BAS16VV; BAS16VY

Triple high-speed switching diodes

Rev. 03 — 20 April 2007 Product data sheet

1. Product profile

1.1 General description

Triple high-speed switching diodes, encapsulated in very small Surface-Mounted Device (SMD) plastic packages.

Table 1. Product overview

Type number	Package		Configuration
	NXP	JEITA	
BAS16VV	SOT666	-	triple isolated
BAS16VY	SOT363	SC-88	

1.2 Features

- High switching speed: $t_{rr} \leq 4$ ns
- Low leakage current
- Reverse voltage: $V_R \leq 100$ V
- Very small SMD plastic packages

1.3 Applications

- High-speed switching
- General-purpose switching
- Voltage clamping
- Reverse polarity protection

1.4 Quick reference data

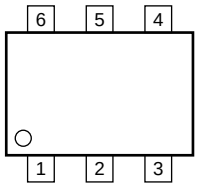
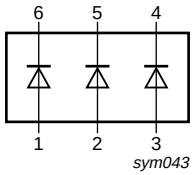
Table 2. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per diode						
I_F	forward current		-	-	200	mA
V_R	reverse voltage		-	-	100	V
t_{rr}	reverse recovery time	[1]	-	-	4	ns

[1] When switched from I_F = 10 mA to I_R = 10 mA; R_L = 100 Ω; measured at I_R = 1 mA.

2. Pinning information

Table 3. Pinning

Pin	Description	Simplified outline	Symbol
1	anode (diode 1)		
2	anode (diode 2)		
3	anode (diode 3)		
4	cathode (diode 3)		
5	cathode (diode 2)		
6	cathode (diode 1)		

3. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
BAS16VV	-	plastic surface-mounted package; 6 leads	SOT666
BAS16VY	SC-88	plastic surface-mounted package; 6 leads	SOT363

4. Marking

Table 5. Marking codes

Type number	Marking code[1]
BAS16VV	53
BAS16VY	16*

[1] * = -: made in Hong Kong
* = p: made in Hong Kong
* = t: made in Malaysia
* = W: made in China

5. Limiting values

Table 6. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
Per diode						
V_{RRM}	repetitive peak reverse voltage			-	100	V
V_R	reverse voltage			-	100	V
I_F	forward current			-	200	mA
I_{FRM}	repetitive peak forward current			-	450	mA
I_{FSM}	non-repetitive peak forward current	square wave	[1]			
		t_p = 1 µs		-	4.5	A
		t_p = 1 ms		-	1	A
		t_p = 1 s		-	0.5	A
P_{tot}	total power dissipation					
	BAS16VV	$T_{amb} \leq 25$ °C	[2]	-	180	mW
	BAS16VY	T_{sp} = 85 °C	[3]	-	250	mW
Per device						
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			–65	+150	°C
T_{stg}	storage temperature			–65	+150	°C

[1] T_j = 25 °C prior to surge.

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

[3] Soldering points at pins 4, 5 and 6.

6. Thermal characteristics

Table 7. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]				
	BAS16VV		[2]	-	-	700	K/W
			[3]	-	-	410	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point						
	BAS16VY		[4]	-	-	260	K/W

[1] Reflow soldering is the only recommended soldering method.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm^2.

[4] Soldering points at pins 4, 5 and 6.

7. Characteristics

Table 8. Characteristics

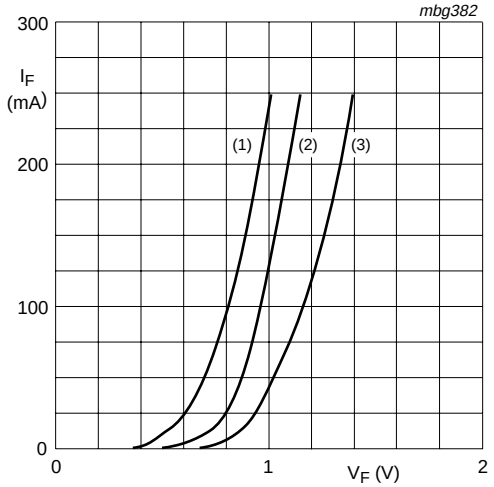
T_{amb} = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
V_F	forward voltage		[1]				
		I_F = 1 mA		-	-	715	mV
		I_F = 10 mA		-	-	855	mV
		I_F = 50 mA		-	-	1	V
		I_F = 150 mA		-	-	1.25	V
I_R	reverse current	V_R = 25 V		-	-	30	nA
		V_R = 75 V		-	-	1	µA
		V_R = 25 V; T_j = 150 °C		-	-	30	µA
		V_R = 75 V; T_j = 150 °C		-	-	50	µA
C_d	diode capacitance	V_R = 0 V; f = 1 MHz		-	-	1.5	pF
t_{rr}	reverse recovery time		[2]	-	-	4	ns
V_{FR}	forward recovery voltage		[3]	-	-	1.75	V

[1] Pulse test: $t_p \leq 300$ µs; $\delta \leq 0.02$.

[2] When switched from I_F = 10 mA to I_R = 10 mA; R_L = 100 Ω; measured at I_R = 1 mA.

[3] When switched from I_F = 10 mA; t_r = 20 ns.

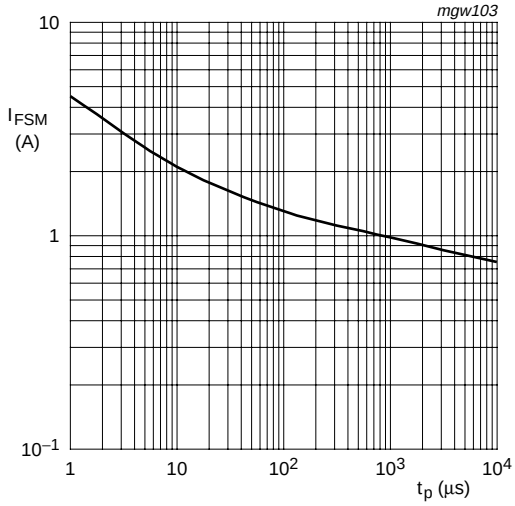


(1) T_{amb} = 150 °C; typical values

(2) T_{amb} = 25 °C; typical values

(3) T_{amb} = 25 °C; maximum values

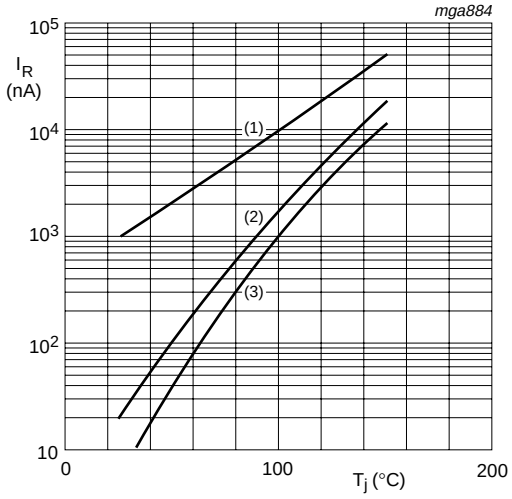
Fig 1. Forward current as a function of forward voltage



Based on square wave currents.

T_j = 25 °C; prior to surge

Fig 2. Non-repetitive peak forward current as a function of pulse duration; maximum values

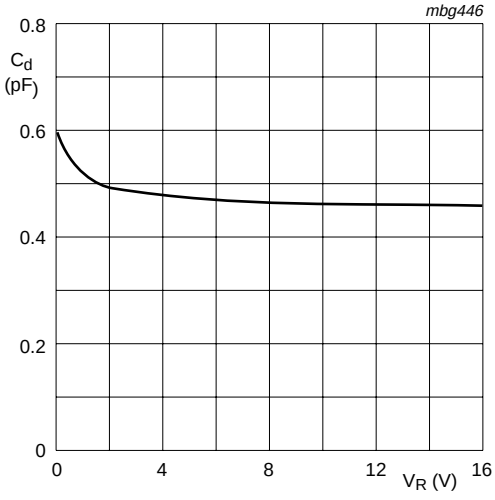


(1) V_R = 75 V; maximum values

(2) V_R = 75 V; typical values

(3) V_R = 25 V; typical values

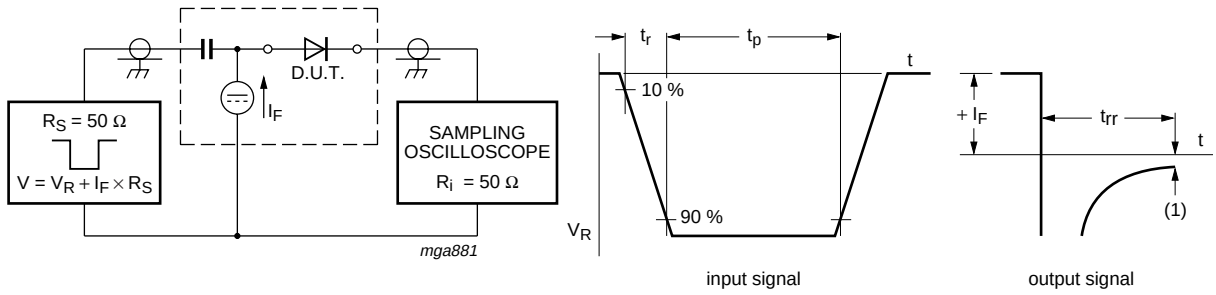
Fig 3. Reverse current as a function of junction temperature



f = 1 MHz; T_{amb} = 25 °C

Fig 4. Diode capacitance as a function of reverse voltage; typical values

8. Test information

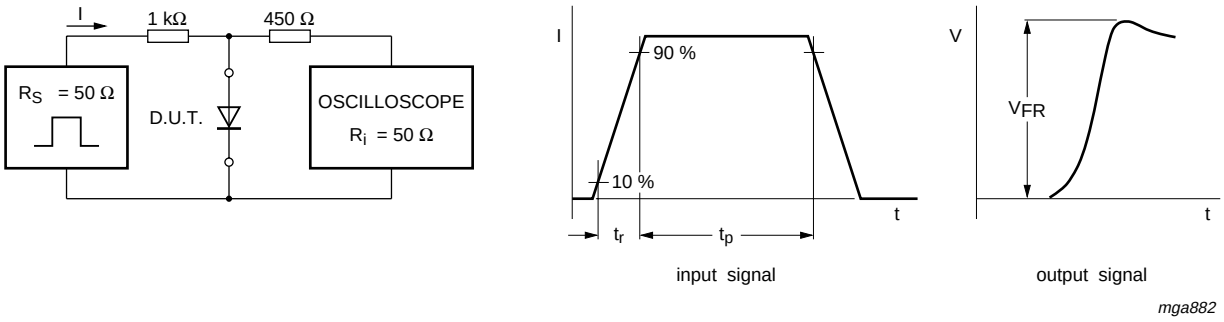


(1) I_R = 1 mA

Input signal: reverse pulse rise time t_r = 0.6 ns; reverse voltage pulse duration t_p = 100 ns; duty cycle δ = 0.05

Oscilloscope: rise time t_r = 0.35 ns

Fig 5. Reverse recovery time test circuit and waveforms



Input signal: forward pulse rise time t_r = 20 ns; forward current pulse duration $t_p \geq$ 100 ns; duty cycle δ ≤ 0.005

Fig 6. Forward recovery voltage test circuit and waveforms

9. Package outline

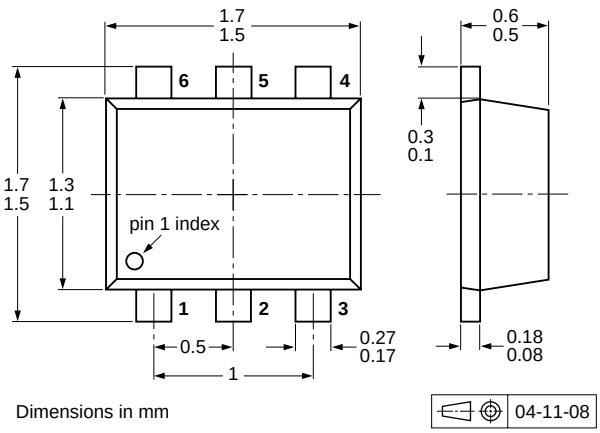


Fig 7. Package outline SOT666

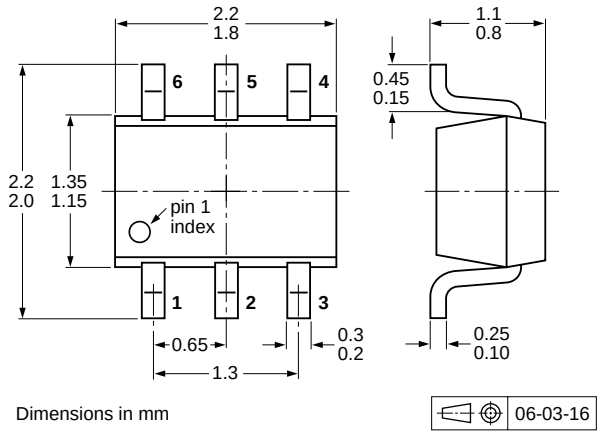


Fig 8. Package outline SOT363 (SC-88)

10. Packing information

Table 9. Packing methods

The indicated -xxx are the last three digits of the 12NC ordering code.[1]

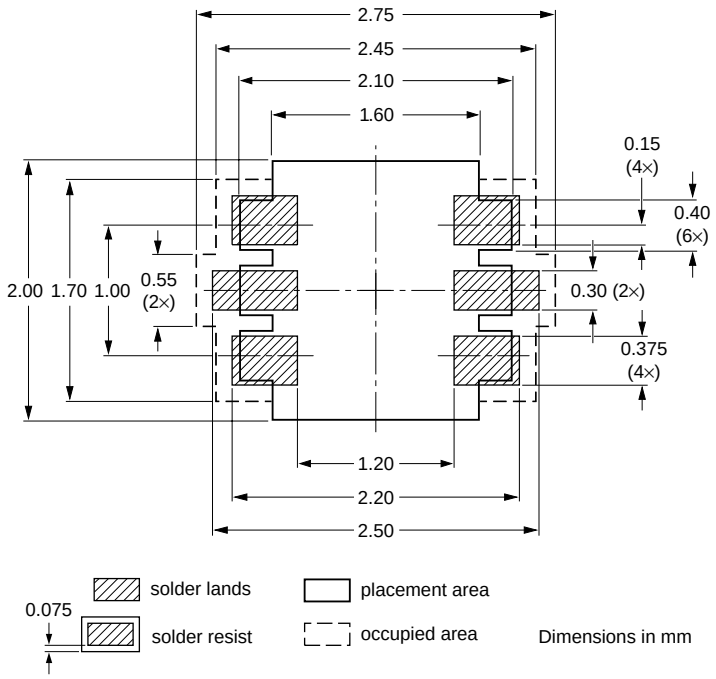
Type number	Package	Description	Packing quantity			
			3000	4000	8000	10000
BAS16VV	SOT666	2 mm pitch, 8 mm tape and reel	-	-	-315	-
		4 mm pitch, 8 mm tape and reel	-	-115	-	-
BAS16VY	SOT363	4 mm pitch, 8 mm tape and reel; T1 [2]	-115	-	-	-135
		4 mm pitch, 8 mm tape and reel; T2 [3]	-125	-	-	-165

[1] For further information and the availability of packing methods, see Section 14.

[2] T1: normal taping

[3] T2: reverse taping

11. Soldering



Reflow soldering is the only recommended soldering method.

Fig 9. Reflow soldering footprint SOT666

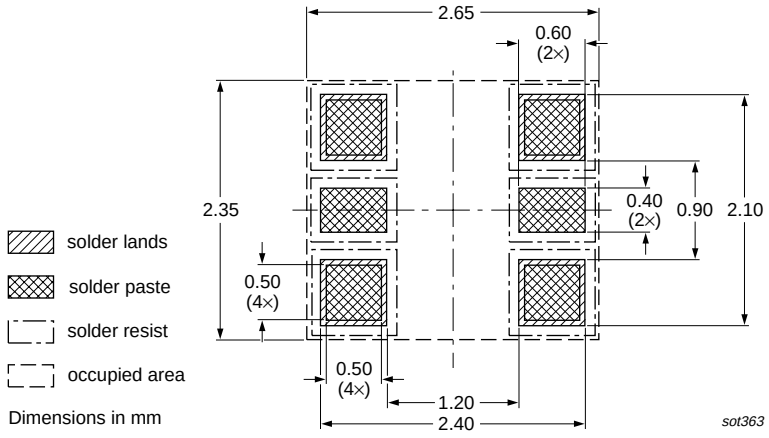


Fig 10. Reflow soldering footprint SOT363 (SC-88)

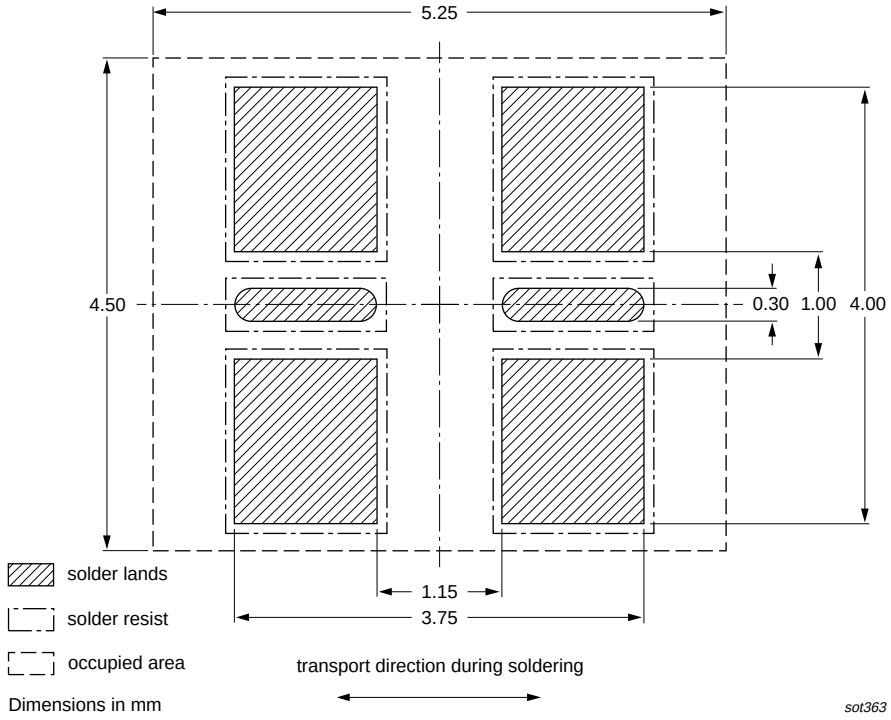


Fig 11. Wave soldering footprint SOT363 (SC-88)

12. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BAS16VV_BAS16VY_3	20070420	Product data sheet	-	BAS16VV_BAS16VY_2
Modifications:	• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors. • Legal texts have been adapted to the new company name where appropriate. • Table 2 “Quick reference data”: indication per diode added • Table 2 “Quick reference data”: Table note 1 for t_{rr} added • Table 5 “Marking codes”: enhanced table note section • Table 6 “Limiting values”: Table note 3 amended • Table 7 “Thermal characteristics”: indication per diode added • Table 7 “Thermal characteristics”: $R_{th(j-s)}$ thermal resistance from junction to soldering point redefined to $R_{th(j-sp)}$ thermal resistance from junction to solder point • Table 7 “Thermal characteristics”: Table note 2, 3 and 4 amended • Table 8 “Characteristics”: Table note 1 for V_F added • Figure 2: figure title amended • Figure 4: T_j junction temperature redefined to T_{amb} ambient temperature • Figure 5: figure title and figure note amended • Figure 6: figure note amended • Figure 7 and 8: superseded by minimized package outline drawings • Table 9 “Packing methods”: packing method for SOT666 added • Table 9 “Packing methods”: enhanced table note section • Section 11 “Soldering”: added • Section 13 “Legal information”: updated			
BAS16VV_BAS16VY_2	20040910	Product data sheet	-	BAS16VY_1
BAS16VY_1	20030408	Product specification	-	-

13. Legal information

13.1 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.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nxp.com.

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15. Contents

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