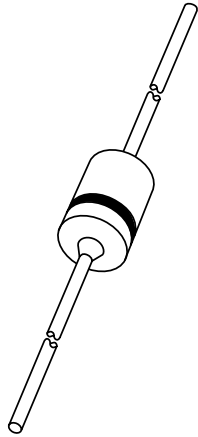


DATA SHEET



PLVA400A series Low-voltage avalanche regulator diodes

Product specification
Supersedes data of April 1992

1996 Apr 26

Low-voltage avalanche regulator diodes

PLVA400A series

FEATURES

- Very low dynamic impedance at low currents: approximately $\frac{1}{20}$ of conventional series
- Hard breakdown knee
- Low noise: approximately $\frac{1}{10}$ of conventional series
- Total power dissipation: max. 400 mW
- Small tolerances of V_Z
- Working voltage range: nom. 5.0 to 6.8 V
- Non-repetitive peak reverse power dissipation: max. 30 W.

APPLICATIONS

- Low current, low power, low noise applications
- CMOS RAM back-up circuits
- Voltage stabilizers
- Voltage limiters
- Smoke detector relays.

DESCRIPTION

High performance voltage regulator diodes in hermetically sealed leaded glass SOD27 (DO-35) packages.

The series consists of PLVA450A to PLVA468A.

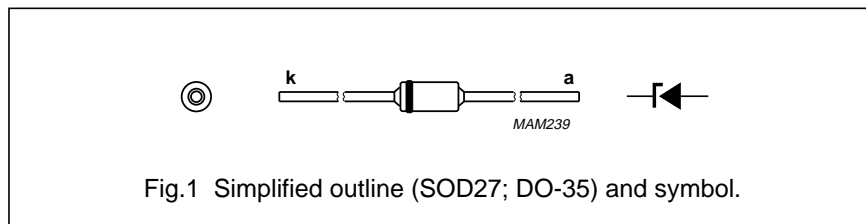


Fig.1 Simplified outline (SOD27; DO-35) and symbol.

MARKING

| TYPE NUMBER | MARKING CODE |
|-------------|--------------|
| PLVA450A | 450APH |
| PLVA453A | 453APH |
| PLVA456A | 456APH |
| PLVA459A | 459APH |
| PLVA462A | 462APH |
| PLVA465A | 465APH |
| PLVA468A | 468APH |

LIMITING VALUES

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|-----------|---|---|------|------|------------------|
| I_F | continuous forward current | | – | 250 | mA |
| I_{ZRM} | repetitive peak working current | $t_p = 100 \mu s; \delta = 10\%$ | | 250 | mA |
| P_{tot} | total power dissipation | $T_{tp} \leq 55 \text{ }^\circ\text{C}; \text{ note 1}$ | – | 400 | mW |
| P_{ZSM} | non-repetitive peak reverse power dissipation | $t_p = 100 \mu s; T_j = 150 \text{ }^\circ\text{C}$ | | 30 | W |
| T_{stg} | storage temperature | | –65 | +200 | $^\circ\text{C}$ |
| T_j | junction temperature | | – | 175 | $^\circ\text{C}$ |

Note

1. Lead length 8 mm.

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|--------|-------------------------|---|------|------|-------|----------|
| V_F | forward voltage | $I_F = 10\text{ mA}$ | – | – | 0.9 | V |
| V_Z | working voltage | $I_Z = 250\text{ }\mu\text{A}$ | | | | |
| | PLVA450A | | 4.80 | 5.00 | 5.20 | V |
| | PLVA453A | | 5.10 | 5.30 | 5.50 | V |
| | PLVA456A | | 5.40 | 5.60 | 5.80 | V |
| | PLVA459A | | 5.70 | 5.90 | 6.10 | V |
| | PLVA462A | | 6.00 | 6.20 | 6.40 | V |
| | PLVA465A | | 6.30 | 6.50 | 6.70 | V |
| | PLVA468A | | 6.60 | 6.80 | 7.00 | V |
| V_Z | working voltage | $I_Z = 10\text{ }\mu\text{A}$ | | | | |
| | PLVA450A | | – | 4.30 | – | V |
| | PLVA453A | | – | 5.20 | – | V |
| | PLVA456A | | – | 5.51 | – | V |
| | PLVA459A | | – | 5.85 | – | V |
| | PLVA462A | | – | 6.19 | – | V |
| | PLVA465A | | – | 6.49 | – | V |
| | PLVA468A | | – | 6.80 | – | V |
| R_Z | dynamic resistance | 1 kHz superimposed; I_{ZAC} is 10% of I_{ZDC} ; $I_Z = 250\text{ }\mu\text{A}$ | | | | |
| | PLVA450A | | – | – | 700 | Ω |
| | PLVA453A | | – | – | 250 | Ω |
| | PLVA456A to PLVA468A | | – | – | 100 | Ω |
| S_Z | temperature coefficient | $I_Z = 250\text{ }\mu\text{A}$ | | | | |
| | PLVA450A | | – | 0.20 | – | mV/K |
| | PLVA453A | | – | 1.60 | – | mV/K |
| | PLVA456A | | – | 1.90 | – | mV/K |
| | PLVA459A | | – | 2.40 | – | mV/K |
| | PLVA462A | | – | 2.65 | – | mV/K |
| | PLVA465A | | – | 2.90 | – | mV/K |
| | PLVA468A | | – | 3.40 | – | mV/K |
| I_R | reverse current | $V_R = 80\% V_Z$ nominal | | | | |
| | PLVA450A | | – | – | 20000 | nA |
| | PLVA453A | | – | – | 5000 | nA |
| | PLVA456A | | – | – | 1000 | nA |
| | PLVA459A | | – | – | 500 | nA |
| | PLVA462A | | – | – | 100 | nA |
| | PLVA465A | | – | – | 50 | nA |
| | PLVA468A | | – | – | 10 | nA |

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| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT | | | |
|--------------|-----------------------|---|------|------|------|--|--|---------|---|
| I_R | reverse current | $V_R = 50\% V_Z$ nominal | - | | | | | | |
| | PLVA450A | | | | | | 34 | nA | |
| | PLVA453A | | | | | | 22 | nA | |
| | PLVA456A | | | | | | 1.1 | nA | |
| | PLVA459A | | | | | | 0.9 | nA | |
| | PLVA462A | | | | | | 0.9 | nA | |
| | PLVA465A | | | | | | 0.9 | nA | |
| | PLVA468A | | | | | | 0.8 | nA | |
| I_R | reverse current | $V_R = 90\% V_Z$ nominal | - | | | | | | |
| | PLVA450A | | | | | | 21 | μ A | |
| | PLVA453A | | | | | | 3.5 | μ A | |
| | PLVA456A | | | | | | 1.3 | μ A | |
| | PLVA459A | | | | | | 1.0 | μ A | |
| | PLVA462A | | | | | | 0.05 | μ A | |
| | PLVA465A | | | | | | 0.04 | μ A | |
| | PLVA468A | | | | | | 0.006 | μ A | |
| ΔV_Z | line regulation | | - | - | | | | | |
| | PLVA459A to PLVA468A | | | | | | $I_{LO} = 10 \mu\text{A}; I_{Hi} = 1 \text{mA}$ | 0.1 | V |
| | PLVA456A | | | | | | $I_{LO} = 50 \mu\text{A}; I_{Hi} = 1 \text{mA}$ | 0.1 | V |
| | PLVA450A | | | | | | $I_{LO} = 100 \mu\text{A}; I_{Hi} = 1 \text{mA}$ | 0.4 | V |
| | PLVA453A | $I_{LO} = 100 \mu\text{A}; I_{Hi} = 1 \text{mA}$ | 0.2 | V | | | | | |
| V_n | noise voltage density | $f = 1 \text{kHz}; B = 1 \text{kHz}; I_Z = 250 \mu\text{A}$ | - | - | 1.0 | $\frac{\mu\text{V}}{\sqrt{\text{Hz}}}$ | | | |

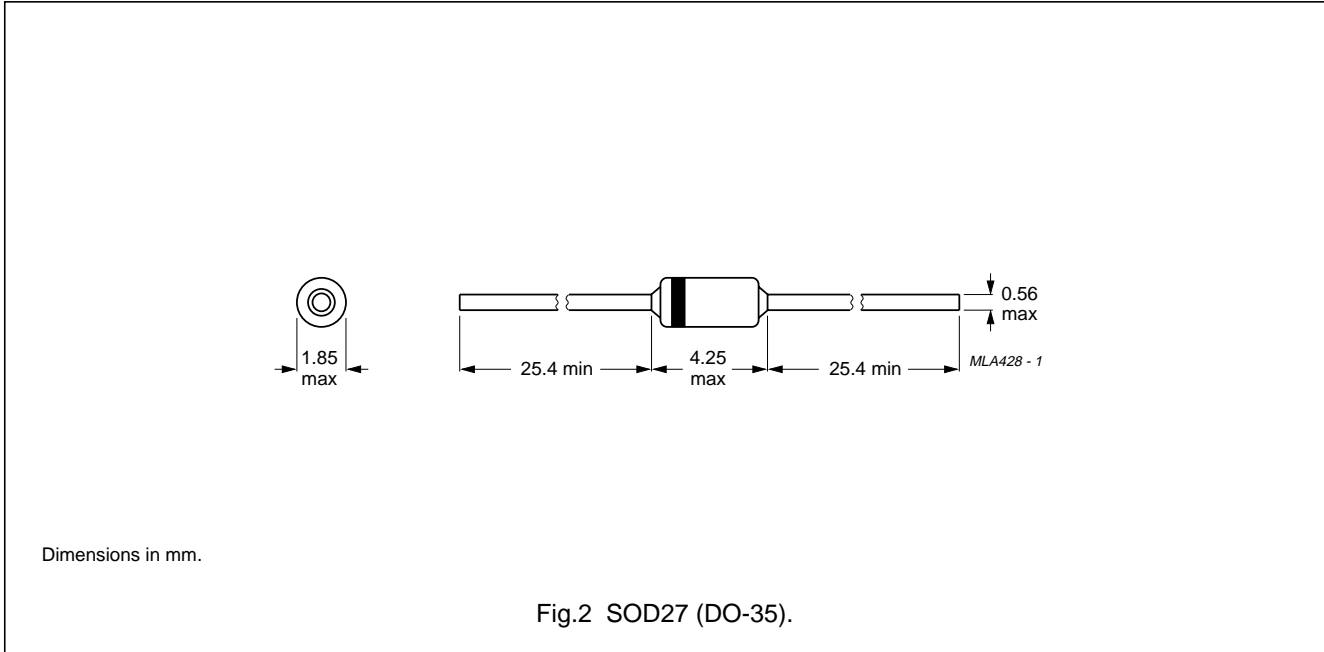
THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|----------------|---|-------------------|-------|------|
| $R_{th\ j-tp}$ | thermal resistance from junction to tie-point | lead length 8 mm. | 300 | K/W |
| $R_{th\ j-a}$ | thermal resistance from junction to ambient | lead length max. | 380 | K/W |

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PACKAGE OUTLINE



DEFINITIONS

| | |
|---|---|
| Data sheet status | |
| 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. |
| Limiting values | |
| 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. | |
| Application information | |
| Where application information is given, it is advisory and does not form part of the specification. | |

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.