



2PD2150

20 V, 3 A NPN low V_{CEsat} (BISS) transistor

Rev. 01 — 22 April 2005

Product data sheet

1. Product profile

1.1 General description

NPN low V_{CEsat} Breakthrough in Small Signal (BISS) transistor in a SOT89 (SC-62/TO-243) SMD plastic package.

PNP complement: 2PB1424.

1.2 Features

- 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 due to less heat generation
- Smaller required Printed-Circuit Board (PCB) area than for conventional transistors

1.3 Applications

- DC-to-DC conversion
- MOSFET gate driving
- Motor control
- Charging circuits
- Power switches (e.g. motors, fans)
- Thin Film Transistor (TFT) backlight inverter

1.4 Quick reference data

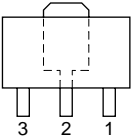
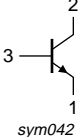
Table 1: Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CEO}	collector-emitter voltage	open base	-	-	20	V
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms	-	-	3	A
h_{FE}	DC current gain	$V_{CE} = 2$ V; $I_C = 0.1$ A	180	-	390	

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2. Pinning information

Table 2: Pinning

Pin	Description	Simplified outline	Symbol
1	emitter		
2	collector		
3	base		

3. Ordering information

Table 3: Ordering information

Type number	Package		
	Name	Description	Version
2PD2150	SC-62	plastic surface mounted package; collector pad for good heat transfer; 3 leads	SOT89

4. Marking

Table 4: Marking codes

Type number	Marking code
2PD2150	M2

5. Limiting values

Table 5: Limiting values

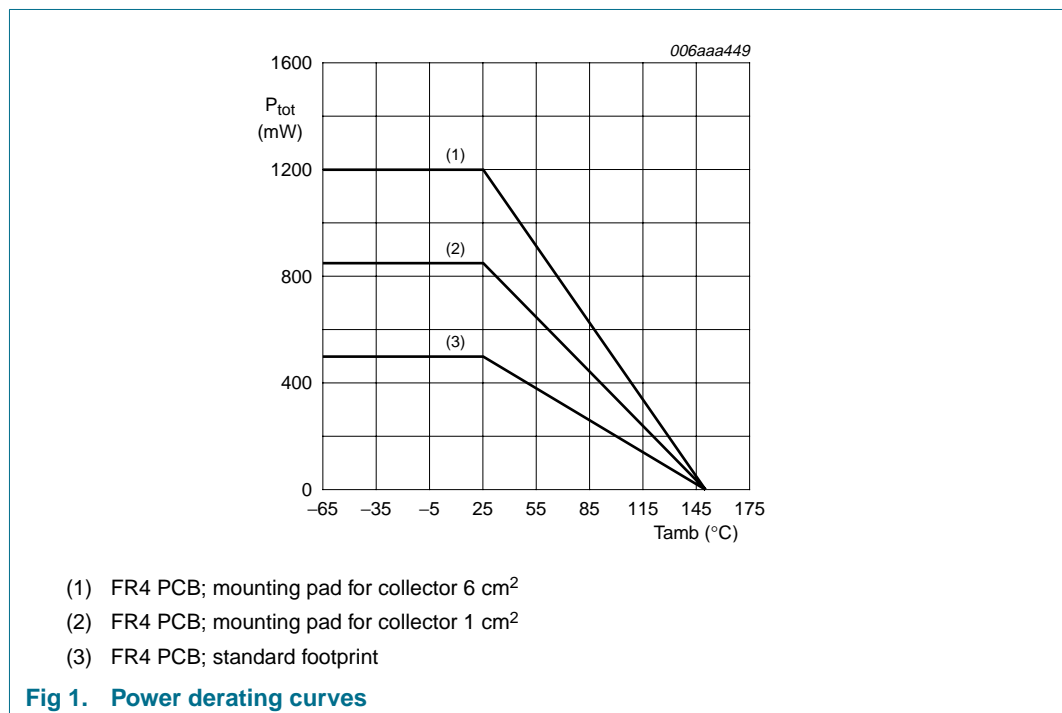
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit	
V_{CBO}	collector-base voltage	open emitter	-	40	V	
V_{CEO}	collector-emitter voltage	open base	-	20	V	
V_{EBO}	emitter-base voltage	open collector	-	5	V	
I_C	collector current (DC)		-	1	A	
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms	-	3	A	
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	500	mW
			[2]	-	850	mW
			[3]	-	1200	mW
T_j	junction temperature		-	150	°C	
T_{amb}	ambient temperature		-65	+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.

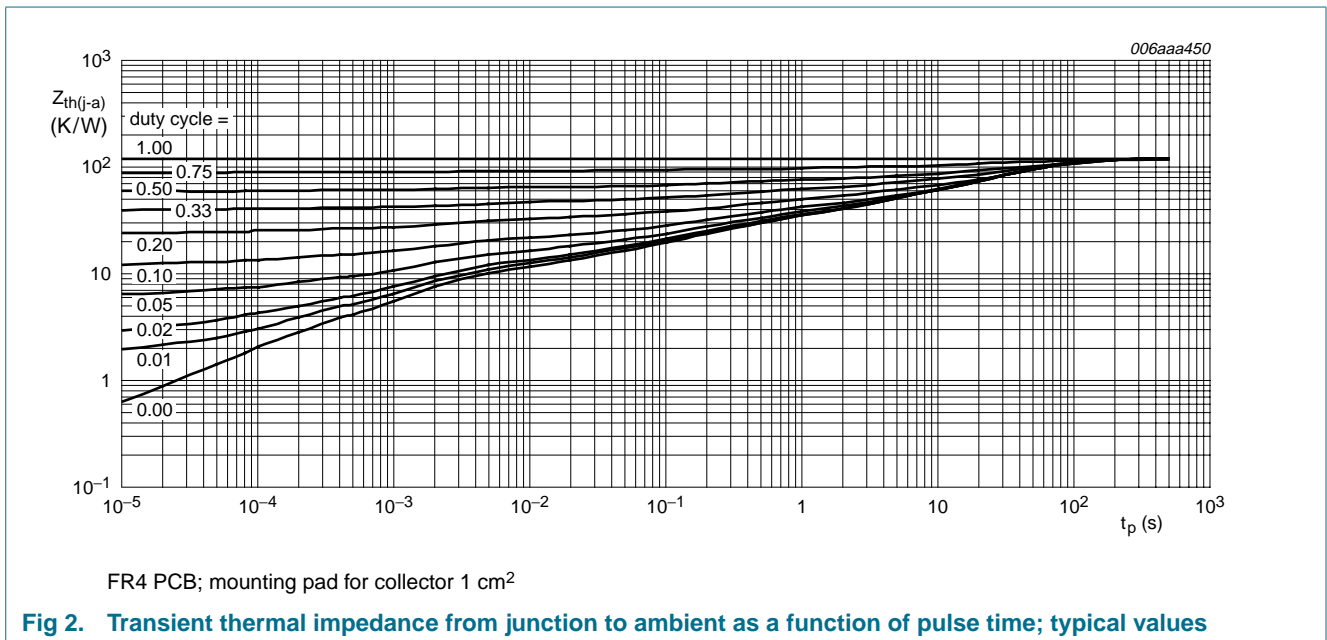


6. Thermal characteristics

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]	-	-	250	K/W
			[2]	-	-	147	K/W
			[3]	-	-	104	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 cm².
- [3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 m².



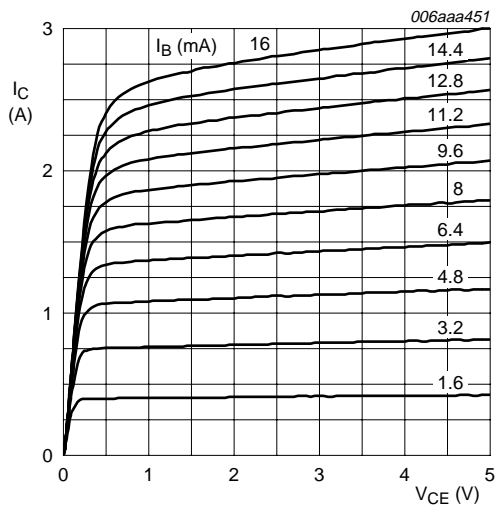
7. Characteristics

Table 7: Characteristics

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

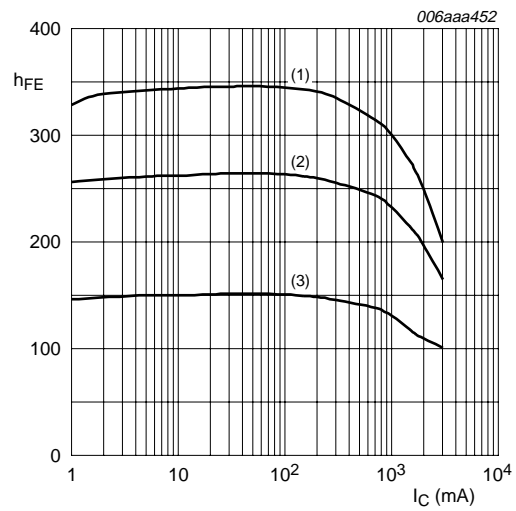
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{CBO}	collector-base cut-off current	$V_{CB} = 30\text{ V}; I_E = 0\text{ A}$	-	-	0.1	μA
		$V_{CB} = 30\text{ V}; I_E = 0\text{ A}; T_j = 150\text{ }^{\circ}\text{C}$	-	-	10	μA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5\text{ V}; I_C = 0\text{ A}$	-	-	0.1	μA
h_{FE}	DC current gain	$V_{CE} = 2\text{ V}; I_C = 0.1\text{ A}$	180	-	390	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 2\text{ A}; I_B = 100\text{ mA}$	-	-	0.5	V
V_{BEon}	base-emitter turn-on voltage	$V_{CE} = 10\text{ V}; I_C = 5\text{ mA}$	[1]	-	0.7	V
		$V_{CE} = 1\text{ V}; I_C = 1\text{ A}$	[1]	-	1	V
f_T	transition frequency	$I_C = 500\text{ mA}; V_{CE} = 2\text{ V}; f = 100\text{ MHz}$	-	220	-	MHz
C_c	collector capacitance	$V_{CB} = 10\text{ V}; I_E = i_e = 0\text{ A}; f = 1\text{ MHz}$	-	20	-	pF

[1] Pulse test: $t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02$.



$T_{amb} = 25\text{ }^\circ\text{C}$

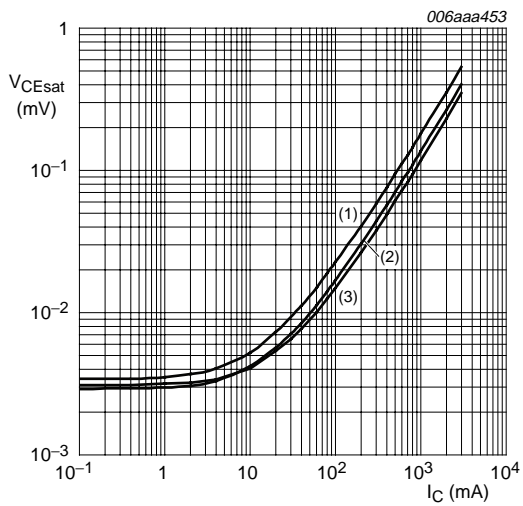
Fig 3. Collector current as a function of collector-emitter voltage; typical values



$V_{CE} = 2\text{ V}$

- (1) $T_{amb} = 100\text{ }^\circ\text{C}$
- (2) $T_{amb} = 25\text{ }^\circ\text{C}$
- (3) $T_{amb} = -55\text{ }^\circ\text{C}$

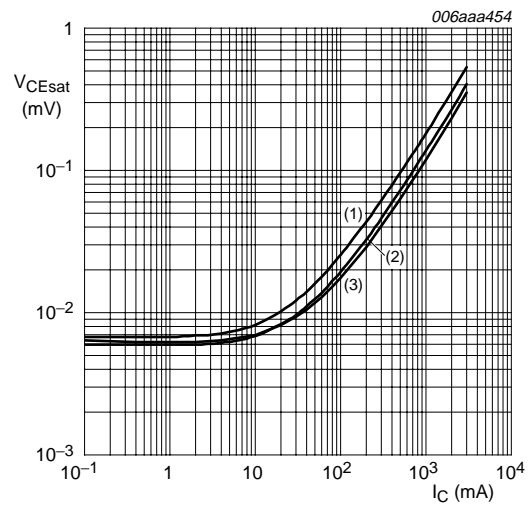
Fig 4. DC current gain as a function of collector current; typical values



$I_C/I_B = 10$

- (1) $T_{amb} = 100\text{ }^\circ\text{C}$
- (2) $T_{amb} = 25\text{ }^\circ\text{C}$
- (3) $T_{amb} = -55\text{ }^\circ\text{C}$

Fig 5. Collector-emitter saturation voltage as a function of collector current; typical values

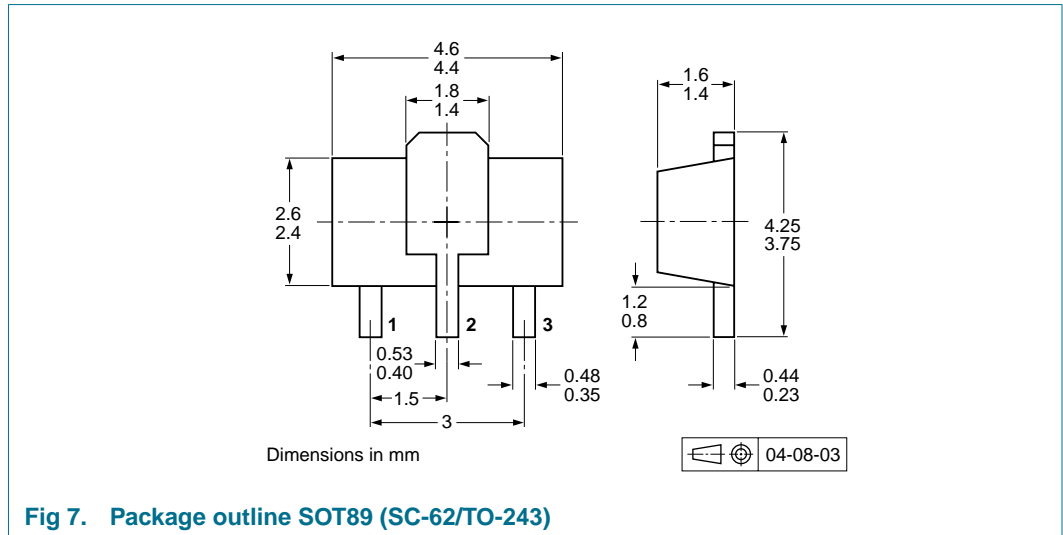


$I_C/I_B = 20$

- (1) $T_{amb} = 100\text{ }^\circ\text{C}$
- (2) $T_{amb} = 25\text{ }^\circ\text{C}$
- (3) $T_{amb} = -55\text{ }^\circ\text{C}$

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

8. Package outline



9. Packing information

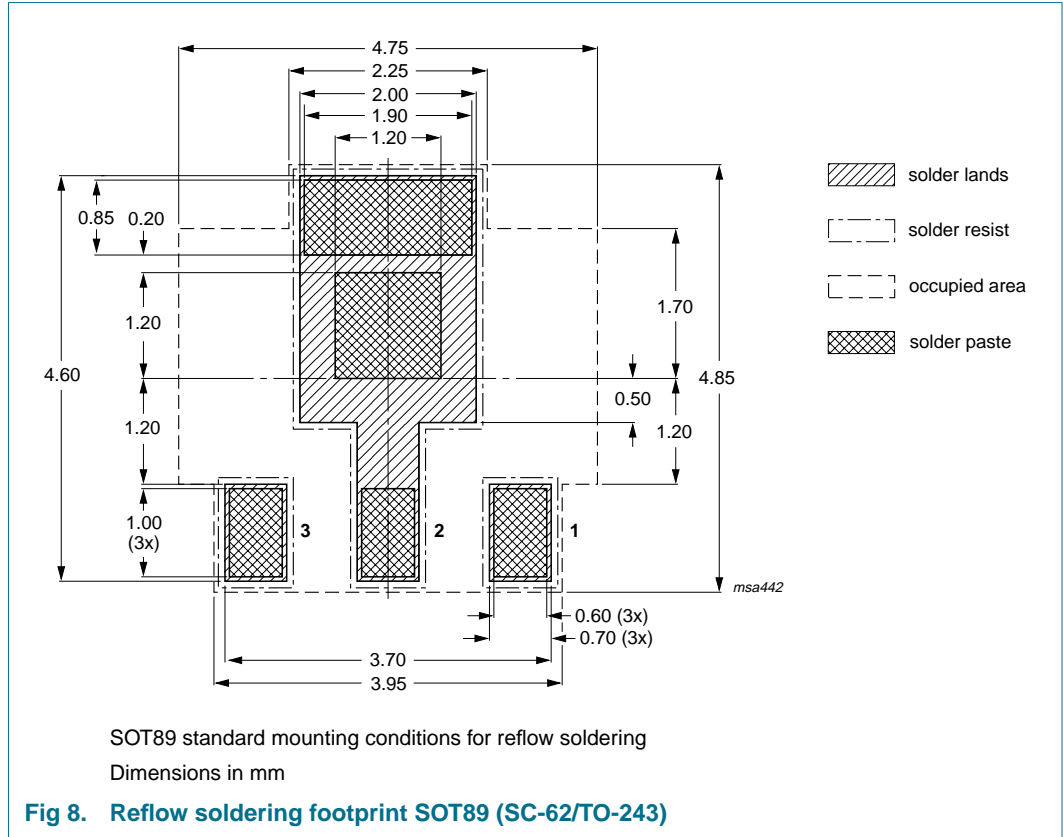
Table 8: Packing methods

The indicated -xxx are the last three digits of the 12NC ordering code. [1]

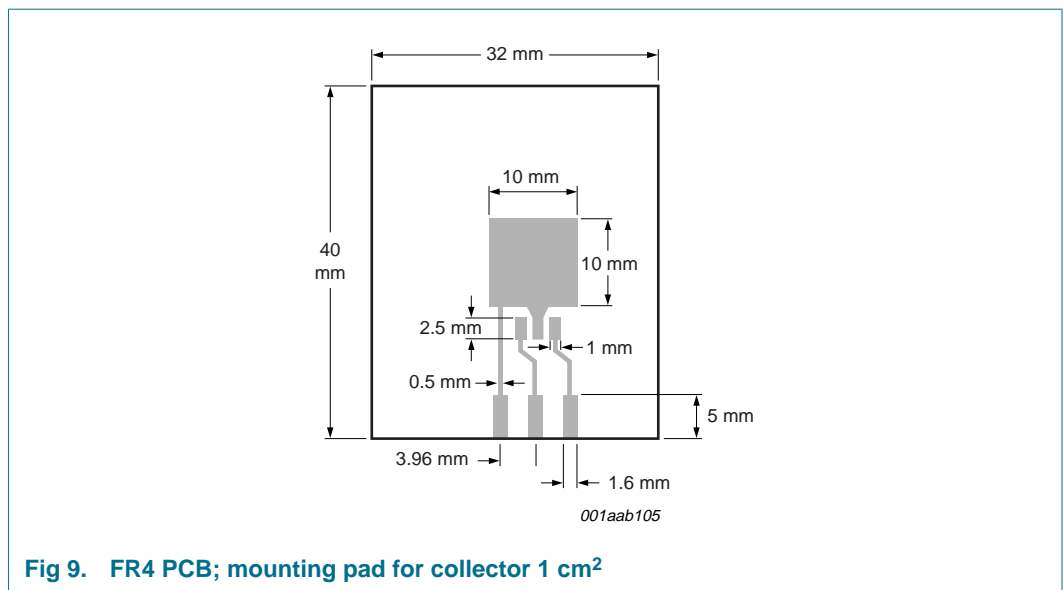
Type number	Package	Description	Packing quantity	
			1000	4000
2PD2150	SOT89	8 mm pitch, 12 mm tape and reel	-115	-135

[1] For further information and the availability of packing methods, see [Section 16](#).

10. Soldering



11. Mounting



12. Revision history

Table 9: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
2PD2150_1	20050422	Product data sheet	-	9397 750 14987	-

13. Data sheet status

Level	Data sheet status ^[1]	Product status ^{[2] [3]}	Definition
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
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[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

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