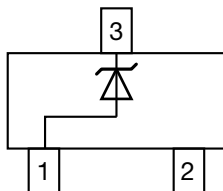


## Small Signal Zener Diodes



### FEATURES

- Silicon planar Zener diodes
- Standard Zener voltage tolerance is  $\pm 5\%$ . Other tolerances are available upon request
- These diodes are also available in DO-35 case with the type designation 1N4681 to 1N4717 and SOD-123 case with the type designation MMSZ4681-V to MMSZ4717-V
- AEC-Q101 qualified
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC


**RoHS**  
COMPLIANT

### PRIMARY CHARACTERISTICS

| PARAMETER             | VALUE         | UNIT |
|-----------------------|---------------|------|
| $V_Z$ range nom.      | 2.4 to 43     | V    |
| Test current $I_{ZT}$ | 0.05          | mA   |
| $V_Z$ specification   | Pulse current |      |
| Int. construction     | Single        |      |

### ORDERING INFORMATION

| DEVICE NAME              | ORDERING CODE                        | TAPED UNITS PER REEL           | MINIMUM ORDER QUANTITY |
|--------------------------|--------------------------------------|--------------------------------|------------------------|
| MMBZ4681-V to MMBZ4717-V | MMBZ4681-V to MMBZ4717-V-series-GS18 | 10 000 (8 mm tape on 13" reel) | 10 000/box             |
| MMBZ4681-V to MMBZ4717-V | MMBZ4681-V to MMBZ4717-V-series-GS08 | 3000 (8 mm tape on 7" reel)    | 15 000/box             |

### PACKAGE

| PACKAGE NAME | WEIGHT | MOLDING COMPOUND FLAMMABILITY RATING | MOISTURE SENSITIVITY LEVEL        | SOLDERING CONDITIONS     |
|--------------|--------|--------------------------------------|-----------------------------------|--------------------------|
| SOT-23       | 8.8 mg | UL 94 V-0                            | MSL level 1 (according J-STD-020) | 260 °C/10 s at terminals |

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

| PARAMETER                     | TEST CONDITION                                      | SYMBOL     | VALUE         | UNIT |
|-------------------------------|-----------------------------------------------------|------------|---------------|------|
| Power dissipation             | On FR - 5 board using recommended solder pad layout | $P_{tot}$  | 350           | mW   |
| Zener current                 | See table "Characteristics"                         |            |               |      |
| Junction to ambient air       | On FR - 5 board using recommended solder pad layout | $R_{thJA}$ | 420           | K/W  |
| Junction temperature, maximum |                                                     | $T_j$      | 150           | °C   |
| Storage temperature range     |                                                     | $T_{stg}$  | - 55 to + 150 | °C   |

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

| PART NUMBER | MARKING CODE | ZENER VOLTAGE RANGE <sup>(1)</sup> |      |      | TEST CURRENT | REVERSE CURRENT |      | VOLTAGE CHANGE <sup>(2)</sup> |
|-------------|--------------|------------------------------------|------|------|--------------|-----------------|------|-------------------------------|
|             |              | $V_Z$ at $I_{ZT1}$                 |      |      | $I_{ZT1}$    | $I_R$ at $V_R$  |      | $\Delta V_Z$                  |
|             |              | V                                  |      |      | mA           | $\mu\text{A}$   | V    | V                             |
|             |              | MIN.                               | NOM. | MAX. |              | MAX.            |      | MAX.                          |
| MMBZ4681-V  | CF           | 2.28                               | 2.4  | 2.52 | 0.05         | 2               | 1    | 0.8                           |
| MMBZ4682-V  | CH           | 2.57                               | 2.7  | 2.84 | 0.05         | 1               | 1    | 0.85                          |
| MMBZ4683-V  | CJ           | 2.85                               | 3    | 3.15 | 0.05         | 0.8             | 1    | 0.9                           |
| MMBZ4684-V  | CK           | 3.14                               | 3.3  | 3.47 | 0.05         | 7.5             | 1.5  | 0.95                          |
| MMBZ4685-V  | CM           | 3.42                               | 3.6  | 3.78 | 0.05         | 7.5             | 2    | 0.95                          |
| MMBZ4686-V  | CN           | 3.71                               | 3.9  | 4.1  | 0.05         | 5               | 2    | 0.97                          |
| MMBZ4687-V  | CP           | 4.09                               | 4.3  | 4.52 | 0.05         | 4               | 2    | 0.99                          |
| MMBZ4688-V  | CT           | 4.47                               | 4.7  | 4.94 | 0.05         | 10              | 3    | 0.99                          |
| MMBZ4689-V  | CU           | 4.85                               | 5.1  | 5.36 | 0.05         | 10              | 3    | 0.97                          |
| MMBZ4690-V  | CV           | 5.32                               | 5.6  | 5.88 | 0.05         | 10              | 4    | 0.96                          |
| MMBZ4691-V  | CA           | 5.89                               | 6.2  | 6.51 | 0.05         | 10              | 5    | 0.95                          |
| MMBZ4692-V  | CX           | 6.46                               | 6.8  | 7.14 | 0.05         | 10              | 5.1  | 0.9                           |
| MMBZ4693-V  | CY           | 7.13                               | 7.5  | 7.88 | 0.05         | 10              | 5.7  | 0.75                          |
| MMBZ4694-V  | CZ           | 7.79                               | 8.2  | 8.61 | 0.05         | 1               | 6.2  | 0.5                           |
| MMBZ4695-V  | DC           | 8.27                               | 8.7  | 9.14 | 0.05         | 1               | 6.6  | 0.1                           |
| MMBZ4696-V  | DD           | 8.65                               | 9.1  | 9.56 | 0.05         | 1               | 6.9  | 0.08                          |
| MMBZ4697-V  | DE           | 9.5                                | 10   | 10.5 | 0.05         | 1               | 7.6  | 0.1                           |
| MMBZ4698-V  | DF           | 10.5                               | 11   | 11.6 | 0.05         | 0.05            | 8.4  | 0.11                          |
| MMBZ4699-V  | DH           | 11.4                               | 12   | 12.6 | 0.05         | 0.05            | 9.1  | 0.12                          |
| MMBZ4700-V  | DJ           | 12.4                               | 13   | 13.7 | 0.05         | 0.05            | 9.8  | 0.13                          |
| MMBZ4701-V  | DK           | 13.3                               | 14   | 14.7 | 0.05         | 0.05            | 10.6 | 0.14                          |
| MMBZ4702-V  | DM           | 14.3                               | 15   | 15.8 | 0.05         | 0.05            | 11.4 | 0.15                          |
| MMBZ4703-V  | DN           | 15.2                               | 16   | 16.8 | 0.05         | 0.05            | 12.1 | 0.16                          |
| MMBZ4704-V  | DP           | 16.2                               | 17   | 17.9 | 0.05         | 0.05            | 12.9 | 0.17                          |
| MMBZ4705-V  | DT           | 17.1                               | 18   | 18.9 | 0.05         | 0.05            | 13.6 | 0.18                          |
| MMBZ4706-V  | DU           | 18.1                               | 19   | 20   | 0.05         | 0.05            | 14.4 | 0.19                          |
| MMBZ4707-V  | DV           | 19                                 | 20   | 21   | 0.05         | 0.01            | 15.2 | 0.2                           |
| MMBZ4708-V  | DA           | 20.9                               | 22   | 23.1 | 0.05         | 0.01            | 16.7 | 0.22                          |
| MMBZ4709-V  | DZ           | 22.8                               | 24   | 25.2 | 0.05         | 0.01            | 18.2 | 0.24                          |
| MMBZ4710-V  | DY           | 23.8                               | 25   | 26.3 | 0.05         | 0.01            | 19   | 0.25                          |
| MMBZ4711-V  | EA           | 25.7                               | 27   | 28.4 | 0.05         | 0.01            | 20.4 | 0.27                          |
| MMBZ4712-V  | EC           | 26.6                               | 28   | 29.4 | 0.05         | 0.01            | 21.2 | 0.28                          |
| MMBZ4713-V  | ED           | 28.5                               | 30   | 31.5 | 0.05         | 0.01            | 22.8 | 0.3                           |
| MMBZ4714-V  | EE           | 31.4                               | 33   | 34.7 | 0.05         | 0.01            | 25   | 0.33                          |
| MMBZ4715-V  | EF           | 34.2                               | 36   | 37.8 | 0.05         | 0.01            | 27.3 | 0.36                          |
| MMBZ4716-V  | EH           | 37.1                               | 39   | 41   | 0.05         | 0.01            | 29.6 | 0.39                          |
| MMBZ4717-V  | EJ           | 40.9                               | 43   | 45.2 | 0.05         | 0.01            | 32.6 | 0.43                          |

**Notes**

- Maximum  $V_F = 0.9\text{ V}$ , at  $I_F = 10\text{ mA}$

<sup>(1)</sup> Tested with pulse test current

<sup>(2)</sup> Maximum voltage change ( $V_Z$ ). Voltage change is equal to the difference between  $V_Z$  at  $100\text{ }\mu\text{A}$  and  $V_Z$  at  $10\text{ }\mu\text{A}$ .



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

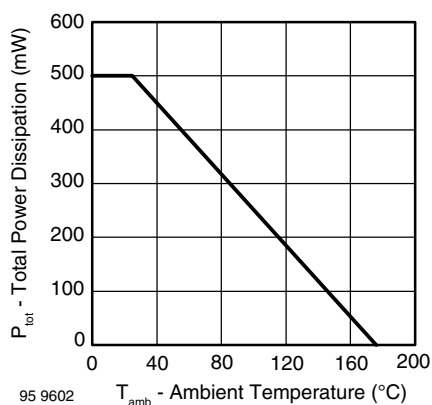


Fig. 1 - Total Power Dissipation vs. Ambient Temperature

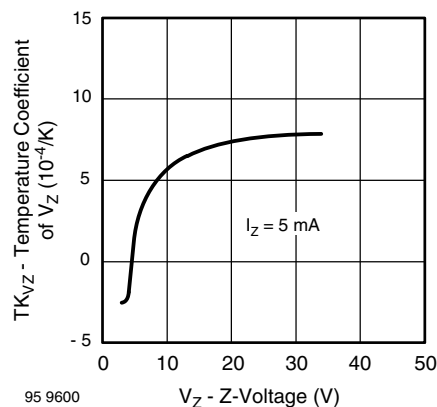


Fig. 4 - Temperature Coefficient of  $V_Z$  vs. Z-Voltage

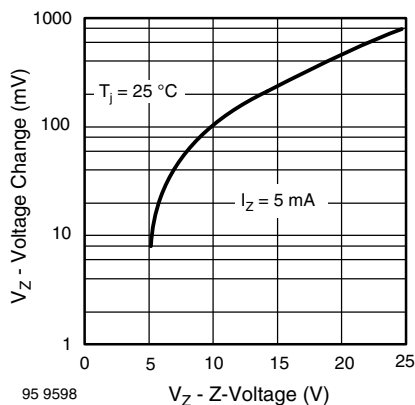


Fig. 2 - Typical Change of Working Voltage under Operating Conditions at  $T_{amb} = 25\text{ }^{\circ}\text{C}$

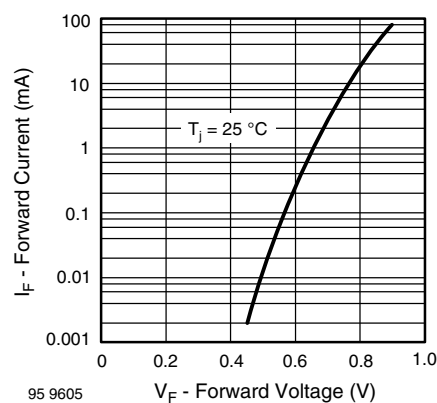


Fig. 5 - Forward Current vs. Forward Voltage

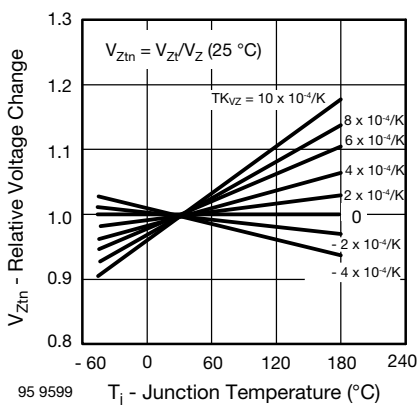


Fig. 3 - Typical Change of Working Voltage vs. Junction Temperature

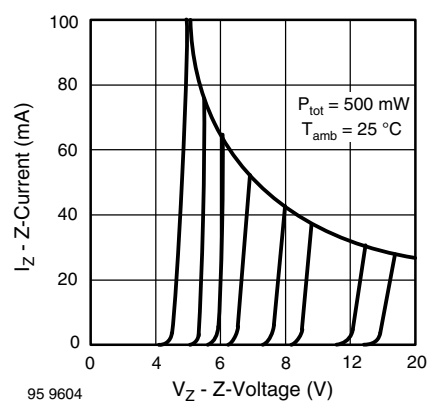


Fig. 6 - Z-Current vs. Z-Voltage

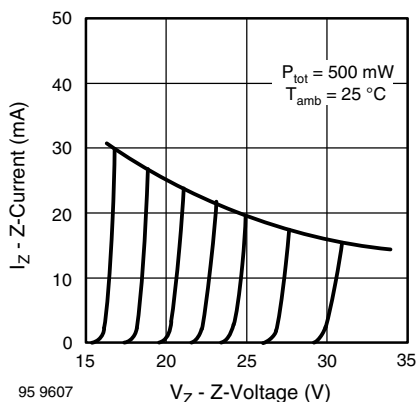


Fig. 7 - Z-Current vs. Z-Voltage

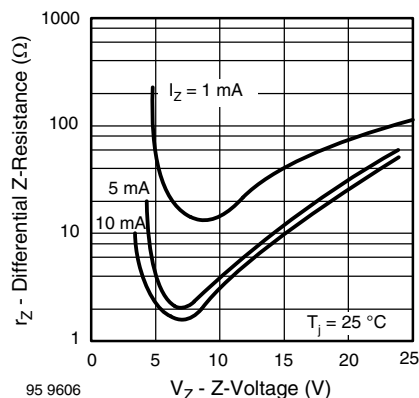
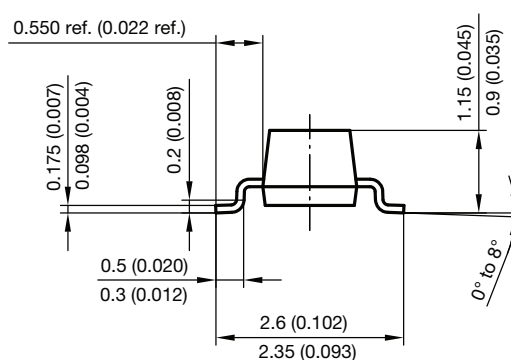
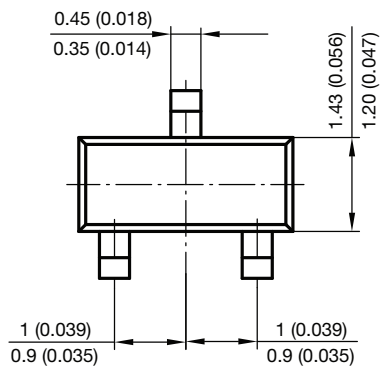
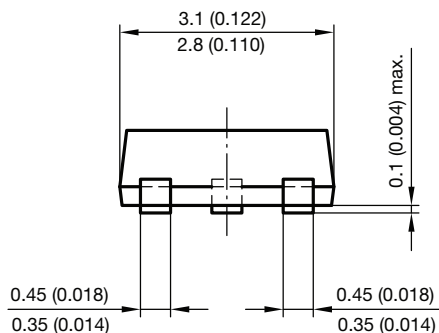
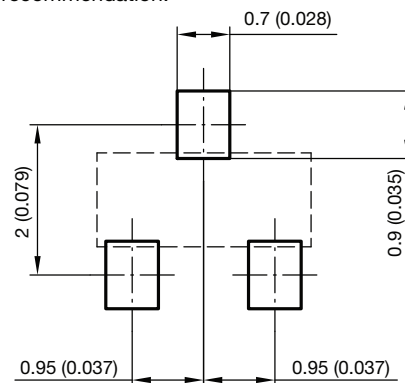


Fig. 8 - Differential Z-Resistance vs. Z-Voltage

**PACKAGE DIMENSIONS** in millimeters (inches): **SOT-23**

**Foot print recommendation:**


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Rev. 8 - Date: 23.Sept.2009  
17418



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