



# BC55PA series

60 V, 1 A NPN medium power transistors

Rev. 9 — 1 July 2022

Product data sheet

## 1. General description

NPN medium power transistor in an ultra thin SOT1061 leadless small Surface-Mounted Device (SMD) plastic package.

Table 1. Product overview

Type number	Package		NPN complement
	Nexperia	JEITA	
BC55PA	SOT1061	-	BC52PA
BC55-10PA			BC52-10PA
BC55-16PA			BC52-16PA

## 2. Features and benefits

- High current
- Three current gain selections
- High power dissipation capability
- Exposed heatsink for excellent thermal and electrical conductivity
- Leadless very small SMD plastic package with medium power capability
- AEC-Q101 qualified

## 3. Applications

- Linear voltage regulators
- Power management
- Low-side switches
- MOSFET drivers
- Battery-driven devices
- Amplifiers

## 4. Quick reference data

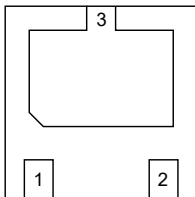
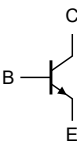
Table 2. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
$V_{CE0}$	collector-emitter voltage	open base	-	-	60	V	
$I_C$	collector current		-	-	1	A	
$I_{CM}$	peak collector current	single pulse; $t_p \leq 1$ ms	-	-	2	A	
$h_{FE}$	DC current gain						
	BC55PA	$V_{CE} = 2$ V; $I_C = 150$ mA $T_{amb} = 25$ °C	[1]	63	-	250	
	BC55-10PA		[1]	63	-	160	
	BC55-16PA		[1]	100	-	250	

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

## 5. Pinning information

Table 3. Pinning

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

## 6. Ordering information

Table 4. Ordering information

Type number	Package		Version
	Name	Description	
BC55PA	HUSON3	plastic surface-mounted package; exposed die pad for good heat transfer; 3 leads	SOT1061
BC55-10PA			
BC55-16PA			

## 7. Marking

Table 5. Marking

Type number	Marking code
BC55PA	AW
BC55-10PA	BH
BC55-16PA	BJ

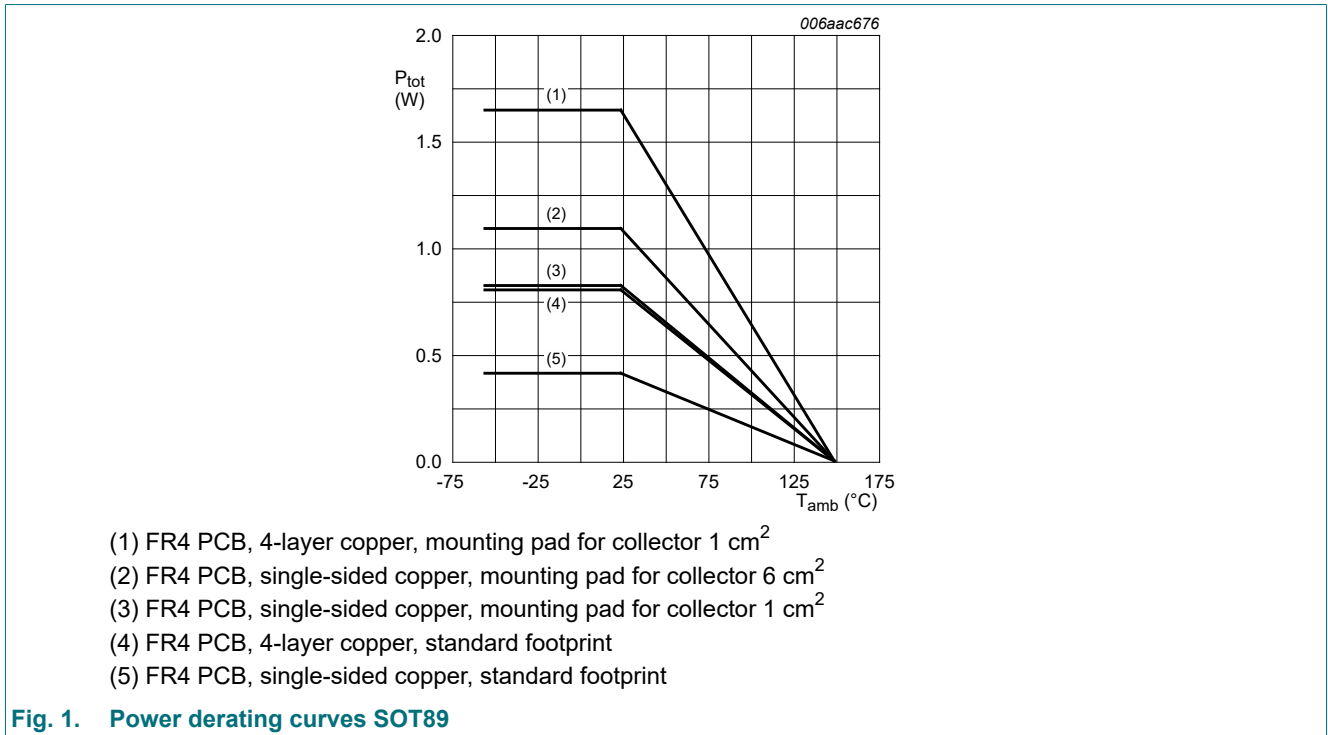
## 8. Limiting values

**Table 6. Limiting values**

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

Symbol	Parameter	Conditions	Min	Max	Unit	
V <sub>CBO</sub>	collector-base voltage	open emitter	-	60	V	
V <sub>CEO</sub>	collector-emitter voltage	open base	-	60	V	
V <sub>EBO</sub>	emitter-base voltage	open collector	-	5	V	
I <sub>C</sub>	collector current		-	1	A	
I <sub>CM</sub>	peak collector current	single pulse; t <sub>p</sub> ≤ 1 ms	-	2	A	
I <sub>B</sub>	base current		-	0.3	A	
I <sub>BM</sub>	peak base current	single pulse; t <sub>p</sub> ≤ 1 ms	-	0.3	A	
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C	[1]	-	0.42	W
			[2]	-	0.83	W
			[3]	-	1.10	W
			[4]	-	0.81	W
			[5]	-	1.65	W
T <sub>j</sub>	junction temperature		-	150	°C	
T <sub>amb</sub>	ambient temperature		-55	150	°C	
T <sub>stg</sub>	storage temperature		-65	150	°C	

- [1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
- [2] Device mounted on an FR4 PCB, single-sided copper, tin-plated; mounting pad for collector 1 cm<sup>2</sup>.
- [3] Device mounted on an FR4 PCB, single-sided copper, tin-plated; mounting pad for collector 6 cm<sup>2</sup>.
- [4] Device mounted on an FR4 PCB, 4-layer copper, tin-plated and standard footprint.
- [5] Device mounted on an FR4 PCB, 4-layer copper, tin-plated, mounting pad for collector 1 cm<sup>2</sup>.



## 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]	-	-	298	K/W
			[2]	-	-	151	K/W
			[3]	-	-	114	K/W
			[4]	-	-	154	K/W
			[5]	-	-	76	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	20	K/W

- [1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
- [2] Device mounted on an FR4 PCB, single-sided copper, tin-plated; mounting pad for collector 1 cm<sup>2</sup>.
- [3] Device mounted on an FR4 PCB, single-sided copper, tin-plated; mounting pad for collector 6 cm<sup>2</sup>.
- [4] Device mounted on an FR4 PCB, 4-layer copper, tin-plated and standard footprint.
- [5] Device mounted on an FR4 PCB, 4-layer copper, tin-plated, mounting pad for collector 1 cm<sup>2</sup>.

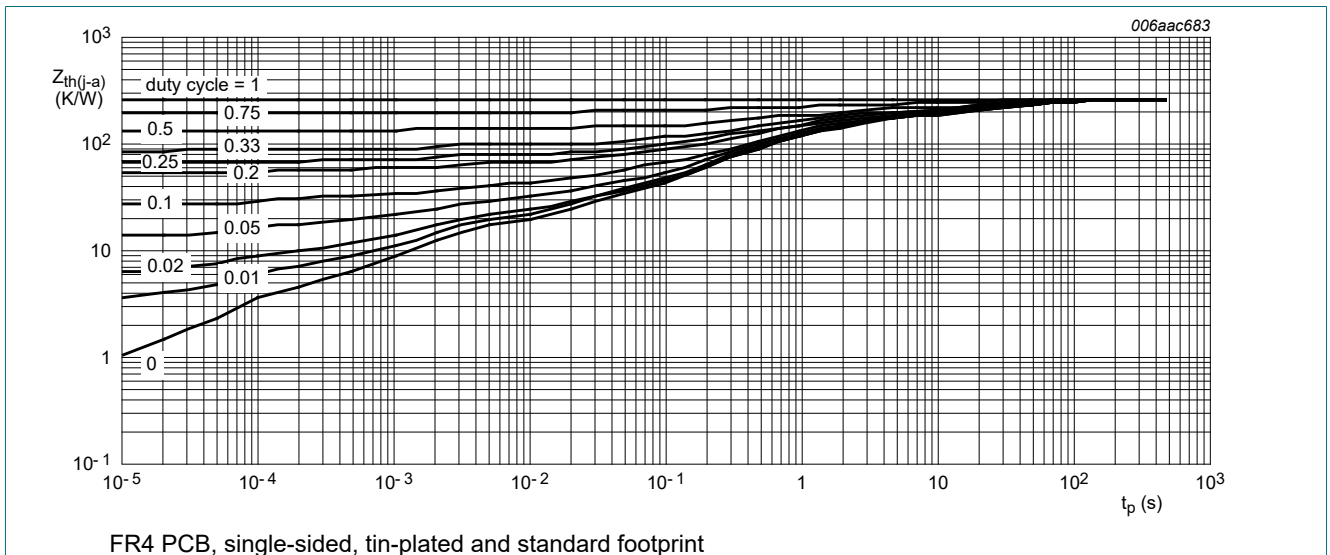


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

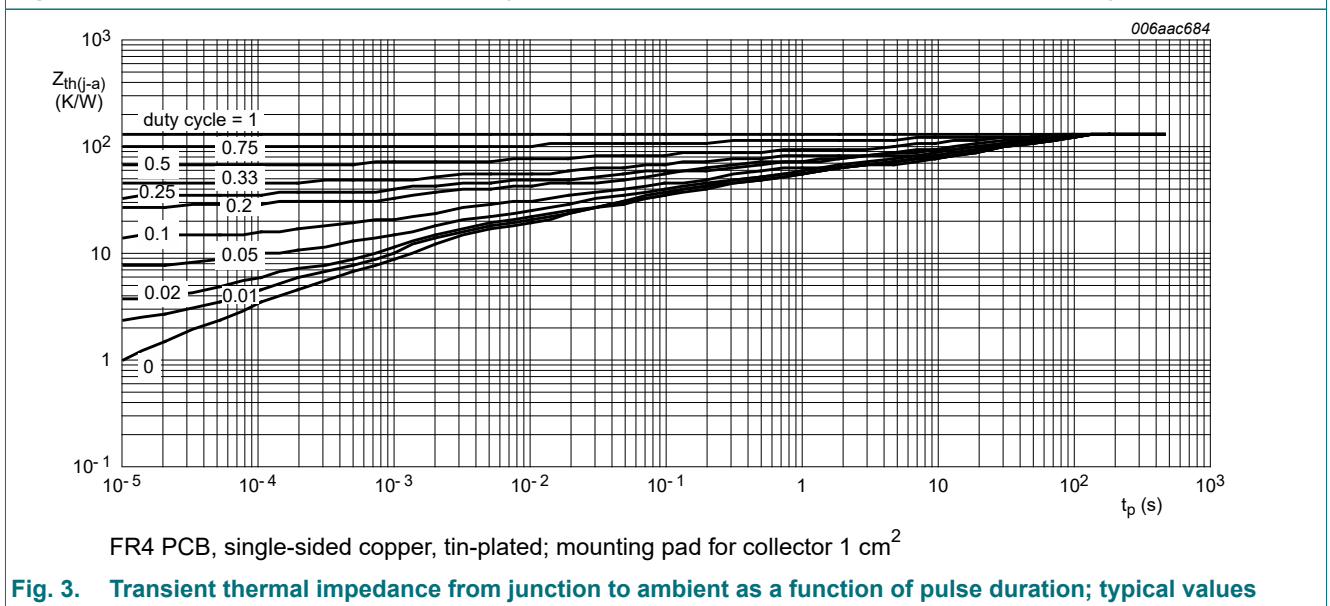
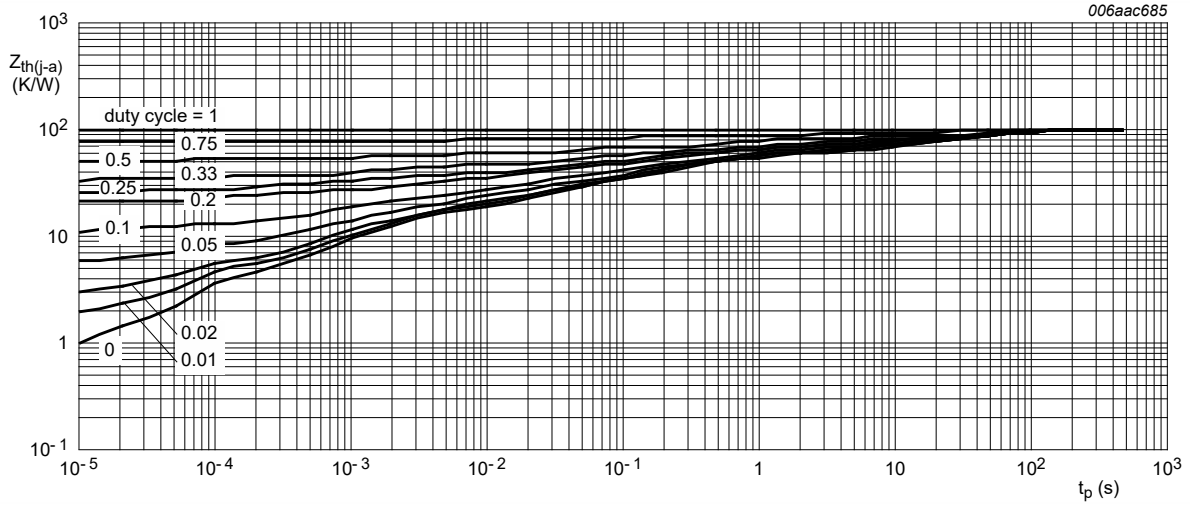
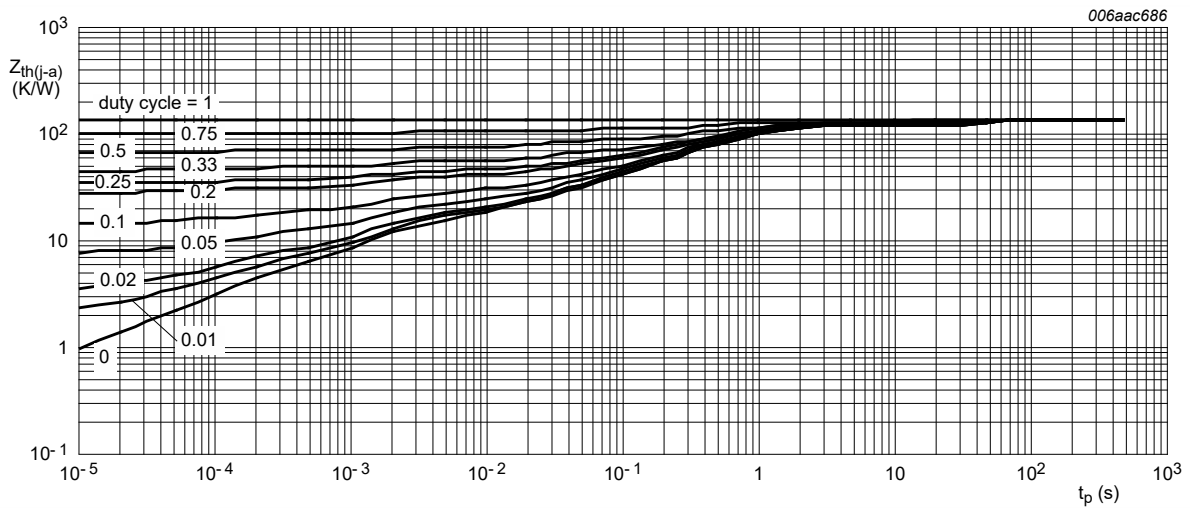


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



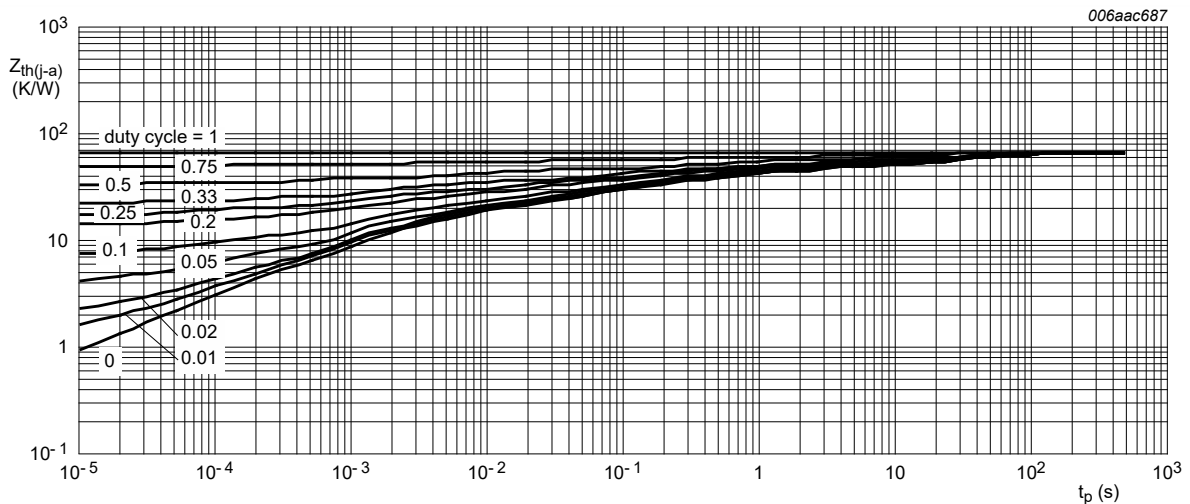
FR4 PCB, single-sided copper, tin-plated; mounting pad for collector 6 cm<sup>2</sup>

Fig. 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



FR4 PCB, 4-layer copper, standard footprint

Fig. 5. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



FR4 PCB, 4-layer copper, mounting pad for collector 1 cm<sup>2</sup>.

Fig. 6. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

## 10. Characteristics

Table 8. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = 100 \mu\text{A}; I_E = 0; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$		60	-	-	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	$I_C = 2 \mu\text{A}; I_B = 0 \text{ A}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$		60	-	-	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	$I_C = 0 \text{ A}; I_E = 100 \mu\text{A}$		5	-	-	V
$I_{CBO}$	collector-base cut-off current	$V_{CB} = 30 \text{ V}; I_E = 0 \text{ A}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$		-	-	100	nA
		$V_{CB} = 30 \text{ V}; I_E = 0 \text{ A}; T_J = 150 \text{ }^\circ\text{C}$		-	-	10	$\mu\text{A}$
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 5 \text{ V}; I_C = 0 \text{ A}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$		-	-	100	nA
$h_{FE}$	DC current gain						
	BC55PA	$V_{CE} = 2 \text{ V}; I_C = 5 \text{ mA}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	[1]	63	-	-	
		$V_{CE} = 2 \text{ V}; I_C = 150 \text{ mA}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	[1]	63	-	250	
		$V_{CE} = 2 \text{ V}; I_C = 500 \text{ mA}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	[1]	40	-	-	
	BC55-10PA	$V_{CE} = 2 \text{ V}; I_C = 5 \text{ mA}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	[1]	63	-	-	
		$V_{CE} = 2 \text{ V}; I_C = 150 \text{ mA}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	[1]	63	-	160	
		$V_{CE} = 2 \text{ V}; I_C = 500 \text{ mA}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	[1]	40	-	-	
	BC55-16PA	$V_{CE} = 2 \text{ V}; I_C = 5 \text{ mA}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	[1]	63	-	-	
		$V_{CE} = 2 \text{ V}; I_C = 150 \text{ mA}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	[1]	100	-	250	
		$V_{CE} = 2 \text{ V}; I_C = 500 \text{ mA}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	[1]	40	-	-	
$h_{FE}$	DC current gain	$V_{CE} = 2 \text{ V}; I_C = 5 \text{ mA}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	[1]	63	-	-	
$h_{FE}$	DC current gain	$V_{CE} = 2 \text{ V}; I_C = 500 \text{ mA}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	[1]	40	-	-	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 500 \text{ mA}; I_B = 50 \text{ mA}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	[1]	-	-	0.5	V
$V_{BE}$	base-emitter voltage	$V_{CE} = 2 \text{ V}; I_C = 500 \text{ mA}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$	[1]	-	-	1	V
$C_c$	collector capacitance	$V_{CB} = 10 \text{ V}; I_E = I_e = 0 \text{ A}; f = 1 \text{ MHz}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$		-	6	-	pF
$f_T$	transition frequency	$V_{CE} = 5 \text{ V}; I_C = 50 \text{ mA}; f = 100 \text{ MHz}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$		100	180	-	MHz

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

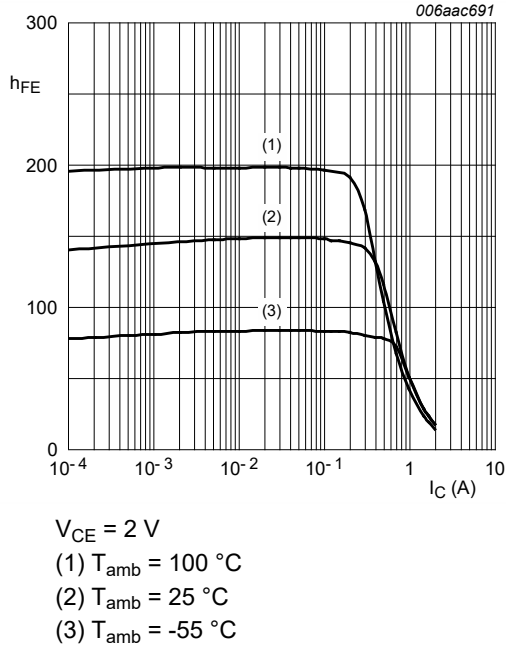


Fig. 7. DC current gain as a function of collector current; typical values

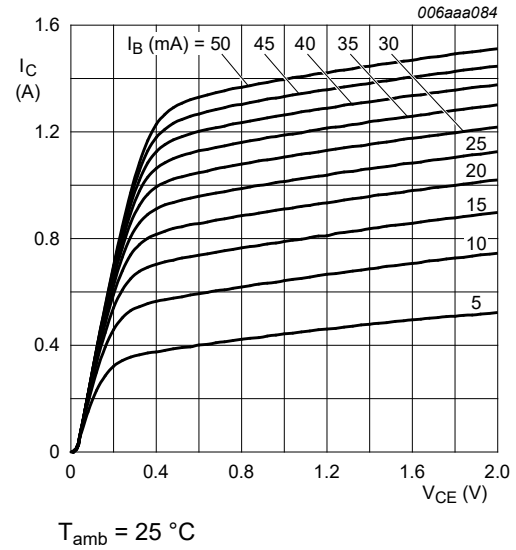


Fig. 8. Collector current as a function of collector-emitter voltage; typical values

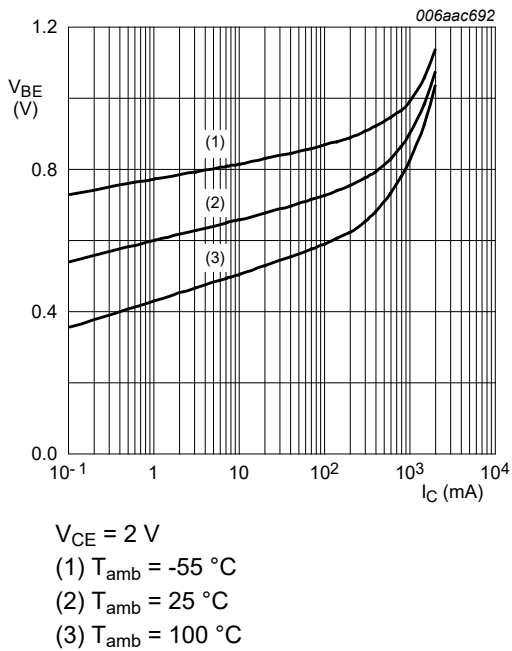


Fig. 9. Base-emitter voltage as a function of collector current; typical values

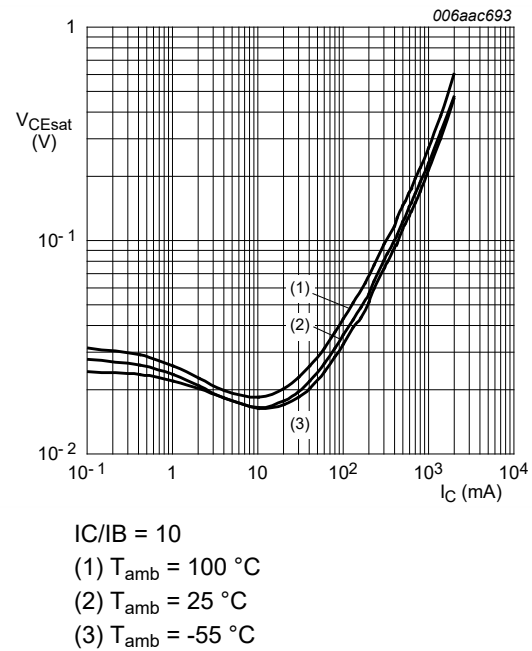


Fig. 10. Collector-emitter saturation voltage as a function of collector current; typical values

## 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

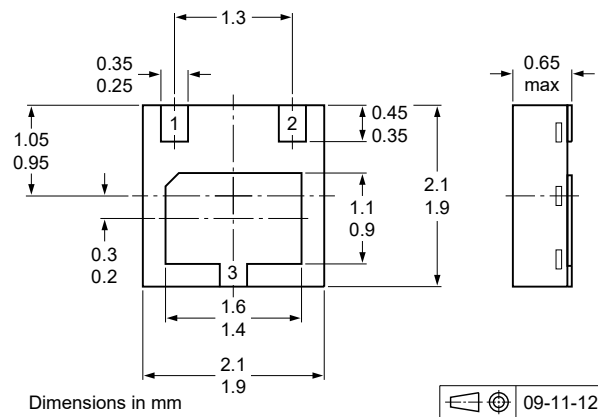


Fig. 11. Package outline SOT1061



13. Soldering

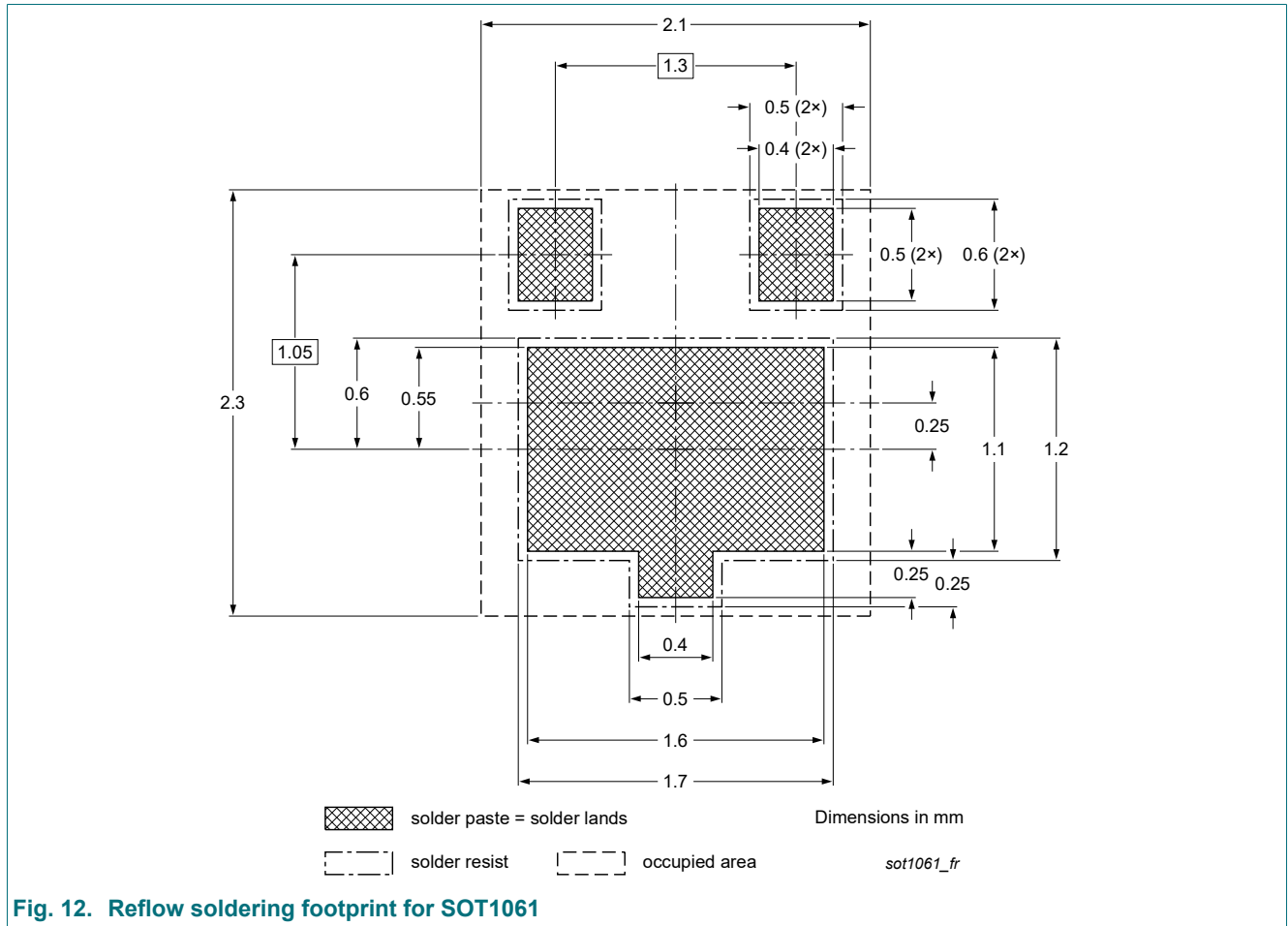


Fig. 12. Reflow soldering footprint for SOT1061

## 14. Revision history

Table 9. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BC55PA_SER v.9	20220701	Product data sheet	-	BCP55_BCX55_BC55PA v.8
Modifications:	<ul style="list-style-type: none"> <li>Series data sheet describing several packages reduced to series data sheets per package.</li> <li>Package information removed.</li> </ul>			
BCP55_BCX55_BC55PA v.8	20111024	Product data sheet	-	BC637_BCP55_BCX55 v.7
BC637_BCP55_BCX55 v.7	20070625	Product data sheet	-	BC637_BCP55_BCX55 v.6
BC637_BCP55_BCX55 v.6	20050218	Product data sheet	CPCN200405029	BC635_637_639 v.4 BCP54_55_56 v.5 BCX54_55_56 v.4
BC635_637_639 v.4	20011010	Product Specification	-	BC635_637_639 v.3
BCP54_55_56 v.5	20030206	Product Specification	-	BCX54_55_56 v.4
BCX54_55_56 v.4	20011010	Product Specification	-	BCX54_55_56 v.3

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