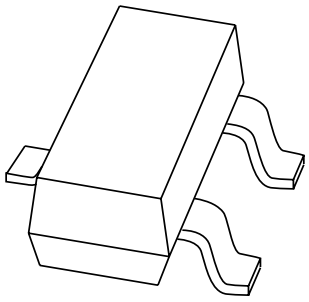
DATA SHEET



PLVA6xxA series
Low-voltage avalanche regulator diodes

Product specification
Supersedes data of 1999 May 25

2004 Jan 14

Philips
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Low-voltage avalanche regulator diodes PLVA6xxA series

FEATURES

- Very low dynamic impedance at low currents: approximately $1/20$ of conventional series
- Hard breakdown knee
- Low noise: approximately $1/10$ of conventional series
- Total power dissipation: max. 250 mW
- Small tolerances of V_Z
- Working voltage range: nominal 5.00 to 6.80 V
- Non-repetitive peak reverse power dissipation: maximal 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 small SOT23 plastic SMD packages.

The series consists of PLVA650A to PLVA668A.

MARKING

TYPE NUMBER	MARKING CODE(1)
PLVA650A	*9A
PLVA653A	*9B
PLVA656A	*9C
PLVA659A	*9D
PLVA662A	*9E
PLVA665A	*9F
PLVA668A	*9G

Note

1. * = p: Made in Hong Kong.
   * = t: Made in Malaysia.
   * = W: Made in China.

PINNING

PIN	DESCRIPTION
1	anode
2	not connected
3	cathode

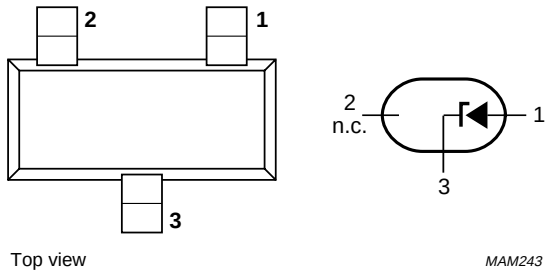


Fig.1 Simplified outline (SOT23) and symbol.

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PLVA6xxA	–	plastic surface mounted package; 3 leads	SOT23

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

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_{ZSM}	non-repetitive peak reverse power dissipation	t_p = 100 μs; T_j = 150 °C	–	30	W
P_{tot}	total power dissipation	T_{amb} = 25 °C; note 1	–	250	mW
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C

Note

1. Device mounted on an FR4 printed circuit-board.

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				
	PLVA650A		4.80	5.00	5.20	V
	PLVA653A		5.10	5.30	5.50	V
	PLVA656A		5.40	5.60	5.80	V
	PLVA659A		5.70	5.90	6.10	V
	PLVA662A		6.00	6.20	6.40	V
	PLVA665A		6.30	6.50	6.70	V
	PLVA668A		6.60	6.80	7.00	V
V_Z	working voltage	I_Z = 10 μA				
	PLVA650A		–	4.30	–	V
	PLVA653A		–	5.20	–	V
	PLVA656A		–	5.51	–	V
	PLVA659A		–	5.85	–	V
	PLVA662A		–	6.19	–	V
	PLVA665A		–	6.49	–	V
	PLVA668A		–	6.80	–	V
R_Z	dynamic resistance	1 kHz superimposed;				
	PLVA650A	I_{ZAC} is 10% of I_{ZDC}; I_Z = 250 μA	–	–	700	Ω
	PLVA653A		–	–	250	Ω
	PLVA656A to PLVA668A		–	–	100	Ω
S_Z	temperature coefficient	I_Z = 250 μA				
	PLVA650A		–	0.20	–	mV/K
	PLVA653A		–	1.60	–	mV/K
	PLVA656A		–	1.90	–	mV/K
	PLVA659A		–	2.40	–	mV/K
	PLVA662A		–	2.65	–	mV/K
	PLVA665A		–	2.90	–	mV/K
	PLVA668A		–	3.40	–	mV/K
I_R	reverse current	V_R = 80% V_Z nominal				
	PLVA650A		–	–	20000	nA
	PLVA653A		–	–	5000	nA
	PLVA656A		–	–	1000	nA
	PLVA659A		–	–	500	nA
	PLVA662A		–	–	100	nA
	PLVA665A		–	–	50	nA
	PLVA668A		–	–	10	nA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_R	reverse current	V_R = 50% V_Z nominal				
	PLVA650A		–	34	–	nA
	PLVA653A		–	22	–	nA
	PLVA656A		–	1.1	–	nA
	PLVA659A		–	0.9	–	nA
	PLVA662A		–	0.9	–	nA
	PLVA665A		–	0.9	–	nA
	PLVA668A		–	0.8	–	nA
I_R	reverse current	V_R = 90% V_Z nominal				
	PLVA650A		–	21	–	µA
	PLVA653A		–	3.5	–	µA
	PLVA656A		–	1.3	–	µA
	PLVA659A		–	1.0	–	µA
	PLVA662A		–	0.05	–	µA
	PLVA665A		–	0.04	–	µA
	PLVA668A		–	0.006	–	µA
ΔV_Z	line regulation					
	PLVA659A to PLVA668A	I_{LO} = 10 µA; I_{HI} = 1 mA	–	–	0.1	V
	PLVA656A	I_{LO} = 50 µA; I_{HI} = 1 mA	–	–	0.1	V
	PLVA650A	I_{LO} = 100 µA; I_{HI} = 1 mA	–	–	0.4	V
	PLVA653A	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

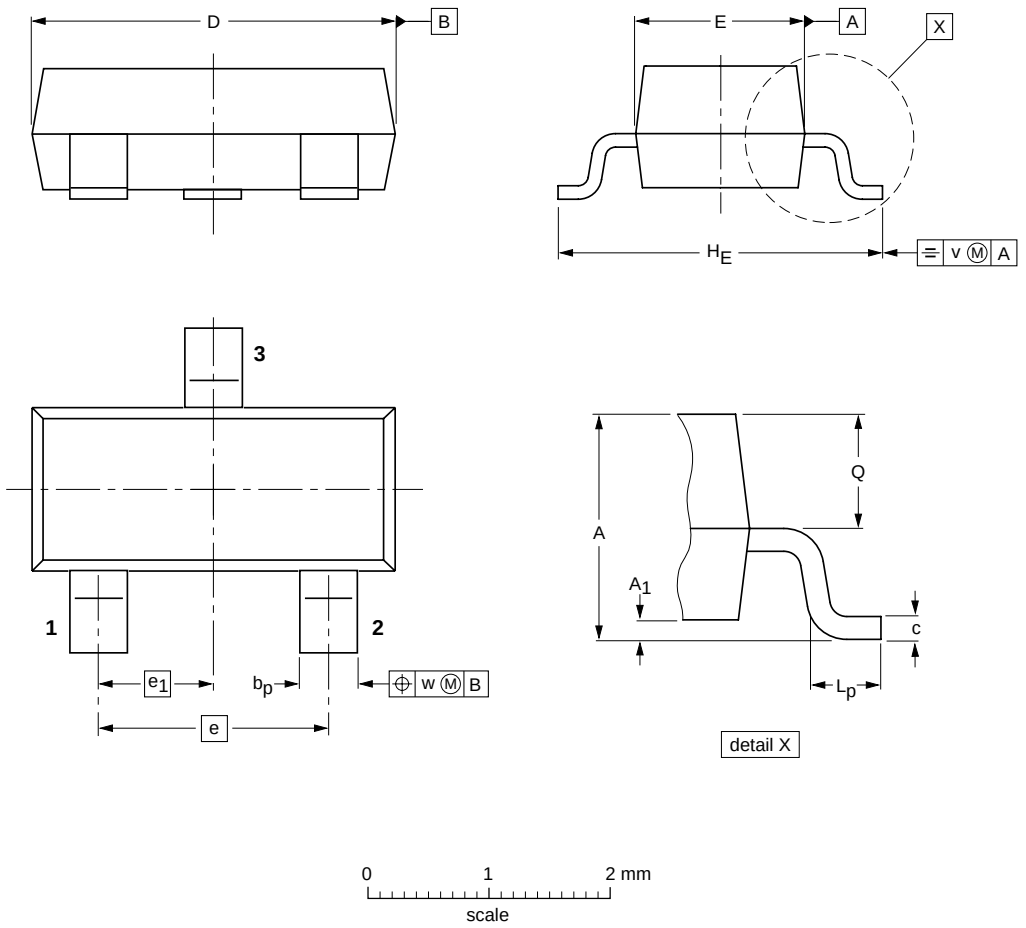
SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th(j\text{-}tp)}$	thermal resistance from junction to tie-point		330	K/W
$R_{th(j\text{-}a)}$	thermal resistance from junction to ambient	note 1	500	K/W

Note

1. Device mounted on an FR4 printed circuit-board.

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads **SOT23**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max.	b_p	c	D	E	e	e_1	H_E	L_p	Q	v	w
mm	1.1 0.9	0.1	0.48 0.38	0.15 0.09	3.0 2.8	1.4 1.2	1.9	0.95	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT23		TO-236AB				~~97-02-28~~ 99-09-13

DATA SHEET STATUS

LEVEL	DATA SHEET STATUS(1)	PRODUCT STATUS(2)(3)	DEFINITION
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
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3. For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

DEFINITIONS

Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). 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.

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Printed in The Netherlands R76/03/pp8 Date of release: 2004 Jan 14 Document order number: 9397 750 12445

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