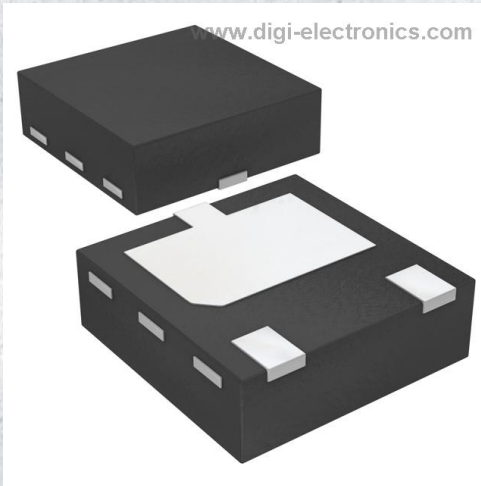


BC55-10PASX Datasheet



<https://www.DiGi-Electronics.com>

DiGi Electronics Part Number	BC55-10PASX-DG
Manufacturer	Nexperia USA Inc.
Manufacturer Product Number	BC55-10PASX
Description	TRANS NPN 60V 1A DFN2020D-3
Detailed Description	Bipolar (BJT) Transistor NPN 60 V 1 A 180MHz 420 mW Surface Mount DFN2020D-3



Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

DiGi is a global authorized distributor of electronic components.

Purchase and inquiry

Manufacturer Product Number:

BC55-10PASX

Series:

-

Transistor Type:

NPN

Voltage - Collector Emitter Breakdown (Max):

60 V

Current - Collector Cutoff (Max):

100nA (ICBO)

Power - Max:

420 mW

Operating Temperature:

150°C (TJ)

Qualification:

AEC-Q100

Package / Case:

3-UDFN Exposed Pad

Base Product Number:

BC55

Manufacturer:

Nexperia USA Inc.

Product Status:

Active

Current - Collector (Ic) (Max):

1 A

Vce Saturation (Max) @ Ib, Ic:

500mV @ 50mA, 500mA

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

63 @ 150mA, 2V

Frequency - Transition:

180MHz

Grade:

Automotive

Mounting Type:

Surface Mount

Supplier Device Package:

DFN2020D-3

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.21.0075

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99



BC55xPAS series

60 V, 1 A NPN medium power transistors

9 October 2024

Product data sheet

1. General description

NPN medium power transistor series encapsulated in an ultra thin DFN2020D-3 (SOT1061D) leadless small Surface-Mounted Device (SMD) plastic package with medium power capability and visible and solderable side pads.

2. Features and benefits

- High collector current capability I_C and I_{CM}
- Reduced Printed-Circuit Board (PCB) area requirements
- Exposed heat sink for excellent thermal and electrical conductivity
- Two current gain selections
- Leadless very small SMD plastic package with medium power capability
- Suitable for Automatic Optical Inspection (AOI) of solder joint

3. Applications

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

4. Quick reference data

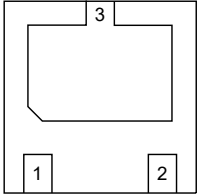
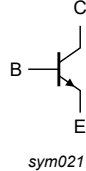
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{CEO}	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						
	BC55PAS	$V_{CE} = 2$ V; $I_C = 150$ mA; $T_{amb} = 25$ °C	[1]	63	-	250	
	BC55-10PAS		[1]	63	-	160	
	BC55-16PAS		[1]	100	-	250	

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

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	B	base	 <p>Transparent top view DFN2020D-3 (SOT1061D)</p>	 <p>sym021</p>
2	E	emitter		
3	C	collector		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BC55PAS	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
BC55-10PAS			
BC55-16PAS			

7. Marking

Table 4. Marking codes

Type number	Marking code
BC55PAS	CG
BC55-10PAS	CH
BC55-16PAS	CJ

8. Limiting values

Table 5. 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		-	60	V
V_{CEO}	collector-emitter voltage	open base		-	60	V
V_{EBO}	emitter-base voltage	open collector		-	5	V
I_C	collector current			-	1	A
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms		-	2	A
I_B	base current			-	0.3	A
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	0.42	W
			[2]	-	0.81	W
			[3]	-	0.83	W
			[4]	-	1.10	W
			[5]	-	1.65	W
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-55	150	°C
T_{stg}	storage temperature			-65	150	°C

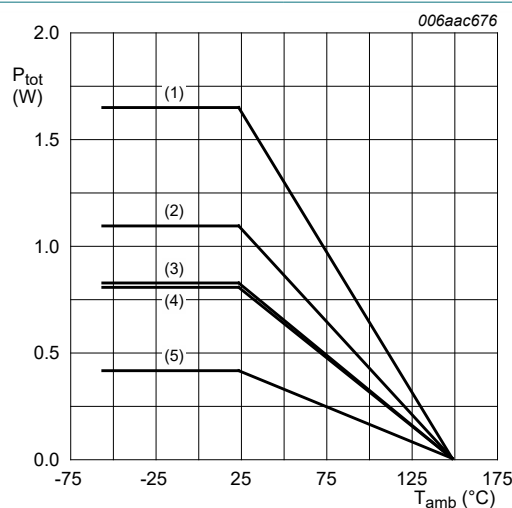
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

[2] Device mounted on an FR4 PCB, 4-layer copper, tin-plated and standard footprint.

[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated and mounting pad for collector 1 cm².

[4] Device mounted on an FR4 PCB, single-sided copper, tin-plated and mounting pad for collector 6 cm².

[5] Device mounted on an FR4 PCB, 4-layer copper, tin-plated and mounting pad for collector 1 cm².



(1) FR4 PCB, 4-layer copper, mounting pad for collector 1 cm²

(2) FR4 PCB, single-sided copper, mounting pad for collector 6 cm²

(3) FR4 PCB, single-sided copper, mounting pad for collector 1 cm²

(4) FR4 PCB, 4-layer copper, standard footprint

(5) FR4 PCB, single-sided copper, standard footprint

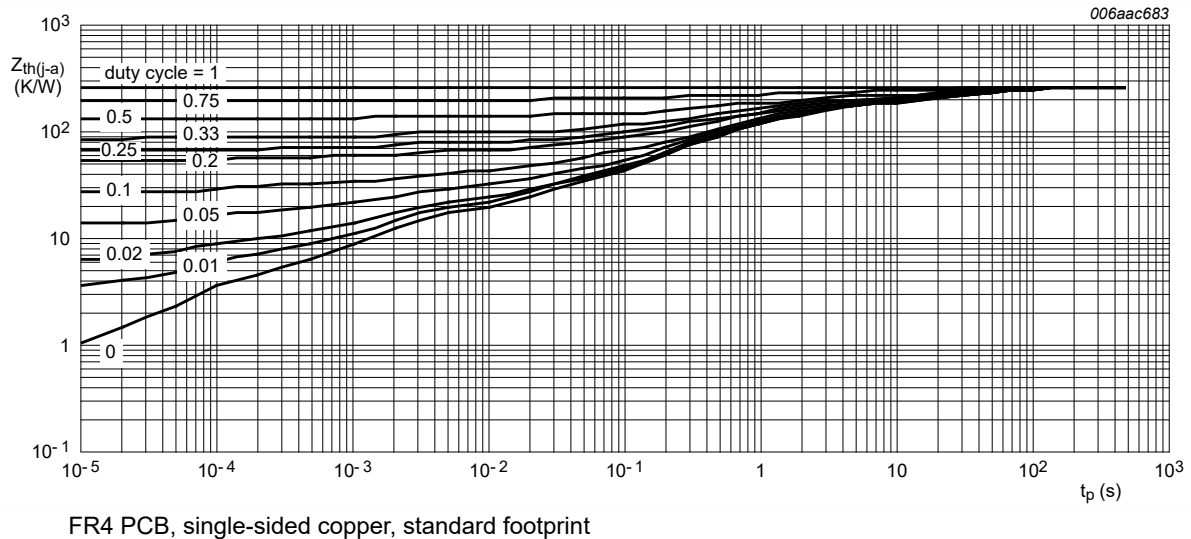
Fig. 1. Power derating curves

9. Thermal characteristics

Table 6. Thermal characteristics

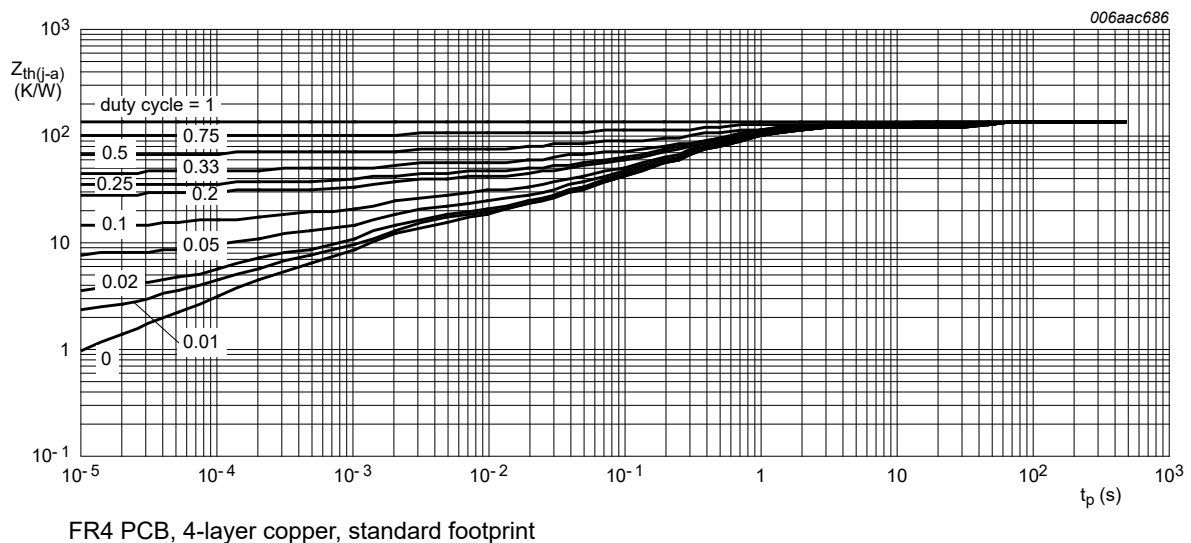
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	298	K/W
			[2]	-	-	154	K/W
			[3]	-	-	151	K/W
			[4]	-	-	114	K/W
			[5]	-	-	76	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	20	K/W

- [1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.
 [2] Device mounted on an FR4 PCB, 4-layer copper, tin-plated and standard footprint.
 [3] Device mounted on an FR4 PCB, single-sided copper, tin-plated and mounting pad for collector 1 cm².
 [4] Device mounted on an FR4 PCB, single-sided copper, tin-plated and mounting pad for collector 6 cm².
 [5] Device mounted on an FR4 PCB, 4-layer copper, tin-plated and mounting pad for collector 1 cm².



FR4 PCB, single-sided copper, standard footprint

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



FR4 PCB, 4-layer copper, standard footprint

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

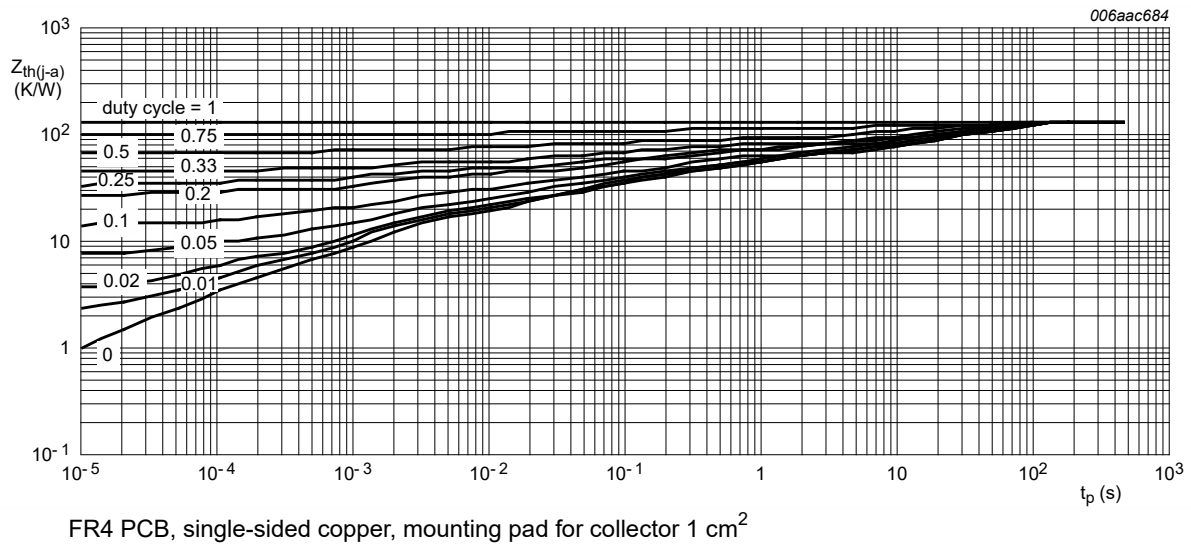


Fig. 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

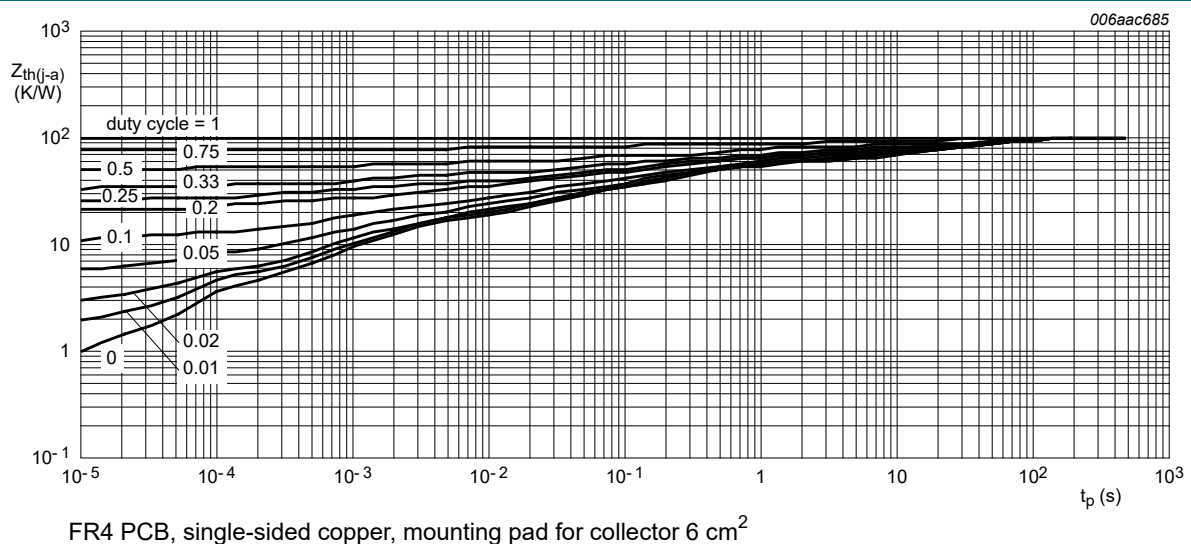


Fig. 5. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

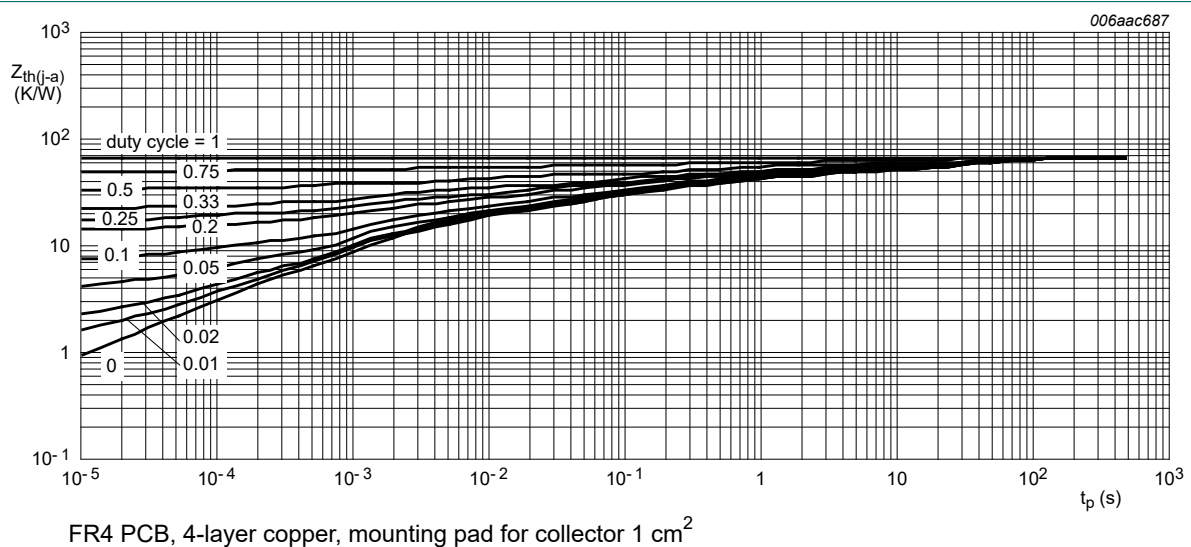


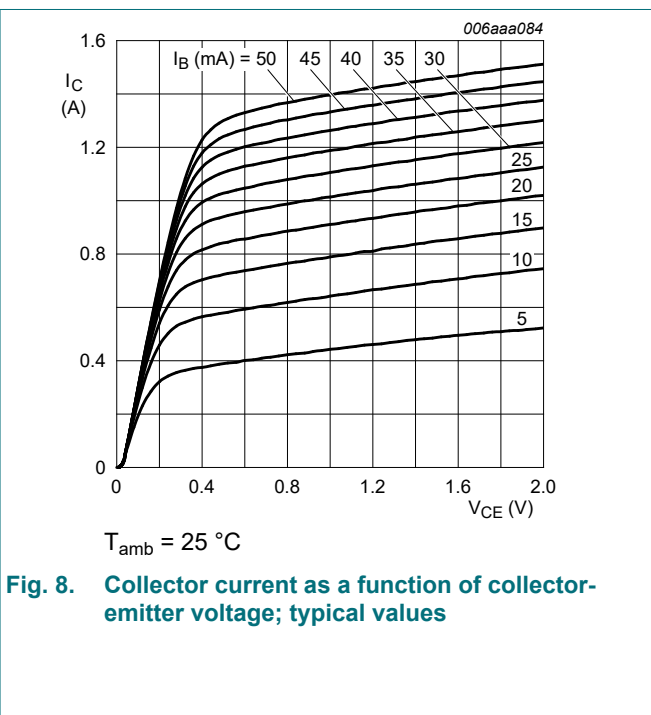
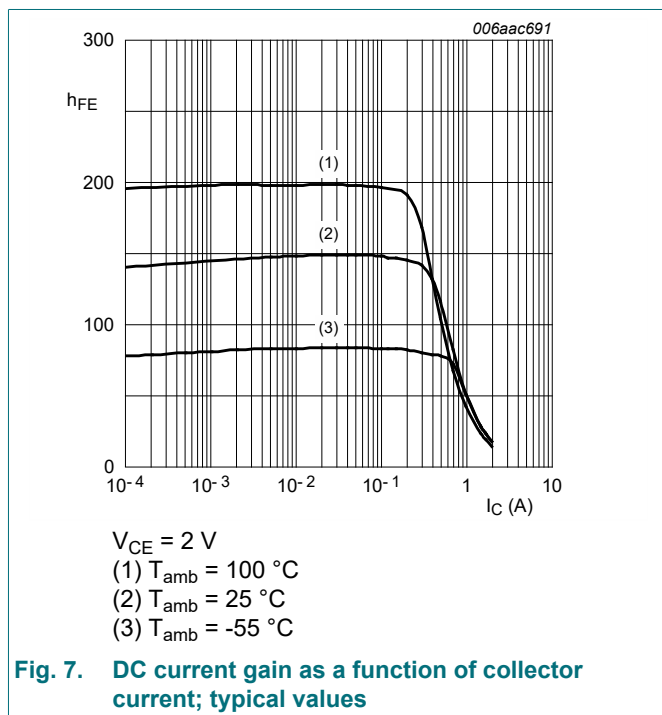
Fig. 6. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{CBO}	collector-base cut-off current (emitter open)	$V_{CB} = 30\text{ V}; I_E = 0\text{ A}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	100	nA
		$V_{CB} = 30\text{ V}; I_E = 0\text{ A}; T_{amb} = 150\text{ }^\circ\text{C}$	-	-	10	μA
I_{EBO}	emitter-base cut-off current (collector open)	$V_{EB} = 5\text{ V}; I_C = 0\text{ A}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	100	nA
h_{FE}	DC current gain					
	BC55PAS	$V_{CE} = 2\text{ V}; I_C = 5\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$		63	-	-
	BC55-10PAS			63	-	-
	BC55-16PAS			63	-	-
	BC55PAS	$V_{CE} = 2\text{ V}; I_C = 150\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	[1]	63	-	250
	BC55-10PAS		[1]	63	-	160
	BC55-16PAS		[1]	100	-	250
	BC55PAS	$V_{CE} = 2\text{ V}; I_C = 500\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	[1]	40	-	-
	BC55-10PAS		[1]	40	-	-
BC55-16PAS		[1]	40	-	-	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 500\text{ mA}; I_B = 50\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	[1]	-	-	500
V_{BE}	base-emitter voltage	$V_{CE} = 2\text{ V}; I_C = 500\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	[1]	-	-	1
C_c	collector capacitance	$V_{CB} = 10\text{ V}; i_e = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ }^\circ\text{C}$	-	6	-	pF
f_T	transition frequency	$V_{CE} = 5\text{ V}; I_C = 50\text{ mA}; f = 100\text{ MHz}; T_{amb} = 25\text{ }^\circ\text{C}$	100	180	-	MHz

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



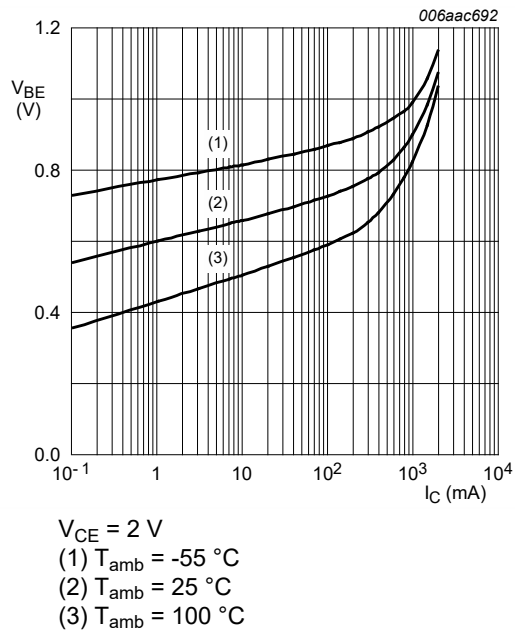


Fig. 9. Base-emitter voltage as a function of collector current; typical values

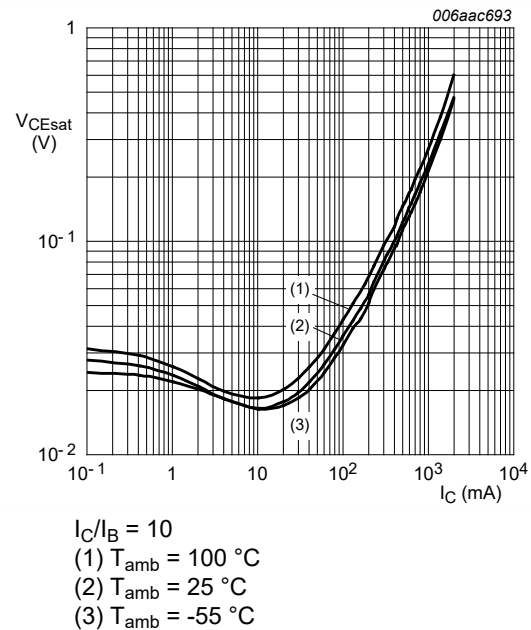


Fig. 10. Collector-emitter saturation voltage as a function of collector current; typical values

11. Package outline

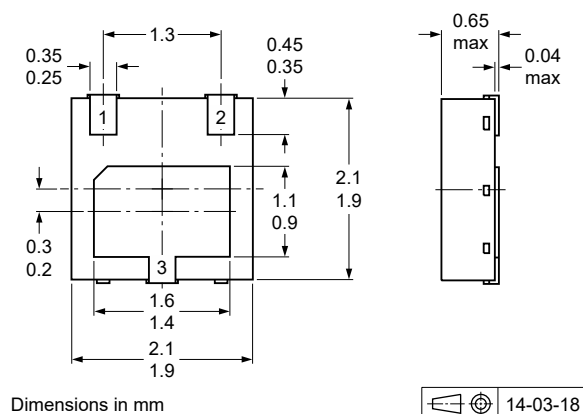


Fig. 11. Package outline DFN2020D-3 (SOT1061D)

12. Soldering

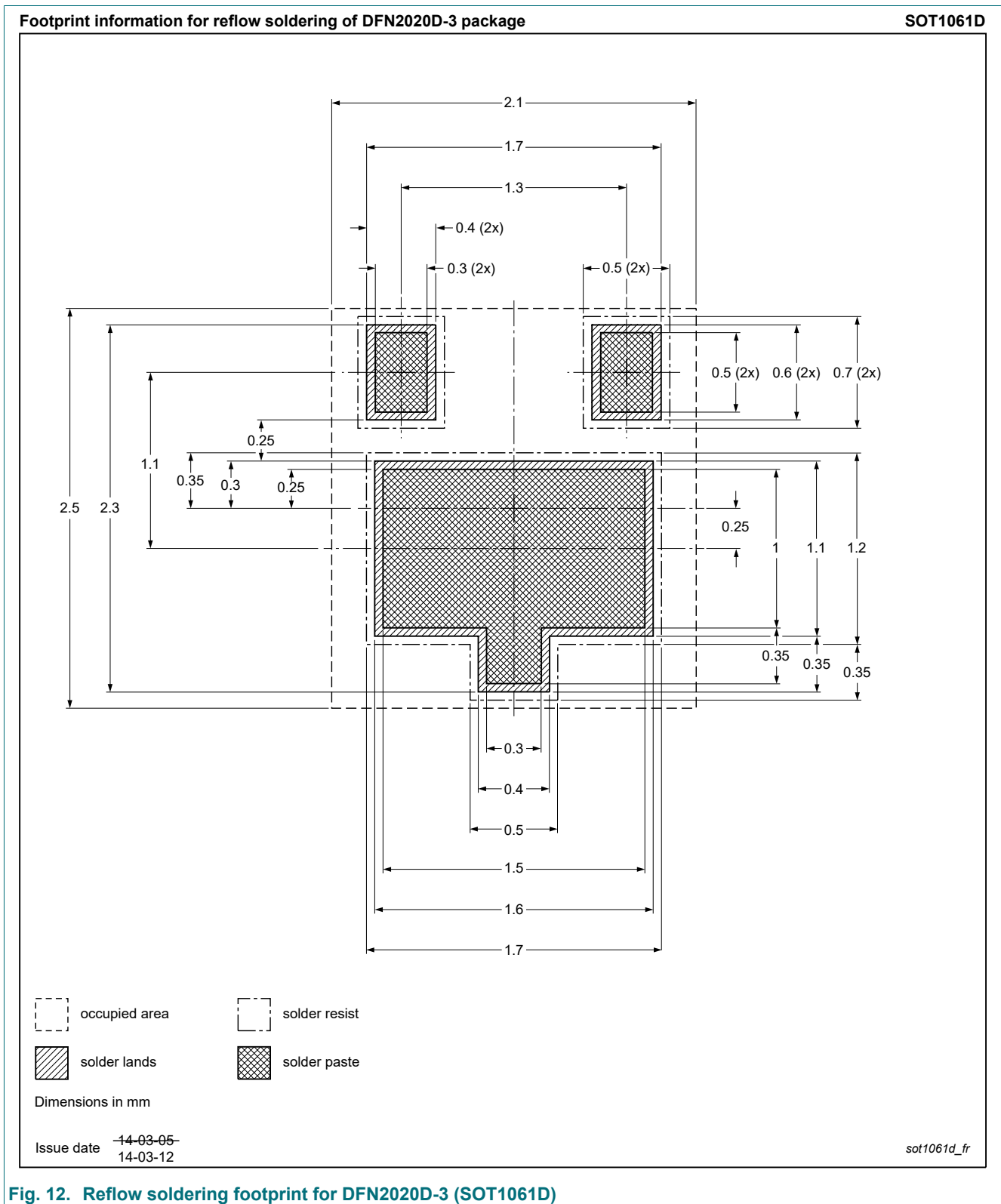


Fig. 12. Reflow soldering footprint for DFN2020D-3 (SOT1061D)

13. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BC55XPAS_SER v.3	20241009	Product data sheet	-	BC55XPAS_SER v.2
Modifications:	<ul style="list-style-type: none"> Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s). 			
BC55XPAS_SER v.2	20230502	Product data sheet	-	BC54_55_56PAS_SER v.1
BC54_55_56PAS_SER v.1	20141111	Product data sheet	-	-

14. 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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