

BAS21PG

Dual isolated high-voltage switching diode

9 June 2015

Product data sheet

1. General description

Dual high-voltage switching diode encapsulated in a very small SOT353 (SC-88A) Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- High switching speed: t_{rr} ≤ 50 ns
- Low leakage current
- Reverse voltage V_R ≤ 250 V
- Low capacitance: C_d ≤ 2 pF
- Very small SMD plastic package
- AEC-Q101 qualified

3. Applications

- High-speed switching at high voltage
- High-voltage general-purpose switching
- Voltage clamping
- Reverse polarity protection

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
Per diode							
I _F	forward current	T _j = 25 °C; single diode loaded		-	-	225	mA
V_{R}	reverse voltage	T _j = 25 °C		-	-	250	V
Per diode			1				
I _R	reverse current	V _R = 200 V; T _j = 25 °C		-	25	100	nA
t _{rr}	reverse recovery time	I_F = 10 mA; I_R = 10 mA; $I_{R(meas)}$ = 1 mA; I_{L} = 100 Ω; I_{L} = 25 °C		-	-	50	ns



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5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode diode 1	<u></u>	5 4
2	n.c.	not connected		
3	A2	anode diode 2		本 本
4	K2	cathode diode 2	∐1 ∐2 ∐3 	
5	K1	cathode diode 1	TSSOP5 (SOT353)	[1] [2] [3] aaa-018440

6. Ordering information

Table 3. Ordering information

Type number	Package					
	Name	Description	Version			
BAS21PG	TSSOP5	plastic surface-mounted package; 5 leads	SOT353			

7. Marking

Table 4. Marking codes

Type number	Marking code
BAS21PG	PG

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8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
Per diode					'	
V_R	reverse voltage	T _j = 25 °C		-	250	V
l _F	forward current	T _j = 25 °C; single diode loaded		-	225	mA
		T _j = 25 °C; double diode loaded		-	125	mA
I _{FRM}	repetitive peak forward current	t _p ≤ 1 ms; δ = 25 %; T _j = 25 °C		-	625	mA
I _{FSM}	non-repetitive peak forward current	t_p = 1 μ s; $T_{j(init)}$ = 25 °C; square wave		-	9	Α
		t_p = 100 μ s; $T_{j(init)}$ = 25 °C; square wave		-	3	Α
		t_p = 10 ms; $T_{j(init)}$ = 25 °C; square wave		-	1.7	Α
Per device;	one diode loaded					
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	255	mW
			[2]	-	290	mW
Tj	junction temperature			-	150	°C
T _{amb}	ambient temperature			-55	150	°C
T _{stg}	storage temperature			-65	150	°C

^[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm².

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9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
R _{th(j-a)}	thermal resistance		[1]	-	-	495	K/W
	from junction to ambient		[2]	-	-	430	K/W
R _{th(j-sp)}	thermal resistance from junction to solder point		[3]	-	-	95	K/W

- [1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
- [2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm².
- [3] Soldering point of cathode tab.

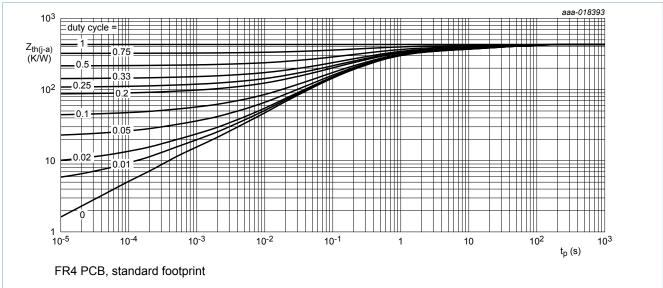
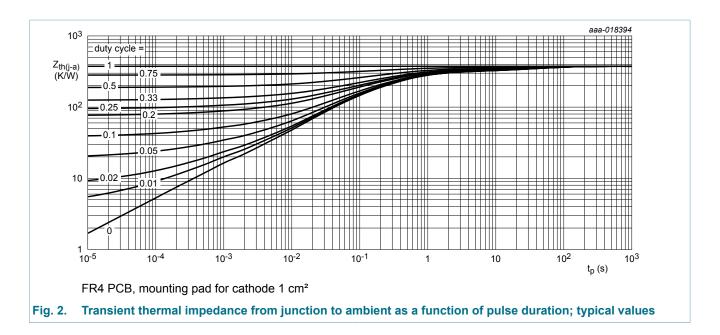


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

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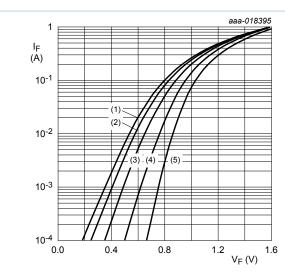


10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Тур	Max	Unit	
Per diode								
$V_{(BR)R}$	reverse breakdown voltage	I _R = 100 μA; T _j = 25 °C		250	-	-	V	
V _F	forward voltage	I _F = 100 mA; T _j = 25 °C		-	-	1	V	
		I _F = 200 mA; T _j = 25 °C		-	-	1.25	V	
I _R	reverse current	V _R = 200 V; T _j = 25 °C		-	25	100	nA	
		V _R = 200 V; T _j = 150 °C		-	40	-	μA	
C _d	diode capacitance	$V_R = 0 \text{ V; } f = 1 \text{ MHz; } T_j = 25 ^{\circ}\text{C}$		-	0.8	2	pF	
t _{rr}	reverse recovery time	I_F = 10 mA; I_R = 10 mA; $I_{R(meas)}$ = 1 mA; I_{L} = 100 Ω; I_{L} = 25 °C		-	-	50	ns	

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(1)
$$T_i = 150 \, ^{\circ}C$$

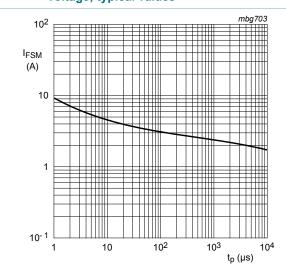
(2)
$$T_i = 125 \, ^{\circ}C$$

(3)
$$T_i = 85 \, ^{\circ}C$$

(4)
$$T_i = 25 \, ^{\circ}C$$

(5)
$$T_i = -40 \, ^{\circ}\text{C}$$

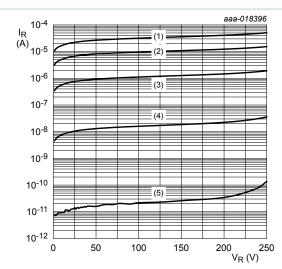
Fig. 3. Forward current as a function of forward voltage; typical values



Based on square wave currents.

$$T_{j(init)}$$
 = 25 °C

Fig. 5. Non-repetitive peak forward current as a function of pulse duration; maximum values



(1)
$$T_i = 150 \, ^{\circ}\text{C}$$

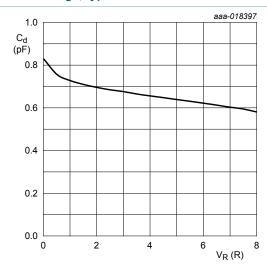
(2)
$$T_j = 125 \, ^{\circ}C$$

(3)
$$T_i = 85 \, ^{\circ}C$$

(4)
$$T_i = 25$$
 °C

(5)
$$T_i = -40 \, ^{\circ}C$$

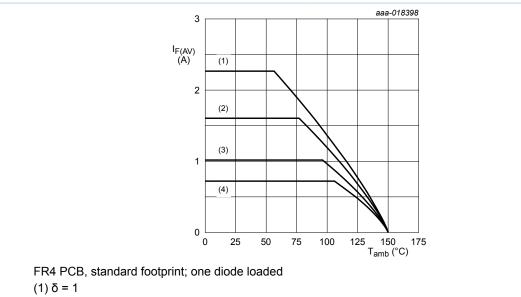
Fig. 4. Reverse current as a function of reverse voltage; typical values



 $f = 1MHz; T_{amb} = 25 °C$

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

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- $(2) \delta = 0.5$
- $(3) \delta = 0.2$
- $(4) \delta = 0.1$

Fig. 7. Average forward current as a function of ambient temperature; typical values

11. Test information

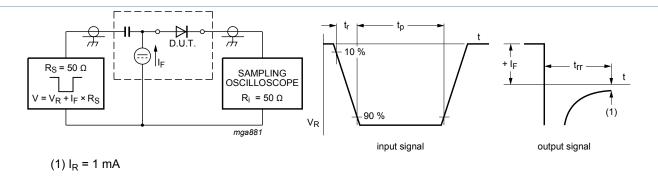


Fig. 8. Reverse recovery time: test circuit and waveforms

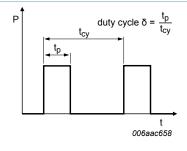


Fig. 9. Duty cycle definition

The current ratings for the typical waveforms are calculated according to the equations: $I_{F(AV)} = I_M \times \delta$ with I_M defined as peak current, $I_{RMS} = I_{F(AV)}$ at DC, and $I_{RMS} = I_M \times \sqrt{\delta}$ with I_{RMS} defined as RMS current.

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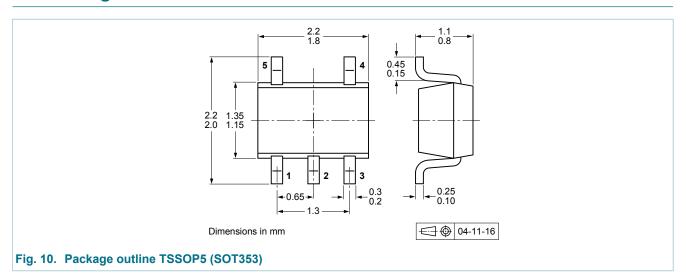
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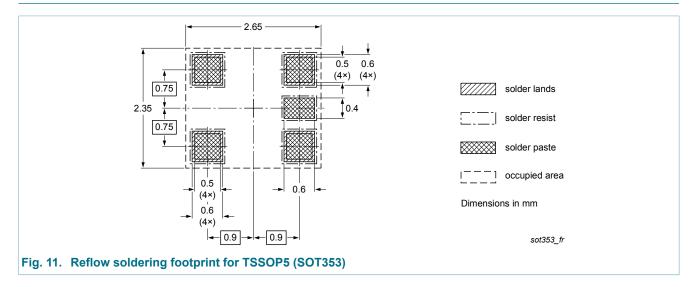
11.1 Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - Stress test qualification for discrete semiconductors, and is suitable for use in automotive applications.

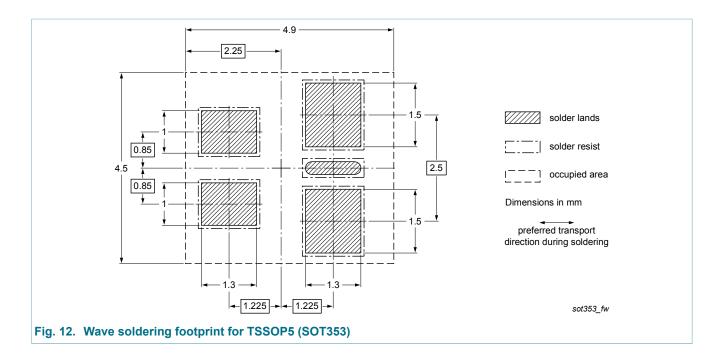
12. Package outline



13. Soldering



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14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAS21PG v.1	20150609	Product data sheet	-	-

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15. Legal information

15.1 Data sheet status

Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
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