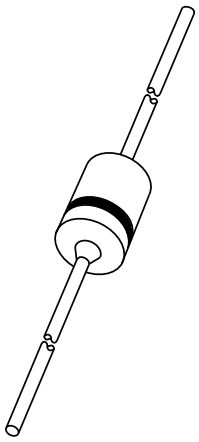
DATA SHEET



PLVA400A series
Low-voltage avalanche regulator diodes

Product specification
Supersedes data of April 1992
File under Discrete Semiconductors, SC01

1996 Apr 26

Philips
Semiconductors

PHILIPS

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.

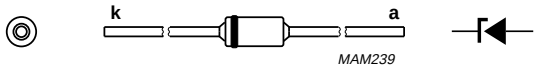


Fig.1 Simplified outline (SOD27; DO-35) and symbol.

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 μs; δ = 10%		250	mA
P_{tot}	total power dissipation	$T_{tp} \leq 55$ °C; note 1	–	400	mW
P_{ZSM}	non-repetitive peak reverse power dissipation	t_p = 100 μs; T_j = 150 °C		30	W
T_{stg}	storage temperature		–65	+200	°C
T_j	junction temperature		–	175	°C

Note

1. Lead length 8 mm.

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

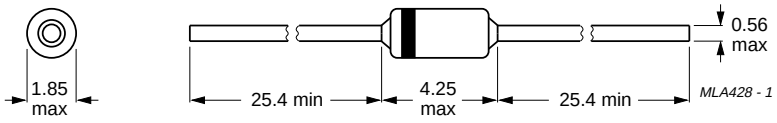
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 10 mA	–	–	0.9	V
V_Z	working voltage	I_Z = 250 μA				
	PLVA450A		4.80	5.00	5.20	V
	PLVA453A		5.10	5.30	5.50	V
	PLVA456A		5.40	5.60	5.80	V
	PLVA459A		5.70	5.90	6.10	V
	PLVA462A		6.00	6.20	6.40	V
	PLVA465A		6.30	6.50	6.70	V
	PLVA468A		6.60	6.80	7.00	V
V_Z	working voltage	I_Z = 10 μA				
	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;				
	PLVA450A	I_{ZAC} is 10% of I_{ZDC}; I_Z = 250 μA	–	–	700	Ω
	PLVA453A		–	–	250	Ω
	PLVA456A to PLVA468A		–	–	100	Ω
S_Z	temperature coefficient	I_Z = 250 μA				
	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

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	–	µA
	PLVA453A		–	3.5	–	µA
	PLVA456A		–	1.3	–	µA
	PLVA459A		–	1.0	–	µA
	PLVA462A		–	0.05	–	µA
	PLVA465A		–	0.04	–	µA
	PLVA468A		–	0.006	–	µA
ΔV_Z	line regulation					
	PLVA459A to PLVA468A	I_{LO} = 10 µA; I_{Hi} = 1 mA	–	–	0.1	V
	PLVA456A	I_{LO} = 50 µA; I_{Hi} = 1 mA	–	–	0.1	V
	PLVA450A	I_{LO} = 100 µA; I_{Hi} = 1 mA	–	–	0.4	V
	PLVA453A	I_{LO} = 100 µA; I_{Hi} = 1 mA	–	–	0.2	V
V_n	noise voltage density	f = 1 kHz; B = 1 kHz; I_Z = 250 µA	–	–	1.0	$\frac{\mu V}{\sqrt{Hz}}$

THERMAL CHARACTERISTICS

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

PACKAGE OUTLINE



Dimensions in mm.

Fig.2 SOD27 (DO-35).

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.