NEC

# ZENER DIODES
# RD2.0M to RD47M

## ZENER DIODES
## 200 mW 3-PIN MINI MOLD

### DESCRIPTION

Type RD2.0M to RD47M Series are planar type zener diodes processing an allowable power dissipation of 200 mW.

### FEATURES

- Planar process
- $V_Z$; Applied E24 standard.

### APPLICATIONS

Circuits for,

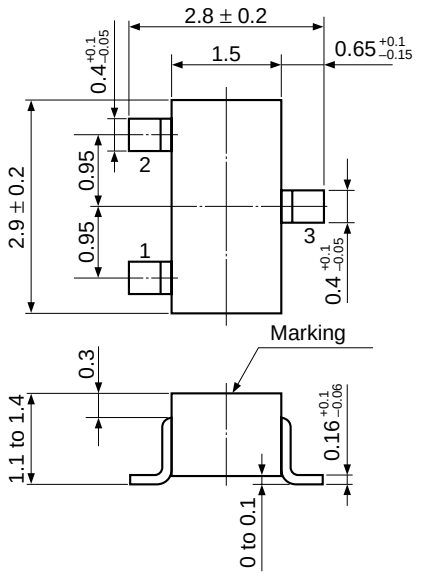
Constant Voltage, Constant Current,
Waveform clipper, Surge absorber, etc.

### MAXIMUM RATINGS ($T_A$ = 25°C)

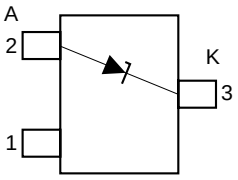
| | | |
|---|---|---|
| Power Dissipation | P | 200 mW |
| Forward Current | $I_F$ | 150 mA |
| Junction Temperature | $T_j$ | 150°C |
| Storage Temperature | $T_{stg}$ | –55 to +150°C |
| Peak Reverse Power | $P_{RSM}$ | 100 W (t = 10 $\mu$s) |

### PACKAGE DIMENSIONS

(Unit: mm)




1 . NC
2 . Anode : A SC-59 (EIAJ)
3 . Cathode: K




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

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## ELECTRICAL CHARACTERISTICS ($T_A$ = 25 ± 2°C)

| Type Number | Class | Zener Voltage $V_Z$ (V)[Note 1] | | | Dynamic Impedance $Z_Z$ (Ω)[Note 2] | | Reverse Current $I_R$ (μA) | |
|---|---|---|---|---|---|---|---|---|
| | | MIN. | MAX. | $I_Z$ (mA) | MAX. | $I_Z$ (mA) | MAX. | $V_R$ (V) |
| RD2.0M | B | 1.90 | 2.20 | 5 | 100 | 5 | 120 | 0.5 |
| RD2.2M | B | 2.10 | 2.40 | 5 | 100 | 5 | 120 | 0.7 |
| RD2.4M | B | 2.30 | 2.60 | 5 | 100 | 5 | 120 | 1.0 |
| RD2.7M | B | 2.50 | 2.90 | 5 | 110 | 5 | 120 | 1.0 |
| | B1 | 2.50 | 2.75 | | | | | |
| | B2 | 2.65 | 2.90 | | | | | |
| RD3.0M | B | 2.80 | 3.20 | 5 | 120 | 5 | 50 | 1.0 |
| | B1 | 2.80 | 3.05 | | | | | |
| | B2 | 2.95 | 3.20 | | | | | |
| RD3.3M | B | 3.10 | 3.50 | 5 | 130 | 5 | 20 | 1.0 |
| | B1 | 3.10 | 3.35 | | | | | |
| | B2 | 3.25 | 3.50 | | | | | |
| RD3.6M | B | 3.40 | 3.80 | 5 | 130 | 5 | 10 | 1.0 |
| | B1 | 3.40 | 3.65 | | | | | |
| | B2 | 3.55 | 3.80 | | | | | |
| RD3.9M | B | 3.70 | 4.10 | 5 | 130 | 5 | 10 | 1.0 |
| | B1 | 3.70 | 3.97 | | | | | |
| | B2 | 3.87 | 4.10 | | | | | |
| RD4.3M | B | 4.01 | 4.48 | 5 | 130 | 5 | 10 | 1.0 |
| | B1 | 4.01 | 4.21 | | | | | |
| | B2 | 4.15 | 4.34 | | | | | |
| | B3 | 4.28 | 4.48 | | | | | |
| RD4.7M | B | 4.42 | 4.90 | 5 | 130 | 5 | 10 | 1.0 |
| | B1 | 4.42 | 4.61 | | | | | |
| | B2 | 4.55 | 4.75 | | | | | |
| | B3 | 4.69 | 4.90 | | | | | |
| RD5.1M | B | 4.84 | 5.37 | 5 | 130 | 5 | 5 | 1.5 |
| | B1 | 4.84 | 5.04 | | | | | |
| | B2 | 4.98 | 5.20 | | | | | |
| | B3 | 5.14 | 5.37 | | | | | |
| RD5.6M | B | 5.31 | 5.92 | 5 | 80 | 5 | 5 | 2.5 |
| | B1 | 5.31 | 5.55 | | | | | |
| | B2 | 5.49 | 5.73 | | | | | |
| | B3 | 5.67 | 5.92 | | | | | |
| RD6.2M | B | 5.86 | 6.53 | 5 | 50 | 5 | 2 | 3.0 |
| | B1 | 5.86 | 6.12 | | | | | |
| | B2 | 6.06 | 6.33 | | | | | |
| | B3 | 6.26 | 6.53 | | | | | |
| RD6.8M | B | 6.47 | 7.14 | 5 | 30 | 5 | 2 | 3.5 |
| | B1 | 6.47 | 6.73 | | | | | |
| | B2 | 6.65 | 6.93 | | | | | |
| | B3 | 6.86 | 7.14 | | | | | |
| RD7.5M | B | 7.06 | 7.84 | 5 | 30 | 5 | 2 | 4.0 |
| | B1 | 7.06 | 7.36 | | | | | |
| | B2 | 7.28 | 7.60 | | | | | |
| | B3 | 7.52 | 7.84 | | | | | |
| RD8.2M | B | 7.76 | 8.64 | 5 | 30 | 5 | 2 | 5.0 |
| | B1 | 7.76 | 8.10 | | | | | |
| | B2 | 8.02 | 8.36 | | | | | |
| | B3 | 8.28 | 8.64 | | | | | |

| Type Number | Class | Zener Voltage $V_Z$ (V)[Note 1] | | | Dynamic Impedance $Z_Z$ (Ω)[Note 2] | | Reverse Current $I_R$ (μA) | |
|---|---|---|---|---|---|---|---|---|
| | | MIN. | MAX. | $I_Z$ (mA) | MAX. | $I_Z$ (mA) | MAX. | $V_R$ (V) |
| RD9.1M | B | 8.56 | 9.55 | 5 | 30 | 5 | 2 | 6.0 |
| | B1 | 8.56 | 8.93 | | | | | |
| | B2 | 8.85 | 9.23 | | | | | |
| | B3 | 9.15 | 9.55 | | | | | |
| RD10M | B | 9.45 | 10.55 | 5 | 30 | 5 | 2 | 7.0 |
| | B1 | 9.45 | 9.87 | | | | | |
| | B2 | 9.77 | 10.21 | | | | | |
| | B3 | 10.11 | 10.55 | | | | | |
| RD11M | B | 10.44 | 11.56 | 5 | 30 | 5 | 2 | 8.0 |
| | B1 | 10.44 | 10.88 | | | | | |
| | B2 | 10.76 | 11.22 | | | | | |
| | B3 | 11.10 | 11.56 | | | | | |
| RD12M | B | 11.42 | 12.60 | 5 | 35 | 5 | 2 | 9.0 |
| | B1 | 11.42 | 11.90 | | | | | |
| | B2 | 11.74 | 12.24 | | | | | |
| | B3 | 12.08 | 12.60 | | | | | |
| RD13M | B | 12.47 | 13.96 | 5 | 35 | 5 | 2 | 10 |
| | B1 | 12.47 | 13.03 | | | | | |
| | B2 | 12.91 | 13.49 | | | | | |
| | B3 | 13.37 | 13.96 | | | | | |
| RD15M | B | 13.84 | 15.52 | 5 | 40 | 5 | 2 | 11 |
| | B1 | 13.84 | 14.46 | | | | | |
| | B2 | 14.34 | 14.98 | | | | | |
| | B3 | 14.85 | 15.52 | | | | | |
| RD16M | B | 15.37 | 17.09 | 5 | 40 | 5 | 2 | 12 |
| | B1 | 15.37 | 16.01 | | | | | |
| | B2 | 15.85 | 16.51 | | | | | |
| | B3 | 16.35 | 17.09 | | | | | |
| RD18M | B | 16.94 | 19.03 | 5 | 45 | 5 | 2 | 13 |
| | B1 | 16.94 | 17.70 | | | | | |
| | B2 | 17.56 | 18.35 | | | | | |
| | B3 | 18.21 | 19.03 | | | | | |
| RD20M | B | 18.86 | 21.08 | 5 | 50 | 5 | 2 | 15 |
| | B1 | 18.86 | 19.70 | | | | | |
| | B2 | 19.52 | 20.39 | | | | | |
| | B3 | 20.21 | 21.08 | | | | | |
| RD22M | B | 20.88 | 23.17 | 5 | 55 | 5 | 2 | 17 |
| | B1 | 20.88 | 21.77 | | | | | |
| | B2 | 21.54 | 22.47 | | | | | |
| | B3 | 22.23 | 23.17 | | | | | |
| RD24M | B | 22.93 | 25.57 | 5 | 60 | 5 | 2 | 19 |
| | B1 | 22.93 | 23.96 | | | | | |
| | B2 | 23.72 | 24.78 | | | | | |
| | B3 | 24.54 | 25.57 | | | | | |
| RD27M | B | 25.10 | 28.90 | 2 | 70 | 2 | 2 | 21 |
| RD30M | B | 28.00 | 32.00 | 2 | 80 | 2 | 2 | 23 |
| RD33M | B | 31.00 | 35.00 | 2 | 80 | 2 | 2 | 25 |
| RD36M | B | 34.00 | 38.00 | 2 | 90 | 2 | 2 | 27 |
| RD39M | B | 37.00 | 41.00 | 2 | 100 | 2 | 2 | 30 |
| RD43M | B | 40.0 | 45.0 | 2 | 130 | 2 | 2 | 33 |
| RD47M | B | 44.0 | 49.0 | 2 | 150 | 2 | 2 | 36 |

**Note 1.** Tested with pulse (40 ms).

**2.** $Z_Z$ is measured at $I_Z$ by given a very small A.C. current signal.

## TYPICAL CHARACTERISTICS ($T_A$ = 25°C)

**Fig. 1 P–$T_A$ RATING**

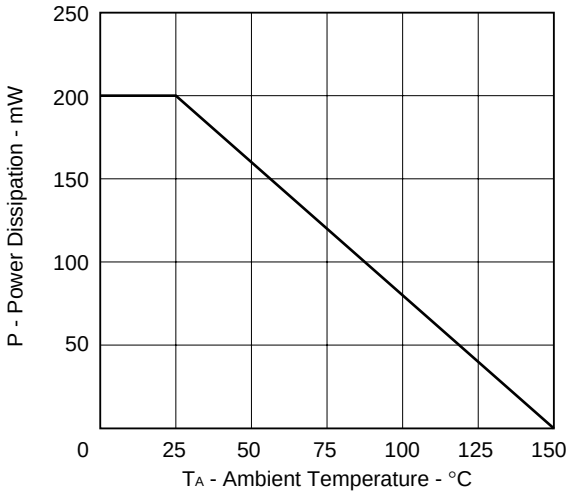
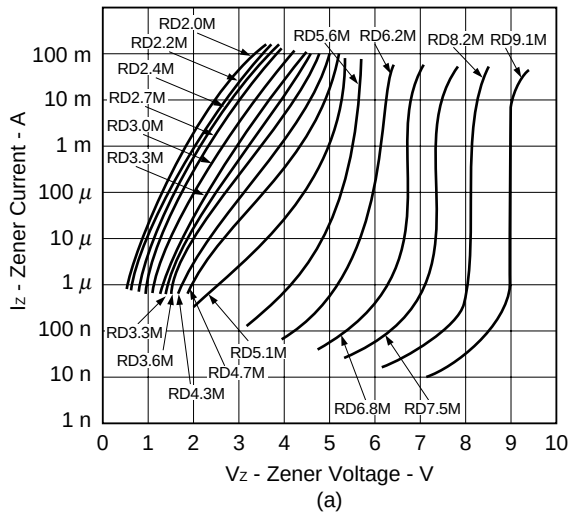
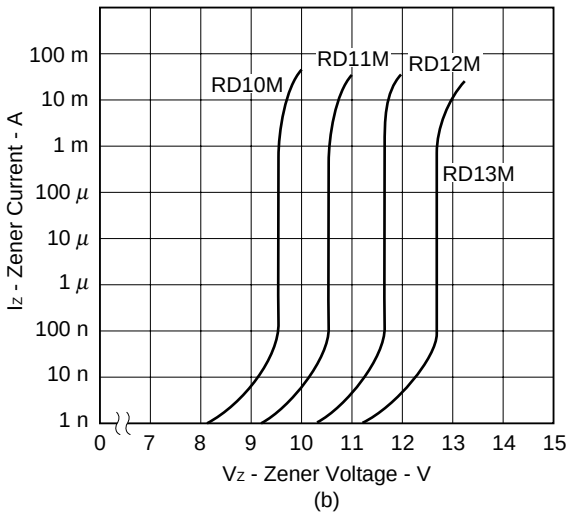
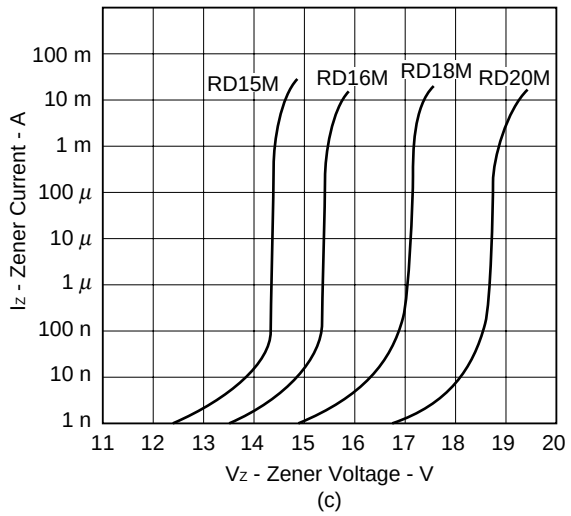
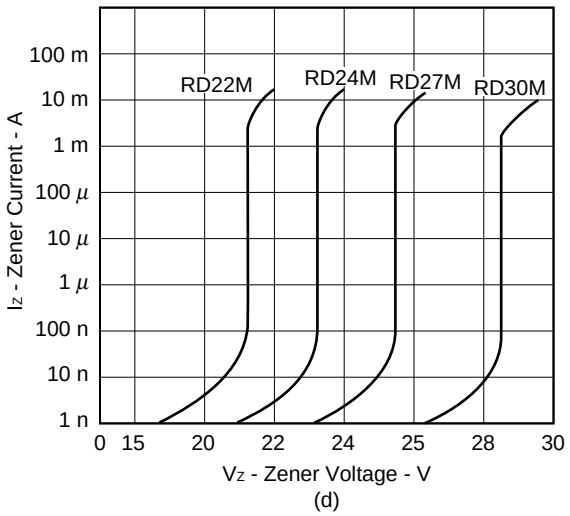



**Fig. 2 $I_Z$ – $V_Z$ CHARACTERISTICS (a to e)**



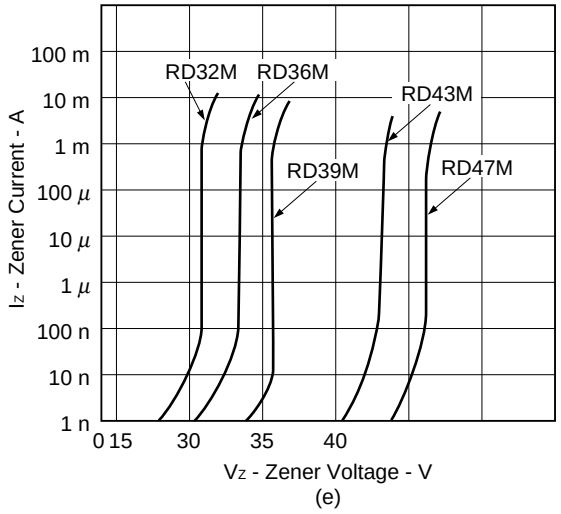



**Fig. 3 $\gamma_Z$ - $V_Z$ CHARACTERISTICS**

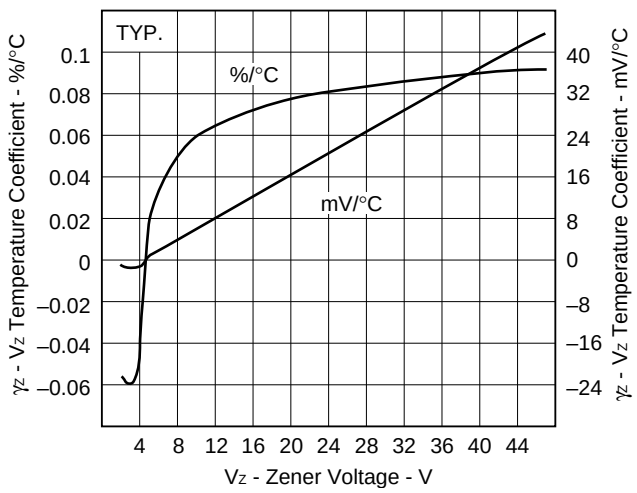



**Fig. 4 $Z_Z$ - $I_Z$ CHARACTERISTICS**

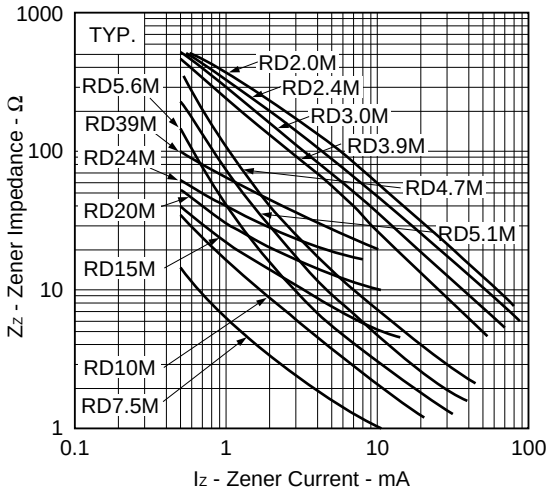


**Fig. 5 TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS**

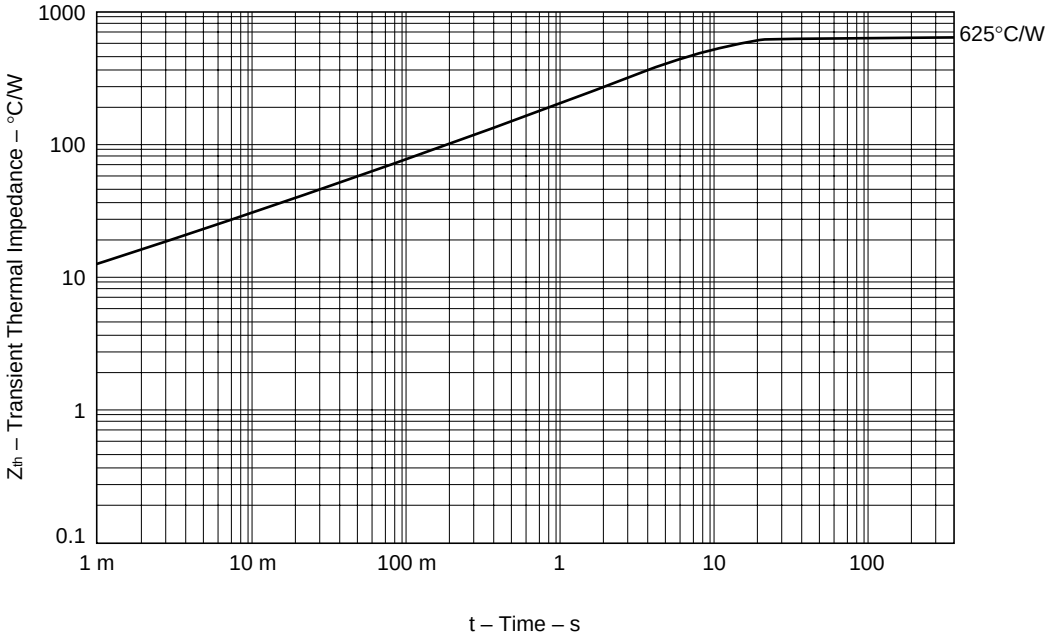
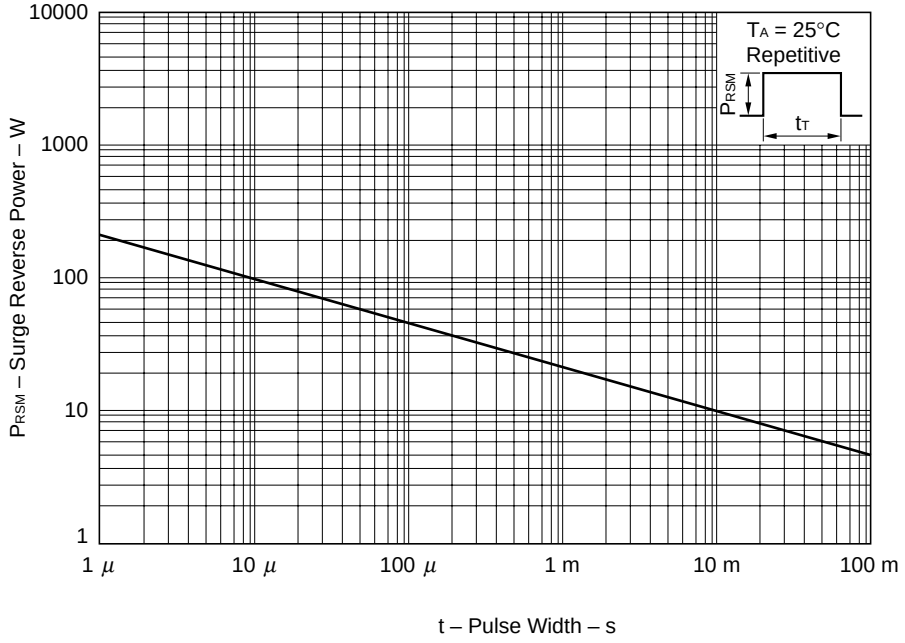



**FIG. 6 SURGE REVERSE POWER RATINGS**



**[MEMO]**

**[MEMO]**

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