



BC847QAPN

45 V, 100 mA NPN/PNP general-purpose transistor

30 October 2018

Product data sheet

1. General description

NPN/PNP general-purpose transistor in a leadless ultra small DFN1010B-6 (SOT1216) Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Reduces component count
- Reduces pick and place costs
- AEC-Q101 qualified
- Low package height of 0.37 mm

3. Applications

- General-purpose switching and amplification
- Mobile applications

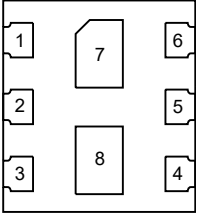
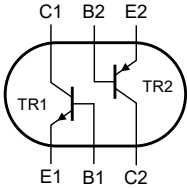
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor; for the PNP transistor with negative polarity						
V_{CE0}	collector-emitter voltage	open base	-	-	45	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	E1	emitter TR1	 Transparent top view DFN1010B-6 (SOT1216)	 sym139
2	B1	base TR1		
3	C2	collector TR2		
4	E2	emitter TR2		
5	B2	base TR2		
6	C1	collector TR1		
7	C1	collector TR1		
8	C2	collector TR2		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BC847QAPN	DFN1010B-6	DFN1010B-6: plastic thermal enhanced ultra thin small outline package; no leads; 6 terminals	SOT1216

7. Marking

Table 4. Marking codes

Type number	Marking code
BC847QAPN	01 00 00

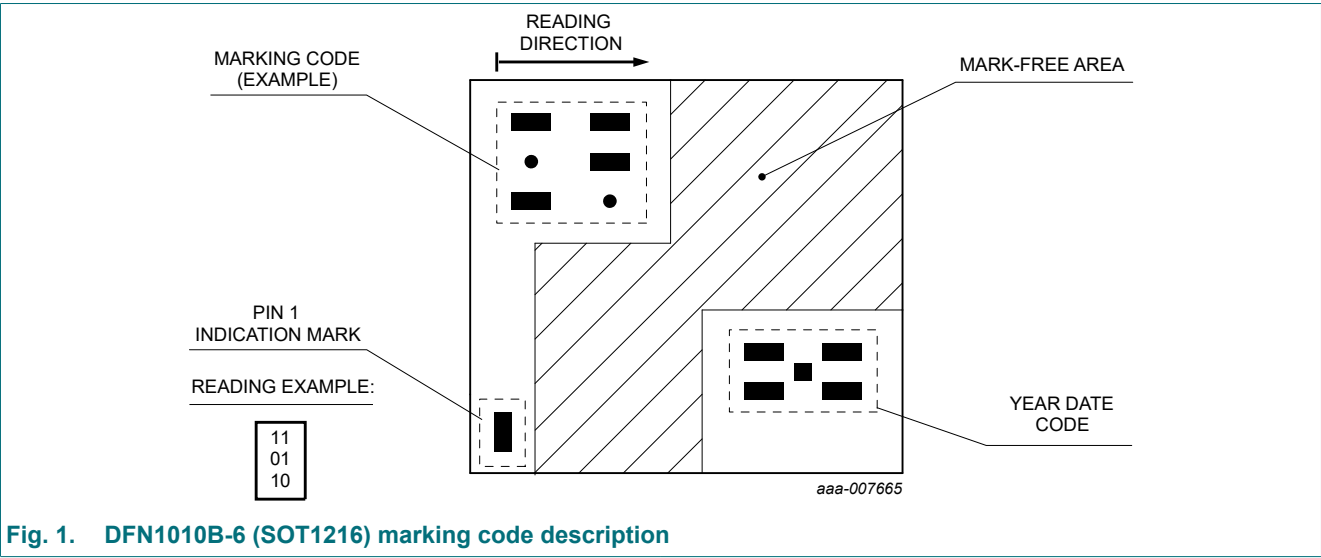


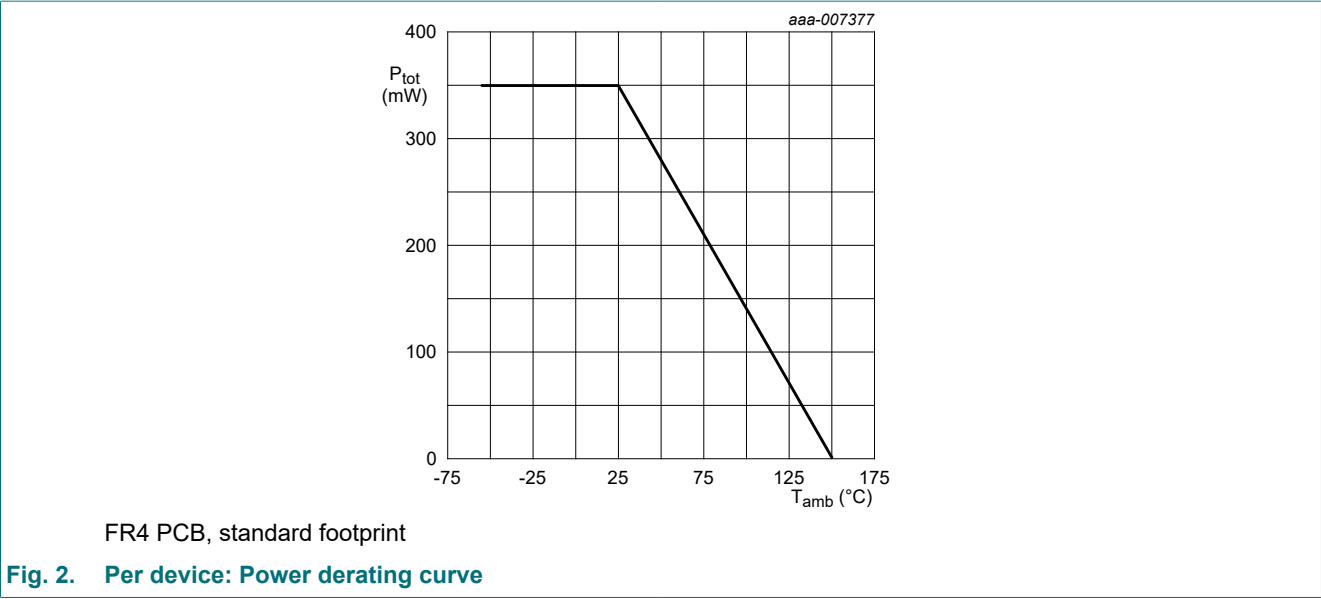
Fig. 1. DFN1010B-6 (SOT1216) marking code description

8. Limiting values

Table 5. Limiting values
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
Per transistor; for the PNP transistor with negative polarity						
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 ≤ 1 ms		-	200	mA
I _{BM}	peak base current			-	100	mA
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	230	mW
Per device						
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	350	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.

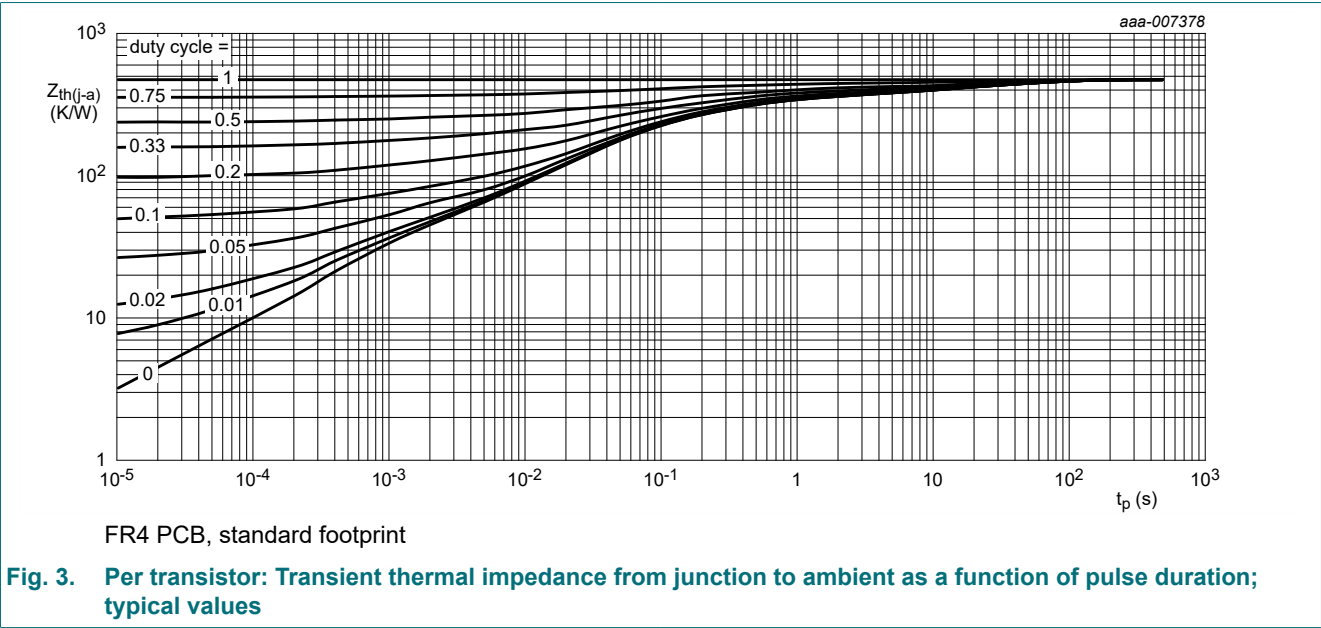


9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per transistor							
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	543	K/W
Per device							
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	357	K/W

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



10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per transistor; for the PNP transistor with negative polarity							
I_{CBO}	collector-base cut-off current	$V_{CB} = 30\text{ V}; I_E = 0\text{ A}; T_{amb} = 25\text{ °C}$		-	-	15	nA
		$V_{CB} = 30\text{ V}; I_E = 0\text{ A}; T_j = 150\text{ °C}$		-	-	5	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5\text{ V}; I_C = 0\text{ A}; T_{amb} = 25\text{ °C}$		-	-	100	nA
h_{FE}	DC current gain	$V_{CE} = 5\text{ V}; I_C = 2\text{ mA}; T_{amb} = 25\text{ °C}$		200	-	450	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 0.5\text{ mA}; T_{amb} = 25\text{ °C}$		-	-	100	mV
		$I_C = 100\text{ mA}; I_B = 5\text{ mA}; \text{pulsed}; t_p \leq 300\text{ μs}; \delta \leq 0.02; T_{amb} = 25\text{ °C}$		-	-	300	mV
V_{BEsat}	base-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 0.5\text{ mA}; T_{amb} = 25\text{ °C}$		-	760	-	mV
		$I_C = 100\text{ mA}; I_B = 5\text{ mA}; \text{pulsed}; t_p \leq 300\text{ μs}; \delta \leq 0.02; T_{amb} = 25\text{ °C}$		-	900	-	mV
V_{BE}	base-emitter voltage	$V_{CE} = 5\text{ V}; I_C = 2\text{ mA}; T_{amb} = 25\text{ °C}$		600	660	725	mV
		$V_{CE} = 5\text{ V}; I_C = 10\text{ mA}; T_{amb} = 25\text{ °C}$		-	710	820	mV
C_C	collector capacitance	$V_{CB} = 10\text{ V}; I_E = 0\text{ A}; i_e = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ °C}$		-	-	4	pF
f_T	transition frequency	$V_{CE} = 5\text{ V}; I_C = 10\text{ mA}; f = 100\text{ MHz}; T_{amb} = 25\text{ °C}$		100	-	-	MHz
NF	noise figure	$V_{CE} = 5\text{ V}; I_C = 0.2\text{ mA}; R_S = 2\text{ k}\Omega; f = 1\text{ MHz}; B = 200\text{ Hz}; T_{amb} = 25\text{ °C}$		-	-	10	dB
TR1 (NPN)							
C_e	emitter capacitance	$V_{EB} = 0.5\text{ V}; I_C = 0\text{ A}; i_c = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ °C}$		-	11	-	pF
TR2 (PNP)							
C_e	emitter capacitance	$V_{EB} = -0.5\text{ V}; I_C = 0\text{ A}; i_c = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ °C}$		-	10	-	pF

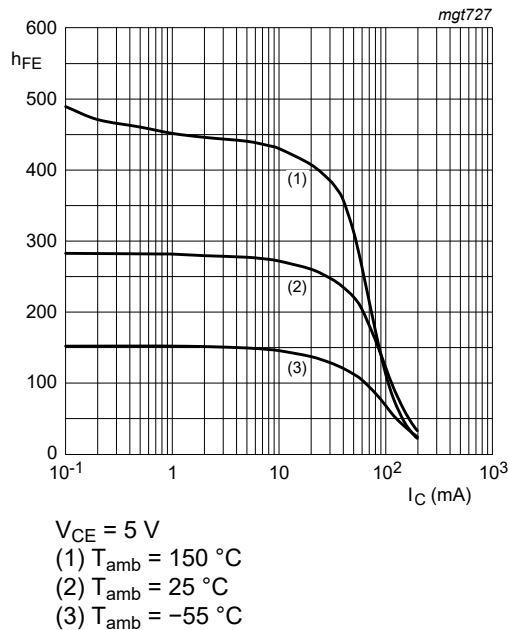


Fig. 4. NPN transistor: DC current gain as a function of collector current; typical values

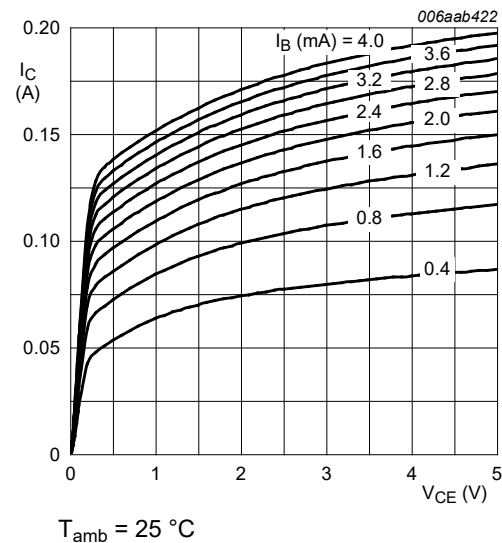


Fig. 5. NPN transistor: Collector current as a function of collector-emitter voltage; typical values

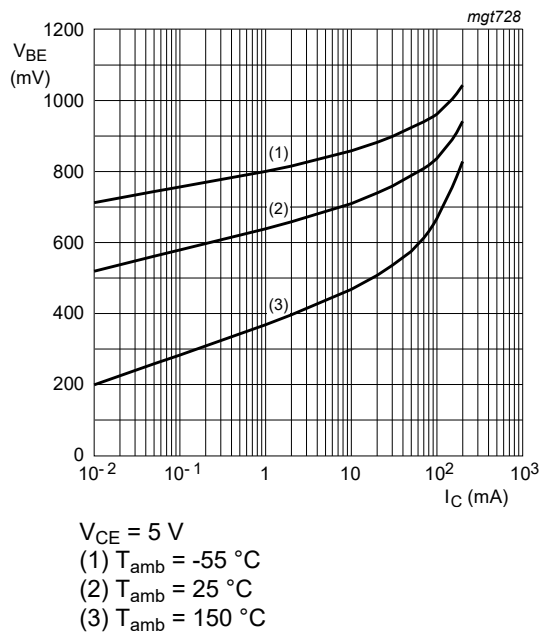


Fig. 6. NPN transistor: Base-emitter voltage as a function of collector current; typical values

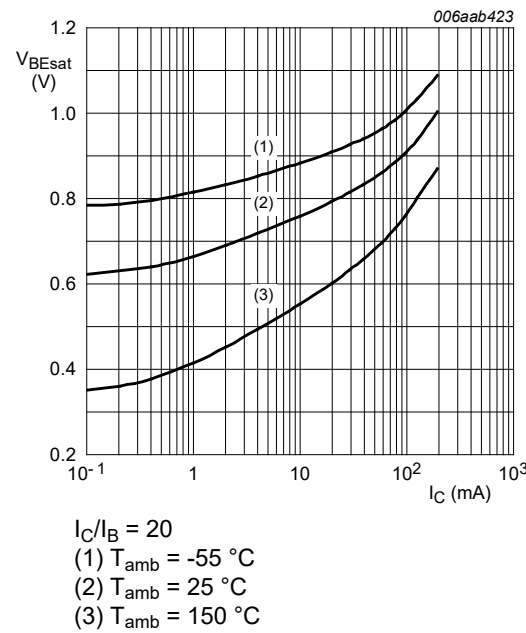


Fig. 7. NPN transistor: Base-emitter saturation voltage as a function of collector current; typical values

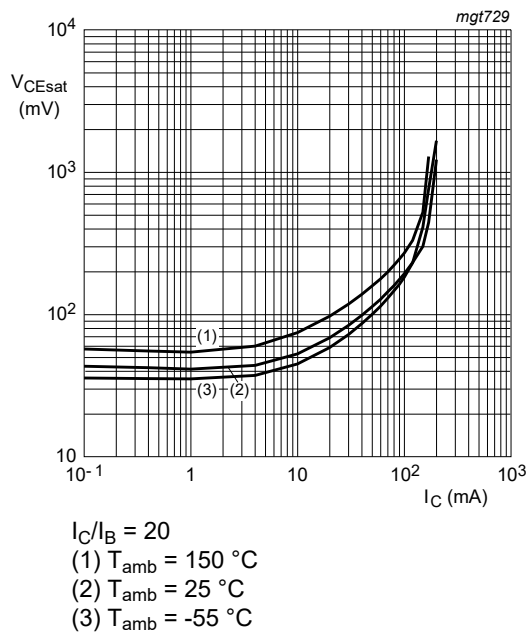


Fig. 8. NPN transistor: Collector-emitter saturation voltage as a function of collector current; typical values

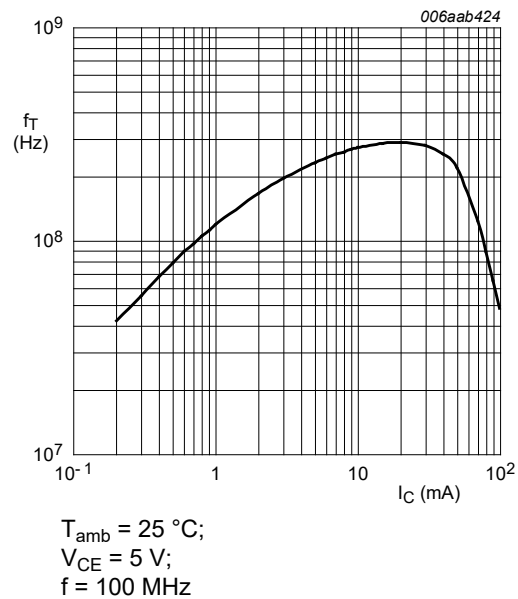


Fig. 9. NPN transistor: Transition frequency as a function of collector current; typical values

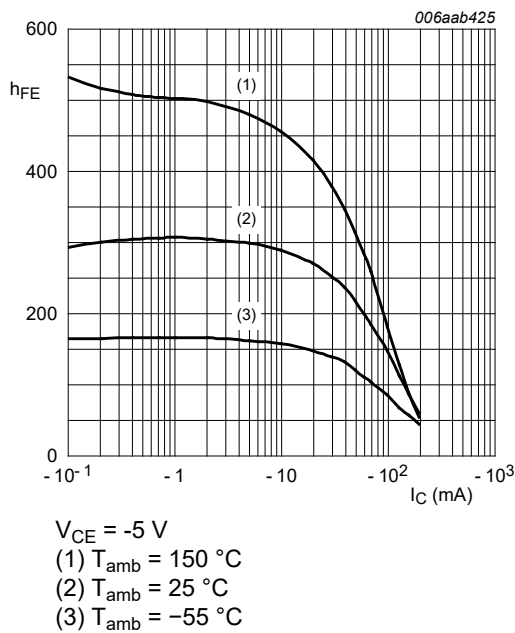


Fig. 10. PNP transistor: DC current gain as a function of collector current; typical values

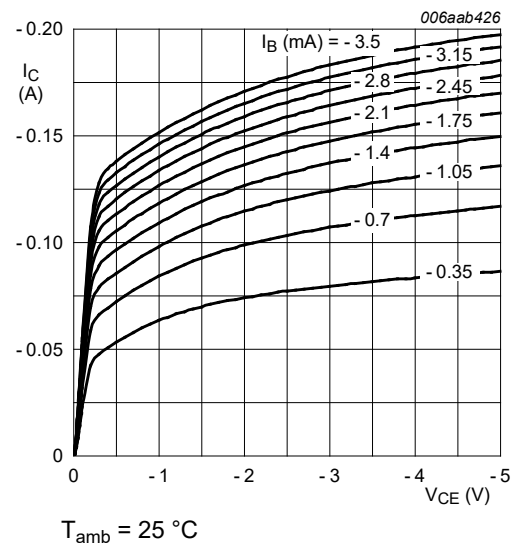


Fig. 11. PNP transistor: Collector current as a function of collector-emitter voltage; typical values

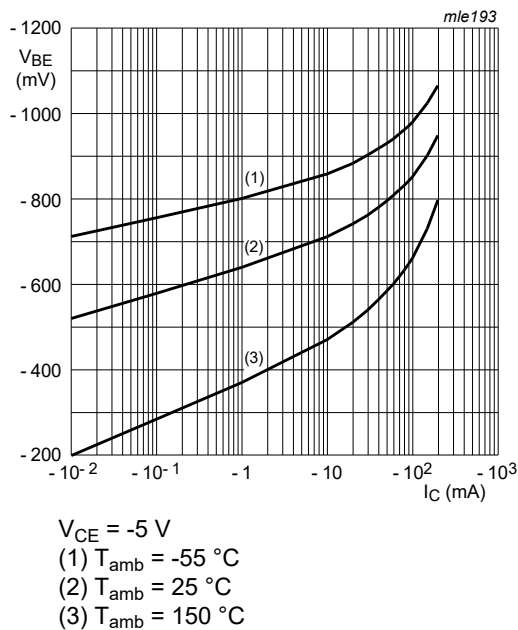


Fig. 12. PNP transistor: Base-emitter voltage as a function of collector current; typical values

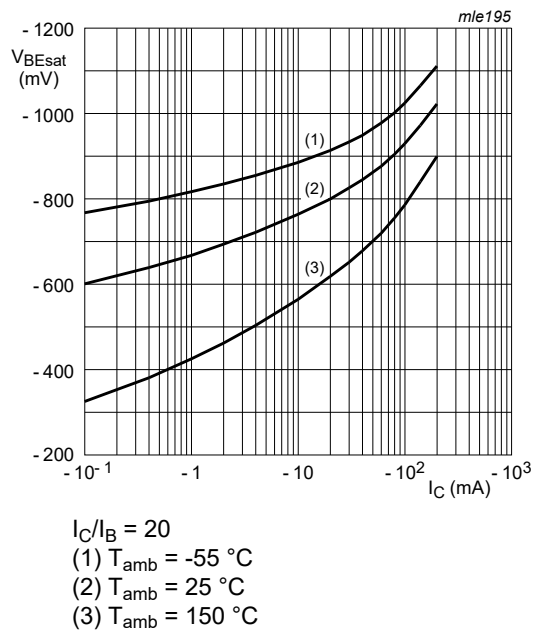


Fig. 13. PNP transistor: Base-emitter saturation voltage as a function of collector current; typical values

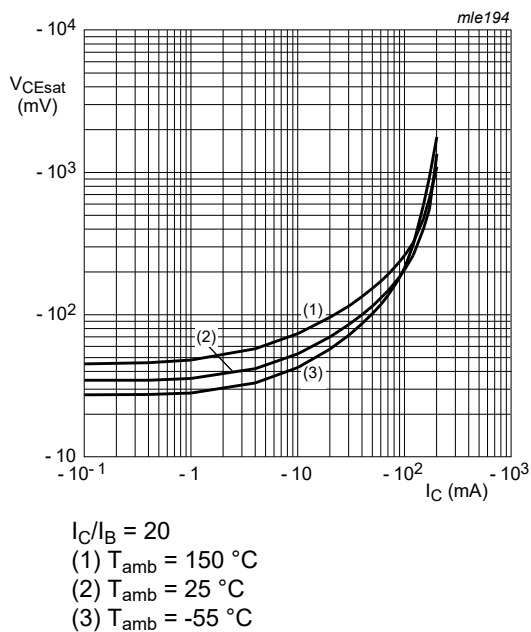


Fig. 14. PNP transistor: Collector-emitter saturation voltage as a function of collector current; typical values

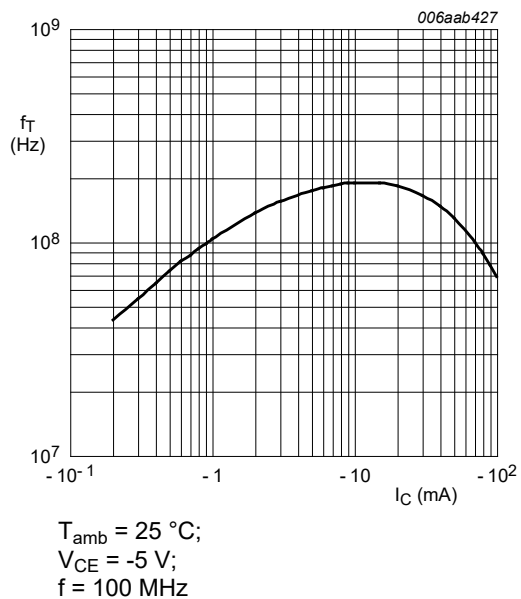


Fig. 15. PNP transistor: Transition frequency as a function of collector current; typical values

11. Test information

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

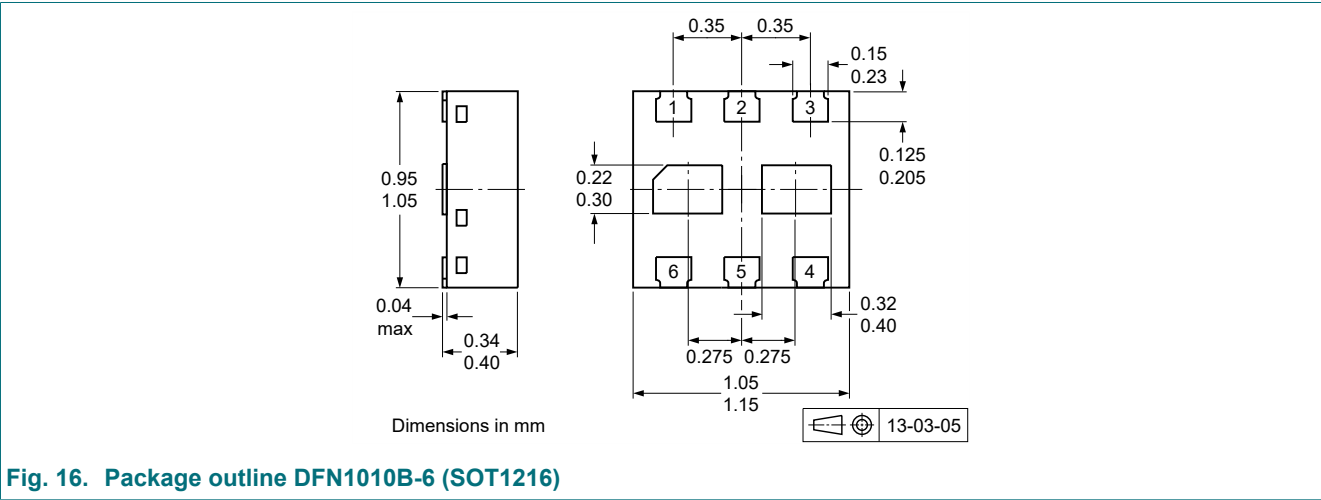


Fig. 16. Package outline DFN1010B-6 (SOT1216)

13. Soldering

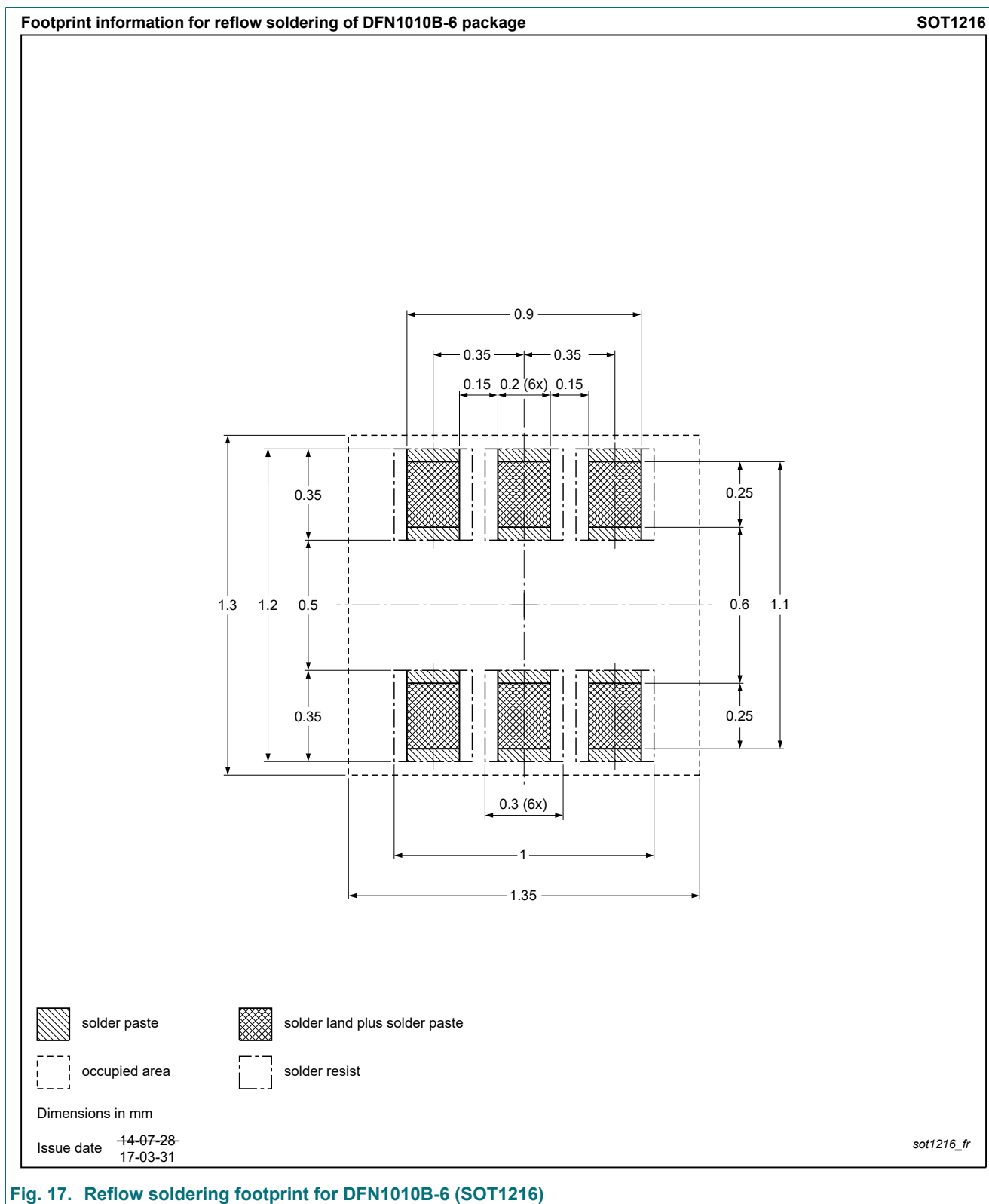


Fig. 17. Reflow soldering footprint for DFN1010B-6 (SOT1216)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BC847QAPN v.3	20181030	Product data sheet	-	BC847QAPN v.2
Modification:	• Characteristics: Titles adjusted for figures 7, 9 and 13			
BC847QAPN v.2	20150708	Product data sheet	-	BC847QAPN v.1
BC847QAPN v.1	20130718	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".
- [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 <https://www.nexperia.com>.

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Contents

1. General description..... 1

2. Features and benefits..... 1

3. Applications..... 1

4. Quick reference data..... 1

5. Pinning information.....2

6. Ordering information.....2

7. Marking.....2

8. Limiting values..... 3

9. Thermal characteristics..... 4

10. Characteristics..... 5

11. Test information..... 8

12. Package outline..... 9

13. Soldering..... 10

14. Revision history..... 11

15. Legal information..... 12

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Date of release: 30 October 2018