

## 1W, 11V-220V Voltage Regulator Diode

### FEATURES

- Silicon zener diodes
- Low profile surface-mount package
- Zener and surge current specification
- Low leakage current
- Excellent stability
- Moisture sensitivity level: level 1, per J-STD-020
- AEC-Q101 qualified available: ordering code with suffix "H"
- RoHS Compliant
- Halogen-free according to IEC 61249-2-21

### KEY PARAMETERS

| PARAMETER             | VALUE      | UNIT |
|-----------------------|------------|------|
| $V_Z$                 | 11 - 220   | V    |
| Test current $I_{ZT}$ | 5 - 50     | mA   |
| $P_{tot}$             | 1.0        | W    |
| $V_F$ at $I_F=0.2A$   | 1.0        | V    |
| $T_{JMAX}$            | 175        | °C   |
| Package               | SOD-123W   |      |
| Configuration         | Single die |      |

### APPLICATIONS

- Switching mode power supply (SMPS)
- Adapters
- Lighting application
- On-board DC/DC converter



### MECHANICAL DATA

- Case: SOD-123W
- Molding compound meets UL 94 V-0 flammability rating
- Terminal: Matte tin plated leads, solderable per J-STD-002
- Meet JESD 201 class 2 whisker test
- Polarity: Indicated by cathode band
- Weight: 16mg (approximately)



SOD-123W

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

| PARAMETER  | SYMBOL         | VALUE       | UNIT |
|--|----------------|-------------|------|
| Forward voltage @ $I_F=0.2A$   | $V_F$          | 1.0         | V    |
| Power dissipation at $T_L=80^\circ\text{C}$<br>$T_A=25^\circ\text{C}$ (Note 1)                             | $P_{tot}$      | 2.3         | W    |
|  |                | 1.0         |      |
| Non-repetitive peak pulse power dissipation<br>100 $\mu\text{s}$ square pulse (Note 2)                     | $P_{ZSM}$      | 300         | W    |
| Non-repetitive peak pulse power dissipation<br>10/1000 $\mu\text{s}$ waveform (BZD27C11PW to BZD27C100PW)  | $P_{RSM}$      | 150         | W    |
| Non-repetitive peak pulse power dissipation<br>10/1000 $\mu\text{s}$ waveform (BZD27C110PW to BZD27C220PW) | $P_{RSM}$      | 100         | W    |
| Operating and storage temperature range  | $T_J, T_{STG}$ | -55 to +175 | °C   |

#### Notes:

1. Mounted on Cu-Pad size 5mm x 5mm
2.  $T_J=25^\circ\text{C}$  prior to surge

| <b>THERMAL PERFORMANCE</b>             |                 |            |             |
|--|-----------------|------------|-------------|
| <b>PARAMETER</b>                       | <b>SYMBOL</b>   | <b>TYP</b> | <b>UNIT</b> |
| Junction-to-lead thermal resistance    | $R_{\theta JL}$ | 22         | °C/W        |
| Junction-to-ambient thermal resistance | $R_{\theta JA}$ | 85         | °C/W        |
| Junction-to-case thermal resistance    | $R_{\theta JC}$ | 24         | °C/W        |

**Thermal Performance Note:** Units mounted on PCB (5mm x 5mm Cu pad test board)

| <b>ORDERING INFORMATION</b>         |                |                         |
|-------------------------------------|----------------|-------------------------|
| <b>ORDERING CODE</b><br>(Note 1, 2) | <b>PACKAGE</b> | <b>PACKING</b>          |
| BZD27CxxPWHRVG                      | SOD-123W       | 3,000 / 7" Plastic reel |
| BZD27CxxPWHRQG                      | SOD-123W       | 10,000 / 13" Paper reel |
| BZD27CxxPW RVG                      | SOD-123W       | 3,000 / 7" Plastic reel |
| BZD27CxxPW RQG                      | SOD-123W       | 10,000 / 13" Paper reel |

**Note:**

1. "xx" defines voltage from 11V (BZD27C11PW) to 220V (BZD27C220PW)
2. "H" means AEC-Q101 qualified

| <b>ELECTRICAL SPECIFICATIONS</b> ( $T_A = 25^\circ\text{C}$ unless otherwise noted) |              |                      |      |       |              |                     |                   |              |
|---|--------------|----------------------|------|-------|--------------|---------------------|-------------------|--------------|
| Part number   | Marking code | Zener voltage        |      |       | Test current | Regulator impedance |                   | Test current |
|   |              | $V_Z @ I_{ZT}^{(1)}$ |      |       | $I_{ZT}$     | $Z_{ZT} @ I_{ZT}$   | $Z_{ZK} @ I_{ZK}$ | $I_{ZK}$     |
|   |              | V                    |      |       | mA           | $\Omega$            | $\Omega$          | mA           |
|   |              | Min.                 | Nom. | Max.  |              | Max.                | Max.              |              |
| BZD27C11PW  | N2           | 10.5                 | 11   | 11.6  | 50           | 7                   | 700               | 0.25         |
| BZD27C12PW  | N3           | 11.4                 | 12   | 12.6  | 50           | 7                   | 700               | 0.25         |
| BZD27C13PW  | N4           | 12.4                 | 13   | 13.7  | 50           | 10                  | 700               | 0.25         |
| BZD27C15PW  | N5           | 14.3                 | 15   | 15.8  | 50           | 10                  | 700               | 0.25         |
| BZD27C16PW  | N6           | 15.2                 | 16   | 16.8  | 25           | 15                  | 700               | 0.25         |
| BZD27C18PW  | N7           | 17.1                 | 18   | 18.9  | 25           | 15                  | 750               | 0.25         |
| BZD27C20PW  | P0           | 19                   | 20   | 21    | 25           | 15                  | 750               | 0.25         |
| BZD27C22PW  | P1           | 20.9                 | 22   | 23.1  | 25           | 15                  | 750               | 0.25         |
| BZD27C24PW  | P3           | 22.8                 | 24   | 25.2  | 25           | 15                  | 750               | 0.25         |
| BZD27C27PW  | P4           | 25.7                 | 27   | 28.4  | 25           | 15                  | 1000              | 0.25         |
| BZD27C30PW  | P5           | 28.5                 | 30   | 31.5  | 25           | 15                  | 1000              | 0.25         |
| BZD27C33PW  | P6           | 31.4                 | 33   | 34.7  | 25           | 15                  | 1000              | 0.25         |
| BZD27C36PW  | P7           | 34.2                 | 36   | 37.8  | 10           | 40                  | 1000              | 0.25         |
| BZD27C39PW  | P8           | 37.1                 | 39   | 41    | 10           | 40                  | 1000              | 0.25         |
| BZD27C43PW  | Q0           | 40.9                 | 43   | 45.2  | 10           | 45                  | 1500              | 0.25         |
| BZD27C47PW  | Q1           | 44.7                 | 47   | 49.4  | 10           | 45                  | 1500              | 0.25         |
| BZD27C51PW  | Q2           | 48.5                 | 51   | 53.6  | 10           | 60                  | 1500              | 0.25         |
| BZD27C56PW  | Q5           | 53.2                 | 56   | 58.8  | 10           | 60                  | 2000              | 0.25         |
| BZD27C62PW  | Q7           | 58.9                 | 62   | 65.1  | 10           | 80                  | 2000              | 0.25         |
| BZD27C68PW  | R1           | 64.6                 | 68   | 71.4  | 10           | 80                  | 2000              | 0.25         |
| BZD27C75PW  | R2           | 71.3                 | 75   | 78.8  | 10           | 100                 | 2000              | 0.25         |
| BZD27C82PW  | R3           | 77.9                 | 82   | 86.1  | 10           | 200                 | 3000              | 0.25         |
| BZD27C91PW  | R4           | 86.5                 | 91   | 95.6  | 5            | 200                 | 3000              | 0.25         |
| BZD27C100PW   | R5           | 95                   | 100  | 105   | 5            | 200                 | 3000              | 0.25         |
| BZD27C110PW   | R6           | 104.5                | 110  | 115.5 | 5            | 250                 | 4000              | 0.25         |
| BZD27C120PW   | R7           | 114                  | 120  | 126   | 5            | 300                 | 4500              | 0.25         |
| BZD27C130PW   | R8           | 123.5                | 130  | 136.5 | 5            | 300                 | 5000              | 0.25         |
| BZD27C150PW   | R9           | 142.5                | 150  | 157.5 | 5            | 300                 | 6000              | 0.25         |
| BZD27C160PW   | R10          | 152                  | 160  | 168   | 5            | 350                 | 6500              | 0.25         |
| BZD27C180PW   | R11          | 171                  | 180  | 189   | 5            | 450                 | 7000              | 0.25         |
| BZD27C200PW   | R12          | 190                  | 200  | 210   | 5            | 750                 | 8000              | 0.25         |
| BZD27C220PW   | R13          | 209                  | 220  | 231   | 5            | 900                 | 8500              | 0.25         |

**Notes:**

1. Pulse test with PW=30 ms

## ELECTRICAL SPECIFICATIONS (T<sub>A</sub> = 25°C unless otherwise noted)

| Part number | Marking code | Zener voltage                                   |      |       | Test current    | Clamping Voltage |                                  | Leakage current                                |     | Temperature coefficient of Zener voltage |      |
|-------------|--------------|---|------|-------|-----------------|------------------|----------------------------------|--|-----|--|------|
|             |              | V <sub>Z</sub> @ I <sub>ZT</sub> <sup>(1)</sup> |      |       | I <sub>ZT</sub> | V <sub>c</sub>   | @I <sub>RSM</sub> <sup>(2)</sup> | I <sub>R</sub> @ V <sub>R</sub> <sup>(1)</sup> |     | α V <sub>Z</sub> @ I <sub>ZT</sub>       |      |
|             |              | V   |      |       | mA              | V                | A                                | μA   | V   | mV/°C                                    |      |
|             |              | Min.  | Nom. | Max.  |                 | Max.             |                                  | Max.   |     | Min.                                     | Max. |
| BZD27C11PW  | N2           | 10.5  | 11   | 11.6  | 50              | 15.7             | 9.6                              | 4.0  | 8.2 | 0.05                                     | 0.10 |
| BZD27C12PW  | N3           | 11.4  | 12   | 12.6  | 50              | 17.0             | 8.8                              | 3.0  | 9.1 | 0.05                                     | 0.10 |
| BZD27C13PW  | N4           | 12.4  | 13   | 13.7  | 50              | 18.9             | 7.9                              | 2.0  | 10  | 0.05                                     | 0.10 |
| BZD27C15PW  | N5           | 14.3  | 15   | 15.8  | 50              | 20.9             | 7.2                              | 1.0  | 11  | 0.05                                     | 0.10 |
| BZD27C16PW  | N6           | 15.2  | 16   | 16.8  | 25              | 22.9             | 6.6                              | 1.0  | 12  | 0.06                                     | 0.11 |
| BZD27C18PW  | N7           | 17.1  | 18   | 18.9  | 25              | 25.6             | 5.9                              | 1.0  | 13  | 0.06                                     | 0.11 |
| BZD27C20PW  | P0           | 19  | 20   | 21    | 25              | 28.4             | 5.3                              | 1.0  | 15  | 0.06                                     | 0.11 |
| BZD27C22PW  | P1           | 20.9  | 22   | 23.1  | 25              | 31.0             | 4.8                              | 1.0  | 16  | 0.06                                     | 0.11 |
| BZD27C24PW  | P3           | 22.8  | 24   | 25.2  | 25              | 33.8             | 4.4                              | 1.0  | 18  | 0.06                                     | 0.11 |
| BZD27C27PW  | P4           | 25.7  | 27   | 28.4  | 25              | 38.1             | 3.9                              | 1.0  | 20  | 0.06                                     | 0.11 |
| BZD27C30PW  | P5           | 28.5  | 30   | 31.5  | 25              | 42.2             | 3.6                              | 1.0  | 22  | 0.06                                     | 0.11 |
| BZD27C33PW  | P6           | 31.4  | 33   | 34.7  | 25              | 46.2             | 3.2                              | 1.0  | 24  | 0.07                                     | 0.12 |
| BZD27C36PW  | P7           | 34.2  | 36   | 37.8  | 10              | 50.1             | 3.0                              | 1.0  | 27  | 0.07                                     | 0.12 |
| BZD27C39PW  | P8           | 37.1  | 39   | 41    | 10              | 54.1             | 2.8                              | 1.0  | 30  | 0.07                                     | 0.12 |
| BZD27C43PW  | Q0           | 40.9  | 43   | 45.2  | 10              | 60.7             | 2.5                              | 1.0  | 33  | 0.08                                     | 0.13 |
| BZD27C47PW  | Q1           | 44.7  | 47   | 49.4  | 10              | 65.5             | 2.3                              | 1.0  | 36  | 0.08                                     | 0.13 |
| BZD27C51PW  | Q2           | 48.5  | 51   | 53.6  | 10              | 70.8             | 2.1                              | 1.0  | 39  | 0.08                                     | 0.13 |
| BZD27C56PW  | Q5           | 53.2  | 56   | 58.8  | 10              | 78.6             | 1.9                              | 1.0  | 43  | 0.09                                     | 0.13 |
| BZD27C62PW  | Q7           | 58.9  | 62   | 65.1  | 10              | 86.5             | 1.7                              | 1.0  | 47  | 0.09                                     | 0.13 |
| BZD27C68PW  | R1           | 64.6  | 68   | 71.4  | 10              | 94.4             | 1.6                              | 1.0  | 51  | 0.09                                     | 0.13 |
| BZD27C75PW  | R2           | 71.3  | 75   | 78.8  | 10              | 103.5            | 1.5                              | 1.0  | 56  | 0.09                                     | 0.13 |
| BZD27C82PW  | R3           | 77.9  | 82   | 86.1  | 10              | 114              | 1.3                              | 1.0  | 62  | 0.09                                     | 0.13 |
| BZD27C91PW  | R4           | 86.5  | 91   | 95.6  | 5               | 126              | 1.2                              | 1.0  | 68  | 0.09                                     | 0.13 |
| BZD27C100PW | R5           | 95  | 100  | 105   | 5               | 139              | 1.1                              | 1.0  | 75  | 0.09                                     | 0.13 |
| BZD27C110PW | R6           | 104.5   | 110  | 115.5 | 5               | 150              | 1.0                              | 1.0  | 82  | 0.09                                     | 0.13 |
| BZD27C120PW | R7           | 114   | 120  | 126   | 5               | 152              | 0.65                             | 1.0  | 91  | 0.09                                     | 0.13 |
| BZD27C130PW | R8           | 123.5   | 130  | 136.5 | 5               | 185              | 0.81                             | 1.0  | 100 | 0.09                                     | 0.13 |
| BZD27C150PW | R9           | 142.5   | 150  | 157.5 | 5               | 205              | 0.73                             | 1.0  | 110 | 0.09                                     | 0.13 |
| BZD27C160PW | R10          | 152   | 160  | 168   | 5               | 224              | 0.67                             | 1.0  | 120 | 0.09                                     | 0.13 |
| BZD27C180PW | R11          | 171   | 180  | 189   | 5               | 229              | 0.43                             | 1.0  | 130 | 0.09                                     | 0.13 |
| BZD27C200PW | R12          | 190   | 200  | 210   | 5               | 254              | 0.39                             | 1.0  | 150 | 0.09                                     | 0.13 |
| BZD27C220PW | R13          | 209   | 220  | 231   | 5               | 279              | 0.35                             | 1.0  | 160 | 0.09                                     | 0.13 |

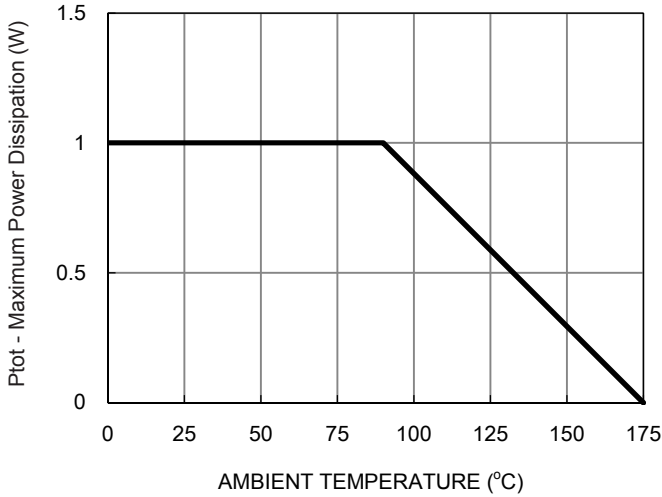
**Notes :**

1. Pulse test with PW=30 ms
2. 10/1000μs waveform

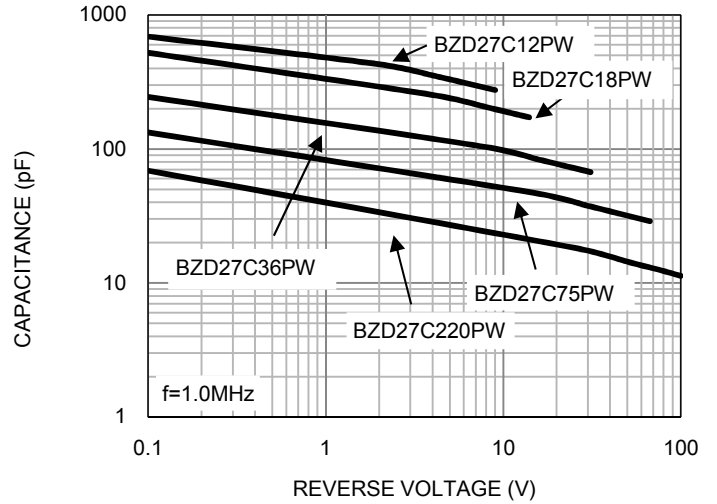
**CHARACTERISTICS CURVES**

( $T_A = 25^\circ\text{C}$  unless otherwise noted)

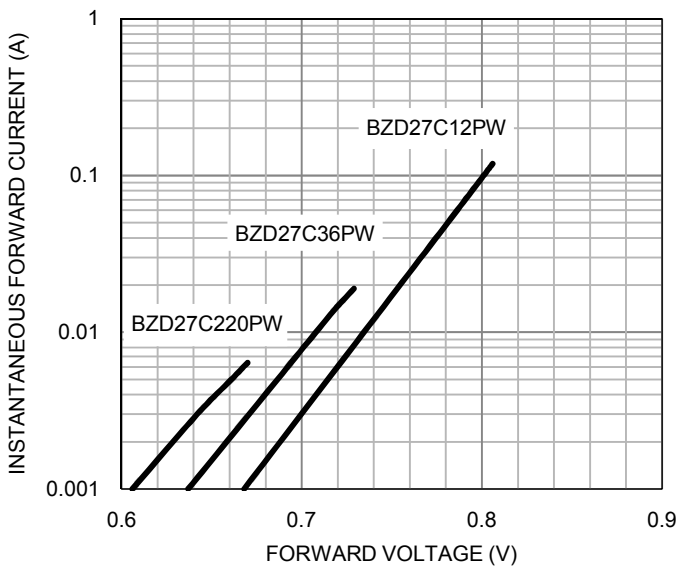
**Fig1. Steady State Power Derating Curve**



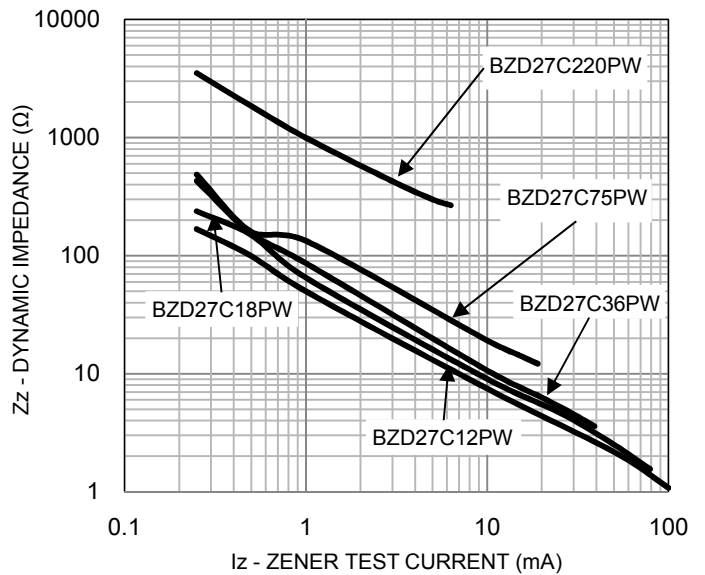
**Fig2. Typical Junction Capacitance**



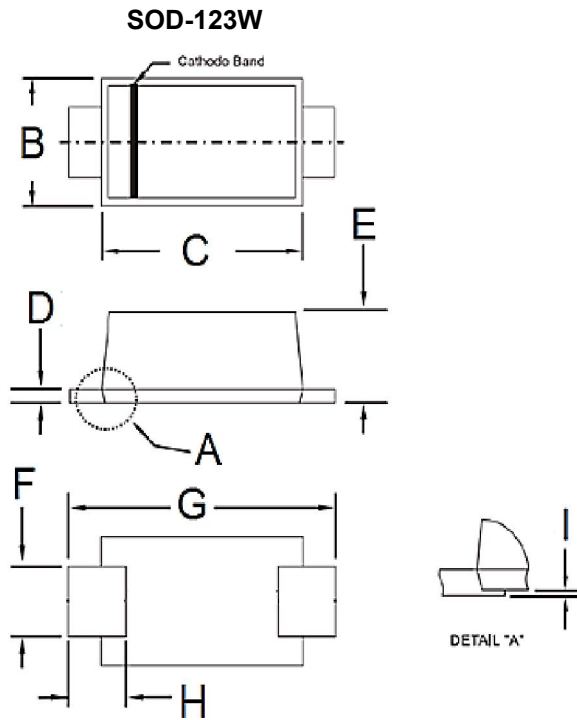
**Fig3. Typical Forward Characteristics**



**Fig4. Typical Zener Impedance**

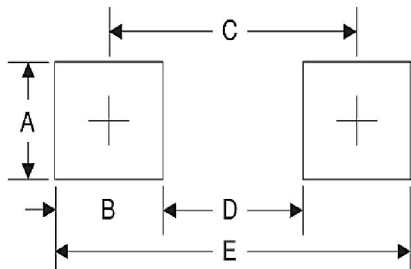


**PACKAGE OUTLINE DIMENSIONS**



| DIM. | Unit (mm) |      | Unit (inch) |       |
|------|-----------|------|-------------|-------|
|      | Min       | Max  | Min         | Max   |
| B    | 1.70      | 1.90 | 0.067       | 0.075 |
| C    | 2.60      | 2.90 | 0.102       | 0.114 |
| D    | 0.10      | 0.22 | 0.004       | 0.009 |
| E    | 0.90      | 1.02 | 0.035       | 0.040 |
| F    | 0.90      | 1.05 | 0.035       | 0.041 |
| G    | 3.60      | 3.80 | 0.142       | 0.150 |
| H    | 0.50      | 0.85 | 0.020       | 0.033 |
| I    | 0.00      | 0.10 | 0.000       | 0.004 |

**SUGGESTED PAD LAYOUT**



| Symbol | Unit (mm) | Unit (inch) |
|--------|-----------|-------------|
| A      | 1.4       | 0.055       |
| B      | 1.2       | 0.047       |
| C      | 3.1       | 0.122       |
| D      | 1.9       | 0.075       |
| E      | 4.3       | 0.169       |

**MARKING DIAGRAM**



P/N = Marking Code  
 YW = Date Code  
 F = Factory Code

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