



BC53PAST-Q series

80 V, 1 A PNP medium power transistors

Rev. 1 — 23 August 2024

Product data sheet

1. General description

PNP medium power transistors in an ultra thin DFN2020D-3 (SOT1061D) leadless small Surface-Mounted Device (SMD) plastic package with medium power capability and Side-Wettable Flanks (SWF).

Table 1. Product overview

Type number	Package	NPN complement
	Nexperia	
BC53PAST-Q	DFN2020D-3 (SOT1061D)	BC56PAST-Q
BC53-10PAST-Q		BC56-10PAST-Q
BC53-16PAST-Q		BC56-16PAST-Q

2. Features and benefits

- High collector current capability I_C and I_{CM}
- Three current gain selections
- Reduced Printed-Circuit Board (PCB) area requirements
- Leadless small SMD plastic package with solderable side pads
- Exposed heat sink for excellent thermal and electrical conductivity
- Suitable for Automatic Optical Inspection (AOI) of solder point
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

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

4. Quick reference data

Table 2. Quick reference data

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

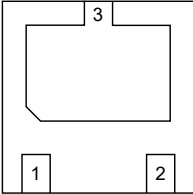
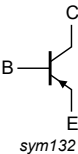
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base	-	-	-80	V
I_C	collector current		-	-	-1	A
I_{CM}	peak collector current	single pulse; $t_p \leq 1\text{ ms}$	-	-	-2	A

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
h _{FE}	DC current gain						
	BC53PAST-Q	V _{CE} = -2 V; I _C = -150 mA	[1]	63	-	250	
	BC53-10PAST-Q		[1]	63	-	160	
	BC53-16PAST-Q		[1]	100	-	250	

[1] pulsed; t_p ≤ 300 μs; δ ≤ 0.02

5. Pinning information

Table 3. Pinning

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	 Transparent top view	 sym132
2	E	emitter		
3	C	collector		

6. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
BP53PAST-Q	DFN2020D-3	plastic, leadless thermal enhanced ultra thin small outline package with side-wettable flanks (SWF); no leads; 3 terminals; 1.3 mm pitch; 2 mm x 2 mm x 0.65 mm body	SOT1061D
BC53-10PAST-Q			
BC53-16PAST-Q			

7. Marking

Table 5. Marking

Type number	Marking code
BC53PAST-Q	G2
BC53-10PAST-Q	F9
BC53-16PAST-Q	F8

8. Limiting values

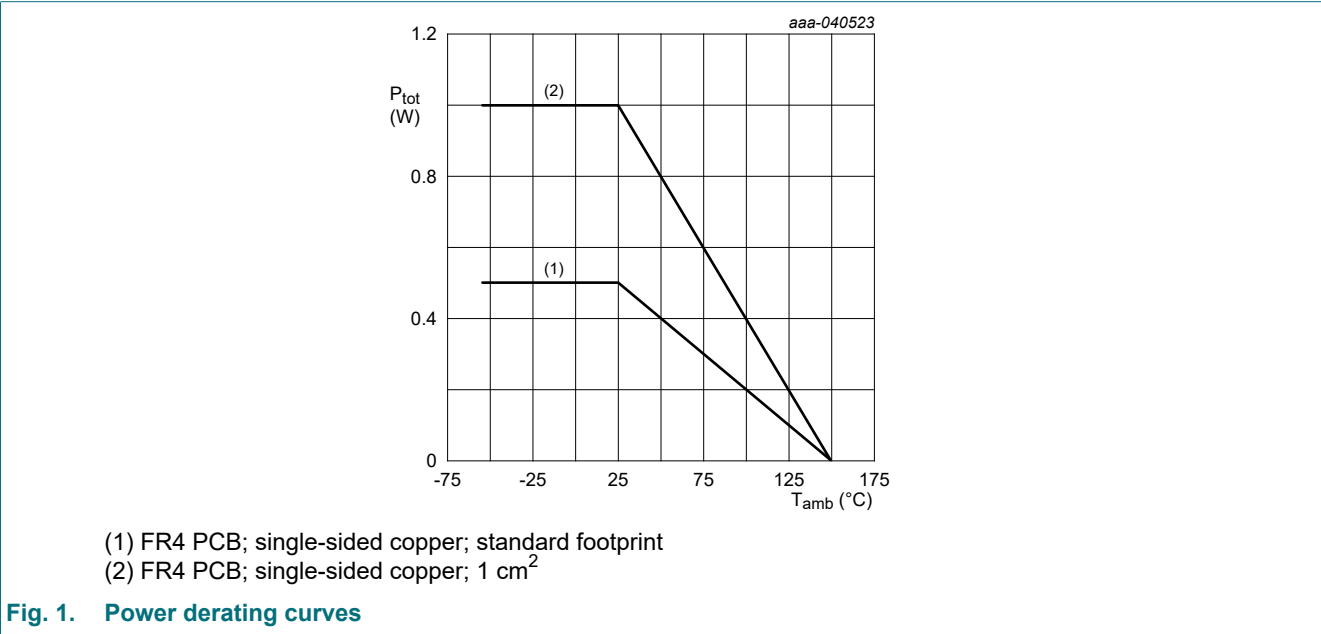
Table 6. Limiting values

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

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

Symbol	Parameter	Conditions	Min	Max	Unit
V_{CBO}	collector-base voltage	open emitter	-	-100	V
V_{CEO}	collector-emitter voltage	open base	-	-80	V
V_{EBO}	emitter-base voltage	open collector	-	-5	V
I_C	collector current		-	-1	A
I_{CM}	peak collector current	single pulse; $t_p \leq 1\text{ ms}$	-	-2	A
I_B	base current		-	-0.2	A
I_{BM}	peak base current	single pulse; $t_p \leq 1\text{ ms}$	-	-0.3	A
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[1]	0.5	W
			[2]	1	W
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.
- [2] Device mounted on an FR4 Printed-Circuit-Board (PCB); single-sided copper; tin-plated; mounting pad for collector 1 cm².



9. Thermal characteristics

Table 7. Thermal characteristics

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

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	235	K/W
			[2]	-	-	124	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	15	K/W

- [1] Device mounted on an FR4 Printed-Circuit-Board (PCB); single-sided copper; tin-plated and standard footprint.
[2] Device mounted on an FR4 Printed-Circuit-Board (PCB); single-sided copper; tin-plated; mounting pad for collector 1 cm².

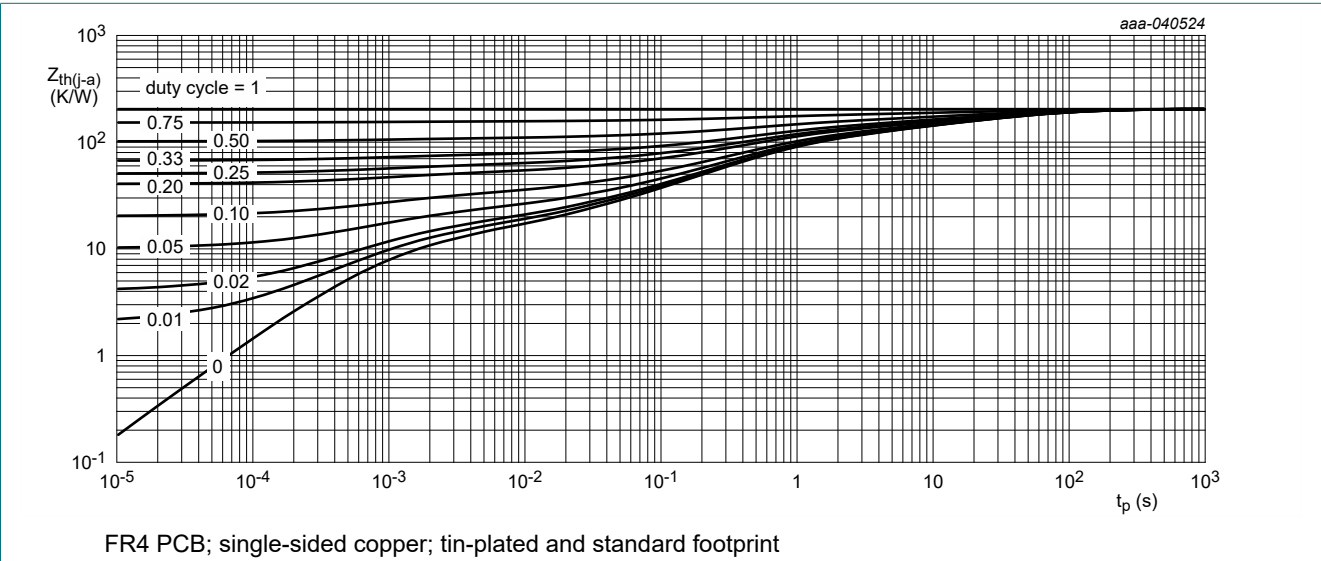


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

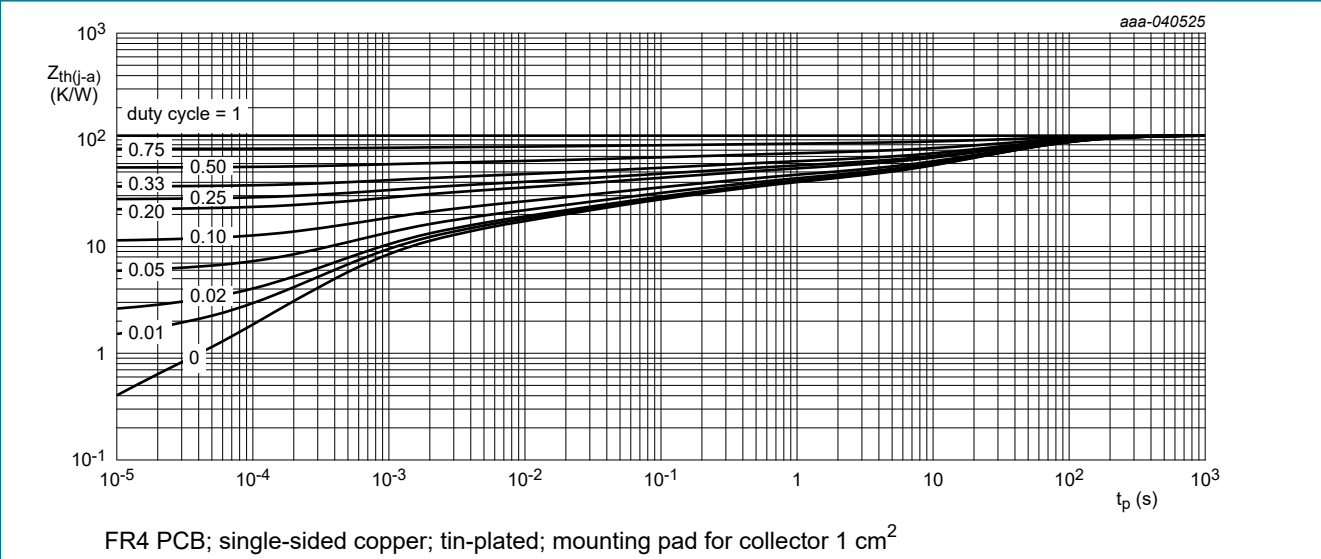


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 8. Characteristics
T_{amb} = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{(BR)CBO}	collector-base breakdown voltage	I _C = -100 µA; I _E = 0 A	-100	-		V
V _{(BR)CEO}	collector-emitter breakdown voltage	I _C = -2 mA; I _E = 0 A	-80	-		V
V _{(BR)EBO}	emitter-base breakdown voltage	I _E = -100 µA; I _C = 0 A	-5	-		V
I _{CBO}	collector-base cut-off current	V _{CB} = -30 V; I _E = 0 A	-	-	-100	nA
		V _{CB} = -30 V; I _E = 0 A; T _j = 150 °C	-	-	-10	µA
I _{EBO}	emitter-base cut-off current	V _{EB} = -5 V; I _C = 0 A	-	-	-100	nA
h _{FE}	DC current gain					
	BC53PAST-Q	V _{CE} = -2 V; I _C = -5 mA	63	-	-	
		V _{CE} = -2 V; I _C = -150 mA	[1] 63	-	250	
		V _{CE} = -2 V; I _C = -500 mA	[1] 40	-	-	
	BC53-10PAST-Q	V _{CE} = -2 V; I _C = -5 mA	63	-	-	
		V _{CE} = -2 V; I _C = -150 mA	[1] 63	-	160	
		V _{CE} = -2 V; I _C = -500 mA	[1] 40	-	-	
	BC53-16PAST-Q	V _{CE} = -2 V; I _C = -5 mA	63	-	-	
		V _{CE} = -2 V; I _C = -150 mA	[1] 100	-	250	
		V _{CE} = -2 V; I _C = -500 mA	[1] 40	-	-	
V _{CEsat}	collector-emitter saturation voltage	I _C = -500 mA; I _B = -50 mA	[1] -	-	-500	mV
V _{BE}	base-emitter voltage	V _{CE} = -2 V; I _C = -500 mA	[1] -	-	-1	V
f _T	transition frequency	V _{CE} = -5 V; I _C = -50 mA; f = 100 MHz	100	-	-	MHz
C _c	collector capacitance	V _{CB} = -10 V; I _E = i _e = 0 A; f = 1 MHz	-	7	-	pF

[1] pulsed; t_p ≤ 300 µs; δ ≤ 0.02

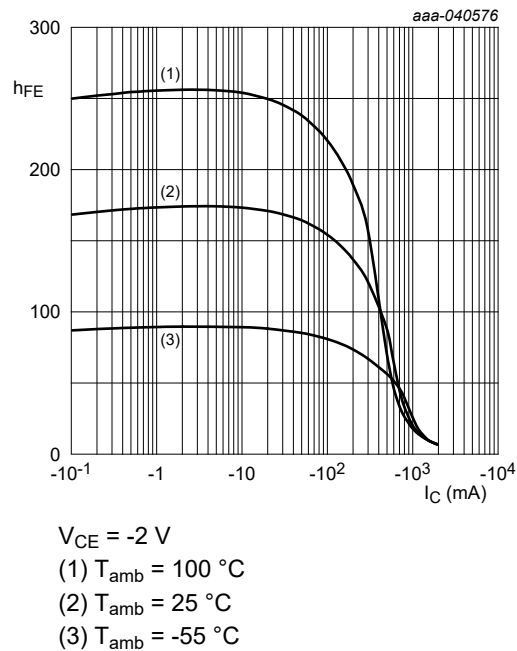


Fig. 4. DC current gain as a function of collector current; typical values

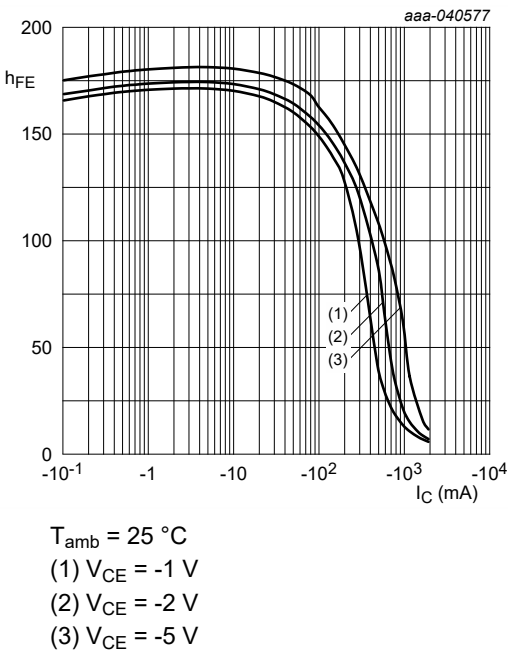


Fig. 5. DC current gain as a function of collector current; typical values

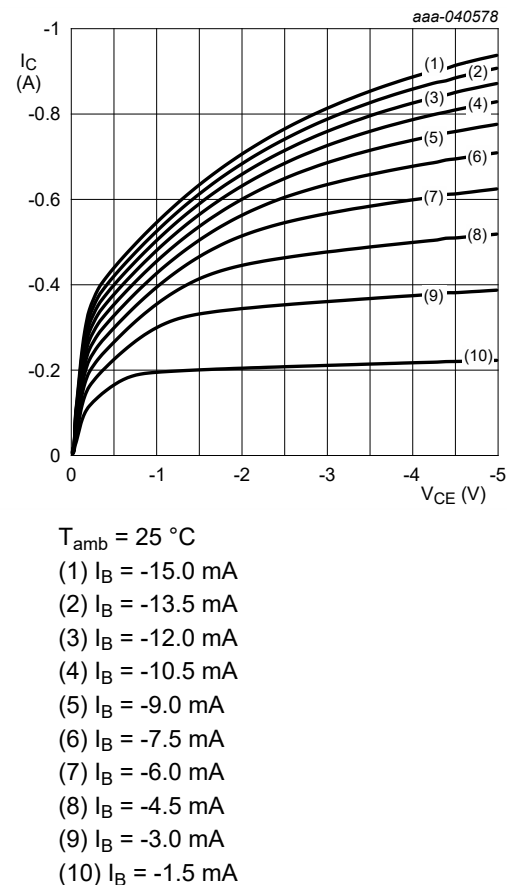


Fig. 6. Collector current as a function of collector-emitter voltage; typical values

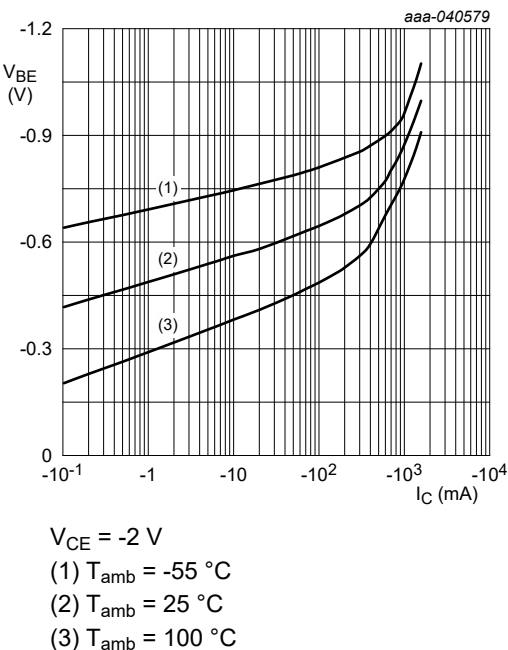


Fig. 7. Base-emitter voltage as a function of collector current; typical values

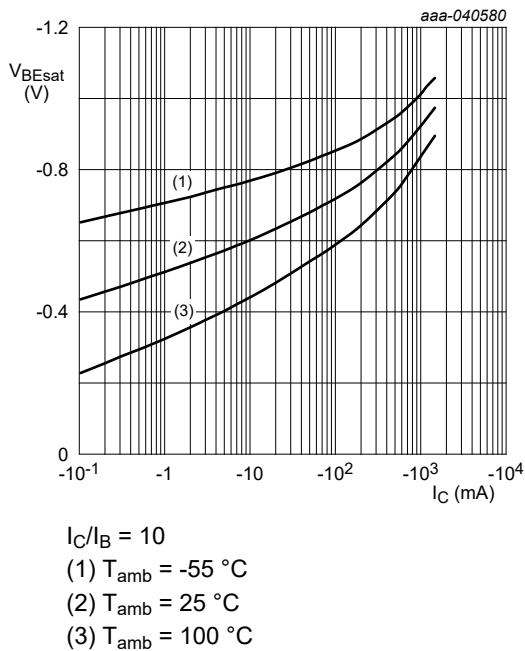


Fig. 8. Base-emitter saturation voltage as a function of collector current; typical values

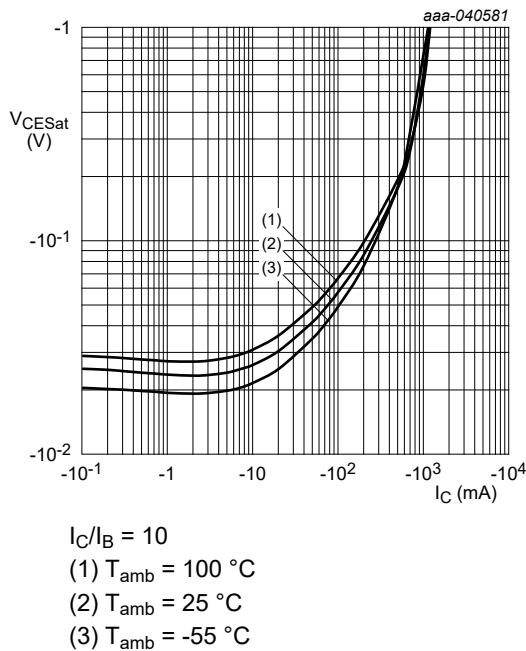


Fig. 9. Collector-emitter saturation voltage as a function of collector current; typical values

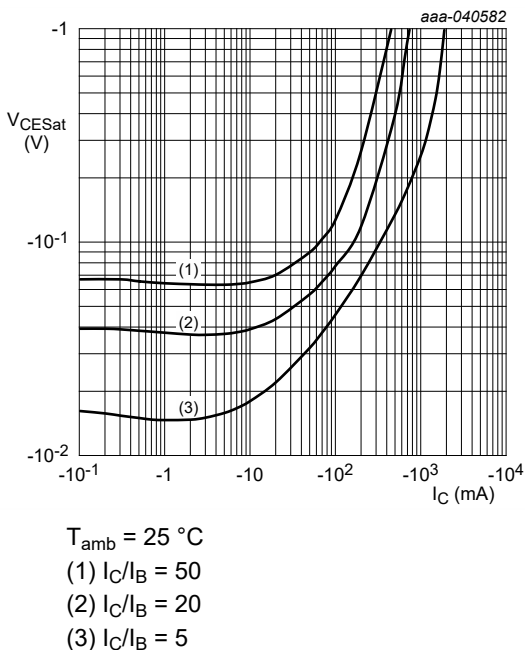


Fig. 10. Collector-emitter saturation voltage as a function of collector current; typical values

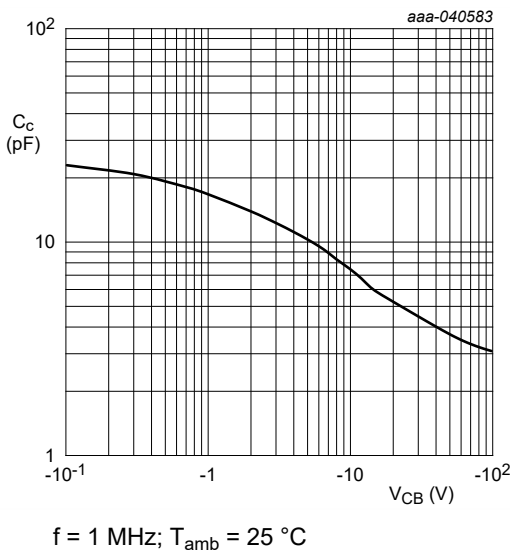


Fig. 11. Collector capacitance as a function of collector-base voltage; typical values

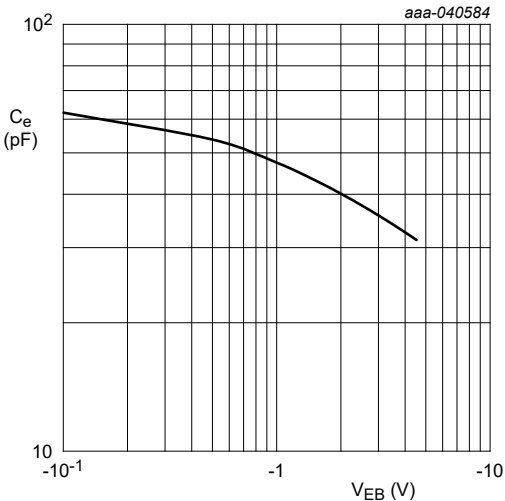


Fig. 12. Emitter capacitance as a function of emitter-base voltage; typical values

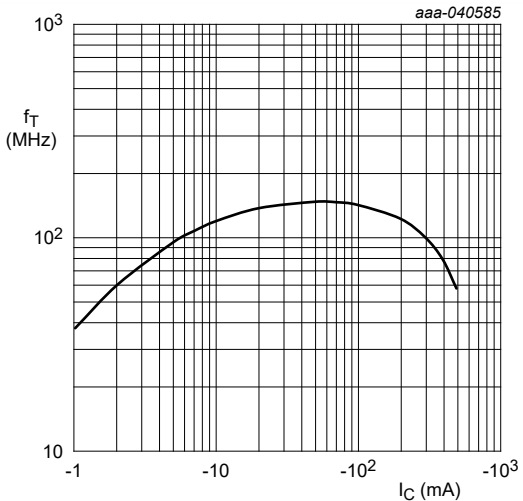


Fig. 13. Transition frequency as a function of collector current; typical values

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

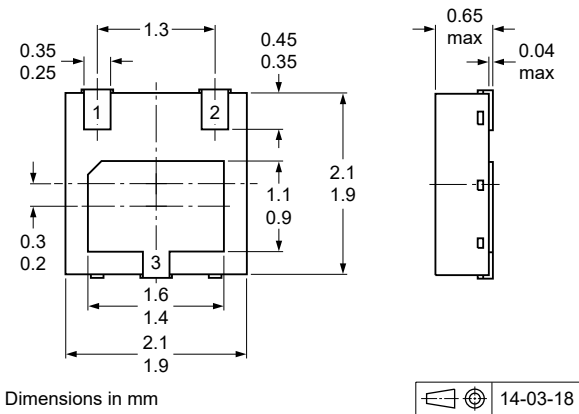


Fig. 14. Package outline DFN2020D-3 (SOT1061D)

13. Soldering

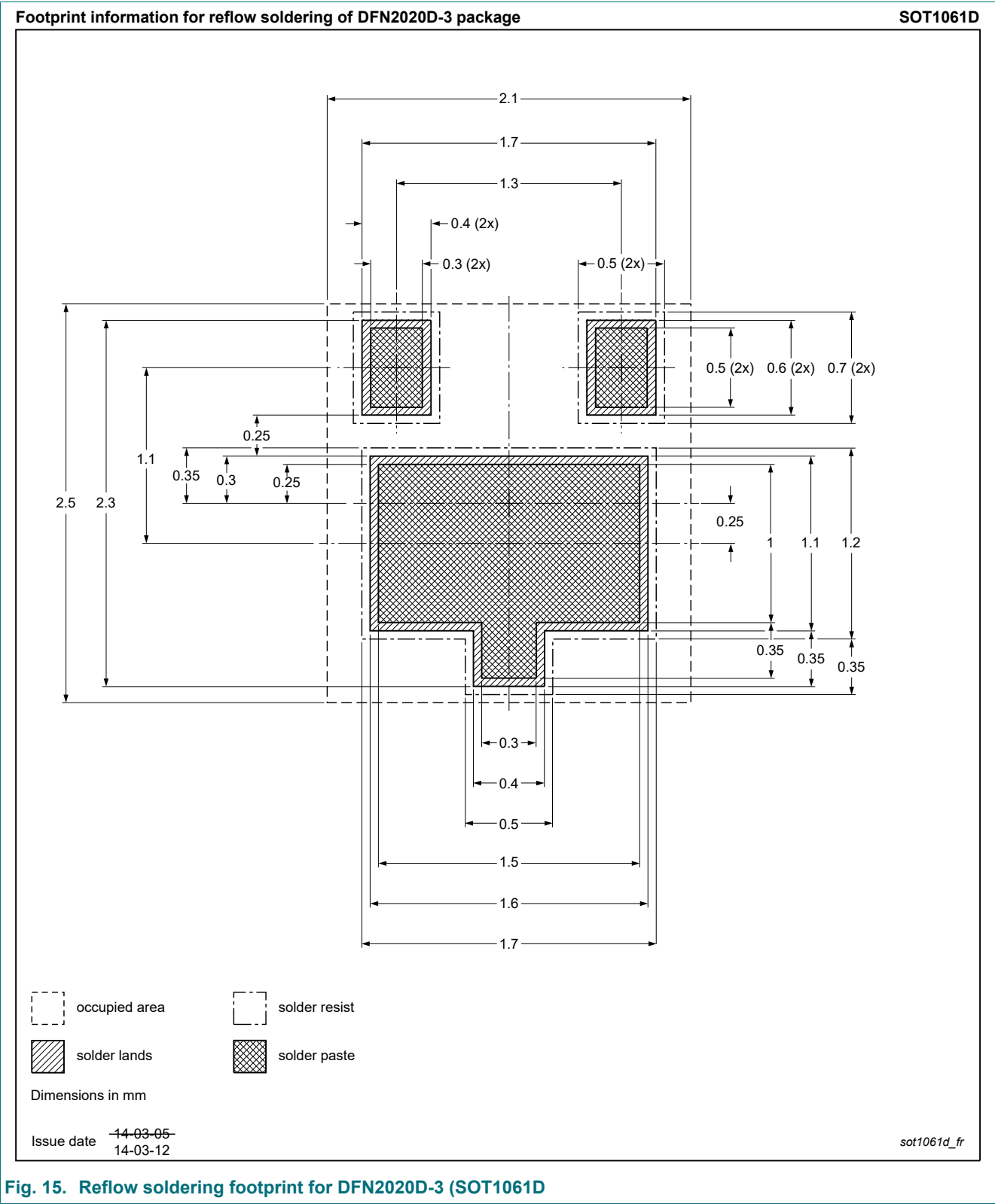


Fig. 15. Reflow soldering footprint for DFN2020D-3 (SOT1061D)

14. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BC53PAST-Q_SER v.1	20240823	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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- [2] The term 'short data sheet' is explained in section "Definitions".
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