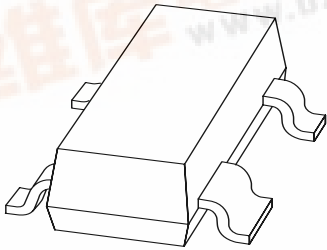


DISCRETE SEMICONDUCTORS

DATA SHEET



BRY62

Silicon controlled switch

Product specification

Supersedes data of 1997 Jul 21

1999 Apr 22

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

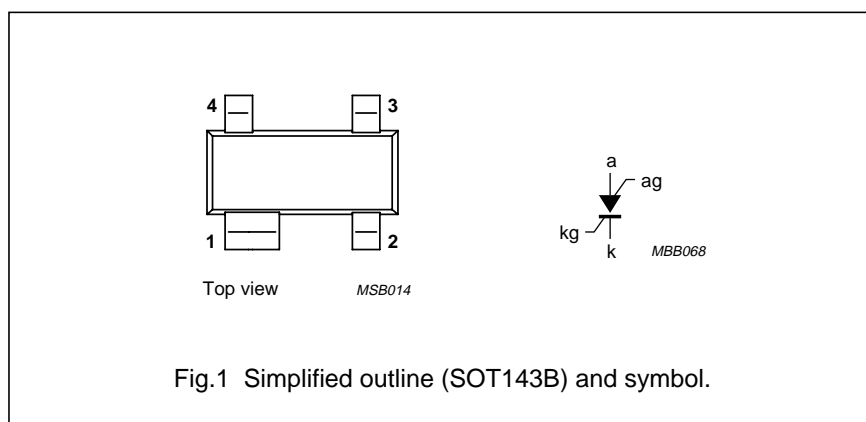
- Switching applications.

MARKING

TYPE NUMBER	MARKING CODE
BRY62	A51

PINNING

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



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	$R_{BE} = 10\text{ k}\Omega$	–	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	$t_p = 10\ \mu\text{s}; \delta = 0.01$	–	–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	$t_p = 10\ \mu\text{s}; \delta = 0.01$	–	2.5	A

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SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Combined device					
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$	–	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 k Ω .

THERMAL CHARACTERISTICS

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

CHARACTERISTICS

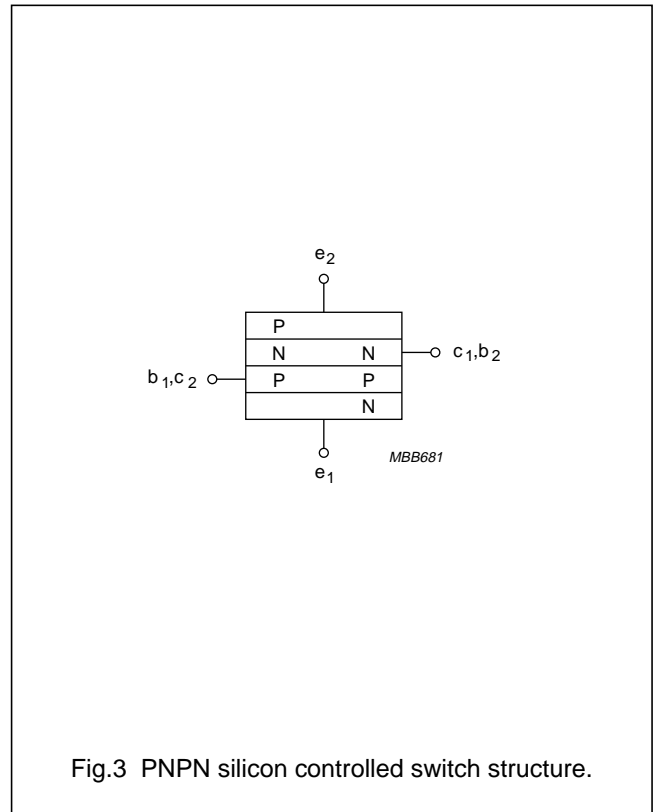
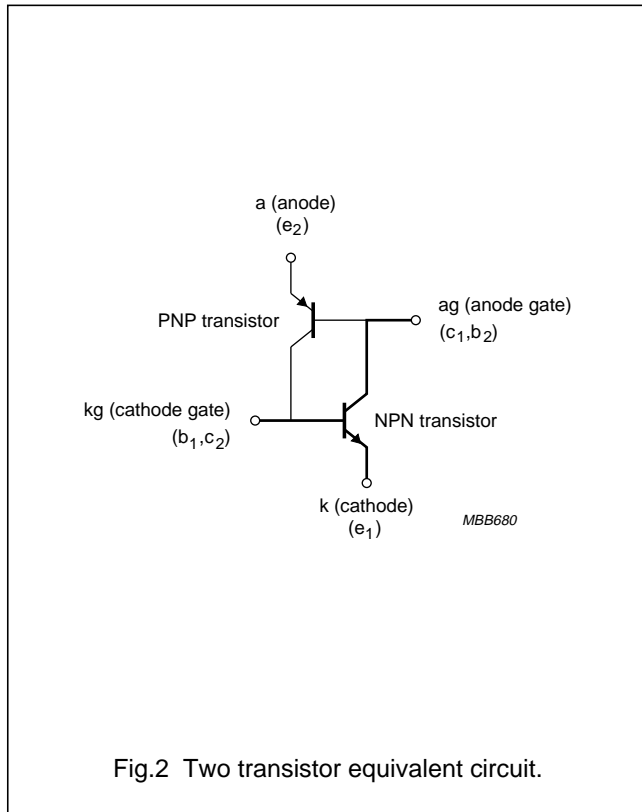
$T_{amb} = 25\text{ °C}$ unless otherwise specified.

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

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



Silicon controlled switch

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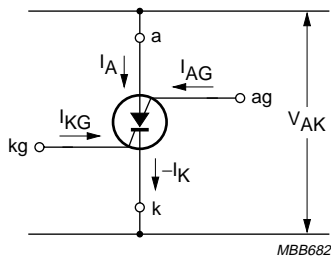


Fig.4 Silicon controlled switch symbol.

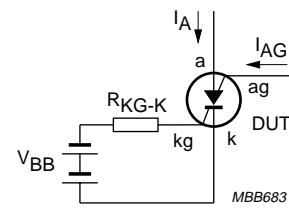


Fig.5 Equivalent test circuit for holding current.

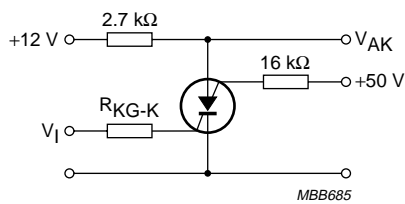


Fig.6 Test circuit for turn-on time.

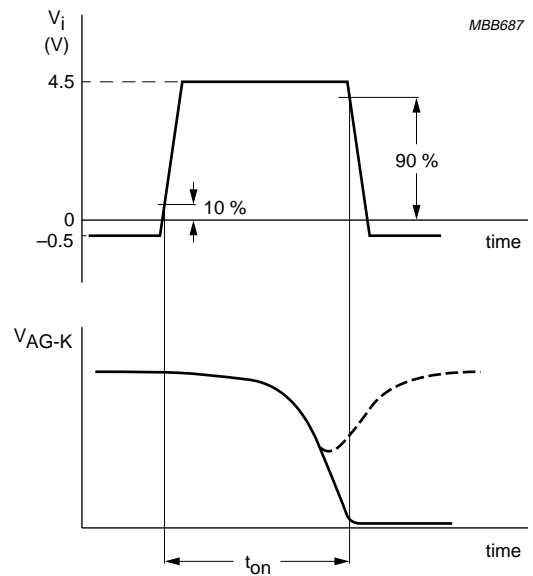


Fig.7 Pulse duration increased until dashed curve disappears.

Silicon controlled switch

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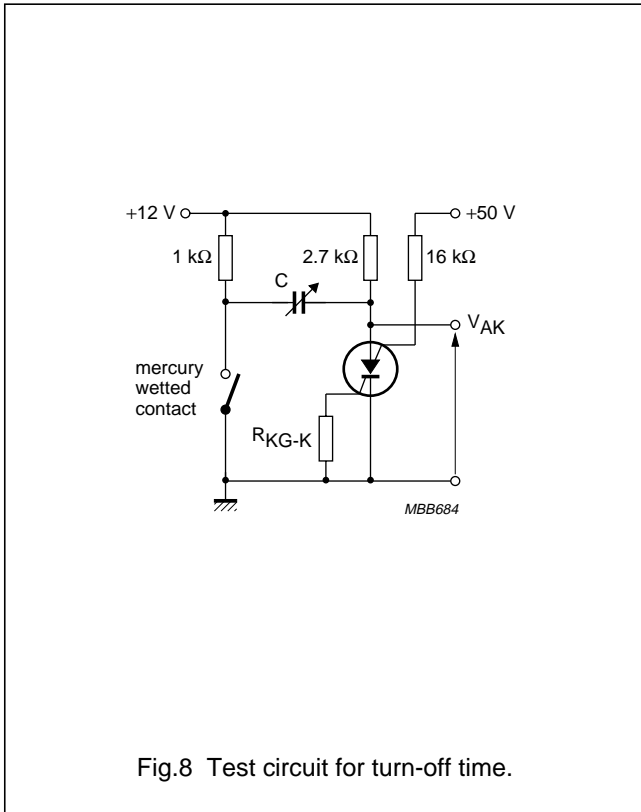


Fig.8 Test circuit for turn-off time.

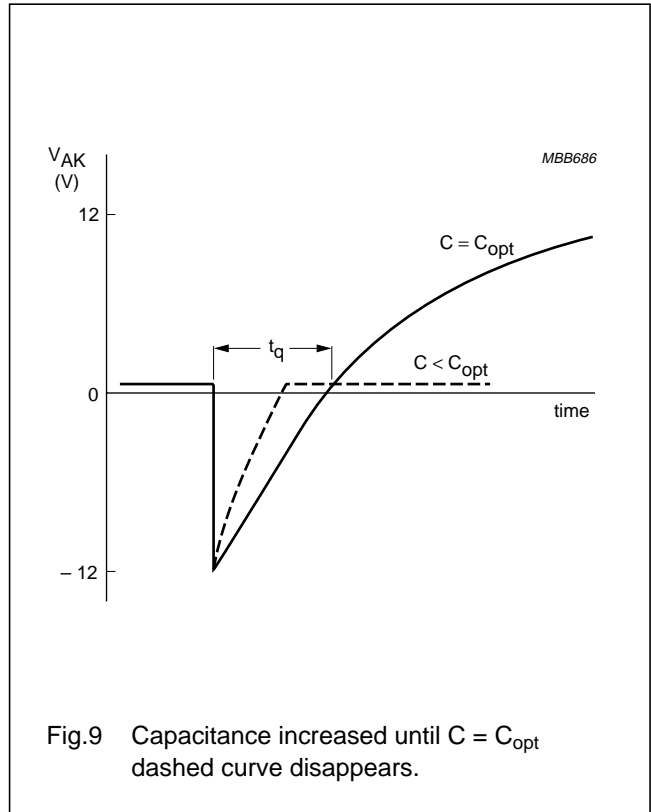
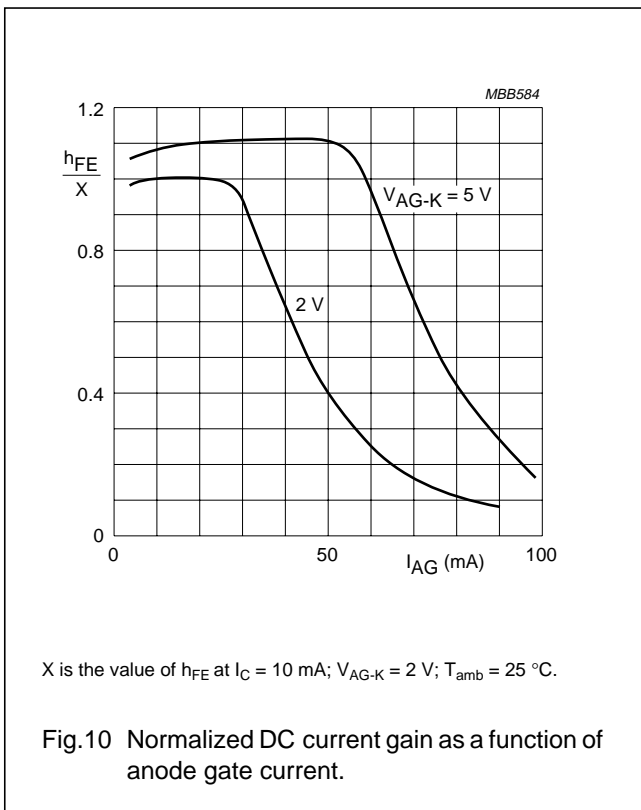
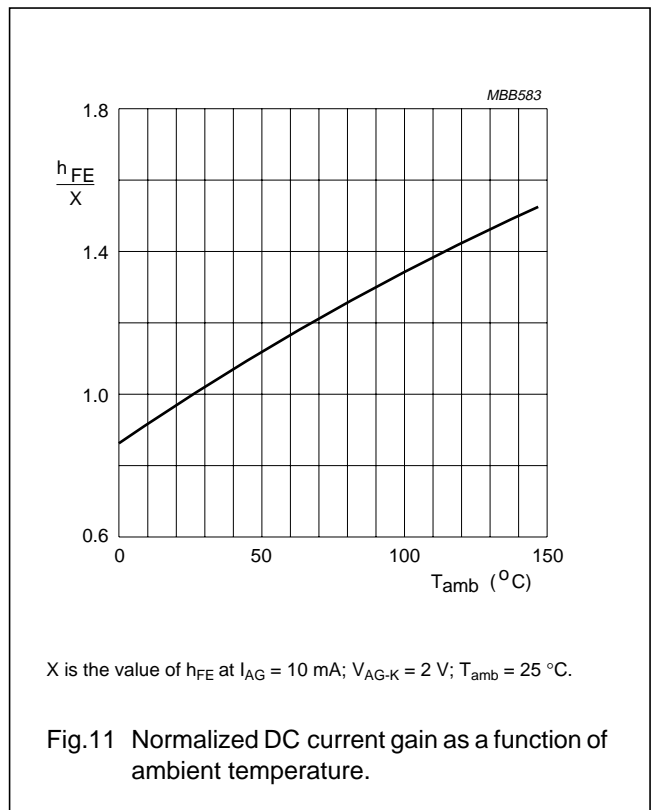


Fig.9 Capacitance increased until $C = C_{opt}$ dashed curve disappears.



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.

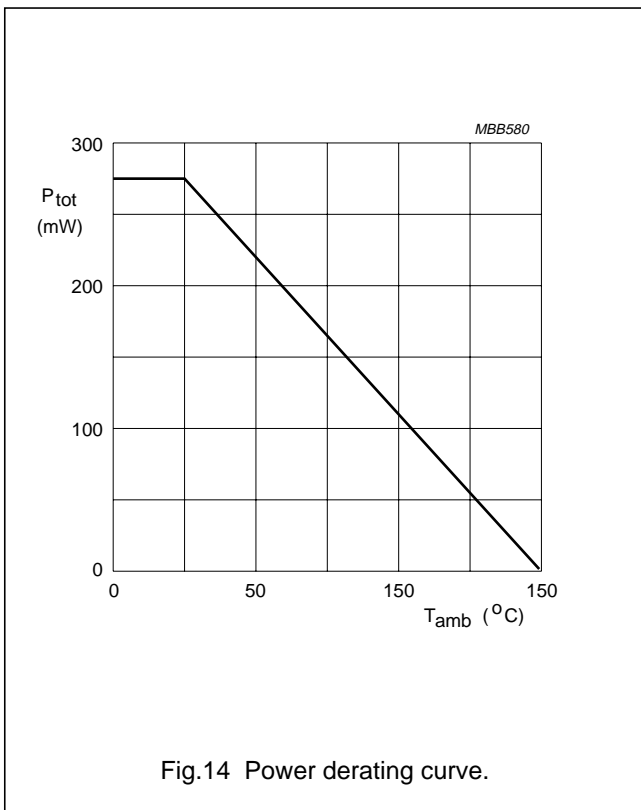
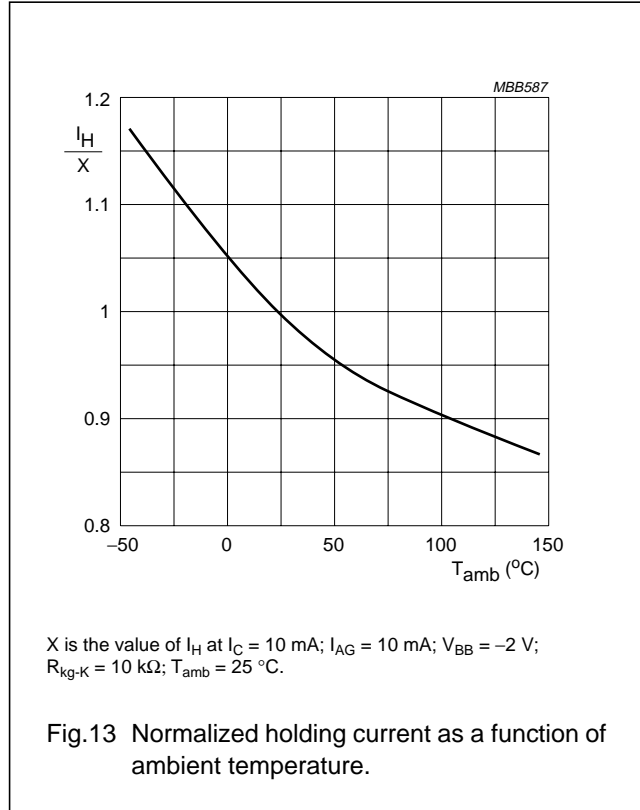
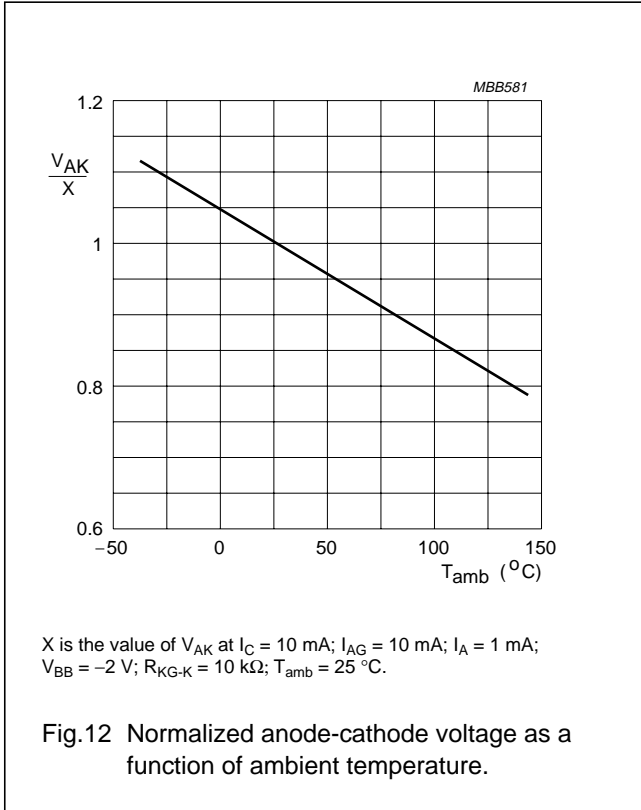


X is the value of h_{FE} at $I_{AG} = 10$ mA; $V_{AG-K} = 2$ V; $T_{amb} = 25$ °C.

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

Silicon controlled switch

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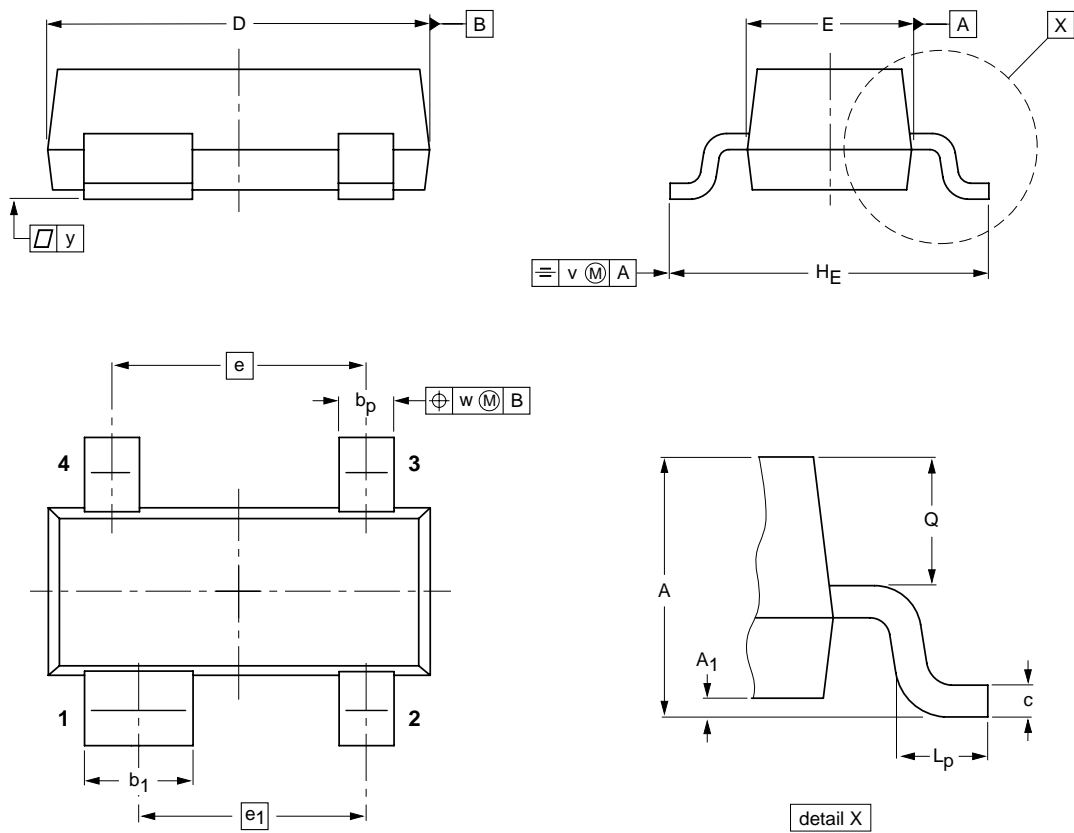
Silicon controlled switch

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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

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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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NOTES

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Printed in The Netherlands

115002/00/03/pp12

Date of release: 1999 Apr 22

Document order number: 9397 750 0572Z

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