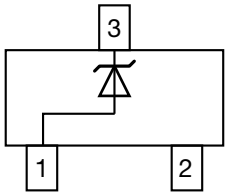
## Small Signal Zener Diodes






### FEATURES

- Silicon planar Zener diodes
- Standard Zener voltage tolerance is ± 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

Pb-free

e3

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 | MMBZ4817-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 °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 |



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**ELECTRICAL CHARACTERISTICS** ($T_{amb}$ = 25 °C, unless otherwise specified)

| PART NUMBER | MARKING CODE | ZENER VOLTAGE RANGE (1) | | | TEST CURRENT | REVERSE CURRENT | | VOLTAGE CHANGE (2) |
|---|---|---|---|---|---|---|---|---|
| | | $V_Z$ at $I_{ZT1}$ | | | $I_{ZT1}$ | $I_R$ at $V_R$ | | $\Delta V_Z$ |
| | | V | | | mA | µA | 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 | 3.7.8 | 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 V, at $I_F$ = 10 mA

(1) Tested with pulse test current

(2) Maximum voltage change ($V_Z$). Voltage change is equal to the difference between $V_Z$ at 100 µA and $V_Z$ at 10 µA.



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**BASIC CHARACTERISTICS** ($T_{amb}$ = 25 °C, unless otherwise specified)

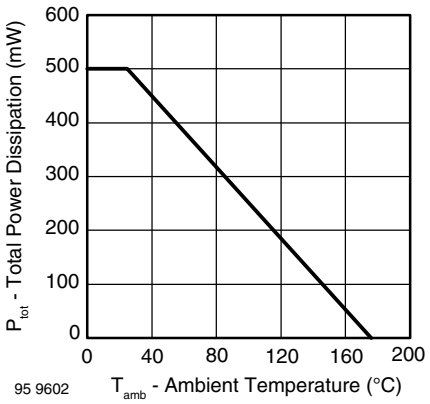



Fig. 1 - Total Power Dissipation vs. Ambient Temperature

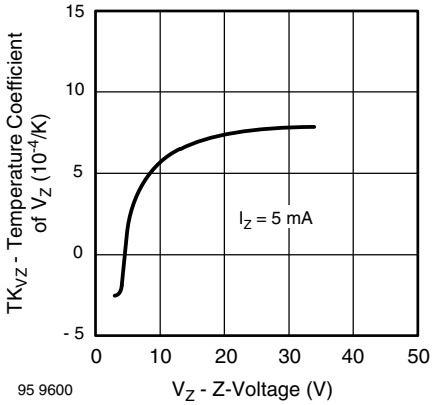



Fig. 4 - Temperature Coefficient of $V_Z$ vs. Z-Voltage

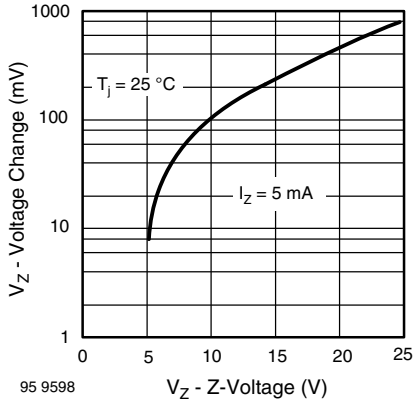



Fig. 2 - Typical Change of Working Voltage under Operating Conditions at $T_{amb}$ = 25 °C

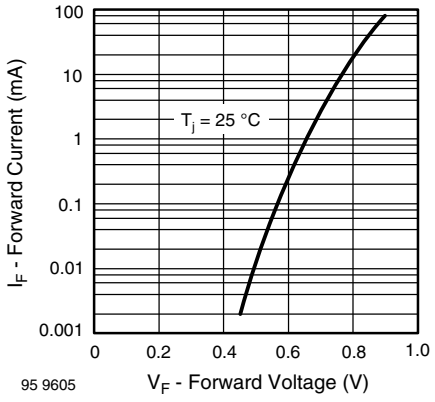



Fig. 5 - Forward Current vs. Forward Voltage

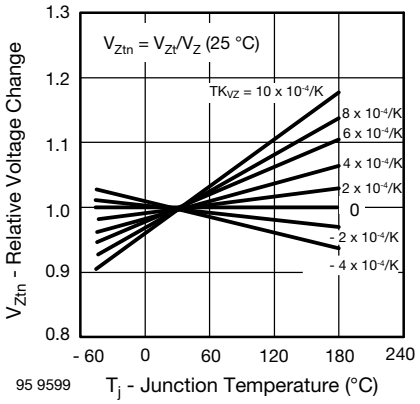



Fig. 3 - Typical Change of Working Voltage vs. Junction Temperature

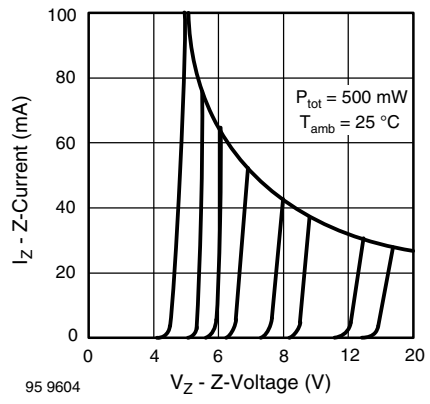



Fig. 6 - Z-Current vs. Z-Voltage


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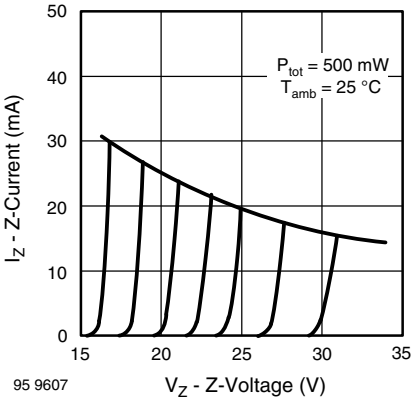



Fig. 7 - Z-Current vs. Z-Voltage

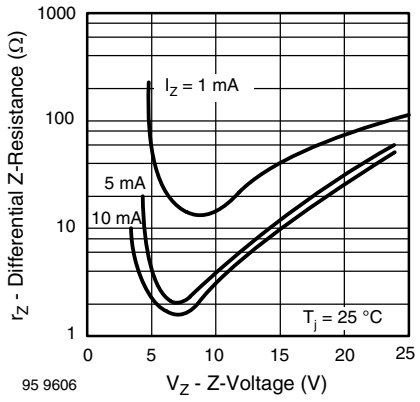
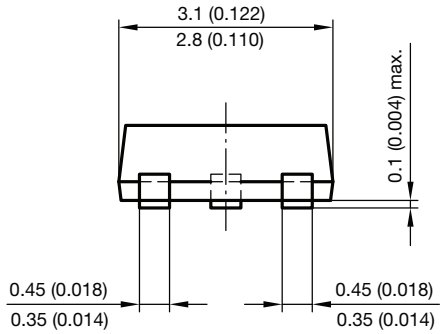
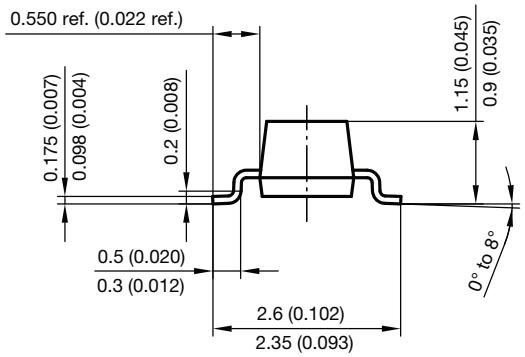
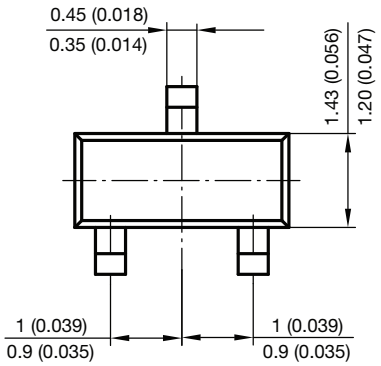



Fig. 8 - Differential Z-Resistance vs. Z-Voltage

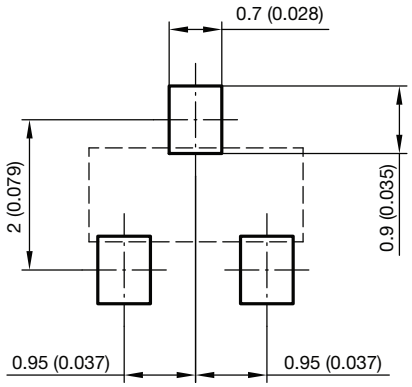
## **PACKAGE DIMENSIONS** in millimeters (inches): **SOT-23**




Foot print recommendation:




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


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