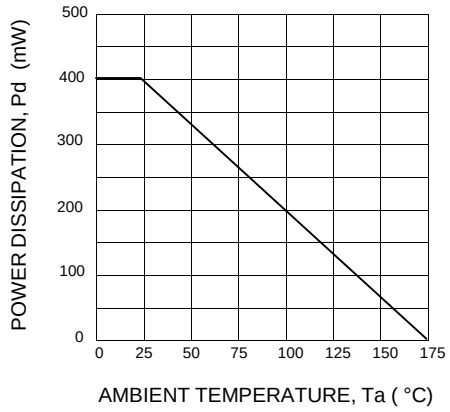



**FIG.2 - TEMPERATURE COEFFICIENT vs. ZENER VOLTAGE**

