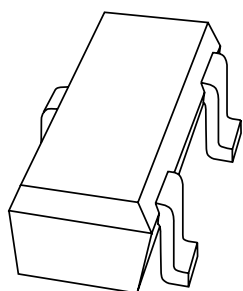


# DATA SHEET



## **PZM-NA series** Voltage regulator double diodes

Product specification  
Supersedes data of 1999 Jun 02

1999 Jun 11

Voltage regulator double diodes

PZM-NA series

FEATURES

- Total power dissipation: max. 220 mW per diode
- Small plastic package suitable for surface mounted design
- Working voltage: nom. 2.4 V and 15 V (E24 range).

APPLICATIONS

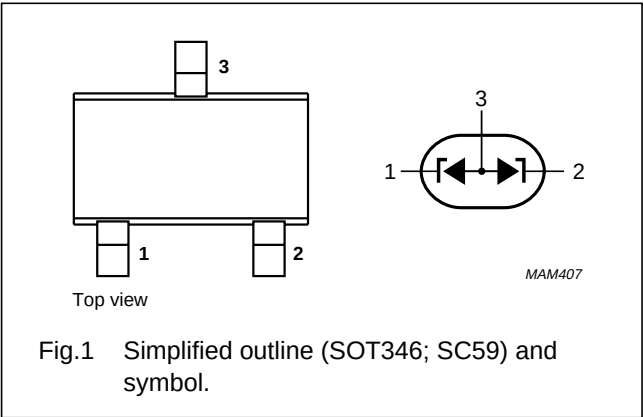
- General regulation functions.

DESCRIPTION

Low power general purpose voltage regulator double diodes in a SOT346 (SC59) plastic package, suitable for surface mounted design.

PINNING

| PIN | DESCRIPTION |
|-----|-------------|
| 1   | cathode     |
| 2   | cathode     |
| 3   | anode       |



MARKING

| TYPE NUMBER | MARKING CODE | TYPE NUMBER | MARKING CODE |
|-------------|--------------|-------------|--------------|
| PZM2.4NBA   | 2A4          | PZM6.2NB2A  | 6A2          |
| PZM2.7NB2A  | 2A7          | PZM6.8NB2A  | 6A8          |
| PZM3.0NB2A  | 3A0          | PZM7.5NB2A  | 7A5          |
| PZM3.3NB2A  | 3A3          | PZM8.2NB2A  | 8A2          |
| PZM3.6NB2A  | 3A6          | PZM9.1NB2A  | 9A1          |
| PZM3.9NB2A  | 3A9          | PZM10NB2A   | 10A          |
| PZM4.3NB2A  | 4A3          | PZM11NB2A   | 11A          |
| PZM4.7NB2A  | 4A7          | PZM12NB2A   | 12A          |
| PZM5.1NB2A  | 5A1          | PZM13NB2A   | 13A          |
| PZM5.6NB2A  | 5A6          | PZM15NB2A   | 15A          |

## Voltage regulator double diodes

## PZM-NA series

**LIMITING VALUES**

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                      | CONDITIONS                      | MIN.        | MAX. | UNIT       |
|------------------|--------------------------------|---------------------------------|-------------|------|------------|
| <b>Per diode</b> |                                |                                 |             |      |            |
| $I_F$            | continuous forward current     |                                 | –           | 200  | mA         |
| $I_{ZSM}$        | non-repetitive peak current    | $t_p = 100 \mu s$ ; square wave | see Table 1 |      |            |
| P                | power dissipation; see note 1  | $T_{amb} = 25^\circ C$          | –           | 220  | mW         |
| $T_{stg}$        | storage temperature            |                                 | –65         | +150 | $^\circ C$ |
| $T_j$            | operating junction temperature |                                 | –           | 150  | $^\circ C$ |

**Note**

1. Device mounted on an FR4 printed circuit board with Cu clad  $5 \times 5$  mm.

**THERMAL CHARACTERISTICS**

| SYMBOL       | PARAMETER                                           | CONDITIONS               | VALUE | UNIT |
|--------------|-----------------------------------------------------|--------------------------|-------|------|
| $R_{th j-s}$ | thermal resistance from junction to soldering point | one diode loaded; note 1 | 350   | K/W  |
| $R_{th j-a}$ | thermal resistance from junction to ambient         | one diode loaded; note 2 | 560   | K/W  |

**Notes**

1. Solderpoint of cathode tab.
2. Device mounted on an FR4 printed circuit board with Cu clad  $5 \times 5$  mm.

## Voltage regulator double diodes

## PZM-NA series

**ELECTRICAL CHARACTERISTICS** $T_j = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

| SYMBOL | PARAMETER       | CONDITIONS                        | MAX. | UNIT          |
|--------|-----------------|-----------------------------------|------|---------------|
| $V_F$  | forward voltage | $I_F = 10\text{ mA}$ ; see Fig.2  | 0.9  | V             |
|        |                 | $I_F = 100\text{ mA}$ ; see Fig.2 | 1.1  | V             |
| $I_R$  | reverse current |                                   |      |               |
|        | PZM2.4NB2A      | $V_R = 1\text{ V}$                | 50   | $\mu\text{A}$ |
|        | PZM2.7NB2A      | $V_R = 1\text{ V}$                | 20   | $\mu\text{A}$ |
|        | PZM3.0NB2A      | $V_R = 1\text{ V}$                | 10   | $\mu\text{A}$ |
|        | PZM3.3NB2A      | $V_R = 1\text{ V}$                | 5    | $\mu\text{A}$ |
|        | PZM3.6NB2A      | $V_R = 1\text{ V}$                | 5    | $\mu\text{A}$ |
|        | PZM3.9NB2A      | $V_R = 1\text{ V}$                | 3    | $\mu\text{A}$ |
|        | PZM4.3NB2A      | $V_R = 1\text{ V}$                | 3    | $\mu\text{A}$ |
|        | PZM4.7NB2A      | $V_R = 1\text{ V}$                | 3    | $\mu\text{A}$ |
|        | PZM5.1NB2A      | $V_R = 1.5\text{ V}$              | 3    | $\mu\text{A}$ |
|        | PZM5.6NB2A      | $V_R = 2.5\text{ V}$              | 2    | $\mu\text{A}$ |
|        | PZM6.2NB2A      | $V_R = 3.0\text{ V}$              | 2    | $\mu\text{A}$ |
|        | PZM6.8NB2A      | $V_R = 3.5\text{ V}$              | 2    | $\mu\text{A}$ |
|        | PZM7.5NB2A      | $V_R = 4.0\text{ V}$              | 1    | $\mu\text{A}$ |
|        | PZM8.2NB2A      | $V_R = 5.0\text{ V}$              | 700  | nA            |
|        | PZM9.1NB2A      | $V_R = 6.0\text{ V}$              | 500  | nA            |
|        | PZM10NB2A       | $V_R = 7.0\text{ V}$              | 200  | nA            |
|        | PZM11NB2A       | $V_R = 8.0\text{ V}$              | 100  | nA            |
|        | PZM12NB2A       | $V_R = 9.0\text{ V}$              | 100  | nA            |
|        | PZM13NB2A       | $V_R = 10.0\text{ V}$             | 100  | nA            |
|        | PZM15NB2A       | $V_R = 11.0\text{ V}$             | 70   | nA            |

## Voltage regulator double diodes

## PZM-NA series

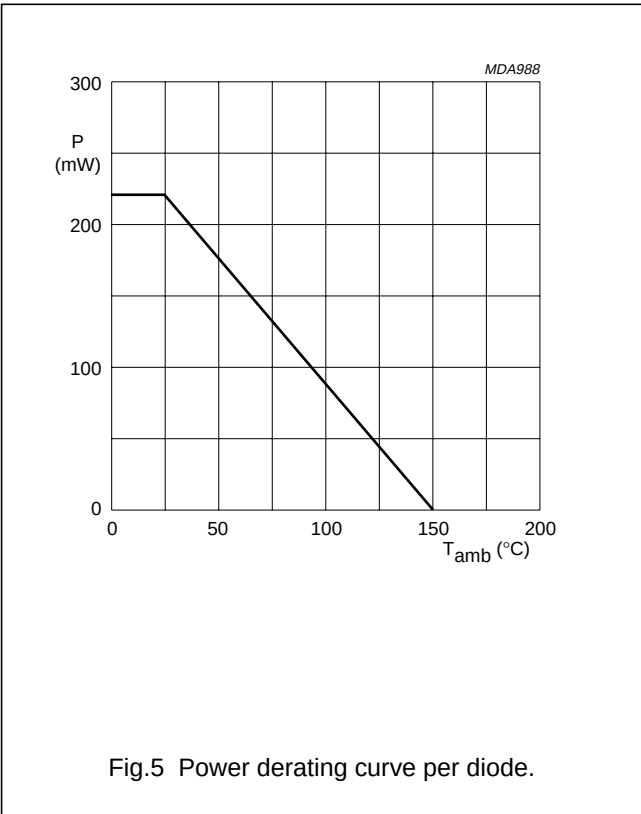
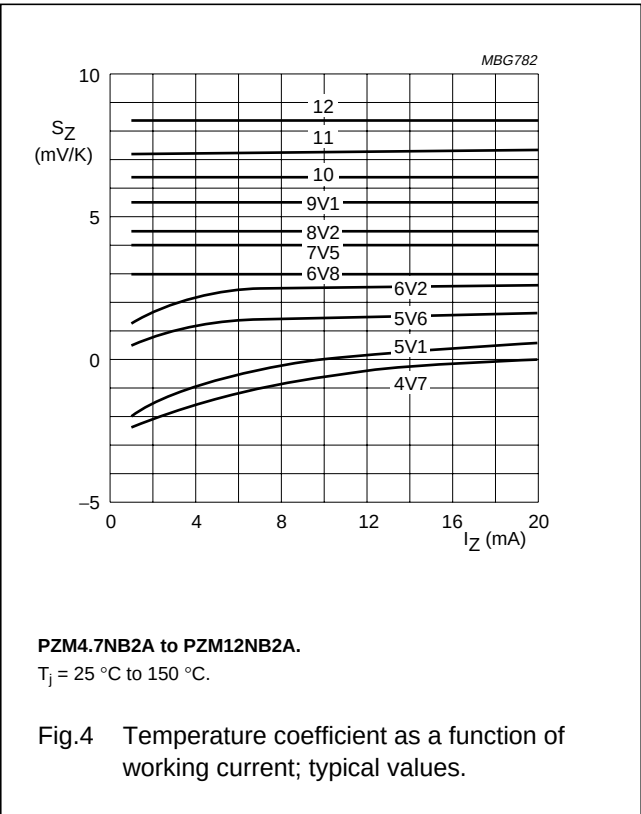
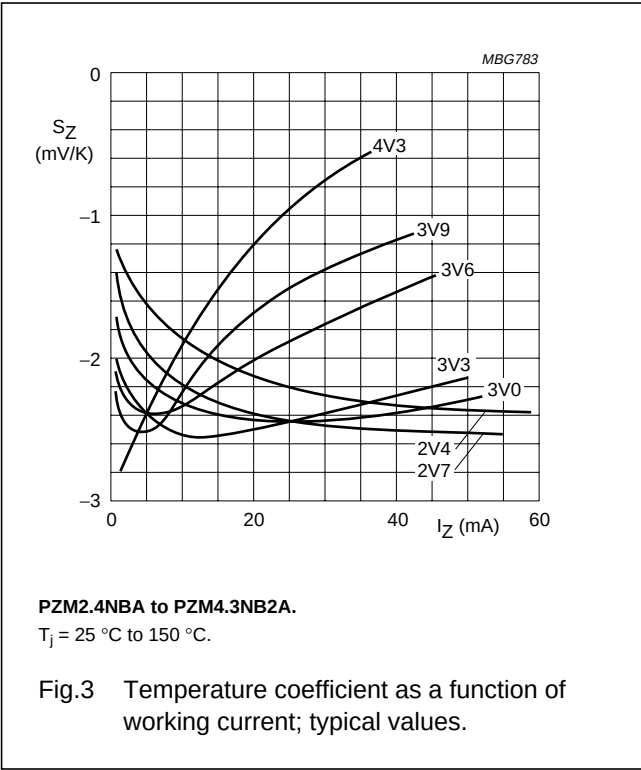
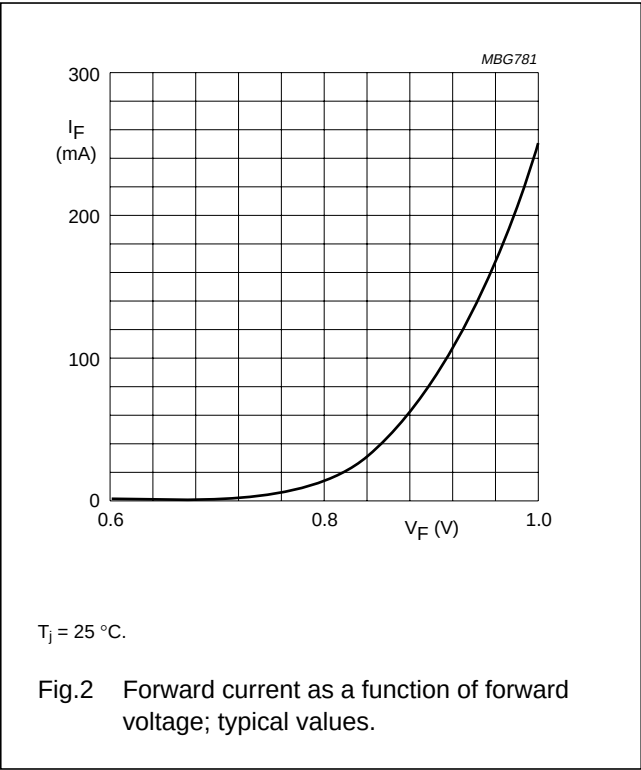
**Table 1** Per type; PZM2.4N to PZM24N $T_j = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

| PZM<br>-XXX | WORKING<br>VOLTAGE $V_Z$ (V)<br>at $I_Z = 5\text{ mA}$ ;<br>$t_m = 40\text{ ms}$ ;<br>$T_{amb} = 25\text{ }^{\circ}\text{C}$ |       | DIFFERENTIAL RESISTANCE<br>$r_{dif} (\Omega)$ |      |                     |      | TEMP.<br>COEFF.<br>$S_Z$ (mV/K)<br>at<br>$I_Z = 5\text{ mA}$ | DIODE<br>CAP.<br>$C_d$ (pF)<br>at<br>$f = 1\text{ MHz}$ ;<br>$V_R = 0$ | NON-REPETITIVE<br>PEAK REVERSE<br>CURRENT<br>$I_{ZSM} \text{ (A)}$<br>at $t_p = 100\text{ }\mu\text{s}$ |
|-------------|------------------------------------------------------------------------------------------------------------------------------|-------|-----------------------------------------------|------|---------------------|------|--------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
|             |                                                                                                                              |       | $I_Z = 1\text{ mA}$                           |      | $I_Z = 5\text{ mA}$ |      |                                                              |                                                                        |                                                                                                         |
|             | MIN.                                                                                                                         | MAX.  | TYP.                                          | MAX. | TYP.                | MAX. | TYP.                                                         | MAX.                                                                   | MAX.                                                                                                    |
| 2.4NBA      | 2.30                                                                                                                         | 2.60  | 275                                           | 400  | 70                  | 100  | -1.6                                                         | 450                                                                    | 8.00                                                                                                    |
| 2.7NB2A     | 2.65                                                                                                                         | 2.90  | 300                                           | 450  | 75                  | 100  | -2.0                                                         | 440                                                                    | 8.00                                                                                                    |
| 3.0NB2A     | 2.95                                                                                                                         | 3.20  | 325                                           | 500  | 80                  | 95   | -2.1                                                         | 425                                                                    | 8.00                                                                                                    |
| 3.3NB2A     | 3.25                                                                                                                         | 3.50  | 350                                           | 500  | 85                  | 95   | -2.4                                                         | 410                                                                    | 8.00                                                                                                    |
| 3.6NB2A     | 3.55                                                                                                                         | 3.80  | 375                                           | 500  | 85                  | 90   | -2.4                                                         | 390                                                                    | 8.00                                                                                                    |
| 3.9NB2A     | 3.87                                                                                                                         | 4.10  | 400                                           | 500  | 85                  | 90   | -2.5                                                         | 370                                                                    | 8.00                                                                                                    |
| 4.3NB2A     | 4.15                                                                                                                         | 4.34  | 410                                           | 600  | 80                  | 90   | -2.5                                                         | 350                                                                    | 8.00                                                                                                    |
| 4.7NB2A     | 4.55                                                                                                                         | 4.75  | 425                                           | 500  | 50                  | 80   | -1.4                                                         | 325                                                                    | 8.00                                                                                                    |
| 5.1NB2A     | 4.98                                                                                                                         | 5.20  | 400                                           | 480  | 40                  | 60   | -0.8                                                         | 300                                                                    | 8.00                                                                                                    |
| 5.6NB2A     | 5.49                                                                                                                         | 5.73  | 80                                            | 400  | 15                  | 40   | 1.2                                                          | 275                                                                    | 8.00                                                                                                    |
| 6.2NB2A     | 6.06                                                                                                                         | 6.33  | 40                                            | 150  | 6                   | 10   | 2.3                                                          | 250                                                                    | 8.00                                                                                                    |
| 6.8NB2A     | 6.65                                                                                                                         | 6.93  | 30                                            | 80   | 6                   | 15   | 3.0                                                          | 215                                                                    | 8.00                                                                                                    |
| 7.5NB2A     | 7.28                                                                                                                         | 7.60  | 15                                            | 80   | 2                   | 10   | 4.0                                                          | 170                                                                    | 3.50                                                                                                    |
| 8.2NB2A     | 8.02                                                                                                                         | 8.36  | 20                                            | 80   | 2                   | 10   | 4.6                                                          | 150                                                                    | 3.50                                                                                                    |
| 9.1NB2A     | 8.85                                                                                                                         | 9.23  | 20                                            | 100  | 2                   | 10   | 5.5                                                          | 120                                                                    | 3.50                                                                                                    |
| 10NB2A      | 9.77                                                                                                                         | 10.21 | 20                                            | 150  | 2                   | 10   | 6.4                                                          | 110                                                                    | 3.50                                                                                                    |
| 11NB2A      | 10.76                                                                                                                        | 11.22 | 25                                            | 150  | 2                   | 10   | 7.4                                                          | 110                                                                    | 3.00                                                                                                    |
| 12NB2A      | 11.74                                                                                                                        | 12.24 | 25                                            | 150  | 2                   | 10   | 8.4                                                          | 105                                                                    | 3.00                                                                                                    |
| 13NB2A      | 12.91                                                                                                                        | 13.49 | 25                                            | 170  | 2                   | 10   | 9.4                                                          | 105                                                                    | 2.50                                                                                                    |
| 15NB2A      | 14.34                                                                                                                        | 14.98 | 25                                            | 200  | 3                   | 15   | 11.4                                                         | 100                                                                    | 2.00                                                                                                    |

Voltage regulator double diodes

PZM-NA series

GRAPHICAL DATA



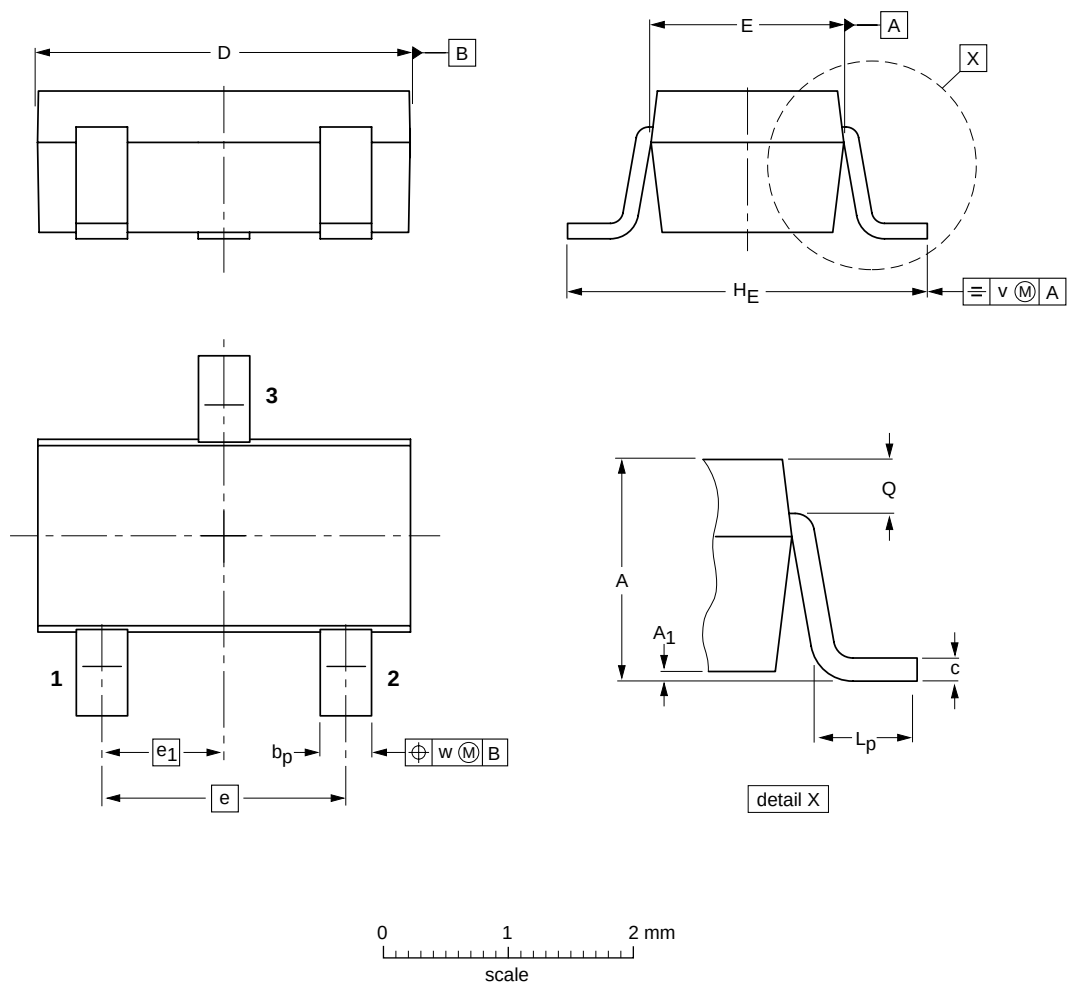
Voltage regulator double diodes

PZM-NA series

PACKAGE OUTLINE

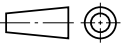
Plastic surface mounted package; 3 leads

SOT346



DIMENSIONS (mm are the original dimensions)

| UNIT | A          | A <sub>1</sub> | b <sub>p</sub> | c            | D          | E          | e   | e <sub>1</sub> | H <sub>E</sub> | L <sub>p</sub> | Q            | v   | w   |
|------|------------|----------------|----------------|--------------|------------|------------|-----|----------------|----------------|----------------|--------------|-----|-----|
| mm   | 1.3<br>1.0 | 0.1<br>0.013   | 0.50<br>0.35   | 0.26<br>0.10 | 3.1<br>2.7 | 1.7<br>1.3 | 1.9 | 0.95           | 3.0<br>2.5     | 0.6<br>0.2     | 0.33<br>0.23 | 0.2 | 0.2 |

| OUTLINE<br>VERSION | REFERENCES |        |       |  | EUROPEAN<br>PROJECTION                                                                | ISSUE DATE |
|--------------------|------------|--------|-------|--|---------------------------------------------------------------------------------------|------------|
|                    | IEC        | JEDEC  | EIAJ  |  |                                                                                       |            |
| SOT346             |            | TO-236 | SC-59 |  |  | 98-07-17   |

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Voltage regulator double diodes

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PZM-NA series

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**DEFINITIONS**

| <b>Data Sheet Status</b>                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Objective specification                                                                                                                                                                                                                                                                                                                                                                                                                                   | This data sheet contains target or goal specifications for product development.       |
| Preliminary specification                                                                                                                                                                                                                                                                                                                                                                                                                                 | This data sheet contains preliminary data; supplementary data may be published later. |
| Product specification                                                                                                                                                                                                                                                                                                                                                                                                                                     | This data sheet contains final product specifications.                                |
| <b>Limiting values</b>                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                       |
| Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability. |                                                                                       |
| <b>Application information</b>                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                       |
| Where application information is given, it is advisory and does not form part of the specification.                                                                                                                                                                                                                                                                                                                                                       |                                                                                       |

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## Voltage regulator double diodes

## PZM-NA series

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### NOTES

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Voltage regulator double diodes

PZM-NA series

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**NOTES**

## Voltage regulator double diodes

## PZM-NA series

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### NOTES

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