JSMICRO SEMICONDUCTOR

BAS16H

1. Product profile

1.1 General description

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

Table 1. Product overview

Type number	Package			Configuration	Package configuration
	Nexperia	JEITA	JEDEC		
BAS16	SOT23	-	TO-236AB	single	small
BAS16H	SOD123F	-	-	single	small and flat lead
BAS16J	SOD323F	SC-90	-	single	very small and flat lead
BAS16L	SOD882	-	-	single	leadless ultra small
BAS16T	SOT416	SC-75	-	single	ultra small
BAS16VV	SOT666	-	-	triple isolated	ultra small and flat lead
BAS16VY	SOT363	SC-88	-	triple isolated	very small
BAS16W	SOT323	SC-70	-	single	very small
BAS316	SOD323	SC-76	-	single	very small
BAS516	SOD523	SC-79	-	single	ultra small and flat lead

1.2 Features and benefits

- High switching speed: $t_{rr} \leq 4$ ns
- Low leakage current
- Repetitive peak reverse voltage: $V_{RRM} \leq 100$ V
- AEC-Q101 qualified
- Low capacitance
- Reverse voltage: $V_R \leq 100$ V
- Small SMD plastic packages

1.3 Applications

- High-speed switching
- General-purpose switching

1.4 Quick reference data

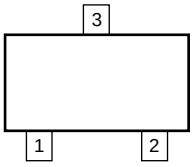
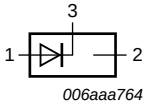
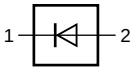
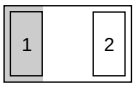
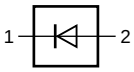
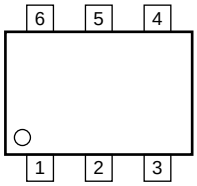
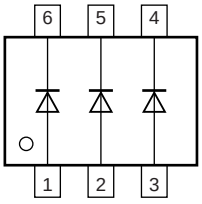
Table 2. Quick reference data

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

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
V_R	reverse voltage			-	-	100	V
I_R	reverse current	V_R = 80 V		-	-	0.5	µA
t_{rr}	reverse recovery time	I_F = 10 mA; I_R = 10 mA; R_L = 100 Ω; $I_{R(meas)}$ = 1 mA		-	-	4	ns

2. Pinning information

Table 3. Pinning

Pin	Description		Simplified outline	Graphic symbol
BAS16; BAS16T; BAS16W				
1	anode		 006aaa144	 006aaa764
2	not connected			
3	cathode			
BAS16H; BAS16J; BAS316; BAS516				
1	cathode	[1]	 001aab540	 006aab040
2	anode			
BAS16L				
1	cathode	[1]	 Transparent top view	 006aab040
2	anode			
BAS16VV; BAS16VY				
1	anode (diode 1)		 001aab555	 006aab106
2	anode (diode 2)			
3	anode (diode 3)			
4	cathode (diode 3)			
5	cathode (diode 2)			
6	cathode (diode 1)			

[1] The marking bar indicates the cathode.

3. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
BAS16	TO-236AB	plastic surface-mounted package; 3 leads	SOT23
BAS16H	-	plastic surface-mounted package; 2 leads	SOD123F
BAS16J	SC-90	plastic surface-mounted package; 2 leads	SOD323F
BAS16L	DFN1006-2	leadless ultra small plastic package; 2 terminals; body 1.0 × 0.6 × 0.5 mm	SOD882
BAS16T	SC-75	plastic surface-mounted package; 3 leads	SOT416
BAS16VV	-	plastic surface-mounted package; 6 leads	SOT666
BAS16VY	SC-88	plastic surface-mounted package; 6 leads	SOT363
BAS16W	SC-70	plastic surface-mounted package; 3 leads	SOT323
BAS316	SC-76	plastic surface-mounted package; 2 leads	SOD323
BAS516	SC-79	plastic surface-mounted package; 2 leads	SOD523

4. Marking

Table 5. Marking codes

Type number	Marking code[1]
BAS16	A6*
BAS16H	A1
BAS16J	AR
BAS16L	S2
BAS16T	A6
BAS16VV	53
BAS16VY	16*
BAS16W	A6*
BAS316	A6
BAS516	6

[1] * = placeholder for manufacturing site code

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

Table 6. Limiting values *...continued*

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

Symbol	Parameter	Conditions		Min	Max	Unit
I_F	forward current					
	BAS16		[1]	-	215	mA
	BAS16H BAS16L		[2]	-	215	mA
	BAS16T		[1]	-	155	mA
	BAS16VV BAS16VY		[1][3]	-	200	mA
	BAS16W		[1]	-	175	mA
	BAS16J BAS316 BAS516		[1]	-	250	mA
I_{FRM}	repetitive peak forward current	$t_p \leq 0.5$ ms; $\delta \leq 0.25$		-	500	mA
I_{FSM}	non-repetitive peak forward current	square wave; $T_{j(init)} = 25$ °C				
		$t_p = 1$ µs		-	4	A
		$t_p = 1$ ms		-	1	A
		$t_p = 1$ s		-	0.5	A
P_{tot}	total power dissipation					
	BAS16	$T_{amb} \leq 25$ °C	[1]	-	250	mW
	BAS16H	$T_{amb} \leq 25$ °C	[2]	-	380	mW
			[5]	-	830	mW
	BAS16J	$T_{amb} \leq 25$ °C	[5]	-	550	mW
	BAS16L	$T_{amb} \leq 25$ °C	[2]	-	250	mW
	BAS16T	$T_{sp} \leq 90$ °C	[1][4]	-	170	mW
	BAS16VV	$T_{amb} \leq 25$ °C	[1][3]	-	180	mW
	BAS16VY	$T_{sp} \leq 85$ °C	[1][3][6]	-	250	mW
	BAS16W	$T_{amb} \leq 25$ °C	[1]	-	200	mW
	BAS316	$T_{sp} \leq 90$ °C	[1][4]	-	400	mW
	BAS516	$T_{sp} \leq 90$ °C	[1][4]	-	500	mW
Per device						
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			−65	+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.

[2] Device mounted on an FR4 PCB with 60 µm copper strip line.

[3] Single diode loaded.

[4] Soldering point of cathode tab.

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

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

6. Thermal characteristics

Table 7. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air					
	BAS16		[1]	-	-	500	K/W
	BAS16H		[2]	-	-	330	K/W
			[3]	-	-	150	K/W
	BAS16J		[3]	-	-	230	K/W
	BAS16L		[2]	-	-	500	K/W
	BAS16VV		[2][4]	-	-	700	K/W
			[3][4]	-	-	410	K/W
	BAS16W		[1]	-	-	625	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point						
	BAS16			-	-	330	K/W
	BAS16H		[5]	-	-	70	K/W
	BAS16J		[5]	-	-	55	K/W
	BAS16T			-	-	350	K/W
	BAS16VY		[4][6]	-	-	260	K/W
	BAS16W			-	-	300	K/W
	BAS316		[5]	-	-	150	K/W
	BAS516		[5]	-	-	120	K/W

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

[2] Device mounted on an FR4 PCB with 60 μm copper strip line.

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

[4] Single diode loaded.

[5] Soldering point of cathode tab.

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

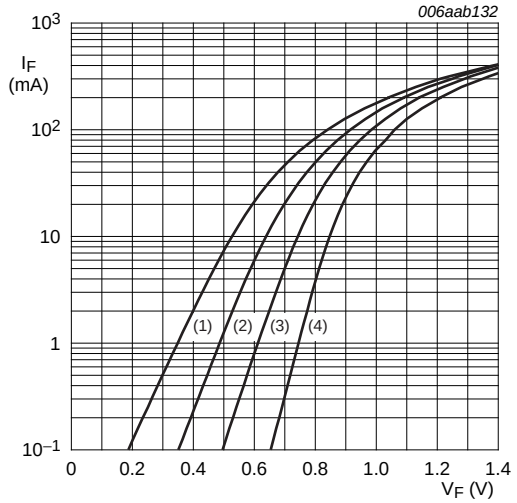
7. Characteristics

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 = 80 V		-	-	0.5	µA
		V_R = 25 V; T_j = 150 °C		-	-	30	µA
		V_R = 80 V; T_j = 150 °C		-	-	50	µA
C_d	diode capacitance	f = 1 MHz; V_R = 0 V					
	BAS16; BAS16H; BAS16J; BAS16L; BAS16T; BAS16VV; BAS16VY; BAS16W; BAS316			-	-	1.5	pF
	BAS516			-	-	1	pF
t_{rr}	reverse recovery time	I_F = 10 mA; I_R = 10 mA; R_L = 100 Ω; $I_{R(meas)}$ = 1 mA		-	-	4	ns
V_{FR}	forward recovery voltage	I_F = 10 mA; t_r = 20 ns		-	-	1.75	V

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



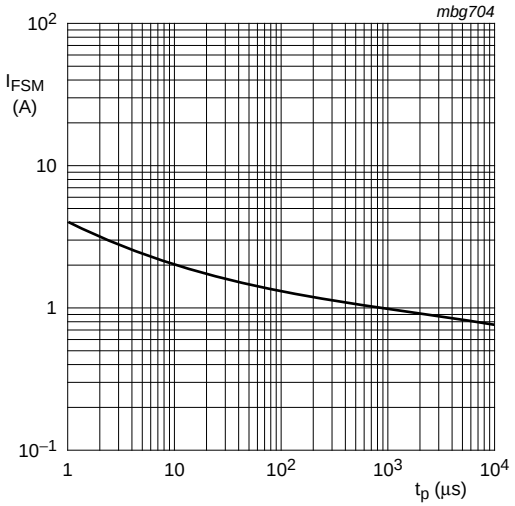
(1) T_{amb} = 150 °C

(2) T_{amb} = 85 °C

(3) T_{amb} = 25 °C

(4) T_{amb} = −40 °C

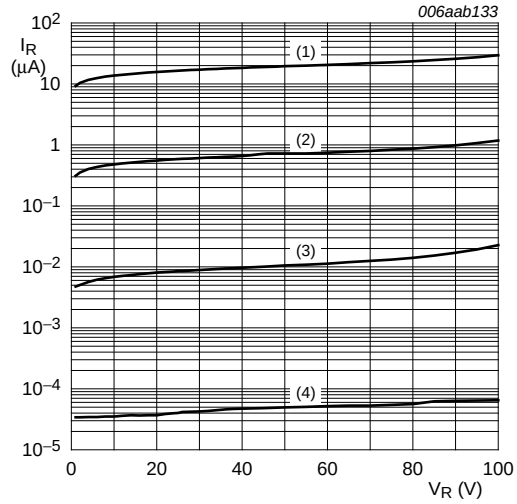
Fig 1. Forward current as a function of forward voltage; typical values



Based on square wave currents.

$T_{j(init)}$ = 25 °C

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



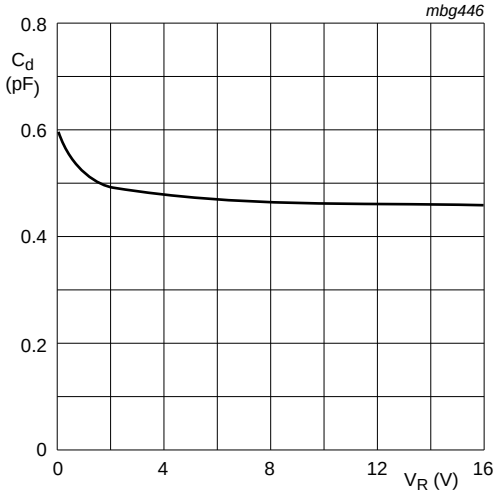
(1) T_{amb} = 150 °C

(2) T_{amb} = 85 °C

(3) T_{amb} = 25 °C

(4) T_{amb} = −40 °C

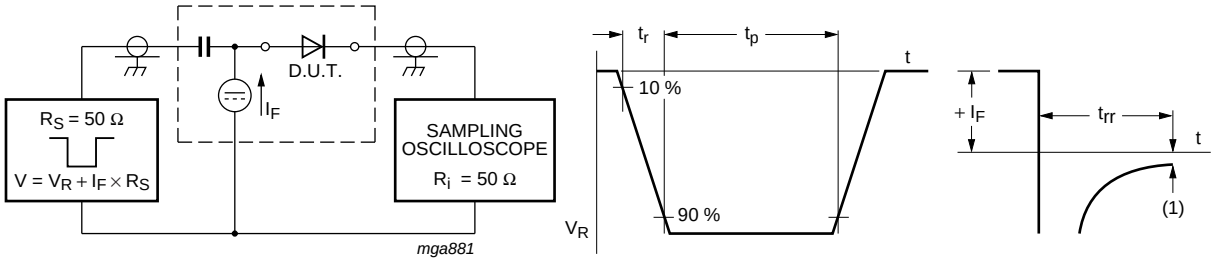
Fig 3. Reverse current as a function of reverse voltage; typical values



f = 1 MHz; T_{amb} = 25 °C

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

8. Test information

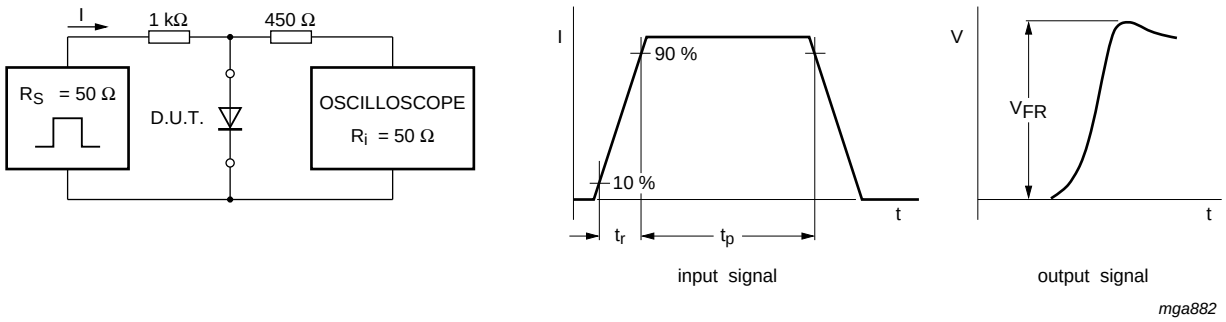


(1) I_R = 1 mA

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



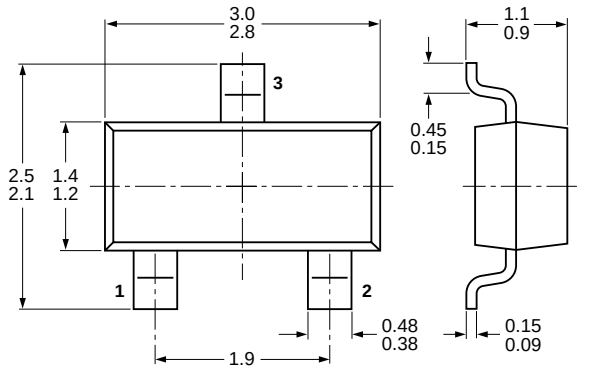
Input signal: forward pulse rise time t_r = 20 ns; forward current pulse duration $t_p \geq$ 100 ns; duty cycle $\delta \leq$ 0.005

Fig 6. Forward recovery voltage test circuit and waveforms

8.1 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.

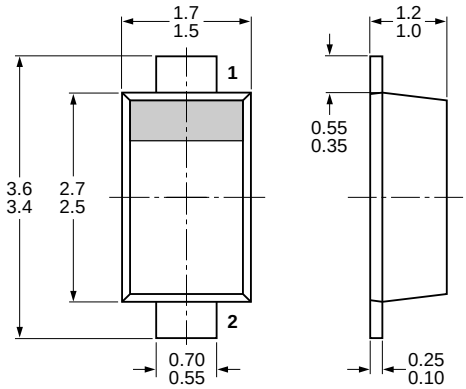
9. Package outline



Dimensions in mm

04-11-04

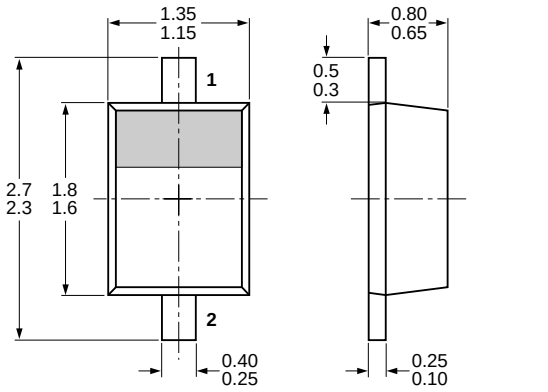
Fig 7. Package outline BAS16 (SOT23/TO-236AB)



Dimensions in mm

04-11-29

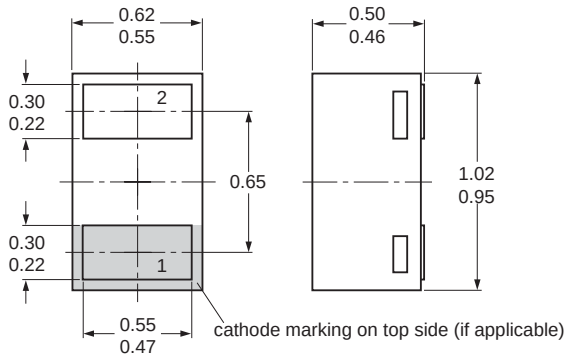
Fig 8. Package outline BAS16H (SOD123F)



Dimensions in mm

04-09-13

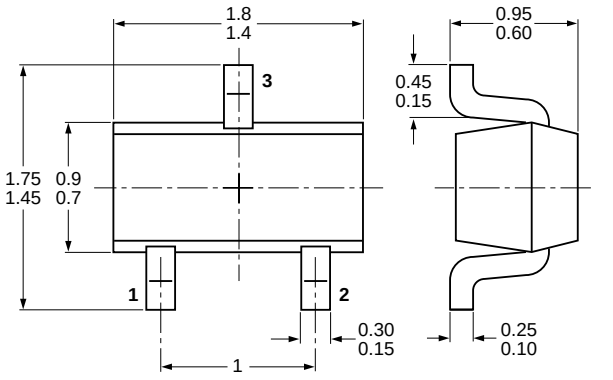
Fig 9. Package outline BAS16J (SOD323F/SC-90)



Dimensions in mm

03-04-17

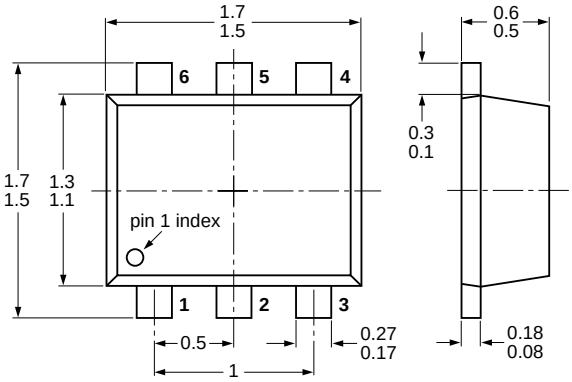
Fig 10. Package outline BAS16L (SOD882/DFN1006-2)



Dimensions in mm

04-11-04

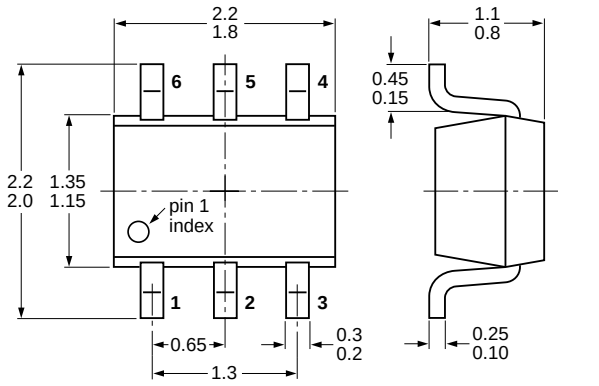
Fig 11. Package outline BAS16T (SOT416/SC-75)



Dimensions in mm

04-11-08

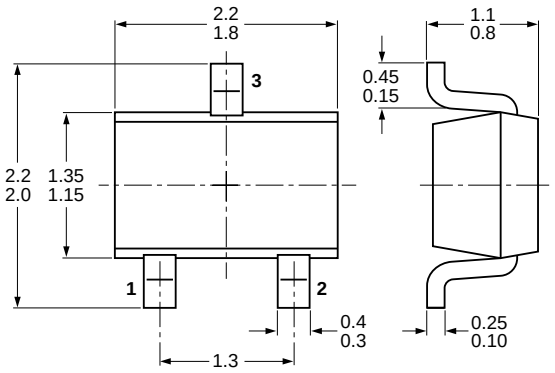
Fig 12. Package outline BAS16VV (SOT666)



Dimensions in mm

06-03-16

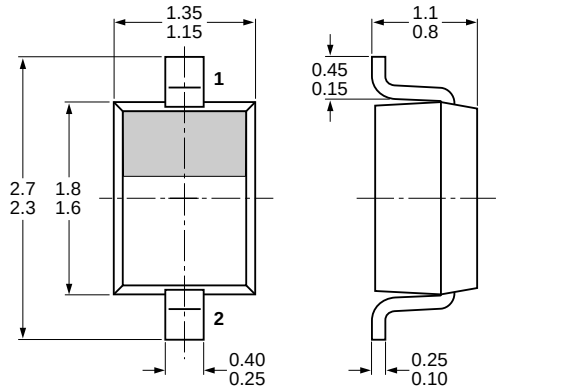
Fig 13. Package outline BAS16VY (SOT363)



Dimensions in mm

04-11-04

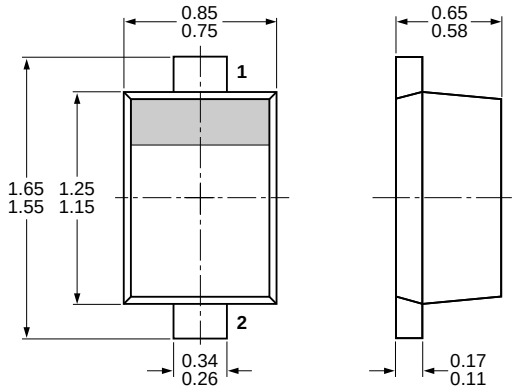
Fig 14. Package outline BAS16W (SOT323/SC-70)



Dimensions in mm

03-12-17

Fig 15. Package outline BAS316 (SOD323/SC-76)



Dimensions in mm

02-12-13

Fig 16. Package outline BAS516 (SOD523/SC-79)

10. Soldering

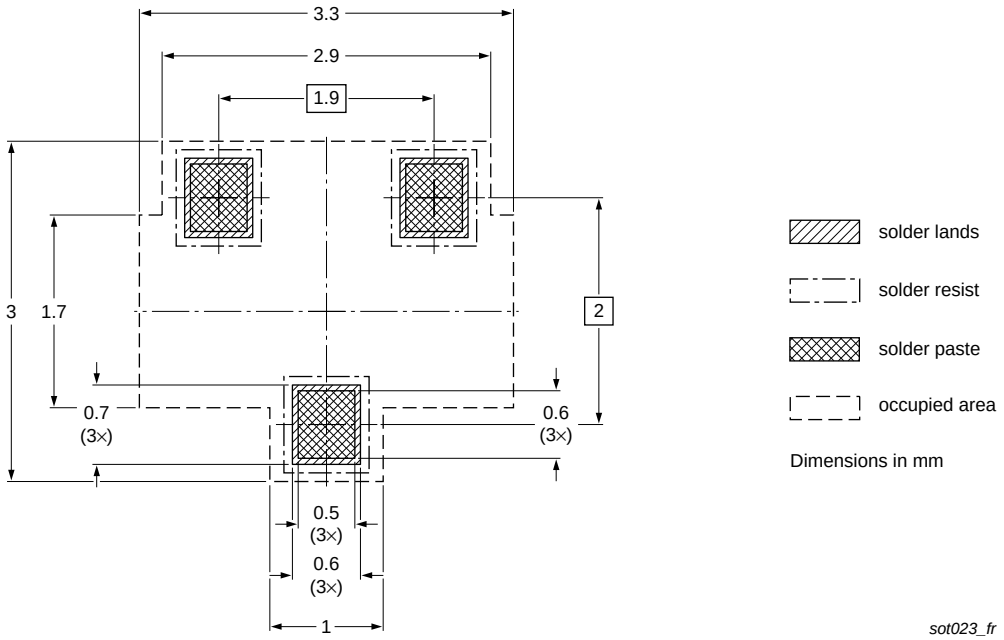


Fig 17. Reflow soldering footprint BAS16 (SOT23/TO-236AB)

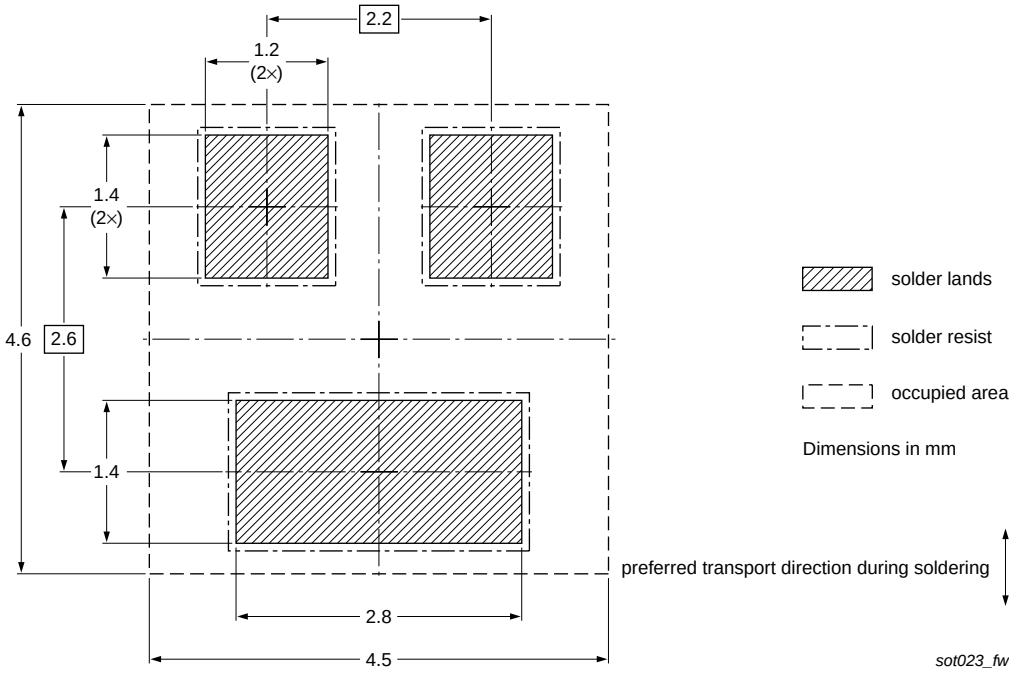
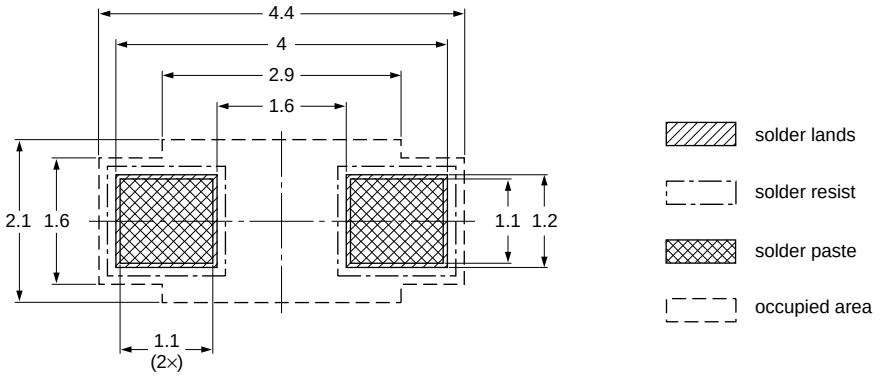


Fig 18. Wave soldering footprint BAS16 (SOT23/TO-236AB)



Dimensions in mm

Fig 19. Reflow soldering footprint BAS16H (SOD123F)

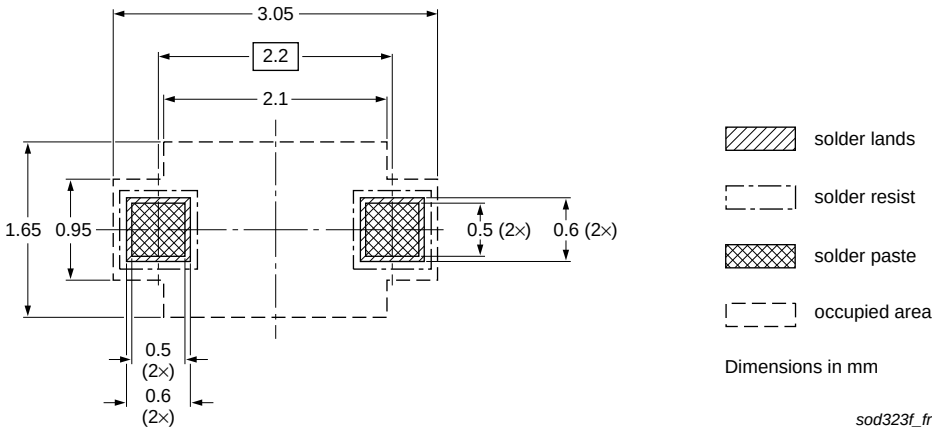


Fig 20. Reflow soldering footprint BAS16J (SOD323F)

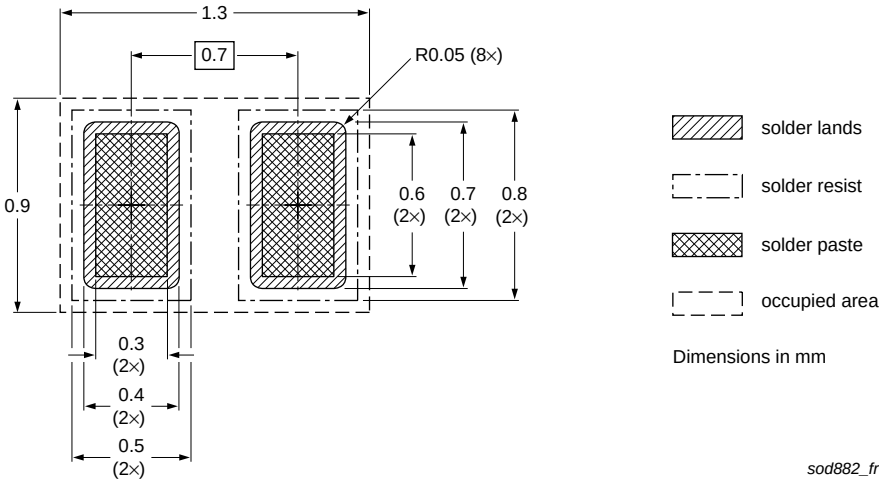


Fig 21. Reflow soldering footprint BAS16L (SOD882/DFN1006-2)

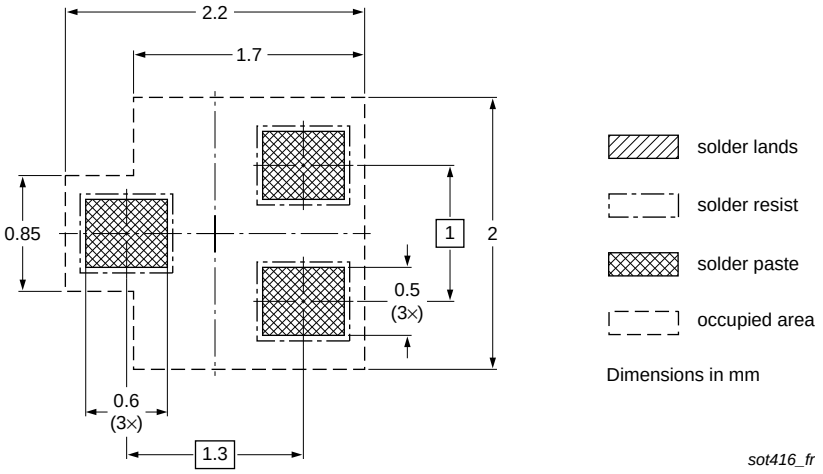


Fig 22. Reflow soldering footprint BAS16T (SOT416/SC-75)

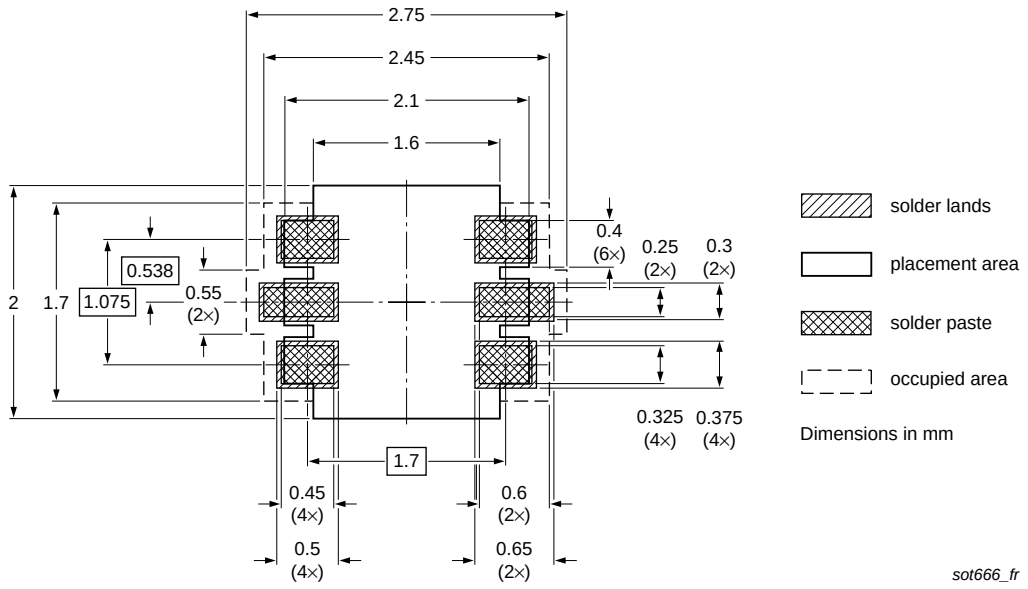


Fig 23. Reflow soldering footprint BAS16VV (SOT666)

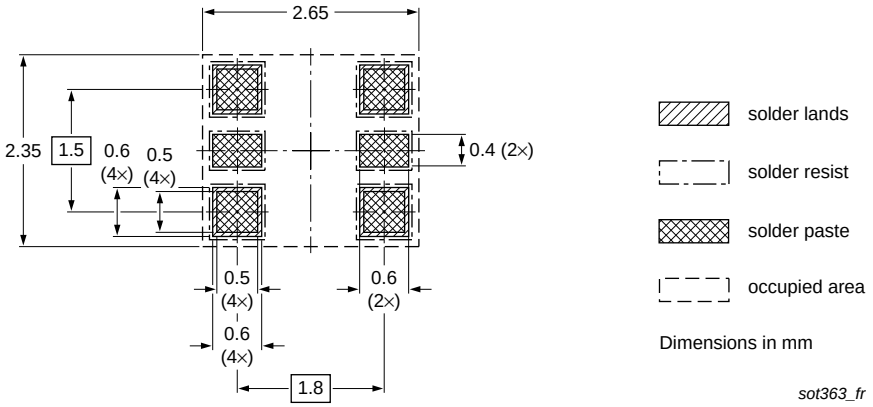


Fig 24. Reflow soldering footprint BAS16VY (SOT363/SC-88)

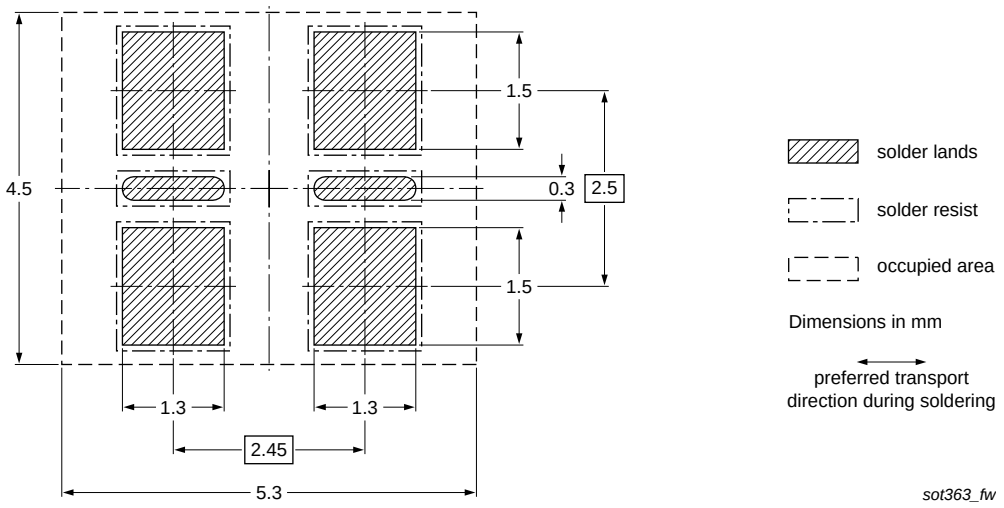


Fig 25. Wave soldering footprint BAS16VY (SOT363/SC-88)

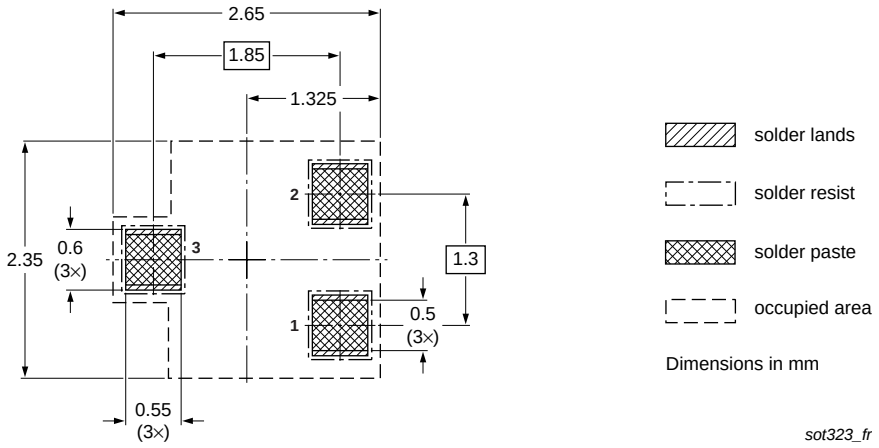


Fig 26. Reflow soldering footprint BAS16W (SOT323/SC-70)

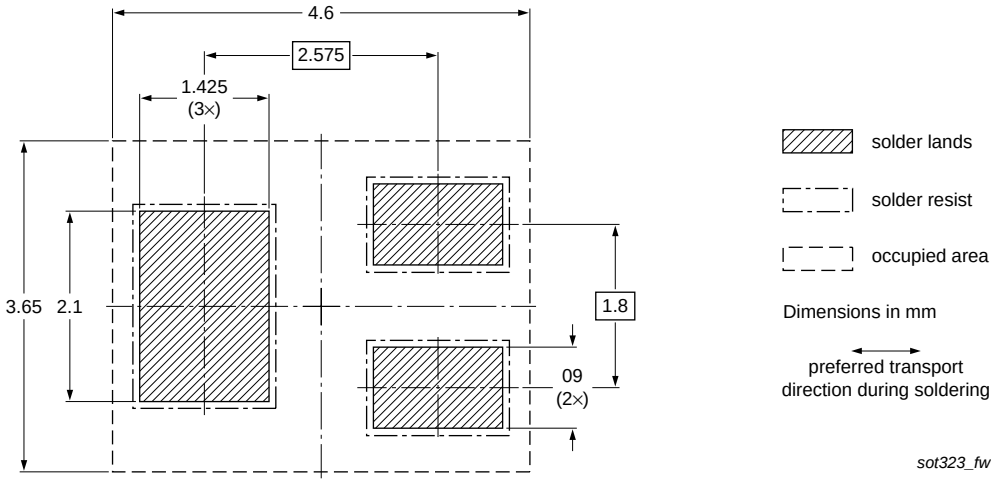


Fig 27. Wave soldering footprint BAS16W (SOT323/SC-70)

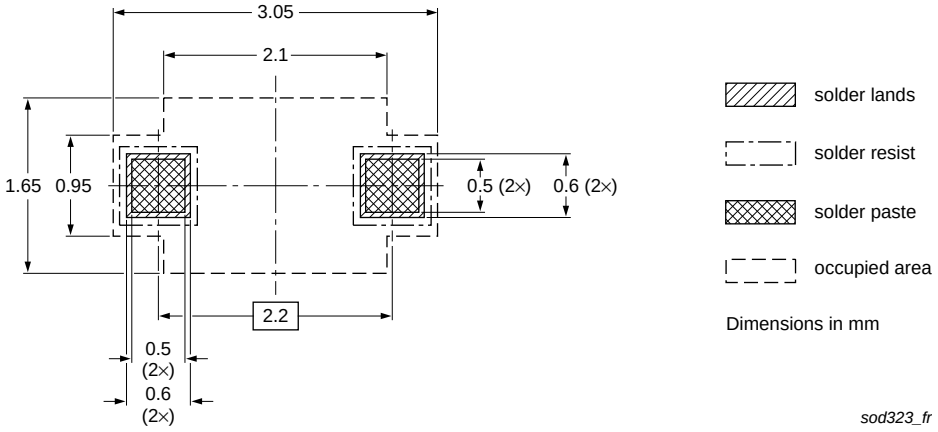


Fig 28. Reflow soldering footprint BAS316 (SOD323/SC-76)

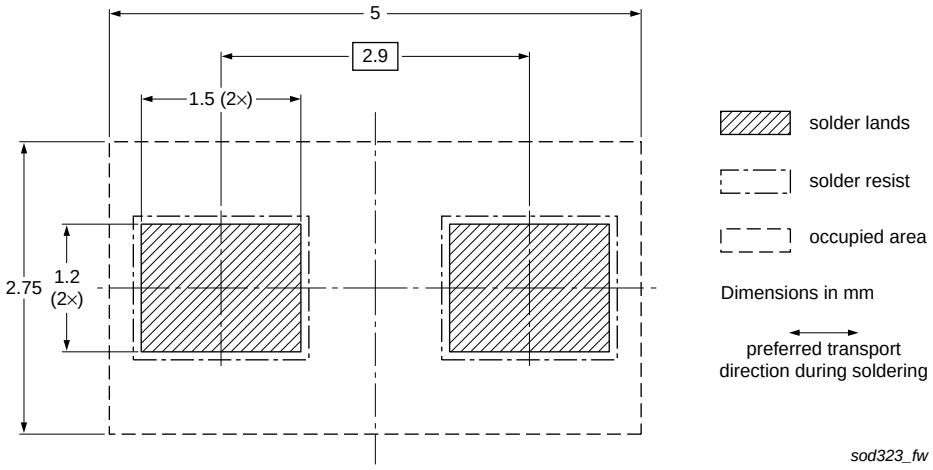


Fig 29. Wave soldering footprint BAS316 (SOD323/SC-76)

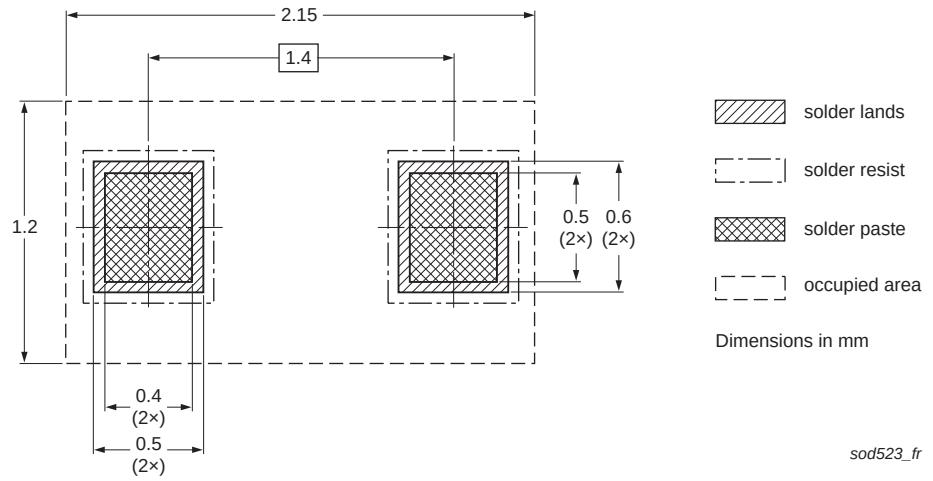


Fig 30. Reflow soldering footprint BAS516 (SOD523/SC-79)

11. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BAS16_SER_6	20140924	Product data sheet	-	BAS16_SER_5
Modifications:	• Section 1.2 “Features and benefits”: updated • Section 4 “Marking”: updated • Table 6 “Limiting values”: updated • Section 8 “Test information”: updated • Section 12 “Legal information”: updated			
BAS16_SER_5	20080825	Product data sheet	-	BAS16_4 BAS16H_1 BAS16J_1 BAS16L_1 BAS16T_1 BAS16VV_BAS16VY_3 BAS16W_4 BAS316_4 BAS516_1
BAS16_4	20011010	Product specification	-	BAS16_3
BAS16H_1	20050415	Product data sheet	-	-
BAS16J_1	20070308	Product data sheet	-	-
BAS16L_1	20030623	Product specification	-	-
BAS16T_1	19980120	Product specification	-	-
BAS16VV_BAS16VY_3	20070420	Product data sheet	-	BAS16VV_BAS16VY_2
BAS16W_4	19990506	Product specification	-	BAS16W_3
BAS316_4	20040204	Product specification	-	BAS316_3
BAS516_1	19980831	Product specification	-	-