

BC847xMB series

45 V, 100 mA NPN general-purpose transistors

Rev. 1 — 5 March 2012

Product data sheet

1. Product profile

1.1 General description

NPN general-purpose transistors in a leadless ultra small SOT883B Surface-Mounted Device (SMD) plastic package.

Table 1. Product overview

Type number	Package	PNP complement		
	Nexperia	JEITA	JEDEC	
BC847AMB	SOT883B	-	-	BC857AMB
BC847BMB	SOT883B	-	-	BC857BMB
BC847CMB	SOT883B	-	-	BC857CMB

1.2 Features and benefits

- Leadless ultra small SMD plastic package
- Low package height of 0.37 mm
- Power dissipation comparable to SOT23
- AEC-Q101 qualified

1.3 Applications

- General-purpose switching and amplification
- Mobile applications

1.4 Quick reference data

Table 2. Quick reference data

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
V_{CEO}	collector-emitter voltage	open base	-	-	45	V
I _C	collector current		-	-	100	mΑ
h _{FE}	DC current gain	$V_{CE} = 5 \text{ V}; I_{C} = 2 \text{ mA}$				
	BC847AMB		110	-	220	
	BC847BMB		200	-	450	
	BC847CMB		420	-	800	



2. Pinning information

Table 3. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	base		
2	emitter	1 3	3
3	collector	2 🔲	1—
		Transparent top view	2
		top view	_
			sym021

3. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
BC847xMB series	-	leadless ultra small plastic package; 3 solder lands; body 1.0 \times 0.6 \times 0.37 mm	SOT883B

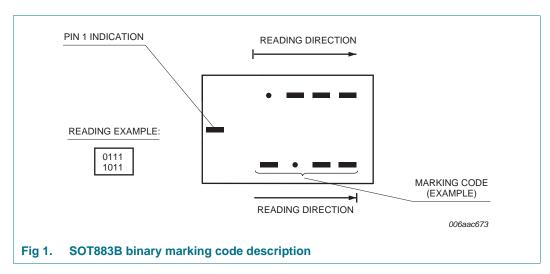
4. Marking

Table 5. Marking codes

Type number	Marking code ^[1]
BC847AMB	0100 0001
BC847BMB	0100 0010
BC847CMB	0100 0011

^[1] For SOT883B binary marking code description, see Figure 1.

4.1 Binary marking code description



BC847XMB_SER

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5. Limiting values

Table 6. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
V_{CBO}	collector-base voltage	open emitter		-	50	V
V_{CEO}	collector-emitter voltage	open base		-	45	V
V_{EBO}	emitter-base voltage	open collector		-	6	V
I _C	collector current			-	100	mA
I _{CM}	peak collector current	single pulse; $t_p \le 1 \text{ ms}$		-	200	mA
I _{BM}	peak base current	$\begin{array}{l} \text{single pulse;} \\ t_p \leq 1 \text{ ms} \end{array}$		-	100	mA
P _{tot}	total power dissipation	$T_{amb} \le 25 ^{\circ}C$	[1][2]	-	250	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.

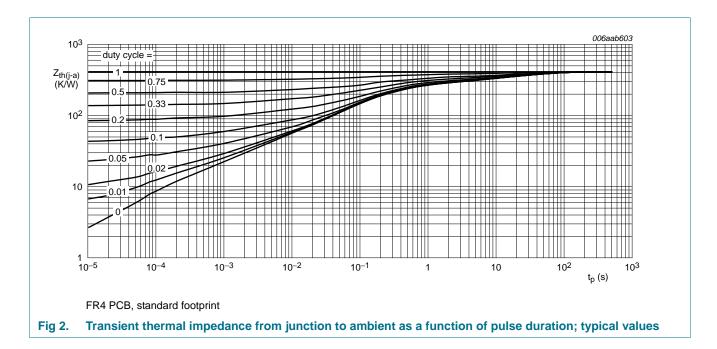
^[2] Reflow soldering is the only recommended soldering method.

6. Thermal characteristics

Table 7. Thermal characteristics

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1][2]	-	500	K/W

- [1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
- [2] Reflow soldering is the only recommended soldering method.



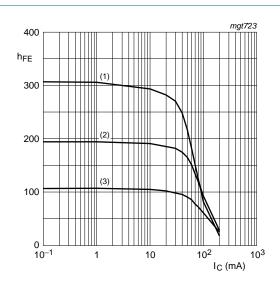
7. Characteristics

Table 8. Characteristics

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

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
I _{CBO}	collector-base	$\begin{array}{c} \text{pase} \\ \text{rent} \\ \end{array} \begin{array}{c} V_{CB} = 30 \ \text{V}; \ I_E = 0 \ \text{A} \\ \hline V_{CB} = 30 \ \text{V}; \ I_E = 0 \ \text{A}; \\ \hline T_j = 150 \ ^{\circ}\text{C} \\ \end{array} \begin{array}{c} \text{lse} \\ \text{rent} \\ \end{array} \begin{array}{c} V_{CB} = 5 \ \text{V}; \ I_C = 0 \ \text{A} \\ \end{array} \begin{array}{c} - \\ \hline \text{rent} \\ \end{array} \begin{array}{c} \text{lse} \\ \text{rent} \\ \end{array} \begin{array}{c} V_{CE} = 5 \ \text{V}; \ I_C = 2 \ \text{mA} \\ \end{array} \begin{array}{c} 110 \ - \\ \hline \text{lse} \\ \end{array} \begin{array}{c} 110 \ - \\ \hline \text{lse} \\ \end{array} \begin{array}{c} 110 \ - \\ \hline \text{lse} \\ \end{array} \begin{array}{c} \text{lse} \\ \end{array} \begin{array}{c} \text{lse} \\ \end{array} \begin{array}{c} \text{lse} \\ \end{array} \begin{array}{c} 110 \ - \\ \hline \text{lse} \\ \end{array} \begin{array}{c} lse$	-	15	nΑ		
	cut-off current	02		-	-	5	μΑ
I _{EBO}	emitter-base cut-off current	$V_{EB} = 5 \text{ V}; I_{C} = 0 \text{ A}$		-	-	100	nA
h _{FE}	DC current gain	$V_{CE} = 5 \text{ V}; I_{C} = 2 \text{ mA}$					
	BC847AMB			110	-	220	
	BC847BMB		$\begin{array}{cccccccccccccccccccccccccccccccccccc$	-	450		
	BC847CMB			420	-	800	
V_{CEsat}	BC847BMB BC847CMB collector-emitter saturation voltage base-emitter saturation voltage	$I_C = 10 \text{ mA}; I_B = 0.5 \text{ mA}$		-	90	200	mV
	saturation voltage	$I_C = 100 \text{ mA}; I_B = 5 \text{ mA}$	<u>[1]</u>	-	200	400	mV
V_{BEsat}	BC847CMB collector-emitter saturation voltage base-emitter	$I_C = 10 \text{ mA}; I_B = 0.5 \text{ mA}$		-	700	-	mV
	saturation voltage	$I_C = 100 \text{ mA}; I_B = 5 \text{ mA}$	[1]	-	900	-	mV
V_{BE}	base-emitter voltage	$I_C = 2 \text{ mA}; V_{CE} = 5 \text{ V}$		580	660	700	mV
		$I_C = 10 \text{ mA}; V_{CE} = 5 \text{ V}$		-	-	770	mV
f _T	transition frequency			100	-	-	MHz
C _c	collector capacitance			-	-	1.5	pF
C _e	emitter capacitance			-	11	-	pF
NF	noise figure	• • • •		-	2	10	dB

^[1] Pulse test: $t_p \leq 300~\mu s;~\delta \leq 0.02.$



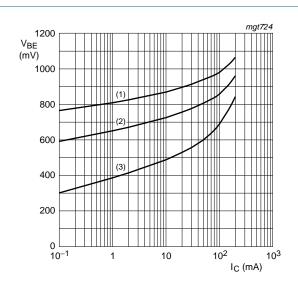
$$V_{CE} = 5 V$$

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

(2)
$$T_{amb} = 25 \, ^{\circ}C$$

(3) $T_{amb} = -55 \, ^{\circ}C$

Fig 3. BC847AMB: DC current gain as a function of collector current; typical values



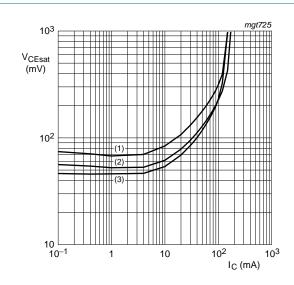
$$V_{CE} = 5 V$$

(1)
$$T_{amb} = -55 \, ^{\circ}C$$

(2)
$$T_{amb} = 25 \, ^{\circ}C$$

(3)
$$T_{amb} = 150 \, ^{\circ}C$$

Fig 4. BC847AMB: Base-emitter voltage as a function of collector current; typical values



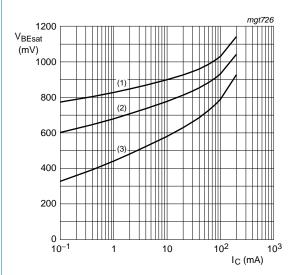
$$I_{\rm C}/I_{\rm B} = 20$$

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

(2)
$$T_{amb} = 25 \, ^{\circ}C$$

(3)
$$T_{amb} = -55 \, ^{\circ}C$$

Fig 5. BC847AMB: Collector-emitter saturation voltage as a function of collector current; typical values



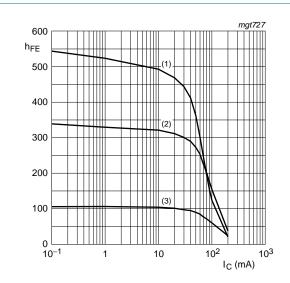
$$I_{\rm C}/I_{\rm B} = 10$$

(1)
$$T_{amb} = -55 \, ^{\circ}C$$

(2)
$$T_{amb} = 25 \, ^{\circ}C$$

(3)
$$T_{amb} = 150 \, ^{\circ}C$$

Fig 6. BC847AMB: Base-emitter saturation voltage as a function of collector current; typical values



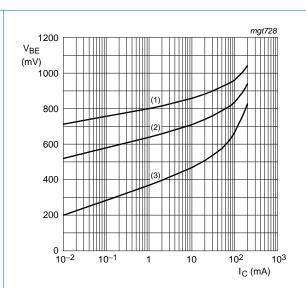
$$V_{CE} = 5 V$$

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

(2)
$$T_{amb} = 25 \, ^{\circ}C$$

(3) $T_{amb} = -55 \, ^{\circ}C$

Fig 7. BC847BMB: DC current gain as a function of collector current; typical values



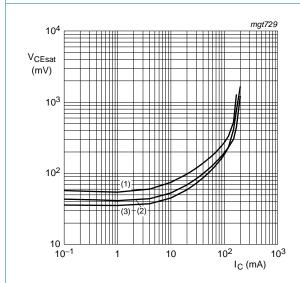
$$V_{CE} = 5 \text{ V}$$

(1)
$$T_{amb} = -55 \, ^{\circ}C$$

(2)
$$T_{amb} = 25 \, ^{\circ}C$$

(3)
$$T_{amb} = 150 \, ^{\circ}C$$

Fig 8. BC847BMB: Base-emitter voltage as a function of collector current; typical values



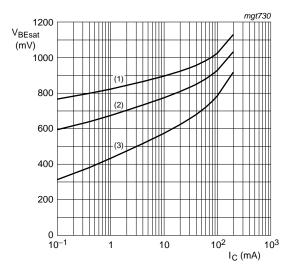
 $I_{\rm C}/I_{\rm B} = 20$

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

(2)
$$T_{amb} = 25 \, ^{\circ}C$$

(3) $T_{amb} = -55 \, ^{\circ}C$

Fig 9. BC847BMB: Collector-emitter saturation voltage as a function of collector current; typical values



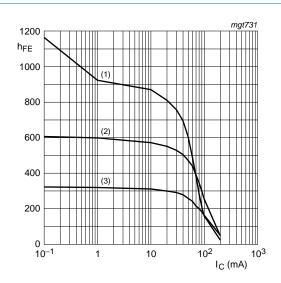
$$I_{\rm C}/I_{\rm B} = 10$$

(1)
$$T_{amb} = -55 \, ^{\circ}C$$

(2) $T_{amb} = 25 \, ^{\circ}C$

(3) $T_{amb} = 150 \, ^{\circ}C$

Fig 10. BC847BMB: Base-emitter saturation voltage as a function of collector current; typical values



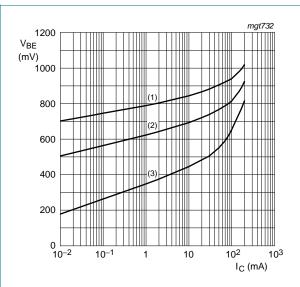
$$V_{CE} = 5 V$$

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

(2)
$$T_{amb} = 25 \, ^{\circ}C$$

(3) $T_{amb} = -55 \, ^{\circ}C$

Fig 11. BC847CMB: DC current gain as a function of collector current; typical values



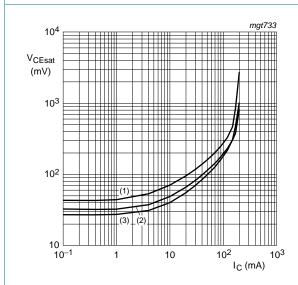
$$V_{CE} = 5 V$$

(1)
$$T_{amb} = -55 \, ^{\circ}C$$

(2)
$$T_{amb} = 25 \, ^{\circ}C$$

(3) $T_{amb} = 150 \, ^{\circ}C$

Fig 12. BC847CMB: Base-emitter voltage as a function of collector current; typical values



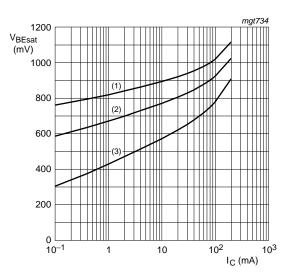
$$I_{\rm C}/I_{\rm B} = 20$$

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

(2)
$$T_{amb} = 25 \, ^{\circ}C$$

(3)
$$T_{amb} = -55 \, ^{\circ}C$$

Fig 13. BC847CMB: Collector-emitter saturation voltage as a function of collector current; typical values



$$I_{\rm C}/I_{\rm B} = 10$$

(1)
$$T_{amb} = -55 \,^{\circ}C$$

(2)
$$T_{amb} = 25 \, ^{\circ}C$$

(3)
$$T_{amb} = 150 \, ^{\circ}C$$

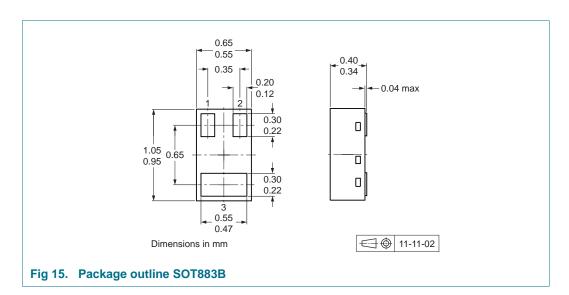
Fig 14. BC847CMB: Base-emitter saturation voltage as a function of collector current; typical values

8. Test information

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



10. Packing information

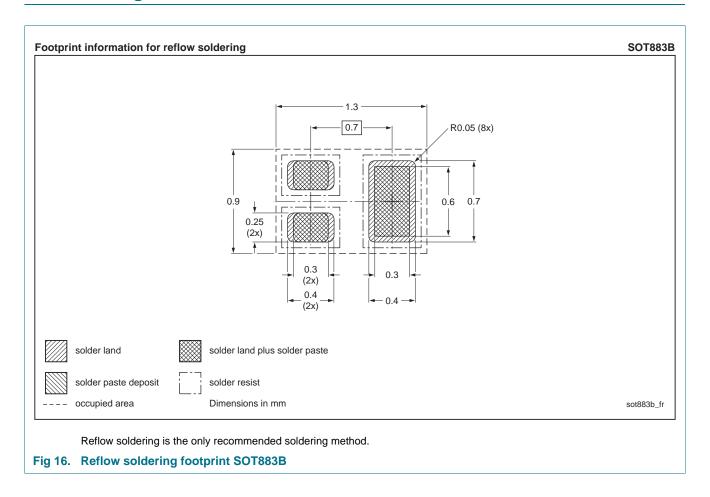
Table 9. Packing methods

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

Type number	Package	Description	Packing quantity
			10000
BC847xMB series	SOT883B	2 mm pitch, 8 mm tape and reel	-315

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

11. Soldering



BC847xMB series

45 V, 100 mA NPN general-purpose transistors

12. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BC847XMB_SER v.1	20120305	Product data sheet	-	-

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".
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BC847xMB series

45 V, 100 mA NPN general-purpose transistors

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Nexperia

BC847xMB series

45 V, 100 mA NPN general-purpose transistors

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