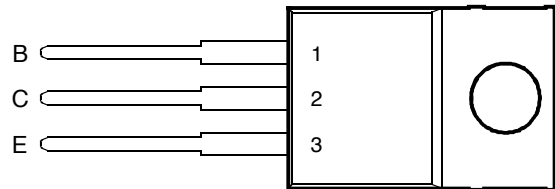


# BD242, BD242A, BD242B, BD242C PNP SILICON POWER TRANSISTORS

**BOURNS®**

- Designed for Complementary Use with the BD241 Series
- 40 W at 25°C Case Temperature
- 3 A Continuous Collector Current
- 5 A Peak Collector Current
- Customer-Specified Selections Available

TO-220 PACKAGE  
(TOP VIEW)



Pin 2 is in electrical contact with the mounting base.

MDTRACA



This series is currently available, but not recommended for new designs.

## absolute maximum ratings at 25°C case temperature (unless otherwise noted)

| RATING   |        | SYMBOL              | VALUE       | UNIT |
|--|--------|---------------------|-------------|------|
| Collector-emitter voltage ( $R_{BE} = 100 \Omega$ )                                | BD242  | $V_{CER}$           | -55         | V    |
|  | BD242A |                     | -70         |      |
|  | BD242B |                     | -90         |      |
|  | BD242C |                     | -115        |      |
| Collector-emitter voltage ( $I_C = -30 \text{ mA}$ )                               | BD242  | $V_{CEO}$           | -45         | V    |
|  | BD242A |                     | -60         |      |
|  | BD242B |                     | -80         |      |
|  | BD242C |                     | -100        |      |
| Emitter-base voltage   |        | $V_{EBO}$           | -5          | V    |
| Continuous collector current   |        | $I_C$               | -3          | A    |
| Peak collector current (see Note 1)  |        | $I_{CM}$            | -5          | A    |
| Continuous base current  |        | $I_B$               | -1          | A    |
| Continuous device dissipation at (or below) 25°C case temperature (see Note 2)     |        | $P_{tot}$           | 40          | W    |
| Continuous device dissipation at (or below) 25°C free air temperature (see Note 3) |        | $P_{tot}$           | 2           | W    |
| Unclamped inductive load energy (see Note 4)                                       |        | $\frac{1}{2}LI_C^2$ | 32          | mJ   |
| Operating junction temperature range   |        | $T_j$               | -65 to +150 | °C   |
| Storage temperature range  |        | $T_{stg}$           | -65 to +150 | °C   |
| Lead temperature 3.2 mm from case for 10 seconds                                   |        | $T_L$               | 250         | °C   |

NOTES: 1. This value applies for  $t_p \leq 0.3 \text{ ms}$ , duty cycle  $\leq 10\%$ .

2. Derate linearly to 150°C case temperature at the rate of 0.32 W/°C.

3. Derate linearly to 150°C free air temperature at the rate of 16 mW/°C.

4. This rating is based on the capability of the transistor to operate safely in a circuit of:  $L = 20 \text{ mH}$ ,  $I_{B(on)} = -0.4 \text{ A}$ ,  $R_{BE} = 100 \Omega$ ,  $V_{BE(off)} = 0$ ,  $R_S = 0.1 \Omega$ ,  $V_{CC} = -20 \text{ V}$ .

## PRODUCT INFORMATION

JUNE 1973 - REVISED SEPTEMBER 2002

Specifications are subject to change without notice.

**electrical characteristics at 25°C case temperature**

| PARAMETER  | TEST CONDITIONS   |  |                                     | MIN                       | TYP | MAX                          | UNIT |
|--|---|--|-------------------------------------|---------------------------|-----|------------------------------|------|
| $V_{(BR)CEO}$ Collector-emitter breakdown voltage      | $I_C = -30 \text{ mA}$<br>(see Note 5)  | $I_B = 0$  | BD242<br>BD242A<br>BD242B<br>BD242C | -45<br>-60<br>-80<br>-100 |     |                              | V    |
| $I_{CES}$ Collector-emitter cut-off current            | $V_{CE} = -55 \text{ V}$<br>$V_{CE} = -70 \text{ V}$<br>$V_{CE} = -90 \text{ V}$<br>$V_{CE} = -115 \text{ V}$ | $V_{BE} = 0$<br>$V_{BE} = 0$<br>$V_{BE} = 0$<br>$V_{BE} = 0$ | BD242<br>BD242A<br>BD242B<br>BD242C |                           |     | -0.2<br>-0.2<br>-0.2<br>-0.2 | mA   |
| $I_{CEO}$ Collector cut-off current                    | $V_{CE} = -30 \text{ V}$<br>$V_{CE} = -60 \text{ V}$  | $I_B = 0$<br>$I_B = 0$                                       | BD242/242A<br>BD242B/242C           |                           |     | -0.3<br>-0.3                 | mA   |
| $I_{EBO}$ Emitter cut-off current                      | $V_{EB} = -5 \text{ V}$   | $I_C = 0$  |                                     |                           |     | -1                           | mA   |
| $h_{FE}$ Forward current transfer ratio                | $V_{CE} = -4 \text{ V}$<br>$V_{CE} = -4 \text{ V}$  | $I_C = -1 \text{ A}$<br>$I_C = -3 \text{ A}$                 | (see Notes 5 and 6)                 | 25<br>10                  |     |                              |      |
| $V_{CE(sat)}$ Collector-emitter saturation voltage     | $I_B = -0.6 \text{ A}$  | $I_C = -3 \text{ A}$   | (see Notes 5 and 6)                 |                           |     | -1.2                         | V    |
| $V_{BE}$ Base-emitter voltage                          | $V_{CE} = -4 \text{ V}$   | $I_C = -3 \text{ A}$   | (see Notes 5 and 6)                 |                           |     | -1.8                         | V    |
| $h_{fe}$ Small signal forward current transfer ratio   | $V_{CE} = -10 \text{ V}$  | $I_C = -0.5 \text{ A}$                                       | $f = 1 \text{ kHz}$                 | 20                        |     |                              |      |
| $ h_{fe} $ Small signal forward current transfer ratio | $V_{CE} = -10 \text{ V}$  | $I_C = -0.5 \text{ A}$                                       | $f = 1 \text{ MHz}$                 | 3                         |     |                              |      |

NOTES: 5. These parameters must be measured using pulse techniques,  $t_p = 300 \mu\text{s}$ , duty cycle  $\leq 2\%$ .

6. These parameters must be measured using voltage-sensing contacts, separate from the current carrying contacts.

**thermal characteristics**

| PARAMETER   | MIN | TYP | MAX   | UNIT |
|---|-----|-----|-------|------|
| $R_{\theta JC}$ Junction to case thermal resistance     |     |     | 3.125 | °C/W |
| $R_{\theta JA}$ Junction to free air thermal resistance |     |     | 62.5  | °C/W |

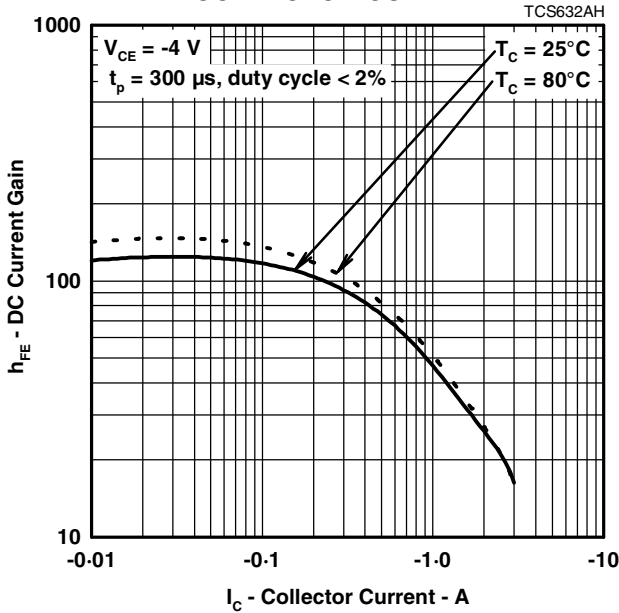
**resistive-load-switching characteristics at 25°C case temperature**

| PARAMETER               | TEST CONDITIONS †             |                              |  | MIN | TYP | MAX | UNIT          |
|-------------------------|-------------------------------|------------------------------|--|-----|-----|-----|---------------|
| $t_{on}$ Turn-on time   | $I_C = -1 \text{ A}$          | $I_{B(on)} = -0.1 \text{ A}$ | $I_{B(off)} = 0.1 \text{ A}$           |     | 0.2 |     | $\mu\text{s}$ |
| $t_{off}$ Turn-off time | $V_{BE(off)} = 3.7 \text{ V}$ | $R_L = 20 \Omega$            | $t_p = 20 \mu\text{s}$ , dc $\leq 2\%$ |     | 0.3 |     | $\mu\text{s}$ |

† Voltage and current values shown are nominal; exact values vary slightly with transistor parameters.

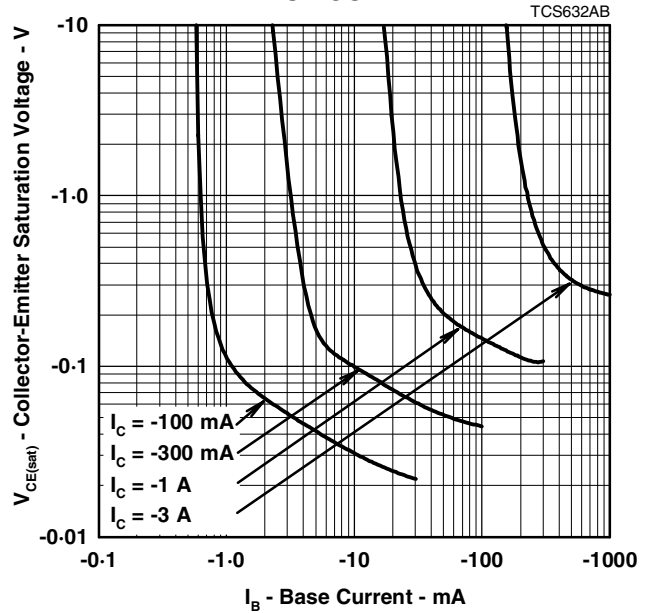
**TYPICAL CHARACTERISTICS**

**TYPICAL DC CURRENT GAIN  
vs  
COLLECTOR CURRENT**



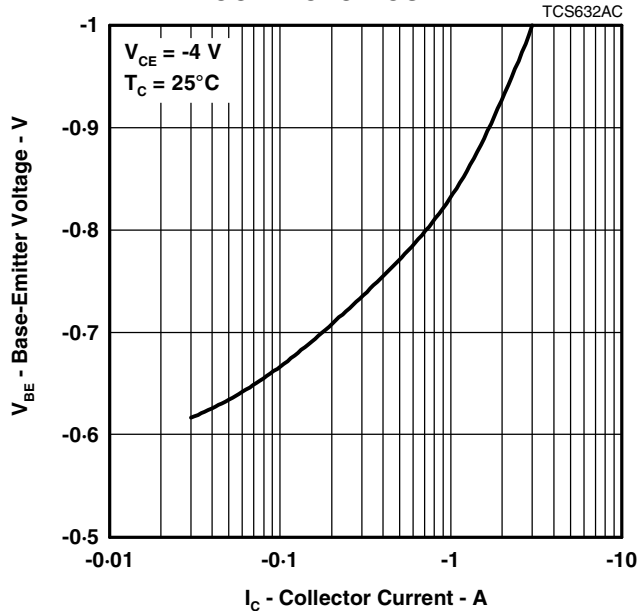
**Figure 1.**

**COLLECTOR-EMITTER SATURATION VOLTAGE  
vs  
BASE CURRENT**



**Figure 2.**

**BASE-EMITTER VOLTAGE  
vs  
COLLECTOR CURRENT**



**Figure 3.**

**PRODUCT INFORMATION**

**MAXIMUM SAFE OPERATING REGIONS**

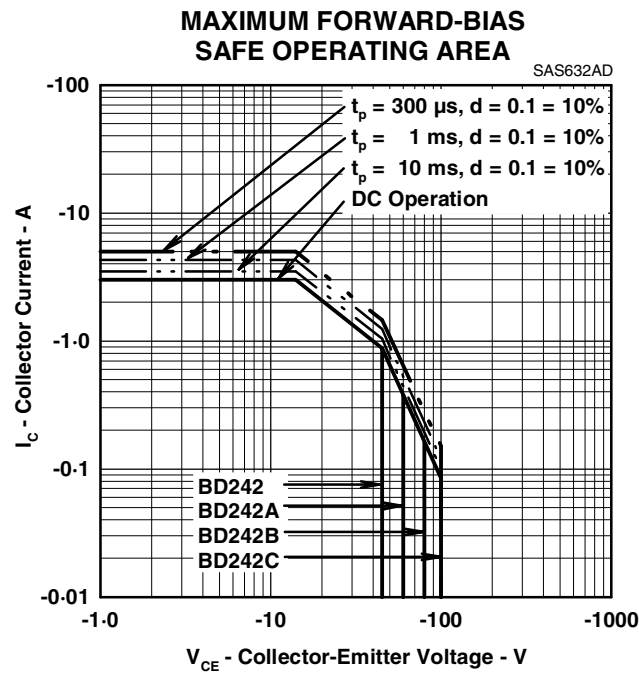


Figure 4.

**THERMAL INFORMATION**

**MAXIMUM POWER DISSIPATION  
vs  
CASE TEMPERATURE**

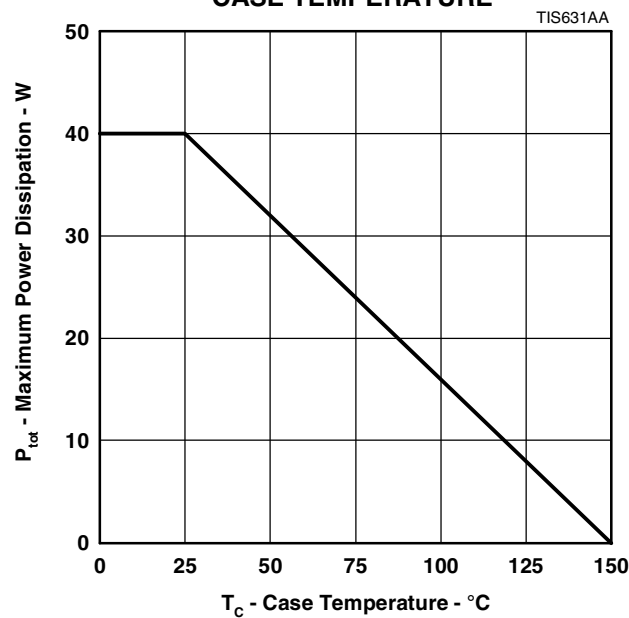


Figure 5.

**PRODUCT INFORMATION**