SEMICONDUCTOR

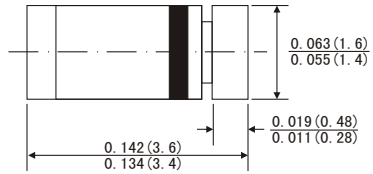
# ZMM1 THRU ZMM200

## 0.5W SILICON PLANAR ZENER DIODES

## FEATURES

- In MinMELF case especially for automated insertion
  Standard Zener voltage tolerance is 5%.Add suffix "B" for 2% tolerance
  Other tolerance, non standard and higher zener voltages are upon request
- High temperature soldering guaranteed:260℃/10 seconds at terminals
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

MiniMELF




Dimensions in inches and (millimeters)

## MECHANICAL DATA

- *Case*: MiniMELF(SOD-80) glass case
- *Weight*: Approx. 0.05 gram

## ABSOLUTE MAXIMUM RATINGS(LIMITING VALUES) ($T_A$=25℃)

| | *Symbols* | *Value* | *Units* |
|---|---|---|---|
| Zener current see table "Characteristics" | | | |
| Power dissipation at $T_A$=25℃ | $P_{tot}$ | 500[1)] | mW |
| Junction temperature | $T_J$ | 175 | ℃ |
| Storage temperature range | $T_{STG}$ | -55 to+175 | ℃ |

## ELECTRICAL CHARACTERISTICS ($T_A$=25℃)

| | *Symbols* | *Min* | *Typ* | *Max* | *Units* |
|---|---|---|---|---|---|
| Thermal resistance junction to ambient | $R_{\theta JA}$ | | | 300[1)] | K/W |
| Forward Voltage at $I_F$ = 100mA | $V_F$ | | | 1 | V |

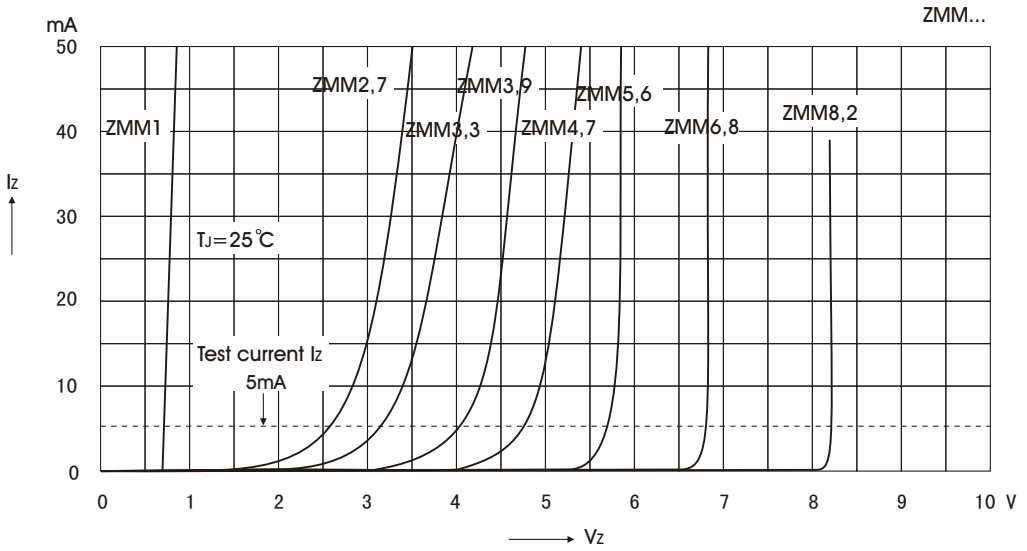
1) Valid provided that electrodes case is kept at ambient temperature

# ZMM1 THRU ZMM200 SILICON PLANAR ZENER DIODES

| Type | Zener Voltage range [1] | | | Maximum zener impedance [1] | | | Maximum Reverse Leakage Current | | | Temp Coefficient of zener voltage |
|---|---|---|---|---|---|---|---|---|---|---|
| | $V_{ZNOM}$ [3] | $I_{ZT}$ | | $r_{zjt}$ and $r_{zjK}$ at $I_{ZK}$ | | | $I_R$ and $IR^2$ [2] at $V_R$ | | | $TK_{VZ}$ |
| | V | mA | V | Ω | Ω | mA | μA | μA | V | %/K |
| ZMM1 [3] | 0.75 | | 0.7…0.8 | <8 | <50 | | -- | -- | | -0.26…-0.23 |
| ZMM2.0 | 2 | | 1.9…2.1 | <85 | <600 | | <100 | <200 | | -0.09…-0.06 |
| ZMM2.4 | 2.4 | | 2.28…2.56 | <85 | <600 | | <50 | <100 | | -0.09…-0.06 |
| ZMM2.7 | 2.7 | | 2.5…2.9 | <85 | <600 | | <10 | <50 | | -0.09…-0.06 |
| ZMM3.0 | 3 | | 2.8…3.2 | <85 | <600 | | <4 | <40 | | -0.08…-0.05 |
| ZMM3.3 | 3.3 | | 3.1…3.5 | <85 | <600 | | <2 | <40 | 1.0 | -0.08…-0.05 |
| ZMM3.6 | 3.6 | | 3.4…3.8 | <85 | <600 | | <2 | <40 | | -0.08…-0.05 |
| ZMM3.9 | 3.9 | | 3.7…4.1 | <85 | <600 | | <2 | <40 | | -0.08…-0.05 |
| ZMM4.3 | 4.3 | | 4.0…4.6 | <75 | <600 | | <1 | <20 | | -0.06…-0.03 |
| ZMM4.7 | 4.7 | | 4.4…5.0 | <60 | <600 | | <0.5 | <10 | | -0.05…+0.02 |
| ZMM5.1 | 5.1 | | 4.8…5.4 | <35 | <550 | | | | | -0.02…+0.02 |
| ZMM5.6 | 5.6 | | 5.2…6.0 | <25 | <450 | | | | | -0.05…+0.05 |
| ZMM6.2 | 6.2 | | 5.8…6.6 | <10 | <200 | | | | 2 | 0.03…0.06 |
| ZMM6.8 | 6.8 | 5 | 6.4…7.2 | <8 | <150 | 1 | | <2 | 3 | 0.03…0.07 |
| ZMM7.5 | 7.5 | | 7.0…7.9 | <7 | <50 | | | | 5 | 0.03…0.08 |
| ZMM8.2 | 8.2 | | 7.7…8.7 | <7 | <50 | | | | 6.2 | 0.03…0.09 |
| ZMM9.1 | 9.1 | | 8.5…9.6 | <10 | <50 | | | | 6.8 | 0.03…0.1 |
| ZMM10 | 10 | | 9.4.10.6 | <15 | <70 | | | | 7.5 | 0.03…0.11 |
| ZMM11 | 11 | | 10.4…11.6 | <20 | <70 | | | | 8.2 | 0.03…0.11 |
| ZMM12 | 12 | | 11.4…12.7 | <20 | <90 | | | | 9.1 | 0.03…0.11 |
| ZMM13 | 13 | | 12.4…14.1 | <26 | <110 | | | | 10 | 0.03…0.11 |
| ZMM15 | 20 | | 13.8…15.6 | <30 | <110 | | | | 11 | 0.03…0.11 |
| ZMM16 | 15 | | 15.3…17.1 | <40 | <170 | | | | 12 | 0.03…0.11 |
| ZMM18 | 22 | | 16.8…19.1 | <50 | <170 | | | | 13 | 0.03…0.11 |
| ZMM20 | 16 | | 18.8…21.2 | <55 | <220 | | | | 15 | 0.03…0.11 |
| ZMM22 | 24 | | 20.8…23.3 | <55 | <220 | | | | 16 | 0.04…0.12 |
| ZMM24 | 27 | | 22.8…25.6 | <80 | <220 | | | | 18 | 0.04…0.12 |
| ZMM27 | 18 | | 25.1…28.9 | <80 | <220 | | | | 20 | 0.04…0.12 |
| ZMM30 | 30 | | 28…32 | <80 | <220 | | | | 22 | 0.04…0.12 |
| ZMM33 | 33 | | 31…35 | <80 | <220 | | | | 24 | 0.04…0.12 |
| ZMM36 | 36 | | 34…38 | <80 | <220 | | | | 27 | 0.04…0.12 |
| ZMM39 | 39 | | 37…41 | <90 | <500 | | 0.1 | | 30 | 0.04…0.12 |
| ZMM43 | 43 | | 40…46 | <90 | <500 | | | <5 | 33 | 0.04…0.12 |
| ZMM47 | 47 | | 44…50 | <110 | <600 | | | | 36 | 0.04…0.12 |
| ZMM51 | 51 | | 48…54 | <125 | <700 | | | | 39 | 0.04…0.12 |
| ZMM56 | 56 | 2.5 | 52…60 | <135 | <700 | 0.25 | | | 43 | 0.04…0.12 |
| ZMM62 | 62 | | 58…66 | <150 | <1000 | | | | 47 | 0.04…0.12 |
| ZMM68 | 68 | | 64…72 | <200 | <1000 | | | | 51 | 0.04…0.12 |
| ZMM75 | 75 | | 70…79 | <250 | <1000 | | | | 56 | 0.04…0.12 |
| ZMM82 | 82 | | 77…87 | <300 | <1500 | | | | 62 | 0.05…0.12 |
| ZMM91 | 91 | | 85…96 | <450 | <2000 | | | | 68 | 0.05…0.12 |
| ZMM100 | 100 | | 94…106 | <450 | <5000 | | | | 75 | 0.05…0.12 |
| ZMM110 | 110 | | 104…116 | <600 | <5000 | | | <10 | 82 | 0.05…0.12 |
| ZMM120 | 120 | | 114…127 | <800 | <5500 | | | | 91 | 0.05…0.12 |
| ZMM130 | 130 | 1 | 124…141 | <950 | <6000 | 0.1 | | | 100 | 0.05…0.12 |
| ZMM150 | 150 | | 138…156 | <1250 | <6500 | | | | 110 | 0.05…0.12 |
| ZMM160 | 160 | | 153…171 | <1400 | <7000 | | | | 120 | 0.05…0.12 |
| ZMM180 | 180 | | 168…191 | <1700 | <8500 | | | | 130 | 0.05…0.12 |
| ZMM200 | 200 | | 188…212 | <2000 | <10000 | | | | 150 | 0.05…0.12 |

1) Tested with pulse tp=20ms
2) Valid provided that electrodes are kept at ambient temperature
3) The ZMM1 is a silicon diode with operation in forward direction. Hence, the index of all parameters should be "F" instead of "Z", Connect the cathode to the negative pole.

## BREAKDOWN CHARACTERISTICS AT $T_J$= CONSTANT (PULSED)

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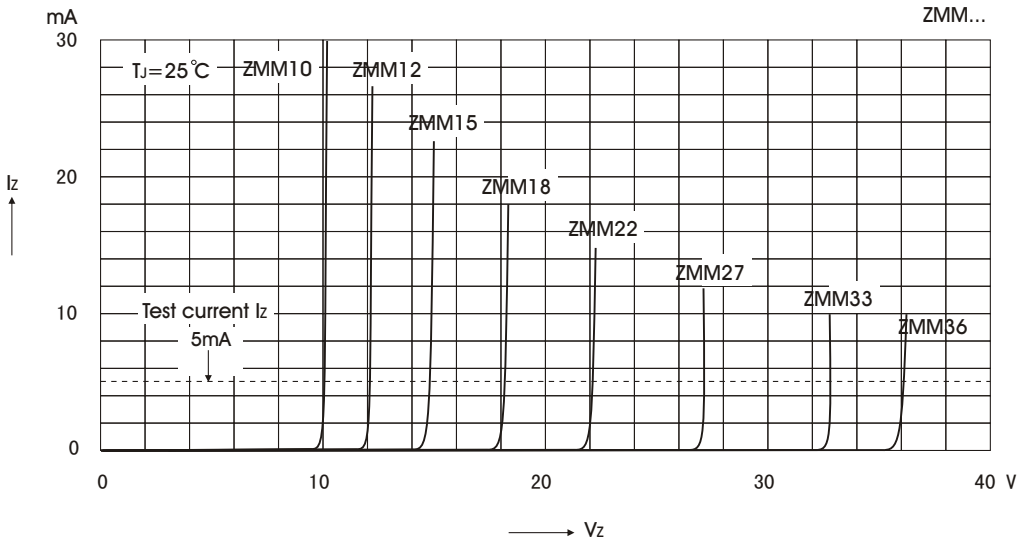

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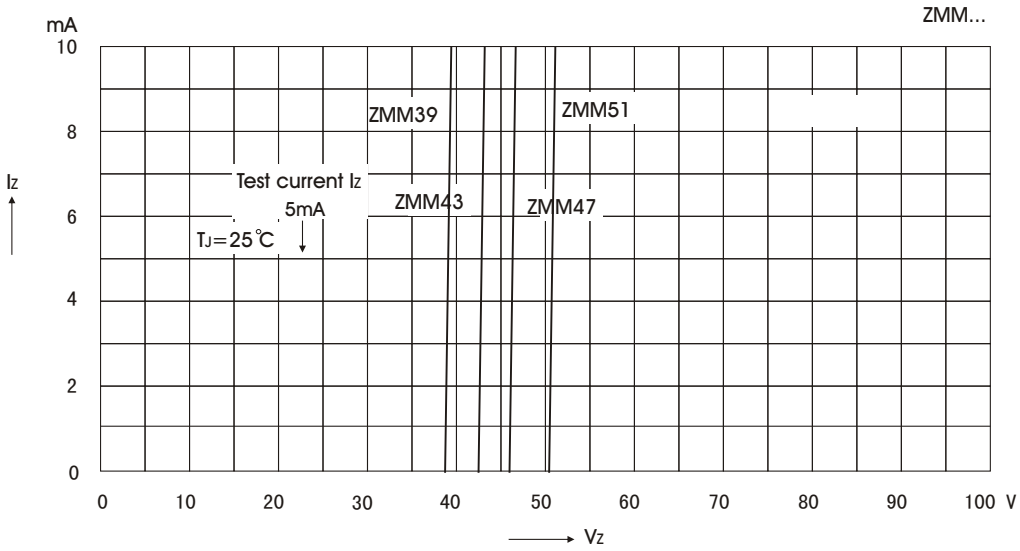
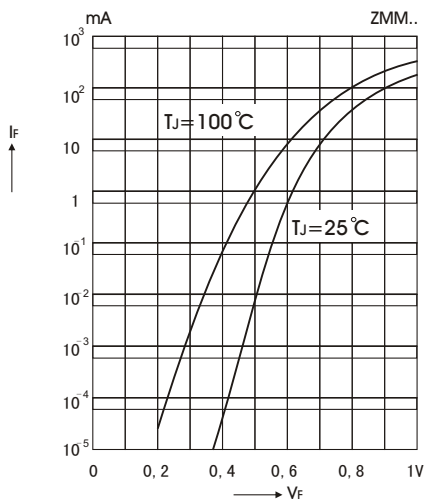
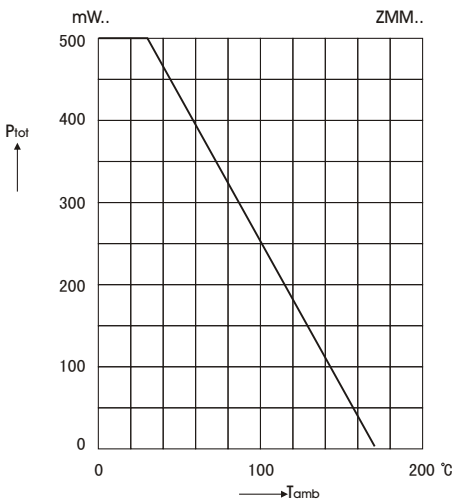



## Forward Characteristics

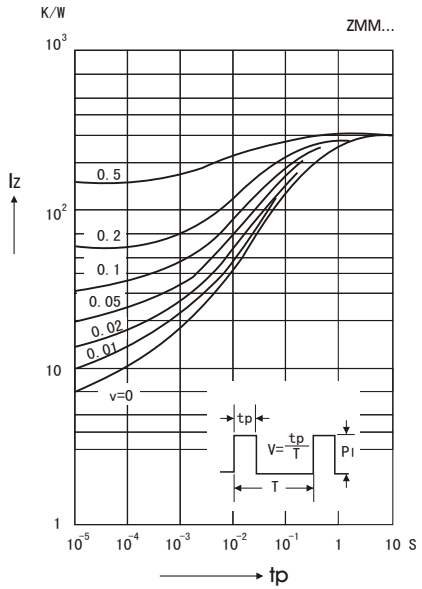



## Admissible power dissipation versus ambient temperature

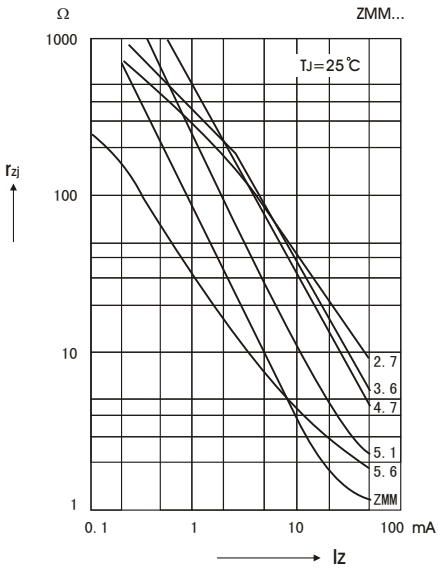
valid provided that electrodes are kept at ambient temperature



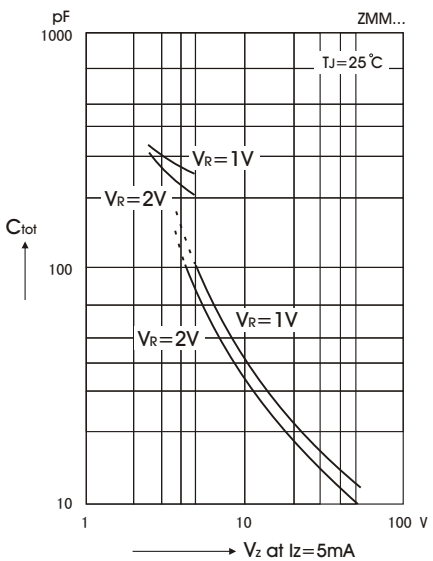
## Pulse thermal resistance versus pulse duration



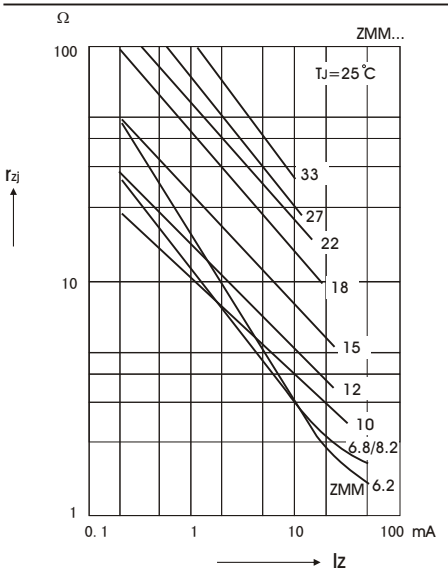

## Dynamic resistance versus Zener current




## Capacitance versus Zener voltage




## Dynamic resistance versus Zener current



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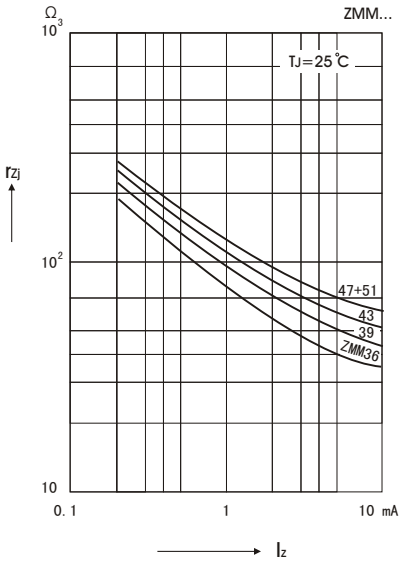
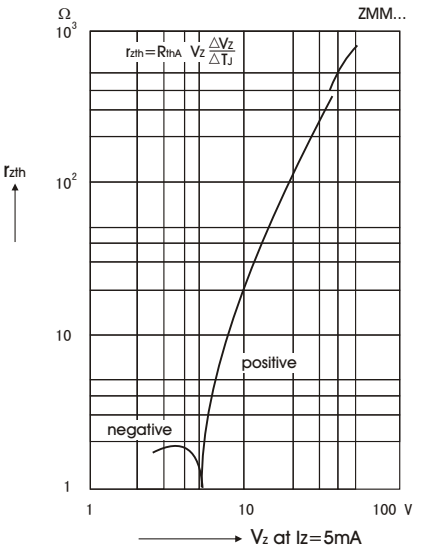
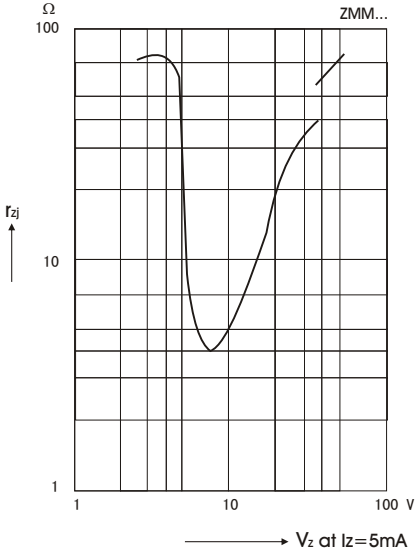


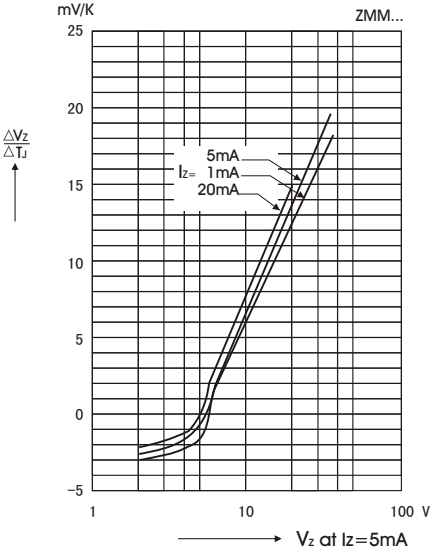

## Thermal differential resistance versus Zener voltage




## Dynamic resistance versus Zener voltage




## Temperature dependence of Zener voltage versus voltage



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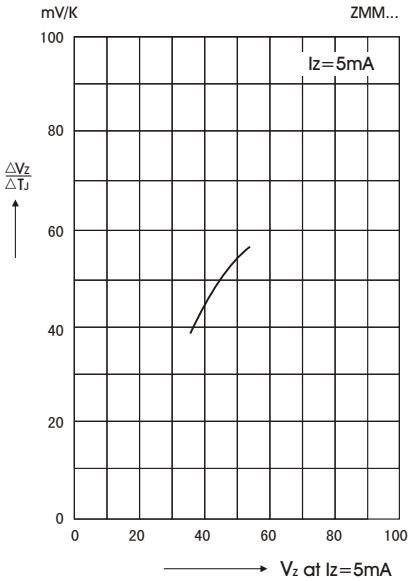
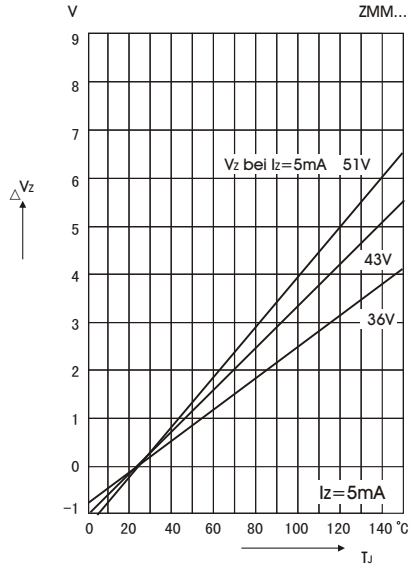



## Change of Zener voltage versus junction temperature

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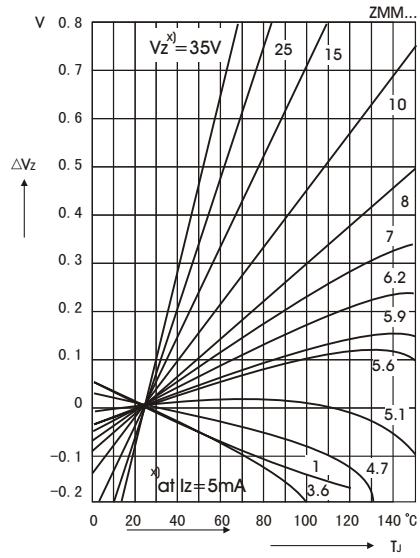
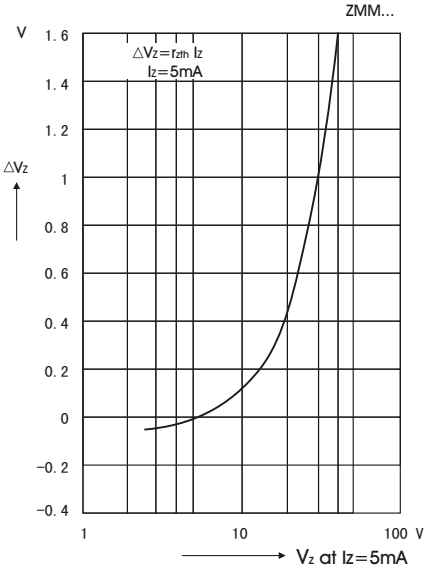



## Change of Zener voltage from turn-on up to the point of thermal equilibrium versus Zener voltage



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