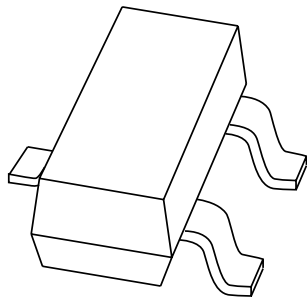


# DATA SHEET



## **PLVA6xxA series** Low-voltage avalanche regulator diodes

Product data sheet  
Supersedes data of 1999 May 25

2004 Jan 14

# Low-voltage avalanche regulator diodes

# PLVA6xxA 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. 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

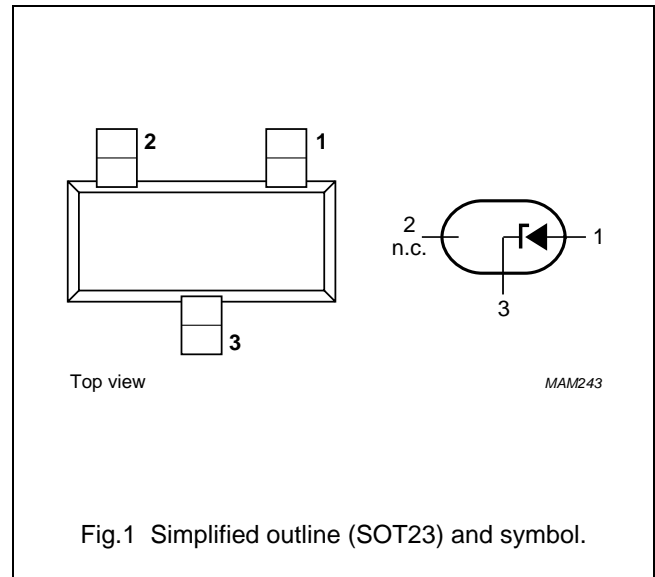
TYPE NUMBER	MARKING CODE <sup>(1)</sup>
PLVA650A	*9A
PLVA653A	*9B
PLVA656A	*9C
PLVA659A	*9D
PLVA662A	*9E
PLVA665A	*9F
PLVA668A	*9G

## 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



## Low-voltage avalanche regulator diodes

## PLVA6xxA series

## 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	$t_p = 100 \mu\text{s}; \delta = 10\%$	–	250	mA
$P_{ZSM}$	non-repetitive peak reverse power dissipation	$t_p = 100 \mu\text{s}; T_j = 150 \text{ }^\circ\text{C}$	–	30	W
$P_{tot}$	total power dissipation	$T_{amb} = 25 \text{ }^\circ\text{C}; \text{note 1}$	–	250	mW
$T_{stg}$	storage temperature		–65	+150	$^\circ\text{C}$
$T_j$	junction temperature		–	150	$^\circ\text{C}$

## Note

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

## Low-voltage avalanche regulator diodes

## PLVA6xxA series

**ELECTRICAL CHARACTERISTICS**T<sub>j</sub> = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 10 mA	–	–	0.9	V
V <sub>Z</sub>	working voltage	I <sub>Z</sub> = 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 <sub>Z</sub>	working voltage	I <sub>Z</sub> = 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 <sub>Z</sub>	dynamic resistance	1 kHz superimposed; I <sub>ZAC</sub> is 10% of I <sub>ZDC</sub> ; I <sub>Z</sub> = 250 μA				
	PLVA650A		–	–	700	Ω
	PLVA653A		–	–	250	Ω
	PLVA656A to PLVA668A		–	–	100	Ω
S <sub>Z</sub>	temperature coefficient	I <sub>Z</sub> = 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 <sub>R</sub>	reverse current	V <sub>R</sub> = 80% V <sub>Z</sub> nominal				
	PLVA650A		–	–	20000	nA
	PLVA653A		–	–	5000	nA
	PLVA656A		–	–	1000	nA
	PLVA659A		–	–	500	nA
	PLVA662A		–	–	100	nA
	PLVA665A		–	–	50	nA
	PLVA668A		–	–	10	nA

## Low-voltage avalanche regulator diodes

## PLVA6xxA series

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
$I_R$	reverse current	$V_R = 90\% V_Z$ nominal				
	PLVA650A		–	21	–	$\mu$ A
	PLVA653A		–	3.5	–	$\mu$ A
	PLVA656A		–	1.3	–	$\mu$ A
	PLVA659A		–	1.0	–	$\mu$ A
	PLVA662A		–	0.05	–	$\mu$ A
	PLVA665A		–	0.04	–	$\mu$ A
	PLVA668A		–	0.006	–	$\mu$ A
$\Delta V_Z$	line regulation					
	PLVA659A to PLVA668A	$I_{LO} = 10 \mu\text{A}; I_{HI} = 1 \text{mA}$	–	–	0.1	V
	PLVA656A	$I_{LO} = 50 \mu\text{A}; I_{HI} = 1 \text{mA}$	–	–	0.1	V
	PLVA650A	$I_{LO} = 100 \mu\text{A}; I_{HI} = 1 \text{mA}$	–	–	0.4	V
	PLVA653A	$I_{LO} = 100 \mu\text{A}; I_{HI} = 1 \text{mA}$	–	–	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		330	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	note 1	500	K/W

## Note

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

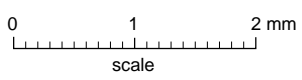
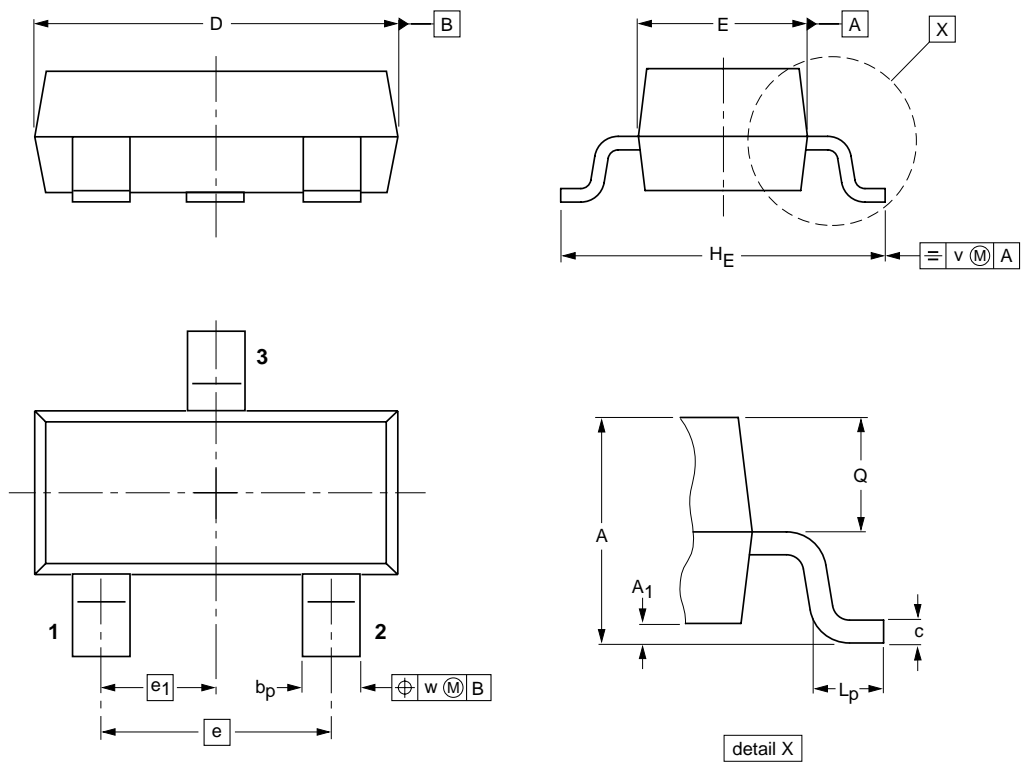
Low-voltage avalanche regulator diodes

PLVA6xxA series

PACKAGE OUTLINE

Plastic surface-mounted package; 3 leads

SOT23



DIMENSIONS (mm are the original dimensions)

UNIT	A	A <sub>1</sub> max.	b <sub>p</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	Q	v	w
mm	1.1 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	JEITA			
SOT23		TO-236AB				04-11-04 06-03-16

## Low-voltage avalanche regulator diodes

## PLVA6xxA series

## DATA SHEET STATUS

DOCUMENT STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)</sup>	DEFINITION
Objective data sheet	Development	This document contains data from the objective specification for product development.
Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

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## **Contact information**

For additional information please visit: <http://www.nxp.com>

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