

RD2.0ES to RD39ES

400 mW DHD ZENER DIODE

(DO-34)

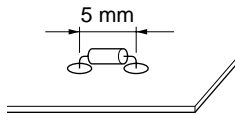
DESCRIPTION

NEC Type RD2.0ES to RD39ES Series are planar type diodes into DO-34 Package (Body length 2.4 mm MAX.) with DHD (Double Heatsink Diode) construction having allowable power dissipation of 400 mW.

FEATURES

- DO-34 Glass sealed package

This diode can be inserted into a PC board with a shorter pitch (5 mm)



- Planar process
- DHD (Double Heatsink Diode) construction
- Vz Applied E24 standard

ORDERING INFORMATION

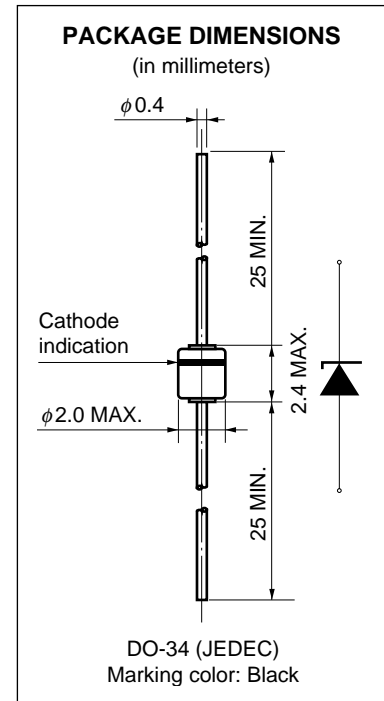
RD2.0ES to RD39ES with suffix "AB1", "AB2", or "AB3" should be applied for orders for suffix "AB".

APPLICATIONS

Circuits for Constant Voltage, Constant Current, Waveform clipper, Surge absorber, etc.

ABSOLUTE MAXIMUM RATINGS ($T_A = 25\text{ }^\circ\text{C}$)

| | | | |
|----------------------|-----------|---------------------------------|----------------|
| Forward Current | I_F | 150 mA | |
| Power Dissipation | P | 400 mW | to see Fig. 6 |
| Surge Reverse Power | P_{RSM} | 100 W ($t = 10\ \mu\text{s}$) | to see Fig. 10 |
| Junction Temperature | T_j | 175 $^\circ\text{C}$ | |
| Storage Temperature | T_{stg} | -65 to +175 $^\circ\text{C}$ | |



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Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

| Type Number | Suffix | Zener Voltage V _Z (V) ^{Note 1} | | | Dynamic Impedance Z _Z (Ω) ^{Note 2} | | Knee Dynamic Impedance Z _{ZK} (Ω) ^{Note 2} | | Reverse Current I _R (μA) | |
|-------------|--------|---|-------|---------------------|---|---------------------|---|---------------------|--|--------------------|
| | | MIN. | MAX. | I _Z (mA) | MAX. | I _Z (mA) | MAX. | I _Z (mA) | MAX. | V _R (V) |
| RD2.0ES | AB | 1.88 | 2.24 | 5 | 100 | 5 | 1000 | 0.5 | 120 | 0.5 |
| | AB1 | 1.88 | 2.12 | | | | | | | |
| | AB2 | 2.01 | 2.24 | | | | | | | |
| RD2.2ES | AB | 2.11 | 2.44 | 5 | 100 | 5 | 1000 | 0.5 | 120 | 0.7 |
| | AB1 | 2.11 | 2.34 | | | | | | | |
| | AB2 | 2.22 | 2.44 | | | | | | | |
| RD2.4ES | AB | 2.32 | 2.65 | 5 | 100 | 5 | 1000 | 0.5 | 120 | 1.0 |
| | AB1 | 2.32 | 2.54 | | | | | | | |
| | AB2 | 2.41 | 2.65 | | | | | | | |
| RD2.7ES | AB | 2.52 | 2.93 | 5 | 110 | 5 | 1000 | 0.5 | 100 | 1.0 |
| | AB1 | 2.52 | 2.77 | | | | | | | |
| | AB2 | 2.68 | 2.93 | | | | | | | |
| RD3.0ES | AB | 2.84 | 3.24 | 5 | 120 | 5 | 1000 | 0.5 | 50 | 1.0 |
| | AB1 | 2.84 | 3.08 | | | | | | | |
| | AB2 | 2.99 | 3.24 | | | | | | | |
| RD3.3ES | AB | 3.15 | 3.54 | 5 | 120 | 5 | 1000 | 0.5 | 20 | 1.0 |
| | AB1 | 3.15 | 3.39 | | | | | | | |
| | AB2 | 3.31 | 3.54 | | | | | | | |
| RD3.6ES | AB | 3.46 | 3.84 | 5 | 120 | 5 | 1100 | 0.5 | 10 | 1.0 |
| | AB1 | 3.46 | 3.69 | | | | | | | |
| | AB2 | 3.60 | 3.84 | | | | | | | |
| RD3.9ES | AB | 3.74 | 4.16 | 5 | 120 | 5 | 1200 | 0.5 | 5 | 1.0 |
| | AB1 | 3.74 | 4.01 | | | | | | | |
| | AB2 | 3.89 | 4.16 | | | | | | | |
| RD4.3ES | AB | 4.04 | 4.57 | 5 | 120 | 5 | 1200 | 0.5 | 5 | 1.0 |
| | AB1 | 4.04 | 4.29 | | | | | | | |
| | AB2 | 4.17 | 4.43 | | | | | | | |
| | AB3 | 4.30 | 4.57 | | | | | | | |
| RD4.7ES | AB | 4.44 | 4.93 | 5 | 100 | 5 | 1200 | 0.5 | 5 | 1.0 |
| | AB1 | 4.44 | 4.68 | | | | | | | |
| | AB2 | 4.55 | 4.80 | | | | | | | |
| | AB3 | 4.68 | 4.93 | | | | | | | |
| RD5.1ES | AB | 4.81 | 5.37 | 5 | 70 | 5 | 1200 | 0.5 | 5 | 1.5 |
| | AB1 | 4.81 | 5.07 | | | | | | | |
| | AB2 | 4.94 | 5.20 | | | | | | | |
| | AB3 | 5.09 | 5.37 | | | | | | | |
| RD5.6ES | AB | 5.28 | 5.91 | 5 | 40 | 5 | 900 | 0.5 | 5 | 2.5 |
| | AB1 | 5.28 | 5.55 | | | | | | | |
| | AB2 | 5.45 | 5.73 | | | | | | | |
| | AB3 | 5.61 | 5.91 | | | | | | | |
| RD6.2ES | AB | 5.78 | 6.44 | 5 | 30 | 5 | 500 | 0.5 | 5 | 3.0 |
| | AB1 | 5.78 | 6.09 | | | | | | | |
| | AB2 | 5.96 | 6.27 | | | | | | | |
| | AB3 | 6.12 | 6.44 | | | | | | | |
| RD6.8ES | AB | 6.29 | 7.01 | 5 | 25 | 5 | 150 | 0.5 | 2 | 3.5 |
| | AB1 | 6.29 | 6.63 | | | | | | | |
| | AB2 | 6.49 | 6.83 | | | | | | | |
| | AB3 | 6.66 | 7.01 | | | | | | | |
| RD7.5ES | AB | 6.85 | 7.67 | 5 | 25 | 5 | 120 | 0.5 | 0.5 | 4.0 |
| | AB1 | 6.85 | 7.22 | | | | | | | |
| | AB2 | 7.07 | 7.45 | | | | | | | |
| | AB3 | 7.29 | 7.67 | | | | | | | |
| RD8.2ES | AB | 7.53 | 8.45 | 5 | 20 | 5 | 120 | 0.5 | 0.5 | 5.0 |
| | AB1 | 7.53 | 7.92 | | | | | | | |
| | AB2 | 7.78 | 8.19 | | | | | | | |
| | AB3 | 8.03 | 8.45 | | | | | | | |
| RD9.1ES | AB | 8.29 | 9.30 | 5 | 20 | 5 | 120 | 0.5 | 0.5 | 6.0 |
| | AB1 | 8.29 | 8.73 | | | | | | | |
| | AB2 | 8.57 | 9.01 | | | | | | | |
| | AB3 | 8.83 | 9.30 | | | | | | | |
| RD10ES | AB | 9.12 | 10.39 | 5 | 20 | 5 | 120 | 0.5 | 0.2 | 7.0 |
| | AB1 | 9.12 | 9.65 | | | | | | | |
| | AB2 | 9.46 | 10.02 | | | | | | | |
| | AB3 | 9.82 | 10.39 | | | | | | | |

| Type Number | Suffix | Zener Voltage V_z (V) ^{Note 1} | | | Dynamic Impedance Z_z (Ω) ^{Note 2} | | Knee Dynamic Impedance Z_{zk} (Ω) ^{Note 2} | | Reverse Current I_R (μA) | |
|-------------|--------|--|-------|------------|---|------------|---|------------|--------------------------------------|-----------|
| | | MIN. | MAX. | I_z (mA) | MAX. | I_z (mA) | MAX. | I_z (mA) | MAX. | V_R (V) |
| RD11ES | AB | 10.18 | 11.38 | 5 | 20 | 5 | 120 | 0.5 | 0.2 | 8.0 |
| | AB1 | 10.18 | 10.71 | | | | | | | |
| | AB2 | 10.50 | 11.05 | | | | | | | |
| | AB3 | 10.82 | 11.38 | | | | | | | |
| RD12ES | AB | 11.13 | 12.35 | 5 | 25 | 5 | 110 | 0.5 | 0.2 | 9.0 |
| | AB1 | 11.13 | 11.71 | | | | | | | |
| | AB2 | 11.44 | 12.03 | | | | | | | |
| | AB3 | 11.74 | 12.35 | | | | | | | |
| RD13ES | AB | 12.11 | 13.66 | 5 | 25 | 5 | 110 | 0.5 | 0.2 | 10 |
| | AB1 | 12.11 | 12.75 | | | | | | | |
| | AB2 | 12.55 | 13.21 | | | | | | | |
| | AB3 | 12.99 | 13.66 | | | | | | | |
| RD15ES | AB | 13.44 | 15.09 | 5 | 25 | 5 | 110 | 0.5 | 0.2 | 11 |
| | AB1 | 13.44 | 14.13 | | | | | | | |
| | AB2 | 13.89 | 14.62 | | | | | | | |
| | AB3 | 14.35 | 15.09 | | | | | | | |
| RD16ES | AB | 14.80 | 16.51 | 5 | 25 | 5 | 150 | 0.5 | 0.2 | 12 |
| | AB1 | 14.80 | 15.57 | | | | | | | |
| | AB2 | 15.25 | 16.04 | | | | | | | |
| | AB3 | 15.69 | 16.51 | | | | | | | |
| RD18ES | AB | 16.22 | 18.33 | 5 | 30 | 5 | 150 | 0.5 | 0.2 | 13 |
| | AB1 | 16.22 | 17.06 | | | | | | | |
| | AB2 | 16.82 | 17.70 | | | | | | | |
| | AB3 | 17.42 | 18.33 | | | | | | | |
| RD20ES | AB | 18.14 | 20.45 | 5 | 30 | 5 | 200 | 0.5 | 0.2 | 15 |
| | AB1 | 18.14 | 19.07 | | | | | | | |
| | AB2 | 18.80 | 19.76 | | | | | | | |
| | AB3 | 19.45 | 20.45 | | | | | | | |
| RD22ES | AB | 20.15 | 22.63 | 5 | 30 | 5 | 200 | 0.5 | 0.2 | 17 |
| | AB1 | 20.15 | 21.20 | | | | | | | |
| | AB2 | 20.64 | 21.71 | | | | | | | |
| | AB3 | 21.08 | 22.17 | | | | | | | |
| | AB4 | 21.52 | 22.63 | | | | | | | |
| RD24ES | AB | 22.05 | 24.85 | 5 | 35 | 5 | 200 | 0.5 | 0.2 | 19 |
| | AB1 | 22.05 | 23.18 | | | | | | | |
| | AB2 | 22.61 | 23.77 | | | | | | | |
| | AB3 | 23.12 | 24.31 | | | | | | | |
| | AB4 | 23.63 | 24.85 | | | | | | | |
| RD27ES | AB | 24.26 | 27.64 | 5 | 45 | 5 | 250 | 0.5 | 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 | 5 | 250 | 0.5 | 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 | 5 | 250 | 0.5 | 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 | 5 | 250 | 0.5 | 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 | 5 | 250 | 0.5 | 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. Z_z and Z_{zk} are measured at I_z by given a very small A.C. current signal.

3. Suffix AB is Suffix AB1, AB2, AB3 or AB4.

TYPICAL CHARACTERISTICS (T_A = 25 °C)

Fig. 1 ZENER CURRENT vs. ZENER VOLTAGE

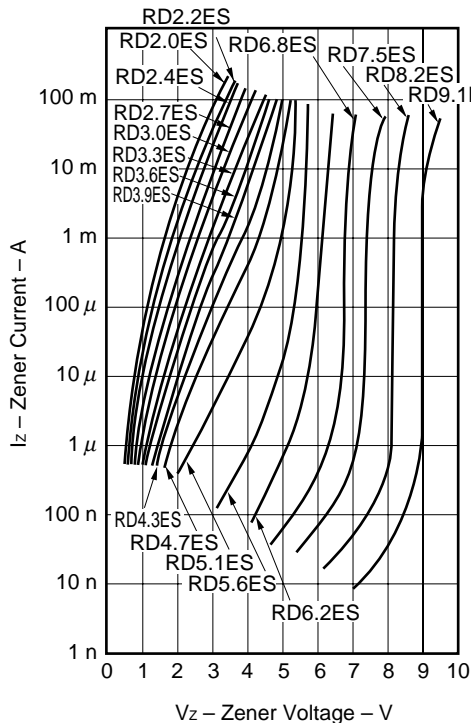


Fig. 2 ZENER CURRENT vs. ZENER VOLTAGE

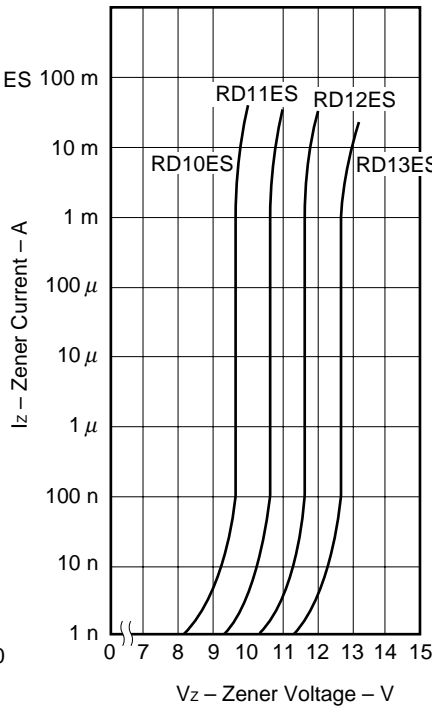


Fig. 3 ZENER CURRENT vs. ZENER VOLTAGE

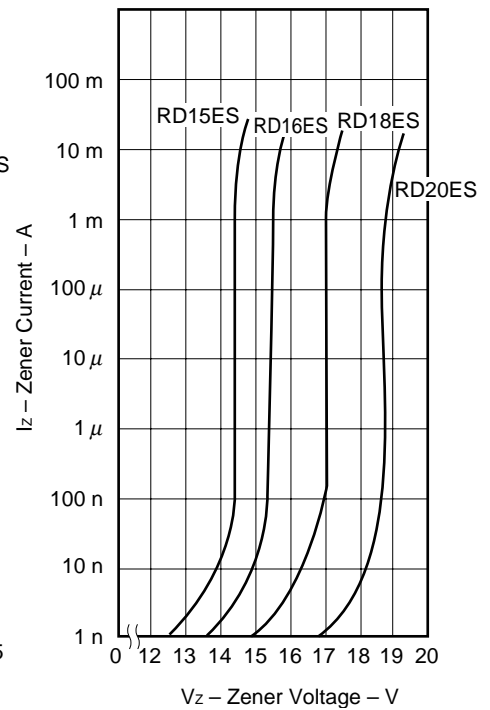


Fig. 4 ZENER CURRENT vs. ZENER VOLTAGE

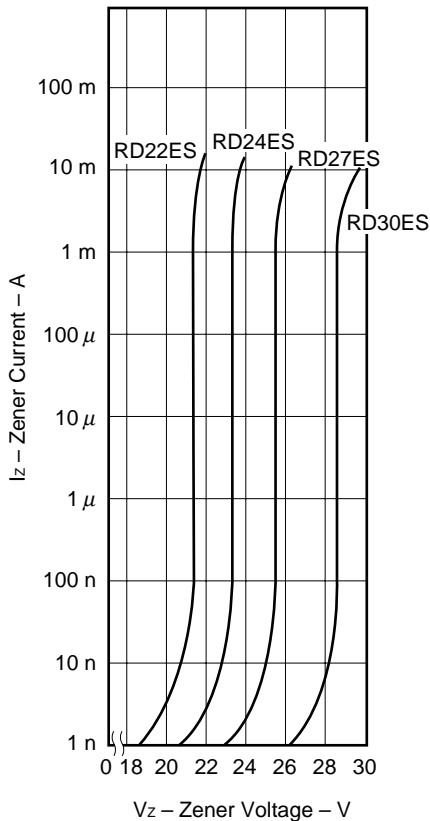


Fig. 5 ZENER CURRENT vs. ZENER VOLTAGE

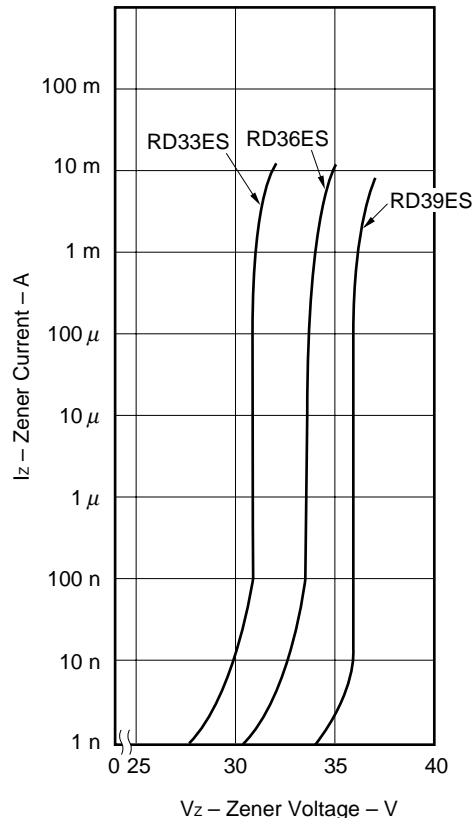


Fig. 6 POWER DISSIPATION vs. AMBIENT TEMPERATURE

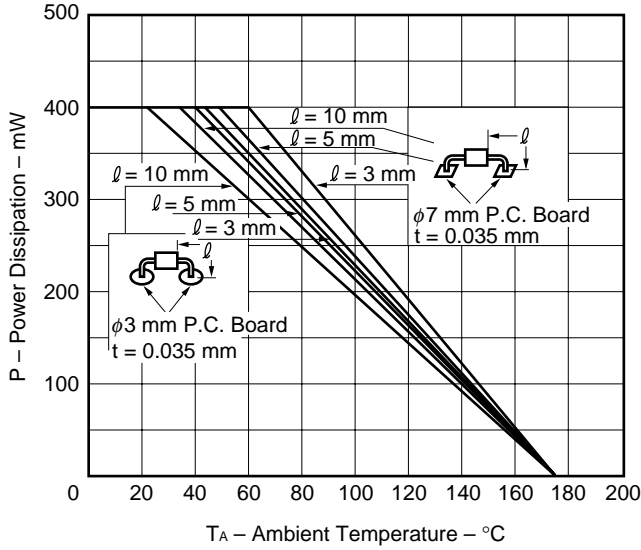


Fig. 7 THERMAL RESISTANCE vs. SIZE OF P.C BOARD

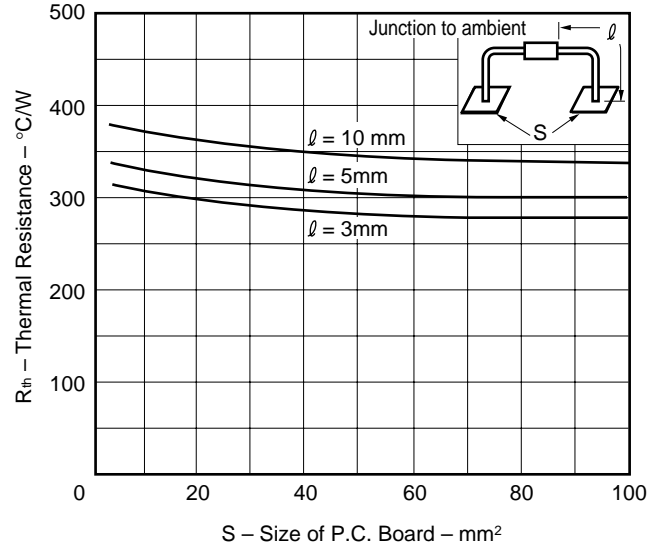


Fig. 8 DYNAMIC IMPEDANCE vs. ZENER CURRENT

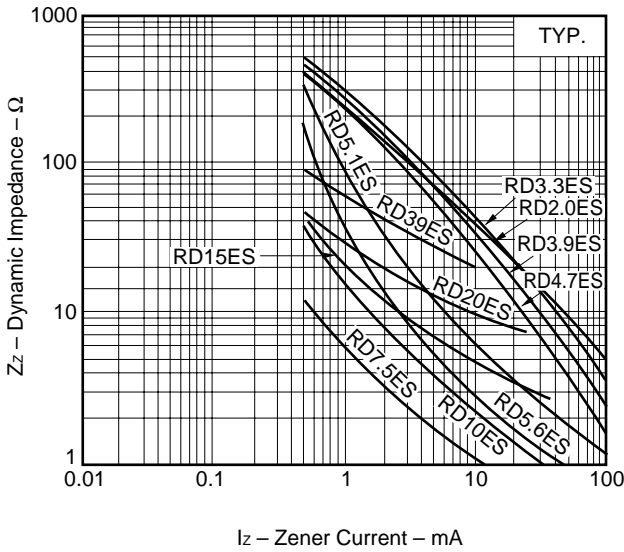


Fig. 9 ZENER VOLTAGE TEMPERATURE COEFFICIENT vs. ZENER VOLTAGE

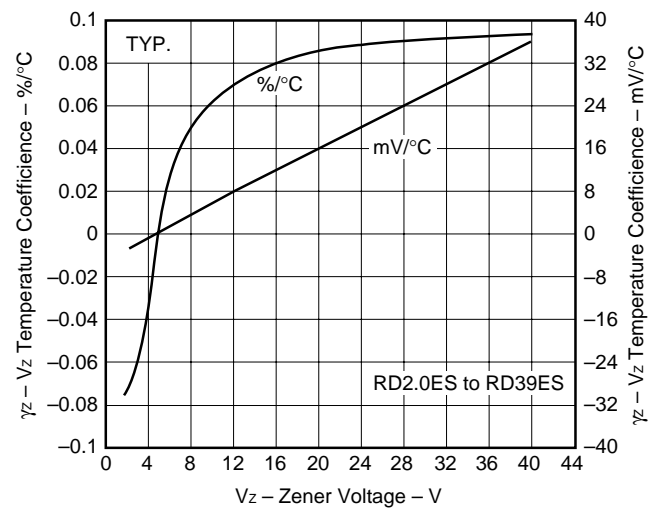


Fig. 10 SURGE REVERSE POWER RATINGS

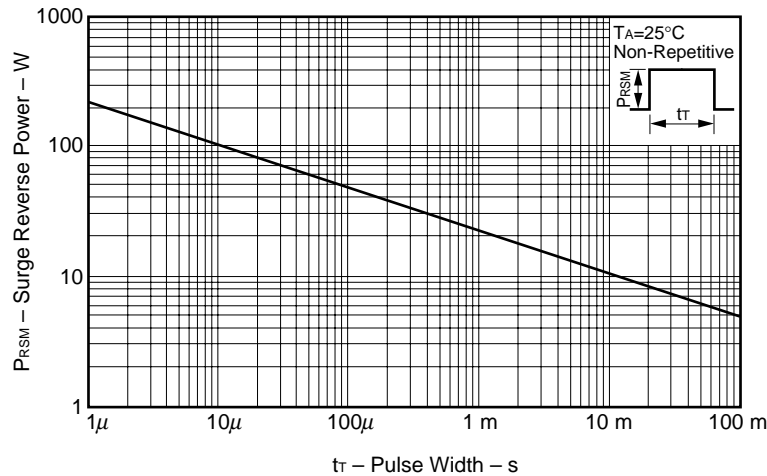
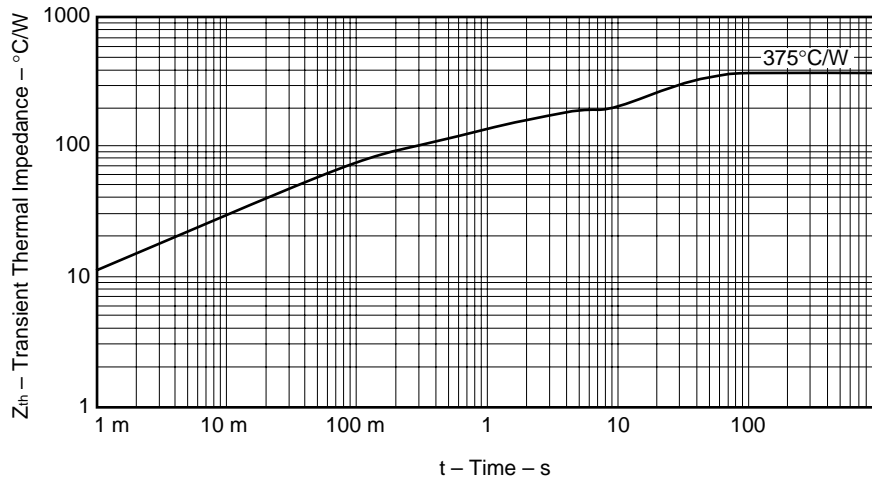


Fig. 11 TRANSIENT THERMAL IMPEDANCE CHARACTERISTIC



[MEMO]

[MEMO]

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