

High-speed double diode

BAS56

FEATURES

- Small plastic SMD package
- High switching speed: max. 6 ns
- Continuous reverse voltage: max. 60 V
- Repetitive peak reverse voltage: max. 60 V
- Repetitive peak forward current: max. 600 mA.

APPLICATIONS

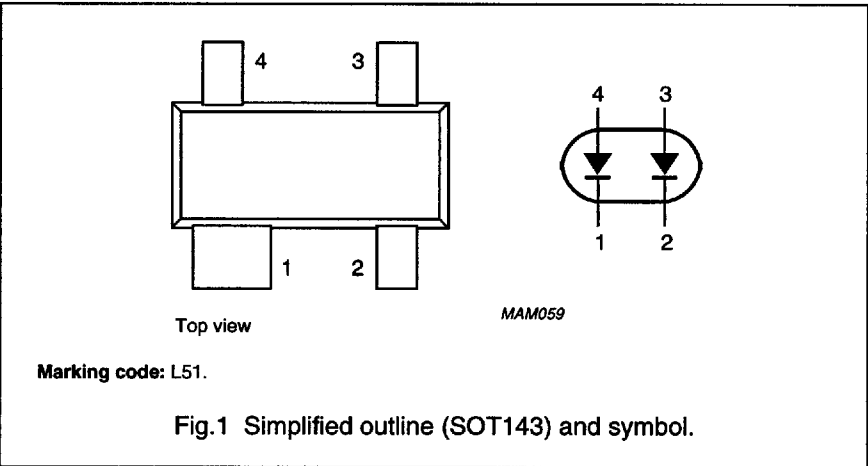
- High speed switching in e.g. surface mounted circuits.

DESCRIPTION

The BAS56 consists of two high-speed switching diodes fabricated in planar technology, and encapsulated in the small rectangular plastic SMD SOT143 package. The diodes are not connected.

PINNING

PIN	DESCRIPTION
1	cathode (k1)
2	cathode (k2)
3	anode (a2)
4	anode (a1)



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**LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{RRM}$	repetitive peak reverse voltage		–	60	V
$V_{RRM}$	repetitive peak reverse voltage	series connection		120	V
$V_R$	continuous reverse voltage		–	60	V
$V_R$	continuous reverse voltage	series connection	–	120	V
$I_F$	continuous forward current	single diode loaded; see Fig.2; note 1	–	200	mA
		double diode loaded; see Fig.2; note 1	–	150	mA
$I_{FRM}$	repetitive peak forward current	single diode loaded	–	600	mA
		double diode loaded	–	430	mA
$I_{FSM}$	non-repetitive peak forward current	square wave; $T_j = 25\text{ °C}$ prior to surge; see Fig.4			
		$t = 1\text{ }\mu\text{s}$	–	9	A
		$t = 100\text{ }\mu\text{s}$	–	3	A
		$t = 10\text{ ms}$	–	1.7	A
$P_{tot}$	total power dissipation	$T_{amb} = 25\text{ °C}$ ; note 1	–	250	mW
$T_{stg}$	storage temperature		–65	+150	°C
$T_j$	junction temperature		–	150	°C

**Note**

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

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**ELECTRICAL CHARACTERISTICS** $T_j = 25\text{ }^{\circ}\text{C}$ ; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_F$	forward voltage	see Fig.3; $I_F = 200\text{ mA}$ ; DC value; note 1	—	1.0	V
$I_R$	reverse current	see Fig.5 $V_R = 60\text{ V}$ $V_R = 60\text{ V}$ ; $T_j = 150\text{ }^{\circ}\text{C}$	— —	100 100	nA $\mu\text{A}$
$I_R$	reverse current	series connection $V_R = 120\text{ V}$ $V_R = 120\text{ V}$ ; $T_j = 150\text{ }^{\circ}\text{C}$	— — —	100 100	nA $\mu\text{A}$
$C_d$	diode capacitance	$f = 1\text{ MHz}$ ; $V_R = 0$ ; see Fig.6	—	2.5	pF
$t_{rr}$	reverse recovery time	when switched from $I_F = 400\text{ mA}$ to $I_R = 400\text{ mA}$ ; $R_L = 100\text{ }\Omega$ ; measured at $I_R = 40\text{ mA}$ ; see Fig.7	—	6	ns
$V_{fr}$	forward recovery voltage	when switched from $I_F = 400\text{ mA}$ ; $t_r = 30\text{ ns}$ ; see Fig.8	—	2.0	V
		when switched from $I_F = 400\text{ mA}$ ; $t_r = 100\text{ ns}$ ; see Fig.8	—	1.5	V

**Note**

- $T_{amb} = 25\text{ }^{\circ}\text{C}$ ; device has reached the thermal equilibrium when mounted on an FR4 printed-circuit board.

**THERMAL CHARACTERISTICS**

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-tp}$	thermal resistance from junction to tie-point		360	K/W
$R_{th\ j-a}$	thermal resistance from junction to ambient	note 1	500	K/W

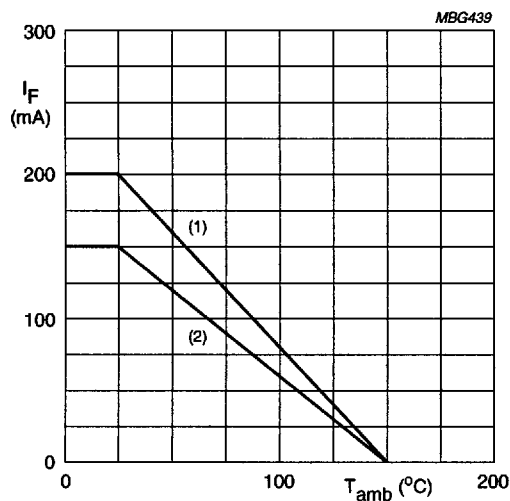
**Note**

- Device mounted on an FR4 printed-circuit board.

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## GRAPHICAL DATA



Device mounted on a FR4 printed-circuit board.

(1) Single diode loaded.

(2) Double diode loaded.

Fig.2 Maximum permissible continuous forward current as a function of ambient temperature.

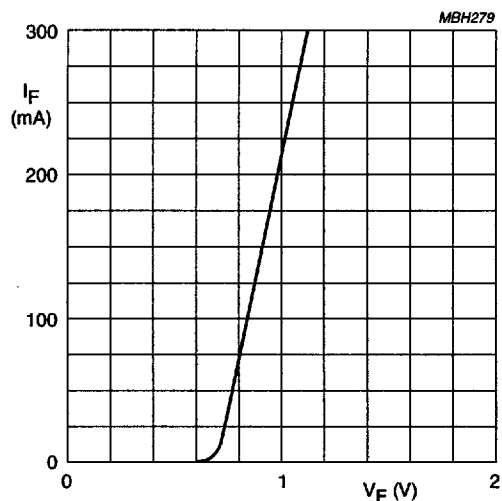
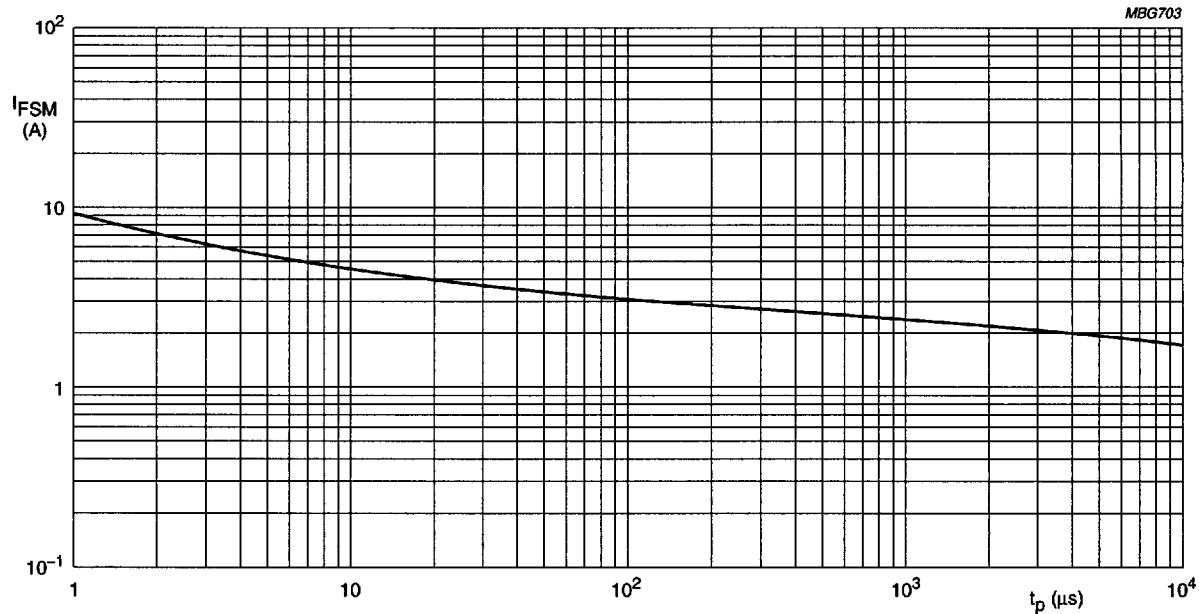
 $T_j = 25^\circ\text{C}$ .

Fig.3 Forward current as a function of forward voltage; typical values.



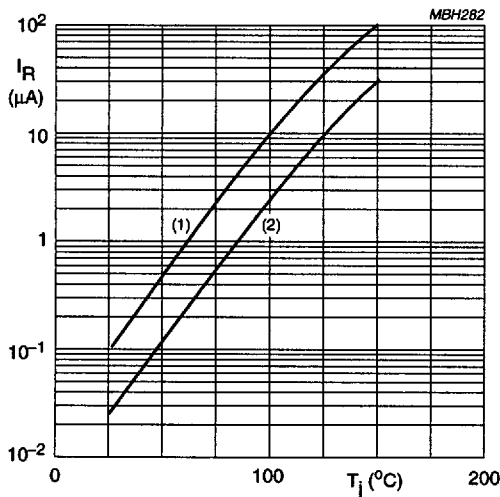
Based on square wave currents.

 $T_j = 25^\circ\text{C}$  prior to surge.

Fig.4 Maximum permissible non-repetitive peak forward current as a function of pulse duration.

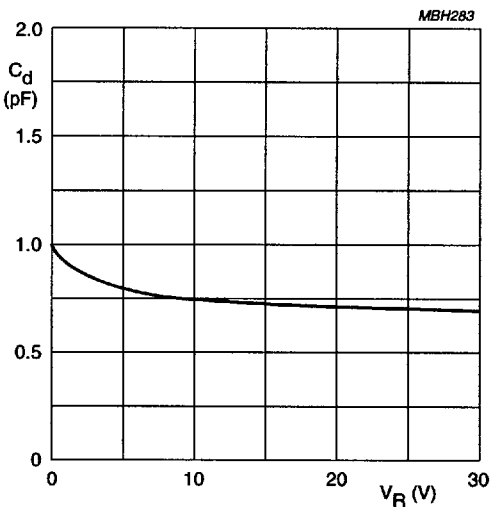
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(1)  $V_R = 60\text{ V}$ ; maximum values.  
(2)  $V_R = 60\text{ V}$ ; typical values.

Fig.5 Reverse current as a function of junction temperature.



$f = 1\text{ MHz}$ ;  $T_j = 25\text{ }^{\circ}C$ .

Fig.6 Diode capacitance as a function of reverse voltage; typical values.

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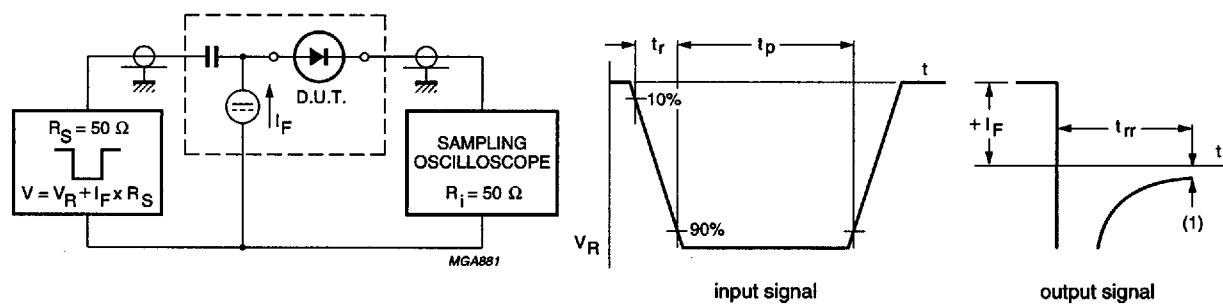
(1)  $I_R = 40\ \text{mA}$ .

Fig.7 Reverse recovery voltage test circuit and waveforms.

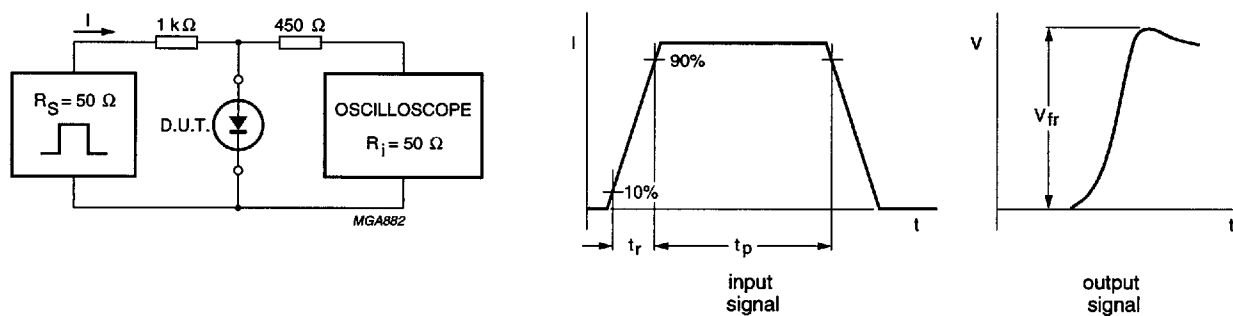
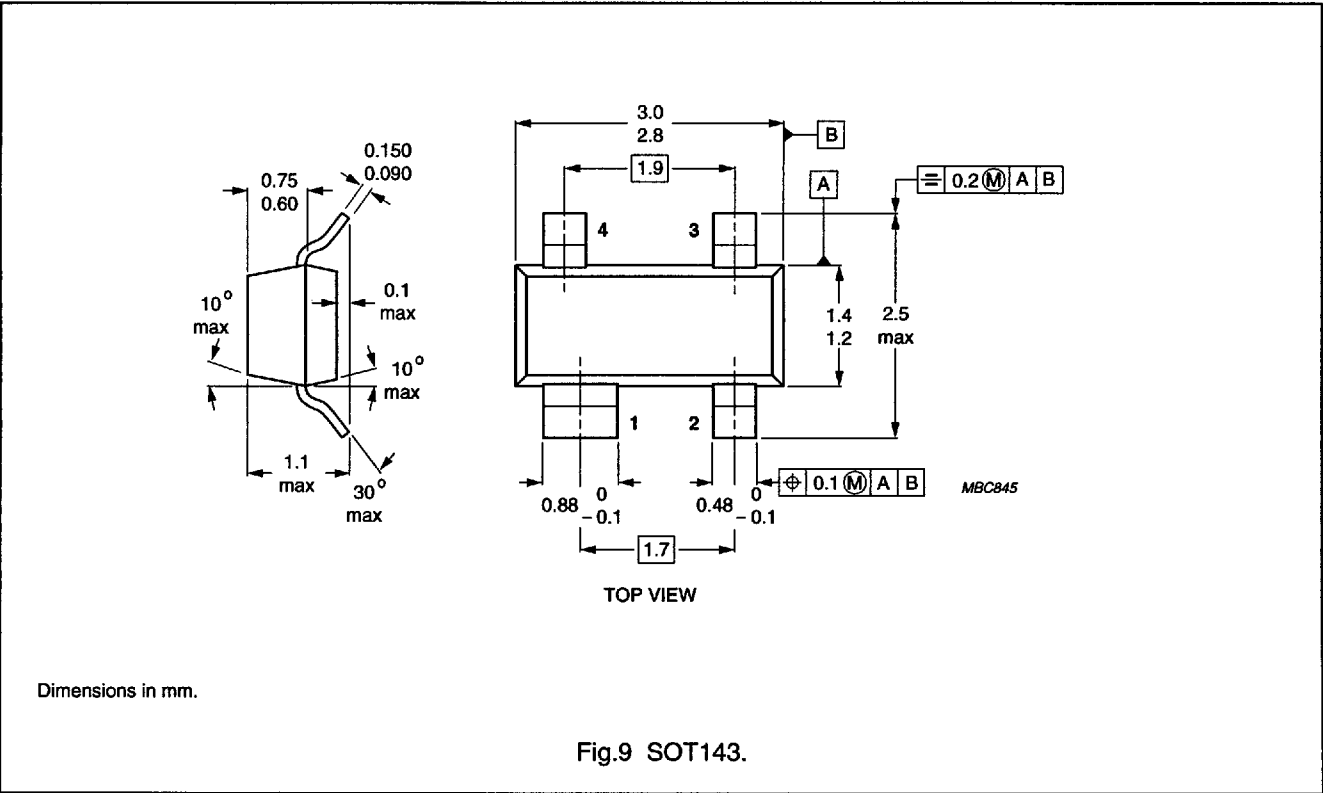
**Input signal:** forward pulse duration  $t_p = 300\ \text{ns}$ ; duty factor  $\delta = 0.01$ .

Fig.8 Forward recovery voltage test circuit and waveforms.

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PACKAGE OUTLINE



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.	

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.