



# PMBTA42DS

NPN/NPN high-voltage double transistors

Rev. 02 — 27 August 2009

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
<b>Per transistor</b>						
$V_{CEO}$	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

## 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		

006aaa677

## 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	
<b>Per transistor</b>						
$V_{CBO}$	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	
<b>Per device</b>						
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C	[1]	-	420	mW
			[2]	-	560	mW
			[3]	-	700	mW
T <sub>j</sub>	junction temperature		-	150	°C	
T <sub>amb</sub>	ambient temperature		-65	+150	°C	
T <sub>stg</sub>	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 1cm<sup>2</sup>.
- [3] Device mounted on a ceramic PCB, Al<sub>2</sub>O<sub>3</sub>, standard footprint.

## 6. Thermal characteristics

**Table 6. Thermal characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per transistor</b>						
R <sub>th(j-a)</sub>	thermal resistance from junction to ambient	in free air	[1]	-	431	K/W
			[2]	-	338	K/W
			[3]	-	278	K/W
R <sub>th(j-sp)</sub>	thermal resistance from junction to solder point		-	-	105	K/W
<b>Per device</b>						
R <sub>th(j-a)</sub>	thermal resistance from junction to ambient	in free air	[1]	-	298	K/W
			[2]	-	223	K/W
			[3]	-	179	K/W

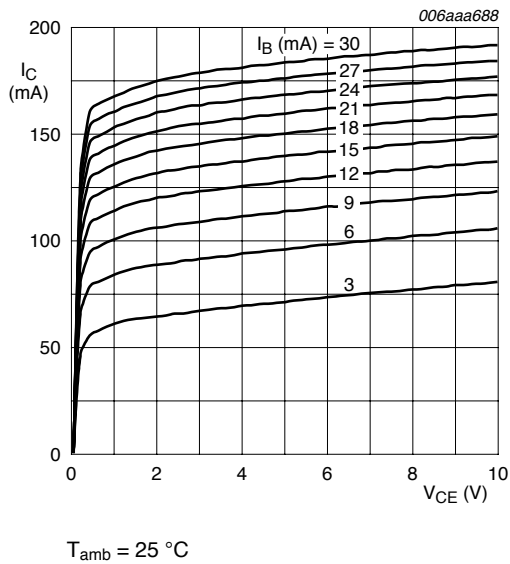
- [1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
- [2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for collector 1cm<sup>2</sup>.
- [3] Device mounted on a ceramic PCB, Al<sub>2</sub>O<sub>3</sub>, standard footprint.

## 7. Characteristics

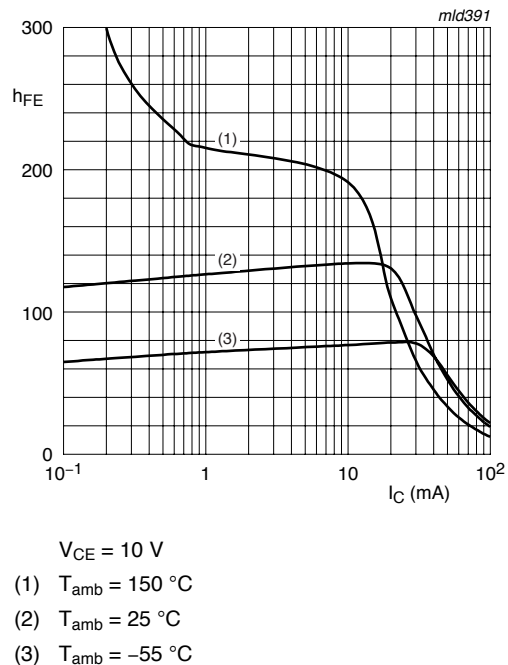
**Table 7. Characteristics**

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

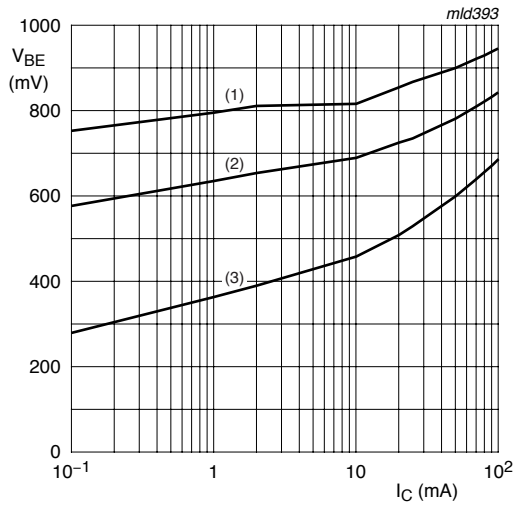
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Per transistor</b>						
$I_{CBO}$	collector-base cut-off current	$V_{CB} = 200\text{ V}; I_E = 0\text{ A}$	-	-	100	nA
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 6\text{ V}; I_C = 0\text{ A}$	-	-	100	nA
$h_{FE}$	DC current gain	$V_{CE} = 10\text{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



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

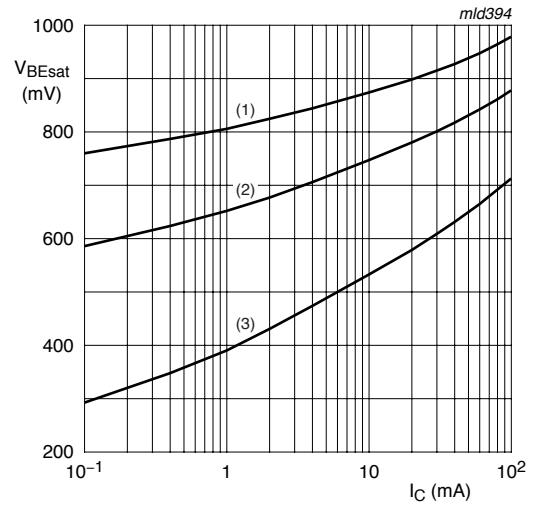


**Fig 2. DC current gain as a function of collector current; typical values**



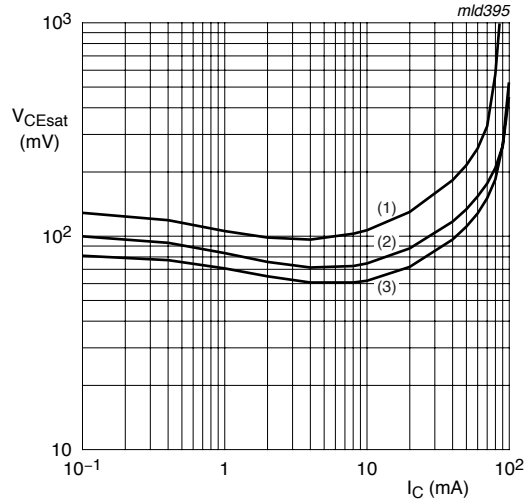
$V_{CE} = 10\text{ V}$   
 (1)  $T_{amb} = -55\text{ °C}$   
 (2)  $T_{amb} = 25\text{ °C}$   
 (3)  $T_{amb} = 150\text{ °C}$

**Fig 3. 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)  $T_{amb} = 150\text{ °C}$

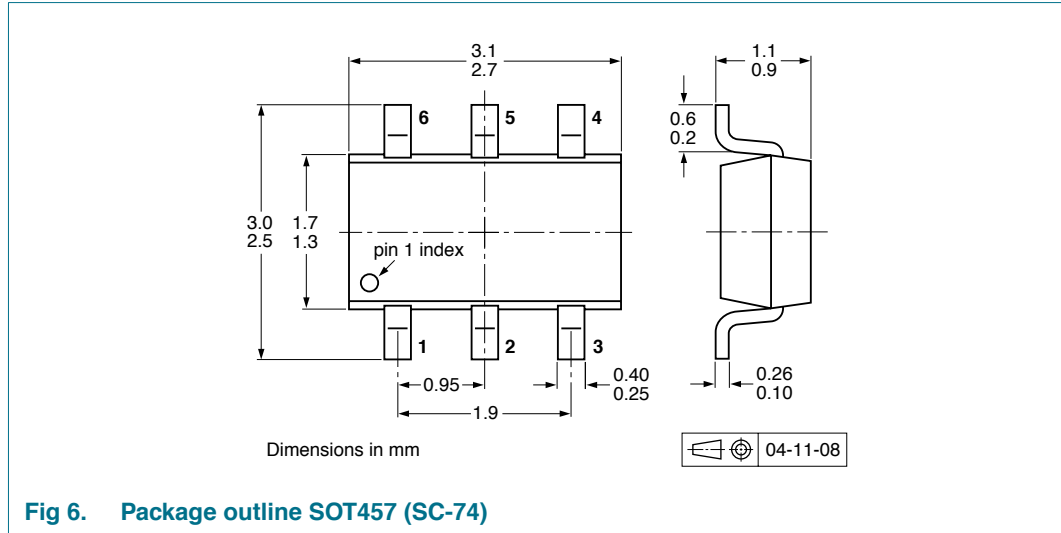
**Fig 4. Base-emitter saturation voltage as a function of collector current, typical values**



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

**Fig 5. 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.<sup>[1]</sup>

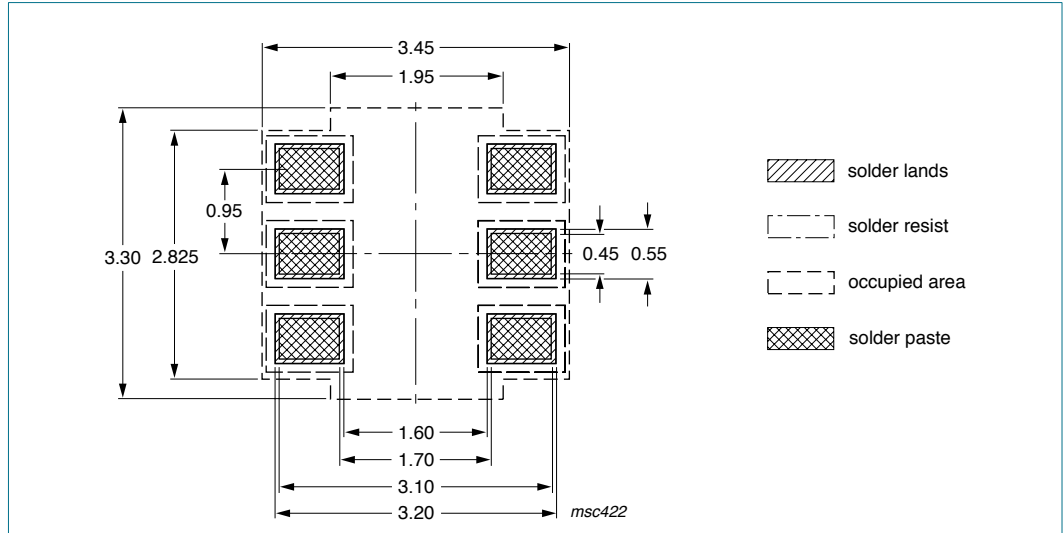
Type number	Package	Description	Packing quantity	
			3000	10000
PMBTA42DS	SOT457	4 mm pitch, 8 mm tape and reel; T1 <sup>[2]</sup>	-115	-135
		4 mm pitch, 8 mm tape and reel; T2 <sup>[3]</sup>	-125	-165

[1] For further information and the availability of packing methods, see [Section 13](#).

[2] T1: normal taping

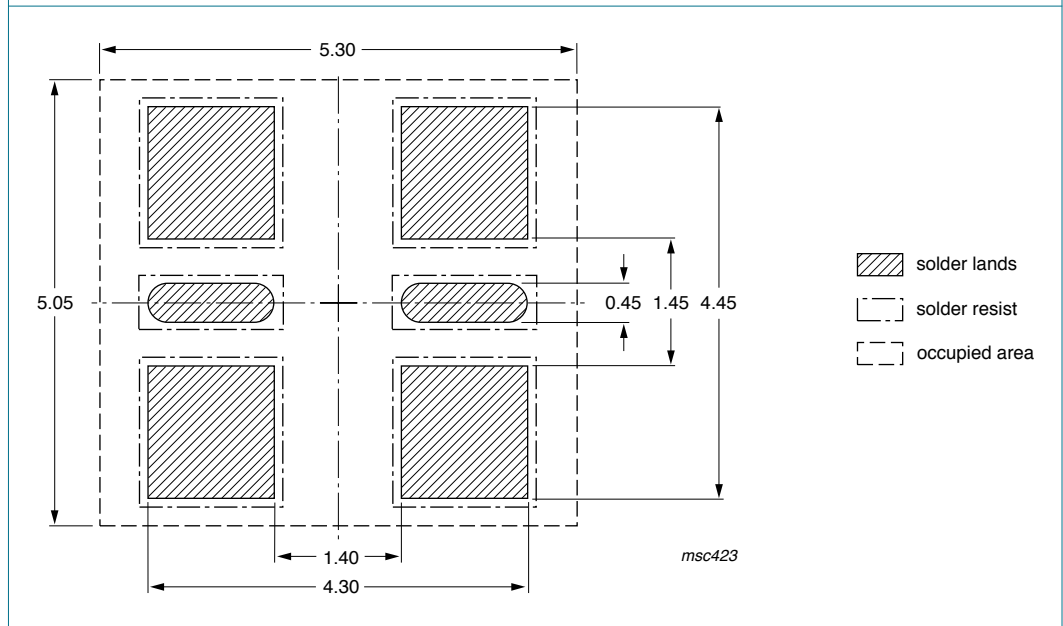
[3] T2: reverse taping

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	Supersedes
PMBTA42DS_2	20090827	Product data sheet	-	PMBTA42DS_1
Modifications:	<ul style="list-style-type: none"><li>This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content.</li><li><a href="#">Figure 8 “Wave soldering footprint SOT457 (SC-74)”</a>:updated</li></ul>			
PMBTA42DS_1	20060106	Product data sheet	-	-



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Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	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.
Product [short] data sheet	Production	This document contains the product specification.

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

[2] The term 'short data sheet' is explained in section "Definitions".

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