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Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China





BC846BM

65 V, 100 mA NPN general-purpose transistor

20 August 2015

Product data sheet

1. General description

NPN general-purpose transistor in a leadless ultra small DFN1006-3 (SOT883) Surface-Mounted Device (SMD) plastic package.

PNP complement: BC856BM.

2. Features and benefits

- Leadless ultra small SMD plastic package
- Power dissipation comparable to SOT23
- AEC-Q101 qualified

3. Applications

- General-purpose switching and amplification
- Mobile applications

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CE0}	collector-emitter voltage	open base	-	-	65	V
I_C	collector current		-	-	100	mA
h_{FE}	DC current gain	$V_{CE} = 5\text{ V}; I_C = 2\text{ mA}; T_{amb} = 25\text{ °C}$	200	-	450	

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	<p>Transparent top view DFN1006-3 (SOT883)</p>	<p>sym021</p>
2	E	emitter		
3	C	collector		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BC846BM	DFN1006-3	DFN1006-3: leadless ultra small plastic package; 3 solder lands	SOT883

7. Marking

Table 4. Marking codes

Type number	Marking code
BC846BM	ZB

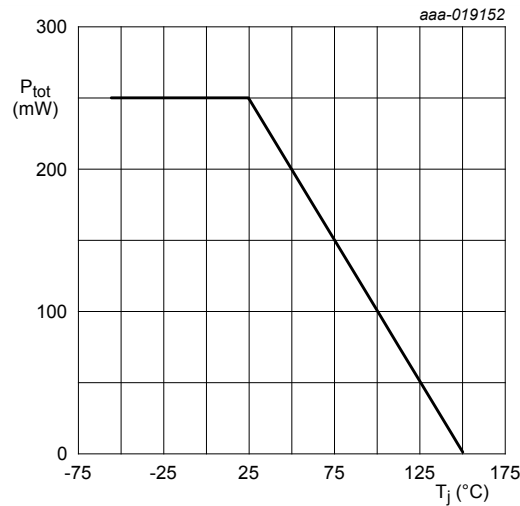
8. Limiting values

Table 5. 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	-	80	V
V_{CEO}	collector-emitter voltage	open base	-	65	V
V_{EBO}	emitter-base voltage	open collector	-	6	V
I_C	collector current		-	100	mA
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms	-	200	mA
I_{BM}	peak base current		-	200	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	250	mW
T_j	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.



FR4 PCB, standard footprint

Fig. 1. Power derating curve DFN1006-3 (SOT883)

9. Thermal characteristics

Table 6. Thermal characteristics

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

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

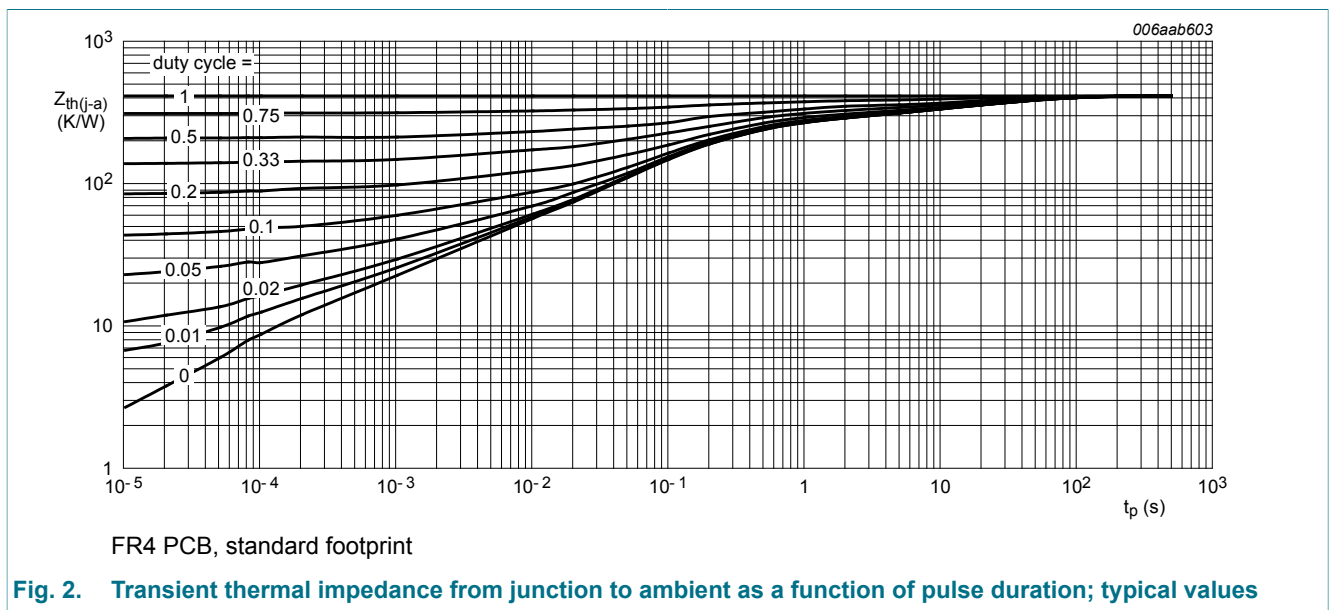
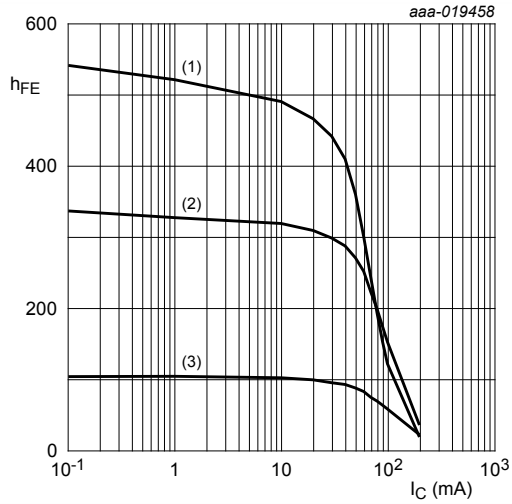


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

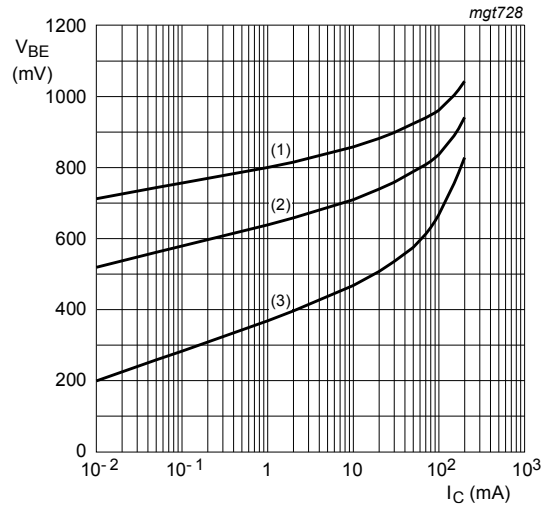
Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I _{CBO}	collector-base cut-off current	V _{CB} = 30 V; I _E = 0 A; T _{amb} = 25 °C	-	-	15	nA
		V _{CB} = 30 V; I _E = 0 A; T _j = 150 °C	-	-	5	μA
I _{EBO}	emitter-base cut-off current	V _{EB} = 5 V; I _C = 0 A; T _{amb} = 25 °C	-	-	100	nA
h _{FE}	DC current gain	V _{CE} = 5 V; I _C = 2 mA; T _{amb} = 25 °C	200	-	450	
V _{CEsat}	collector-emitter saturation voltage	I _C = 10 mA; I _B = 0.5 mA; T _{amb} = 25 °C	-	-	200	mV
		I _C = 100 mA; I _B = 5 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _{amb} = 25 °C	-	200	400	mV
V _{BEsat}	base-emitter saturation voltage	I _C = 10 mA; I _B = 0.5 mA; T _{amb} = 25 °C	-	760	-	mV
		I _C = 100 mA; I _B = 5 mA; T _{amb} = 25 °C	-	900	-	mV
V _{BE}	base-emitter voltage	V _{CE} = 5 V; I _C = 2 mA; T _{amb} = 25 °C	580	660	700	mV
		V _{CE} = 5 V; I _C = 10 mA; T _{amb} = 25 °C	-	-	770	mV
C _C	collector capacitance	V _{CB} = 10 V; I _E = 0 A; i _e = 0 A; f = 1 MHz; T _{amb} = 25 °C	-	2	3	pF
C _E	emitter capacitance	V _{EB} = 0.5 V; I _C = 0 A; i _c = 0 A; f = 1 MHz; T _{amb} = 25 °C	-	11	-	pF
f _T	transition frequency	V _{CE} = 5 V; I _C = 10 mA; f = 100 MHz; T _{amb} = 25 °C	100	-	-	MHz
NF	noise figure	V _{CE} = 5 V; I _C = 200 μA; R _S = 2 kΩ; f = 1 kHz; B = 200 Hz; T _{amb} = 25 °C	-	2	10	dB



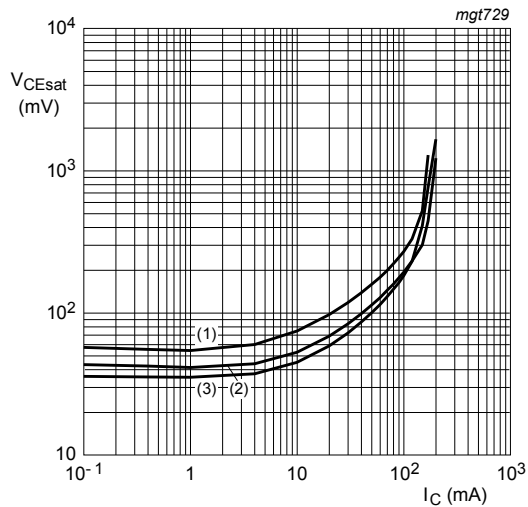
$V_{CE} = 5\text{ V}$
 (1) $T_{amb} = 150\text{ }^{\circ}\text{C}$
 (2) $T_{amb} = 25\text{ }^{\circ}\text{C}$
 (3) $T_{amb} = -55\text{ }^{\circ}\text{C}$

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



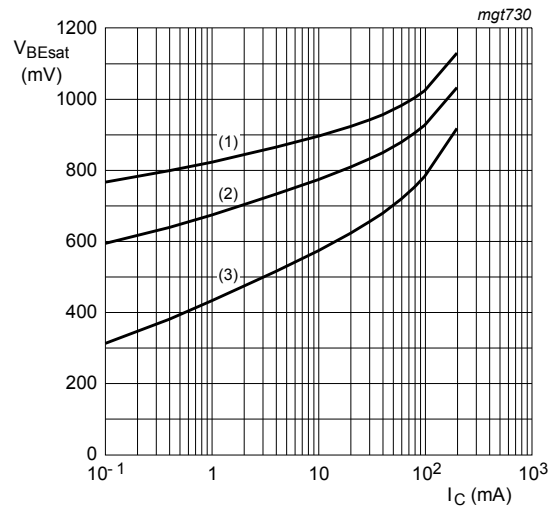
$V_{CE} = 5\text{ V}$
 (1) $T_{amb} = -55\text{ }^{\circ}\text{C}$
 (2) $T_{amb} = 25\text{ }^{\circ}\text{C}$
 (3) $T_{amb} = 150\text{ }^{\circ}\text{C}$

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



$I_C/I_B = 20$
 (1) $T_{amb} = 150\text{ }^{\circ}\text{C}$
 (2) $T_{amb} = 25\text{ }^{\circ}\text{C}$
 (3) $T_{amb} = -55\text{ }^{\circ}\text{C}$

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



$I_C/I_B = 10$
 (1) $T_{amb} = -55\text{ }^{\circ}\text{C}$
 (2) $T_{amb} = 25\text{ }^{\circ}\text{C}$
 (3) $T_{amb} = 150\text{ }^{\circ}\text{C}$

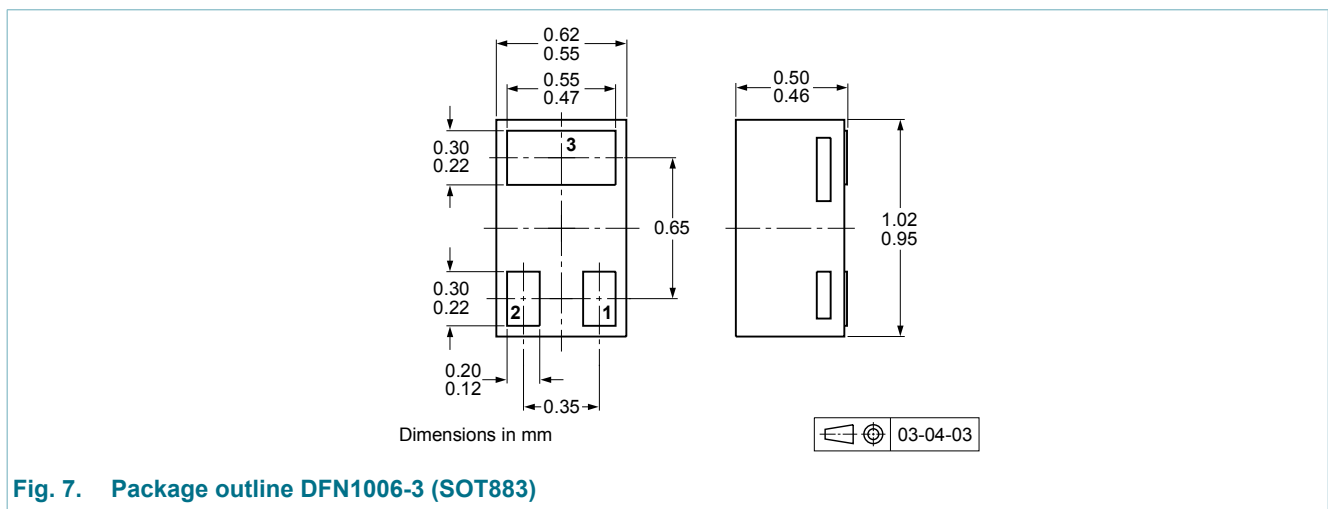
Fig. 6. Base-emitter saturation voltage as a function of collector current; typical values

11. Test information

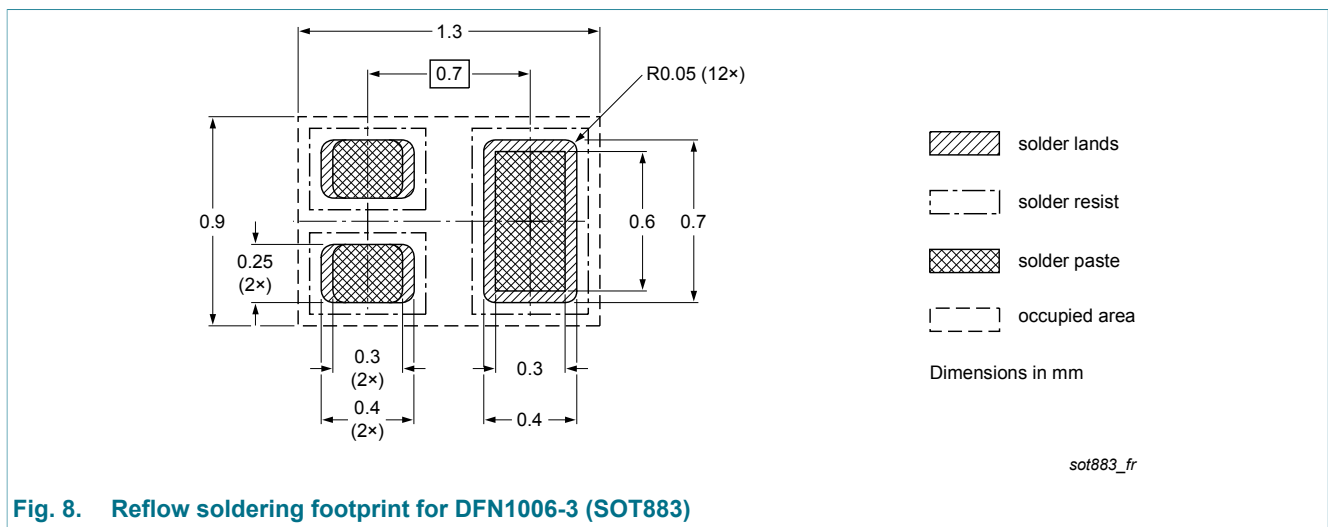
11.1 Quality information

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



14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BC846BM v.1	20150820	Product data sheet	-	-

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

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