

# ZENER DIODES

## RD2.0FM to RD120FM

### ZENER DIODES

#### 1 W 2 PIN POWER MINI MOLD

#### DESCRIPTION

Type RD2.0FM to RD120FM series are 2 pin power mini mold package zener diodes possessing an allowable power dissipation of 1 W.

#### QUALITY GRADE

Standard.

Please refer to "Quality Grades On NEC Semiconductor Devices" (Document number C11531E) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

#### FEATURES

- Sharp breakdown characteristics
- Vz: Applied E24 standard

#### APPLICATIONS

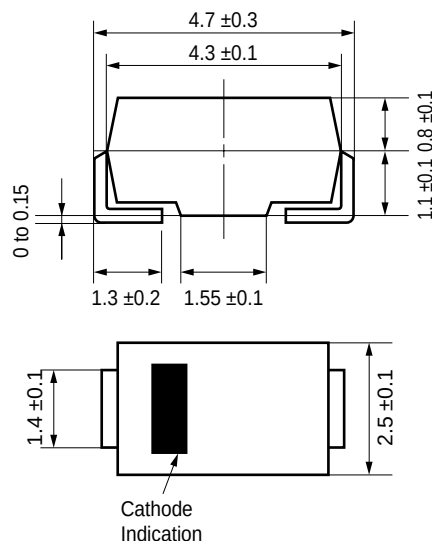
Circuits for, constant voltage, constant current, waveform clipper, surge absorber, etc.

#### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C)

|                      |                  |             |    |
|----------------------|------------------|-------------|----|
| Power Dissipation    | P                | 1           | W  |
| Forward Current      | I <sub>F</sub>   | 200         | mA |
| Junction Temperature | T <sub>j</sub>   | 150         | °C |
| Storage Temperature  | T <sub>stg</sub> | -55 to +150 | °C |

#### PACKAGE DIMENSIONS

(Unit: mm)



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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 ( $T_A = 25 \pm 2^\circ\text{C}$ )

(1/2)

| Type Number | Class | Zener Voltage<br>$V_Z$ (V) <sup>Note1</sup> |      |            | Dynamic Impedance<br>$Z_Z$ ( $\Omega$ ) <sup>Note2</sup> |            | Reverse Current<br>$I_R$ ( $\mu\text{A}$ ) |           |
|-------------|-------|---------------------------------------------|------|------------|----------------------------------------------------------|------------|--------------------------------------------|-----------|
|             |       | MIN.                                        | MAX. | $I_Z$ (mA) | MAX.                                                     | $I_Z$ (mA) | MAX.                                       | $V_R$ (V) |
| RD2.0FM     | B     | 1.9                                         | 2.2  | 5          | 140                                                      | 5          | 200                                        | 0.5       |
| RD2.2FM     | B     | 2.1                                         | 2.4  | 5          | 140                                                      | 5          | 200                                        | 0.7       |
| RD2.4FM     | B     | 2.3                                         | 2.6  | 5          | 140                                                      | 5          | 200                                        | 1.0       |
| RD2.7FM     | B     | 2.5                                         | 2.9  | 5          | 140                                                      | 5          | 150                                        | 1.0       |
| RD3.0FM     | B     | 2.8                                         | 3.2  | 5          | 140                                                      | 5          | 100                                        | 1.0       |
| RD3.3FM     | B     | 3.1                                         | 3.5  | 5          | 140                                                      | 5          | 80                                         | 1.0       |
| RD3.6FM     | B     | 3.4                                         | 3.8  | 5          | 140                                                      | 5          | 60                                         | 1.0       |
| RD3.9FM     | B     | 3.7                                         | 4.1  | 5          | 140                                                      | 5          | 40                                         | 1.0       |
| RD4.3FM     | B     | 4.0                                         | 4.5  | 5          | 140                                                      | 5          | 20                                         | 1.0       |
| RD4.7FM     | B     | 4.4                                         | 4.9  | 5          | 100                                                      | 5          | 20                                         | 1.0       |
| RD5.1FM     | B     | 4.8                                         | 5.4  | 5          | 100                                                      | 5          | 20                                         | 1.0       |
| RD5.6FM     | B     | 5.3                                         | 6.0  | 5          | 70                                                       | 5          | 20                                         | 1.5       |
| RD6.2FM     | B     | 5.8                                         | 6.6  | 5          | 40                                                       | 5          | 20                                         | 3.0       |
| RD6.8FM     | B     | 6.4                                         | 7.2  | 5          | 25                                                       | 5          | 20                                         | 3.5       |
| RD7.5FM     | B     | 7.0                                         | 7.9  | 5          | 25                                                       | 5          | 20                                         | 4.0       |
| RD8.2FM     | B     | 7.7                                         | 8.7  | 5          | 25                                                       | 5          | 20                                         | 5.0       |
| RD9.1FM     | B     | 8.5                                         | 9.6  | 5          | 25                                                       | 5          | 20                                         | 6.0       |
| RD10FM      | B     | 9.4                                         | 10.6 | 5          | 20                                                       | 5          | 10                                         | 7.0       |
| RD11FM      | B     | 10.4                                        | 11.6 | 5          | 20                                                       | 5          | 10                                         | 8.0       |
| RD12FM      | B     | 11.4                                        | 12.6 | 5          | 25                                                       | 5          | 10                                         | 9.0       |
| RD13FM      | B     | 12.4                                        | 14.1 | 5          | 30                                                       | 5          | 10                                         | 10        |
| RD15FM      | B     | 13.8                                        | 15.6 | 5          | 30                                                       | 5          | 10                                         | 11        |
| RD16FM      | B     | 15.3                                        | 17.1 | 5          | 40                                                       | 5          | 10                                         | 12        |
| RD18FM      | B     | 16.8                                        | 19.1 | 5          | 45                                                       | 5          | 10                                         | 13        |
| RD20FM      | B     | 18.8                                        | 21.2 | 5          | 55                                                       | 5          | 10                                         | 15        |
| RD22FM      | B     | 20.8                                        | 23.3 | 2          | 55                                                       | 2          | 10                                         | 17        |
| RD24FM      | B     | 22.8                                        | 25.6 | 2          | 70                                                       | 2          | 10                                         | 19        |
| RD27FM      | B     | 25.1                                        | 28.9 | 2          | 80                                                       | 2          | 10                                         | 21        |
| RD30FM      | B     | 28.0                                        | 32.0 | 2          | 80                                                       | 2          | 10                                         | 23        |
| RD33FM      | B     | 31.0                                        | 35.0 | 2          | 80                                                       | 2          | 10                                         | 25        |
| RD36FM      | B     | 34.0                                        | 38.0 | 2          | 90                                                       | 2          | 10                                         | 27        |
| RD39FM      | B     | 37.0                                        | 41.0 | 2          | 130                                                      | 2          | 10                                         | 30        |
| RD43FM      | B     | 40.0                                        | 45.0 | 2          | 150                                                      | 2          | 5                                          | 33        |
| RD47FM      | B     | 44.0                                        | 49.0 | 2          | 170                                                      | 2          | 5                                          | 36        |
| RD51FM      | B     | 48.0                                        | 54.0 | 2          | 220                                                      | 2          | 5                                          | 39        |
| RD56FM      | B     | 53.0                                        | 60.0 | 2          | 220                                                      | 2          | 5                                          | 43        |
| RD62FM      | B     | 58.0                                        | 66.0 | 2          | 220                                                      | 2          | 5                                          | 47        |
| RD68FM      | B     | 64.0                                        | 72.0 | 2          | 230                                                      | 2          | 5                                          | 52        |

**Note 1.**  $V_Z$  is tested with pulsed (40 ms).

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

**ELECTRICAL CHARACTERISTICS ( $T_A = 25 \pm 2^\circ\text{C}$ )**

**(2/2)**

| Type Number | Class | Zener Voltage<br>$V_Z$ (V) <sup>Note1</sup> |       |            | Dynamic Impedance<br>$Z_Z$ ( $\Omega$ ) <sup>Note2</sup> |            | Reverse Current<br>$I_R$ ( $\mu\text{A}$ ) |           |
|-------------|-------|---------------------------------------------|-------|------------|----------------------------------------------------------|------------|--------------------------------------------|-----------|
|             |       | MIN.                                        | MAX.  | $I_Z$ (mA) | MAX.                                                     | $I_Z$ (mA) | MAX.                                       | $V_R$ (V) |
| RD75FM      | B     | 70.0                                        | 79.0  | 2          | 250                                                      | 2          | 5                                          | 57        |
| RD82FM      | B     | 77.0                                        | 87.0  | 2          | 270                                                      | 2          | 5                                          | 63        |
| RD91FM      | B     | 85.0                                        | 96.0  | 2          | 340                                                      | 2          | 5                                          | 69        |
| RD100FM     | B     | 94.0                                        | 106.0 | 2          | 430                                                      | 2          | 5                                          | 76        |
| RD110FM     | B     | 104.0                                       | 116.0 | 2          | 530                                                      | 2          | 5                                          | 84        |
| RD120FM     | B     | 114.0                                       | 126.0 | 2          | 620                                                      | 2          | 5                                          | 91        |

**Note 1.**  $V_Z$  is tested with pulsed (40 ms).

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

TYPICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )

Fig.1 P -  $T_A$  RATING

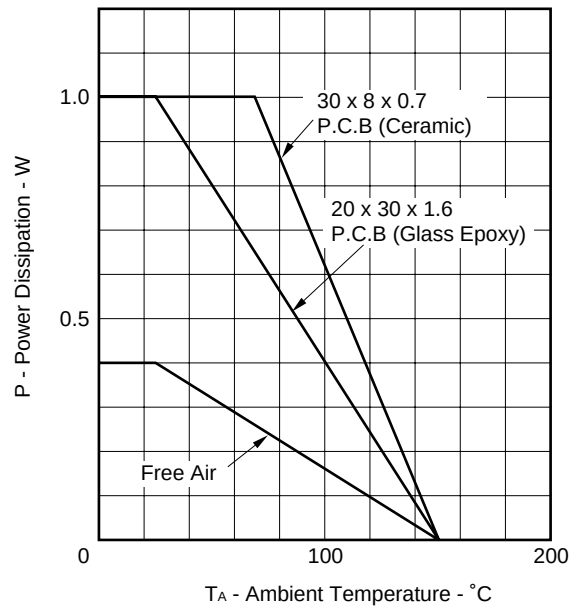
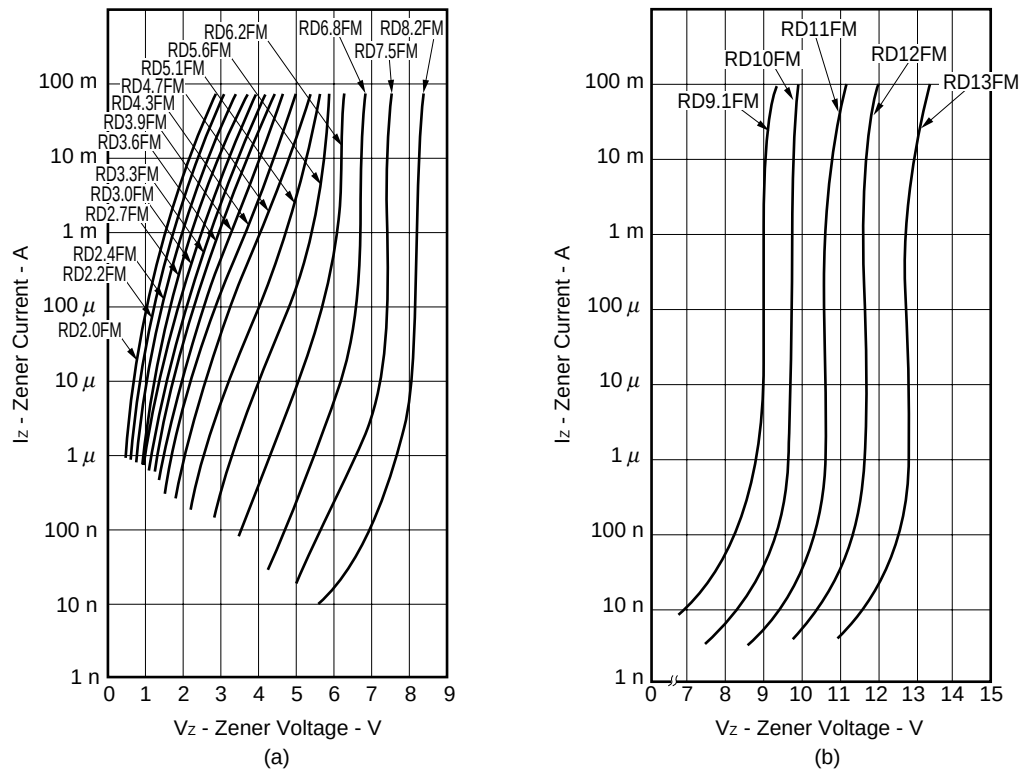
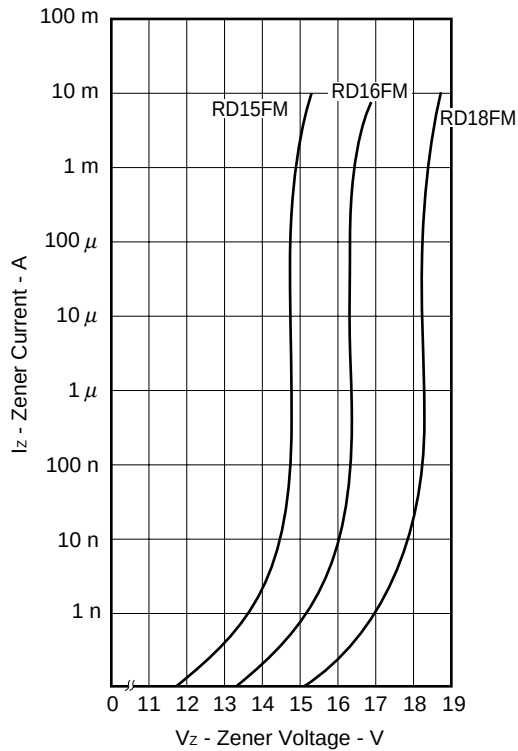
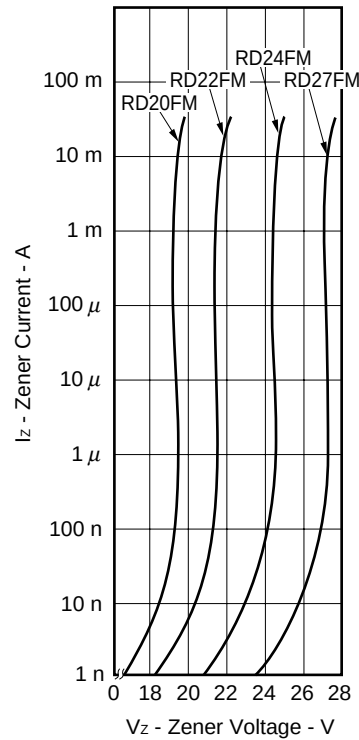


Fig.2  $I_z$  -  $V_z$  CHARACTERISTICS (a to f)

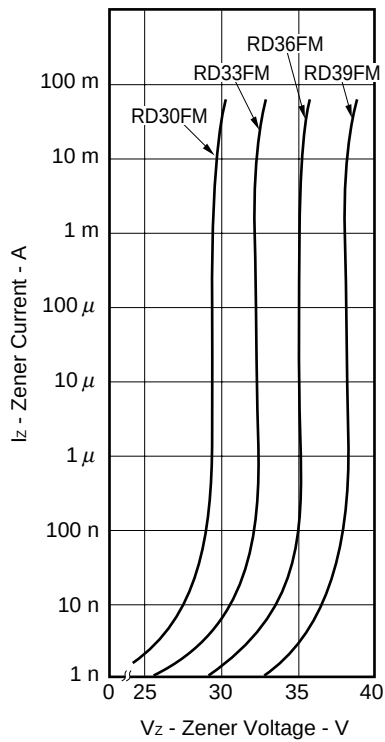




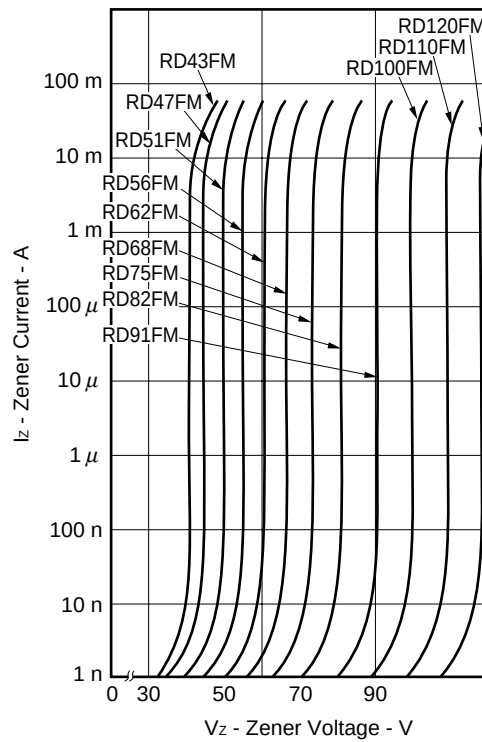
(c)



(d)



(e)



(f)

Fig.3  $\gamma_z - V_z$  CHARACTERISTICS

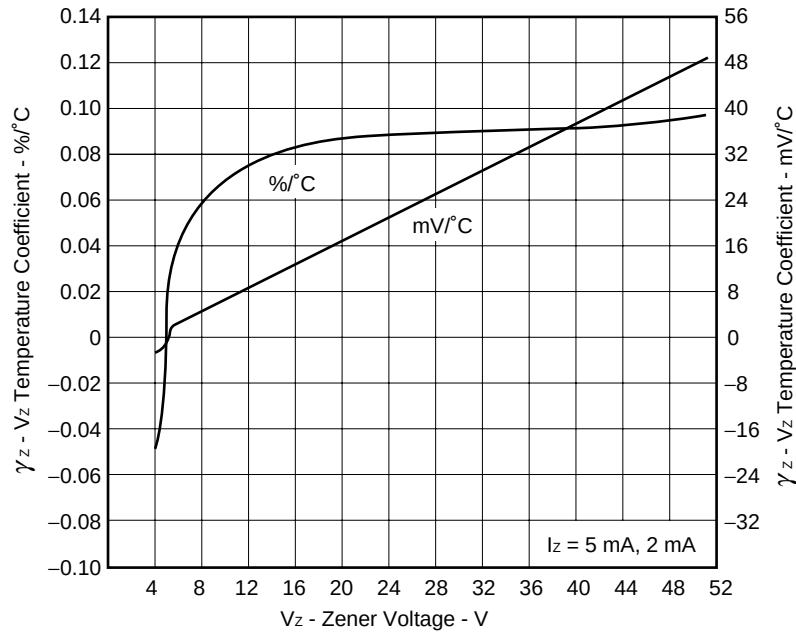
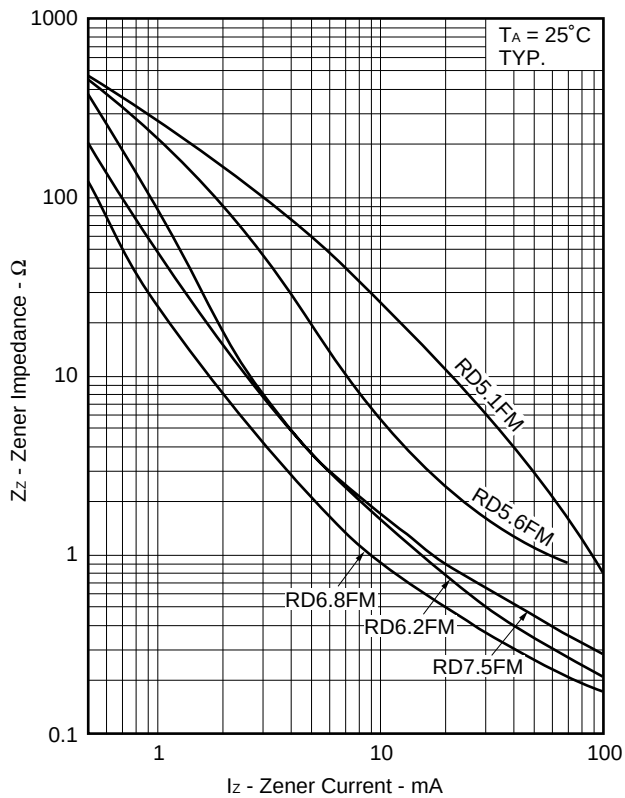
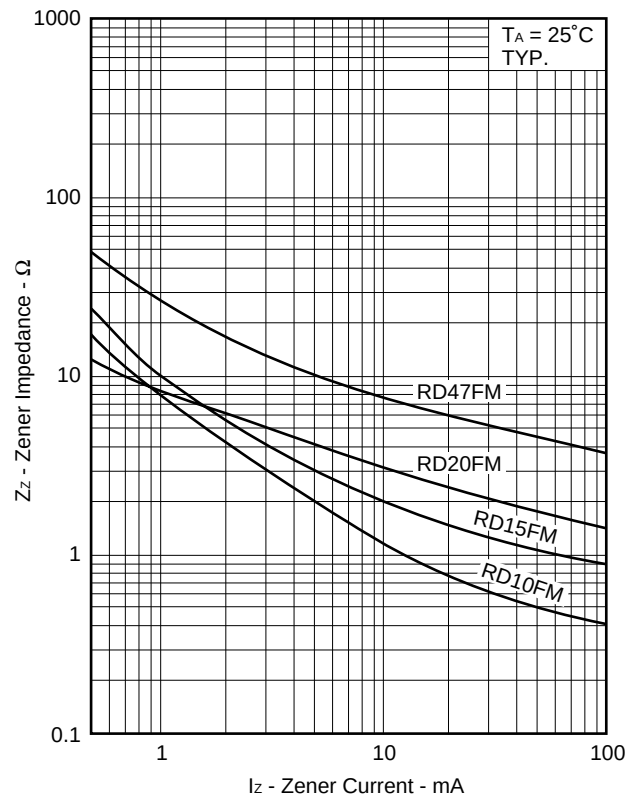


Fig.4  $Z_z - I_z$  CHARACTERISTICS



(a)



(b)

Fig.5 TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS

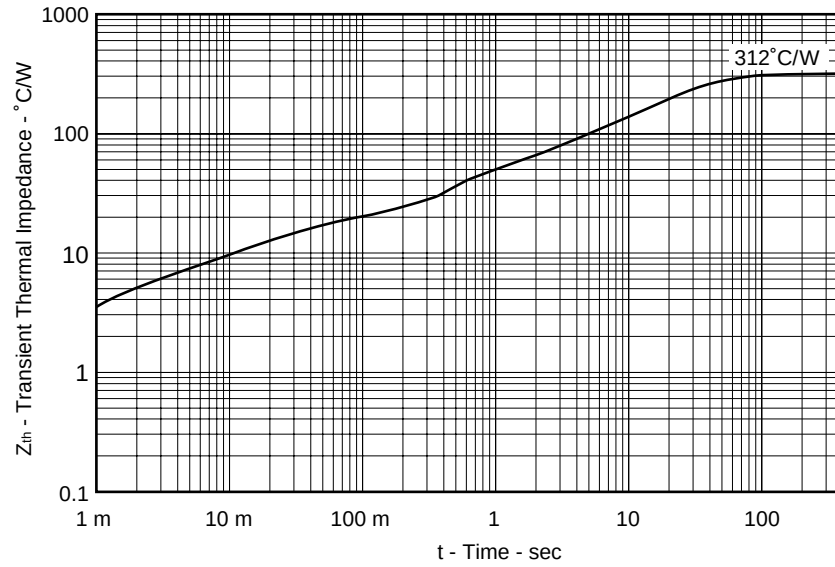
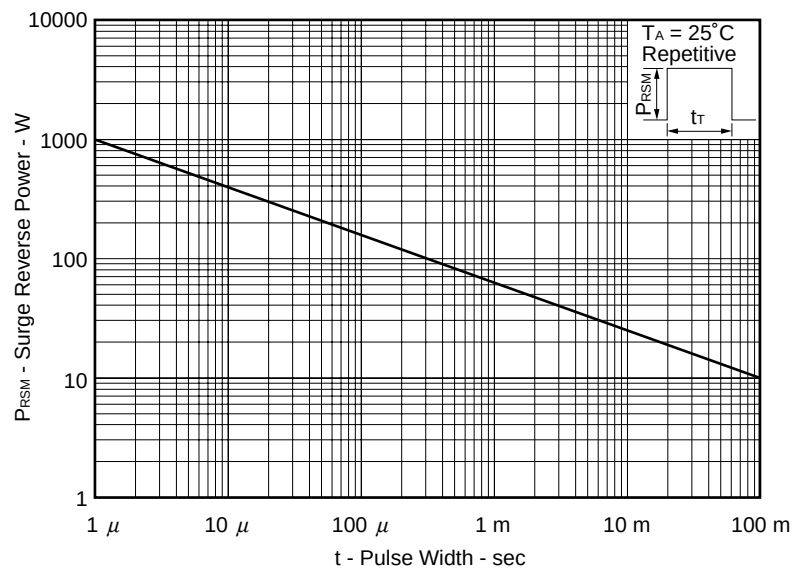


Fig.6 SURGE REVERSE POWER RATINGS



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