

# PBSS5350D

50 V, 3 A PNP low  $V_{CEsat}$  (BISS) transistor

Rev. 6 — 28 June 2011

Product data sheet

## 1. Product profile

### 1.1 General description

PNP low  $V_{CEsat}$  Breakthrough In Small Signal (BISS) transistor in a small SOT457 (SC-74) Surface-Mounted Device (SMD) plastic package.

NPN complement: PBSS4350D

### 1.2 Features and benefits

- Low collector-emitter saturation voltage  $V_{CEsat}$
- High current capability
- High efficiency due to less heat generation
- AEC-Q101 qualified
- Smaller Printed-Circuit Board (PCB) area than for conventional transistors

### 1.3 Applications

- Supply line switching circuits
- Battery management applications
- DC-to-DC conversion

### 1.4 Quick reference data

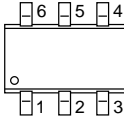
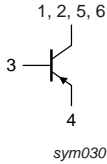
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{CEO}$	collector-emitter voltage	open base	-	-	-50	V
$I_C$	collector current		-	-	-3	A
$I_{CM}$	peak collector current		-	-	-5	A
$R_{CEsat}$	collector-emitter saturation resistance	$I_C = -2$ A; $I_B = -200$ mA; pulsed; $t_p \leq 300$ $\mu$ s; $\delta \leq 0.02$ ; $T_{amb} = 25$ °C	-	120	150	m $\Omega$



## 2. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	C	collector	 <p><b>SOT457 (TSOP6)</b></p>	 <p><i>sym030</i></p>
2	C	collector		
3	B	base		
4	E	emitter		
5	C	collector		
6	C	collector		

## 3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PBSS5350D	TSOP6	plastic surface-mounted package (TSOP6); 6 leads	SOT457

## 4. Marking

Table 4. Marking codes

Type number	Marking code
PBSS5350D	53

## 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	-	-60	V	
$V_{CEO}$	collector-emitter voltage	open base	-	-50	V	
$V_{EBO}$	emitter-base voltage	open collector	-	-6	V	
$I_C$	collector current		-	-3	A	
$I_{CM}$	peak collector current		-	-5	A	
$I_{BM}$	peak base current		-	-1	A	
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[1]	-	600	mW
			[2]	-	750	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 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for collector 1 cm<sup>2</sup>.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm<sup>2</sup>.

[3] Device mounted on an FR4 4-layer PCB.

## 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]	-	-	208	K/W
			[2]	-	-	160	K/W
		pulsed; $t_p \leq 50\text{ ms}$ ; $\delta \leq 0.5\%$ ; in free air	[2]	-	-	100	K/W

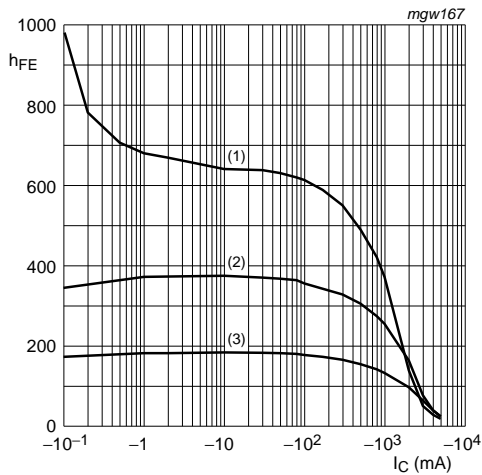
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm<sup>2</sup>.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 6 cm<sup>2</sup>.

## 7. Characteristics

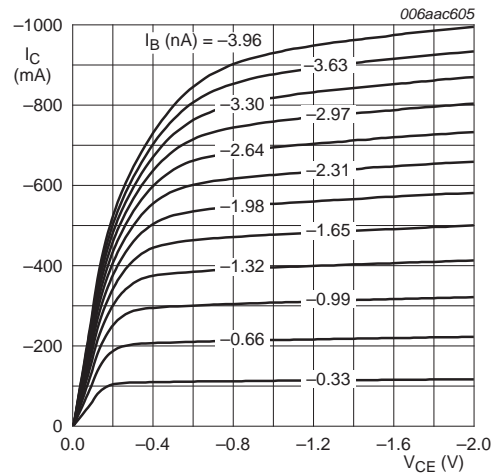
Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{CBO}$	collector-base cut-off current	$V_{CB} = -50\text{ V}; I_E = 0\text{ A}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	-100	nA
		$V_{CB} = -50\text{ V}; I_E = 0\text{ A}; T_j = 150\text{ }^\circ\text{C}$	-	-	-50	$\mu\text{A}$
$I_{EBO}$	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	$V_{CE} = -2\text{ V}; I_C = -500\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	200	-	-	
		$V_{CE} = -2\text{ V}; I_C = -1\text{ A};$ pulsed; $t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	200	-	-	
		$V_{CE} = -2\text{ V}; I_C = -2\text{ A};$ pulsed; $t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	100	-	-	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = -500\text{ mA}; I_B = -50\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	-100	mV
		$I_C = -1\text{ A}; I_B = -50\text{ mA}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	-180	mV
		$I_C = -2\text{ A}; I_B = -200\text{ mA};$ pulsed; $t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	-300	mV
$R_{CEsat}$	collector-emitter saturation resistance	$t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	-	120	150	$\text{m}\Omega$
$V_{BEsat}$	base-emitter saturation voltage		-	-	-1.2	V
$V_{BEon}$	base-emitter turn-on voltage	$V_{CE} = -2\text{ V}; I_C = -1\text{ A};$ pulsed; $t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	-1.1	V
$f_T$	transition frequency	$V_{CE} = -5\text{ V}; I_C = -100\text{ mA}; f = 100\text{ MHz};$ $T_{amb} = 25\text{ }^\circ\text{C}$	100	-	-	MHz
$C_c$	collector capacitance	$V_{CB} = -10\text{ V}; I_E = 0\text{ A}; i_e = 0\text{ A};$ $f = 1\text{ MHz}; T_{amb} = 25\text{ }^\circ\text{C}$	-	-	40	pF



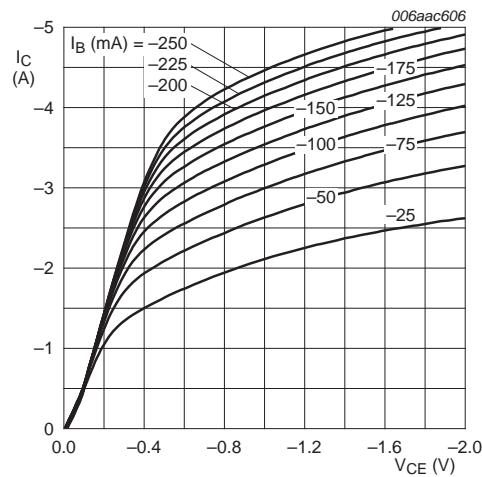
$V_{CE} = -2\text{ V}$   
 (1)  $T_{amb} = 150^\circ\text{C}$   
 (2)  $T_{amb} = 25^\circ\text{C}$   
 (3)  $T_{amb} = -55^\circ\text{C}$

**Fig 1. DC current gain as a function of collector current; typical values**



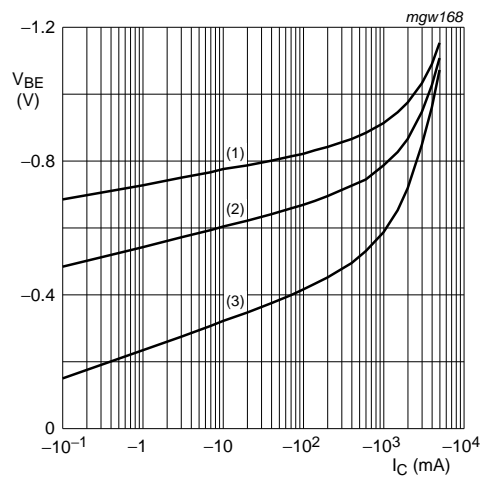
$T_{amb} = 25^\circ\text{C}$

**Fig 2. Collector current as a function of collector-emitter voltage; typical values**



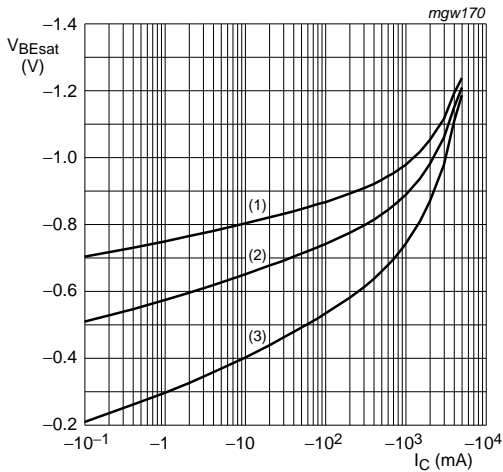
$T_{amb} = 25^\circ\text{C}$

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



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

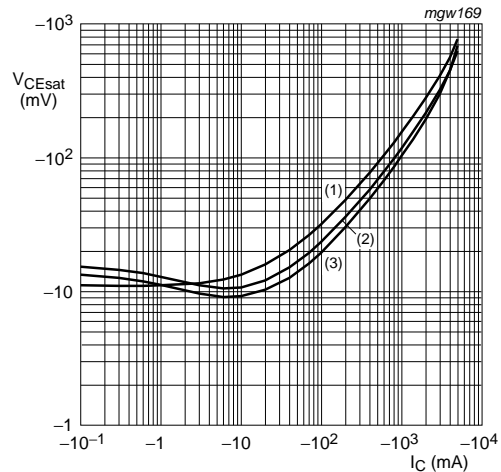
**Fig 4. Base-emitter voltage as a function of collector current; typical values**



$I_C/I_B = 10$

- (1)  $T_{amb} = -55\text{ °C}$
- (2)  $T_{amb} = 25\text{ °C}$
- (3)  $T_{amb} = 150\text{ °C}$

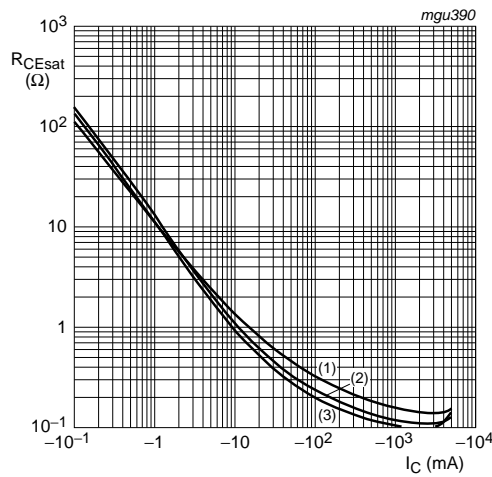
**Fig 5. Base-emitter saturation voltage as a function of collector current; typical values**



$I_C/I_B = 10$

- (1)  $T_{amb} = 150\text{ °C}$
- (2)  $T_{amb} = 25\text{ °C}$
- (3)  $T_{amb} = -55\text{ °C}$

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



$I_C/I_B = 20$

- (1)  $T_{amb} = 150\text{ °C}$
- (2)  $T_{amb} = 25\text{ °C}$
- (3)  $T_{amb} = -55\text{ °C}$

**Fig 7. Collector-emitter saturation resistance as a function of collector current; typical values**

## 8. Package outline

Plastic surface-mounted package (TSOP6); 6 leads

SOT457

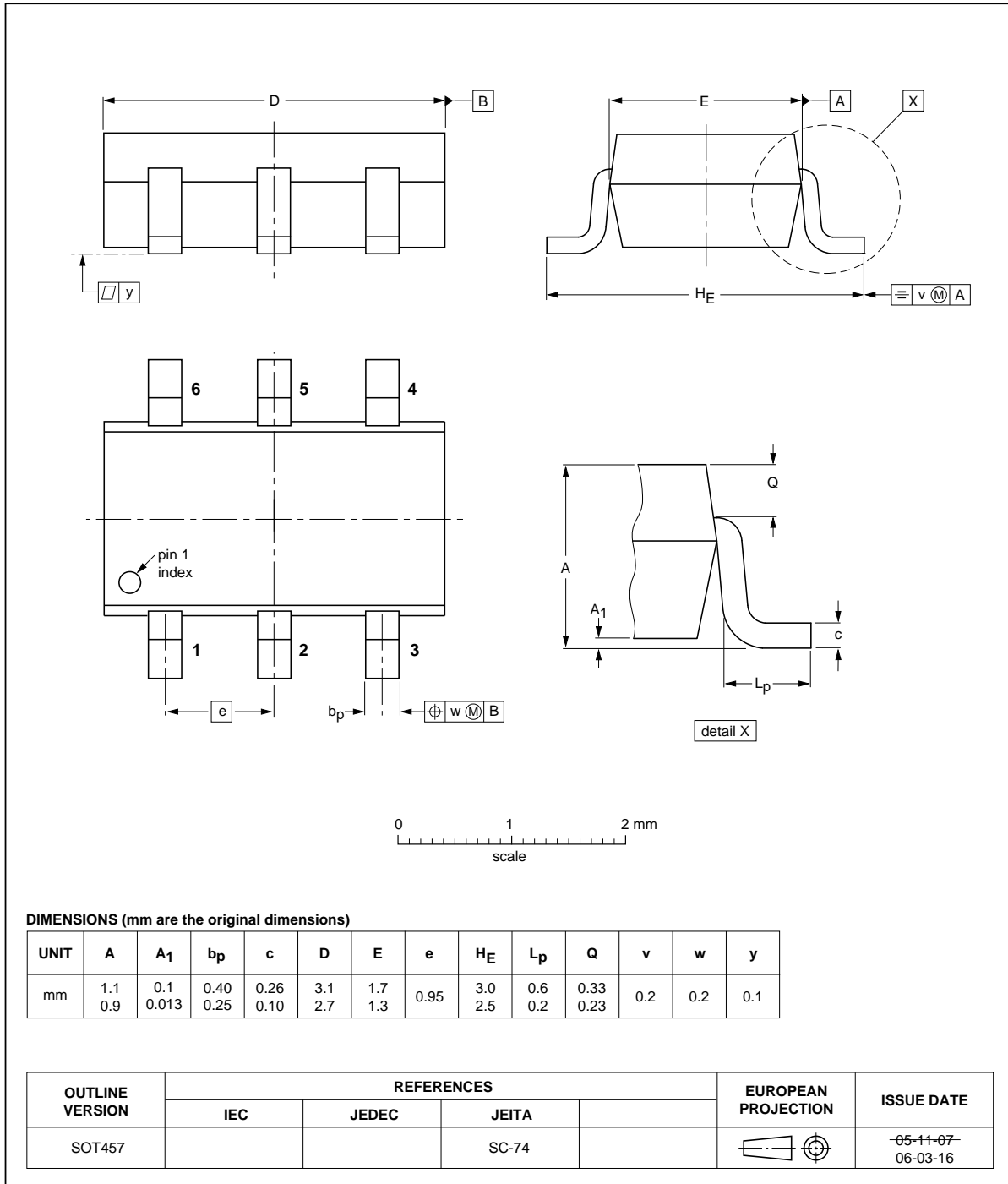
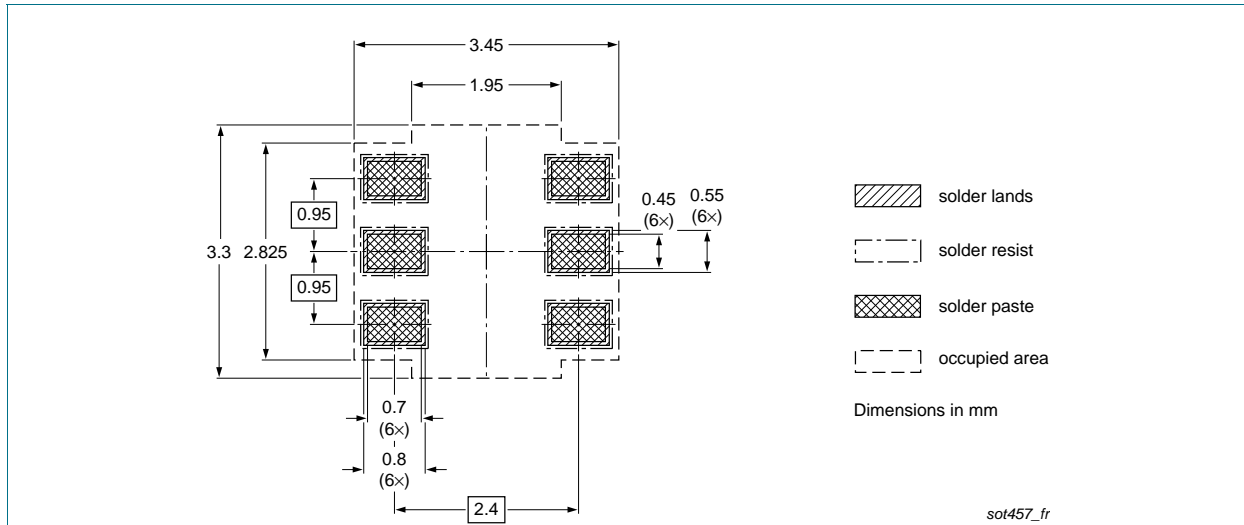
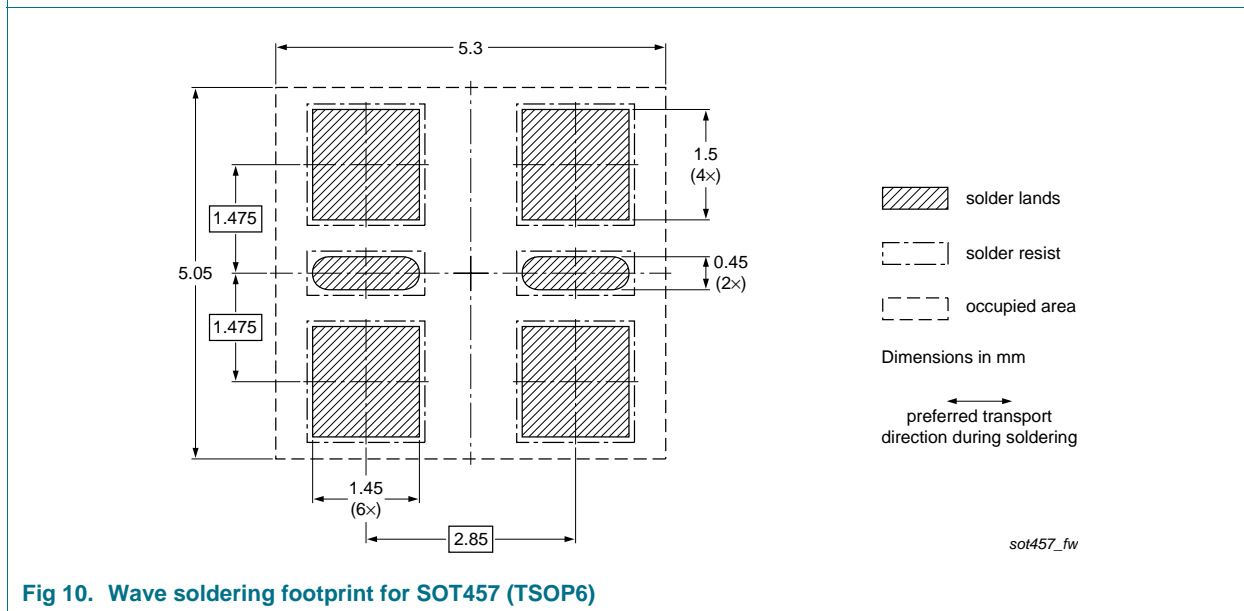


Fig 8. Package outline SOT457 (TSOP6)

## 9. Soldering



**Fig 9. Reflow soldering footprint for SOT457 (TSOP6)**



**Fig 10. Wave soldering footprint for SOT457 (TSOP6)**



## 10. Revision history

**Table 8.** Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PBSS5350D v.6	20110628	Product data sheet	-	PBSS5350D v.5
Modifications:	• <a href="#">5 "Limiting values"</a> : P <sub>tot</sub> conditions updated.			
PBSS5350D v.5	20110323	Product data sheet	-	PBSS5350D v.4
PBSS5350D v.4	20011113	Product specification	-	PBSS5350D v.3
PBSS5350D v.3	20010713	Product specification	-	PBSS5350D v.2
PBSS5350D v.2	20010126	Product specification	-	PBSS5350D v.1
PBSS5350D v.1	20000308	Product specification	-	-

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Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
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Product [short] data sheet	Production	This document contains the product specification.

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