



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 | | |

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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} ≤ 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 cm².

[3] Device mounted on a ceramic PCB, Al₂O₃, 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 cm².

[3] Device mounted on a ceramic PCB, Al₂O₃, standard footprint.

7. Characteristics

Table 7: Characteristics

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------------------|--------------------------------------|------------------------------------------------------------------|-----|-----|-----|------|
| Per transistor | | | | | | |
| 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 |

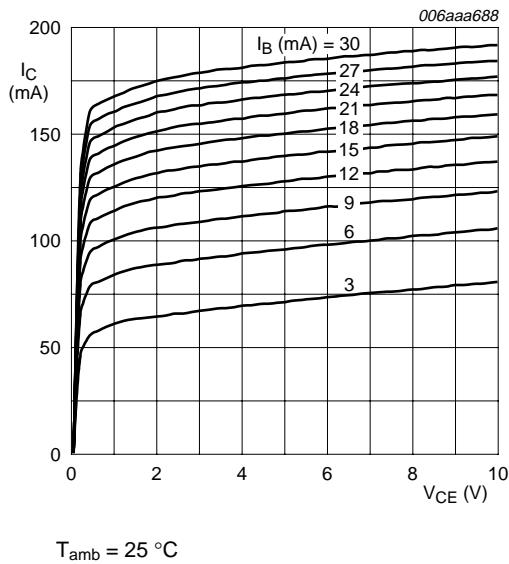


Fig 1. Collector current as a function of collector-emitter voltage; typical values

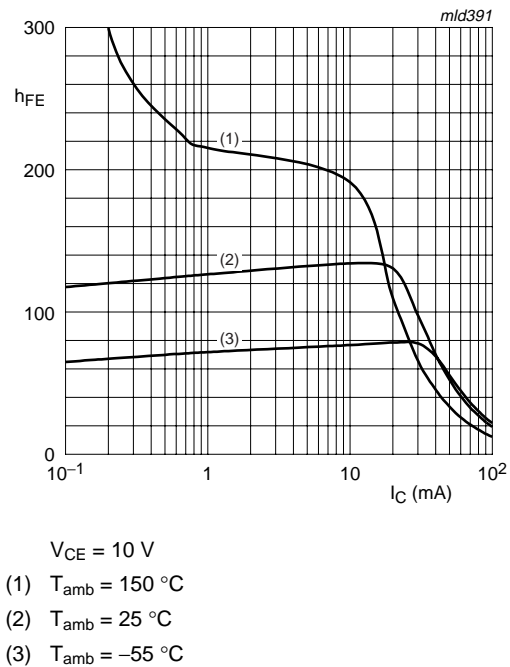
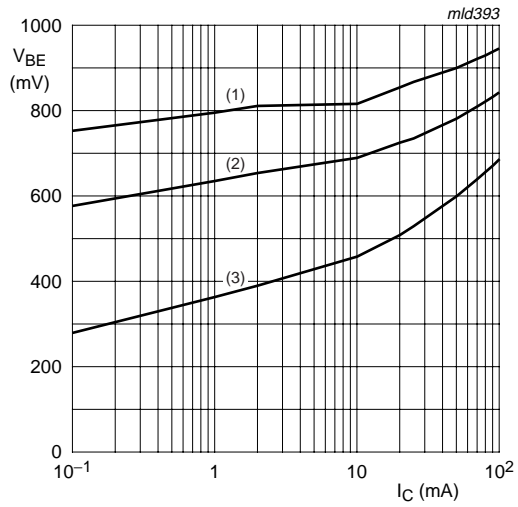
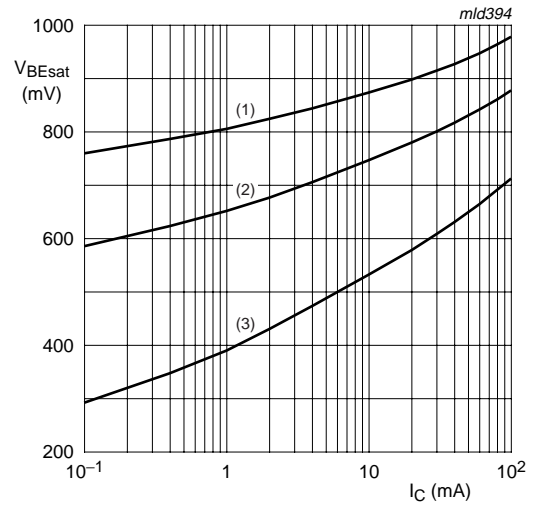


Fig 2. DC current gain as a function of collector current; typical values



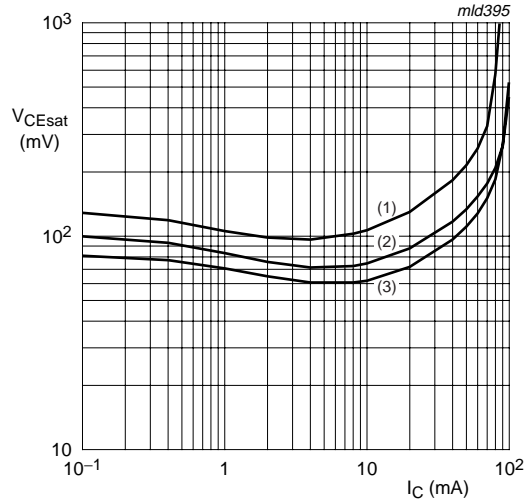
$V_{CE} = 10\text{ V}$
 (1) $T_{amb} = -55\text{ °C}$
 (2) $T_{amb} = 25\text{ °C}$
 (3) $T_{amb} = 150\text{ °C}$

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) $T_{amb} = 150\text{ °C}$

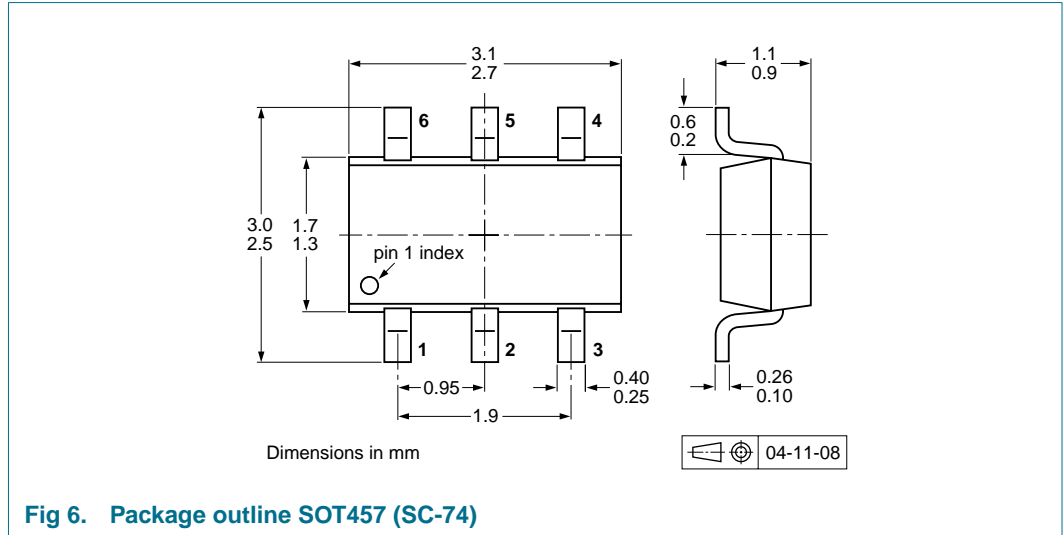
Fig 4. Base-emitter saturation voltage as a function of collector current, typical values



$I_C/I_B = 10$
 (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. [\[1\]](#)

| 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

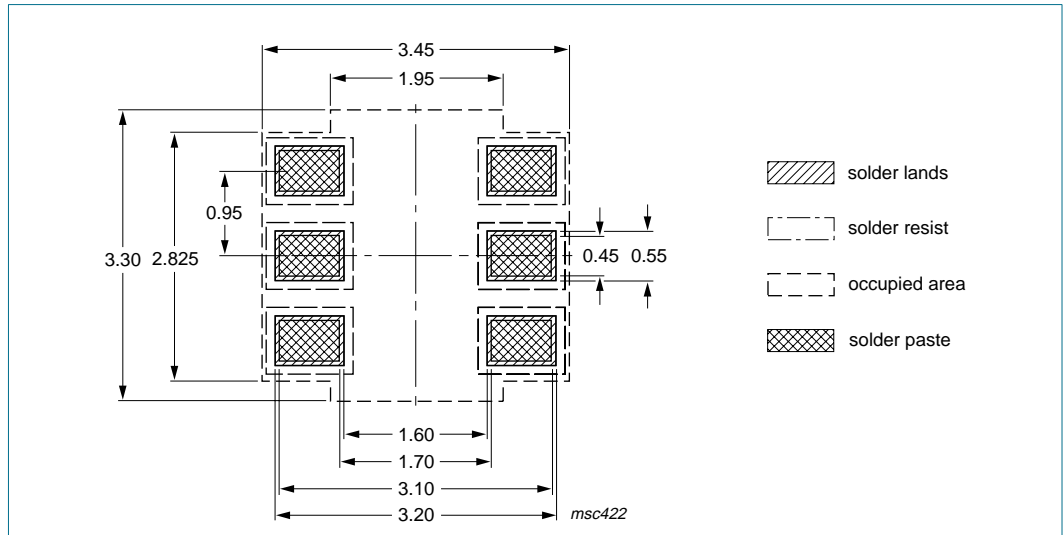


Fig 7. Reflow soldering footprint SOT457 (SC-74)

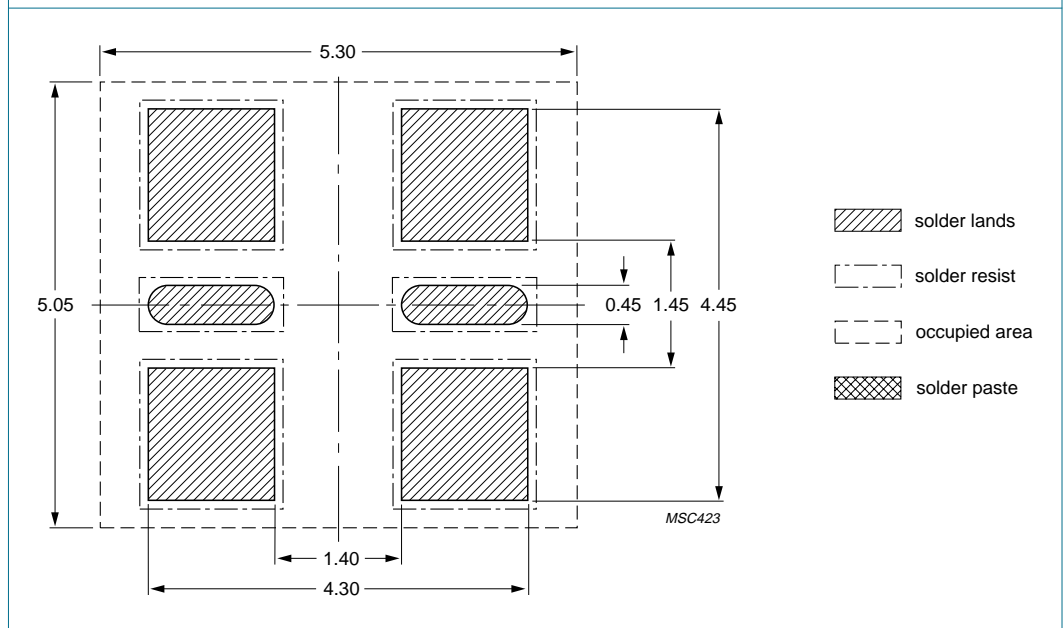


Fig 8. Wave soldering footprint SOT457 (SC-74)

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. |
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