

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
- DC-to-DC conversion
- Battery management applications

1.4 Quick reference data

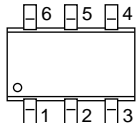
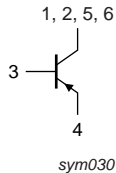
Table 1. Quick reference data

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; $t_p \leq 300$ μ s; $\delta \leq 0.02$; $T_{amb} = 25$ °C	-	120	150	m Ω



2. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	C	collector	 <p>SOT457 (TSOP6)</p>	 <p>sym030</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} ≤ 25 °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 cm².

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

[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 ≤ 50 ms; δ ≤ 0.5.; in free air	[2]	-	-	100	K/W

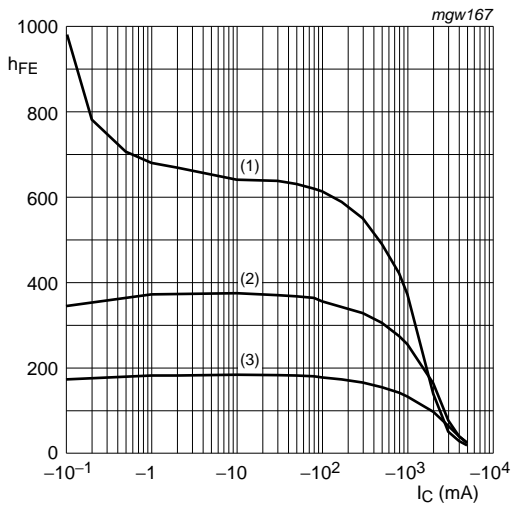
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1 cm².

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

7. Characteristics

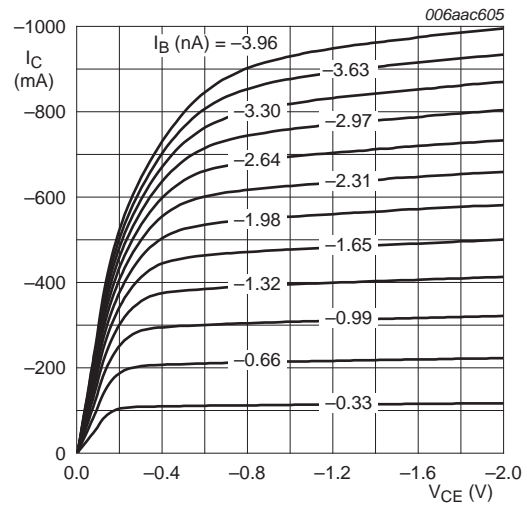
Table 7. Characteristics

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	μA
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



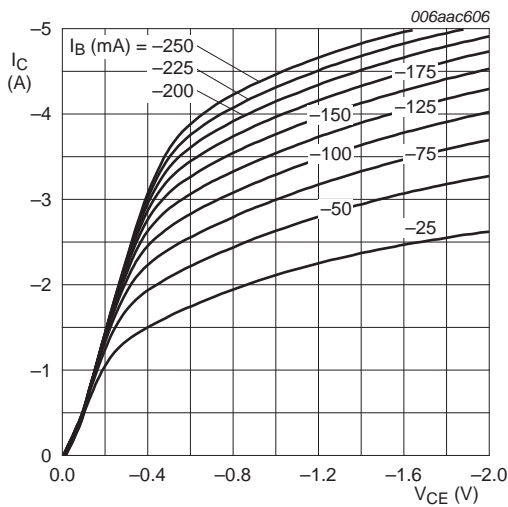
$V_{CE} = -2\text{ V}$
 (1) $T_{amb} = 150\text{ }^{\circ}\text{C}$
 (2) $T_{amb} = 25\text{ }^{\circ}\text{C}$
 (3) $T_{amb} = -55\text{ }^{\circ}\text{C}$

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



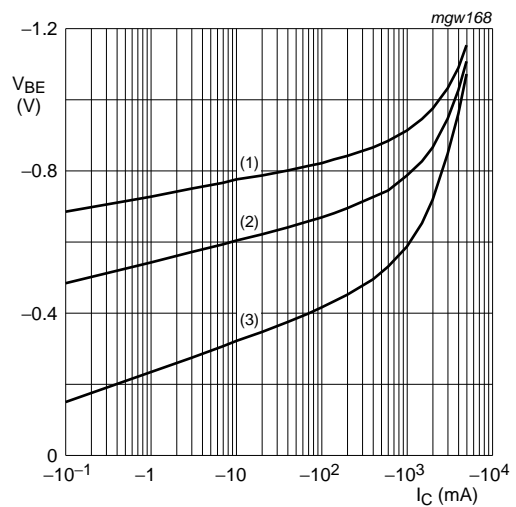
$T_{amb} = 25\text{ }^{\circ}\text{C}$

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



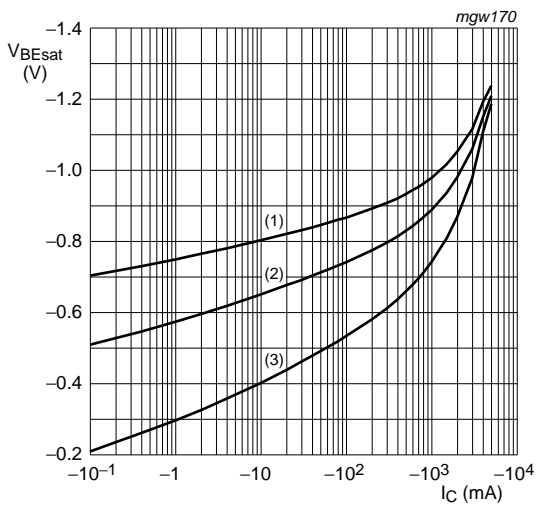
$T_{amb} = 25\text{ }^{\circ}\text{C}$

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



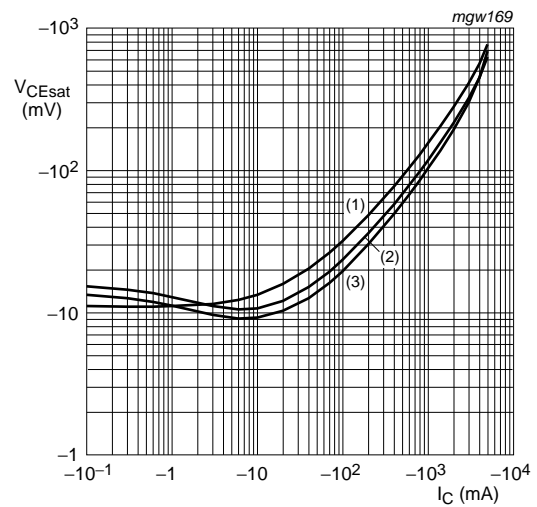
$V_{CE} = -2\text{ V}$
 (1) $T_{amb} = -55\text{ }^{\circ}\text{C}$
 (2) $T_{amb} = 25\text{ }^{\circ}\text{C}$
 (3) $T_{amb} = 150\text{ }^{\circ}\text{C}$

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



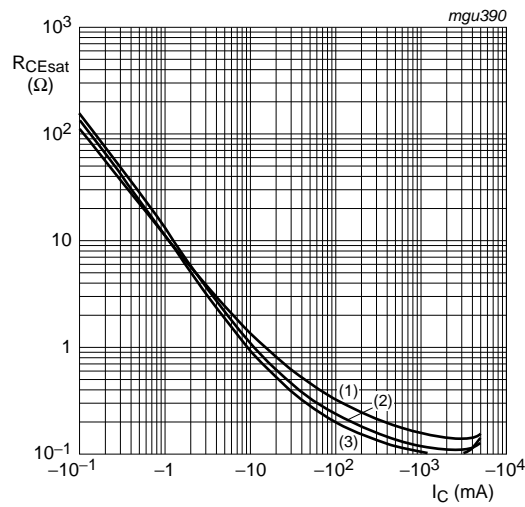
$I_C/I_B = 10$
 (1) $T_{amb} = -55\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = 150\text{ °C}$

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

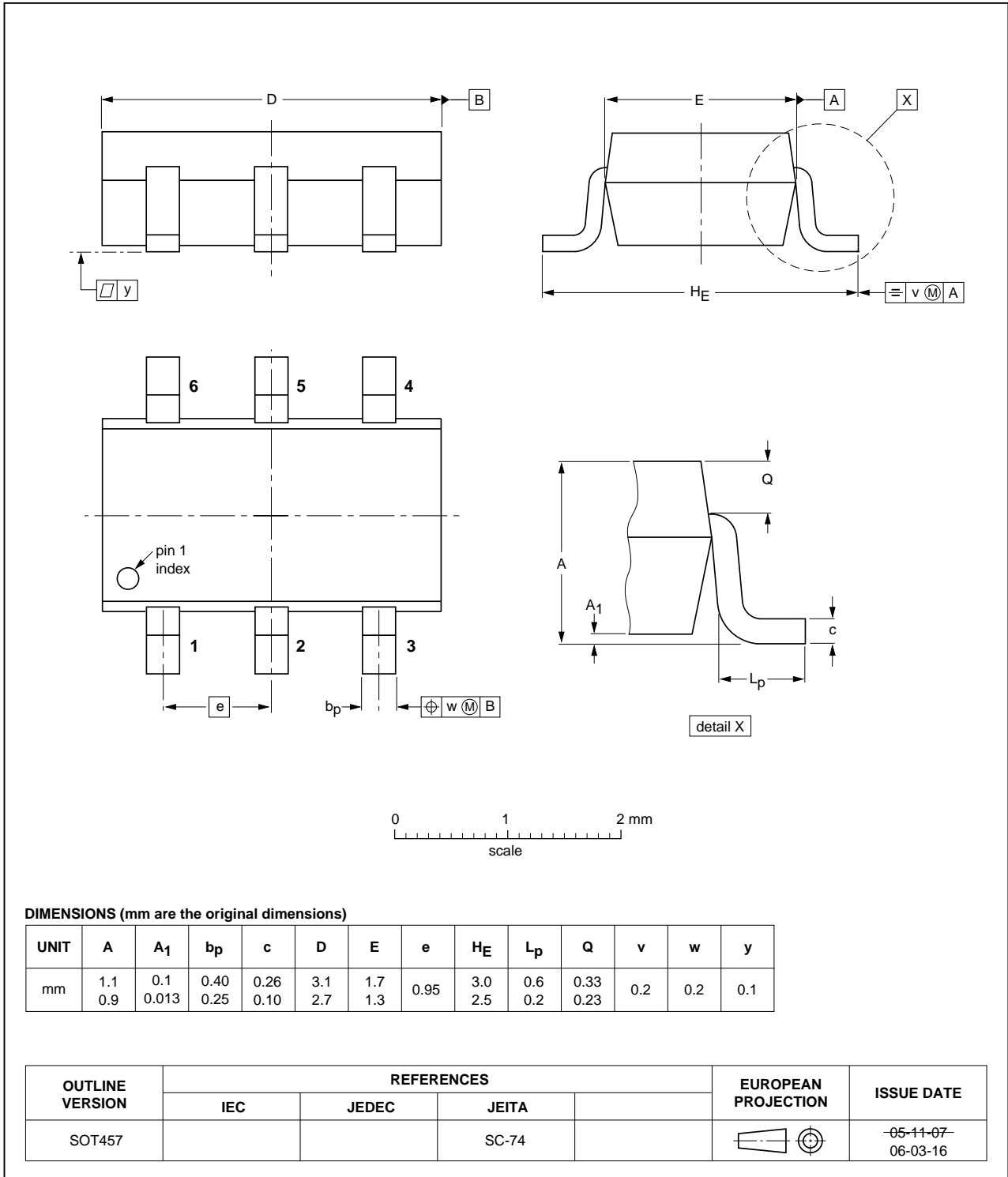


Fig 8. Package outline SOT457 (TSOP6)

9. Soldering

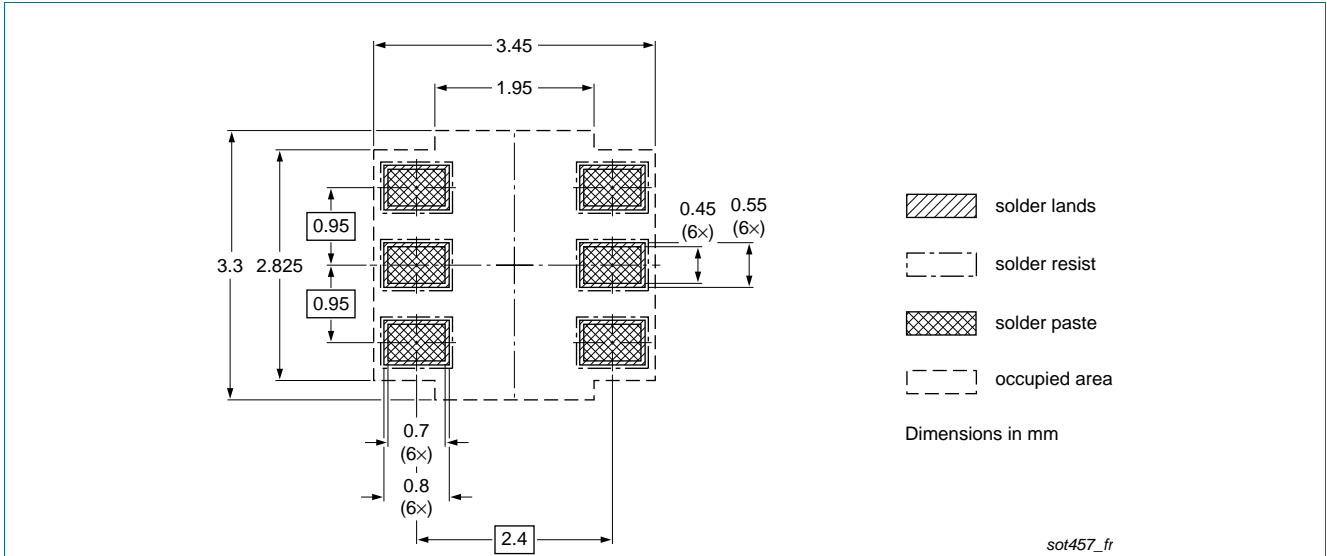


Fig 9. Reflow soldering footprint for SOT457 (TSOP6)

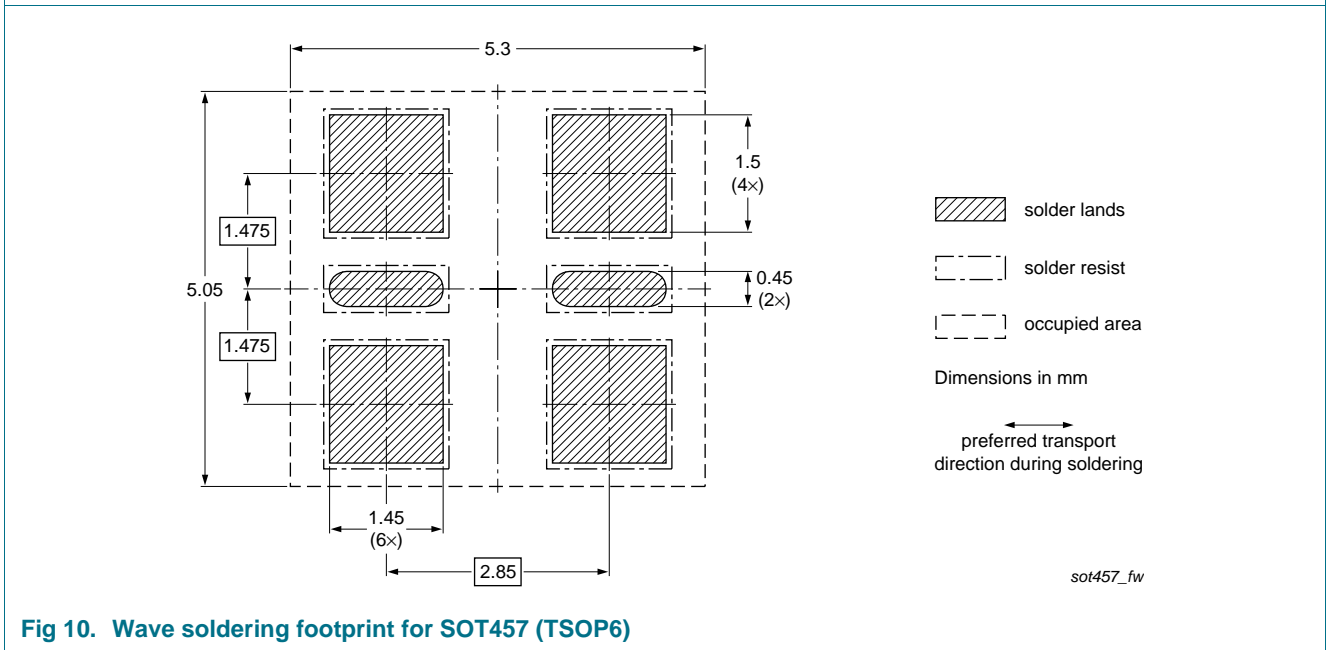


Fig 10. Wave soldering footprint for SOT457 (TSOP6)

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:	• 5 "Limiting values" : P _{tot} 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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11.1 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.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
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[2] The term 'short data sheet' is explained in section "Definitions".

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