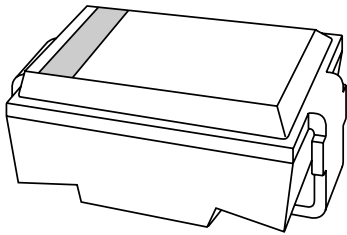


# DATA SHEET



## **BZG142** SMA ZenBlock™; zener with integrated blocking diode

Product specification  
Supersedes data of 2001 Apr 17

2001 Aug 20

# SMA ZenBlock™; zener with integrated blocking diode

**BZG142**

**FEATURES**

- Zener and 600 V/250 ns blocking diode in one package
- Protects the MOSFET in power IC controllers such as STARPlug™(1), TOPSwitch™(2) and VIPer™(3)
- High surge capability
- Supports valley switching
- Glass passivated junctions
- Excellent clamping capability and stability
- Supplied in 12 mm embossed tape.

**DESCRIPTION**

The SMA ZenBlock™ is designed to protect the MOSFET in flyback converters against over-voltages caused by the transformer leakage inductance. The SMA ZenBlock™ combines a zener/TVS with a fast soft-recovery diode in one package, and can be used to replace double diode, RC or RCD snubbers.

The BZG142 consists of a glass passivated chip in a DO-214AC surface mount package.

The well-defined void-free case is of a transfer-moulded thermo-setting plastic. The small rectangular package has two J bent leads.

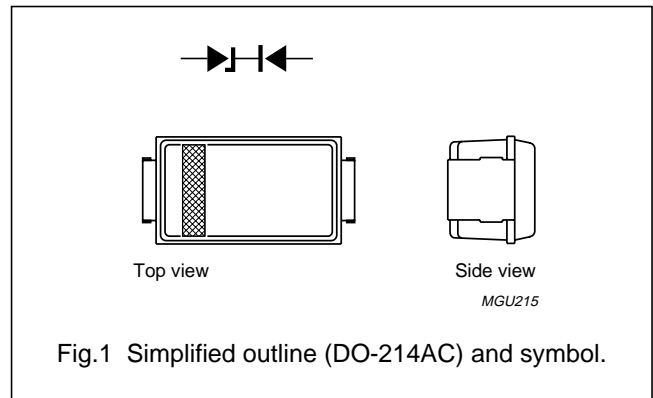


Fig.1 Simplified outline (DO-214AC) and symbol.

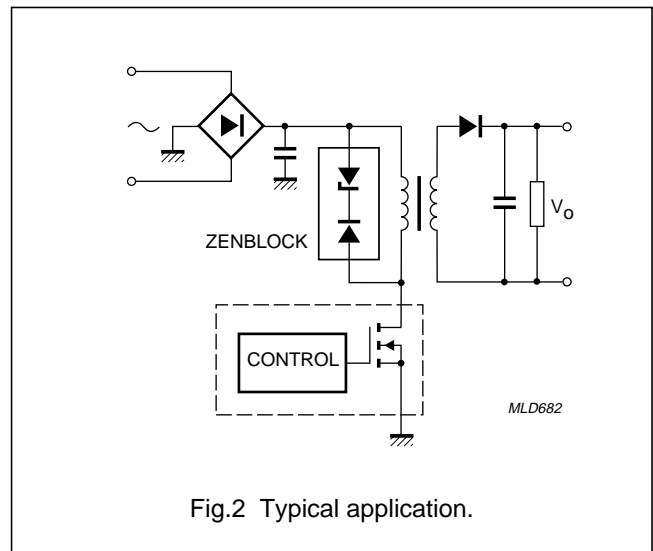


Fig.2 Typical application.

(1) STARPlug is a trademark of Philips.  
 (2) TOPSwitch is a trademark of Power Integrations.  
 (3) VIPer is a trademark of STMicroelectronics.

**LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
T <sub>stg</sub>	storage temperature		-65	+175	°C
T <sub>j</sub>	junction temperature		-65	+175	°C
<b>Zener</b>					
P <sub>tot</sub>	total power dissipation	T <sub>tp</sub> = 105 °C; see Fig.3	-	2.8	W
P <sub>ZSM</sub>	non-repetitive peak reverse power dissipation	t <sub>p</sub> = 100 μs; square pulse; T <sub>j</sub> = 25 °C prior to surge; see Figs 5 and 6	-	400	W
P <sub>RSM</sub>	non-repetitive peak reverse power dissipation	10/1 000 μs exponential pulse; T <sub>j</sub> = 25 °C prior to surge; see Fig.4	-	150	W
<b>Blocking diode</b>					
V <sub>R</sub>	continuous reverse voltage		-	600	V
E <sub>RSM</sub>	non-repetitive peak reverse avalanche energy	L = 120 mH; T <sub>j</sub> = T <sub>j(max)</sub> prior to surge; inductive load switched off	-	7.5	mJ

# SMA ZenBlock™; zener with integrated blocking diode

BZG142

## ELECTRICAL CHARACTERISTICS ZENER/TVS

$T_j = 25\text{ °C}$  unless otherwise specified.

TYPE NUMBER SUFFIX <sup>(1)</sup>	WORKING VOLTAGE			TEMPERATURE COEFFICIENT		TEST CURRENT	CLAMPING VOLTAGE		REVERSE CURRENT at STAND-OFF VOLTAGE	
	$V_Z$ (V) at $I_{test}$ (see Fig.7)			$S_Z$ (%/K) at $I_{test}$		$I_{test}$ (mA)	$V_{(CL)R}$ (V)	at $I_{RSM}$ (A) <sup>(2)</sup>	$I_R$ ( $\mu$ A) $T_j = 150\text{ °C}$	at $V_R$ (V)
	MIN.	NOM.	MAX.	MIN.	MAX.		MAX.		MAX.	
68	61	68	75	0.07	0.12	10	97	1.54	100	56
91	82	91	100	0.07	0.12	5	130	1.15	100	75
100	90	100	110	0.07	0.12	5	143	1.05	100	82
120	108	120	132	0.07	0.12	5	171	0.88	100	100
150	135	150	165	0.07	0.12	5	214	0.70	100	120
160	144	160	176	0.07	0.12	5	228	0.66	100	130
180	162	180	198	0.07	0.12	5	258	0.58	100	150
200	180	200	220	0.07	0.12	5	288	0.52	100	160

### Notes

- To complete the type number the suffix is added to the basic type number, e.g. BZG142-68.
- Non-repetitive peak reverse current in accordance with "IEC 60060-1, Section 8" (10/1000  $\mu$ s pulse); see Fig.4.

## ELECTRICAL CHARACTERISTICS BLOCKING DIODE

$T_j = 25\text{ °C}$  unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)R}$	reverse avalanche breakdown voltage	$I_R = 0.1\text{ mA}$	700	–	–	V
$C_{ZB}$	ZenBlock capacitance	$f = 1\text{ MHz}$ ; $V_R = 0$ ; see Fig.8	–	15	–	pF
$I_R$	reverse current	$V_R = 600\text{ V}$	–	–	5	$\mu$ A
		$V_R = 600\text{ V}$ ; $T_j = 150\text{ °C}$	–	–	100	$\mu$ A

## THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-tp}$	thermal resistance from junction to tie-point		25	K/W
$R_{th\ j-a}$	thermal resistance from junction to ambient	note 1	100	K/W
		note 2	150	K/W

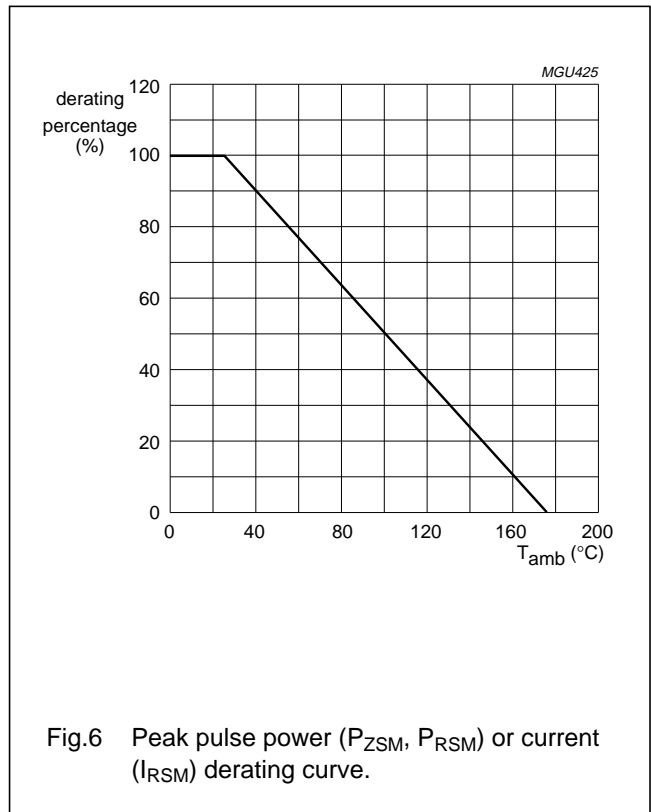
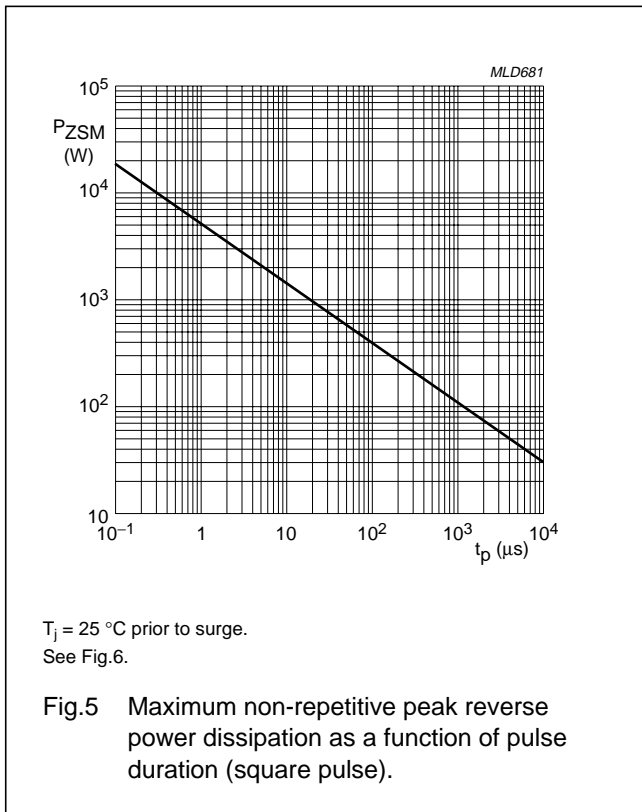
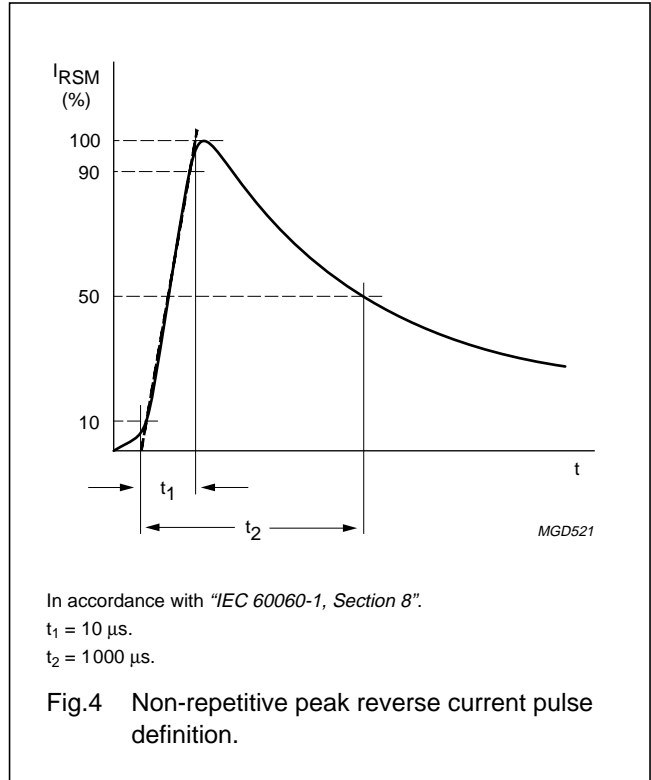
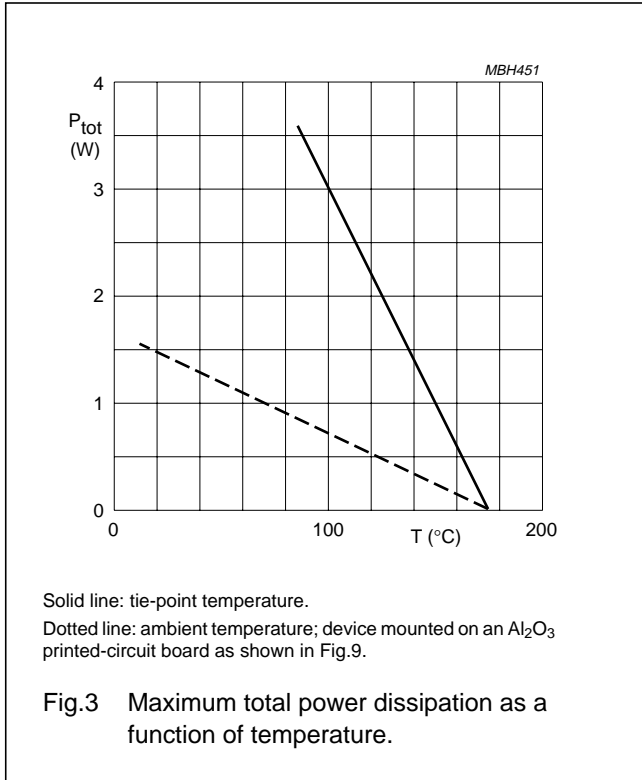
### Notes

- Device mounted on an  $Al_2O_3$  printed-circuit board, 0.7 mm thick; thickness of Cu-layer  $\geq 35\ \mu$ m, see Fig.9.
- Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer  $\geq 40\ \mu$ m, see Fig.9.  
For more information please refer to the "General Part of associated Handbook".

SMA ZenBlock™; zener  
with integrated blocking diode

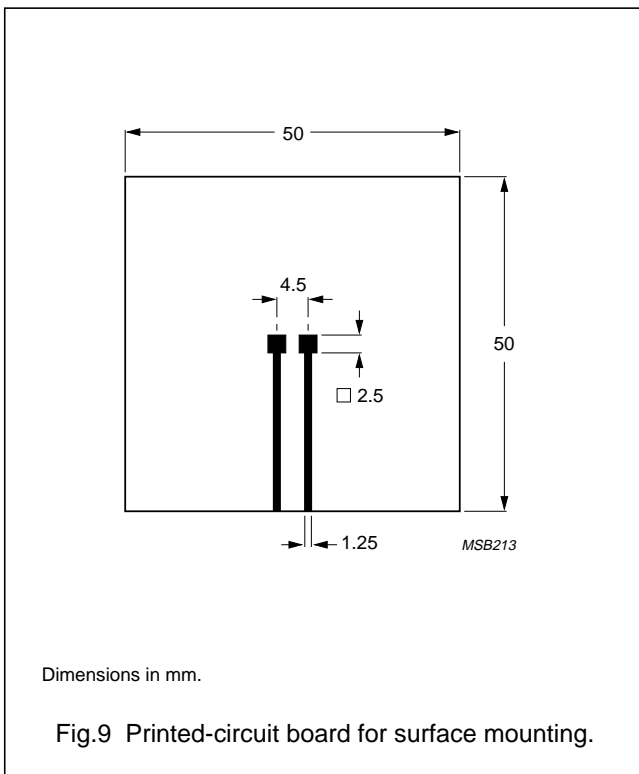
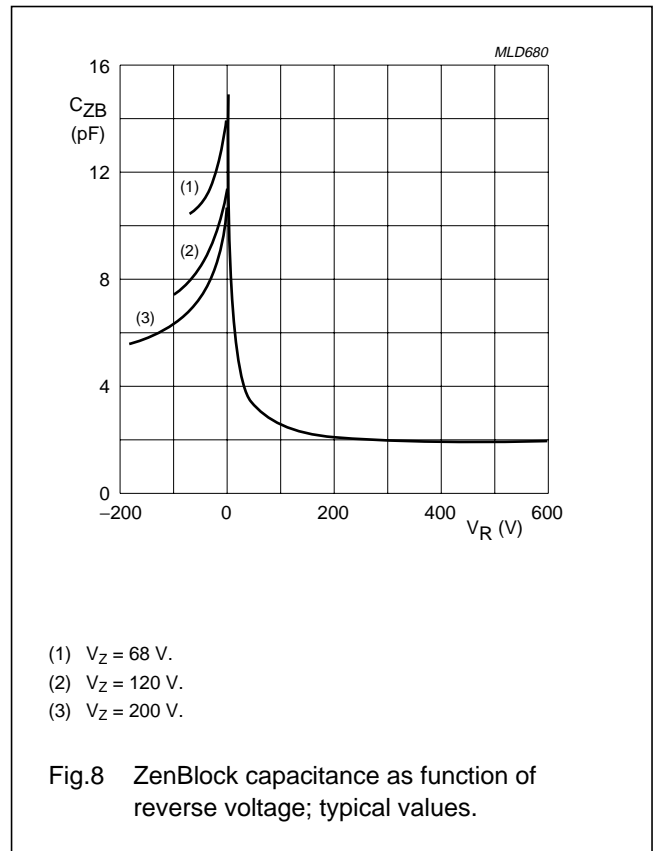
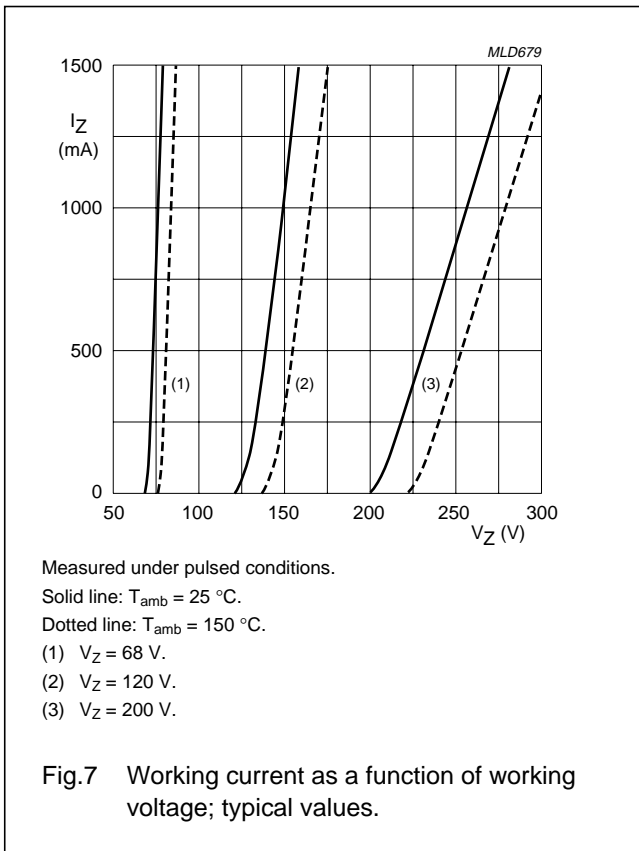
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GRAPHICAL DATA



SMA ZenBlock™; zener  
with integrated blocking diode

BZG142



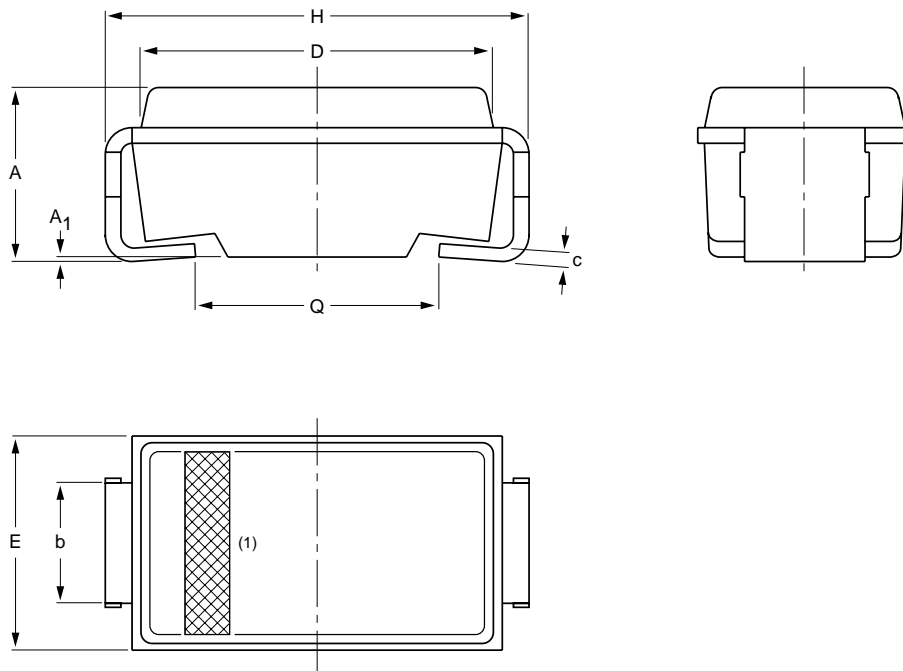
SMA ZenBlock™; zener  
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BZG142

PACKAGE OUTLINE

Transfer-moulded thermo-setting plastic small rectangular surface mounted package;  
2 connectors

SOD124



DIMENSIONS (mm are the original dimensions)

UNIT	A	A <sub>1</sub>	b	c	D	E	H	Q
mm	2.3 2.0	0.05	1.6 1.4	0.2	4.5 4.3	2.8 2.4	5.5 5.1	3.3 2.7

Note

1. The marking band indicates the cathode.

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ		
SOD124		DO-214AC			99-10-22

# SMA ZenBlock™; zener with integrated blocking diode

BZG142

## DATA SHEET STATUS

DATA SHEET STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)</sup>	DEFINITIONS
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.
Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
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