



40 V, 2 A NPN low VCEsat (BISS) transistor 16 October 2014

Product data sheet

1. **General description**

NPN low V_{CEsat} Breakthrough In Small Signal (BISS) transistor in a medium power SOT223 (SC-73) Surface-Mounted Device (SMD) plastic package.

PNP complement: PBSS5240Z

2. **Features and benefits**

- Low collector-emitter saturation voltage V_{CEsat}
- High collector current capability I_C and I_{CM}
- High energy efficiency due to less heat generation
- AEC-Q101 qualified

3. **Applications**

- DC-to-DC conversion
- Supply line switching
- Battery charger
- LCD backlighting
- Driver in low supply voltage applications (e.g. lamps and LEDs)
- Inductive load driver (e.g. relays, buzzers and motors)

4. Quick reference data

Table 1. Quick reference data								
Symbol	Parameter	Conditions		Min	Тур	Мах	Unit	
V _{CEO}	collector-emitter voltage	open base		-	-	40	V	
I _C	collector current			-	-	2	А	
I _{CM}	peak collector current	$t_p \le 1 \text{ ms}; \text{ single pulse}$		-	-	3	А	
R _{CEsat}	collector-emitter saturation resistance	I_C = 1 A; I_B = 100 mA; pulsed; t_p ≤ 300 μs; δ ≤ 0.02; T_{amb} = 25 °C		-	-	275	mΩ	



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5. Pinning information

Table 2.	Pinning	information		
Pin	Symbol	Description	Simplified outline	Graphic symbol
1	В	base	4	2, 4
2	С	collector		1
3	E	emitter		· •
4	С	collector	L1 L2 L3 SC-73 (SOT223)	3 sym016

6. Ordering information

Table 3. Ordering in	formation					
Type number	Package					
	Name	Description	Version			
PBSS4240Z	SC-73	plastic surface-mounted package with increased heatsink; 4 leads	SOT223			

7. Marking

Table 4. Marking codes	
Type number	Marking code
PBSS4240Z	S4240Z

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8. Limiting values

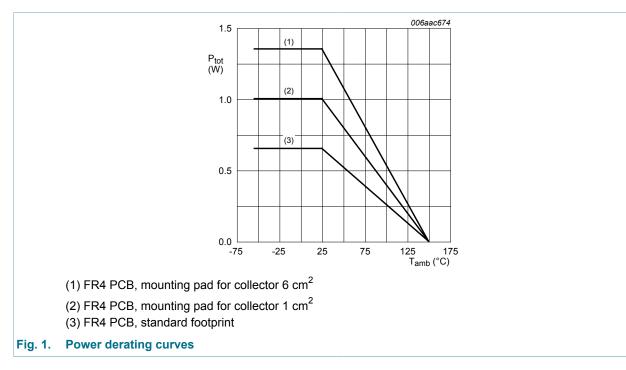
Table 5.Limiting values

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		-	7	V
I _C	collector current			-	2	А
I _{CM}	peak collector current	$t_p \le 1 \text{ ms}$; single pulse		-	3	А
I _B	base current			-	300	mA
I _{BM}	peak base current	$t_p \le 1 \text{ ms}$; single pulse		-	1	А
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	[1]	-	0.65	W
			[2]	-	1	W
			[3]	-	1.35	W
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 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 an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm².



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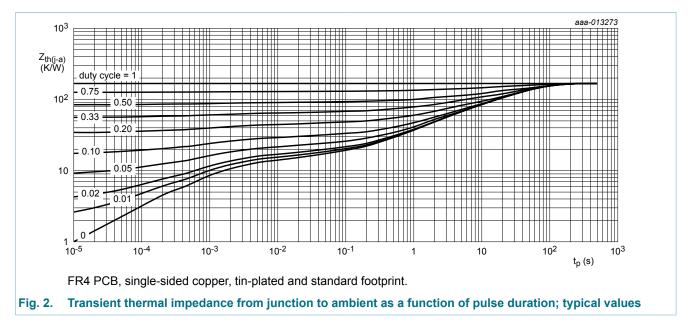
9. Thermal characteristics

Table 6. Thermal characteristics								
Symbol	Parameter	Conditions		Min	Тур	Max	Unit	
R _{th(j-a)} thermal resistant from junction to ambient	thermal resistance	in free air	[1]	-	-	192	K/W	
	-		[2]	-	-	125	K/W	
	ampient		[3]	-	-	93	K/W	
R _{th(j-sp)}	thermal resistance from junction to solder point			-	-	16	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.

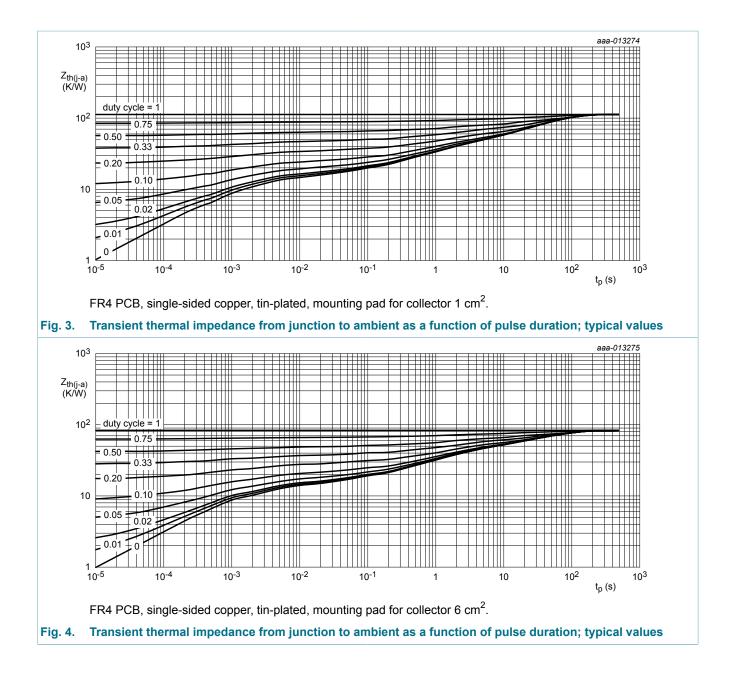
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm².



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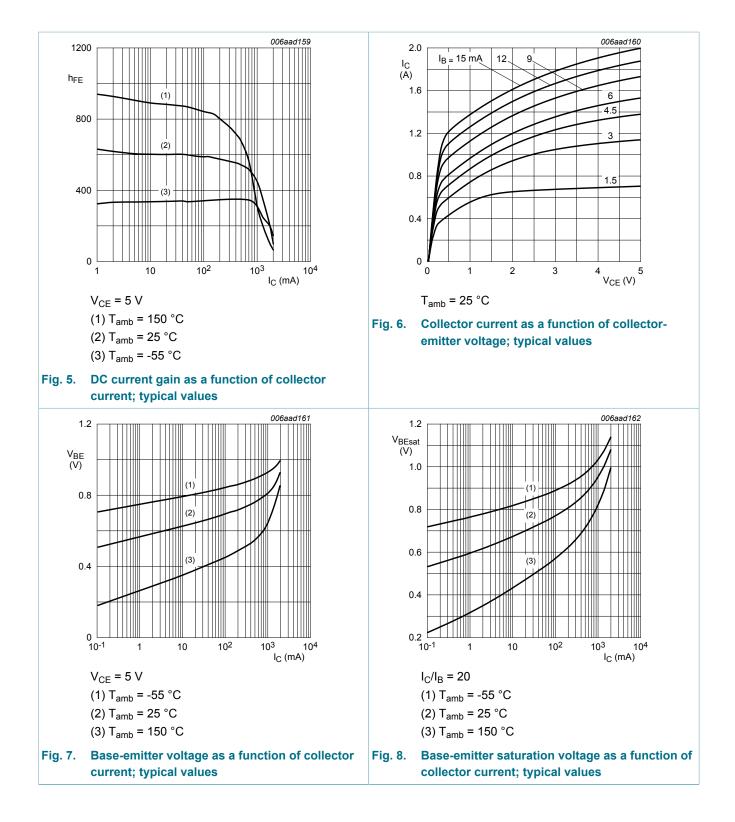


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10. Characteristics

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
I _{CBO}	collector-base cut-off	V_{CB} = 32 V; I _E = 0 A; T _{amb} = 25 °C	-	-	100	nA
	current	V _{CB} = 32 V; I _E = 0 A; T _j = 150 °C	-	-	50	μA
I _{CES}	collector-emitter cut-off current	V_{CE} = 32 V; V_{BE} = 0 V; T_{amb} = 25 °C	-	-	100	nA
I _{EBO}	emitter-base cut-off current	V_{EB} = 5 V; I _C = 0 A; T _{amb} = 25 °C	-	-	100	nA
h _{FE}	DC current gain	V_{CE} = 5 V; I _C = 1 mA; T _{amb} = 25 °C	300	-	-	
		$\begin{split} V_{CE} &= 5 \text{ V; } \text{I}_{C} = 500 \text{ mA; } \text{t}_{\text{p}} \leq 300 \mu\text{s}\text{;} \\ \bar{\delta} &\leq 0.02\text{; } \text{T}_{\text{amb}} = 25 ^{\circ}\text{C} \end{split}$	300	-	-	
		V_{CE} = 5 V; I _C = 1 A; t _p ≤ 300 µs; $\delta \le 0.02$; T _{amb} = 25 °C	200	-	-	
		$\label{eq:VCE} \begin{array}{l} V_{CE} \texttt{= 5 V; } I_{C} \texttt{= 2 A; pulsed; } t_{p} \texttt{\leq 300 } \mu s; \\ \delta \texttt{\leq 0.02; } T_{amb} \texttt{= 25 °C} \end{array}$	75	-	-	
V _{CEsat}	collector-emitter	I_{C} = 100 mA; I_{B} = 1 mA; T_{amb} = 25 °C	-	-	80	mV
	saturation voltage	$\begin{split} I_{C} &= 500 \text{ mA; } I_{B} = 50 \text{ mA; } t_{p} \leq 300 \mu\text{s;} \\ \delta &\leq 0.02; T_{amb} = 25 ^{\circ}\text{C} \end{split}$	-	-	150	mV
		I_{C} = 1 A; I_{B} = 100 mA; pulsed; $t_{p} \le 300 \mu\text{s}; \delta \le 0.02; T_{amb}$ = 25 °C	-	-	275	mV
		I_{C} = 2 A; I_{B} = 200 mA; pulsed; $t_{p} \le 300 \ \mu$ s; δ ≤ 0.02; T_{amb} = 25 °C	-	-	550	mV
R _{CEsat}	collector-emitter saturation resistance	I_{C} = 1 A; I_{B} = 100 mA; pulsed; $t_{p} \le 300 \ \mu$ s; δ ≤ 0.02; T_{amb} = 25 °C	-	-	275	mΩ
V _{BEsat}	base-emitter saturation voltage	I_{C} = 1 A; I_{B} = 100 mA; pulsed; $t_{p} \le 300$ μs; δ ≤ 0.02; T_{amb} = 25 °C	-	-	1.2	V
V _{BEon}	base-emitter turn-on voltage	V_{CE} = 5 V; I _C = 1 A; t _p ≤ 300 µs; $\delta \le 0.02$; T _{amb} = 25 °C	-	-	1.1	V
f _T	transition frequency	V_{CE} = 10 V; I _C = 50 mA; f = 100 MHz; T _{amb} = 25 °C	150	-	-	MHz
Cc	collector capacitance	V _{CB} = 10 V; I _E = 0 A; i _e = 0 A; f = 1 MHz; T _{amb} = 25 °C	-	-	10	pF

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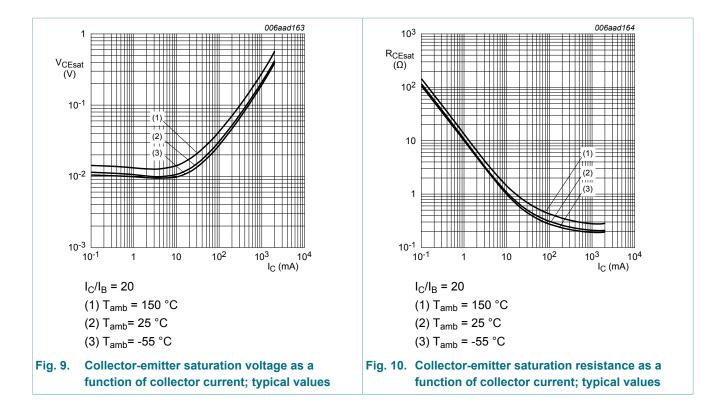
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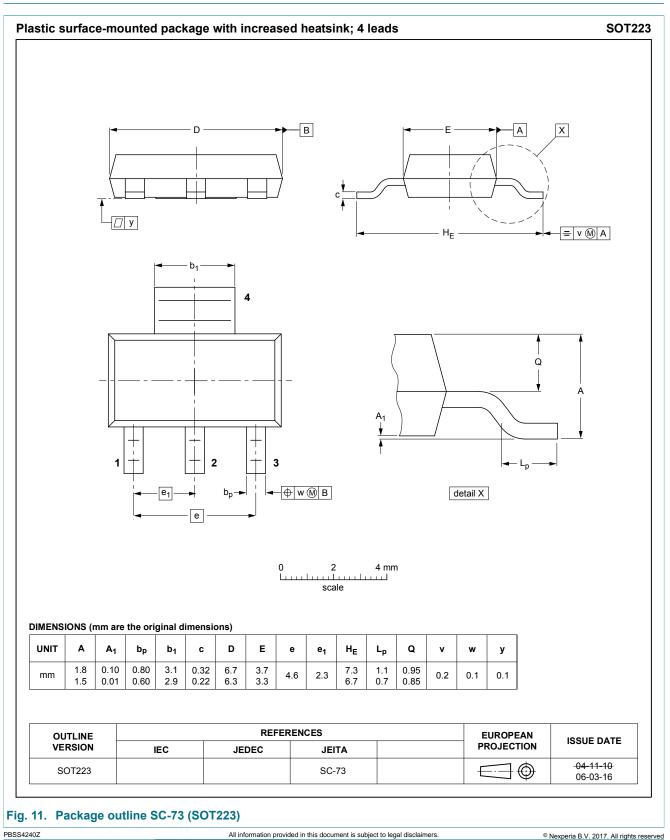
11. Test information

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.

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12. Package outline



Product data sheet

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7 3.85 3.6 3.5 - 0.3 ŧ 1.3 1.2 (4×) (4×) solder lands ł Ī | solder resist 3.9 6.1 7.65 solder paste -1 occupied area 1 Dimensions in mm 2.3 2.3 1.2 (3×) 1.3 (3×) 6.15 sot223_fr Fig. 12. Reflow soldering footprint for SC-73 (SOT223) 8.9 6.7 1.9 solder lands 4 solder resist 6.2 8.7 occupied area Dimensions in mm preferred transport ł direction during soldering 1.9 (3×) 2.7 2.7 1.9 1.1 (2×) sot223_fw Fig. 13. Wave soldering footprint for SC-73 (SOT223)

13. Soldering

PBSS4240Z

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14. Revision history

Table 8. Revision history							
Data sheet ID	Release date	Data sheet status	Change notice	Supersedes			
PBSS4240Z v. 1	20141016	Product data sheet	-	-			

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15. Legal information

15.1 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.
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