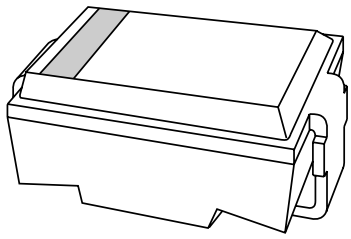
DATA SHEET



BZG142

SMA ZenBlock™; zener with integrated blocking diode

Product specification
Supersedes data of 2001 Apr 17

2001 Aug 20

Philips
Semiconductors

PHILIPS

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.

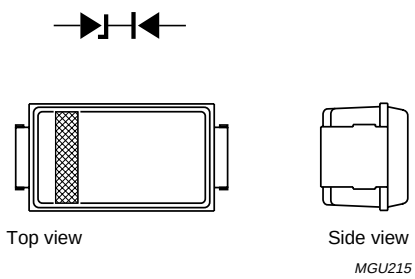


Fig.1 Simplified outline (DO-214AC) and symbol.

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.

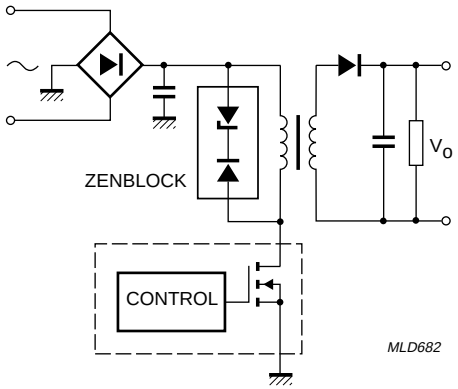


Fig.2 Typical application.

(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_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature		–65	+175	°C
Zener					
P_{tot}	total power dissipation	T_{tp} = 105 °C; see Fig.3	–	2.8	W
P_{ZSM}	non-repetitive peak reverse power dissipation	t_p = 100 µs; square pulse; T_j = 25 °C prior to surge; see Figs 5 and 6	–	400	W
P_{RSM}	non-repetitive peak reverse power dissipation	10/1000 µs exponential pulse; T_j = 25 °C prior to surge; see Fig.4	–	150	W
Blocking diode					
V_R	continuous reverse voltage		–	600	V
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j(max)}$ prior to surge; inductive load switched off	–	7.5	mJ

ELECTRICAL CHARACTERISTICS ZENER/TVS

T_j = 25 °C unless otherwise specified.

TYPE NUMBER SUFFIX(1)	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)(2)	I_R (μA) T_j = 150 °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

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

ELECTRICAL CHARACTERISTICS BLOCKING DIODE

T_j = 25 °C unless otherwise specified.

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

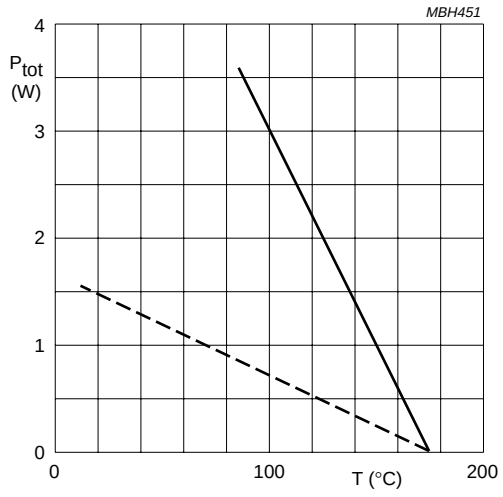
THERMAL CHARACTERISTICS

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

Notes

1. Device mounted on an Al_2O_3 printed-circuit board, 0.7 mm thick; thickness of Cu-layer ≥35 μm, see Fig.9.
2. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.9. For more information please refer to the *"General Part of associated Handbook"*.

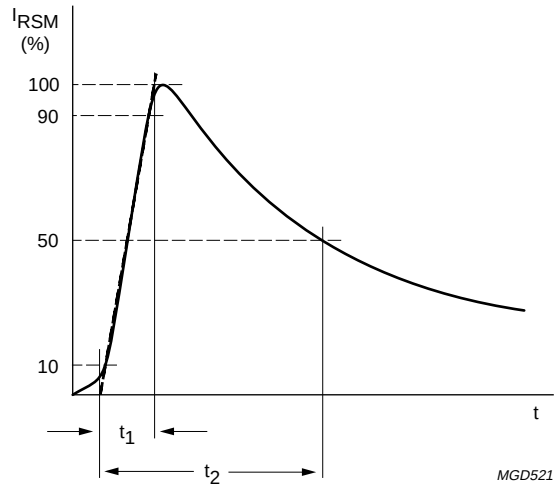
GRAPHICAL DATA



Solid line: tie-point temperature.

Dotted line: ambient temperature; device mounted on an Al_2O_3 printed-circuit board as shown in Fig.9.

Fig.3 Maximum total power dissipation as a function of temperature.

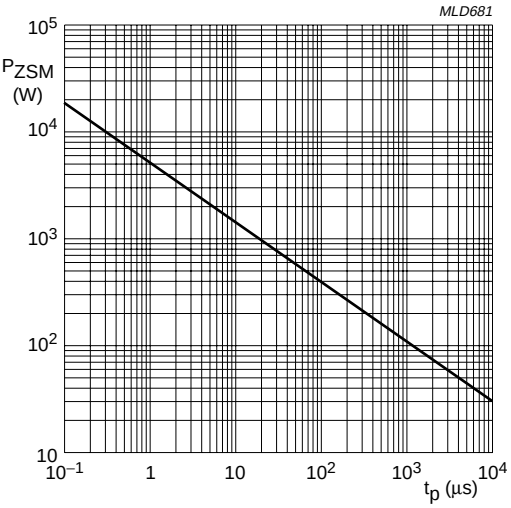


In accordance with *"IEC 60060-1, Section 8"*.

t_1 = 10 µs.

t_2 = 1000 µs.

Fig.4 Non-repetitive peak reverse current pulse definition.



T_j = 25 °C prior to surge.

See Fig.6.

Fig.5 Maximum non-repetitive peak reverse power dissipation as a function of pulse duration (square pulse).

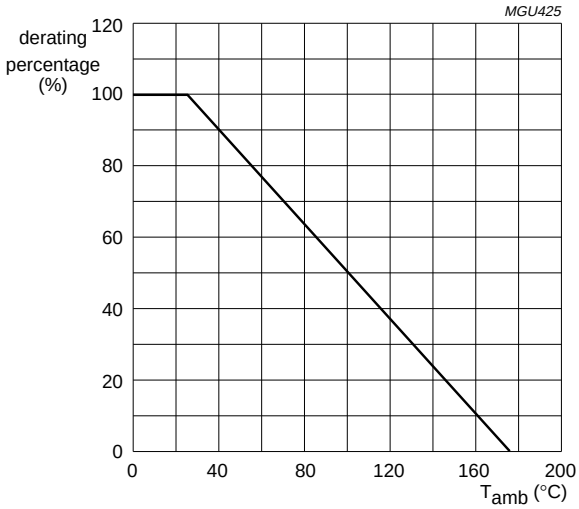
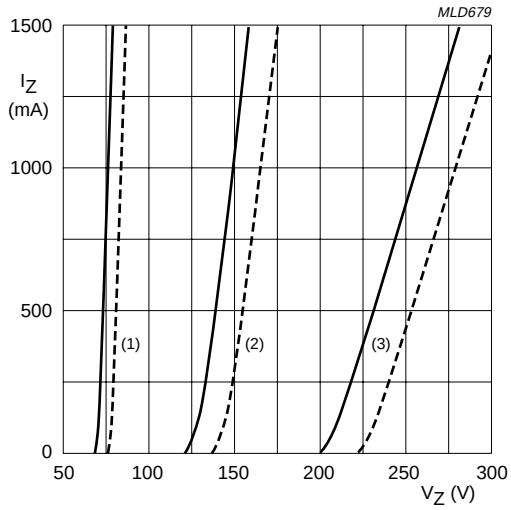
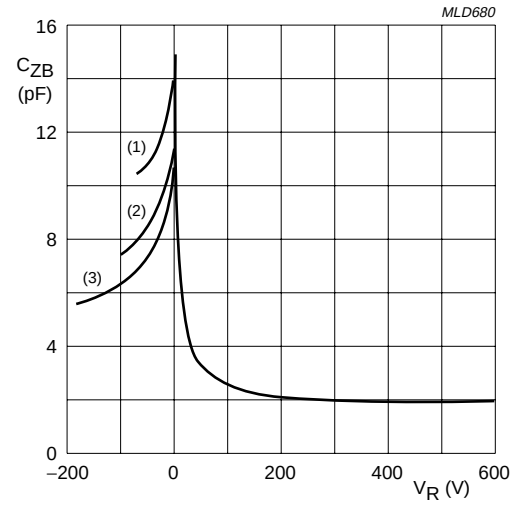


Fig.6 Peak pulse power (P_{ZSM}, P_{RSM}) or current (I_{RSM}) derating curve.



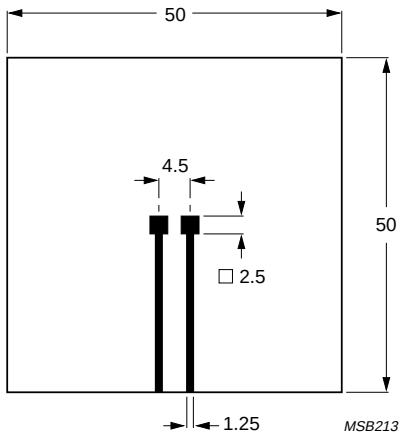
Measured under pulsed conditions.
Solid line: T_{amb} = 25 °C.
Dotted line: T_{amb} = 150 °C.
(1) V_Z = 68 V.
(2) V_Z = 120 V.
(3) V_Z = 200 V.

Fig.7 Working current as a function of working voltage; typical values.



(1) V_Z = 68 V.
(2) V_Z = 120 V.
(3) V_Z = 200 V.

Fig.8 ZenBlock capacitance as function of reverse voltage; typical values.

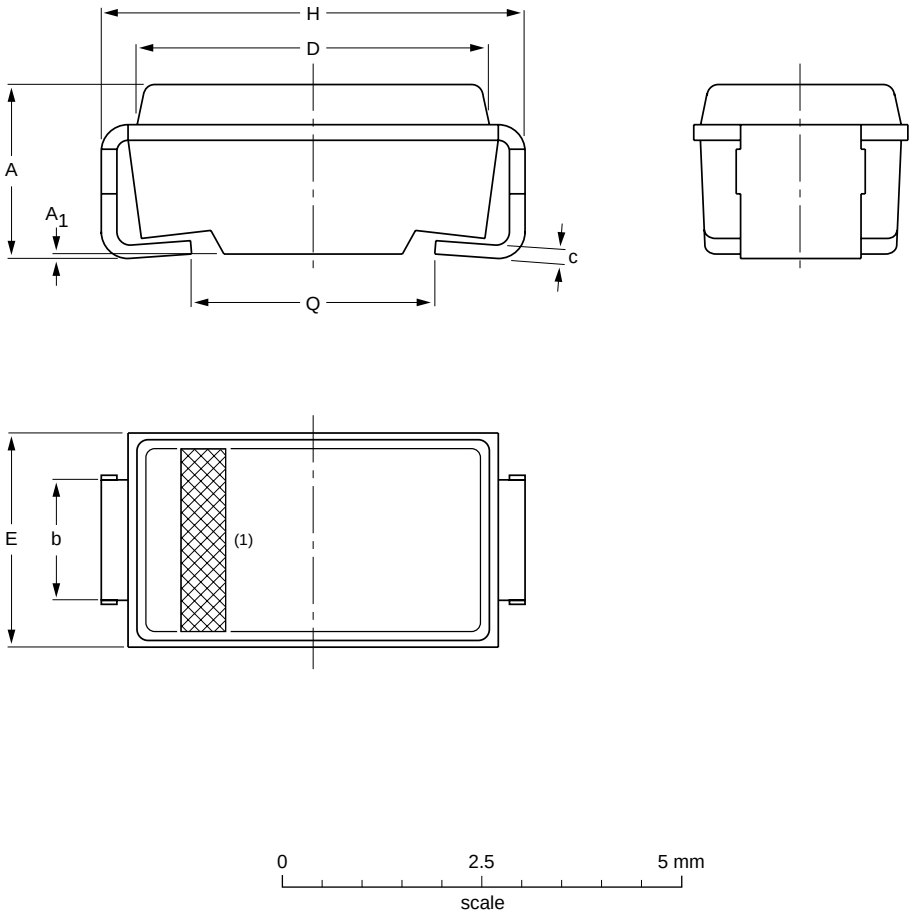


Dimensions in mm.

Fig.9 Printed-circuit board for surface mounting.

PACKAGE OUTLINE

Transfer-moulded thermo-setting plastic small rectangular surface mounted package; 2 connectors **SOD124**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	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

DATA SHEET STATUS

DATA SHEET STATUS(1)	PRODUCT STATUS(2)	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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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 613510/03/pp8 Date of release: 2001 Aug 20 Document order number: 9397 750 08468

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