1. General description

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

PNP/PNP complement: BC857QAS. NPN/PNP complement: BC847QAPN.

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	Тур	Max	Unit
Per transistor						
V _{CEO}	collector-emitter voltage	open base	-	-	45	V
I _C	collector current		-	-	200	mA
h _{FE}	DC current gain	V _{CE} = 5 V; I _C = 2 mA	200	-	450	



45 V, 200 mA NPN/NPN general-purpose transistor

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	E1	emitter TR1		C1 B2 E2
2	B1	base TR1	$\begin{bmatrix} 1 & 7 & 6 \end{bmatrix}$	
3	C2	collector TR2	5	(TR1) TR2)
4	E2	emitter TR2		
5	B2	base TR2	3 8 4	E1 B1 C2
6	C1	collector TR1		sym020
7	C1	collector TR1	Transparent top view	
8	C2	collector TR2	DFN1010B-6 (SOT1216)	

6. Ordering information

Table 3. Ordering information

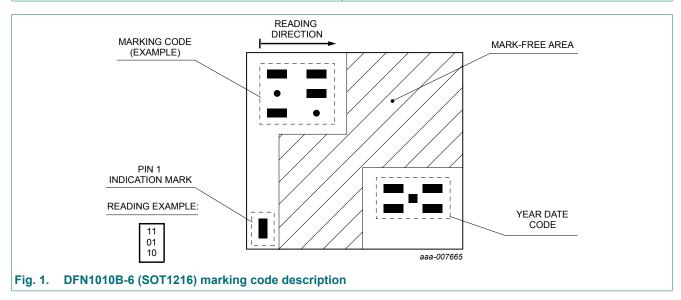
Type number	Package		
	Name	Description	Version
BC847QAS	DFN1010B-6	DFN1010B-6: plastic thermal enhanced ultra thin small outline package; no leads; 6 terminals	SOT1216

45 V, 200 mA NPN/NPN general-purpose transistor

7. Marking

Table 4. Marking codes

Type number	Marking code
BC847QAS	00 01 00



45 V, 200 mA NPN/NPN general-purpose transistor

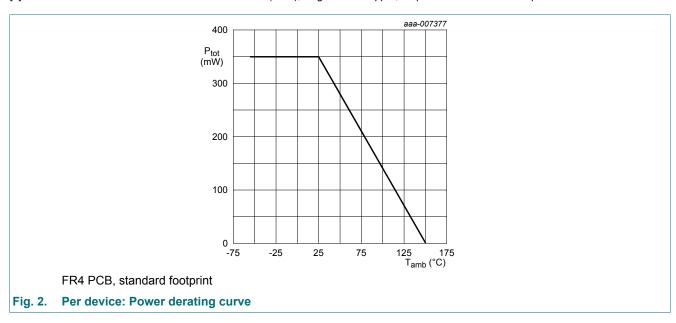
8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
Per transist	or		,	'		
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			-	200	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
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.



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9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Тур	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.

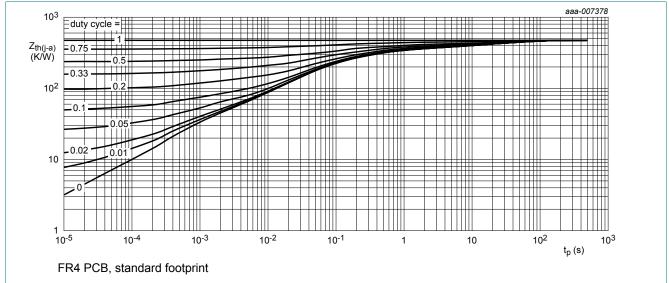


Fig. 3. Per transistor: Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

45 V, 200 mA NPN/NPN general-purpose transistor

10. Characteristics

Table 7. Characteristics

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

Symbol	Parameter	Conditions	N	lin	Тур	Max	Unit
Per transisto	or						
I _{CBO}	collector-base cut-off	V _{CB} = 30 V; I _E = 0 A; T _j = 150 °C	-		-	5	μA
	current	V _{CB} = 30 V; I _E = 0 A	-		-	15	nA
I _{EBO}	emitter-base cut-off current	V _{EB} = 5 V; I _C = 0 A	-		-	100	nA
h _{FE}	DC current gain	V _{CE} = 5 V; I _C = 2 mA	2	00	-	450	
V _{CEsat}	collector-emitter	I _C = 10 mA; I _B = 0.5 mA	-		-	100	mV
	saturation voltage	I_C = 100 mA; I_B = 5 mA; pulsed; $t_p \le$ 300 μs; $\delta \le$ 0.02	-		-	300	mV
V _{BEsat}	base-emitter saturation	I _C = 10 mA; I _B = 0.5 mA	-		760	-	mV
	voltage	I_C = 100 mA; I_B = 5 mA; pulsed; $t_p \le$ 300 μs; $\delta \le$ 0.02	-		900	-	mV
V _{BE}	base-emitter voltage	V _{CE} = 5 V; I _C = 2 mA	6	00	660	725	mV
		V _{CE} = 5 V; I _C = 10 mA	-		710	820	mV
C _c	collector capacitance	V _{CB} = 10 V; I _E = 0 A; i _e = 0 A; f = 1 MHz	-		-	4	pF
C _e	emitter capacitance	V _{EB} = 0.5 V; I _C = 0 A; f = 1 MHz	-		11	-	pF
f _T	transition frequency	V _{CE} = 5 V; I _C = 10 mA; f = 100 MHz	1	00	-	-	MHz
NF	noise figure	V_{CE} = 5 V; I_{C} = 0.2 mA; R_{S} = 2 k Ω ; f = 1 MHz; B = 200 Hz	-		-	10	dB

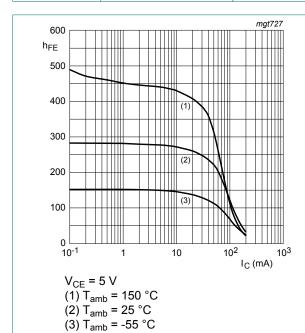


Fig. 4. DC current gain as a function of collector current; typical values

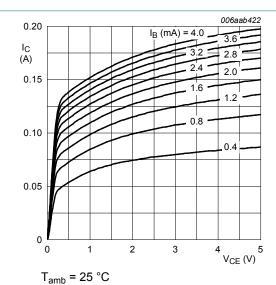
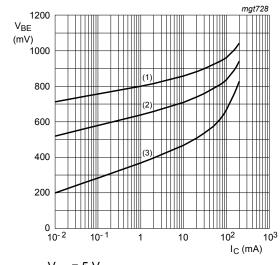


Fig. 5. Collector current as a function of collectoremitter voltage; typical values

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$$V_{CE} = 5 V$$

(1) $T_{amb} = -55 °C$

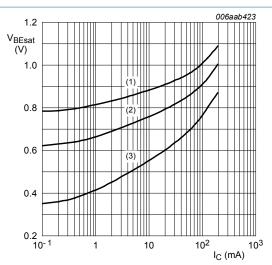
$$(1) T_{amb} = -55 ° ($$

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

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

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

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



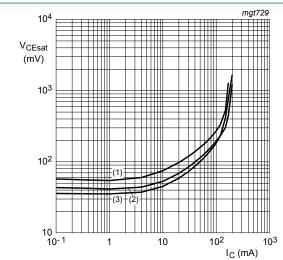
$$I_{\rm C}/I_{\rm B} = 20$$

$$(1) T_{amb} = -55 ° ($$

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

$$\begin{split} &I_{\text{C}}/I_{\text{B}} = 20\\ &(1)~T_{\text{amb}} = -55~^{\circ}\text{C}\\ &(2)~T_{\text{amb}} = 25~^{\circ}\text{C}\\ &(3)~T_{\text{amb}} = 150~^{\circ}\text{C} \end{split}$$

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



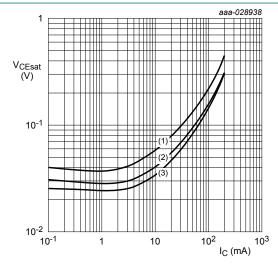
$$I_C/I_B = 20$$

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

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

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

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



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

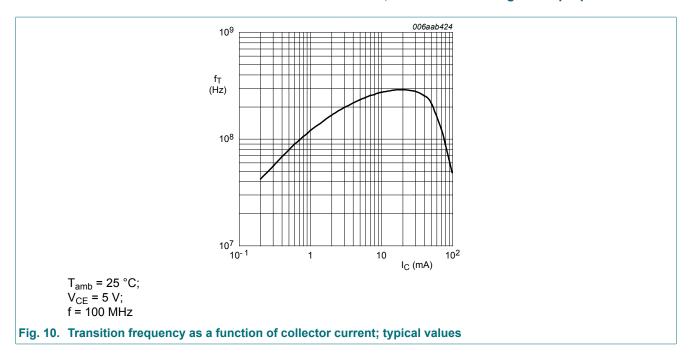
$$(1) T_{amb} = 150 °C$$

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

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

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

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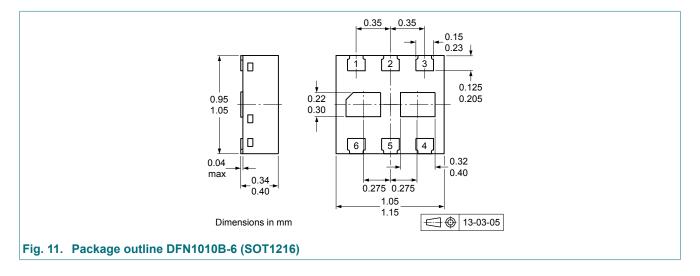


11. Test information

Quality information

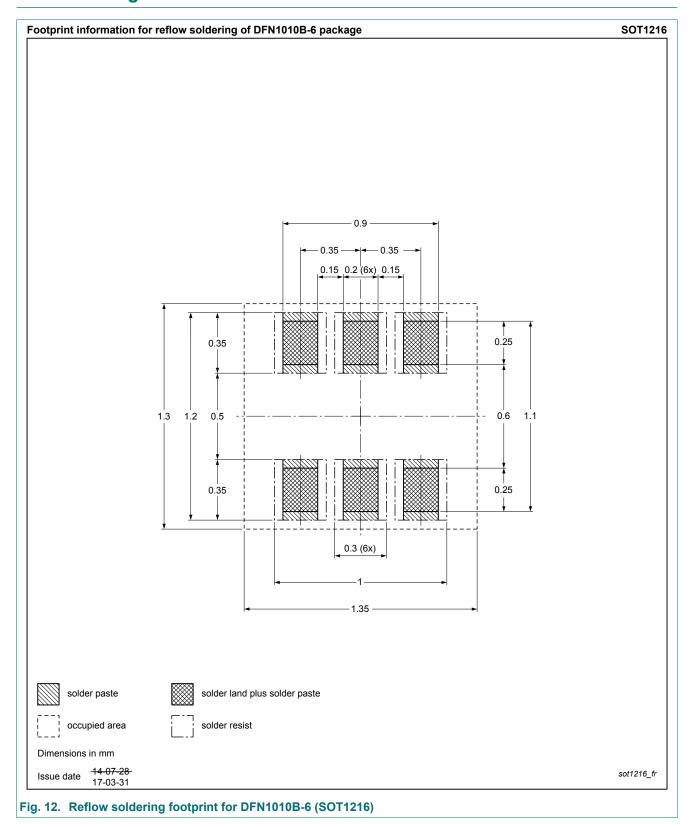
This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - *Stress test qualification for discrete semiconductors*, and is suitable for use in automotive applications.

12. Package outline



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13. Soldering



45 V, 200 mA NPN/NPN general-purpose transistor

14. Revision history

Table 8. Revision history

Tubio of Itovioloff file	otor y						
Data sheet ID	Release date	Data sheet status	Change notice	Supersedes			
BC847QAS v.3	20181009	Product data sheet	-	BC847QAS v.2			
Modifications:	_	 Limiting values: I_C value changed to 200 mA Characteristics: Figure 9 added 					
BC847QAS v.2	20150708	Product data sheet	-	BC847QAS v.1			
BC847QAS v.1	20140729	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.

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