Microsemi
SCOTTSDALE DIVISION

# 1N2804 thru 1N2846B and 1N4557 thru 1N4564B

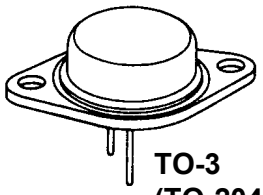
## 50 Watt Zener Diodes

## DESCRIPTION

These high power 50 W Zener diodes represented by the JEDEC registered 1N2804 thru 1N2846B and 1N4557 thru 1N4564B series provide voltage regulation in a selection over a 3.9 V to 200 V broad range of voltages. They may be operated up to 50 W with adequate mounting and heat sinking with their low thermal resistance. These Zeners are also available in JAN, JANTX, JANTXV military qualifications. Microsemi also offers numerous other Zener products to meet higher and lower power applications.

**IMPORTANT:** For the most current data, consult *MICROSEMI's* website: http://www.microsemi.com

## APPEARANCE



**TO-3**
**(TO-204AD)**

## FEATURES

- JEDEC registered 1N2804 thru 1N2846B and 1N4557 thru 1N4564B
- Internal solder bond construction
- Hermetically sealed (welded)
- Zener Voltage 3.9V to 200V.
- Also available in JAN, JANTX, and JANTXV qualifications per MIL-PRF-19500/114 by adding the JAN, JANTX, or JANTXV prefixes to part numbers for desired level of screening; (e.g. JANTX1N2804B, etc.
- Standard polarity is anode to case
- Reverse polarity with cathode to case by designating R suffix in part number, e.g. 1N2804RB, etc.
- Consult factory for surface mount equivalents

## APPLICATIONS / BENEFITS

- Regulates voltage over a broad operating current and temperature range
- Standard voltage tolerances are +/- 5% with B suffix, +/-10% with an A suffix, and +/-20% with no suffix
- Consult factory for +/-2% or +/-1% with a C or D suffix respectively
- Reverse polarity available
- Nonsensitive to ESD per MIL-STD-750 Method 1020
- Inherently radiation hard as described in Microsemi MicroNote 050

## MAXIMUM RATINGS

- Junction Temperatures: -65°C to +175°C
- Storage Temperatures: -65°C to +200°C
- DC Power Dissipation: 50 watts at $T_C \leq 75$ °C
- Power Derating: 0.5W/°C above 75°C
- Forward Voltage @ 10 A: 1.5 Volts
- THERMAL RESISTANCE: 2.0 °C/W maximum junction to base (1.5 °C/W typical)
- Solder temperatures: 260 °C for 10 s (max)

## MECHANICAL AND PACKAGING

- CASE: Industry Standard TO-3 (TO-204AD), hermetically sealed, 0.052 inch diameter pins.
- FINISH: All external surfaces are corrosion resistant and terminal solderable.
- POLARITY: Standard Polarity units are connected anode to case. Reverse polarity (cathode to case) is indicated by Suffix R in part number
- WEIGHT: 15 grams.
- MOUNTING HARDWARE: Consult factory for optional insulator and sheet metal screws
- See package dimensions on last page



Copyright © 2003


**Microsemi**
Scottsdale Division
8700 E. Thomas Rd. PO Box 1390, Scottsdale, AZ 85252 USA, (480) 941-6300, Fax: (480) 947-1503

# 1N2804 thru 1N2846B and 1N4557 thru 1N4564B

## 50 Watt Zener Diodes



## *ELECTRICAL CHARACTERISTICS @ 25°C

| JEDEC TYPE NO. (Note 1) | NOMINAL ZENER VOLTAGE $V_Z$ @ $I_{ZT}$ (Note 2) Volts | ZENER TEST CURRENT ($I_{ZT}$) mA | MAX. ZENER IMPEDANCE (Note 3) $Z_{ZT}$ @ $I_{ZT}$ OHMS | MAX. ZENER IMPEDANCE (Note 3) $Z_{ZK}$ @ 5mA ($I_{ZK}$) OHMS | MAX. DC ZENER CURRENT ($I_{ZM}$ @ 75°C Case Temp. (Note 4) mA | TYPICAL ZENER VOLTAGE Temp. Coeff. $\alpha_{VZ}$ %/°C | MAXIMUM LEAKAGE CURRENT** $I_R$ @ $V_R$ µA | MAXIMUM LEAKAGE CURRENT** $I_R$ @ $V_R$ V |
|---|---|---|---|---|---|---|---|---|
| †1N4557B | 3.9 | 3200 | 0.16 | 400 | 11,900 | -0.046 | 150 | 0.5 |
| †1N4558B | 4.3 | 2900 | 0.16 | 500 | 10,650 | -0.033 | 150 | 0.5 |
| †1N4559B | 4.7 | 2650 | 0.12 | 600 | 9,700 | -0.015 | 100 | 1 |
| †1N4560B | 5.1 | 2450 | 0.12 | 650 | 8,900 | +/-0.010 | 20 | 1 |
| †1N4561B | 5.6 | 2250 | 0.12 | 900 | 8,100 | +0.03 | 20 | 1 |
| †1N4562B | 6.2 | 2000 | 0.14 | 1000 | 7,300 | +0.049 | 20 | 2 |
| 1N4563B | 6.8 | 1850 | 0.16 | 200 | 6,650 | +0.053 | 10 | 2 |
| 1N4564B | 7.5 | 1650 | 0.24 | 100 | 6,050 | +0.057 | 10 | 3 |
| †1N2804B | 6.8 | 1850 | 0.2 | 70 | 7,400 | .040 | 150 | 4.5 |
| †1N2805B | 7.5 | 1700 | 0.3 | 70 | 6,600 | .045 | 100 | 5 |
| †1N2806B | 8.2 | 1500 | 0.4 | 70 | 5,800 | .048 | 50 | 5.4 |
| †1N2807B | 9.1 | 1370 | 0.5 | 70 | 5,300 | .050 | 25 | 6.1 |
| †1N2808B | 10 | 1200 | 0.6 | 80 | 4,800 | .055 | 25 | 6.7 |
| †1N2809B | 11 | 1100 | 0.8 | 80 | 4,300 | .060 | 10 | 8.4 |
| †1N2810B | 12 | 1000 | 1.0 | 80 | 4,000 | .065 | 10 | 9.1 |
| †1N2811B | 13 | 960 | 1.1 | 80 | 3,700 | .065 | 10 | 9.9 |
| 1N2812B | 14 | 890 | 1.2 | 80 | 3,400 | .070 | 10 | 10.6 |
| †1N2813B | 15 | 830 | 1.4 | 80 | 3,100 | .070 | 10 | 11.4 |
| †1N2814B | 16 | 780 | 1.6 | 80 | 2,950 | .070 | 10 | 12.2 |
| 1N2815B | 17 | 740 | 1.8 | 80 | 2,750 | .075 | 10 | 13.0 |
| †1N2816B | 18 | 700 | 2.0 | 80 | 2,550 | .075 | 10 | 13.7 |
| 1N2817B | 19 | 660 | 2.2 | 80 | 2,450 | .075 | 10 | 14.4 |
| †1N2818B | 20 | 630 | 2.4 | 80 | 2,350 | .075 | 10 | 15.2 |
| †1N2819B | 22 | 570 | 2.5 | 80 | 2,100 | .080 | 10 | 16.7 |
| †1N2820B | 24 | 520 | 2.6 | 80 | 1,950 | .080 | 10 | 18.2 |
| 1N2821B | 25 | 500 | 2.7 | 90 | 1,850 | .080 | 10 | 19 |
| †1N2822B | 27 | 460 | 2.8 | 90 | 1,650 | .085 | 10 | 20.6 |
| †1N2823B | 30 | 420 | 3.0 | 90 | 1,550 | .085 | 10 | 22.8 |
| †1N2824B | 33 | 380 | 3.2 | 90 | 1,450 | .085 | 10 | 25.1 |
| †1N2825B | 36 | 350 | 3.5 | 90 | 1,300 | .085 | 10 | 27.4 |
| †1N2826B | 39 | 320 | 4.0 | 90 | 1,175 | .090 | 10 | 29.7 |
| †1N2827B | 43 | 290 | 4.5 | 90 | 1,075 | .090 | 10 | 32.7 |
| 1N2828B | 45 | 280 | 4.5 | 100 | 1,030 | .090 | 10 | 34.2 |
| †1N2829B | 47 | 270 | 5.0 | 100 | 980 | .090 | 10 | 35.8 |
| 1N2830B | 50 | 250 | 5.0 | 100 | 935 | .090 | 10 | 38 |
| †1N2831B | 51 | 245 | 5.2 | 100 | 925 | .090 | 10 | 38.8 |
| †1N2832B | 56 | 220 | 6 | 110 | 825 | .090 | 10 | 42.6 |
| †1N2833B | 62 | 200 | 7 | 120 | 735 | .090 | 10 | 47.1 |
| †1N2834B | 68 | 180 | 8 | 140 | 670 | .090 | 10 | 51.7 |
| †1N2835B | 75 | 170 | 9 | 150 | 600 | .090 | 10 | 56 |
| †1N2836B | 82 | 150 | 11 | 160 | 550 | .090 | 10 | 62.2 |
| †1N2837B | 91 | 140 | 15 | 180 | 470 | .090 | 10 | 69.2 |
| †1N2838B | 100 | 120 | 20 | 200 | 450 | .090 | 10 | 76 |
| 1N2839B | 105 | 120 | 25 | 210 | 430 | .095 | 10 | 79.8 |
| †1N2840B | 110 | 110 | 30 | 220 | 410 | .095 | 10 | 83.6 |
| †1N2841B | 120 | 100 | 40 | 240 | 375 | .095 | 10 | 91.2 |
| †1N2842B | 130 | 95 | 50 | 275 | 345 | .095 | 10 | 98.8 |
| †1N2843B | 150 | 85 | 75 | 400 | 300 | .095 | 10 | 114.0 |
| †1N2844B | 160 | 80 | 80 | 450 | 285 | .095 | 10 | 121.6 |
| †1N2845B | 180 | 68 | 90 | 525 | 250 | .095 | 10 | 136.8 |
| †1N2846B | 200 | 65 | 100 | 600 | 220 | .100 | 10 | 152.0 |

*JEDEC Registered Data. **Not JEDEC Data.

†Have JAN, JANTX and JANTXV Qualifications to MIL-S-19500/114.

**See further notes on following page**



Copyright © 2003


**Microsemi**
Scottsdale Division
8700 E. Thomas Rd. PO Box 1390, Scottsdale, AZ 85252 USA, (480) 941-6300, Fax: (480) 947-1503

**NOTES:**

1. The JEDEC type numbers shown (B suffix) have a +/- 5% tolerance on nominal zener voltage. The suffix A is used to identify +/-10% tolerance; no suffix indicates +/-20% tolerance. If tighter tolerance is required, consult factory. Standard polarity units have the anode connected to the case. Reverse polarity (cathode-to-case) units are available and are indicated by suffix R in the part number.
2. Zener Voltage ($V_Z$) is measured with junction in thermal equilibrium with 30°C base temperature. The test currents ($I_{ZT}$) have been selected so that at nominal voltages the dissipation is a constant 12.5 watts. This results in a nominal junction temperature rise of 18.75°C .
3. The zener impedance is derived from the 60 cycle ac voltage, which results when an ac current having an rms value equal to 10% of the dc zener current ($I_{ZT}$ or $I_{ZK}$) is superimposed on $I_{ZT}$ or $I_{ZK}$. Zener impedance is measured at 2 points to ensure a sharp knee on the breakdown curve and to eliminate unstable units. A curve showing the variation of zener impedance vs. zener current for six representative types is shown in Figure 3. Also see MicroNote 202 for further information.
4. The values of $I_{ZM}$ are calculated for a +/-5% tolerance on nominal zener voltage. Allowance has been made for the rise in zener voltage above $V_{ZT}$ that results from zener impedance and the increase in junction temperature as power dissipation approaches 50 watts. In the case of individual diodes, $I_{ZM}$ is that value of current that results in a dissipation of 50 watts.

## GRAPHS AND CIRCUITS

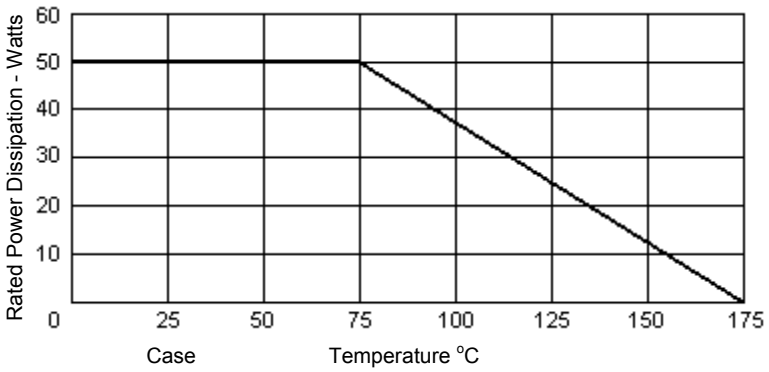
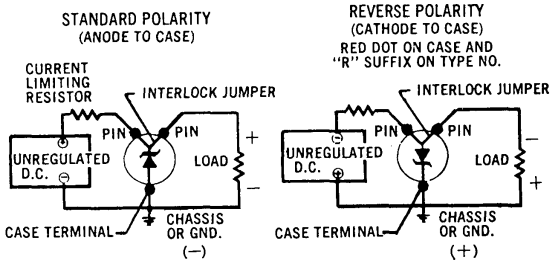



**FIGURE 2**
POWER DERATING CURVE

Typical circuit connections for anode-to-case and cathode-to-case polarities (standard and reverse polarities, respectively).



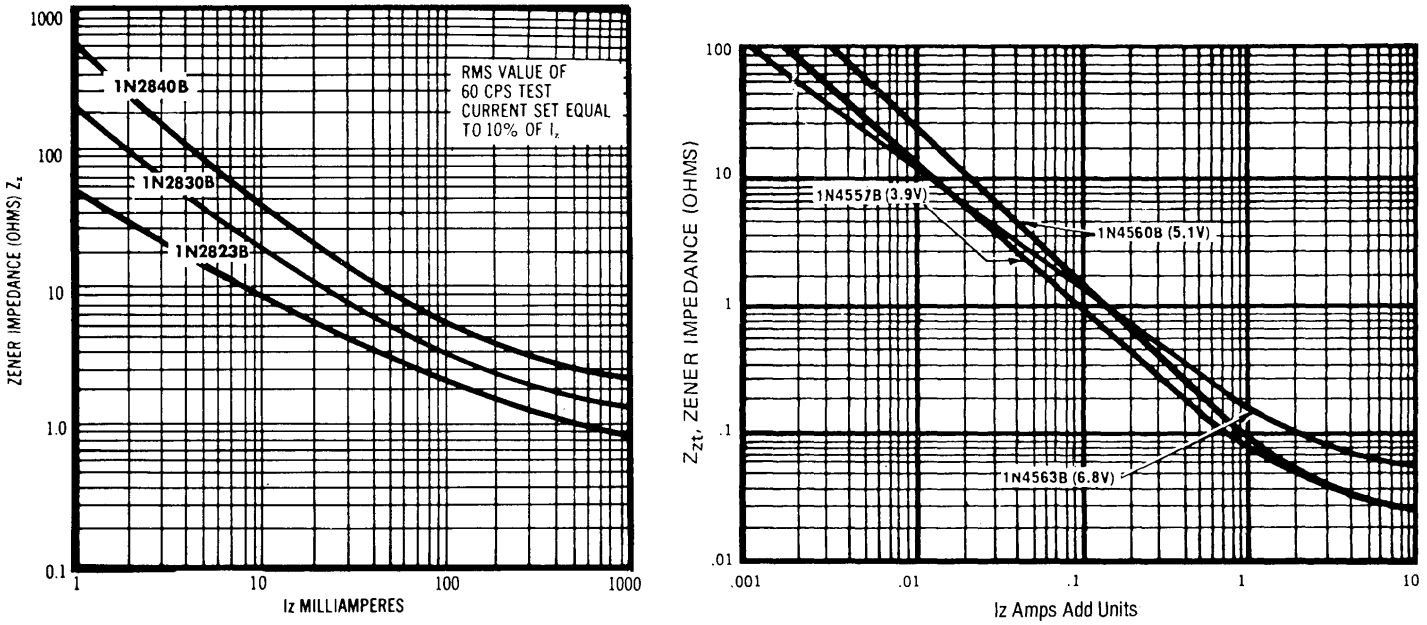
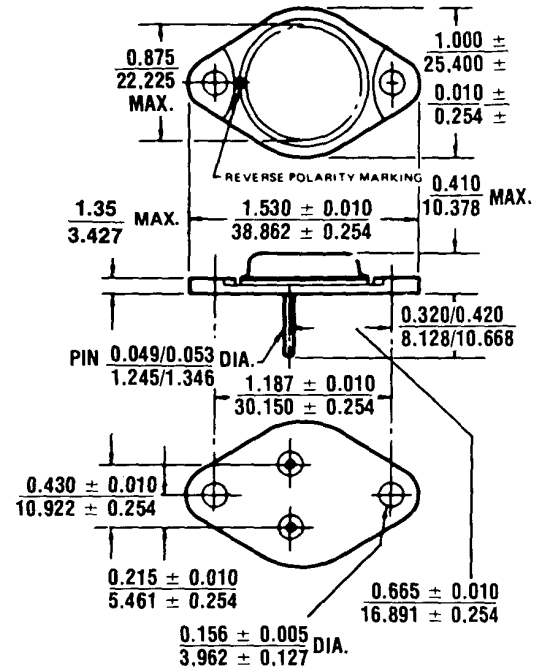




**FIGURE GROUP 3**
TYPICAL ZENER IMPEDANCE vs. ZENER CURRENT FOR TYPES SHOWN



Copyright © 2003
11-12-2003 REV A

## PACKAGE DIMENSIONS




All dimensions in INCH / m.m.



Copyright © 2003
11-12-2003 REV A

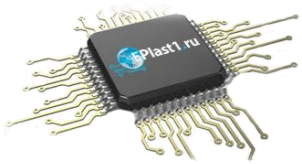
Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.




**Как с нами связаться**

**Телефон:** 8 (812) 309 58 32 (многоканальный)
**Факс:** 8 (812) 320-02-42
**Электронная почта:** org@eplast1.ru
**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.