

Zener Diodes with Surge Current Specification



SMA (DO-214AC)

ADDITIONAL RESOURCES



3D Models

| PRIMARY CHARACTERISTICS | | |
|------------------------------|-----------------|------|
| PARAMETER | VALUE | UNIT |
| V _Z range nom. | 10 to 270 | V |
| Test current I _{ZT} | 2 to 50 | mA |
| V _{BR} | 9.4 to 251 | V |
| V _{WM} | 8.2 to 220 | V |
| P _{PPM} | 300 | W |
| T _J max. | 150 | °C |
| V _Z specification | Pulse current | |
| Circuit configuration | Single | |
| Polarity | Uni-directional | |

FEATURES

- High reliability
- Stand-off voltage range 8.2 V to 220 V
- Excellent clamping capability
- Fast response time
- AEC-Q101 qualified available
- Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade
- Base P/NHM3 - halogen-free, RoHS-compliant, and AEC-Q101 qualified
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Protection from high voltage, high energy transients

ORDERING INFORMATION

| DEVICE NAME | ORDERING CODE | TAPED UNITS PER REEL | MINIMUM ORDER QUANTITY |
|----------------|-----------------|----------------------|------------------------|
| BZG04-M-series | BZG04xxx-M3-08 | 1500 per 7" reel | 6000/box |
| BZG04-M-series | BZG04xxx-M3-18 | 6000 per 13" reel | 6000/box |
| BZG04-M-series | BZG04xxx-HM3-08 | 1500 per 7" reel | 6000/box |
| BZG04-M-series | BZG04xxx-HM3-18 | 6000 per 13" reel | 6000/box |

PACKAGE

| PACKAGE NAME | WEIGHT | MOLDING COMPOUND FLAMMABILITY RATING | MOISTURE SENSITIVITY LEVEL | SOLDERING CONDITIONS |
|----------------|--------|--------------------------------------|--------------------------------------|------------------------------|
| SMA (DO-214AC) | 73 mg | UL 94 V-0 | MSL level 1 (according J-STD-020) | Peak temperature max. 260 °C |

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)

| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
|---|---|-------------------|-------------|------|
| Power dissipation | R _{thJA} < 25 K/W | P _{tot} | 3000 | mW |
| | R _{thJA} < 100 K/W | P _{tot} | 1250 | mW |
| Non repetitive peak surge power dissipation | t _p = 10/1000 μs exp. pulse, T _J = 25 °C prior to surge | P _{ZSM} | 300 | W |
| Peak forward surge current | 10 ms single half sine wave | I _{FSM} | 50 | A |
| Junction to lead | | R _{thJL} | 25 | K/W |
| Junction to ambient air | Mounted on epoxy-glass hard tissue, fig. 1a | R _{thJA} | 150 | K/W |
| | Mounted on epoxy-glass hard tissue, fig. 1b | R _{thJA} | 125 | K/W |
| | Mounted on Al-oxide-ceramic (Al ₂ O ₃), fig. 1b | R _{thJA} | 100 | K/W |
| Junction temperature | | T _J | 150 | °C |
| Storage temperature range | | T _{stg} | -65 to +150 | °C |
| Operating temperature range | | T _{op} | -65 to +150 | °C |
| Forward voltage (max.) | I _F = 0.5 A | V _F | 1.2 | V |

**ELECTRICAL CHARACTERISTICS** ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

| PART NUMBER | ZENER VOLTAGE RANGE | TEST CURRENT | STAND OFF VOLTAGE | | BREAKDOWN VOLTAGE | CLAMPING VOLTAGE ⁽¹⁾ | | TEMPERATURE COEFFICIENT | | JUNCTION CAPACITANCE |
|----------------|---------------------------|-----------------|----------------------|---------------|-------------------------|------------------------------------|----------|----------------------------|------|--|
| | V_Z at I_{ZT1} | I_{ZT1} | V_R at I_R | | $V_{(BR)}$ at I_{ZT1} | $V_{CL(R)}$ at I_{PP} | I_{PP} | TK_{VZ} at I_{ZT1} | | C_j at $V_R = 0\text{ V}$, $f = 1\text{ MHz}$ |
| | V | mA | V | μA | V | V | A | % / K | | pF |
| | NOM. | | | MAX. | MIN. | MIN. | | TYP. | MAX. | TYP. |
| BZG04-8V2-M | 10 | 50 | 8.2 | 20 | 9.4 | 14.8 | 20.3 | 0.05 | 0.09 | 1200 |
| BZG04-9V1-M | 11 | 50 | 9.1 | 5 | 10.4 | 15.7 | 19.1 | 0.05 | 0.1 | 1100 |
| BZG04-10-M | 12 | 50 | 10 | 5 | 11.4 | 17 | 17.7 | 0.05 | 0.1 | 1000 |
| BZG04-11-M | 13 | 50 | 11 | 5 | 12.4 | 18.9 | 15.9 | 0.05 | 0.1 | 850 |
| BZG04-12-M | 15 | 50 | 12 | 5 | 13.8 | 20.9 | 14.4 | 0.05 | 0.1 | 815 |
| BZG04-13-M | 16 | 25 | 13 | 5 | 15.3 | 22.9 | 13.1 | 0.06 | 0.11 | 785 |
| BZG04-15-M | 18 | 25 | 15 | 5 | 16.8 | 25.6 | 11.7 | 0.06 | 0.11 | 710 |
| BZG04-16-M | 20 | 25 | 16 | 5 | 18.8 | 28.4 | 10.6 | 0.06 | 0.11 | 655 |
| BZG04-18-M | 22 | 25 | 18 | 5 | 20.8 | 31 | 9.7 | 0.06 | 0.11 | 610 |
| BZG04-20-M | 24 | 25 | 20 | 5 | 22.8 | 33.8 | 8.9 | 0.06 | 0.11 | 570 |
| BZG04-22-M | 27 | 25 | 22 | 5 | 25.1 | 38.1 | 7.9 | 0.06 | 0.11 | 545 |
| BZG04-24-M | 30 | 25 | 24 | 5 | 28 | 42.2 | 7.1 | 0.06 | 0.11 | 505 |
| BZG04-27-M | 33 | 25 | 27 | 5 | 31 | 46.2 | 6.5 | 0.06 | 0.11 | 475 |
| BZG04-30-M | 36 | 10 | 30 | 5 | 34 | 50.1 | 6 | 0.06 | 0.11 | 450 |
| BZG04-33-M | 39 | 10 | 33 | 5 | 37 | 54.1 | 5.5 | 0.06 | 0.11 | 420 |
| BZG04-36-M | 43 | 10 | 36 | 5 | 40 | 60.7 | 4.9 | 0.07 | 0.12 | 390 |
| BZG04-39-M | 47 | 10 | 39 | 5 | 44 | 65.5 | 4.6 | 0.07 | 0.12 | 370 |
| BZG04-43-M | 51 | 10 | 43 | 5 | 48 | 70.8 | 4.2 | 0.07 | 0.12 | 350 |
| BZG04-47-M | 56 | 10 | 47 | 5 | 52 | 78.6 | 3.8 | 0.07 | 0.12 | 330 |
| BZG04-51-M | 62 | 10 | 51 | 5 | 58 | 86.5 | 3.5 | 0.08 | 0.13 | 310 |
| BZG04-56-M | 68 | 10 | 56 | 5 | 64 | 94.4 | 3.2 | 0.08 | 0.13 | 291 |
| BZG04-62-M | 75 | 10 | 62 | 5 | 70 | 103.5 | 2.9 | 0.08 | 0.13 | 280 |
| BZG04-68-M | 82 | 10 | 68 | 5 | 77 | 114 | 2.6 | 0.08 | 0.13 | 275 |
| BZG04-75-M | 91 | 5 | 75 | 5 | 85 | 126 | 2.4 | 0.09 | 0.13 | 260 |
| BZG04-82-M | 100 | 5 | 82 | 5 | 94 | 139 | 2.2 | 0.09 | 0.13 | 250 |
| BZG04-91-M | 110 | 5 | 91 | 5 | 104 | 152 | 2 | 0.09 | 0.13 | 243 |
| BZG04-100-M | 120 | 5 | 100 | 5 | 114 | 167 | 1.8 | 0.09 | 0.13 | 170 |
| BZG04-110-M | 130 | 5 | 110 | 5 | 124 | 185 | 1.6 | 0.09 | 0.13 | 153 |
| BZG04-120-M | 150 | 5 | 120 | 5 | 138 | 204 | 1.5 | 0.09 | 0.13 | 150 |
| BZG04-130-M | 160 | 5 | 130 | 5 | 153 | 224 | 1.3 | 0.09 | 0.13 | 145 |
| BZG04-150-M | 180 | 5 | 150 | 5 | 168 | 249 | 1.2 | 0.09 | 0.13 | 140 |
| BZG04-160-M | 200 | 5 | 160 | 5 | 188 | 276 | 1.1 | 0.09 | 0.13 | 135 |
| BZG04-180-M | 220 | 2 | 180 | 5 | 208 | 305 | 1 | 0.09 | 0.13 | 131 |
| BZG04-200-M | 240 | 2 | 200 | 5 | 228 | 336 | 0.9 | 0.09 | 0.13 | 122 |
| BZG04-220-M | 270 | 2 | 220 | 5 | 251 | 380 | 0.8 | 0.09 | 0.13 | 120 |

Note⁽¹⁾ 10/1000 μs pulse

BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

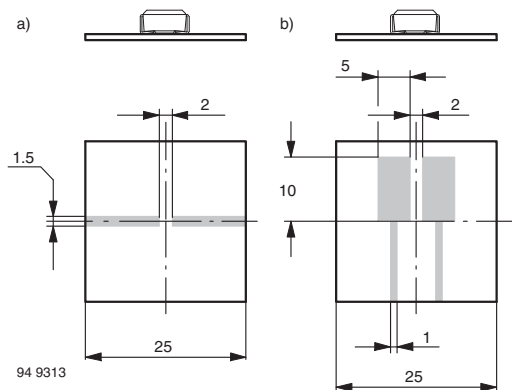


Fig. 1 - Boards for R_{thJA} Definition (Copper Overlay 35 μ)

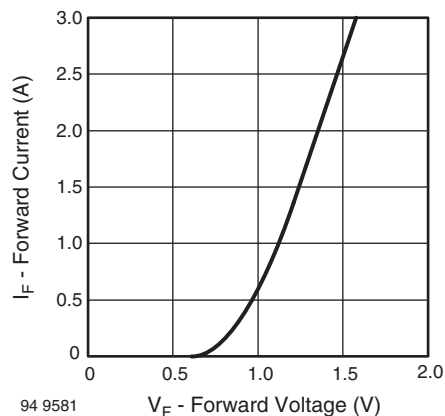


Fig. 3 - Forward Current vs. Forward Voltage

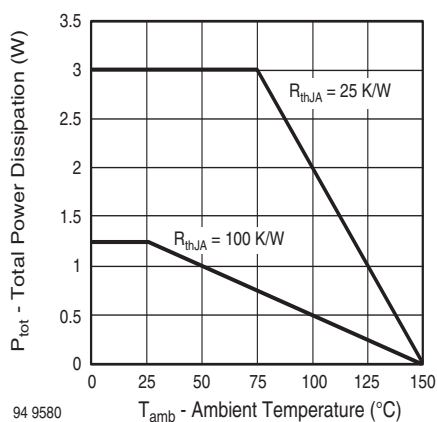


Fig. 2 - Typ. Total Power Dissipation vs. Ambient Temperature

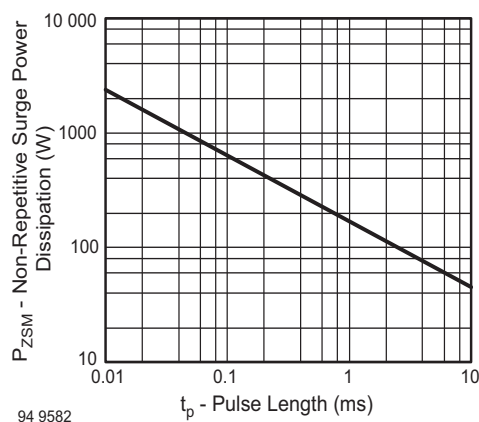


Fig. 4 - Non Repetitive Surge Power Dissipation vs. Pulse Length

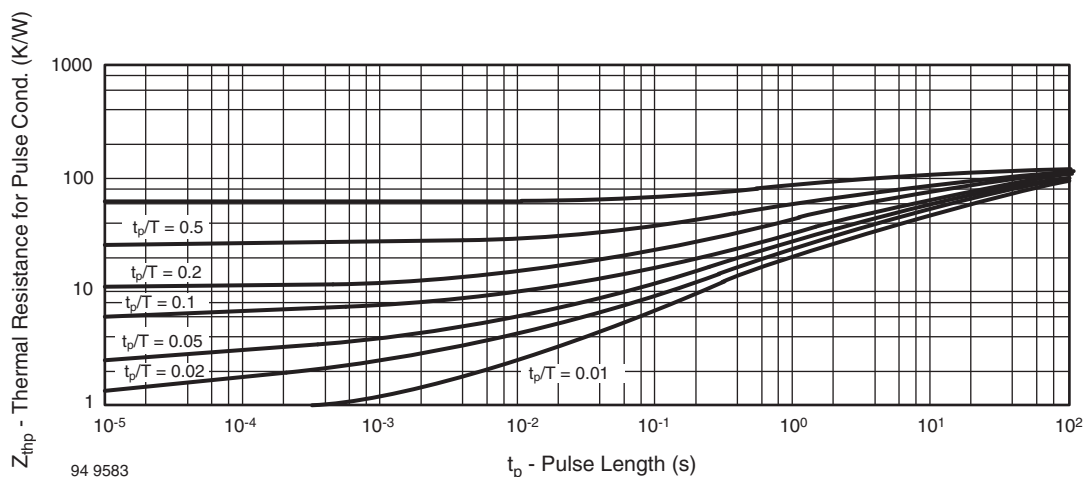
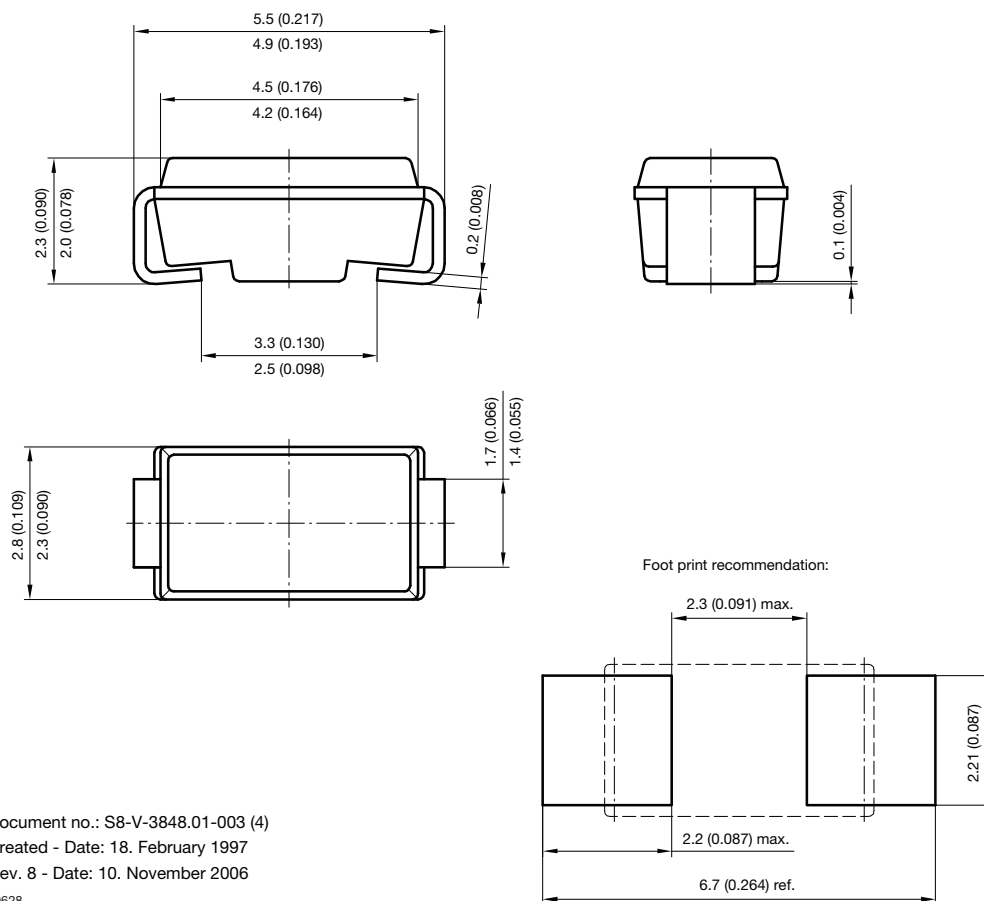


Fig. 5 - Thermal Response



PACKAGE DIMENSIONS in millimeters (inches): **SMA (DO-214AC)**



Document no.: S8-V-3848.01-003 (4)
Created - Date: 18. February 1997
Rev. 8 - Date: 10. November 2006
19628



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