

High-speed diode

FEATURES

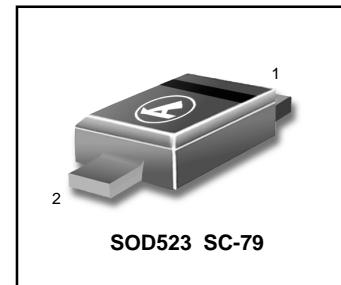
- Ultra small plastic SMD package
- High switching speed: max. 4 ns
- Continuous reverse voltage: max. 75 V
- Repetitive peak reverse voltage: max. 85 V
- Repetitive peak forward current: max. 500 mA

APPLICATIONS

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

DESCRIPTION

The BAS516 is a high-speed switching diode fabricated in planar technology, and encapsulated in the SOD523 (SC79) SMD plastic package.

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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		—	85	V
V_R	continuous reverse voltage		—	75	V
I_F	continuous forward current	$T_s = 90^\circ\text{C}$; note 1; see Fig.1	—	250	mA
I_{FRM}	repetitive peak forward current		—	500	mA
I_{FSM}	non-repetitive peak forward current	square wave; $T_j = 25^\circ\text{C}$ prior to surge; see Fig.3			
		$t = 1\mu\text{s}$	—	4	A
		$t = 1\text{ ms}$	—	1	A
		$t = 1\text{ s}$	—	0.5	A
P_{tot}	total power dissipation	$T_s = 90^\circ\text{C}$; note 1	—	500	mW
T_{stg}	storage temperature		-65	+150	°C
T_j	junction temperature		—	150	°C

Note

1. T_s is the temperature at the soldering point of the cathode tab.

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

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	$I_F = 1\text{ mA}$	715	mV
		$I_F = 10\text{ mA}$	855	mV
		$I_F = 50\text{ mA}$	1	V
		$I_F = 150\text{ mA}$	1.25	V
I_R	reverse current	$V_R = 25\text{ V}$	30	nA
		$V_R = 75\text{ V}$	1	μA
		$V_R = 25\text{ V}; T_j = 150^\circ\text{C}$	30	μA
		$V_R = 75\text{ V}; T_j = 150^\circ\text{C};$	50	μA
C_d	diode capacitance	$f = 1\text{ MHz}; V_R = 0$; see Fig.5	1	pF
t_{rr}	reverse recovery time	when switched from $I_F = 10\text{ mA}$ to $I_R = 10\text{ mA}$; $R_L = 100\Omega$; measured at $I_R = 1\text{ mA}$; see Fig.6	4	ns
V_{fr}	forward recovery voltage	when switched from $I_F = 10\text{ mA}$; $t_R = 20\text{ ns}$; see Fig.7	1.75	V

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th,j-s}$	thermal resistance from junction to soldering point	note 1	120	K/W

- Note** 1. Soldering point of the cathode tab.

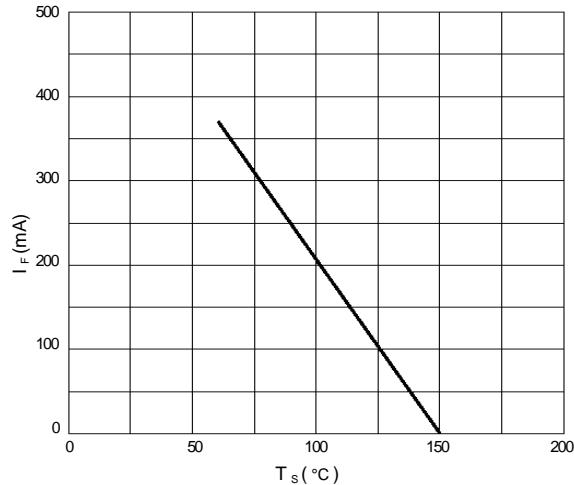
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Fig.1 Maximum permissible continuous forward current as a function of soldering point temperature.

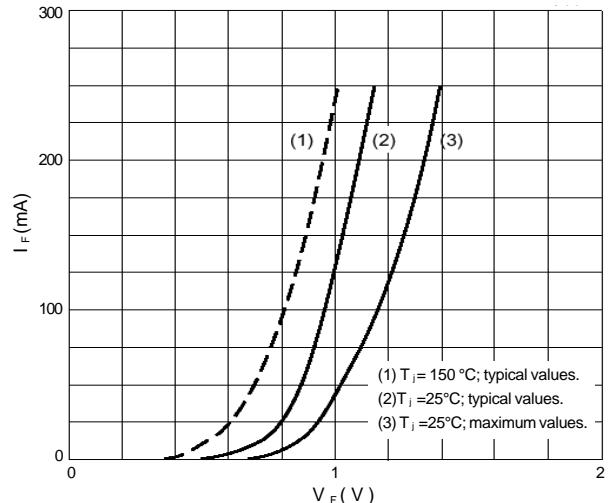


Fig.2 Forward current as a function of forward voltage.

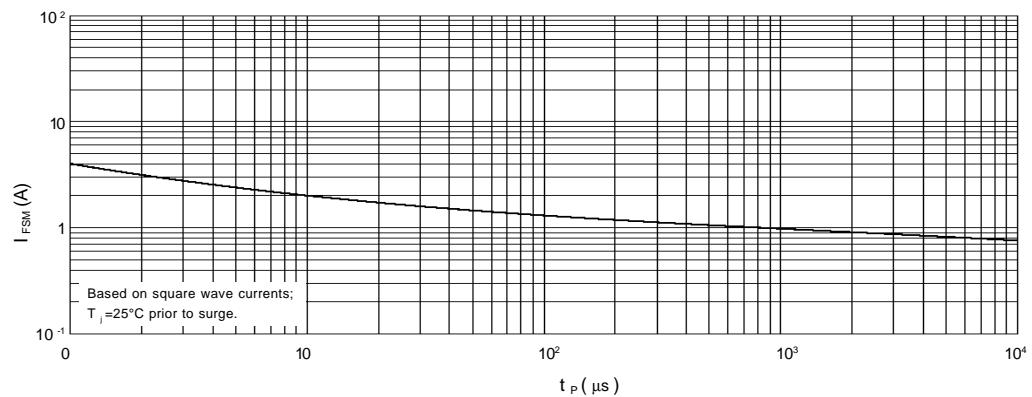


Fig.3 Maximum permissible non-repetitive peak forward current as a function of pulse duration.

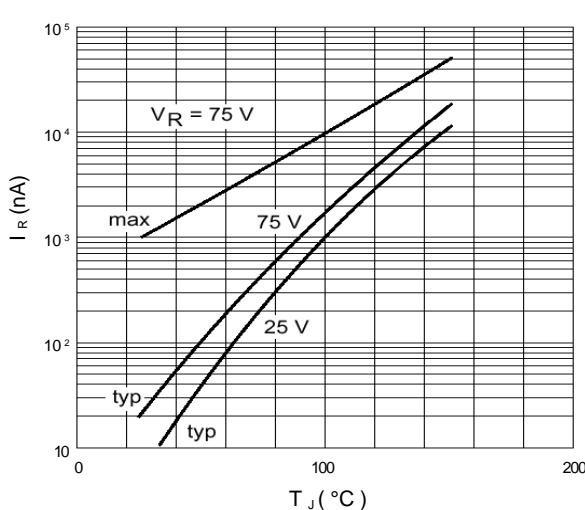


Fig.4 Reverse current as a function of junction temperature.

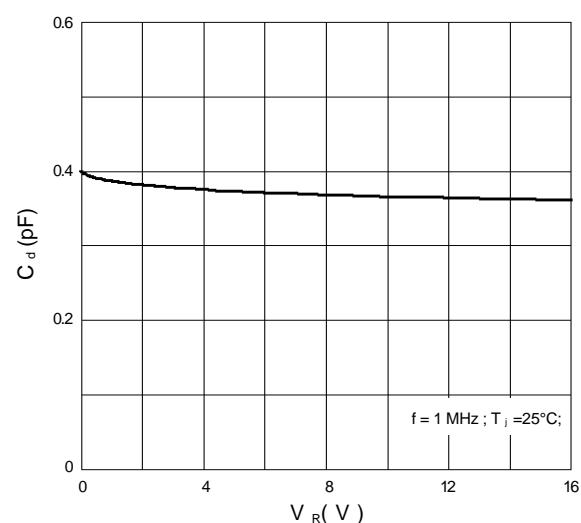
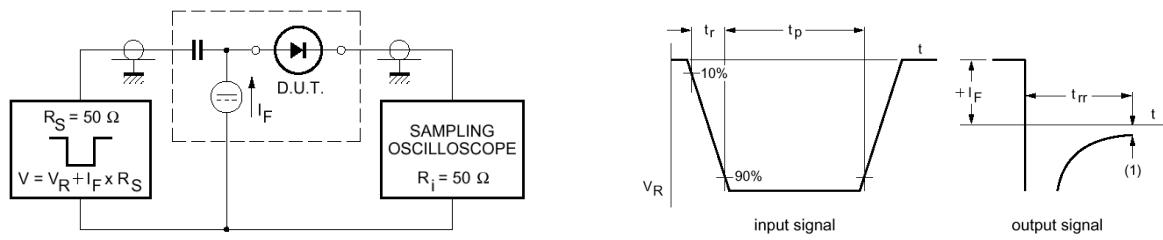


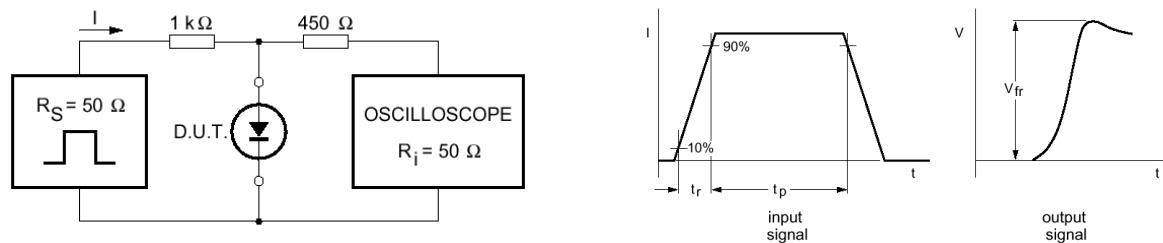
Fig.5 Diode capacitance as a function of reverse voltage; typical values.

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

Input signal: reverse pulse rise time $t_r = 0.6 \text{ ns}$; reverse voltage pulse duration $t_p = 100 \text{ ns}$; duty factor $\delta = 0.05$;
Oscilloscope: rise time $t_r = 0.35 \text{ ns}$.

Fig.6 Reverse recovery voltage test circuit and waveforms.



Input signal: forward pulse rise time $t_r = 20 \text{ ns}$; forward current pulse duration $t_p \geq 100 \text{ ns}$; duty factor $\delta \leq 0.005$.

Fig.7 Forward recovery voltage test circuit and waveforms.