

# BC847AM,315 Datasheet



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DiGi Electronics Part Number	BC847AM,315-DG
Manufacturer	<a href="#">Nexperia USA Inc.</a>
Manufacturer Product Number	BC847AM,315
Description	TRANS NPN 45V 0.1A SOT883
Detailed Description	Bipolar (BJT) Transistor NPN 45 V 100 mA 100MHz 2 50 mW Surface Mount SOT-883



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## Purchase and inquiry

**Manufacturer Product Number:**

BC847AM,315

**Series:**

-

**Transistor Type:**

NPN

**Voltage - Collector Emitter Breakdown (Max):**

45 V

**Current - Collector Cutoff (Max):**

15nA (ICBO)

**Power - Max:**

250 mW

**Operating Temperature:**

150°C (TJ)

**Qualification:**

AEC-Q101

**Package / Case:**

SC-101, SOT-883

**Base Product Number:**

BC847

**Manufacturer:**

Nexperia USA Inc.

**Product Status:**

Active

**Current - Collector (Ic) (Max):**

100 mA

**Vce Saturation (Max) @ Ib, Ic:**

400mV @ 5mA, 100mA

**DC Current Gain (hFE) (Min) @ Ic, Vce:**

110 @ 2mA, 5V

**Frequency - Transition:**

100MHz

**Grade:**

Automotive

**Mounting Type:**

Surface Mount

**Supplier Device Package:**

SOT-883

## Environmental & Export classification

**RoHS Status:**

ROHS3 Compliant

**REACH Status:**

REACH Unaffected

**HTSUS:**

8541.21.0075

**Moisture Sensitivity Level (MSL):**

1 (Unlimited)

**ECCN:**

EAR99



# BC847XM series

45 V, 100 mA NPN general-purpose transistors

Rev. 13 — 1 July 2022

Product data sheet

## 1. General description

NPN general-purpose transistors in a ultra small SOT883 (SC-101) Surface-Mounted Device (SMD) plastic package.

**Table 1. Product overview**

Type number[1]	Package		PNP complement
	Nexperia	JEITA	
BC847AM	SOT883	SC-101	BC857AM
BC847BM			BC857BM
BC847CM			BC857CM

[1] Valid for all available selection groups.

## 2. Features and benefits

- General-purpose transistors
- SMD plastic packages
- Three different gain selections
- AEC-Q101 qualified

## 3. Applications

- General-purpose switching and amplification

## 4. Quick reference data

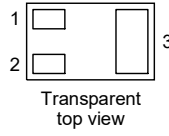
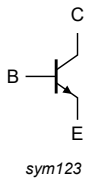
**Table 2. Quick reference data**

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{CEO}$	collector-emitter voltage	open base	-	-	45	V
$I_C$	collector current		-	-	100	mA
$h_{FE}$	DC current gain					
	BC847AM	$V_{CE} = 5\text{ V};$ $I_C = 2\text{ mA}$	110	180	220	
	BC847BM		200	290	450	
	BC847CM		420	520	800	

## 5. Pinning information

Table 3. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	 <p>Transparent top view</p>	 <p>sym123</p>
2	E	emitter		
3	C	collector		

## 6. Ordering information

Table 4. Ordering information

Type number	Package		Version
	Name	Description	
<a href="#">BC847AM</a>	SC-101	leadless ultra small plastic package; 3 solder lands; body 1.0 x 0.6 x 0.5 mm	<a href="#">SOT883</a>
<a href="#">BC847BM</a>			
<a href="#">BC847CM</a>			

## 7. Marking

Table 5. Marking codes

Type number	Marking code
BC847AM	D4
BC847BM	D5
BC847CM	D6

## 8. 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; $t_p \leq 1$ ms	-	200	mA
$I_{BM}$	peak base current	single pulse; $t_p \leq 1$ ms	-	100	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25$ °C	[1] -	250	mW
$T_j$	junction temperature		-	150	°C
$T_{amb}$	ambient temperature		-65	150	°C
$T_{stg}$	storage temperature		-65	150	°C

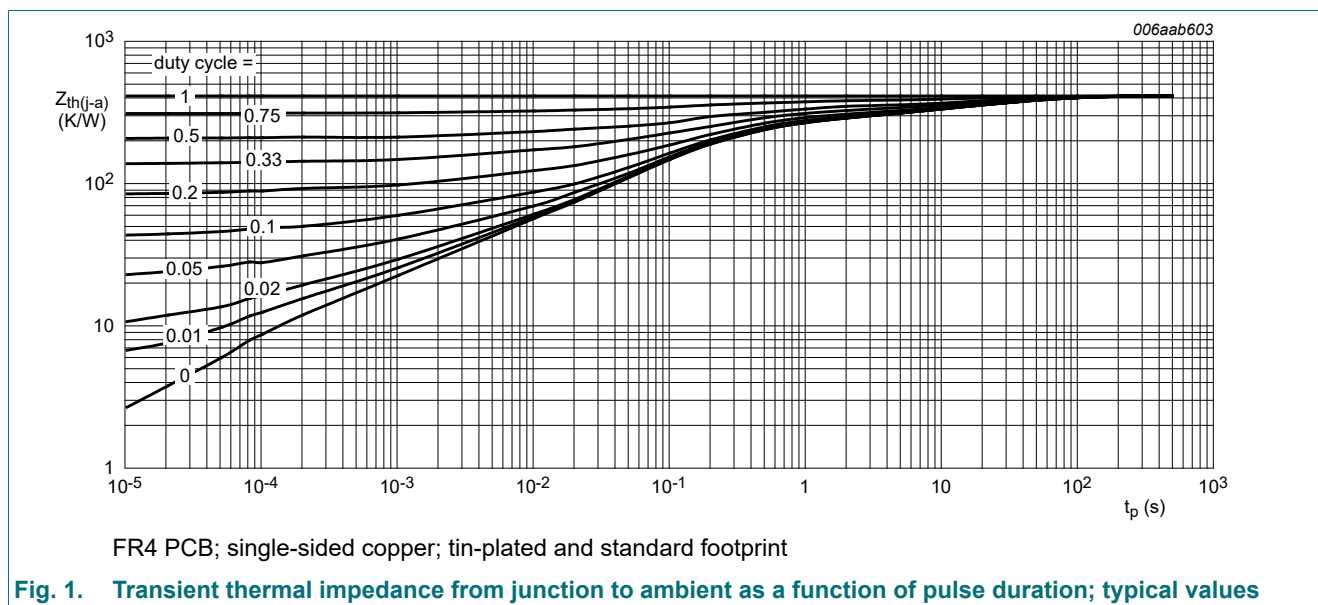
[1] Device mounted on an PCB with 60  $\mu$ m copper strip line, standard footprint.

## 9. 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	[1] -	-	500	K/W

[1] Device mounted on an PCB with 60  $\mu$ m copper strip line, standard footprint.



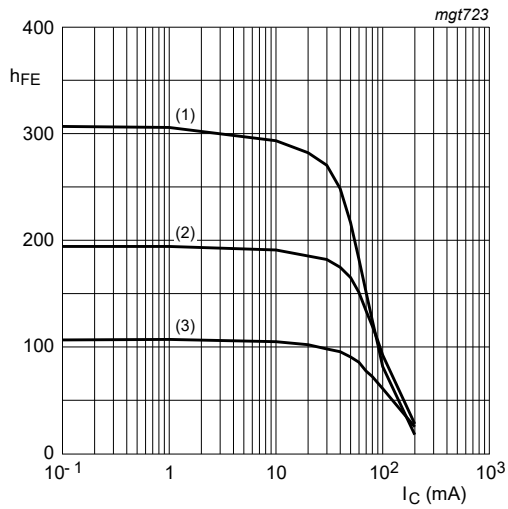
## 10. Characteristics

**Table 8. Characteristics**
 $T_{amb} = 25\text{ °C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = 100\ \mu\text{A}$ ; $I_E = 0\ \text{A}$	50	-	-	V	
$V_{(BR)CES}$	collector-emitter breakdown voltage	$I_C = 2\ \text{mA}$ ; $V_{BE} = 0\ \text{V}$	45	-	-	V	
$V_{(BR)EBO}$	emitter-base breakdown voltage	$I_C = 0\ \text{A}$ ; $I_E = 100\ \mu\text{A}$	6	-	-	V	
$I_{CBO}$	collector-base cut-off current	$V_{CB} = 30\ \text{V}$ ; $I_E = 0\ \text{A}$	-	-	15	nA	
		$V_{CB} = 30\ \text{V}$ ; $I_E = 0\ \text{A}$ ; $T_j = 150\text{ °C}$	-	-	5	$\mu\text{A}$	
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 5\ \text{V}$ ; $I_C = 0\ \text{A}$	-	-	100	nA	
$h_{FE}$	DC current gain						
	BC847AM	$V_{CE} = 5\ \text{V}$ ; $I_C = 10\ \mu\text{A}$	-	170	-		
	BC847BM		-	280	-		
	BC847CM		-	420	-		
	BC847AM	$V_{CE} = 5\ \text{V}$ ; $I_C = 2\ \text{mA}$	110	180	220		
	BC847BM		200	290	450		
	BC847CM		420	520	800		
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 10\ \text{mA}$ ; $I_B = 0.5\ \text{mA}$	-	90	200	mV	
		$I_C = 100\ \text{mA}$ ; $I_B = 5\ \text{mA}$	[1]	-	200	400	mV
$V_{BEsat}$	base-emitter saturation voltage	$I_C = 10\ \text{mA}$ ; $I_B = 0.5\ \text{mA}$	[2]	-	700	-	mV
		$I_C = 100\ \text{mA}$ ; $I_B = 5\ \text{mA}$	[2]	-	900	-	mV
$V_{BE}$	base-emitter voltage	$V_{CE} = 5\ \text{V}$ ; $I_C = 2\ \text{mA}$	[2]	580	660	700	mV
		$V_{CE} = 5\ \text{V}$ ; $I_C = 10\ \text{mA}$		-	-	770	mV
$f_T$	transition frequency	$V_{CE} = 5\ \text{V}$ ; $I_C = 10\ \text{mA}$ ; $f = 100\ \text{MHz}$	100	-	-	MHz	
$C_c$	collector capacitance	$V_{CB} = 10\ \text{V}$ ; $I_E = i_e = 0\ \text{A}$ ; $f = 1\ \text{MHz}$	-	-	1.5	pF	
$C_e$	emitter capacitance	$V_{EB} = 0.5\ \text{V}$ ; $I_C = i_c = 0\ \text{A}$ ; $f = 1\ \text{MHz}$	-	11	-	pF	
NF	noise figure	$I_C = 200\ \mu\text{A}$ ; $V_{CE} = 5\ \text{V}$ ; $R_S = 2\ \text{k}\Omega$ ; $f = 1\ \text{kHz}$ ; $B = 200\text{Hz}$	-	2	10	dB	

[1] pulsed;  $t_p \leq 300\ \mu\text{s}$ ;  $\delta \leq 0.02$

[2]  $V_{BE}$  decreases by approximately 2 mV/K with increasing temperature



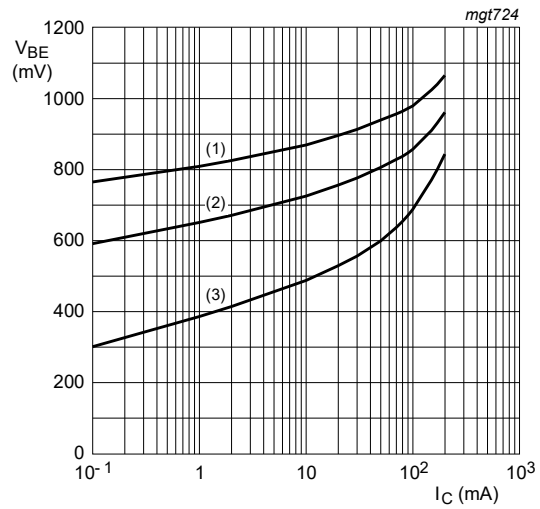
$V_{CE} = 5 \text{ V}$

(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. 2. BC847AM: DC current gain as a function of collector current; typical values**



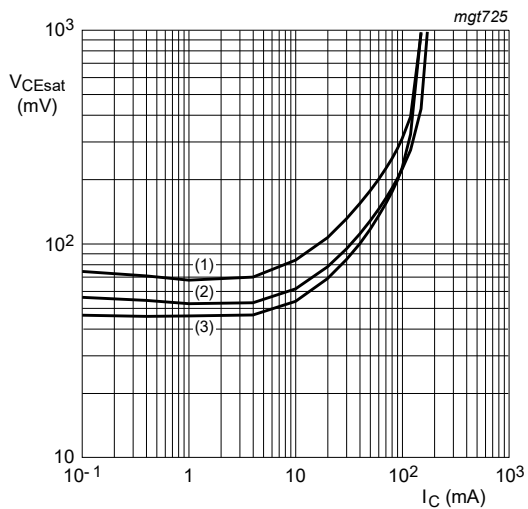
$V_{CE} = 5 \text{ V}$

(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. 3. BC847AM: Base-emitter voltage as a function of collector current; typical values**



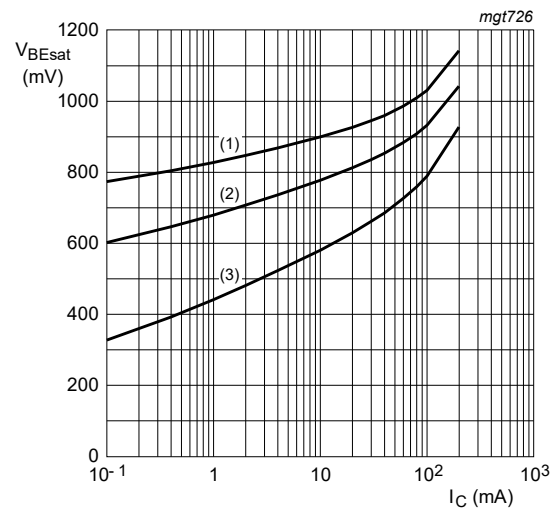
$I_C/I_B = 20$

(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. 4. BC847AM: Collector-emitter saturation voltage as a function of collector current; typical values**



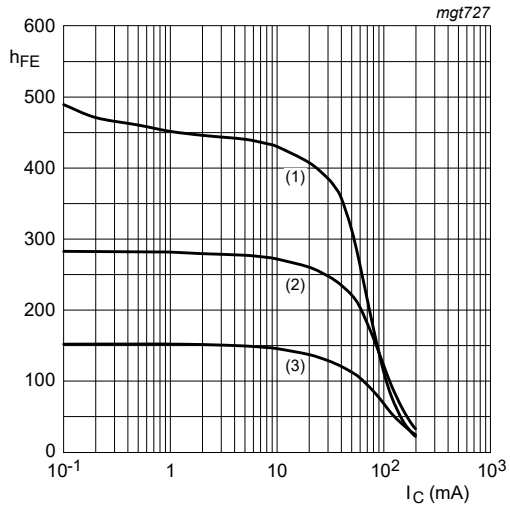
$I_C/I_B = 10$

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

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

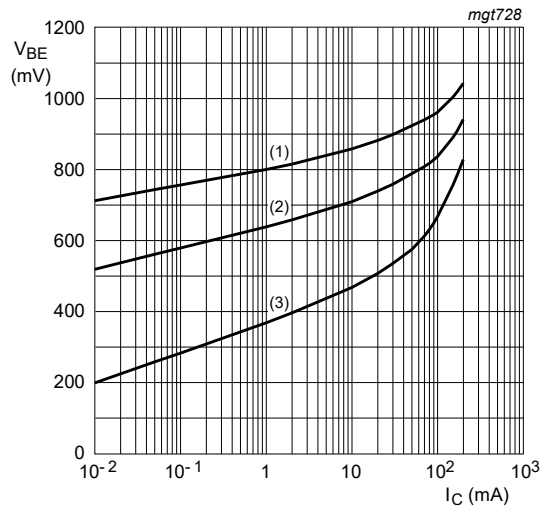
(3)  $T_{amb} = 150 \text{ }^\circ\text{C}$

**Fig. 5. BC847AM: Base-emitter saturation voltage as a function of collector current; typical values**



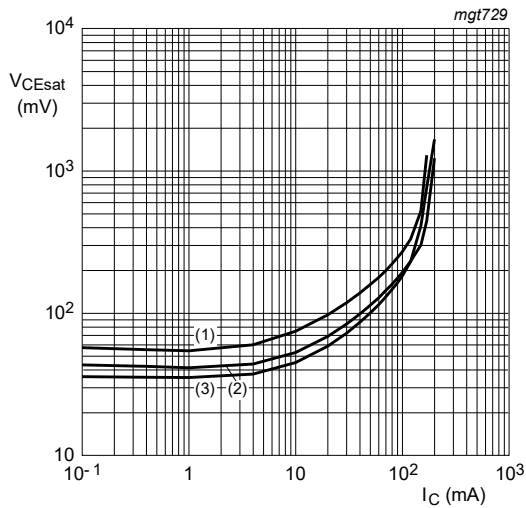
$V_{CE} = 5\text{ V}$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

**Fig. 6. BC847BM: DC current gain as a function of collector current; typical values**



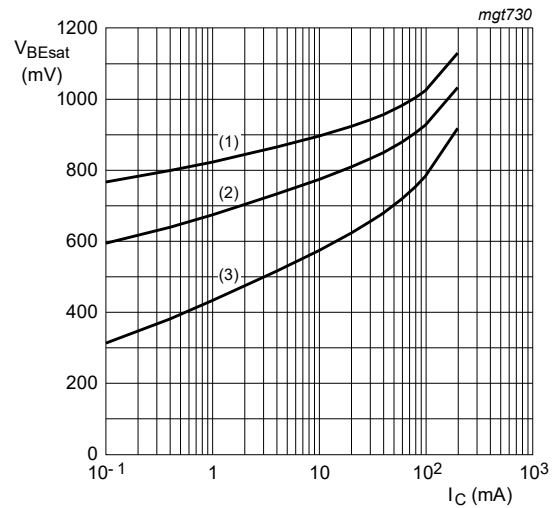
$V_{CE} = 5\text{ V}$   
 (1)  $T_{amb} = -55\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = 150\text{ °C}$

**Fig. 7. BC847BM: Base-emitter voltage as a function of collector current; typical values**



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

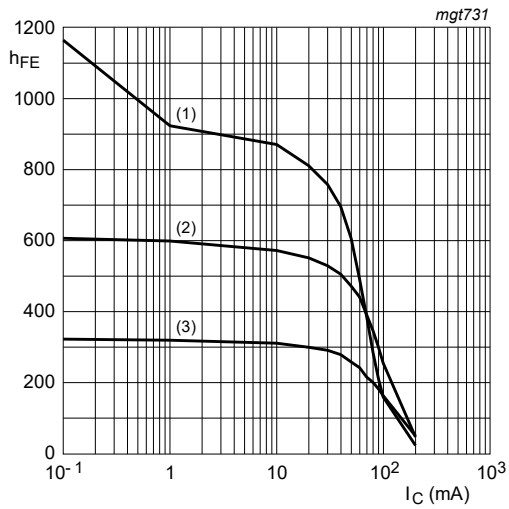
**Fig. 8. BC847BM: Collector-emitter saturation voltage as a function of collector current; typical values**



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

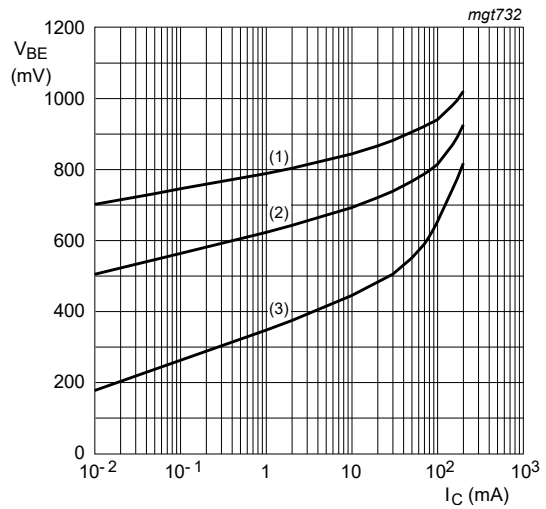
**Fig. 9. BC847BM: Base-emitter saturation voltage as a function of collector current; typical values**





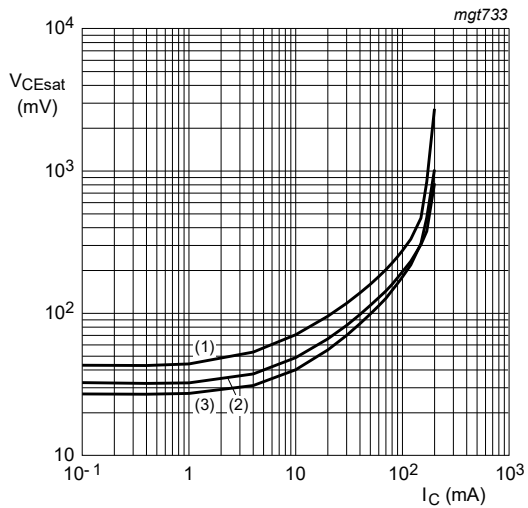
$V_{CE} = 5\text{ V}$   
 (1)  $T_{amb} = 150\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = -55\text{ °C}$

**Fig. 10. BC847CM: DC current gain as a function of collector current; typical values**



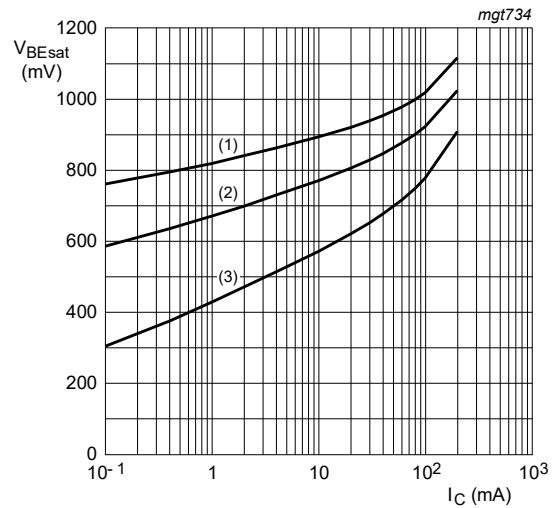
$V_{CE} = 5\text{ V}$   
 (1)  $T_{amb} = -55\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = 150\text{ °C}$

**Fig. 11. BC847CM: Base-emitter voltage as a function of collector current; typical values**



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

**Fig. 12. BC847CM: Collector-emitter saturation voltage as a function of collector current; typical values**



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

**Fig. 13. BC847CM: 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

Table 9. Package outline

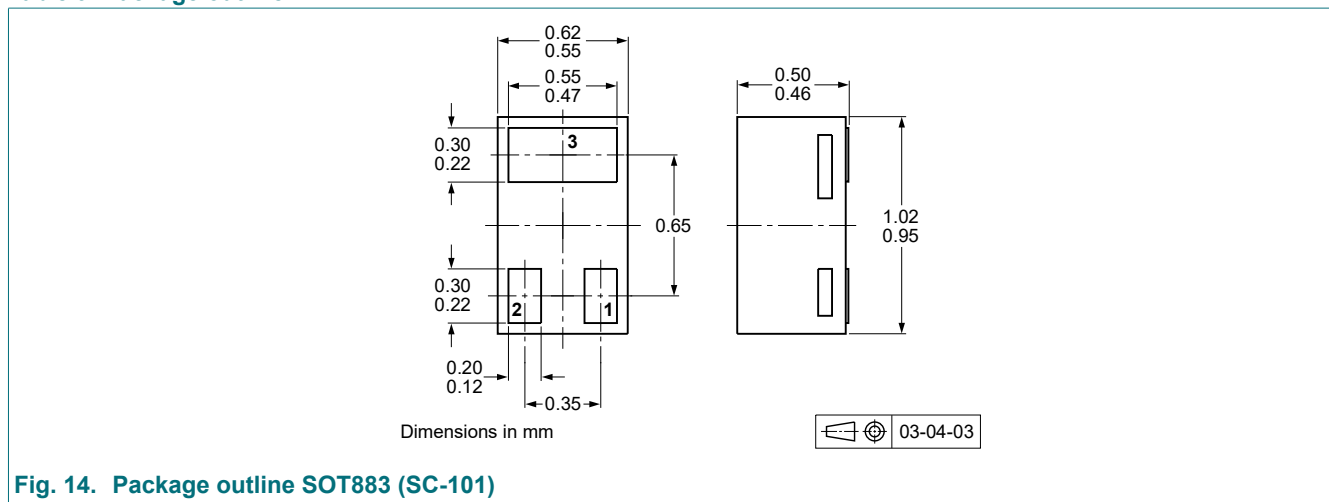


Fig. 14. Package outline SOT883 (SC-101)

## 13. Soldering

Table 10. Soldering

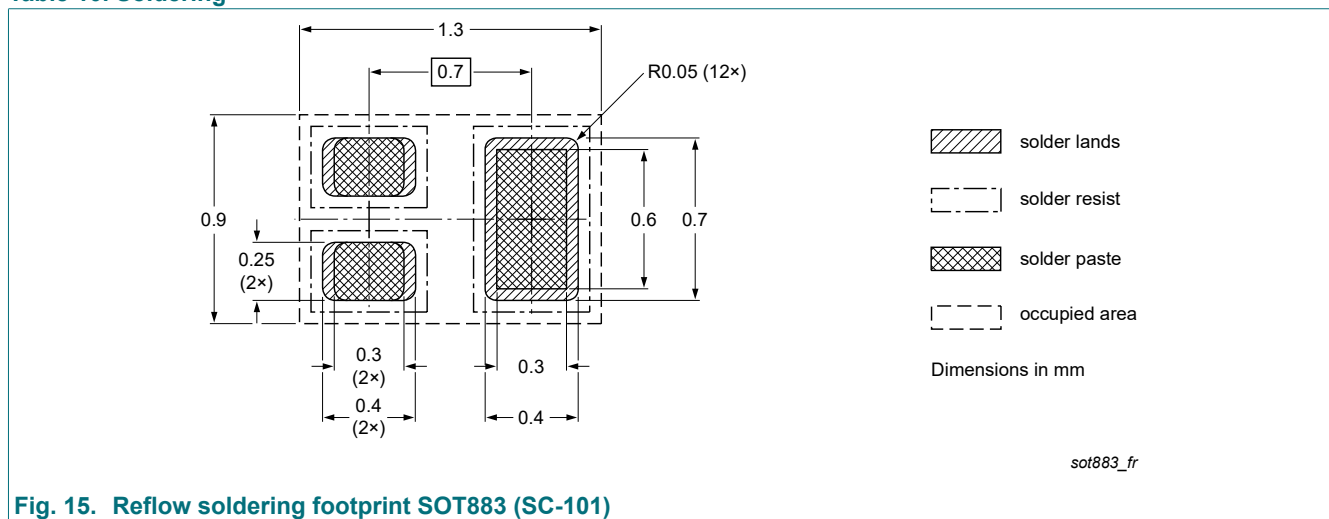


Fig. 15. Reflow soldering footprint SOT883 (SC-101)

## 14. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BC847XM_SER v.13	20220701	Product data sheet	-	BC847_SER v.12
Modifications:	<ul style="list-style-type: none"> <li>Series data sheet reduced to 3 data sheets per package</li> </ul>			
BC847_SER v.12	20191024	Product data sheet	-	BC847_SER v.11
BC847_SER v.11	20181205	Product data sheet	-	BC847_SER v.10
BC847_SER v.10	20180302	Product data sheet	-	BC847_SER v.9
BC847_SER v.9	20140923	Product data sheet	-	BC847_SER v.8
BC847_SER v.8	20120820	Product data sheet	-	BC847_BC547_SER v.7
BC847_BC547_SER v.7	20081210	Product data sheet	-	BC847_BC547_SER v.6
BC847_BC547_SER v.6	20050519	Product data sheet	-	-

## 15. Legal information

### 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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Date of release: 1 July 2022



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