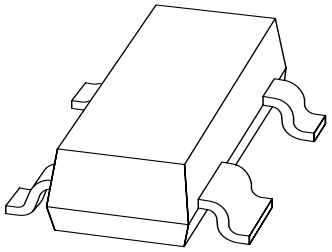
DATA SHEET



BRY62
Silicon controlled switch

Product specification
Supersedes data of 1997 Jul 21

1999 Apr 22

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Silicon controlled switch BRY62

DESCRIPTION

Silicon planar PNPN switch in a SOT143B plastic package. It is an integrated PNP/NPN transistor pair, with all electrodes accessible.

APPLICATIONS

- Switching applications.

MARKING

TYPE NUMBER	MARKING CODE
BRY62	A51

PINNING

PIN	DESCRIPTION
1	anode gate
2	anode
3	cathode
4	cathode gate

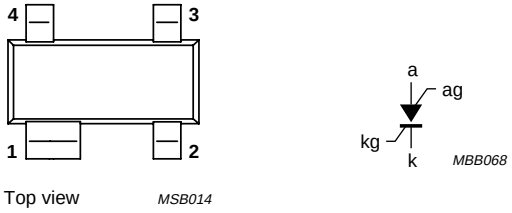


Fig.1 Simplified outline (SOT143B) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
NPN transistor					
V_{CBO}	collector-base voltage	open emitter	–	70	V
V_{CER}	collector-emitter voltage	R_{BE} = 10 kΩ	–	70	V
V_{EBO}	emitter-base voltage	open collector	–	5	V
I_C	collector current (DC)	note 1	–	175	mA
I_{CM}	peak collector current	note 2	–	175	mA
I_E	emitter current (DC)		–	–175	mA
I_{ERM}	repetitive peak emitter current	t_p = 10 μs; δ = 0.01	–	–2.5	A
PNP transistor					
V_{CBO}	collector-base voltage	open emitter	–	–70	V
V_{CEO}	collector-emitter voltage	open base	–	–70	V
V_{EBO}	emitter-base voltage	open collector	–	–70	V
I_E	emitter current (DC)		–	175	mA
I_{ERM}	repetitive peak emitter current	t_p = 10 μs; δ = 0.01	–	2.5	A

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Combined device					
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	–	250	mW
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C
T_{amb}	operating ambient temperature	see Fig.14	–65	+150	°C

Notes

1. Provided the I_E rating is not exceeded.
2. During switching on, the device can withstand the discharge of a capacitor of a maximum value of 500 pF. This capacitor is charged when the transistor is in cut-off condition, with a collector supply voltage of 160 V and a series resistance of 100 kΩ.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	in free air	500	K/W

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
NPN transistor					
I_{CER}	collector cut-off current	V_{CE} = 70 V; R_{BE} = 10 kΩ	–	100	nA
		V_{CE} = 70 V; R_{BE} = 10 kΩ; T_j = 150 °C	–	10	µA
I_{EBO}	emitter cut-off current	I_C = 0; V_{EB} = 5 V; T_j = 150 °C	–	10	µA
V_{CEsat}	collector-emitter saturation voltage	I_C = 10 mA; I_B = 1 mA	–	500	mV
V_{BEsat}	base-emitter saturation voltage	I_C = 10 mA; I_B = 1 mA	–	900	mV
h_{FE}	DC current gain	I_C = 10 mA; V_{CE} = 2 V	50	–	
f_T	transition frequency	I_C = 10 mA; V_{CE} = 2 V; f = 100 MHz	100	–	MHz
C_c	collector capacitance	$I_E = i_e$ = 0; V_{CB} = 20 V; f = 1 MHz	–	5	pF
C_e	emitter capacitance	$I_C = i_c$ = 0; V_{EB} = 1 V; f = 1 MHz	–	25	pF
PNP transistor					
I_{CEO}	collector cut-off current	I_B = 0; V_{CE} = –70 V; T_j = 150 °C	–	–10	µA
I_{EBO}	emitter cut-off current	I_C = 0; V_{EB} = –70 V; T_j = 150 °C	–	–10	µA
h_{FE}	DC current gain	I_E = 1 mA; V_{CB} = –5 V	3	15	
Combined device					
V_{AK}	forward on-state voltage	$R_{KG\text{-}K}$ = 10 kΩ			
		I_A = 50 mA; I_{AG} = 0	–	1.4	V
		I_A = 50 mA; I_{AG} = 0; T_j = – 55 °C	–	1.9	V
		I_A = 1 mA; I_{AG} = 10 mA	–	1.2	V
I_H	holding current	$R_{KG\text{-}K}$ = 10 kΩ; I_{AG} = 10 mA; V_{BB} = –2 V; (see Fig.5)	–	1	mA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Switching times					
t_{on}	turn-on time	V_{KG-K} = –0.5 to 4.5 V; R_{KG-K} = 1 kΩ; see Figs 6 and 7	–	0.25	µs
		V_{KG-K} = –0.5 to 0.5 V; R_{KG-K} = 10 kΩ	–	1.5	µs
t_{off}	turn-off time	R_{KG-K} = 10 kΩ; see Figs 8 and 9	–	15	µs

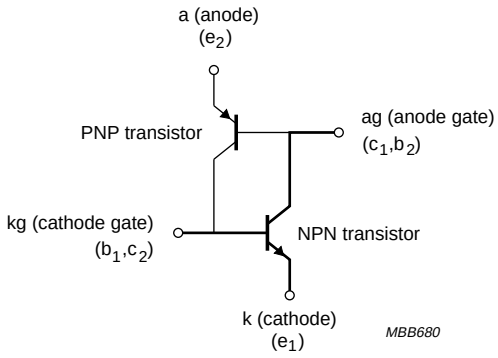


Fig.2 Two transistor equivalent circuit.

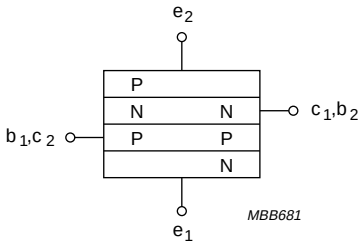


Fig.3 PNPN silicon controlled switch structure.

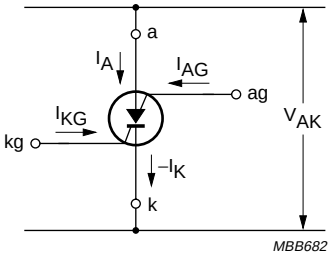


Fig.4 Silicon controlled switch symbol.

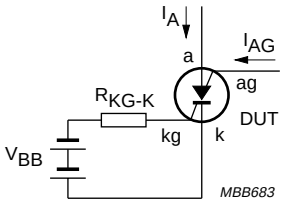


Fig.5 Equivalent test circuit for holding current.

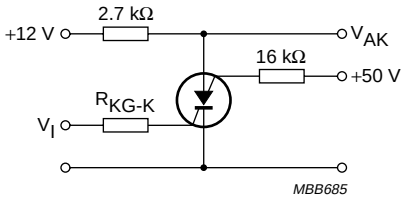


Fig.6 Test circuit for turn-on time.

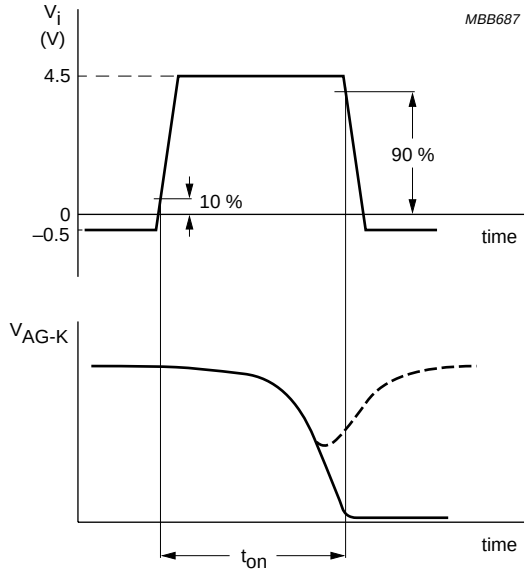


Fig.7 Pulse duration increased until dashed curve disappears.

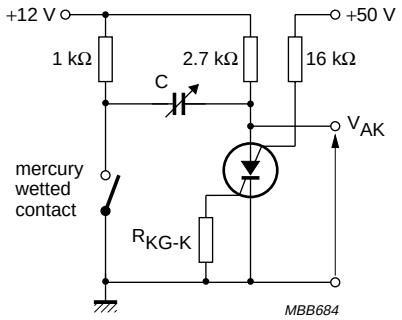


Fig.8 Test circuit for turn-off time.

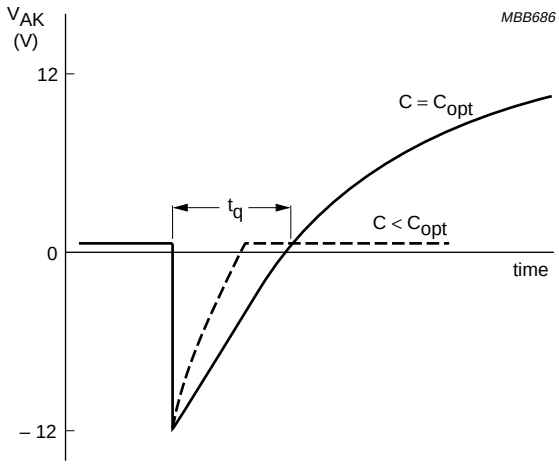
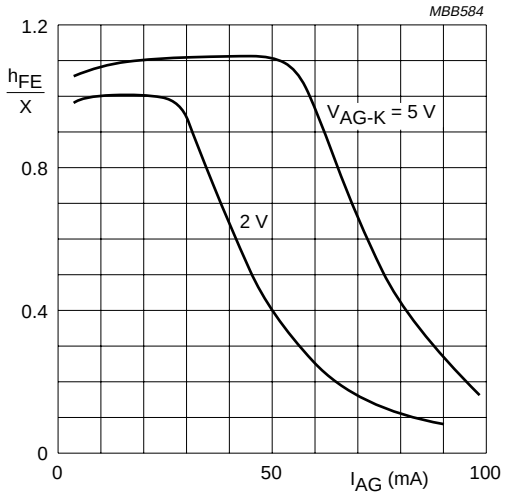
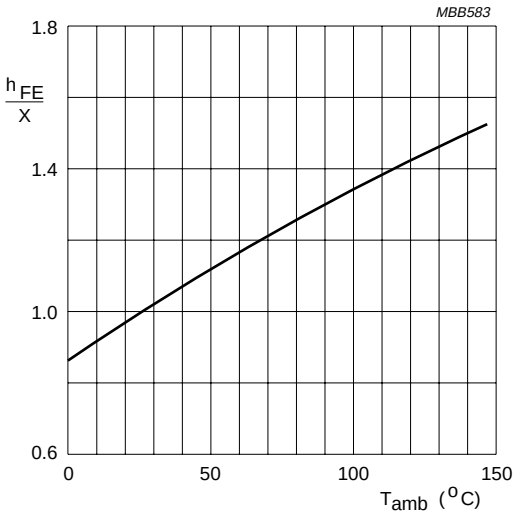


Fig.9 Capacitance increased until C = C_{opt} dashed curve disappears.



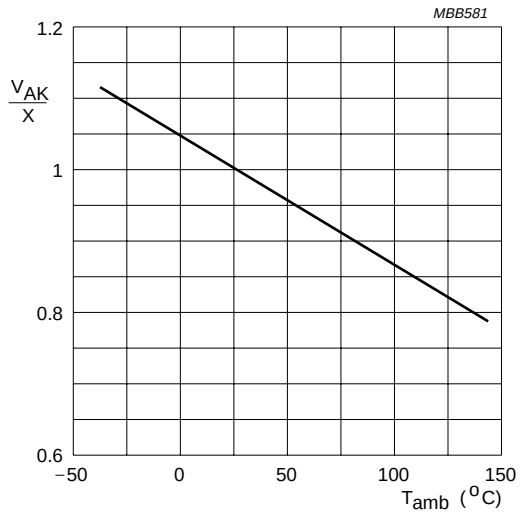
X is the value of h_{FE} at I_C = 10 mA; V_{AG-K} = 2 V; T_{amb} = 25 °C.

Fig.10 Normalized DC current gain as a function of anode gate current.



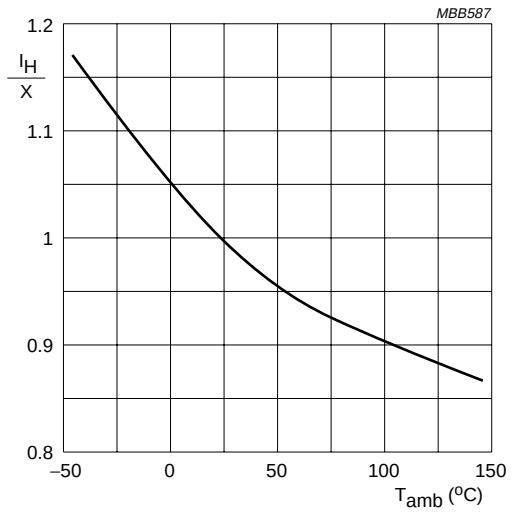
X is the value of h_{FE} at I_{AG} = 10 mA; V_{AG-K} = 2 V; T_{amb} = 25 °C.

Fig.11 Normalized DC current gain as a function of ambient temperature.



X is the value of V_{AK} at I_C = 10 mA; I_{AG} = 10 mA; I_A = 1 mA; V_{BB} = −2 V; R_{KG-K} = 10 kΩ; T_{amb} = 25 °C.

Fig.12 Normalized anode-cathode voltage as a function of ambient temperature.



X is the value of I_H at I_C = 10 mA; I_{AG} = 10 mA; V_{BB} = −2 V; R_{kg-K} = 10 kΩ; T_{amb} = 25 °C.

Fig.13 Normalized holding current as a function of ambient temperature.

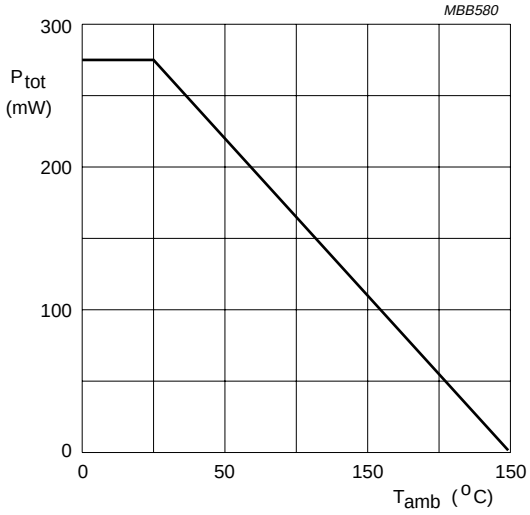
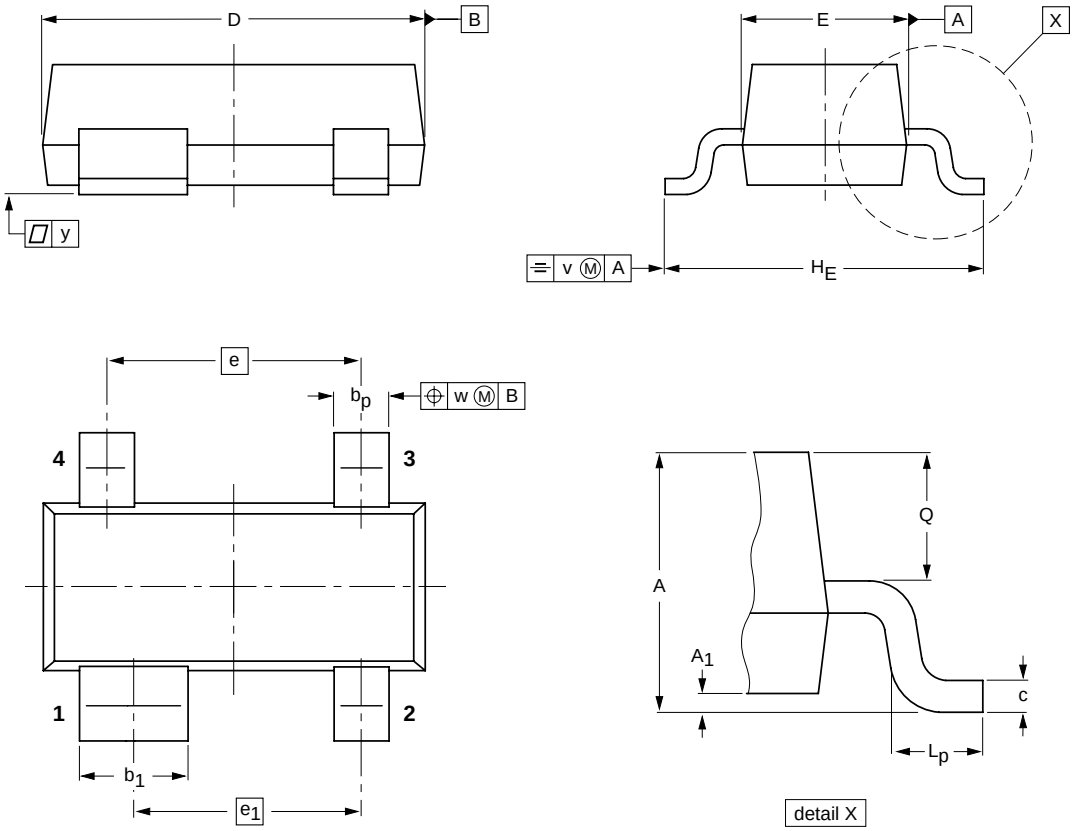


Fig.14 Power derating curve.

PACKAGE OUTLINE

Plastic surface mounted package; 4 leads **SOT143B**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max	b_p	b_1	c	D	E	e	e_1	H_E	L_p	Q	v	w	y
mm	1.1 0.9	0.1	0.48 0.38	0.88 0.78	0.15 0.09	3.0 2.8	1.4 1.2	1.9	1.7	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT143B						97-02-28

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.	

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