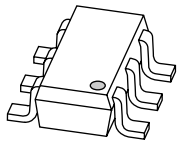

PMBTA42DS

NPN/NPN high-voltage double transistors

Rev. 01 — 6 January 2006 Product data sheet

1. Product profile

1.1 General description

NPN/NPN high-voltage double transistors in a small SOT457 (SC-74) Surface Mounted Device (SMD) plastic package.

1.2 Features

- High breakdown voltage
- Two electrically isolated transistors
- Small SMD plastic package

1.3 Applications

- Automotive:
  - High- and low-side switches
  - Voltage regulators
- Communication: Telecom line interface
- Consumer: CRT TV
- Computing: Monitors

1.4 Quick reference data

Table 1: Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor						
V_{CEO}	collector-emitter voltage	open base	-	-	300	V
I_C	collector current		-	-	100	mA
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms	-	-	200	mA

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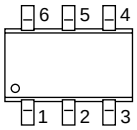
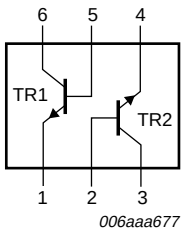
2. Pinning information

Table 2: Pinning

Pin	Description	Simplified outline	Symbol
1	emitter TR1		
2	base TR2		
3	collector TR2		
4	emitter TR2		
5	base TR1		
6	collector TR1		





3. Ordering information

Table 3: Ordering information

Type number	Package		
	Name	Description	Version
PMBTA42DS	SC-74	plastic surface mounted package (TSOP6); 6 leads	SOT457

4. Marking

Table 4: Marking codes

Type number	Marking code
PMBTA42DS	P4

5. Limiting values

Table 5: Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
Per transistor						
V_{CBO}	collector-base voltage	open emitter		-	300	V
V_{CEO}	collector-emitter voltage	open base		-	300	V
V_{EBO}	emitter-base voltage	open collector		-	6	V
I_C	collector current			-	100	mA
I_{CM}	peak collector current	single pulse; $t_p \leq 1$ ms		-	200	mA
I_{BM}	peak base current	single pulse; $t_p \leq 1$ ms		-	100	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	290	mW
			[2]	-	370	mW
			[3]	-	450	mW

Table 5: Limiting values *…continued*

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

Symbol	Parameter	Conditions		Min	Max	Unit
Per device						
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	420	mW
			[2]	-	560	mW
			[3]	-	700	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 and standard footprint.

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

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

6. Thermal characteristics

Table 6: Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per transistor							
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	431	K/W
			[2]	-	-	338	K/W
			[3]	-	-	278	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	105	K/W
Per device							
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	298	K/W
			[2]	-	-	223	K/W
			[3]	-	-	179	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 cm^2.

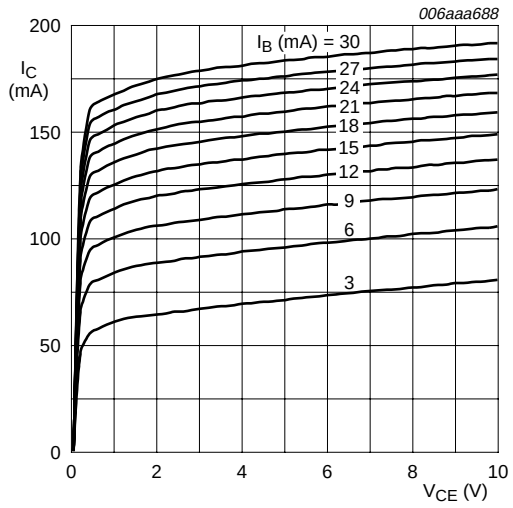
[3] Device mounted on a ceramic PCB, Al_2O_3, standard footprint.

7. Characteristics

Table 7: Characteristics

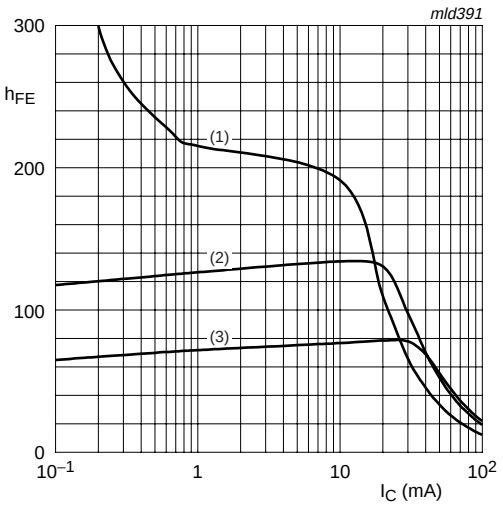
T_{amb} = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per transistor						
I_{CBO}	collector-base cut-off current	V_{CB} = 200 V; I_E = 0 A	-	-	100	nA
I_{EBO}	emitter-base cut-off current	V_{EB} = 6 V; I_C = 0 A	-	-	100	nA
h_{FE}	DC current gain	V_{CE} = 10 V; I_C = 1 mA	25	-	-	
		V_{CE} = 10 V; I_C = 10 mA	40	-	-	
		V_{CE} = 10 V; I_C = 30 mA	40	-	-	
V_{CEsat}	collector-emitter saturation voltage	I_C = 20 mA; I_B = 2 mA	-	-	500	mV
V_{BEsat}	base-emitter saturation voltage	I_C = 20 mA; I_B = 2 mA	-	-	900	mV
C_{re}	feedback capacitance	V_{CB} = 20 V; I_C = i_c = 0 A; f = 1 MHz	-	-	3	pF
f_T	transition frequency	V_{CE} = 20 V; I_C = 10 mA; f = 100 MHz	50	-	-	MHz



T_{amb} = 25 °C

Fig 1. Collector current as a function of collector-emitter voltage; typical values



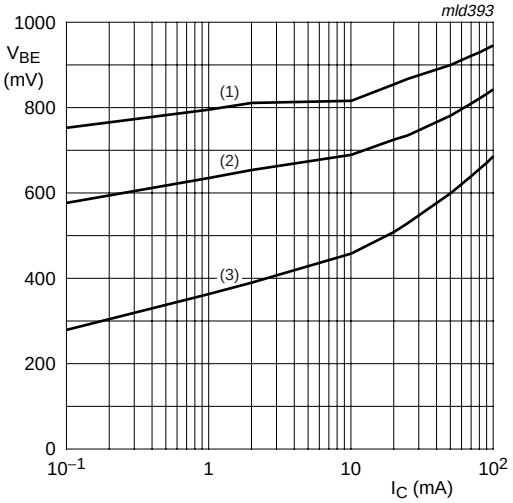
V_{CE} = 10 V

(1) T_{amb} = 150 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = –55 °C

Fig 2. DC current gain as a function of collector current; typical values



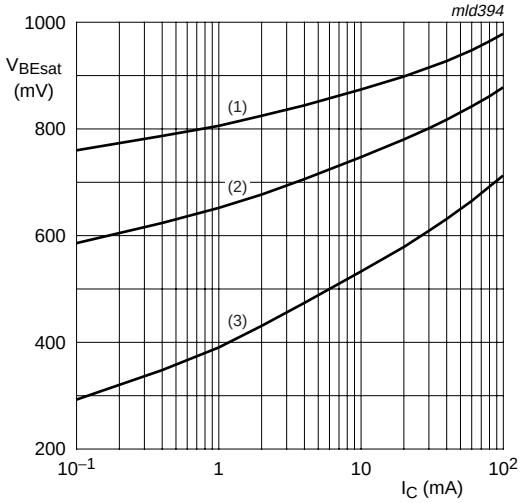
V_{CE} = 10 V

(1) T_{amb} = –55 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = 150 °C

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



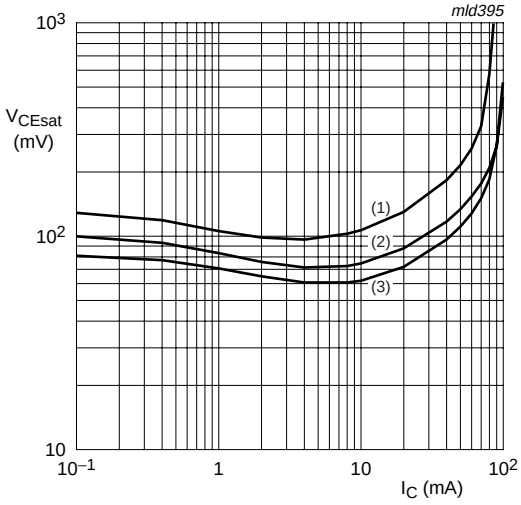
I_C/I_B = 10

(1) T_{amb} = –55 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = 150 °C

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



I_C/I_B = 10

(1) T_{amb} = 150 °C

(2) T_{amb} = 25 °C

(3) T_{amb} = –55 °C

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

8. Package outline

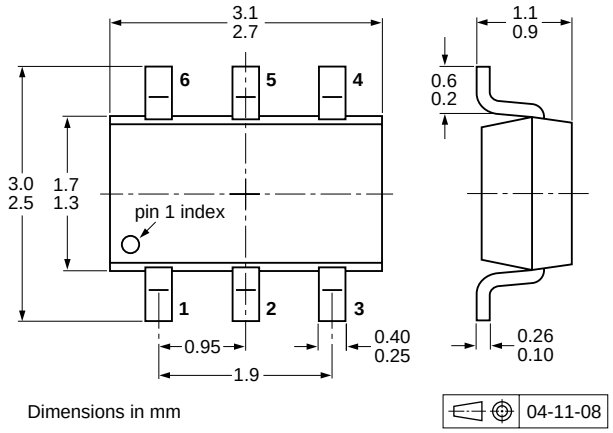


Fig 6. Package outline SOT457 (SC-74)

9. Packing information

Table 8: Packing methods

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

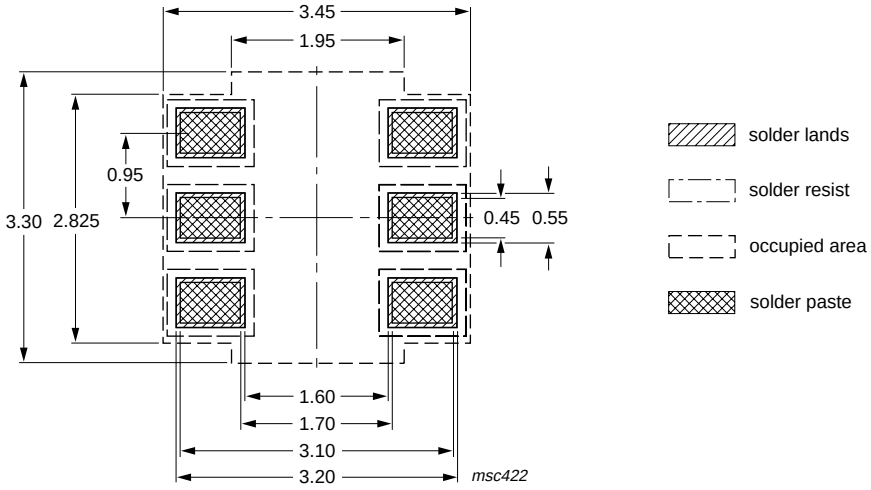
Type number	Package	Description		Packing quantity	
				3000	10000
PMBTA42DS	SOT457	4 mm pitch, 8 mm tape and reel; T1	[2]	-115	-135
		4 mm pitch, 8 mm tape and reel; T2	[3]	-125	-165

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

[2] T1: normal taping

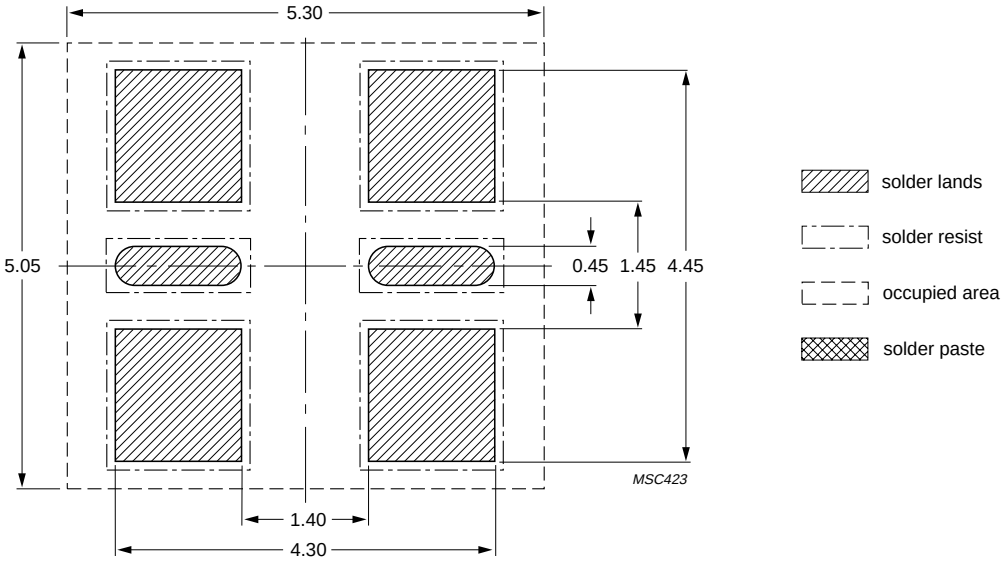
[3] T2: reverse taping

10. Soldering



Dimensions in mm

Fig 7. Reflow soldering footprint SOT457 (SC-74)



Dimensions in mm

Fig 8. Wave soldering footprint SOT457 (SC-74)

11. Revision history

Table 9: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
PMBTA42DS_1	20060106	Product data sheet	-	-	-

12. 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.
II	Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
III	Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN).

[1] Please consult the most recently issued data sheet before initiating or completing a design.

[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL http://www.semiconductors.philips.com.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

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Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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17. Contents

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