



PBSS5240V

40 V low V_{CEsat} PNP transistor

28 December 2022

Product data sheet

1. General description

PNP transistor providing low V_{CEsat} and high current capability in a SOT666 ultra small Surface-Mounted Device (SMD) plastic package.

NPN complement: PBSS4240V

2. Features and benefits

- Low collector-emitter saturation voltage V_{CEsat}
- High collector current capability I_C and I_{CM}
- High collector current gain (h_{FE}) at high I_C
- High efficiency leading to reduced heat generation
- Reduced printed-circuit board area requirements

3. Applications

- Power management:
 - DC-DC converter
 - Supply line switching
 - Battery charger
- Peripheral driver:
 - Driver in low supply voltage applications (e.g. lamps, LEDs)
 - Inductive load drivers (e.g. relay and buzzers)

4. Quick reference data

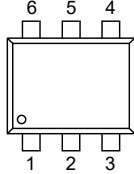
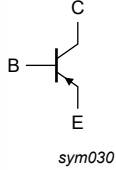
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base	-	-	-40	V
I_C	collector current		[1]	-	-1.8	A
I_{CRM}	repetitive peak collector current	Operated under pulsed conditions; $t_p \leq 30$ ms	-	-	-2	A
R_{CEsat}	collector-emitter saturation resistance	$I_C = -1$ A; $I_B = -100$ mA; pulsed; $t_p \leq 300$ μ s; $\delta \leq 0.02$; $T_{amb} = 25$ °C	-	180	250	m Ω

[1] Device mounted on a ceramic PCB, Al_2O_3 , standard footprint.

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	C	collector	 <p style="text-align: center;">SOT666</p>	 <p style="text-align: center;"><i>sym030</i></p>
2	C	collector		
3	B	base		
4	E	emitter		
5	C	collector		
6	C	collector		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PBSS5240V	SOT666	plastic, surface-mounted package; 6 leads; 0.5 mm pitch; 1.6 mm x 1.2 mm x 0.55 mm body	SOT666

7. Marking

Table 4. Marking codes

Type number	Marking code
PBSS5240V	52

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		-	-40	V
V_{CEO}	collector-emitter voltage	open base		-	-40	V
V_{EBO}	emitter-base voltage	open collector		-	-5	V
I_C	collector current		[1]	-	-1.8	A
I_{CRM}	repetitive peak collector current	Operated under pulsed conditions; $t_p \leq 30$ ms		-	-2	A
I_{CM}	peak collector current			-	-3	A
I_B	base current			-	-300	mA
I_{BM}	peak base current	single pulse; $t_p \leq 1$ ms		-	-1	A
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[2]	-	300	mW
			[3]	-	500	mW
			[1]	-	900	mW
			[2] [4]	-	1.2	W
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-65	150	°C
T_{stg}	storage temperature			-65	150	°C

[1] Device mounted on a ceramic PCB, Al₂O₃, standard footprint.

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

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

[4] Operated under pulsed conditions: duty cycle $\delta \leq 20\%$, pulse width $t_p \leq 30$ ms.

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]	-	-	410	K/W
			[2]	-	-	215	K/W
			[3]	-	-	140	K/W
			[1] [4]	-	-	110	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 cm².

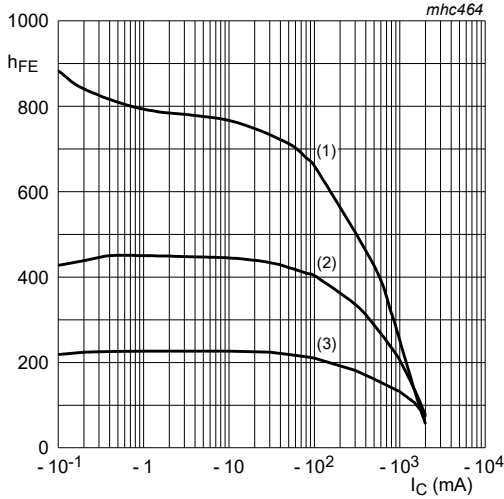
[3] Device mounted on a ceramic PCB, Al₂O₃, standard footprint.

[4] Operated under pulsed conditions: duty cycle $\delta \leq 20\%$, pulse width $t_p \leq 30$ ms.

10. Characteristics

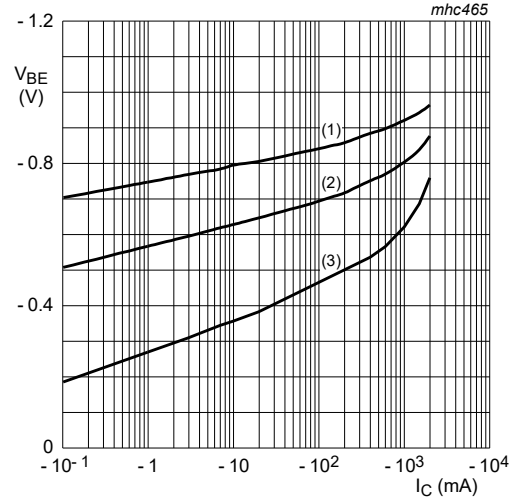
Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{CBO}	collector-base cut-off current	$V_{CB} = -40\text{ V}; I_E = 0\text{ A}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	-100	nA
		$V_{CB} = -40\text{ V}; I_E = 0\text{ A}; T_j = 150\text{ }^\circ\text{C}$	-	-	-50	μA
I_{CEO}	collector-emitter cut-off current (base open)	$I_B = 0\text{ A}; V_{CE} = -30\text{ V}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	-100	nA
I_{EBO}	emitter-base cut-off current	$V_{EB} = -5\text{ V}; I_C = 0\text{ A}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	-100	nA
h_{FE}	DC current gain	$V_{CE} = -5\text{ V}; I_C = -1\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	300	-	-	
		$V_{CE} = -5\text{ V}; I_C = -100\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	300	-	800	
		$V_{CE} = -5\text{ V}; I_C = -500\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	250	-	-	
		$V_{CE} = -5\text{ V}; I_C = -1\text{ A}; T_{amb} = 25\text{ }^\circ\text{C}$	160	-	-	
		$V_{CE} = -5\text{ V}; I_C = -2\text{ A}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	50	-	-	
V_{CEsat}	collector-emitter saturation voltage	$I_C = -100\text{ mA}; I_B = -1\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-80	-120	mV
		$I_C = -500\text{ mA}; I_B = -50\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-100	-145	mV
		$I_C = -1\text{ A}; I_B = -100\text{ mA}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	-	-180	-250	mV
		$I_C = -2\text{ A}; I_B = -200\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-370	-530	mV
R_{CEsat}	collector-emitter saturation resistance	$I_C = -1\text{ A}; I_B = -100\text{ mA}; \text{pulsed}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	-	180	250	$\text{m}\Omega$
V_{BEsat}	base-emitter saturation voltage	$I_C = -1\text{ A}; I_B = -100\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	-1.1	V
V_{BEon}	base-emitter turn-on voltage	$V_{CE} = -5\text{ V}; I_C = -1\text{ A}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	-1	V
f_T	transition frequency	$V_{CE} = -10\text{ V}; I_C = -50\text{ mA}; f = 100\text{ MHz}; T_{amb} = 25\text{ }^\circ\text{C}$	150	-	-	MHz
C_c	collector capacitance	$V_{CB} = -10\text{ V}; I_E = 0\text{ A}; I_B = 0\text{ A}; f = 1\text{ MHz}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	12	pF



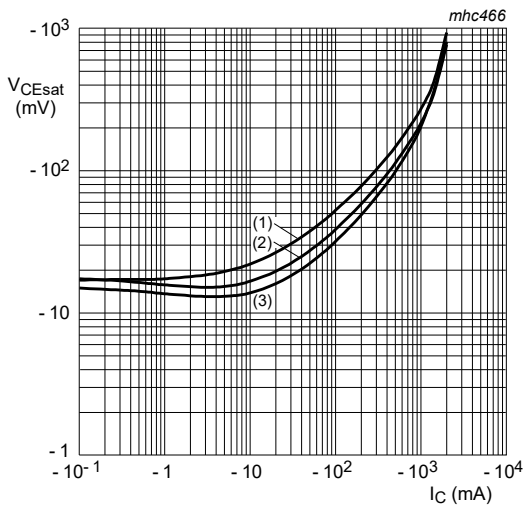
$V_{CE} = -5\text{ V}$
 (1) $T_{amb} = 150\text{ }^\circ\text{C}$
 (2) $T_{amb} = 25\text{ }^\circ\text{C}$
 (3) $T_{amb} = -55\text{ }^\circ\text{C}$

Fig. 1. TR2 (PNP): DC current gain as a function of collector current; typical values



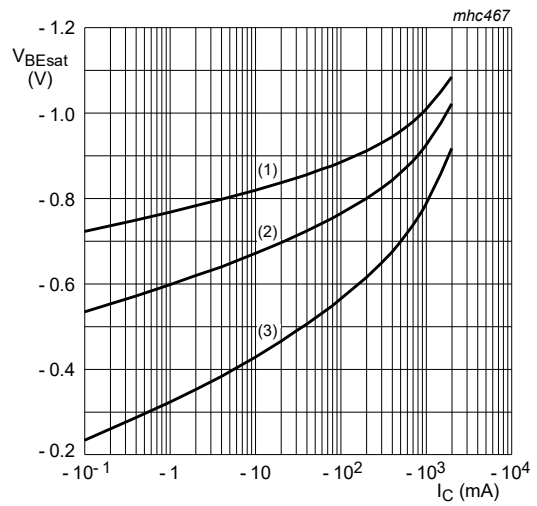
$V_{CE} = -5\text{ V}$
 (1) $T_{amb} = -55\text{ }^\circ\text{C}$
 (2) $T_{amb} = 25\text{ }^\circ\text{C}$
 (3) $T_{amb} = 150\text{ }^\circ\text{C}$

Fig. 2. TR2 (PNP): Base-emitter voltage as a function of collector current; typical values



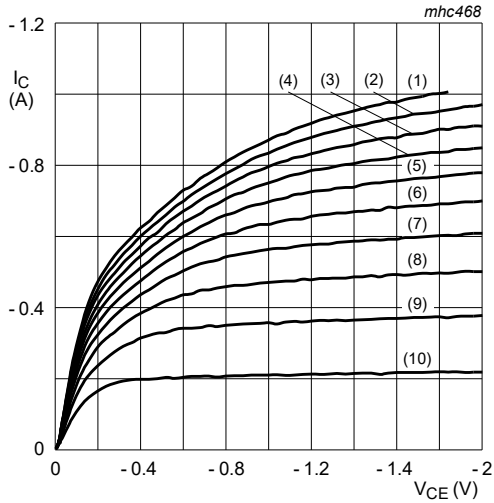
$I_C/I_B = 20$
 (1) $T_{amb} = 150\text{ }^\circ\text{C}$
 (2) $T_{amb} = 25\text{ }^\circ\text{C}$
 (3) $T_{amb} = -55\text{ }^\circ\text{C}$

Fig. 3. TR2 (PNP): Collector-emitter saturation voltage as a function of collector current; typical values



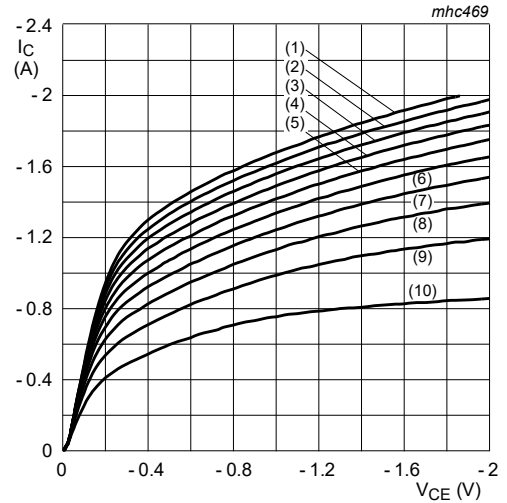
$I_C/I_B = 20$
 (1) $T_{amb} = -55\text{ }^\circ\text{C}$
 (2) $T_{amb} = 25\text{ }^\circ\text{C}$
 (3) $T_{amb} = 150\text{ }^\circ\text{C}$

Fig. 4. TR2 (PNP): Base-emitter saturation voltage as a function of collector current; typical values



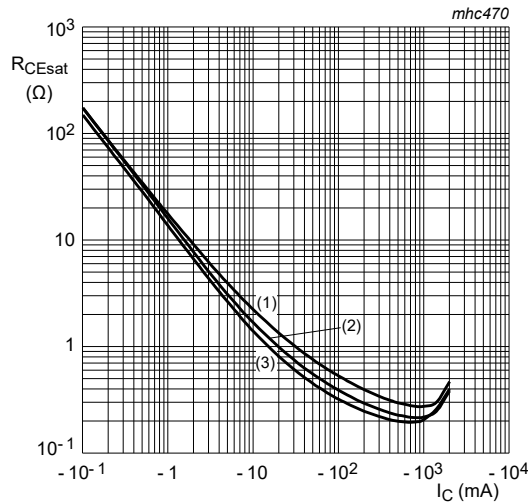
$T_{amb} = 25\text{ }^{\circ}\text{C}$
 (1) $I_B = -7\text{ mA}$
 (2) $I_B = -6.3\text{ mA}$
 (3) $I_B = -5.6\text{ mA}$
 (4) $I_B = -4.9\text{ mA}$
 (5) $I_B = -4.2\text{ mA}$
 (6) $I_B = -3.5\text{ mA}$
 (7) $I_B = -2.8\text{ mA}$
 (8) $I_B = -2.1\text{ mA}$
 (9) $I_B = -1.4\text{ mA}$
 (10) $I_B = -0.7\text{ mA}$

Fig. 5. TR2 (PNP): Collector current as a function of collector-emitter voltage; typical values



$T_{amb} = 25\text{ }^{\circ}\text{C}$
 (1) $I_B = -50\text{ mA}$
 (2) $I_B = -45\text{ mA}$
 (3) $I_B = -40\text{ mA}$
 (4) $I_B = -35\text{ mA}$
 (5) $I_B = -30\text{ mA}$
 (6) $I_B = -25\text{ mA}$
 (7) $I_B = -20\text{ mA}$
 (8) $I_B = -15\text{ mA}$
 (9) $I_B = -10\text{ mA}$
 (10) $I_B = -5\text{ mA}$

Fig. 6. TR2 (PNP): Collector current as a function of collector-emitter voltage; typical values



$I_C/I_B = 20$
 (1) $T_{amb} = 150\text{ }^{\circ}\text{C}$
 (2) $T_{amb} = 25\text{ }^{\circ}\text{C}$
 (3) $T_{amb} = -55\text{ }^{\circ}\text{C}$

Fig. 7. TR2 (PNP): Collector-emitter equivalent on-resistance as a function of collector current; typical values

11. Package outline

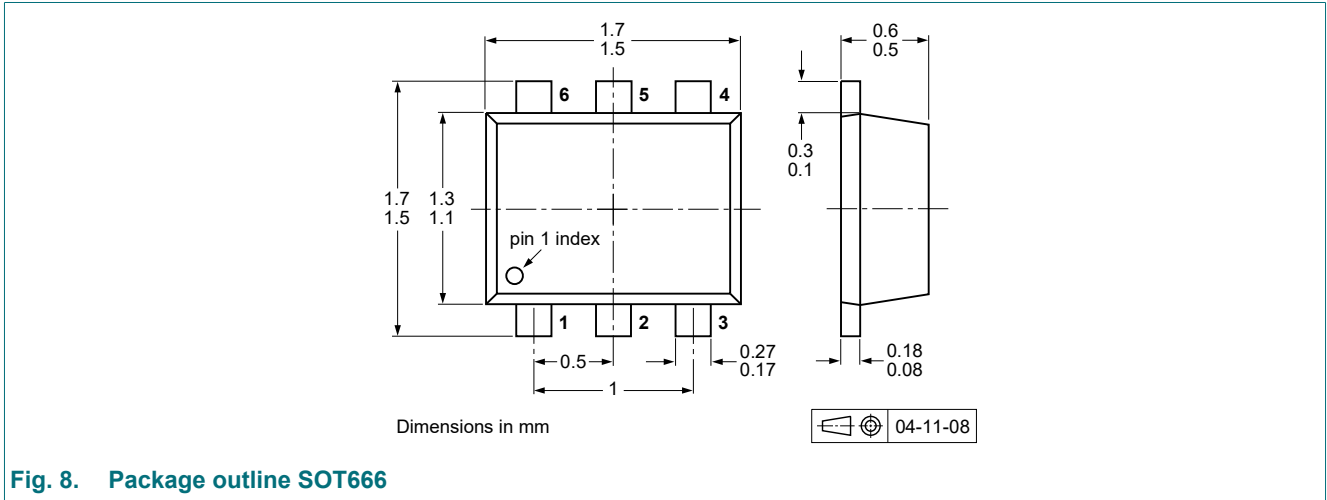


Fig. 8. Package outline SOT666

12. Soldering

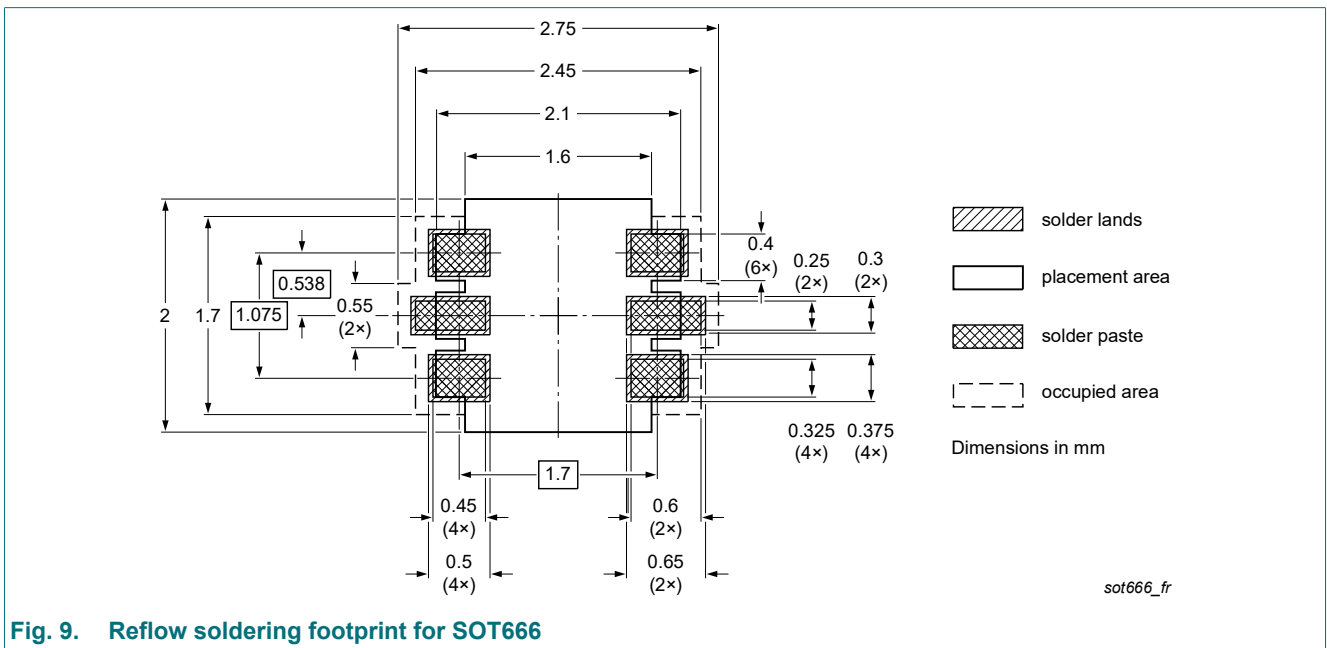


Fig. 9. Reflow soldering footprint for SOT666

13. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PBSS4240V v.2	20221228	Product data sheet	-	PBSS4240V v.1
Modifications:	<ul style="list-style-type: none">• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.• Legal texts have been adapted to the new company name where appropriate.• Product(s) changed to non-automotive qualification.			
PBSS4240V v.1	20030130	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".
- [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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